UNDER	Schedule 1 of the Resource Management Act 1991 (the Act)
IN THE MATTER OF	Proposed Change 1 to the Regional Policy Statement for the Wellington Region

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Further Comments from Doctors for Active Safe Transport (DAST)

Made pursuant to Minute 12 Point 19

30 September 2023

INTRODUCTION

1. Commissioners directed planning experts to caucus on the transport provisions of the proposed RPS Plan Change 1. Commissioners then invited further comments from submitters on the Joint Witness Statement (JWS) resulting from this caucus. This note responds to that invitation.

2. Further, a supplementary section 42A report comments on the submission from Combined Cycling Submitters. We comment below on this report.

BACKGROUND

3. The preamble to the transport provisions of the RPS notes that "Immediate, rapid, and large-scale reductions in greenhouse gas emissions are required to limit global warming to 1.5°C". Transport is the largest contributor to greenhouse gas emissions in the region and has continued to increase over the last 20 years, contrary to other major sources of CO2[1].

4. The RPS must therefore drive dramatic and rapid change in the way we do transport.

5. Further, the original submission of DAST is that mode of transport is a key determinant of health outcomes. These health impacts have not been recognised in the proposed RPS, despite health being central to the purpose in s(5) of the RMA.

6. Comments here are limited to proposed Policy CC.1. Our proposed amendments are collated at the conclusion of this section.

A HIERARCHY OF MEASURES IS UNHELPFUL

7. Louise Allwood, in her section 42A report, proposed a hierarchy of measures to achieve mode shift. All other expert planners support the removal of the hierarchy.

8. DAST supports the removal of the hierarchy. As described above, 'Immediate, rapid and large-scale" change is required. We do not have the luxury of time to guide the evolution of urban form in order to achieve mode shift. All possible measures must be employed in parallel to achieve the required, rapid change.

9. To illustrate this point, higher density housing in the Riverlink project in the Hutt CBD is forecast to provide accommodation for 2,600 – 7,300 people over a 10 – 30 year period, and thereby facilitate mode shift.[2] However, this huge project will provide closer access to public

[1] Para 81, RPS Section 132 Report, August 2022
[2] Evidence of Associate Prof Caroline Shaw, Riverlink, para 24

transport for only 2 – 6% of Lower Hutt's population, and will only be achieved well beyond the time by which substantial reductions in greenhouse gas emissions much be achieved. These are worthwhile changes – but will be 'way too little, way too late' as the principle means of achieving mode shift.

10. Further, there is clear international evidence that dedicated cycling infrastructure is pivotal to achieving mode shift[3]. Dedicated cycling infrastructure can be implemented quickly[4], much more quickly than changes in urban form.

11. Finally, to achieve the dramatic change necessary, all the clauses must be implemented – not just those preferred in a particular instance by territorial planners. Plans may also include other measures not anticipated here. The phrase "by measures which must include" captures this.

12. DAST therefore proposes that the hierarchy is removed and clause (c) is moved to be first on the list of proposed mechanisms as the "first amongst equals".

'SUPPORT' IS NOT ENOUGH

13. The JWS proposes clause c (which we propose shifting to a) is amended to "*support* the prioritisation of active modes and public transport"
14. 'Support' is insufficient to give effect to the overall policy to "maximise mode shift".
15. We cite the example of Riverlink, where the Applicants (GWRC, HCC and WK) stated that the proposals will "be conducive in supporting a mode shift from cars to alternate modes".[5] This was to be achieved through "proposed cycling infrastructure [that] is a significant improvement from the status quo."[6]
16. Despite this 'support', the project forecast a year-on-year increase in car use, with an uncertain impact (if any) on mode shift.[7]
17. Measures to 'support' mode shift leave far too much ambiguity and 'wriggle room' – given the need to achieve "immediate, rapid, and large-scale reductions" in emissions.

[3] See, for example, Mueller N, et al. Health impact assessment of cycling network expansions in European cities. Preventive Medicine. 2018;109:62-70
[4] See, for example, Shaw C, Cleghorn, C, Public Health Interventions: the elephant in the room of the health system crisis, NZ Med J, Jan 2023, 136(1568)
[5] Opening Legal Submissions on Behalf of Applicants, para 81
[6] Opening Legal Submissions on Behalf of Applicants, para 81. Notably, the decision stated "We find that unsurprising given the unsatisfactory nature of the existing situation", ENV-2021-WLG-000039, para 228
[7] Evidence of Assoc Prof Caroline Shaw, para 7

18. DAST proposes that “achieve” replace “support” in clauses (c). District and regional plans should take measures which reasonably expect to “achieve” mode shift, not “support” it. [8]

Other matters in Policy CC.1

19. “Optimise travel demand”: We note experts did not reach consensus on this matter. DAST proposes the deletion of this phrase and associated definition. Its intent is captured in clauses (a) to (c), and this phrase and its definition introduces duplication and ambiguity. The hierarchy suggested in the definition is opposed for the reasons stated above.
20. “*Improved health outcomes*” is proposed by DAST to be inserted in the policy in line with our original submission, given the unequivocal link between transport and health. We accept this clause deals principally with climate change – but given health’s centrality to the purpose of the RMA this link should be included.
21. Clause (c) (which we proposed shifting to a) currently proposes “prioritising active modes and public transport”. This lacks specificity - and is often currently achieved solely by putting pretty pictures of cyclists and walkers on the cover of a plan that does little else to change private vehicle use! We propose language consistent with the GWRC Mode Shift Plan 2021 and Waka Kotahi’s Walking and Cycling plans. We recommend that the PRS “*prioritises safe, attractive and connected walking, cycling and public transport networks*”. (see further discussion on Policy 57 below).
22. We are concerned that clause b (which we proposed shifting to c) lacks clarity in its intent:
    - Public transport routes (particularly bus routes) can and should evolve over time. Public transport should ‘go to the people’, not the other way round. “Walkable catchments” applies principally to train stations.
    - ‘Utilising existing space’ is unclear in its intent (what is ‘existing space’?). The greatest impediment to active and public transport modes is currently the substantial amount of existing road corridors committed to on-street parking. We recommend this be clarified to specifically give active modes and public transport a preference in policy over on-street parking.

[8] Commissioners may well be able to find better words or phrases to give effect to this intent – but mode shift is something we are setting out to actually make happen – not something to which we give our ‘support’.

RESULTING PROPOSED POLICY CC.1

The text of Policy CC.1 below results from the amendments to the policy as proposed by Louise Allwood in her section 42A report, updated for the agreed recommendations from the JWS.

Changes proposed by DAST are in red.

Policy CC.1: Reducing greenhouse gas emissions associated with transport demand and infrastructure – district and regional plans

District and regional plans shall include objectives, policies, rules and/or methods that ~~optimise transport demand by requiring~~ require all new and altered transport infrastructure to be ~~is~~ designed, constructed, and operated in a way that contributes to an efficient transport network, maximises mode shift, ~~and~~ reduces greenhouse gas emissions, and improves health outcomes by ~~giving effect to a hierarchical approach (in order of priority), by~~ measures which must include all of:

(a) ~~(c)~~ Where providing new infrastructure or capacity upgrades on the transport network, ~~support~~ achieve modes shift through the prioritisation ~~of active modes~~of safe, attractive and connected walking, cycling and public transport networks, taking into consideration the primary function of the infrastructure; and

~~(a)~~ (b) Supporting development in locations to minimise travel distances between residential, employment and the location of other essential services in combination with the delivery of multi-modal transport networks and infrastructure to serve developments; ~~then~~ and

~~(b)~~ (c) Supporting development within walkable catchments of public transport routes where practicable, and utilising ~~existing space to remove barriers~~ existing road corridors ~~for access~~ to improve walking, cycling and public transport by prioritising space for this purpose over on-street car parking; ~~then~~

Explanation:
This policy requires transport infrastructure planning (including design, construction and operation) to consider and choose solutions that will ~~contribute to reducing~~ achieve substantial reductions in greenhouse gas emissions. New or altered transport infrastructure should support an efficient transport network and influence travel demand through ensuring development occurs in locations that can be best served by public transport and other low

and zero-carbon transport modes. This supports behaviour change through mode shift from private vehicles to public transport or active modes. This policy does not apply to aircraft, or activities undertaken at Wellington Airport which support aircraft activities e.g. aircraft parking stands at the Airport.

~~Insert New Definition – Optimise transport demand Optimise transport demand means:~~

~~(a) Influencing demand spatially and reducing trip length; then~~

~~(b) Creating choices to travel via sustainable modes and reduce emissions; then~~

~~(c) Design and deliver development in a way that supports sustainable modes and an efficient transport network.~~

Insert New Definition - Walkable Catchment A walkable catchment is an area that an average person could walk from a specific point to get to multiple destinations. A walkable catchment consists of a maximum 20 minute average walk, or as otherwise defined in District Plans.

Comment on Supplementary Section 42A: 'attractive' or 'well-designed'

23. A supplementary section 42A report was issued on the Combined Cycling Submitters submission[9]. As this report was issued after our oral submission, we comment here on its recommendation.
24. Combined Cycle Submitters (CCS) (S142.005) sought that Policy 57 be amended to include specific reference to 'attractive' within clause (e)1 , with the wording proposed *"provides for well-connected, safe, attractive and accessible multi modal transport networks"*
25. The supplementary section 42A report instead proposes the insertion of the word 'well-designed'.
26. DAST opposes the substitution of 'well-designed' for 'attractive' for the following reasons:
    a. 'safe and attractive' is a common phrase used in cycle standards[10] and the GWRC Mode Shift Plan[11], and has, for example, been incorporated into the consent conditions for Riverlink.

[9] Supplementary statement of evidence of Owen Edward Jeffreys on behalf of Wellington Regional Council Hearing Stream 4 – Urban Development 29 September 2023.
[10] See for example, the Waka Kotahi Cycling Action Plan, https://www.nzta.govt.nz/walking-cycling-and-public-transport/cycling/strategies-and-plans/waka-kotahi-cycling-action-plan/
[11] https://www.gw.govt.nz/assets/Documents/2021/10/J000861SUMMARYWellington-Regional-Land-Transport-Plan-2021July2-new-pages-2.2Web.pdf

b. The Environment Court in its consideration of Riverlink considered the meaning of the word 'attractive'.[12] There is therefore now case law to guide its interpretation. This judgement references attributes that go beyond "well-designed" to include something that "attracts interest". This is very relevant to the changes in behaviour that are a necessary component of mode shift.

c. 'Well-designed' will be open to diverse interpretations.

d. 'Well-designed' as a definition invariably leads itself to interpretation and arbitration by 'experts' – usually in the context of expert conferences which exclude users or their advocates. "Attractive" must be viewed from the perspective of users. It must be – in the eyes of users - 'good enough to want to use it', rather than just 'meeting appropriate design standards' as determined by experts. This better captures the intent of policy 57.

27. DAST therefore recommends that commissioners adopt the term 'attractive' in Policy 57 as originally suggested by Combined Cycling Submitters.

[12] Decision No [2022] NZEnvC 161 ENV-2021-WLG-000039, para 239

IN THE ENVIRONMENT COURT
AT WELLINGTON
I TE KŌTI TAIAO O AOTEAROA
KI TE WHANGANUI-A-TARA

Decision No [2022] NZEnvC 161

ENV-2021-WLG-000039

IN THE MATTER	of the direct referral of applications for resource consents and Notices of Requirement under Sections 87G and 198E of the Resource Management Act 1991 for the Riverlink Project
BY	NEW ZEALAND TRANSPORT AGENCY WELLINGTON REGIONAL COUNCIL HUTT CITY COUNCIL KIWIRAIL HOLDINGS LIMITED Applicants

Court: Alternate Environment Judge C J Thompson
Environment Commissioner D J Bunting
Environment Commissioner K A Edmonds

Hearing: 26 - 29 April 2022. Last case event: Final submissions: 27 May 2022

Appearances:
D G Allen, M L Mulholland and C A Easter for Applicants
K M Anderson and M J Dicken for Hutt City Council and Wellington Regional Council as regulatory authorities
T H Bennion for 10 Cycling Submitters, and Prof R Badcock
B S Carruthers for Harvey Norman Properties (NZ) Ltd
A W Braggins and O C Manning for Parsons Green Trust and Parsons Green Ltd
Rt Hon T C Mallard – in person
P J Morgan - in person
E Blake – in person on behalf of Living Streets Aotearoa

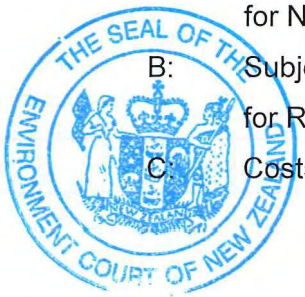
Decisions dated and issued: 25 August 2022

DECISIONS OF THE COURT

A: Subject to resolution of the content and wording of some Conditions the applications for Notices of Requirement (see paras [22] – [25]) will be confirmed

B: Subject to resolution of the content and wording of some Conditions the applications for Resource Consents (see para [26]) will be granted

C: Costs (including possible costs under s 285(5) RMA) are reserved



REASONS

General background

[1] The area of, and around, what is now Lower Hutt City was occupied by Maori for some centuries before the arrival of Europeans/Pakeha, and was known to them as *Harataunga*. There were, at various stages, at least 8 major Kainga and Pa sites along the valley and on the shoreline of Te Whanganui-a-Tara (Port Nicholson). The forested areas of the valley and its surrounding hills provided resources of timber for whare and Pa building, and for the making of waka. The river – once called *Harataunga* and later *Te Awa Kairangi* - was a significant source of food, and a means of travel up and down the valley. We note that in 2011 the New Zealand Geographic Board/Nga Pou Taunaha o Aotearoa gave the river the dual name *Te Awa Kairangi/Hutt River.*

[2] The first European/Pakeha settlement in the Port Nicholson area came in 1840. It was sited at the mouth of Te Awa Kairangi/Hutt River, and called *Brittania*. The settlement was not a success – the occupants quickly found that the area was subject to flooding by the river and the majority of them moved south to what is now the Thorndon area of Wellington City.

[3] Some Europeans did remain in the Valley, and others came later – its flat lands were a promising farming resource, so long as care was taken to avoid the more flood-prone areas.

[4] Sadly, in 1846, there was significant armed conflict between Tangata Whenua and the European settlers, and lives were lost.

[5] In landform terms, a very significant event occurred in 1855. A major earthquake (magnitude c8.1 to 8.3) permanently raised significant parts of the lower valley – allowing reclamation of land from the wetlands, and providing safer land for settlement and for farming.

[6] The Hutt Valley, viewed as a whole, is triangular in shape, with the widest portion being the Harbour foreshore area – Pito-one (more commonly known as Petone), and narrowing as one moves northward towards the Taita Gorge and beyond, with the Hutt River/Te Awa Kairangi flowing down the valley, generally on its western side, and then crossing it towards the east as it approaches the Harbour.

[7] The European name *Hutt* – sometimes confusingly to those not familiar with the area, – is part of the names of *Hutt Valley* (the valley as a whole); of *Lower Hutt* (the area of the valley

south of the Taita Gorge); of *Upper Hutt* (a separate City area north of the Taita Gorge); of *Hutt City* (the central city business and government area of *Lower Hutt*); and *the Hutt* (a more casual term which can apply to the whole, or any part of, the Hutt Valley) - came from the name of Sir William Hutt, a director and chairman of the New Zealand Company. The name was originally given only to the river, but it soon became the European name for the whole valley and its later individual component areas.

[8] What is now Lower Hutt City has a population of c113,000 and Upper Hutt City, in the northern end of the valley, has a population of c45,000.

[9] As with almost all urban and semi-urban areas, housing, administration and business construction, and accompanying infrastructure has been developed over time according to demand and available financial resources. Planning-type controls have not always had an effective and up-to-date view to the future and the best coordination of public and private amenities; likely demand for future developments, and requirements for utilities such as bridging, efficient and safe roading, rail lines, accessibility, provision of power and water, and protection from natural forces such as weather and flooding.

[10] So it has been in and around the Lower Hutt central city area. In its present form, access across the river by the existing Melling Bridge onto and off the north/south bound Highway (SH2 – aka Western Hutt Road) is inefficient, and dangerous to some users. Access to the Lower Hutt – Wellington commuter rail service (the Melling Line) at the present Melling Railway Station is not as easy as it could be, particularly for cyclists and pedestrians. Despite quite extensive stopbank construction over the years, the city's areas on both sides of the river are not sufficiently protected against foreseeable flooding, particularly as climate change will increase both the size and frequency of floods.

[11] As the city centre has developed over the years it has been built, consciously or not, with a general tendency to *turn its back* to the river and its surrounds, rather than facing them and taking advantage of the amenities and space which they could provide.

The Riverlink project – in brief

[12] There are three public authorities and a corporate behind the Riverlink project. In no particular order they are the Wellington Regional Council (WRC – also referred to in some instances as GW or GWC) – responsible for the management of the river and its possible hazards, and for the supply and management of freshwater, wastewater and stormwater. It is

also responsible for the operation of the public transport network – with commuter rail being of particular significance in this matter.

[13] The Hutt City Council (HCC) has broad responsibilities for the construction, maintenance and operation of urban renewal and local road aspects of the project.

[14] The New Zealand Transport Agency/Waka Kotahi (NZTA) is responsible for giving effect to the central Government's land transport policies. In the present context, that means the construction, operation and maintenance of state highways, cycleways, paths and associated infrastructure.

[15] KiwiRail Holdings Ltd (KiwiRail) is a State Owned Enterprise and the operator of the railway lines and services connecting Wellington and the Hutt Valley and beyond. Its involvement is with the proposed moving of the Melling Railway Station and the accompanying changes to the commuter line between Melling and Wellington City.

[16] Those four organisations - all involved in the planning, design, construction, maintenance and operation of the various aspects of public utilities and facilities in the area - have combined their knowledge and ambitions to present a set of projects that are separate but interrelated and, in some cases and to varying degrees, interdependent.

The Project – a broad overview

[17] The works associated with the Project involve:

River works – Reshaping Te Awa Kairangi/Hutt River to a natural meander pattern within a widened and lowered channel. Gravel (associated with riverbed reshaping) and vegetation removal is required between the Kennedy Good and Ewen Bridges. Rock lining and vegetation is to be placed along the river for erosion protection.

Stopbanks – Upgrade and construction of new stopbanks between Ewen Bridge and Mills Street with a maximum height of 5.5 m and a minimum crest width of 4 m.

Melling Interchange and Bridge – Ground improvements, construction of a new Melling River Bridge, removal of the existing Melling River Bridge, construction of a grade separated diamond interchange which includes a single span bridge over SH2; construction of a new link road connecting Tirohanga Road to Harbour View Road; reconfiguration of Pharazyn Street.

Melling Station and Line – Realignment of the Melling Line, construction of a new Melling Station c500m south of the existing one – and including moving and incorporating the existing building into the new one (because of its heritage value), with approximately 200 car parks to be provided in the *park-n-ride* facility.

Local roads

The works involving local roads include:

- stopping of parts of Melling Link, Daly Street, Marsden Street, Fraser Street, Block Road, Margaret Street and Pharazyn Street.
- realignments of Marsden Street, Pharazyn Street, Harbour View Road Tirohanga Road, Queens Drive, Andrews Avenue and High Street.
- reconfigurations to support active modes through shared spaces on Margaret Street, a new pedestrian accessway and service lane from Laings Road to the stopbanks and the provision of improved pedestrian paths and cycle lanes on Bridge Street, Laings Road, Dudley Street, Bunny Street, Queens Drive, Marsden Street and Pharazyn Street.
- rerouting of traffic from the *"western access route"* (Daly Street and Rutherford Street) to the *"eastern access route"* (Knights Road and Bloomfield Terrace/Cornwall Street) to facilitate traffic flow around the city centre.

Carparking – a net reduction of around 700 carparks.

Pedestrian and cycling bridge, and riverside promenade – A pedestrian and cycling bridge to provide a connection between the new railway station and the Lower Hutt city centre. A new walking and cycling promenade to be constructed between Margaret Street and Andrews Avenue, situated on top of the stopbank.

Cycling and Pedestrian Network - (as proposed by Applicants at start of hearing – the configuration of some of these has since been modified)

The works involved with the cycling and pedestrian network include:

- a separated bi-directional cycle path along the railway corridor from Parliament Street to the new Melling Station.
- a shared path over the full length of the true left bank of Te Awa Kairangi on the upper berm.
- separated paths with minimum widths of 3m for cycling and 2m for other active modes along the true right bank transitioning to the stopbank.
- active mode paths on the new Melling Bridge.
- a shoulder of SH2 northbound up to the existing interchange - utilising exit ramps to connect to bridges over SH2 and the river corridor network.
- a shoulder southbound with underpasses to remove conflict with the off ramp exit.

Earthworks and vegetation removal – Earthworks for the stopbanks, widening of the river channel, earthworks, ground improvement and raising land on the western side of the river for the interchange and new Melling Station. Approximately 23.9ha of vegetation (predominantly willows) to be removed to enable construction.

Te Awa Kairangi/Hutt River riverside works – River amenity to be increased with the provision of public open spaces and planted areas that are connected to the shared paths and pedestrian/cycle bridge.

Culverts and stormwater – Rationalisation (where possible) and alterations to culverts in the new stopbanks, introduction of stormwater treatment to SH2 and the Melling interchange and local roads, where this can be retrofitted. Where culverts are being replaced, provision to be made for fish passage, where practicable.

Network utilities – With network utilities impacted in a number of roads, the railway track and under the existing stopbanks, changes - rationalisation and relocation of utilities are required, including water supply, wastewater, stormwater pump stations, high and low voltage power cables and substations, fibre optic cables and telephone lines.

Operation and maintenance – Continuing beyond the construction period, these activities relate to:

- landscape furniture, accessways and stairs along the stopbank pathway and local streets;
- local roads, pedestrian and cycle facilities;
- state highway road and cycle facilities;
- operational stormwater discharge, conveyance, detention and treatment (where provided) from the altered local roads and SH2; and
- flood protection and erosion control in the river corridor - these activities are anticipated to be covered by Wellington Regional Council's existing global resource consents for flood maintenance works.

[18] In general terms, the area affected by the Project is centred on the river between the Kennedy Good Bridge to the north, and the Ewen Bridge to the south – a distance of c3km - and extends out for some distance on both banks.

Introduction to the proceedings before the Court

[19] The proceedings related to the Notices of Requirement and resource consents have, with the parties' agreement, been sent by the local authorities to the Court under the process

set out in s87Cff of the Resource Management Act 1991 (the Act – or RMA). The Court therefore is not acting as an appellate body and is required to consider and decide the applications at first instance. The local authorities have provided the Court with reports pursuant to s87F(4) – and copies of those have of course been provided to all of the parties under s87F(5).

[20] In the Notice of Motion dated 23 November 2021 for what has become known as the RiverLink Project (the Project), the NZTA, WRC, HCC and KiwiRail (together, the Applicants) applied to the Court under ss87G and 198E for orders for:

(a) the confirmation of NZTA's, WRC's, HCC's and KiwiRail's Notices of Requirement (NoRs);

(b) the grant of NZTA's, WRC's and HCC's applications for land use consent under the Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011 (NES Soil) (District Applications); and

(c) the grant of NZTA's, WRC's and HCC's applications for resource consents (Regional Applications).

[21] In their Notice of Motion the Applicants provided the following:

1. The Applications relate to the Project. The Project involves a series of integrated projects – broadly split into flood protection works (WRC), Melling transport improvements (NZTA) and urban renewal and revitalisation works (HCC) – within a 3-kilometre stretch of Te Awa Kairangi/Hutt River between Kennedy Good Bridge and Ewen Bridge, and the immediate urban environs on either side in Lower Hutt.
2. The grounds for the applications are:
   (a) in relation to the NoRs:
      (i) on 29 July 2021, KiwiRail lodged a NoR with HCC;
      (ii) on 30 July 2021, NZTA, WRC and HCC lodged NoRs with HCC;
      (iii) on 29 September 2021, the Applicants requested, in accordance with s198B, that the NoRs be referred directly to the Environment Court for determination;
      (iv) on 20 October 2021, HCC in its regulatory capacity granted the request, in accordance with s198C, that the NoRs be determined by the Environment Court instead of by HCC;
      (v) on 22 November 2021, HCC in its regulatory capacity issued a report under s198D; and

(vi) in accordance with s198E(1)(b), the Applicants continue to want the NoRs to be the subject of a decision by the Environment Court instead of a recommendation by HCC in its regulatory capacity;

(b) in relation to the District Applications:

(i) on 30 July 2021, NZTA, WRC and HCC lodged applications for land use consent under the NES Soil with HCC;

(ii) on 29 September 2021, NZTA, WRC and HCC requested, in accordance with s87D, that the District Applications be referred directly to the Environment Court for determination;

(iii) on 20 October 2021, HCC in its regulatory capacity granted the request, in accordance with s87E, that the District Applications be determined by the Environment Court instead of by HCC;

(iv) on 22 November 2021, HCC in its regulatory capacity issued a report under s87F; and

(v) in accordance with s87G(1)(b), NZTA, WRC and HCC continue to want the grant of the District Applications to be determined by the Environment Court instead of by HCC in its regulatory capacity;

(c) in relation to the Regional Applications:

(i) on 30 July 2021 NZTA, WRC and HCC lodged applications for land use consents, water permits and discharge permits with WRC in its regulatory capacity;

(ii) on 29 September 2021 NZTA, WRC and HCC requested, in accordance with s87D, that the applications be referred directly to the Environment Court for determination;

(iii) on 20 October 2021 WRC in its regulatory capacity granted the request, in accordance with s87E of the RMA, that the Regional Applications be determined by the Environment Court instead of by WRC;

(iv) on 22 November 2021 GW issued a report under s87F of the RMA; and

(v) in accordance with s87G(1)(b), NZTA, WRC and HCC continue to want the grant of the Regional Applications to be determined by the Environment Court instead of by WRC in its regulatory capacity;

(d) granting the District and Regional Applications and confirming the NoRs on the basis that doing so will promote the sustainable management of natural and physical resources; and

(e) the further grounds contained in the affidavits of:

(i) Thomas Geoffrey Newson[1] affirmed on 23 November 2021;

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1 Riverlink Project Director

(ii) Nigel David Corry[2] affirmed on 23 November 2021; and

(iii) Johanna Elizabeth Miller[3] affirmed on 23 November 2021.

Notices of Requirement sought

[22] The Notices of Requirement being sought by NZTA under ss168 and 181(1) of the RMA are for:

- a designation to construct, operate, maintain and improve a state highway, cycle way/shared path, and associated infrastructure in the vicinity of the existing SH2/Harbour View Road interchange (Melling Interchange) extending across the river to Queens Drive and in the west up Harbour View Road in an area of land of approximately 10.9 hectares; and
- an alteration to designation reference TNZ1 in the City of Lower Hutt District Plan to change the boundary of an area of land of approximately 12.4ha identified as SH2.

[23] The Notices of Requirement being sought by the WRC under s168 of the RMA are for:

- a designation for the construction, operation and maintenance of flood protection works in and adjacent to Te Awa Kairangi/Hutt River in an area of land of approximately 71.34 ha between Kennedy Good Bridge and Ewen Bridge; and
- a designation for the construction, operation and maintenance of a new Melling Station and associated infrastructure in an area of land of approximately 1.34 ha located at the northern terminus of the Melling railway line.

[24] The Notices of Requirement being sought by the HCC under ss168 and 181(1) of the RMA are for:

- a designation for the construction, operation and maintenance of urban renewal and revitalisation works in an area of land of approximately 9.75 ha adjacent to the Lower Hutt City Centre; and
- an alteration to designation reference HCC4 in the District Plan to change the boundary in an area of land of approximately 1.64 ha identified as the Riverbank Carpark.

[25] The Notice of Requirement being sought by KiwiRail under s181(1) of the RMA is for an alteration to designation reference NZR1 in the District Plan to enable the relocation of the

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2 Chief Executive Wellington Regional Council

3 Chief Executive Hutt City Council

Melling Station and rail line and to protect KiwiRail's ability to, at some point in the future, extend the rail line northwards beyond the relocated Melling Station and through the new Melling Interchange.

Resource Consents sought

[26] The consents being sought from the WRC are:

By the Wellington Regional Council, Hutt City Council, and NZTA:

Land use consents [37720] – [37728]:

To undertake large scale earthworks and vegetation clearance, including earthworks within a Community Drinking Water Supply Protection Area, and drilling of bores in a Community Drinking Water Supply Protection Area;

- for the reconstruction, construction, alteration and replacement of culverts;
- for the new Melling vehicle bridge and the new pedestrian/cycle bridge across Te Awa Kairangi/Hutt River including piers constructed in the River and temporary causeways for construction;
- for new structures in the bed of Te Awa Kairangi/Hutt River such as habitat features, erosion protection structures and river access structures including within sites of significance to Mana Whenua;
- for the maintenance, repair, replacement, upgrade, or use of existing structures, including erosion protection structures;
- for the demolition and removal of temporary structures required for construction activities including the temporary causeways to construct the new Melling Bridge, the pedestrian/cycle bridge and the existing Melling Bridge;
- for beach recontouring, gravel extraction, and bed excavation of Te Awa Kairangi/Hutt River within and outside sites of significance to Mana Whenua; for vegetation removal and planting within the bed of Te Awa Kairangi/Hutt River, including the planting of non-native species within sites of significance to Mana Whenua; and
- for construction vehicle tracking through Te Awa Kairangi/Hutt River.

Land use consent (unlimited duration) [37729]:

- for the reclamation of a 25m reach of a stream near Harbour View Road.

Water permits [37719], [37730] - [37732]:

- for the take, diversion and discharge of groundwater for the purpose of dewatering;
- for the permanent diversion of flood water due to construction of stop banks and structures in the floodplain of Te Awa Kairangi/Hutt River;

- for all other activities associated with RiverLink that result in the temporary or permanent diversion of water including temporary diversions of water within Te Awa Kairangi/Hutt River and tributaries associated with construction works; and
- for the permanent diversion of water within or from the tributaries of Te Awa Kairangi/Hutt River through replacement culverts.

Discharge permits [37733] – [37736]:

- for the discharge of sediment-laden water and contaminants to water or onto land where it may enter water from earthworks and vegetation clearance;
- for the discharge of sediment to water as a result of works in the watercourses (i.e. structures, gravel extraction, excavations);
- for the discharge of contaminated land to land and water; and
- for the discharge of contaminants to air associated with the processing of river gravels.

By the HCC and NZTA from the Wellington Regional Council:

Discharge permits [37945], [37947]:

- for operational stormwater discharges from the State Highway network, local roads and impermeable surfaces.

There are also consent applications to HCC by the Project partners for soil disturbance under the NES soil.

Statutory Provisions

[27] The statutory provisions relating to these consents are:

- *NZTA*: Land use consent under s9(1) of the RMA for the disturbance of soil under the Resource Management (National Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011 (NES Soil) in an area of land and river in the vicinity of the Melling Interchange.
- *WRC*: Land use consent under s9(1) of the RMA for the disturbance of soil under the NES Soil between Kennedy Good Bridge and Ewen Bridge.
- *HCC*: Land use consent under s9(1) of the RMA for the disturbance of soil under the NES Soil in an area of land adjacent to the Lower Hutt city centre.

NZTA, WRC and HCC:

- Land use consents in accordance with s9(2) of the RMA and the Proposed Natural Resources Plan (PNRP), Regional Freshwater Plan (RFP) and Regional Soil Plan (RSP);
- Land use consents in accordance with s13 of the RMA and the PNRP and RFP;

- Land use consents in accordance with the Resource Management (National Environmental Standards for Freshwater) Regulations 2020 (NESFW);
- Water permits in accordance with s14 of the RMA and the PNRP and RFP;
- Discharge to land permits in accordance with s15 of the RMA and the PNRP and Regional Plan for Discharges to Land (RPDL);
- Discharge to water permits in accordance with s15 of the RMA and the PNRP and RFP;
- Discharge to air permits in accordance with s15 of the RMA and the PNRP and the Regional Air Quality Management Plan (RAQMP).

Statutory Acknowledgments

[28] The Project area is subject to two Statutory Acknowledgements:

- Port Nicholson Block (Taranaki Whānui ki Te Upoko o Te Ika) Claims Settlement Act 2009, and
- Ngāti Toa Rangitira Claims Settlement Act 2014

[29] Both of these acknowledgements include Te Awa Kairangi and Wellington Harbour, and the statutory acknowledgement for Ngāti Toa Rangitira includes the tributaries of the River.

Mana whenua involvement

[30] Evidence was received from Ms Kim Skelton, speaking on behalf of Taranaki Whānui ki Te Upoko o Te Ika (Taranaki Whānui). She confirmed that Taranaki Whānui have a whakapapa-based relationship with the river, Te Awa Kairangi, and the receiving saltwater environment of Te Whanganui-a-Tara. Taranaki Whānui is one of the five Project Partners and supports it, as well as putting forward 6 recommendations as being of particular importance to mana whenua. They are:

(a) *Mahinga Kai* – mana whenua are resourced to develop and implement a measurement framework for mahinga kai as a compulsory value in the National Policy Statement for Freshwater Management 2020 by 2025, and mana whenua work with territorial authorities to identify (by 2025) and restore (by 2035) the spawning habitats of indigenous fish and mahinga kai species (eg inanga) in their rohe.

(b) *Mana Whenua as decision makers* – the Project provides for the establishment of, and provides operational funding for, a mana whenua kaitiaki monitoring and management programme like Ngā Māngai Waiora (ambassadors for water).

(c) *Stormwater and Wastewater discharges in the Project Area* – Stormwater is captured and treated and, where possible, utilised as a resource. Where released to streams, it is released in a manner aligned with natural flow regimes.

(d) *Smaller streams in the Project Area* – WRC works with mana whenua to name, identify and map all āku waiheke (smaller streams) and ngā wai huna (concealed waters) that are not named, or have anglicised names, with traditional Māori names; and culverts, weirs and dams must allow for native fish migration, but block trout and pest fish access to uninvaded areas.

(e) *Sites of significance in/near the Project Area* – the Project provides for shared decision-making with mana whenua so that they are actively involved in the restoration and protection of mana whenua sites of significance.

(f) *Flood Protection works* – WRC works with mana whenua, community groups and territorial authorities to amend (by 2024) all relevant regulatory documents to ensure:

(i) that river management enhances habitat restoration and stormwater treatment along the full length of developed rivers; and

(ii) the protection of swimming holes.

Specifically, for Te Awa Kairangi / Hutt River, these objectives should be accounted for when undertaking flood protection works.

[31] As Ms Skelton puts the Iwi's view of the project, it *...provides us an opportunity to correct a wrong, to instil new behaviour, new understandings and new relationships.* The Iwi *... supports priority actions to rebuild our connections with Te Awa Kairangi and begin to restore the mauri of Te Awa Kairangi me ōna takiwā.*

[32] We also heard from Ms Jenny Ngarimu, giving evidence on behalf of Te Runanga o Toa Rangitira (Ngāti Toa). Ngāti Toa is also one of the Riverlink partners and support what is proposed. She described Ngāti Toa's relationship with the area and with Te Awa Kairangi in particular. The benefits of flood protection, better access to the City, improved relationships with Te Awa Kairangi and its mauri, and improved infrastructure for foot and bicycle travel were all noted by her, on behalf of the Iwi, as being desirable outcomes.

[33] Tangata whenua have gifted the project the name *Te Wai Takamori o Te Awa Kairangi – The Soothing Waters of Te Awa Kairangi.*

[34] The conditions have an important role in underpinning and securing outcomes that are important to Mana Whenua and we therefore outline them in some detail here.

[35] There is to be a Mana Whenua Steering Group (MWSG) for the project set up at least six months prior to the anticipated commencement of Construction Works (Condition 10). Its purpose (Condition 11) is to:

a. Facilitate ongoing engagement with Mana Whenua in respect of the activities authorised by the designations and resource consents;
b. Provide an opportunity for Mana Whenua to provide kaitiaki inputs into the Project as set out in Conditions 12 and 13;
c. Ensure appropriate tikanga and kawa (customary practices and protocols) are being applied throughout the development and implementation of the Project.

[36] Condition 12 requires that MWSG be invited to hold regular meetings (monthly or as otherwise agreed) throughout the Construction Works until at least six months after completion of construction to participate in:

a. Development of the Project design to incorporate cultural values into elements such as:
    (i) Cultural expression in artwork, landscape works and plantings to be confirmed in the final Urban and Landscape Master Plan (prepared under Condition 63);
    (ii) Implementation of biodiversity mitigation, offset, or compensation measures;
    (iii) Signage describing local features and the history of the area.
b. Input to the Communications Plan with respect to methods of engaging with iwi and hapū;
c. **Endorsement** that specified management plans (Construction Environmental Management Plan, Erosion and Sediment Control Plan, Groundwater Management Plan, Artesian Aquifer Interception Management Plan, Ecology Management Plan, Archaeological and Heritage Management Plan and the Stream Offset Plan) are consistent with the Mana Whenua Values Plan;
d. Preparation of the On-Call Procedure (as required by Condition 53) and any updates:

e. Development and implementation of agreed cultural protocols/tikanga appropriate to stages of the works or activities (for example: blessings, unmonitored discoveries, vegetation clearance, relocation of native flora and fauna);

f. Observation and input to monitoring activities and to active management responses (if triggered under Condition 88 when monitoring results before, during or following completion of Construction Works exceed thresholds set out in Conditions 85-87A or 96) including input on cultural indicators for matters such as traditional association, mahinga kai and stream health to the applicable Ecology Management Plans.

[37] In opening the Applicants' counsel pointed out the Applicants are prepared to accept the requirement for endorsement (as bolded above) given the status of mana whenua in the Project, submitting:[4]

> I am aware that conditions should not delegate substantive decision making to a council officer, a compliance check should be as much as possible a work process with limited discretion needing to be exercised and third party approvals have been deliberately avoided for accommodating requests of third party input in a "provide evidence of engagement" manner. The notable exception to the third party approval process is condition 12 which requires mana whenua endorsement of certain management plans which address values of significance to mana whenua. This condition does not strictly meet the guidance provided in the Court's minute but reflects the feedback I received from mana whenua, the endorsement step was very important for mana whenua and I see this as being a suitable means for giving effect to section 8 of the RMA as well as provisions relating to Māori relationships with land and water, along with kaitiakitanga in section 6 and 7 and has arisen because expertise on mana whenua values is limited to mana whenua.

[38] Condition 13 requires a Mana Whenua Values Plan, to be prepared by a Suitably Qualified Person identified in consultation with the MWSG, for the construction phase. Its purpose is to:

- set out the cultural monitoring requirements and measures for the construction phase; and to
- acknowledge the cultural values of the area to Mana Whenua and to minimise potential for adverse effects on those values.

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4 Transcript at 248

[39] There are matters the Plan is to include. Importantly there are requirements and measures related to the RiverLink Kaitiaki Strategy, a "high level" document Ms Ngarimu took us through. There is also to be an outline of the historic and living cultural values of the area to mana whenua and measures to minimise potential adverse effects on these values.

[40] There are specific factors and cultural monitoring activities to be addressed in the Management Plans referred to in Condition 12 related to potential effects on taonga or other species of significance to MWSG, opportunities to use natural materials in the Project design as well as to participate in activities such as planting, translocation, ecology monitoring, and any other matters or measures to avoid or mitigate potential adverse effects on mana whenua values, customs and practices. Other matters are site dedications or cultural interpretation prior to Construction Works commencing in areas with significance to mana whenua and cultural protocols and procedures for cultural inductions, along with the confirmation of the roles and responsibilities and personnel.

Submitters and s274 parties

[41] The WRC and HCC s87F reports record that 122 parties lodged submissions on the Project. There was also one late submission which was accepted.

[42] At the time of lodging submissions, 42 submitters indicated that they wished to be heard, and 23 submitters filed notices of interest as s274 parties. This may sound rather technical, but in a process where, as here, the Court is examining issues at first instance and not on an appeal, the Court must take account of all submissions.

[43] Forty four of the submissions were in support of the Project -either in whole or in part; - 14 were neutral, 1 was in partial opposition and 63 were in opposition – either in whole or in part.

[44] With specific reference to the KiwiRail proposal, 18 submissions were in opposition, 66 support the proposal and 29 were neutral with 9 submitters not stating their position on this proposal.

[45] In brief, positive effects identified by submitters included economic and social benefits, reduced traffic congestion, improved interfaces with Te Awa Kairangi, improved flood resilience, aspects of the cycling and walking provisions, and the provision for the rail line to be extended to Belmont some time in the future.

[46] Conversely, there were wide ranging concerns raised at the time of the submissions about the Applicants' proposal to incorporate shared use cycle/pedestrian pathways in many locations, as opposed to separate pathways being provided for cyclists and pedestrians. We have dealt with this as a distinct topic in this decision.

[47] Transport related concerns included the active mode issues – ie walking and cycling or using small mobility vehicles; the loss of carparks at a number of locations, including in Mills Street close to the Riverbank on the eastern side of the River; the 107 parks currently leased by the HCC to a major retailer, and a lack of parking on the western side of the river for recreational users. There were also concerns that the proposed merging of Harbour View Road and Tirohanga Road would cause traffic issues and that more attention needed to be given to providing for bus priority lanes.

[48] Issues were raised about the construction phase of the Project included dust creating health problems for residents; noise and vibration effects on people and property; the lack of alternative temporary parking during construction, and the lack of meaningful discussions with affected homeowners about the Project's construction timing and the methodology proposed. We discuss those issues in some detail later in this decision.

[49] Other submitters raised issues in opposition to the Project, including aquatic ecosystem health, flood protection, climate change, construction dust, effects on mana whenua values, the aquifer, the trout fishery, stormwater treatment, community drinking water supply, and consistency with WRC statutory planning documents. Again we discuss these issues elsewhere in this decision.

[50] Heritage New Zealand Pouhere Taonga (HNZPT) raised concerns about the effects of the Project on the heritage values of two HNZPT Category 2 listed properties (Lochaber/Prospect College at 125 Western Hutt Road; and Casa Loma at 760 Western Hutt Road), the Wesleyan Cemetery and the proposed demolition of the Melling Railway Station.

[51] In addition to HNZPT, the owners of *Lochaber/Prospect College* and *Casa Loma* also raised concerns about the effects of the Project on their properties.

[52] Some submitters were also concerned that the Project needed to be designed to cater for people with disabilities, including the provision of mobility car parking spaces, disabled access to the new Melling Station, and disabled access to the stopbanks with a request that the Applicants consult with the Lower Hutt disability community. We consider those issues to

be important – and they should be incorporated into the project design, and conditions. While Condition 14A(j) provides for the PDLG to include up to two representative from the Disabled Persons Assembly, we could not find any reference to design standards and outcomes for mobility car parking and disabled access(es) in Condition 36A. Provisions defining these standards/outcomes are to be added to this condition.

Pre-hearing resolutions and follow-up

[53] The Applicants and various of the parties had a series of meetings in the early part of 2022 to discuss the submissions and to explore whether the concerns raised by individual submitters could be resolved. These meetings involved direct discussions between the Applicants and the parties in some cases and court-facilitated mediations and/or expert conferencing for others.

[54] As this decision arises out of a 'first instance' hearing we have to independently consider each of the issues reported as having been resolved between the parties. Only then can we accept them as being appropriate outcomes in terms of the RMA and the relevant subsidiary planning documents. We return to whether those outcomes are confirmed and are to be included as part of our decision.

[55] Four of the parties involved in the early 2022 meetings were affected property owners (Alison and Anthony McKone, Paul and Jennifer Officer, Harvey Norman Properties (NZ) Ltd and Parsons Green Trust/Parsons Green Ltd. Three were government agencies (Heritage New Zealand Pouhere Taonga, Kāinga Ora - Homes and Communities and the Director-General of Conservation). One was a council-controlled organisation (Wellington Water Ltd). Thirteen had cycling interests (10 individuals and 3 organisations) with two (Malcolm Wheeler and Living Streets Aotearoa) having discrete issues. The late submitter, Mr Rodney Braddock, had a cycling interest.

[56] Issues raised by Harvey Norman Properties (NZ) Ltd about carparking and access for its building on Rutherford St in Hutt City were settled shortly before the hearing, as were issues raised by Parsons Green Trust and Parsons Green Ltd in relation to their properties on the western side of the river. Counsel for those parties advised the Court that their clients did not need to participate further in the process. That proved not to be the situation with Parsons Green Trust and Parsons Green Ltd and we heard from them during and after the hearing.

[57] In an email to the Court dated 26 January 2022, counsel for Kāinga Ora – Homes and Communities advised that his client was withdrawing its s274 notice and would be taking no further part in the proceedings.

[58] The Applicants and Ms Alison McKone (on behalf of herself and Mr Anthony McKone) met in Court-assisted mediation on 2 February 2022 to discuss their concerns about the effects of the Project on their property at 39A Mills Street, Lower Hutt. With agreements reached at the mediation between the parties as to how each of these effects would be managed, Mr and Ms McKone confirmed that their concerns had been addressed to their satisfaction and that they would not be participating any further in the proceedings.

[59] The Applicants and Mr Neil Carr (on behalf of Mr Paul Officer and Mrs Jennifer Officer) met in Court-assisted mediation on 2 February 2022 to discuss the Officers' concerns about the effects of the Project on their property known as *Casa Loma* at 760 Western Hutt Road. On the basis of the outcome of mediation, the Officers advised that their concerns about the Project had been addressed to their satisfaction and that they would not be participating further in the proceedings. There is a condition (50B) specifically relating to this property, as discussed further in the Archaeological and Heritage section of this decision.

[60] In a joint memorandum to the Court dated 26 January 2022, the Applicants and HNZPT advised that, following discussions between them, the concerns raised by HNZPT in its submissions had been resolved through agreed amendments to the proposed conditions.

[61] These include an agreement to relocate the existing Melling Railway Station Building and its incorporation into the new Melling Station facilities; responses to minor potential effects of the Project on the heritage values of Lochaber/Prospect College (125 Western Hutt Road), and a minor amendment to the condition for the on-call procedure for the accidental discovery of archaeological remains. HNZPT advised that unless something material arose following those resolutions, it did not intend to call evidence.

[62] In a joint memorandum to the Court dated 27 January 2022, the Applicants and the Director-General of Conservation advised that, following discussions between them, the concerns raised in the Director-General's submissions had been resolved through agreed amendments to the proposed conditions. The parties recorded that these amendments would be reflected in the Project condition set which would accompany the planning evidence of Ms Mary O'Callahan to be filed on behalf of the applicants. Unless something material arose

following the agreed resolution, the Director-General advised that she would not be calling evidence for the proceedings.

[63] In their joint memorandum to the Court dated 25 February 2022, the Applicants and Wellington Water advised that the concerns raised in Wellington Water's submissions had been resolved through agreed amendments to the proposed conditions in tandem with a Relationship Agreement agreed between them. Unless something material arose following the agreed resolution, Wellington Water advised that it would not be calling evidence for the proceedings.

[64] There was expert conferencing on several topics prior to the hearing that advanced resolution of matters and also informed the subsequent evidence and hearing process. We have looked at the expert conferencing statements but do not need to dwell on the process. Instead we focus on the evidence and conditions put forward by the experts on matters of substance given we are reviewing the adequacy of this for ourselves as well as making decisions on the limited matters still at issue between the parties.

[65] As can be seen, in the course of Court assisted mediation, expert witness conferencing and direct discussion between parties, a significant range of issues were resolved without requiring hearing time, although we have to be satisfied that the outcomes are lawful and appropriate, given that we are dealing with the issues at first instance rather than on appeal.

The Legal Framework

[66] We are dealing with notices of requirement as well as resource consent applications. We look separately at the matters that we must address under each category before addressing the order in which we will address the specific matters.

Consideration of NORs

[67] The Environment Court may cancel a requirement, confirm a requirement, or confirm a requirement but modify it or impose conditions on it as the Court thinks fit.

[68] In reaching its decision the Court must have regard to the same considerations as does a territorial authority when making a recommendation under s171 RMA; which provides:

> (1) When considering a requirement and any submissions received, a territorial authority must, subject to Part 2, consider the effects on the environment of allowing the requirement, having particular regard to -
>
> (a) any relevant provisions of-

(i) a national policy statement:

(ii) a New Zealand coastal policy statement:

(iii) a regional policy statement or proposed regional policy statement:

(iv) a plan or proposed plan; and

(b) whether adequate consideration has been given to alternative sites, routes, or methods of undertaking the work if-

(i) the requiring authority does not have an interest in the land sufficient for undertaking the work; or

(ii) it is likely that the work will have a significant adverse effect on the environment; and

(c) whether the work and designation are reasonably necessary for achieving the objectives of the requiring authority for which the designation is sought; and

(d) any other matter the territorial authority considers reasonably necessary in order to make a recommendation on the requirement.

[69] The effects to be considered under subsection (1) may include any positive effects on the environment to offset or compensate for any adverse effects on the environment that will or may result from the activity enabled by the designation, as long as those effects result from measures proposed or agreed to by the requiring authority.

[70] Under s176A(1) of the RMA an outline plan of the public work, project, or work to be constructed on designated land must be submitted by the requiring authority to the territorial authority to allow the territorial authority to request changes before construction is commenced. An outline plan need not be submitted to the territorial authority if the details of the proposed public work, project, or work, as referred to in subsection (3) are incorporated into the designation (s176A(2)(b)); or the territorial authority waives the requirement for an outline plan (s176A(2)(c)).

[71] Section 176A(3) specifies that an outline plan must show—

(a) the height, shape, and bulk of the public work, project, or work; and

(b) the location on the site of the public work, project, or work; and

(c) the likely finished contour of the site; and

(d) the vehicular access, circulation, and the provision for parking; and

(e) the landscaping proposed; and

(f) any other matters to avoid, remedy, or mitigate any adverse effects on the environment.

[72] Within 20 working days after receiving the outline plan, the territorial authority may request the requiring authority to make changes to the outline plan and if the requiring authority

decides not to make the changes requested, the territorial authority has a right of appeal against the decision to the Environment Court. In determining any such appeal, the Environment Court must consider whether the changes requested by the territorial authority will give effect to the purpose of this Act.

[73] The Applicants submit that the details of the Project are primarily "incorporated into the designation" such that no outline plan is required other than for certain specific elements (namely, active transport elements as set out in proposed Condition 3A, and any temporary car park or activation activities, and integration of retained or new buildings into flood protection structures under proposed Condition DH4), or where an alternative design or work is proposed. For the rest of the Project the Applicants submit that sufficient detail has been provided, such that s176(2)(b) is satisfied, or alternatively that it is appropriate for a waiver under s176(2)(c) to be granted. We do have questions about the intention of Condition 3 in connection with access to an outline plan process where an alternative design or work is proposed. We return to the point in discussing preliminary issues on Conditions.

Consideration of resource consent applications

[74] As noted, the Applicants have also sought resource consents for certain aspects of the Project. The overall activity status is *discretionary.* We are obliged to consider the matters outlined in ss104, 104B (*discretionary* activities) and s105 and s107, which relate to discharge permits.

[75] Section 104 requires:

> (1) When considering an application for a resource consent and any submissions received, the consent authority must, subject to Part 2 ... , have regard to–
>
> (a) any actual and potential effects on the environment of allowing the activity; and
>
> (ab)any measure proposed or agreed to by the applicant for the purpose of ensuring positive effects on the environment to offset or compensate for any adverse effects on the environment that will or may result from allowing the activity; and
>
> (b) any relevant provisions of—
>
> (i) a national environmental standard:
>
> (ii) other regulations:
>
> (iii) a national policy statement:
>
> (iv) a New Zealand coastal policy statement:
>
> (v) a regional policy statement or proposed regional policy statement:
>
> (vi) a plan or proposed plan; and

(c) any other matter the consent authority considers relevant and reasonably necessary to determine the application.

A resource consent application can be granted (with conditions), or declined.

RMA Part 2

[76] Our consideration of both a NOR and a resource consent application is of course subject to Part 2 of the RMA.

[77] The relevance of Part 2 to the consideration of applications for resource consents has been considered by the Court of Appeal in *RJ Davidson Family Trust* v *Marlborough District Council.*[5] The Court of Appeal determined that:

- The position of the words "subject to Part 2" near the outset and preceding the list of matters to which a consent authority must have regard (in s 104), clearly show that it is necessary to have regard to Part 2, when it is appropriate to do so.
- If it is clear that a plan has been prepared having regard to Part 2, and with a coherent set of policies designed to achieve clear environmental outcomes, reference to Part 2 is unlikely to add anything.
- If a plan has been competently prepared under the Act, in many cases a consent authority will feel assured in taking the view that there is no need to refer to Part 2 because it will not add anything to the evaluative exercise. Absent such assurance, or if in doubt, it will be appropriate and necessary to do so.

[78] The High Court in *New Zealand Transport Agency v Architectural Centre Inc* considered the implications of *King Salmon* in the context of a NoR application. The High Court distinguished *King Salmon* on the basis that s171 of the RMA requires a different approach to that taken in a plan change context. The High Court cited with approval the following passage from the Board of Inquiry's findings:[6] ....

> Further and perhaps more importantly, as we have already noted, Section 171(1) and the considerations it prescribes are expressed as being subject to Part 2. We accordingly have a *specific statutory direction* to appropriately consider and apply that part of the Act in making our determination.

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5 *RJ Davidson Family Trust v Marlborough District Council* [2018] NZCA 316, [2018] 3 NZLR 283

6 *New Zealand Transport Agency v Architectural Centre Inc* [2015] NZHC 1991 at [118]

Structure of our decision

[79] We acknowledge while there are many similarities between the matters to be considered for notices of requirement and resource consent applications there are some differences between the matters and also their weighting. That includes:

- "have particular regard to" the matters for notices of requirement and "have regard to" for resource consent applications;
- the planning instruments to be considered are different for a notice of requirement in not referring to a national environmental standard;
- notices of requirement have the added two matters of consideration related to alternatives and achieving the objectives of the requiring authority for which the designation is sought;
- there are additional matters to consider for resource consent applications for discharges in s105 and s107.

[80] Notwithstanding those differences we find it appropriate to approach the remainder of our decision under the following headings:

- Conditions (some preliminary matters);
- Effects (noting the broad definition of "effects" in the RMA) on the environment of allowing the NOR or activity;
- Provisions of RMA planning instruments;
- Alternative sites, routes or methods;
- Reasonable necessity for achieving NOR objectives;
- Sections 105 and 107 for discharge permits;
- Any other matter relevant and reasonably necessary to our decision (including references to non-RMA statutory and other documents);
- Conclusions and directions as to conditions.

[81] Given the conditions are an integral part of what is proposed we deal with some preliminary matters on conditions early in the decision and then largely under the *Effects* heading but also elsewhere where necessary.

[82] Where there are disputed issues, or issues about which the Court has a concern, we deal with relevant conditions and specific plan provisions in the appropriate location but generally under the "effects" heading where most first surface.

Preliminary issues on conditions

[83] We received the rebuttal evidence (that included a revised condition set) very close to the hearing. We issued a Minute[7] expressing concerns about the approach to conditions including noise and vibration during construction as not being in line with the principles of sound condition drafting. We noted that if particular parts of New Zealand Standards or international standards are an important part of a condition it is preferable that these are incorporated directly in a condition as access to these documents is limited by copyright.

[84] Ms Mary O'Callahan provided a revised version of the conditions just prior to giving evidence addressing many of the points made in our Minute. For example, references to external documents now have clear referencing with dates (and the removal of references to successor documents) to provide greater certainty to the requiring authority, consent holder, regulator and community as to what is required. Our Minute required that all external documents referred to in the conditions be available to the Court and other parties electronically prior to the hearing. We note that there were several external documents the Applicants were unable to provide electronically and the Applicants clearly did not see the need to provide these in hard copy or consider access to them to be a limitation on our ability to make a decision.

[85] The Applicants, in closing, under the heading *Certainty and Clarity* in the conditions submitted:

> [73] ... Given the Court's limited questions for Ms O'Callahan that has hopefully been to the Court's satisfaction.

Taking Ms O'Callahan through each of the conditions would have extended the hearing and we considered it unnecessary in the light not only of our Minute but our exploration of issues with counsel and other witnesses for the applicants.

[86] We note that the Applicants circulated a working version of the conditions to the other parties on 3 May 2022 and a copy of that was provided to the Registrar on 9 May 2022. That includes comments from Ms O'Callahan on why changes in that version have been made.

[87] We also note that some parties sought specific amendments to conditions in their closing submissions (20 May 2022) and consider those where we have not previously dealt with them. We note that the Applicants' closing refers to making a number of minor changes to conditions in response to the feedback from the parties.

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7 Minute of the Environment Court Re Proposed Conditions for Designations and Consents 19 April 2022

[88] We now review the most recent condition set (20 May 2022) submitted by the Applicants.

Condition 3

[89] We are unclear about what is intended by the scope and application of Condition 3. The designations and consents should be clear on their face and accessible to those involved with and affected by the implementation and enforcement of conditions. It is not helpful to refer to Chapter 4 (Project description) of the AEE report or modified plans given the process that has now been gone through. The key requirements (including plans that are at least electronically available) should be referred to in this condition.

[90] What is "final design" as opposed to the many references to "detailed design" elsewhere in the conditions? Should "final design" be undertaken in general accordance with (listed) design drawings?

[91] What is intended by:

> An Outline Plan under Section 176A of the RMA may be prepared and submitted for any works not included within this condition, or for any works not in general accordance (in whole or part) with a) and b)?

[92] How do the conditions relate to the second advice note that reads:

> With the exception of the mandatory Outline Plan requirements set out in conditions 3A and DH4, the documentation provided in support of the Notices of Requirement for the designations contains all the information that would be required to be provided with an Outline Plan under Section 176A of the RMA, therefore no separate Outline Plans for construction will be submitted?

Condition 5

[93] The Applicants propose an amendment submitted to be in line with condition wording from recent Te Ara o Te Ata: Mt Messenger Bypass conditions[8] and to provide more certainty. The Applicants propose to add: "Any changes to the management plans must remain consistent with the objectives and performance standards of the management plan and the conditions".

[94] The Applicants submitted:[9]

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8 *D-G of Conservation v Taranaki Regional Council* [2021] NZEnvC 40

9 NOE at 57

> What it adds is any changes to the management plans shall remain consistent with the objectives and performance standards of the management plan and the resource consent conditions. So it does have an extra link ensuring the changes.
> The rationale for that provision is when you're down at the *no* or *de minimis* effect level there's a pragmatic reality of the scale of these plans and what changes and so it's allowing a practical change without having to go through a certification process where there's either no or *de minimis* adverse effects or where you've come up with a solution that actually has environmental benefits. So it allows an efficiency of development when you're dealing at either the beneficial end of the spectrum or at the *de minimis* no effect end of the spectrum. So it is very compartmentalised into the scope of its use but I do accept that there is some uncertainty as to who decides what is *de minimis*. In my experience that hasn't been an issue and, as I say, these consent conditions have been used before but do propose that it's added in that any changes are consistent with the objectives and performance standards and I will come to objectives soon because they're called purposes generally in this condition set …

[95] We find the proposed revision, insofar as it purports to deal with problems with the broad and highly uncertain discretion provided by "a change that results in an improved environmental outcome" falls short of the expectations we set out in our Minute.

[96] These conditions provide for a separate process with an Enabling Works Construction Environment Management Plan (EWCEMP) where a CEMP and supporting specialist management plans have not been completed and certified at the commencement of Enabling Works. The purpose of the EWCEMP is to confirm the management procedures and construction methods to be used to "avoid, remedy or mitigate potential adverse effects arising from Enabling Works".

[97] This provides no certainty that the parameters and outcomes (including in management plans) set out in conditions otherwise specified to deal adequately with adverse environmental effects from construction apply. Enabling Works have the potential to cause unacceptable environmental effects. We highlighted our concern about this for noise and vibration but the issue is a broader one.

[98] Further consideration is to be given to reworking the conditions to ensure that parameters and outcomes set for construction apply to Enabling Works.

[99] We note that Condition 5 still allows revisions to all management plans for "non-material changes in design, construction methods or management of effects" to be deemed to be

approved unless the Manager has advised in writing within 10 working days of receiving the revised management plan that the amendment requires certification. Furthermore we see the Manager is now required to give reasons for any advice that certification is not required for any amendment. In the absence of such advice from the Manager "... any Construction Works or Enabling Works associated with the *minor* amendment may proceed". It is by no means certain to us what a "minor" amendment might be interpreted to mean particularly in the light of the reference to "an improved environmental outcome". How does it relate to the terms "non-material changes" and the inclusive description of "a material change" in the relevant Condition?

[100] We accept that an administrative change, including nominating personnel (5(b)) and "no adverse effect" and even a "de minimis adverse effect" (5(a)) could be dealt with in this way. However, we remain of the view that to extend it to the discretion required to decide whether a change "results in an improved environmental outcome" is unacceptable. Who would decide, and how, whether a change remains "consistent with the objectives and performance standards of the management plan and conditions" (objectives and performance standards are themselves terms used inconsistently in the condition set provided). "Consistent" is not a high bar.

[101] We assume the new requirement for the Manager to give reasons (under Condition 6) for not requiring certification for a non-material change is to provide a paper trail and as a general proposition we can see the benefit of that for project and compliance management for both the regulator and the consent holder. It also increases transparency for the community where both the operational and regulatory functions of the WRC or HCC are involved. However, we do not accept this should extend to "an improved environmental outcome". That part of Condition 5 is to be removed.

Enabling Works (Conditions 20 and 21) - Best Practicable Option

[102] In our Minute we raised concerns that many of the conditions refer to the "best practicable option" (BPO), a term defined in the RMA in the context of noise, but the use of which can result in an uncertain condition.

[103] The RMA definition of BPO is:

> **best practicable option**, in relation to a discharge of a contaminant or an emission of noise, means the best method for preventing or minimising the adverse effects on the environment having regard, among other things, to—

(a) the nature of the discharge or emission and the sensitivity of the receiving environment to adverse effects; and
(b) the financial implications, and the effects on the environment, of that option when compared with other options; and
(c) the current state of technical knowledge and the likelihood that the option can be successfully applied.

[104] The Applicants have now removed references to BPO in the conditions for issues other than noise.

Use of the term "Practicable" or similar

[105] In our Minute we also questioned the certainty and potential implications of the widespread and inconsistent use of phrases like "reasonably practicable" or "practicable" (or similar) in the conditions. The Applicants responded by reviewing and amending the conditions to (mostly) use "practicable" to replace the other words or phrases.

[106] The Applicants submitted that while such phrases do not provide absolute certainty, they are widely used in conditions for large RMA projects. In response to questions from the Court, counsel noted that such provisions were there to "allow some form of discretion" given the scale of the project and the work still required through detailed design. Ms O'Callahan also noted that those terms are used to allow "just a little bit of flexibility around mitigation or process steps".

[107] The Court questioned witnesses about factors that might be relevant to practicability for particular conditions. In closing the Applicants submitted that the responses given by witnesses demonstrated the difficulty of providing further specificity in most cases, as the relevant factors are circumstance dependent and, in some cases, will be unforeseeable. This is particularly the case given the broad nature of the Project area and the numerous activities taking place.

[108] In its closing version of the conditions the Applicants proposed a new definition of "practicable" drafted by Ms O'Callahan and said to be based on case law (set out in the Applicants' closing) and on the responses from experts at the hearing, and said to be further refined following closing comments from Living Streets Aotearoa:

Unless otherwise indicated by the context:

(1) the specified task or action is not absolute but the Consent Holder must take reasonable steps in the circumstances to deliver it.

(2) the course of action by the Consent Holder must consider the benefit to be secured alongside other relevant factors in the circumstances including safety, cost, time, feasibility, functionality and difficulty.

(3) the Consent Holder must consider the effects of acting or not acting on the receiving environment.

[109] The RMA case law referred to is discussed in the Applicants' closing submissions. Counsel submitted that findings on "reasonably practicable' as it is used in s32 of the RMA, a section that provides for the evaluation of planning instruments (and does not deal with consenting or NORs), by the Environment Court in *Royal Forest and Bird Protection Society of New Zealand Inc v Whakatāne District Council*[10] are apposite.

[110] We note that decision acknowledges that the definition of BPO is helpful in understanding what the word "practicable" may mean in the context of the Act and how the practicability of an option should be analysed.[11] The decision also referred to principles distilled under other legislation:

(i) 'reasonably practicable' is narrower than 'physically possible' and implies a "computation of the quantum of risk against the measures involved in averting the risk (in money, time or trouble), so that if there is a gross disproportion between them, then extensive measures are not required to meet an insignificant risk";

(ii) 'practicable' has been held to mean "possible to be accomplished with known means or resources" and synonymous with "feasible", being more than merely a possibility and including consideration of the context of the proceeding, the costs involved and other matters of practical convenience;

(iii) 'reasonably practicable' is not absolute, but is "an objective test which must be considered in relation to the purpose of the requirement and the problems involved in complying with it, such that a weighing exercise is involved with the weight of the considerations varying according to the circumstances; where human safety is involved, factors impinging on that must be given appropriate weight.

It found that those broader principles and approach were analogous to the RMA context.

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10 *Royal Forest and Bird Protection Society of New Zealand Inc v Whakatāne District Council* [2017] NZEnvC 51

11 *Royal Forest and Bird Protection Society of New Zealand Inc v Whakatāne District Council* [2017] NZEnvC 51 at [47]

[111] Closing submissions also referred to a High Court decision regarding the Sale and Supply of Alcohol Act 2012 as distilling the following principles in relation to the phrase "so far as reasonably practicable":[12]

(a) the requirement is not absolute;

(b) the physical possibility or feasibility of a task or course of action is not synonymous with reasonable practicability;

(c) ascertaining what is reasonably practicable entails a balancing exercise between the benefit sought to be secured and the sacrifices that would be occasioned by securing that benefit (such as cost, time, difficulty, inconvenience);

(d) the assessment is to proceed on the basis of the information known at the time the decision is made; and

(e) the meaning of 'reasonably practicable' is not static: it will respond to the context in which it is used.

[112] In closing, the Applicants concluded[13]

> In light of the case law, the Applicants consider 'where practicable' provides an appropriately high threshold, and the limited flexibility this proviso affords certainly does not enable a consent holder or requiring authority to otherwise disregard the condition requirement.

Finding

[113] We accept the (largely) consistent use of "practicable" in the revised condition set, carefully reviewing its applicability and that of any alternatives in the context it is used.

[114] We do not accept the definition of "practicable" put forward by the Applicants, or that there is a need for a definition of "practicable" in the condition set. A concern is that there has been no real opportunity for submissions or evidence addressing the definition given the Applicants have only tabled it in their closing. A further concern is that we have not been able to test with witnesses the definition in terms of actual examples the condition set is likely to present in terms of the implementation of the Project.

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12 *Christchurch Medical Officer of Health v J & G Vaudrey Ltd* [2015] NZHC 2749, [2016] 2 NZLR 382 at [87]

13 Applicants' closing at [91]

[115] Several fundamental questions (not exhaustive) that occur to us on the individual elements listed under (1)-(3) in para [108] above and the overall definition (as provided by the Applicants in closing) are:

- What is a specified task or action that is not absolute in (1)? Do the conditions adequately identify these?
- Under (2) is there a risk that the benefits will not be adequately identified and considered?
- Why are there examples of factors (albeit inclusively) that relate to safety, cost, time, feasibility, functionality and difficulty and none that relate to benefits in (2)?
- Is there the potential for the use of the word "cost" in the list to be interpreted in a narrow sense and not to encompass for example intangibles and reversibility in (2)?
- What is the receiving environment to be considered in relation to the condition concerned in (3)?
- What weighting is to be conferred on meeting the individual elements? Are they all to be achieved?
- Does the definition properly or reliably encapsulate case law principles that might inform its interpretation or application under the RMA?
- Where are the standards, limits, thresholds or other outcomes that set the relevant "context", including for a Project developed, advanced and consented (and to be implemented) on an integrated basis?
- In terms of certainty what would be the basis of enforcement of a condition based on this definition?

[116] Accordingly the definition of "practicable" is to be deleted from the conditions.

Lack of outcome-based conditions and concerns about management plans

[117] The Applicants accepted that the conditions need to be certain and need to set parameters for management plans that provide flexibility for delivery within those parameters. They filed Appendix A to the opening submissions providing an overview of the links between outcome conditions and management plan conditions (condition number, management plan, outcome (or purpose), condition where outcome is specified). They also said that the proposed conditions include purposes for all relevant conditions.

[118] In the conditions set out Management Plan Processes there is the following:

- Management Plan process (Condition 4) that includes Table 1: Management Plan and other plan/processes Table setting out: its name and whether optional; its decision pathway (for information purposes only or requiring certification); when

and who to submit to/certify; the expected consent authority response time; and duration for implementation.

- Those for information purposes only (and not certification) are: Communications Plan and Site Specific Communication Plans (Conditions 18, 19A, 19B), Mana Whenua Values Plan (Condition 13), Parking Review (Condition 35), Transitional Parking Plan (Condition 36), Electrical Infrastructure Management Plan, Melling Station Conservation Plan.
- Those requiring certification are: Enabling Works Construction Environmental Management Plan(s) (Condition 20 - see below for exception), Construction Environmental Management Plan (Condition 34), Erosion and Sediment Control Plan (Condition 104) and any Site Specific Erosion and Sediment Control Plans (Condition 105), Groundwater Management Plan (Condition 120), Artesian Aquifer Interception Plan (Condition 121), Ecology Management Plan (Condition 73), Stream Offset Plan (Condition 83), Archaeological and Heritage Management Plan (Condition 52), Contaminated Land Site Management Plan (Condition 43), Construction Air Quality Management Plan (Condition 49), Urban Landscape Master Plan (ULMP) and Site Specific Design Plan (where required design detail is not available at time of ULMP submission (Condition 63), Stormwater Operation and Maintenance Plan (Conditions COH1 and COW2).
- Condition 20 means Enabling Works Construction Environmental Management Plan(s) are needed only if a CEMP is not done at the commencement of Enabling Works.
- The Ecology Management Plan (Condition 73) has certification but is subject to deemed certification in the event that no response has been received from the Manager and a seasonal window for undertaking activities applies to the relevant Construction activities.
- Construction Traffic Management Plan (Condition 37), including any Site Specific Traffic Management Plans (Condition 38) is for information purposes only (will be certified by road controlling authorities).

[119] The Construction Noise and Vibration Management Plan, including any Site Specific Construction Noise and Vibration Management Plan, is for information (and not certification). The condition footnote states:

> Relevant condition requires the CNVMP to be prepared in accordance with Waka Kotahi guidance document which requires an independent review of the CNVMP; therefore no requirement for further certification as guideline

represents best practice and requires an independent review which will relate to the CNVMP for the entire Project.

We have concerns with this approach as we raise under the heading of effects construction noise and vibration.

[120] Amendment processes for revised management plans (Conditions 5, 6 and 7) generally require certification if that was prescribed for the initial management plan. We deal with Condition 5 and its purported exceptions separately as we find some of these unacceptable.

[121] Certification is generally by a "Manager" defined as:

> The Manager, Environmental Regulation WRC and/or the Team Leader, Resource Consents HCC (as relevant) or their authorised delegate.

[122] We note that Condition 8 requires that all management plans identified in Condition 12 must describe how they have taken into account Kaitiaki principles and feedback from the Mana Whenua Steering Group.

[123] We find the reference in Condition 34 Construction Environmental Management Plan requiring particular regard to the *NZ Transport Agency Guideline for Preparing Environmental and Social Management Plans (April 2014)* to be unnecessary and potentially misleading. What is required in management plans is to be clearly set out in the conditions and not to import or imply that this guideline document has the content and status that justify "particular regard" be had to it. We make a similar comment about a reference to the use of an external NZTA Guide in the Noise and Vibration section of this decision.

Effects

[124] We now consider the effects in the light of the definition of effects in the RMA:[14]

In this Act, unless the context otherwise requires, the term *effect* includes—

(a) any positive or adverse effect: and
(b) any temporary or permanent effect;
(c) any past, present, or future effect; and
(d) any cumulative effect which arises over time or in combination with other effects—

regardless of the scale, intensity, duration, or frequency of the effect, and also includes—

(e) any potential effect of high probability; and
(f) any potential effect of low probability which has a high potential impact.

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14 RMA, s3

Te Awa Kairangi/Hutt River

[125] Evidence on river related issues was provided (among other things) on behalf of the Applicants by Mr Bruce Symmans (on flood containment and river design), by Mr Mark Pennington (on river hydraulics and containment), by Mr Kyle Christensen (on river geomorphology), by Mr Graeme Campbell (Manager Flood Protection Department, representing WRC on the RiverLink Project Board) and Mr Craig Martell who provided evidence on behalf of WRC Regulatory.

Stopbank works

[126] The Project includes moving the existing stopbanks out from the river at critical locations and raising them by between 0.5 m and 1.9m (typically 1.5m) with 0.9m of freeboard. The channel capacity will also be improved with deepening at some locations to contain and pass the Hutt River Flood Plain Management Plan (HRFMP) 2,800 cumec design flood. Following the completion of the construction of the Project, the design is for the previous overtopping of the river during floods within the Project area to be contained in the river channel.

[127] The stopbanks immediately upstream and downstream of the Project reach have already been constructed to the 2,800 cumec design standard. This includes the stopbanks downstream of the Ewen Bridge which we will come back to below.

[128] A number of flood protection works identified in the HRFMP are still to be completed to provide the 2,800 cumec design flood capacity for the whole system. These works identified as priorities in the HRFMP do not form part of the Project with Mr Symmans advising that these are unlikely to be adversely affected by the construction of the Project.

[129] Some damage to the stopbanks is expected in earthquakes larger than the 1 in 50-year "serviceability" earthquake. Mr Symmans notes that the likelihood of a significant flood occurring at the same time as an earthquake larger than the serviceability earthquake is considered low. Notwithstanding, an emergency response plan is to be developed to include an assessment of likely stopbank damage for various sized earthquakes; the risk of damage if there was to be an earthquake at the same time as a flood, and the type of remedial work which would be required to reinstate a damaged stopbank.

Erosion and Sediment Control Conditions

[130] We include here an overview of the erosion and sediment control conditions (both within and outside of the Te Awa Kairangi corridor) which, during construction works, have been

designed to protect the quality of the water in both Te Awa Kairangi and in other waterways affected by the Project.

[131] Condition 80 lists a series of restrictions which are to apply during the river construction works including that re-shaping, contouring and gravel extraction are to be undertaken within linear lengths no longer than 500m each moving in a direction from downstream to upstream.

[132] Causeways for bridge construction works are to be no wider than 50% of the channel width.

[133] Condition 81 requires that construction works are not to be undertaken in the flowing channel between the months of September and November (with the exception of the installation of bridge piles where SSEMPs are to be prepared.)

[134] Condition 85 requires riverbed monitoring to be undertaken during and following the Construction Works within the reaches of Te Awa Kairangi with minimum requirements to be met for pebble counts, pool and riffle counts, sediment cover and fine sediment mobilisation. If specified trigger values for each of these are exceeded, the active management response in Condition 88 must be implemented.

[135] Condition 86 contains equivalent provisions to Condition 85 for macroinvertebrate monitoring, Condition 87 for indigenous fish and Condition 87A for trout.

[136] Conditions 89-95 require construction works in the river to be undertaken in general accordance with the current GWRC Code of Practice for River Management Activities within a specified maximum number of hours each day. These works are to cease when the river falls below a defined 1.2 cumec[15] low flow limit measured at Taita Gorge and where practicable, bunds are to be provided to facilitate construction of the works either in the dry or in a standing water channel.

[137] Vehicles being used for river works must be cleaned free of sediment prior to entering the river and prior to construction commencing, a trial is to be undertaken to determine the best way for these vehicles to access the river in order to minimise sedimentation effects.

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15 We have used the terms "cumec" and "m^3/sec" interchangeably throughout this decision both meaning volumetric flow of cubic metres/sec

[138] Following completion of each 500m lineal section, all disturbed areas in the section are to be stabilised in accordance with the stabilisation methods set out in the ESCP or SSESCP.

[139] Condition 96 lists contingency measures for controlling sediment releases into the river corridor. These include reducing the maximum daily footprint or daily work period, installing geofabric to filter sediments into the river flow and temporary armouring of exposed surfaces that generate sediment.

[140] This same condition lists the erosion and sediment control monitoring measures which must be undertaken during the river corridor construction activities. These include weather forecast monitoring of climatic conditions, the installation of telemetered continuous turbidity sensors at each of the bridges along the river, grab sampling for the two weeks from commencing a disturbance (as well as for an additional two weeks if there is an exceedance of a proactive trigger) and grab sampling for discharges from outside of the river corridor during defined rainfall trigger events.

[141] The condition also defines trigger values for measuring changes in turbidity during the river construction works and interim response actions to be followed where as noted above, these trigger values are exceeded.

[142] Further, if these interim response actions are shown to be inadequate, (and as noted above, the trigger values of Conditions 85-87A are exceeded) then Condition 88 comes into play. This lists a series of management response actions which must be identified and implemented with inputs on these to be sought from the Consent Holder, the Mana Whenua Steering Group, the Manager and the Suitably Qualified Person (SQP) responsible for freshwater ecology monitoring.

[143] In addition to the conditions for managing erosion and sediment releases from construction works within the river corridor, Conditions 97-103 address the control of erosion and sediment releases from works undertaken outside of the river corridor.

[144] Prior to bulk earthworks commencing within any particular area, Condition 97 requires a certification statement from an SQP that erosion and sediment control measures have been constructed in accordance with a certified Erosion Sediment Control Plan (ESCP) and/or a Site Specific ESCP (SSESCP).

[145] Condition 98 requires construction sites to be audited by an SQP as a minimum on a weekly basis to ensure that the controls are operating effectively in accordance with the ESCP.

[146] Condition 99 requires the rainfall contingency measures identified in the ESCP/SSESCP to be put in place each time rainfall events are forecast to exceed specified 1 hour and 24 hour limits.

[147] Following each actual rainfall event which exceeds these 1 hour and 24 hour limits, Condition 100 requires pH and turbidity monitoring to be undertaken at specified locations upstream and downstream of the erosion and sediment control devices.

[148] If the pH and turbidity limits specified in Condition 101 are exceeded, a series of response actions must be initiated including the identification of any additional remediation measures to be put in place - all to the satisfaction of the Manager.

[149] If there has been a failure of a control device or exceedance of the limits specified in Condition 101, under Condition 102 an SQP must inspect the affected waterbody and recommend required remediation and/or mitigation measures.

[150] Finally, Condition 103 lists the types of fill materials which are acceptable for importing into the Project area.

[151] Conditions 104-106 define in some detail the conditions and measures which are to apply in the preparation of the ESCP and the SSESCPs.

[152] Our understanding is that these erosion and sediment control conditions proposed by the Applicants have been accepted by WRC Regulatory. For our part, we find these conditions to be both wide ranging and comprehensive for managing and controlling erosion and sediment discharges for protecting the quality of the water in both Te Awa Kairangi and in other waterways affected by the construction of the Project.

Resilience Between Ewen Bridge and Ava Railway Bridge

[153] By the time of the hearing the experts for both the Applicants and WRC (GW Regulatory) had resolved all issues relating to the deepening and widening of the river as well as the stopbank works on both sides of the river within the Project area. In addition, there was agreement that based on the results of the modelling which had been undertaken, any flooding effects downstream of Estuary Bridge would be less than minor.

[154] We acknowledge the agreements reached by the experts on all of these issues, and accept that they are valid outcomes.

[155] Conversely, as noted in the joint witness statement from the conference held on 16 March 2022 among the experts, left unresolved was Mr Martell's concerns about the risk of overtopping and potential stopbank failure between the Ewen Bridge and the Ava Railway Bridge and that possible mitigation measures to respond to this risk had not been addressed.

[156] Related to Mr Martell's concern also was compliance with Policy P27(d) of the Proposed Natural Resources Plan (PNRP).

[157] The Ava Railway bridge, as the name suggests, is an asset of KiwiRail and takes a railway line (the Hutt Valley Line) across the river, where it continues up the Hutt Valley towards the Remutaka Tunnel. As the bridge does not form part of the Project, the Applicants have no ability to replace it or to change its configuration.

[158] As currently configured, Mr Symmans said that this bridge will constrict the free passage of flood flows along the river causing back-up and a rise in water levels upstream during the 2,800 cumec design flood event. The 2,800 cumec event is estimated to occur between a 1 in 3,100 to 1 in 67,000 year return period.

[159] The flood flow modelling has identified that, with the existing Ava Railway Bridge in place, there is a risk of 200 mm deep overtopping on the left hand stopbank some 70m downstream of the Ewen Bridge for a duration of approximately one hour in the 2,800 cumec flood event. No overtopping is expected in more frequent events.

[160] When the Ava Bridge is eventually replaced with a longer bridge, Mr Symmans said that the whole river flood containment system will likely be able to achieve the final containment objectives of the HRFMP.

[161] WRC Regulatory proposed a new condition to address Mr Martell's concern about the risk and consequences of overtopping of this stopbank. This condition would require additional sensitivity modelling to be undertaken between Ewen Bridge and the Ava Railway Bridge in a large flood event followed by the preparation of a risk assessment report. If this report identified an increased risk of stopbank overtopping or failure as a result of the RiverLink works, the consent holder would then be required to prepare and have certified an Ava Rail Bridge

Risk Reduction Plan for mitigating this risk including a requirement that the mitigation works identified in the Plan be completed within two years of the Plan being certified.

[162] The Applicants' closing position on this issue was that there was no rationale or justification for imposing such a condition either as proposed by WRC Regulatory, or to satisfy Policy 27(d) of the PNRP.

[163] In support of this position, Mr Symmans' evidence is that the risk of such a stop bank failure is low, with a probability of the 2,800 cumec design flood occurring before the anticipated replacement of the Ava Rail Bridge (assessed as being at the end of the bridge's 25 to 50 year serviceable life) being in the order of 0.1%.

[164] As noted, the stopbanks through this reach of the river have recently been upgraded to the HRFMP design standards including additional erosion protection with Mr Symmans advising that this included the construction of a new concrete flood wall along the top of the stopbank.

[165] As to the consequences resulting from 200 mm of overtopping, Mr Symmans' evidence is that this would be insignificant, with very little damage as the overflowing water would most likely be contained within the adjacent Market Grove carriageway.

[166] Mr Symmans has also undertaken an assessment of potential failure modes of the stopbank in a 200mm overtopping event. In this assessment, he has considered the potential for the concrete flood wall to slide, to overturn or to be undermined. He has assessed each of these potential failure modes to be low risk. In addition, he has considered potential failure modes for the overflow to cause erosion of the wall toe, erosion of the underlying stopbank structure and erosion of the downslope garden area. He has also assessed each of these potential failure modes as low risk.

[167] His overall risk assessment is that the likelihood of stopbank failure with the modelled 200mm of overtopping is low and that the consequences if there was a failure of the stopbank are insignificant.

[168] In response, Mr Martell pointed out that while Mr Symmans had addressed a range of potential failure points in the stopbank, this range was incomplete in that he should also have assessed the stopbanks under the NZSOLD[16] guidelines.

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16 We understand NZSOLD to be an acronym for the New Zealand Society of Large Dams

[169] In its Closing Submission, WRC Regulatory submitted that WRC's Flood Response Procedure (Emergency Management Plan)[17] does not replace the need for an assessment of the risk of stopbank failure identified by Mr Martell, and that while this Plan may provide a "toolbox" for mitigating any outcomes of risk it does not specifically highlight any potential risks of, or additional location specific measures for this area.

[170] To summarise the evidence on the resilience of this stopbank:

- as currently configured, the Ava Railway Bridge will constrict the free passage of flood flows along the river causing back-up and a rise in water levels upstream of the bridge during the 2,800 cumec design flood event;
- modelling has shown this rise in water level will result in a depth of overtopping of 200mm on the left hand stopbank some 70m downstream of the Ewen Bridge for a duration of approximately one hour in the 2,800 cumec design flood event.
- overtopping is not expected in more frequent flood events;
- the return period of the 2,800 cumec design flood has been estimated to be between 1 in 3,100 to 1 in 67,000 years;
- the risk of a stop bank failure has been assessed by Mr Symmans as low with the probability of the 2,800 cumec flood occurring before the anticipated replacement of the Ava Rail (assessed as being at the end of its 25 to 50 year serviceable life) being in the order of 0.1%.
- when the Ava Railway Bridge is eventually replaced with a longer bridge the whole flood containment system of the river is likely to be able to achieve the final containment objectives of the HRFMP;
- WRC Regulatory are seeking a condition under which the Applicants would be required to prepare and have certified an Ava Railway Bridge Risk Reduction Plan the purpose of which is to identify whether there is an increased risk of stopbank overtopping or failure as a result of the RiverLink works and if so, the options available to mitigate this risk.
- the Applicants oppose the inclusion of such a condition.

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17 The title of this document identified in the Applicants' Closing Submission is Flood Response Procedure which we take to be the same document as that identified in WRC's Closing Submission at [4] as Emergency Management Plan

[171] From this summary it can be seen that the experts have agreed that with flood flows below 2,800 cumecs there should be no overtopping and from Mr Symmans' evidence, the risk of a 2,800 cumec flood occurring before the bridge is replaced would be less than 0.1%.

[172] To assist us in obtaining an alternative understanding of Mr Symmans' evidence on the probability of stopbank overtopping before the Ava Bridge is replaced, we have undertaken a review using information sourced from two documents, GW's s87F Report and Technical Report #1 in the AEE.

[173] In the s87F Report, a 2,300 cumec event is recorded as having an ARI[18] of between 460 and 2,100 years under current climate conditions and between 60 and 140 years in a 2130 climate change scenario (depending on the climate change scenario assumptions made).

[174] In this same report, the 2,800 cumec design flood has an ARI of between 3,100 and 67,000 years under current climate conditions and an ARI of between 260 to 1,400 years in a 2130 climate change scenario.

[175] From Technical Report #1, flood peaks with an ARI of 100 years are estimated to be 1,897 cumecs under current climate conditions and 2,473 cumecs in 2130 with climate change adjustments (an increase of around 500 cumecs from the effects of climate change over the intervening period of 110 years).[19]

[176] The experts have agreed that with flood flows below 2,800 cumecs there should be no overtopping. Guided by the flood peak modelling results in Technical Report #1 as set out above, if the existing Ava Bridge is replaced in the next 50 or so years, the peak 100 year ARI flow in the river at the time of replacement (say in 2080) would be well below the 2,473 cumecs modelled for 2130. From this we conclude that the risk of any overtopping up to the time of the bridge replacement should be negligible. Without doing the maths, our review aligns in general terms with Mr Symmans' evidence that the risk of a 2,800 cumec flood occurring before the bridge is replaced would be less than 0.1 %.

Finding on Stopbank Resilience

[177] The stopbank was upgraded to modern design standards as recently as 2010 and, notwithstanding Mr Martell's references to the NZSOLD assessment guidelines, we are

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18 ARI is an acronym for Annual Recurrence Interval

19 Technical Assessment #1 River Hydraulics at Table 1

satisfied from Mr Symmans' evidence that the stopbank should have more than adequate resilience to withstand the effects of any overtopping if indeed this was to occur.

[178] Also, if there was to be overtopping, we accept Mr Symmans' evidence that this would be very short term with insignificant consequences and very little damage with the overflowing water most likely being contained within the adjacent Market Grove carriageway.

[179] Taken together, we find that the risk of overtopping of the stopbank before the Ava Railway Bridge is replaced to be negligible, that the recently strengthened stopbank should have more than adequate resilience to withstand the effects if any overtopping did occur and that in this situation, any overflowing water would be contained within the Market Grove carriageway.

[180] Our overall finding, therefore, is that the condition proposed by WRC Regulatory is not required and does not need to be included in the RiverLink conditions.

[181] Even though it was not tested before us, we acknowledge that WRC has a Flood Response Procedure in place for the river with the Applicants' advice that the Procedure is to be updated post the construction of RiverLink.

[182] It would seem to us that, despite our finding not to include WRC Regulatory's proposed condition in the RiverLink conditions, this would not preclude WRC reconsidering this issue if it deemed this to be appropriate when it comes to update the Procedure post the completion of the RiverLink works.

Compliance with the PNRP

[183] With respect to the PNRP, Policy 27(d) provides:

> Use and development, including hazard mitigation methods, in on or over high hazard areas shall be managed to ensure that: ...
>
> (d) the development does not cause or exacerbate hazard risk in other areas unless effects are avoided, remedied or mitigated in accordance with a hazard risk management strategy, and

[184] The PNRP defines a 'hazard risk management strategy' as:

> A coherent, integrated framework for the management of a hazard risk to avoid increasing, or reducing if practicable, overall risk of social, environmental and economic harm and adverse effects from natural hazards.

[185] We have found that in the period between now and the likely time of replacement of the Ava Railway Bridge, both the risk of overtopping of the stopbank and the potential consequences if there was any overtopping are negligible. Accordingly, we find that the RiverLink development should not cause or exacerbate hazard risk in this area and therefore that the development will satisfy Policy 27(d) of the PNRP.

Traffic and Transportation

[186] In the context of this decision we have taken "traffic" to mean the use of engineering techniques for movement on roadways and "transportation" to involve the movement of a range of modes from one place to another.

[187] Mr Duncan Tindall identified a range of traffic and transportation benefits which would follow the implementation of the Project. These included:

(a) an increase in the mode share for active and public transport modes, which is in accordance with several key national and local policies and strategies;
(b) improved safety to cyclists and pedestrians within Lower Hutt central city as a result of the additional paths and crossing facilities delivered by the Project;
(c) improved multi-modal access to the new Melling Station and between the new Melling Station and Lower Hutt central city as the new pedestrian and cycling bridge provides a more direct connection over the Hutt River away from vehicular traffic;
(d) more reliable bus journeys arising from the signalisation of current roundabouts in Lower Hutt central city;
(e) a safer and less congested environment in Lower Hutt central city as a result of more through traffic movements occurring on SH2 as the delays at Melling Interchange are removed by the grade separation; and
(f) safety benefits for road users from the grade separation of SH2 at Melling Interchange, including a likely reduction in the annual injury crash rate from 4 per annum to 0.3 per annum, and reduced death and serious injuries (DSIs).

[188] Mr Tindall also identified a number of adverse effects arising from the Project. Primarily these include difficulties of access to around 140 properties in the Project area and a net loss of 600 – 700 carparks arising primarily from the construction of the stop bank over the area currently used for parking with potential adverse safety effects for road users from this loss. During construction there would also be journey delays and localised access restrictions with potential adverse safety outcomes for both traffic and active mode users.

[189] During construction, Mr Tindall recommended the development of a Comprehensive Traffic Management Plan and Site Specific Traffic Management Plans for specific locations (which we come back to below). Even with these in place, he said that adverse effects during construction would still be significant and unavoidable.

[190] With respect to parking during construction and afterwards, he said that proposed mitigation measures included a review of public parking within and adjacent to the Project area with the implementation of changes to time restrictions and pricing mechanisms so as to achieve an appropriate balance between supply and demand and short term and long term parking needs. We also come back to this below when we discuss the proposed conditions on parking.

[191] In response to concerns raised in submissions that the design of the intersection of Tirohanga Road and Harbour View Road would lead to user delays, Mr Tindall advised that the grade separation at SH2 will allow for significantly more "green time" for the combined traffic from these two roads and that there would be significantly reduced delays compared with those currently being experienced. Overall, he did not expect there to be any congestion or safety issues for the users of these two roads.

[192] With respect to roads to the east of the river, Mr Carey Morris said that while the designs of the reconfigured intersections for these roads have been developed sufficiently for consenting purposes, these will be subject to further refinement in the final design phase of the Project (although aspects such as the number of lanes and configurations (e g signalisation) were not expected to change).

[193] We asked Mr Andrew Whaley to attend the hearing as we had questions about the working hours and days and approach he had assumed when putting the construction methodology together including those which would have an impact on traffic movements particularly at night.

[194] Mr Whaley said:[20]

> The general working hours, based on allowable noise limits, for the Project will be Monday to Saturday, from 7.30 am – 6.00 pm: however, there will be some flexibility required for activities best undertaken outside these hours. Work outside the general working hours will require a site-specific assessment as to the application of the best practicable options to mitigate effects.

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20 EIC at [15]

[195] Mr Whaley expanded on his evidence outlining the types of activities that might occur outside the general working hours and the reasons for that. That included delivery and establishment of over-dimension equipment and large construction elements like bridge beams under traffic management conditions; often completed as off-peak night work. He said that would be a single night activity per item typically coming via SH 2 overnight while the traffic on the highway is less. With for example the bringing in of bridge beams it might take several nights in succession to get them all in. He said the biggest elements anticipated are the bridge beams themselves for the pedestrian bridge, the Melling River Bridge and then the Melling Interchange Bridge.

[196] In terms of short duration activities requiring significant traffic management Mr Whaley said this predominantly focusses around shifts and changes between stages, for example, when there is the new section of the SH 2 carriageway and a shift is required to put the traffic on it to make the existing carriageway available to work on. Those traffic management shifts would be likely to be done overnight while the traffic is manageable rather than during peak hours or the interpeak during the day when it is busier. That would also apply to the Hutt City road works. This approach would be safer and more manageable for the crews working on the Project construction.

[197] He also mentioned that there would be some minor works, with an example at the intersections within Hutt City needing footpath improvements that it is preferable to do overnight so as not to interrupt foot traffic and trade for commercial purposes. He said a lot of that will actually be agreed with the owners of those particular premises, whether they can live with disruption during the day or so forth.

Conditions on Traffic

[198] Condition 35 requires that, prior to the start of construction, the consent holder must undertake a public parking review to provide input to a Transitional Parking Plan which is to inform decisions for the provision of public carparks to support the commercial and retail businesses of the city centre both during construction and following completion of construction.

[199] Condition 36B provides for the refinement of the designs of the reconfigured intersections referred to by Mr Morris.

[200] Condition 37 requires the consent holder to engage an SQP to prepare a Construction Traffic Management Plan (CTMP) for the management of construction and general traffic during the construction of the Project. The CTMP is to address a range of issues including the

public safety of pedestrians and cyclists, the minimisation of delays and disruption to traffic, maintaining access for emergency vehicles, and informing the public on these matters as an ongoing input to the Communications Plan.

[201] This same condition also requires that the CTMP is to be consistent with the November 2018 version of New Zealand Transport Agency Code of Practice for temporary traffic management (CoPTTM).

[202] The CTMP is required to address a wide range of methods for managing traffic effects[21]. These include how access to the contractor's yard at 705 Western Hutt Road is to be managed, the management of adverse construction traffic effects on Pharazyn Street, methods to maintain bus and user access, methods to minimise the use of Connolly Street for heavy construction vehicles, methods to maintain where practicable safe and clearly marked pedestrian and cycle access for roads, footpaths and the river corridor, parking management consistent with the Transitional Parking Plan and methods to minimise the effects of construction staff and contractor parking on the availability of all day public parking.

[203] Condition 39 requires that Site Specific Traffic Management Plans (SSTMPs) are to be prepared by an SQP for the specific locations identified in the CTMP based on the measures listed in Condition 40. In particular, these measures are to include the maintenance of passenger transport services and facilities including school bus routes and timely access to Hutt Hospital.

[204] We are unclear as to what is intended by "additional forecasted traffic" in Condition 36B. What year does that apply to? This condition needs to be clarified and we have included it in the list of matters in Appendix 1.

Cycling and walking - Outline Plan Conditions

[205] Before evaluating the issues still in contention between the cycling and pedestrian submitters and the Applicants, we summarise here the Outline Plan of Works' conditions proposed by the Applicants for finalising the designs of the pathways and other active transport routes to be constructed under the Project.

[206] Condition 3A requires the submission of an Outline Plan of Works to the Manager for - all cycle paths, shared paths and footpaths, pedestrian and cycle crossing points and all other

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21 19 methods are listed in the condition

intended active transport routes in accordance with s176A RMA. The condition lists the information which must be provided as part of this Outline Plan of Works process.

[207] Condition 14A requires the establishment of a Project Design Liaison Group (PDLG). The PDLG requires that (among others) up to two representatives of the Port Nicholson Cycling Club, the Hutt Cycle Network (and Living Streets Aotearoa) be invited to participate in the PDLG process. The purpose of the PDLG is to promote safe and useable cycle and pedestrian facilities including sharing information and seeking feedback on the detailed designs relating to cycling, walking and accessibility and to raise areas of concern or identify opportunities for the Project team to respond to. It requires the Consent Holder, when preparing the Outline Plan, to include a list of matters not resolved in whole or in part (presumably within the PDLG) with reasons.

[208] Condition 36A requires that the detailed design of active transport facilities within the Project (and the Outline Plan required by Condition 3A) must be suitable for the "level of usage" anticipated by the Consent holder. It contains design standards that are to apply to the active transport facilities shown on specific drawings. All new and modified shared paths and segregated and separated cycle paths must be surfaced in asphalt or concrete (36A(c)). Condition 36A(d) specifies all new and modified pedestrian cycle facilities, including the proposed pedestrian and cycling bridge, must be designed and constructed to provide a minimum width of:

i. 3m for cycle paths
ii. 3m for cycling and 2m for pedestrians and a vegetated strip between for the separated path from the new Melling Station to 300m south of Belmont School
iii. 4m for the lower shared path from Ewen Bridge to new Melling Bridge, adjacent to the true left bank of the river
iv. 3.5m for the shared path on top of the stopbank on the true right bank, between Ewen Bridge and new Melling Bridge
v. 3m for shared paths elsewhere

unless localised narrowing is required to accommodate specific constraints in which case no less than 1.2m, for a length of no more than 3m, is permitted to make sure the path remains accessible for its intended purpose.

[209] Condition 36B requires the consent holder to demonstrate through the provision of updated traffic modelling results that the intersection of Kings Crescent with Queens Drive and Bloomfield Terrace will accommodate the additional forecasted traffic to a level of service E or better for all approaches and if this is unable to be achieved, the consent holder will be required to confirm mitigation measures for future works to improve these intersections and broader mode change initiatives to reduce background traffic levels.

[210] Condition 36C requires the Consent Holder to undertake detailed design and post-construction road safety audits (including all new and modified pedestrian and cycling facilities) and if significant or serious matters are identified, for these to be provided for information to the relevant road controlling authority. In doing so we note that there is also provision in this condition for recommendations to be made on the findings of the safety audits for areas beyond the Project area.

[211] Condition 36D requires the Consent Holder to engage a Suitably Qualified Person (SQP) to undertake a review of the operational safety of the shared paths within the Project area once these have been in use for a minimum of 12 months after the completion of the Project Works. If this review identifies any significant or serious safety concerns arising between path users, the SQP must recommend mitigation measures with these to be implemented as far as practicable.

[212] Our finding on these Outline Plan conditions is that conditions 36A and 36B are to be amended to provide more specificity on what is meant by "level of usage" (36A) and "additional forecast traffic" (36B). In addition, as set out below, conditions 36A and 3A are to be amended to respond to our findings on the provision of the pathway(s) on the TLB including the section from the new Melling Bridge to Ewen Bridge, the slip lane on Pharazyn Street and the pathways just south of the Kennedy Good Bridge.

Standards and Guidelines

[213] Documents that had some focus in the evidence on provision for cycling and walking are:

- New Zealand Pedestrian and Planning Design Guide (NZPP&DG) 2009;
- Austroads Guide to Road Design Part 6A Paths for Walking and Cycling (AGRD Part 6A) 11 February 2021;
- The UK's 2020 'Gear Change: A bold vision for cycling and walking' guide;
- The UK's Sustrans ("Sustainable Transport").

[214] Mr Roger Boulter on behalf of Living Streets Aotearoa considered that the AGRD Part 6A Paths for Walking and Cycling should only be used for guidance insofar as it adds value to the NZPP&DG that already exists. Mr Boulter was of the view that where the two guides conflict, the NZPP&DG rather than the AGRD Part 6A should be followed.

[215] Mr Simon Kennett for the Applicants and Dr Glen Koorey for CCS referred to work underway in New Zealand to further revise the existing path width guidance, with Dr Koorey

stating this would result in even lower thresholds at which separated paths would be recommended (and with often wider dimensions). Dr Koorey accepted these new guidelines are yet to be confirmed, but said that they indicate the direction that design standards in NZ for walking and cycling have been taking over the past few decades. On this aspect, we refer to what we have said below about the clear case for having separated pedestrian and cycle paths from the outset.

[216] We are not bound to follow New Zealand Standards[22] (or for that matter international standards) and New Zealand or international guideline documents.

[217] We also note the continuing evolution of those documents, to catch up with factors such as climate change and the recognition of the health benefits of more active transport modes, along with changing attitudes and practices during the Covid-19 pandemic.

Cycling issues in contention

[218] The closing legal submissions on behalf the combined cycle submitters (CCS) identified six cycling related issues which remained in contention at the end of the hearing with CCS noting that these issues had not been addressed to their satisfaction in the Applicants' 3 May 2002 condition set.

[219] The issues were:

- Mode shift – more generally - and the related issue of expected demand;
- The extent of the need for separated paths – both as a general principle, and particularly with regard to the path on the True Left Bank (TLB);
- Adequacy of the alternative commuter route north off SH2, including the adequacy of conditions at the Pharazyn Street multi-modal intersections and the cycle routes and level of service around the Kennedy Good Bridge;
- Cycle facilities over the new Melling Interchange and Bridge;
- The key intersections in the CBD that continue the routes for cyclists crossing the pedestrian/cycling bridge, and the Melling River Bridge; and
- Conditions sought by cyclists around path lighting and on-going maintenance.

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22 *Mcintyre v Christchurch City Council* [1996] NZRMA 289, *ZJV (New Zealand) Ltd v Queenstown Lakes District Council* [2015] NZEnvC 205 at [92] and *Meridian Energy Ltd v Wellington City Council* [2011] NZEnvC 232 at [108]

[220] We address each of these issues in turn but before that we consider evidence, including on health benefits and safety, from witnesses other than experts engaged by the Applicants and CCS.

[221] Dr Caroline Shaw, an epidemiologist and public health medicine specialist gave evidence on the uncontested health benefits of more active modes of transport. She said:[23]

> So if we want to enable mode shift towards cycling and away from cars, the infrastructure needs to work well for the types of trips that are relevant to mode shift, so that's ... utility cycling trips, it needs to be safe and efficient, not hugely longer in distance or time, and it gets people to the places that they need to go, so the shops, the schools, the pools, all of those sorts of things that are relevant to people's lives, and ... the way to enable this for people who don't cycle and for people who have things like caring responsibilities, which is largely women still, is to provide separated cycle facilities ... from everyone including pedestrians.

[222] Dr Marion Leighton, who works with patients with acute and chronic health conditions, also gave evidence on the relationship between transport and health outcomes. She took a broader view of the health impacts of the Project. She covered the contribution of regular physical activity including cycling to preventing or improving chronic health conditions. Her concern was that there has been a focus in the Project on minimising road trauma rather than the health benefits of increased physical activity.

[223] Several cycling witnesses referred in their evidence to injuries they had suffered while cycling in support of the need for safer cycling facilities.

[224] Ms Larri Wallbridge gave evidence that for her personally to be attracted to an alternate path over continuing to ride on SH2 it must support an easy flow and quick commute times, provide full separation from pedestrians, be well maintained and be away from dogs off-lead. She also did an internet survey of the preferences of people currently cycling on the road on SH2 north of Petone, receiving 167 responses. In her view the perception of safety by cyclists is a factor that should be considered when assessing safety.

[225] Mr Matthew Young, one of three witnesses for the three cycle submitters who prepared a combined statement of evidence, said that their evidence on RiverLink reflected the views of several thousand cyclists for the Hutt cycle network, the Port Nicholson Poneke Cycle Club and Cycle Reach. Dr David Tripp, the second witness said that this also includes doctors for

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23 Transcript at 264

active safe transport, a network of over 130 Wellington and Hutt Hospital doctors who daily face the negative outcomes of our transport system in terms of more cancer, heart disease and diabetes. He said this is a daily tragedy for many of our Hutt Valley whanau.

[226] The witnesses spoke to threefold concerns: safety, estimates of demand and planning of networks. Dr Tripp had been involved in the 2006 cycle strategy and spoke of some frustration about the speed and nature of the delivery of connected networks for cyclists and pedestrians.[24]

[227] Mr Darren Conway, the third witness said that:[25]

> ... safety matters ... [i]n particular with shared paths. Safe systems, including vision zero, adopted by Waka Kotahi, do not rely on human behaviour, such as being courteous, to achieve safety. The application of the principle is to design infrastructure so that when human behaviour doesn't work people are still protected. No cyclist can rely on a dog, or a toddler, understanding signs or courtesy. No pedestrian especially the frail should have to fear a collision with a cyclist. ... Cycle infrastructure must be designed to be safe rather than just hoping people can or will do the right thing.

[228] For completeness we note that Mr Kennett gave rebuttal evidence on and attached the Riverlink Cycling Safe System Assessment (SSA) dated 22 February 2022. That assessment varied from a standard SSA with a focus solely on the safety of cycling in and around the scheme. It concluded that the RiverLink Project provides a higher alignment to the Austroads safe system principles and a safer environment for cyclists than the existing situation. We find that unsurprising given the unsatisfactory nature of the existing situation.

[229] Ms Merran Baker, who was not required to appear before the Court, gave evidence expressing a concern that the RiverLink plans indicate improvements to cycle paths that do not go far enough to attract the interested but concerned riders. A concern was that without separated paths for foot traffic and cyclists both parties will be poorly served.

[230] All of the above points made by the witnesses are important. We consider them in relation to not only the positive and adverse effects on the environment of allowing the proposal but the other statutory matters under the RMA. That includes our consideration of conditions.

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24 Transcript at 429
25 Transcript at 428

Mode shift and mode share

[231] We now clarify the meaning we give to the term mode shift; - mode should be taken to mean the type of movement or transport to be used – ranging from walking, to cycling or using other wheeled devices such as scooters, skateboards, wheelchairs (all whether powered or not), through to motorcycles and cars, to public transport (eg buses or trains). Shift is the encouragement and facilitation of changes of mode – generally away from cars and towards public transport, cycling, devices and walking.

[232] Quite aside from the issues of enjoyment, and health and wellness, there is undoubted benefit in moving travellers away from motorcar use and towards walking, cycling (or other small devices) and public transport. The benefit can arise in many ways – eg less road congestion; better road safety; less demand for parking space. We should note here that our consideration of the desirability of mode shift does not include issues of preventing or reducing the discharge of greenhouse gases to prevent or reduce climate change. That is because of the content of s7(i) and s104E RMA.

[233] As noted by Mr Bennion in his submissions for the cycling groups he represented, there are a number of public documents which, while not made under the direct auspices of the RMA, are very relevant to the issue of mode shift and to environmentally sound outcomes. They are documents coming from central government, the NZTA, and the Regional Council and are helpful in explaining what all relevant agencies can seek to achieve.

[234] The first of the documents to be referred to under this heading is the Government Policy Statement on Land Transport 2021. In Section 2.2 of the document, safety is highlighted as a *strategic priority*. As one of the co-benefits the issue of *Inclusive Access* is mentioned as follows:

> Many New Zealanders are reluctant to travel by foot, bike, or micro-mobility options due to a lack of safe infrastructure. Safer roads, footpaths and cycleways, as well as safe public transport services, will give people a wider range of quality options to access opportunities.

[235] And one of the means of delivering that outcome is specifically noted as: -

> enhancing the safety and accessibility of footpaths, bike lanes and cycleways.

[236] The Applicants do acknowledge – see eg Ms O'Callahan's rebuttal evidence, para 34 – that an increase in mode share for active and transport modes would be in accordance with several national and local policies and strategies, but consider that the Project's objectives and planning framework do not support conditions aimed at mode shift. We cannot agree with that

view. It is a somewhat surprising view since the conditions themselves refer to "mode shift" (see Condition 36B, with its reference to "broader mode change initiatives to reduce background traffic levels").

[237] Policy 57 of the Regional Policy Statement provides that:

> When considering an application for a resource consent, notice of requirement, or a change, variation or review of a district plan, for subdivision, use or development, particular regard shall be given to the following matters, in making progress towards achieving the key outcomes of the Wellington Regional Land Transport Strategy:
>
> (a) whether traffic generated by the proposed development can be accommodated within the existing transport network and the impacts on the efficiency, reliability or safety of the network;
> (b) connectivity with, or provision of access to, public services or activities, key centres of employment activity or retail activity, open spaces or recreational areas;
> (c) whether there is good access to the strategic public transport network;
> (d) provision of safe and attractive environments for walking and cycling; and
> (e) whether new or upgrades to existing transport network infrastructure have been appropriately recognised and provided for. (emphasis added)

[238] The *explanation* in the Policy goes on to state:

> Progress towards the Wellington Regional Land Transport Strategy Key Outcomes cannot be achieved by that strategy alone. Subdivision use and development decisions also need to consider impacts on the strategy's outcomes.

As noted, Policy 57 lists matters that need to be given *particular regard* when considering all proposals in terms of their effect on land transport outcomes. The Wellington Regional Land Transport Strategy Key Outcomes are:

- Increased peak period passenger transport mode share;
- Increased mode share for pedestrians and cyclists;
- Reduced greenhouse gas emissions;
- Reduced severe road congestion;
- Improved regional road safety;
- Improved land use and transport integration;
- Improved regional freight efficiencies.

(emphasis added)

[239] Some comment may be useful here. Para (d) of Policy 57 was discussed during the hearing – particularly about what the latter part of the term ... *safe and attractive* ... should be taken to mean. Ms O'Callahan took the view that attractive meant *visually appealing*. While such an attribute could help increase the numbers of people using the environment in question, we consider that the term, in this context, should be seen as meaning much more than just visually appealing, or *"pretty"*. We would include attributes such as having a comfortable surface – one that, for instance, does not, at one extreme, have large and deep puddles, or

soft and slippery mud; or at the other, rough and uneven cobblestones. Also, that the walking or cycling environment has attributes such as easy and convenient access points and good visibility to enable hazards or impeded access to be readily seen. Further, the attribute of safety – eg the reducing of the possibilities of collisions with other users is, in our view, very much part of being attractive. We note too the definition of attractive in the Concise Oxford Dictionary – *having qualities or features which arouse interest.*

[240] Policy 57 specifically mentions ... *making progress towards achieving the key outcomes of the Wellington Regional Land Transport Strategy.* As noted above those outcomes specifically include ... *increased passenger transport mode share; and ... increased mode share for pedestrians and cyclists.*

[241] Under Section 2.3 - Strategic Priority: Better Travel Options, the Policy Statement on Land Transport notes, under the heading Healthy and safe people:

> Better active travel options will support positive, physical and mental health. Mode shift and smoother traffic flows will improve air quality.

And under the further heading of *Environmental Sustainability* there is the note:

> People will have better options for low emissions travel modes, including active modes and public transport.

[242] Mode shift is undoubtedly regarded as a matter of importance in the region, of which the Hutt Valley is part. For instance, the Wellington Regional Land Transport Plan 2021 - published by the Regional Council - is a document to which all councils in the region, together with NZTA and KiwiRail, have contributed. In its Executive Summary, it contains relevant background comments such as these:

> The Wellington Region is made up of connected cities, towns and rural areas. What happens in one area affects the others. ...
>
> We want the transport network to enable the region to grow in a way that makes it easy for people to get around, while creating less congestion, fewer emissions and more liveable spaces.

It describes wanting a transport network that will, among other things, *minimise impacts on the environment.* The document sets out three targets (which it describes as being *ambitious*) and they include one of particular relevance:

> *Mode share – 40 percent increase in active travel and public transport mode share.* In 2018, 28 percent of all trips in the Wellington Region were made by public transport and active travel. By 2030, we want to increase this to 39 percent of all trips.

[243] In describing the challenges faced in achieving the *targets* the plan mentions as one of the *priority areas for investment*:

> Travel choice. Make walking, cycling and public transport a safe and attractive option for more trips throughout the region.

[244] A further document of interest is the *Regional Mode Shift Plan Wellington 2020*, published by the NZTA. The document's summary contains this relevant portion:

> Cycling is increasing but from a low base. Newly completed cycle facilities around the region have increased people's ability to cycle safely, but there are still significant gaps in the network that impact on use of active modes (especially for commuting). Latent demand for cycling could be realised with continued progress with both transformational projects (eg Te Ara Tupua) and other potential separated facilities to create a connected regional cycling network. The growing popularity of e-bikes and bikes on buses are also increasing the number of cyclists and cycle trips in the region, and shared e-scooter and bike schemes are an emerging way of getting around.

[245] At page 25 of the Mode Shift Plan is the following:

> *Making shared and active modes more attractive*
>
> Momentum is building in the region with investments in, and improvements to, active and shared mode infrastructure, with recent catchup investment in our rail network, a new bus network, several new walking and cycling facilities, emergence of micro-mobility options in Wellington City and Hutt City and travel promotion initiatives for cycling and school travel.
>
> To unlock mode shift in the region, ongoing investment and infrastructure and service provision is key, especially those that support increased capacity and service levels for public transport on rail and bus to manage overcrowding and to make public transport attractive, as well as a network of separated cycling and micro-mobility infrastructure.

[246] And the document goes on to discuss topics such as:

> Make walking and cycling safe and attractive travel choices by prioritising these modes in the design and layouts of our streets.

And has this statement:

> A particular opportunity exists through the relatively new technologies of e-bikes and e-scooters, which can help overcome issues of hills, wind and distance. This opportunity will only be realised if there are substantial improvements to street design and the provision of safer dedicated infrastructure. Cycle network planning needs to take e-bike use and the proportion of women that cycle to travel to work into account.

[247] In discussing changes in mode share over the ensuing 15 years the document says:

> We envisage a proactive approach that brings forward improvements so that the share of shared and active modes can continue to improve at pace.

[248] In our view, there simply can be no doubt that those outcomes, described in the Policy statement as requiring particular regard, are very significant, and taking all reasonable steps to increase mode share is an important factor.

Cycleways and pathways – separation, segregation, sharing and safety

[249] The issue of the separation, segregation, sharing and safety was rather fundamental to the cycling parties' concerns and positions. A shared pathway (we will use that term for pedestrian ways and cycleways) is one that is intended to accommodate both cyclists and pedestrians travelling in both directions, and without physical or signed separation between the parts (ie left side/right side) of the pathway that each may use. Depending on the width of the pathway, and the numbers of each type of user present at any given time, the issues of convenience, and safety, are perfectly obvious.

[250] A segregated pathway is one that has painted indicators on its surface, showing which part of it should be used by cyclists and which by pedestrians. Again, width and the numbers of both types of users (and their inclinations to "follow the signs") will be significant to comfort and safety outcomes.

[251] *Separated* pathways are, obviously enough, intended for use by only one set of users. The two parts may be separated by a railing or similar structure, or they may be far apart – ie having no common starts, finishes or courses.

[252] Policy 57 of the Regional Policy Statement (see text at para 237]), specifically refers to *... safe ... environments for walking and cycling.*

[253] The issue of *user safety* dominated the concerns about this part of the Project. In one form or another, the Project, as presented, includes c6km of cycle paths – about equally divided between the east and west sides of the river. There really cannot be any viable argument with the proposition that separated paths – ie those having cyclists and other small mobility device riders on one path, and pedestrians and dog walkers on another - with clear physical separation between the two - is the safest for everyone. So there would need to be a compelling reason not to do that, when we have a *blank canvas* Project and the room to do separate paths on both sides of the river.

[254] Significantly, there is to be a separated cycle pathway on the TRB (True Right Bank - ie western side) of the river. This, we understand, arises out of an acknowledgement that it is likely to be the most used pathway for cyclists travelling north and south in commutes to and from the city area and the Melling Railway Station, with the latter having the dedicated foot and cycle bridge across the river to the CBD.

[255] Conversely, the pathway on the TLB is proposed to be shared – ie pedestrians and cyclists travelling both north and south will share one pathway. While the TRB paths can expect significant user numbers, we are also conscious that the TLB of the river connects to much higher population numbers in the valley floor suburbs of Hutt City, and might be expected to attract high rates of commuter, casual and recreational use.

[256] Also, as was emphasised by one cyclist submitter, from a safety perspective, running any kind of cycle path through a dog park as is the case at the northern end on the TRB inevitably raises the level of risk for both types of users. We use the term raises in the sense that almost inevitably there will, from time to time, be unrestrained dogs in any of the open areas around the river – just as there is in any recreational or open area, and that of itself carries a risk of course. But to place an unfenced cycle path in any area specifically designated as a dog playing/exercise area is to knowingly impose a raised risk for all users - the cyclists, the dogs, and their owners. The separation of the areas of such incompatible activities requires attention in the design of the project, and perhaps also in the consent conditions. Conditions should be amended appropriately.

Pathway(s)

[257] The Applicant's general position on the provision of pathway(s) was one of deferral – ie that if experience shows in the future that shared cycle and pathways are dangerous or ineffective – by way of injuries, or worse, to users and/or a low rate of people shifting from cars to other modes - then the creation of separate cycleways and pathways can be done at some presently unknowable date in the future. We cannot agree with that general position.

[258] Also, the Applicants' argued that the 200% increase in use by 2050 in Mr Kennett's estimate for the TLB provides for a considerable uptake in demand. We agree with Dr Koorey that this estimate of future demand may not be enough when thinking about the relative changes that might be seen in that time. We also accept his evidence about the importance of a cycleway being of good quality.

[259] We note also that there was evidence that left us with some doubt about whether it was as simple as had been suggested to retrofit inadequate provision of such facilities with separate cycleways and pathways. Mr Kennett referred to places where there might be culverts or short bridges or retaining walls built around steep parts of the environment where you might want to future-proof the design to allow for path widening at a later date without incurring the expense of re-doing those particular aspects. He gave an example of the area beside the Melling substation where there is an existing narrow path where it would be difficult to put in a wider path. He said a separated path might be better on an alternative route, it being not feasible to try and squeeze paths in between the river and the existing substation. Another example is the very large carpark by Melling Bridge on the eastern side where he considered path widening might be realistic but providing separated paths might be unrealistic because of the amount of space left between the river edge and the edge of the carpark.

[260] We accept that constructing separated paths on the TLB between the Ewen Bridge and the Kennedy Good Bridge, rather than a shared or (at the least) a segregated path, will have a significant cost impact. Given that the Project as a whole is going to take some considerable time to complete, and that the TLB pathway/cycleways will not be completed until the new Melling Bridge is in place, we have the clear view that working on the basis that the safest and most efficient alternative should be the one approved by a condition is the course to be followed.

[261] We find that the case has clearly been made for a separated cycle path for the TLB between the new Melling Bridge and Kennedy Good Bridge. Where feasible, this could involve repurposing one (or part) of the existing paths rather than necessarily creating a completely new path.

[262] For the section between Melling Bridge and Ewen Bridge on the TLB, we accept the evidence of Mr Kennett that the placemaking function of the riverside area is very important and that a "slow zone" is appropriate to mitigate the risk of cyclists travelling too fast and colliding with pedestrians, scooter riders and slow cyclists who might cross this route at multiple locations.

[263] We accept also the points made by Dr Koorey on why it is *tricky* to deal with "slow zones" given unpredictable human behaviour and their reliance on users doing the right thing.

[264] For this section, between Melling Bridge and Ewen Bridge therefore, we find that there should be a shared path of minimum 4m width as recommended by Mr Kennett with suitable

"slow zone" provisions installed for the safe protection of both the path users and those recreating on the areas adjoining the path.

[265] We would expect not only careful design treatment of this "slow zone" but as well, a process for dealing with any problems that might arise through the ongoing monitoring (not just for one year) of its safety for all users in conjunction with a feedback loop for implementing any corrective measures identified through this monitoring process. However, we do not prescribe this in conditions.

[266] There is to be a reference in Condition 36A (and consequential amendments to Condition 3A) to the provision of a separated cycle path on the TLB between Melling Bridge and Kennedy Good Bridge with the area between Melling Bridge and Ewen Bridge to be identified as a "slow zone" (and to be marked on a plan so there is no confusion about the area involved).

[267] We note that Condition 36A(d) refers to all new and modified paths having a minimum width of 3m for cycle paths. From the evidence that also seems an appropriate width for the separated cycle route on the TLB between the new Melling Bridge and Kennedy Good Bridge with this to be added in as a new item (aa), along with an indicative drawing (even if that were to include route options for consideration in the detailed design).

Pharazyn Street Crossing

[268] A new separated cycleway is to be constructed on the TRB of the river starting from just south of the new Melling Station through to the Kennedy Good Bridge. This cycleway will connect at its southern end with a new section of cycleway currently being built further south.[26] From this connection point, the cycleway will run north along the eastern side of the Melling Railway line to just south of the site of the new Melling Railway Station. From there it will turn right towards the river, crossing both Pharazyn Street and an immediately adjacent shared pathway "at grade". It will then pass under the new cycle/pedestrian bridge, onto and under the new Melling Interchange and then onwards on the berm of the river to the Kennedy Good Bridge.[27]

[269] CCS are concerned that where this cycleway crosses Pharazyn Street there will be increased vulnerability to cyclists from articulated trucks entering, travelling along, and exiting the service lane serving 57-71 Pharazyn Street. CCS note also that this will be a new cycle

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26 This cycleway which is currently under construction is not part of the Project

27 Drawing No A16-4381-L201, L202, L203. (Morris rebuttal evidence at Appendix A)

route which is to have a key role in mitigating the poor safety for cyclists who currently use SH2.

[270] CCS has sought that the slip lane clause in Condition 3A(a)(ii) (headed by the term *safety for all modes)* be amended as follows:

a. Crossings for cyclists and pedestrians which enhance the attractiveness and functionality of those modes;
b. Ensure a high enough level of service for cyclists in order to maintain the TRB path as a preferred route for most cyclists who would otherwise have remained on SH2;
c. Provision for an articulated truck to enter, travel along and exit the service lane serving 57-71 Pharazyn Street <u>including consideration of shifting the entrance-way to the slip lane if required to also accommodate the above objectives.</u> (The underlined words have been emphasised in the CCS submission)

[271] In the condition set attached to its closing submission, the Applicants have proposed the wording to this condition intended to make it clear that the location of the slip lane will be considered. We find that it would be clearer if the Condition is worded as follows:

> Location of entrance, and provision for, an articulated truck to enter, travel along and exit the service lane serving 57-71 Pharazyn Street.

Kennedy Good Bridge and Further North

[272] CCS remains concerned that, in order to attract cyclists to use the new separated cycling pathway on the TRB, improvements are required where this pathway reaches the Kennedy Good Bridge. As currently proposed, a little south of the bridge, the TRB cycling and the pedestrian pathways merge, before bifurcating into two shared pathways, one along each side of the Belmont School with the eastern leg skirting a dog park.

[273] CCS is seeking a condition requiring:[28]

- for a Network Functionality Review to be undertaken of cycling in this area (in addition to a safety assessment) in order to assess and incorporate links to surrounding suburbs) with the consent holder confirming mitigation;
- the pathway between SH2 and the Belmont School currently proposed as a shared path to be a separated path for cyclists with pedestrian access (as at present) being maintained on the path between the school and the river;

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28 CCS Closing Submission at [17]

- for any off-road sections north of Kennedy Good Bridge to where the route connects with SH2 to be cycle only for faster cyclists and with appropriate lighting.

[274] In response, the Applicants advised that work is in hand to investigate options for cycling connections to the north of Kennedy Good Bridge, although these are outside of the Project area. This includes funding which has been approved for a sealed path to be constructed from the bridge some 700m north to Carter/Owen Street. Under investigation also is the proposed signalisation of the Owen Street/SH2 intersection which would enable cyclists to enter /leave the pathway and use the state highway to the north where there are wide shoulders from this point through to the intersection with SH58.

[275] Mr Akhylesh Keshaboina said that ultimately, NZTA's goal is to provide a dedicated cycleway through to Upper Hutt.

[276] As we have noted, Condition 36C includes provision for recommendations to be made on the findings of the safety audits for areas beyond the Project area. (our emphasis). We do not find in favour of the additional requirement being sought by CCS for a Network Functionality Review of cycling in this area to be undertaken as well.

[277] With respect to CCS's second request, as opposed to having two shared pathways, one on each side of the Belmont School, unless there are sound safety reasons for doing otherwise, we suggest that the western pathway be assigned as a dedicated cycleway with the eastern leg retained as a pedestrian pathway.

[278] With respect to the third CCS request, it would seem to make good sense to have a separated cycling path between the proposed Kennedy Good Bridge to Carter Street/Owen Street, although as this is outside of the Project area, this would be a decision for the relevant road controlling authority to make. This is not to suggest there should not be other and better provision for walking along this side of the river north of the Kennedy Good Bridge.

[279] We direct that, under the Outline Plan of Works process, Condition 3A(b)(ii) be amended to include the investigation of the designations for each of these pathways along the lines we have suggested. There should also be consideration of any safety issues relating to the passage of the pathway(s) through the area of the dog park.

Provisions for active modes on new Interchange and Melling River Bridge

[280] The position of CCS is that there should be separated cycle paths on the Interchange and the new Melling River Bridge. This position was supported in the evidence of Dr Koorey who suggested that separated cycle paths could be accommodated within the existing width of the bridge by reducing the width of the median strip and narrowing the lanes which were currently in excess of those required for a 50km/hr zone. This saving in width would allow the pathways on each side of the bridge to be widened from the 3m proposed in the Applicants' current design.

[281] The Applicants pointed out that the 3m width was a considerable improvement over the existing 1.7m wide pathways on each side of the existing bridge, with this existing space also being interrupted at intervals with lighting poles.

[282] We do not recall hearing any evidence in reply from them on Dr Koorey's suggestion for reconfiguring the lane and median widths to provide extra width for the pathways across the bridge.

[283] Mr Tindall for the Applicants advised that he had assessed a range of potential phasing and signal timings for traffic using the Interchange including active modes. These were reflected in the three traffic lanes required to accommodate the modelled traffic capacity. This work had identified that there would be a very high level of pedestrian and cycle efficiency through low cycle times and corresponding low wait times. He noted that, as recorded in the JWS, the experts had agreed that this would result in positive safety and efficiency outcomes.

[284] We address this same issue in the pedestrian issue section of this decision where Mr Boulter on behalf of Living Streets Aotearoa confirmed that this positive outcome for cyclists would also apply to pedestrians using the Interchange.

[285] With respect to the cycle use of the Interchange and the new Melling Bridge, Mr Kennett advised that that there are no cycle specific facilities in the hills west of the new Interchange and that cycling numbers would most likely remain low from this source, with only a small number being attracted to the paths on each side of the new Melling Bridge. He added that a segregated shared pathway with tactile delineators could also mitigate the concerns of more vulnerable pedestrians.

[286] In response to the issues raised by Dr Koorey, the Applicants have amended Condition 3A(b)(iii) which now requires that segregated paths across the Interchange and the new

Melling Bridge be investigated at the detailed design stage, (even though Dr Koorey (and CCS) are seeking separated pathways on the bridge).

[287] As can be seen from this overview, each of the experts had differing opinions as to what provisions should or could be made to accommodate separated active mode crossings of the Interchange and the new Melling Bridge.

[288] We make the following observations:

- The 3m wide pathways on the new bridge must inevitably be an improvement on the existing 1.7m wide pathways (as argued by the Applicants).
- The TRB cycleway which is to be constructed on the river side of the railway line is to become the primary route for cyclists travelling north/south (compared with the existing use of SH2) with the new pedestrian/cycling bridge across the river becoming a key east/west route.
- This would suggest to us that the use of the new Interchange and Melling River Bridge by these cyclists (at least) is likely to be quite limited.
- The Applicants' evidence is that, with the very limited provision of existing cycling facilities on the western hills, there is likely to be very little cycling use of the new Interchange and river bridge generated from this source.
- We did not identify any specific response from the Applicants to Dr Koorey's suggestion that wider pathways on the bridge might be able to be accommodated if the traffic lanes and the central median on the bridge were narrowed.

[289] Having made these observations, our finding on this issue is to rely on Condition 3A(b)(iii) as the basis for finalising how active modes should be accommodated on the Interchange and on the new Melling Bridge.

[290] This is in conjunction with Condition 36D which requires that an SQP is to undertake a review of the operational safety of the shared pathways once these have been in use for a minimum of 12 months after completion of the Project Works and to recommend any mitigation measures that may be warranted to respond to significant or serious safety concerns which have arisen between path users. These measures must be implemented as far as practicable within the new and altered designation areas.

Intersection/Urban Street Issues

[291] Queens Drive and Margaret Street are the continuations of the routes for cyclists crossing the pedestrian/cycling bridge and the new Melling River Bridge. CCS is seeking cycle-

only paths and protected intersections along these streets. CCS argues that it would be neither safe nor attractive for cyclists moving from the river crossing pathways into busy, multi-lane intersections where, for Queens Drive, the traffic is projected to increase from 8,200 to 14,050 vehicles per day.

[292] In more detail, the Cycling Submitters are seeking:[29]

- a separated uni-directional cycle path on each side of Queens Drive to the edge of the intersection of Queens Drive and Rutherford Street;
- a separated cycle only path to be developed in detailed design from the end of the pedestrian and cycling bridge to the intersection of High and Rutherford Streets[30], and
- protected routes for cyclists on the intersections of Queens Drive and Rutherford Street and Queens Drive and High Street.

[293] Whilst we did not find specific reference to these matters in the Applicants' closing legal submission, our understanding is that these issues would be addressed through Condition 36B.

[294] To recap, this requires the consent holder to demonstrate, through the provision of updated traffic modelling results, that the intersection of Kings Crescent with Queens Drive and Bloomfield Terrace will accommodate the additional forecasted traffic to a *level of service E* or better for all approaches and, if this is unable to be achieved, the consent holder will be required to confirm mitigation measures for future works to improve these intersections and broader mode change initiatives to reduce background traffic levels.

[295] While they may well be included within the scope of the updated traffic modelling to be undertaken under Condition 36B, the location/intersection coverage in this condition should be amended to include specific reference to the locations/intersections requested by the Cycling Submitters.

Pathway Lighting

[296] CCS are concerned that the lighting Condition 36A(e) in the condition set attached to the Applicants' closing submission does not provide for adequate lighting of some of the pathways to be constructed under the Project. We note the references to Ministry of Justice National

29 Statement of Combined Evidence of s274 Cycling Submitters at [157]

30 We were a little confused by this as these two streets do not appear to intersect

Guidelines for Crime Prevention Through Environmental Design in New Zealand (November 2005) principles (CPTED).

[297] Particular concerns are that lighting poles are not to be located on the stopbanks or on the river berms and that the level of lighting design proposed for the Project is at level PP2 (medium fear of crime) whereas the community considers that the risk of crime in the riverside areas are at level PP1 (high fear of crime).

[298] CCS claimed that no evidence has been presented to justify this exclusion. CCS is therefore seeking that Condition 36A(e) be amended to provide for the higher PP1 level (or PP2 if CPTED considerations permit in a specific location). They are also seeking that alternative design methods be permitted if lighting poles located in the floodplain or on a stopbank are identified by a hydrologist to have an impact on flood performance which is more than minor, and if minimum path widths would be compromised.

[299] With respect to flood performance, the Applicants do not agree that there is a lack of evidence about avoiding locating lighting poles on or between the stopbanks. Reasons advanced for this avoidance include debris accumulation around the poles and potential adverse ecological effects.[31]

[300] The Applicants note that amended Condition 36A(e) requires that cycle and pedestrian routes must incorporate lighting to PP1 or PP2 standard where practicable, or where there is no alternative location due to site constraints, to a minimum standard of PP4. This condition also confirms that no poles are to be installed on stopbanks; between stopbanks, or in a way which would compromise the minimum specified path widths.

[301] Condition 63 requires the consent holder to submit an Urban and Landscape Master Plan (ULMP) prepared by a Suitably Qualified Person. In particular, Condition 63(g)(ii) requires that environmental design measures under the ULMP are to support crime prevention through the CPTED principles. The development and implementation of a lighting strategy for the Project's paths and public open spaces must be undertaken in accordance with CPTED principles, with this strategy to be certified by the Manager (a defined term in the conditions).

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31 For similar reasons, as noted in the Stormwater section of this decision, installing a proprietary Treatment Device in the bed of the river has also been opposed by the Applicants

[302] However, we acknowledge the provisions of the Urban and Landscape Design Framework (ULDF), which informs the preparation of the ULMP to come, drawn to our attention by CCS in responding to the Applicants' closing, which refers to:[32]

- Functional lighting is to be restricted to areas identified as key movement routes and spaces for access and connection, and restricted from the wider site.
- Minimise the use of light poles within the river corridor to maintain the integrity of flood defences.
- Where light poles are required within the river corridor, design to minimise the risk of flood damage due to scouring or entrapment of debris.
- Light poles to the top of stopbanks are to be avoided. Where they are required in this location to achieve functional lighting levels ensure the stopbank is of sufficient width, and foundation is designed to prevent erosion.

[303] As we have noted, the Applicants' evidence was that for debris accumulation and ecological reasons (at least), lighting poles should not be located on the stopbanks nor in the floodplain of the river. We recognise that in relation to a designation s176(1)(b) of the RMA provides that:

> ... no person may, without the prior written consent of that requiring authority, do anything in relation to the land that is subject to the designation that would prevent or hinder a public work or project or work to which the designation relates, including—
>
> (i) undertaking any use of the land; and
>
> (ii) subdividing the land; and
>
> (iii) changing the character, intensity, or scale of the use of the land.

[304] In the light of the approach in the Urban and Landscape Design Framework, we question whether there is the need for such an absolute condition (Condition 36A(e)) or whether there is an alternative approach that would still safeguard the function of the stopbanks and river corridor. We ask that this be given some consideration particularly as the process involved in amending conditions in the future is not a simple one.

[305] We add of course that no matter what level of lighting is provided, users must also take personal responsibility for their own safety when choosing to use the pathways at night (as well as during the day) particularly on the more remote sections along the river.

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32 RiverLink Urban and Landscape Design Framework, p 64

Pathway Maintenance

[306] CCS is seeking that there be a cycle and pedestrian path maintenance condition including (in brief) the following key elements:

- details of the party responsible for ongoing maintenance of the pathways;
- legal access arrangements;
- a regular maintenance and inspection programme including the collection and disposal of debris and sediments;
- a post storm inspection and maintenance programme;
- ongoing inspection checklists including vegetation;
- recording and documenting works undertaken;
- a website with contact details for the logging of enquiries on maintenance issues.

[307] In response the Applicants point out that they are unaware of any similar condition being in effect across the region. They add that their understanding is that the main concern of CCS relates to who will be responsible, among the Applicants, for maintaining the individual pathways to be constructed under the Project.

[308] Their response is to refer to Condition 19 (b). This condition requires a communications plan to be prepared and updated annually during construction of the Project. The plan is to include details of a contact person responsible for the ongoing maintenance of cycle and pedestrian paths constructed as part of the Project; means for users to communicate maintenance requirements to this person, and methods for communicating this information to path users at the completion of Construction Works.

[309] While this condition responds to the maintenance of the pathways during the term of the construction of the Project, it does not address who is to be responsible for the ongoing operation and maintenance of the individual pathways post completion of construction. For example, will NZTA have ongoing responsibility for the separated cycleways on the TRB, the Interchange and the new Melling River Bridge? Which agency will have ongoing responsibility for the maintenance of the shared pathways and the new pedestrian/cycling bridge?

[310] Section 4 of the conditions, headed Operation and Maintenance Conditions, addresses individual responsibilities for the ongoing operation and maintenance of certain aspects of the Project Works. It would be of assistance to cyclists and other active mode users if a further condition could be added to Section 4 setting out the responsibilities of each of the Applicant parties for the ongoing operation and maintenance of each of the active mode components to be constructed or modified under the Project.

Pedestrian/Walking Issues

[311] We respond in this section to the evidence produced on behalf of Living Streets Aotearoa by Mr Roger Boulter (an urban transport planner) on pedestrian and shared/separated path issues and Ms Paula Warren (a planner) on pedestrian planning and condition issues.

[312] With respect to pedestrians using the new Interchange, Mr Boulter said that while there would be a lot more roads for the pedestrians to cross compared with the existing at grade intersection, traffic would be travelling at much lower speeds. He therefore placed more emphasis on convenience for pedestrians using the Interchange as opposed to their safety. He noted that phasing of the signalling for users of the Interchange was a trade-off between facilitating the flow of traffic through the Interchange and optimising wait times for pedestrians. In this context, he acknowledged that Mr Tindall had designed more lanes to stack the traffic which would benefit pedestrians (and cyclists) by reducing their waiting times.

[313] Key amongst Ms Warren's concerns were how the conditions addressed standards, minimum levels of service and certainty of outcomes. She said that she had endeavoured to find a definitive document on these issues which could be referenced in the conditions. While a level of service methodology had been used in other countries, she was not aware of this having been adopted in consent conditions on any other project in New Zealand.

[314] While she had been concerned about pedestrian pathways being narrowed on other projects thereby impeding wheelchair access, she said that she had reached agreement with the Applicants on a condition to address this. We understand this has been responded to in Condition 36A(d)(vi) which addresses localised narrowing of paths.

[315] She acknowledged the outcome in Condition 36A for pedestrian paths to be on "safe, direct and accessible routes.... as far as practicable" on the basis that these provisions would be interpreted correctly.

[316] In terms of the use of the term "practicable" or "reasonably practicable" in the conditions, she said *"I think again I'd be reasonably comfortable to have an undefined reasonable practicable in the conditions as long as it is clear what the outcomes of the project are intended to be and how you would prioritise between those outcomes so that you can then judge*

whether the reason that you are not delivering for one of the modes is reasonable or not in light of the intent of the overall project".[33]

[317] In response to a concern raised in Ms Ellen Blake's opening statement on behalf of Living Streets Aotearoa, the Applicants advised that the Indicative Active Transport Plan Long Plot had been revised to provide better clarity around the location of all new and existing footpaths.

[318] From our review of the evidence, we did not identify any Living Streets Aotearoa requests seeking amendments to details of the pedestrian facilities to be constructed under the Project.

[319] If we have missed something, as described in more detail in our section on cycling, there are a range of conditions to address the finalisation of the designs for all active mode facilities (including pedestrian usage). These have been provided for (inter alia) in Conditions 3A, the PDLG Condition 14A, and Conditions 36A, 36B, 36C and 36D (all as discussed in this decision).

[320] In particular, we note that Condition 14A provides for two representatives from Living Streets Aotearoa to be invited to participate as members of the PDLG whose purpose is to promote safe and user suitable cycle and pedestrian facilities on the Project.

Short-term parking

[321] By the time of the hearing, counsel for WRC and HCC Regulatory advised that Ms Harriet Fraser's only remaining issue of concern was about the monitoring of short-term parking in the CBD during construction.

[322] Ms Fraser proposed amendments to Condition 36 relating to the contents of a Transitional Parking Plan (TPP) to add identification of an acceptable parking occupancy for short-stay public parking in the CBD during construction; methods to monitor the performance of the TPP to meet that standard, and the requirement that the TPP is amended to mitigate adverse parking effects shown from the monitoring. When questioned she accepted that this clause did not provide for certainty but provided some flexibility and it could be more specific. She referred to parking for 2 hours or less that supports visitors to businesses (customer parking) with the disruption phase meaning short-term parking needs protection. She saw a benefit in adding a robust process to follow with measurement parameters rather than purely relying on political will.

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33 Transcript at page 486

[323] The Applicants' position is that amendments to Condition 36 requiring monitoring of short stay parking is unnecessary, because Conditions 35 and 36 already provide for processes that will identify potential areas of short stay parking that will be affected, and for the implementation of measures to manage the loss of such parking. Also, the Project will result in a relatively small decrease in short-stay parks. Other concerns are that the requirement for the "identification of an acceptable parking occupancy" is vague and provides no greater certainty than already provided through conditions. In addition, the Applicants submit that HCC, as the territorial authority, will pay close attention to the matter but it should not be a condition compliance matter.

[324] We note the reasons Ms Fraser advanced for seeking amendments that attempt to provide greater specificity and certainty for businesses on short stay parking for shoppers and clients. In the light of the Project's limited effect on short stay parking capacity, the constraints of the Project, and the general territorial authority responsibilities of HCC, we decide against the amendments to Condition 36 proposed by Ms Fraser, or other improved approaches.

Stormwater

[325] Evidence on stormwater was provided by Mr Allen Ingles for the Applicants and Mr David Wilson for WRC Regulatory.

[326] In their expert conference held in March 2022, Mr Ingles and Mr Wilson addressed:

- whether there should be pre-treatment of the stormwater with gross pollutant traps[34] in those locations where the stormwater discharges to the river across treatment swales;
- whether there should be grass filter strips for pre-treatment of sheet flows prior to the treatment swales;
- the treatment of flows from:
  - Pharazyn Street;
  - the treatment of run-off from galvanised steel or copper gutter roof systems;
  - from Queens Drive between Rutherford and High Street, and from Rutherford Street between Queens Drive and Pretoria Street.

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34 Gross pollutant traps are described as referring to *Stormwater 360 Vortcapture* or similar

[327] Apart from whether gross pollutant traps should be provided upstream of the treatment swales in the berms of the river and the treatment of the Rutherford Street sub-catchments, (where there was disagreement) agreement was reached on the following:

- grass filter strips should be included for the pre-treatment of sheet flows to the treatment swales;
- a rain garden should be provided in the area adjacent to the Pharazyn Street/Marsden Street intersection;
- if the roof of the Melling Station cannot be painted for heritage reasons, runoff from the roof should be treated with a carpark raingarden system;

[328] Amplifying, Mr Ingles advised that swales for stormwater treatment have been adopted only where there is no available space for alternative treatment options outside the floodplain of the river. He noted that areas within the floodplain are vulnerable to periodic inundation and other treatment systems such as rain gardens and wetlands which rely on ponding water make these types of treatment particularly vulnerable to siltation from inundation by sediment laden flows. This means that after each inundation they would have to be completely reconstructed.

[329] While swales within the floodway can also silt up as floodwaters recede, aligning the swales parallel with the flow of the river maintains the flow in the swale channel reducing siltation and the deposition of contaminants.

[330] Both experts agreed that swales provided the best form of stormwater treatment within the floodplains of the river. Where they disagreed was whether or not, before discharging into swales, the stormwater should be pre-treated in gross pollutant traps.[35]

[331] The experts were unaware of any New Zealand studies that defined expected gross pollutant loads for equivalent environments to RiverLink. They agreed that where there was a significant load in the stormwater discharge, pre-treatment would be appropriate. Where they differed was that in Mr Ingles' opinion, there was not a high gross pollutant load and therefore a pre-treatment system would add little value. Mr Wilson on the other hand considered it would be best practice to provide pre-treatment.

[332] With respect to the treatment of stormwater flows from Queens Drive between Rutherford and High Street, and from Rutherford Street between Queens Drive and Pretoria Street, the

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35 We understand that these devices may also be described as *screened hydrodynamic separators*. For simplicity, in this decision we have adopted the term *gross pollutant traps*

experts agreed that a subsurface treatment system would not be practicable unless an area of land was available at the low point of the road.

[333] The Applicants' Closing Submissions noted that the issues which were still at large - were:

- the necessity and practicability of pre-treatment of runoff to the treatment swales;
- the treatment of the Rutherford Street sub-catchments;
- Policy P73 of the PNRP which requires the adverse effects of stormwater discharges to be minimised with its definition of "minimised" including the qualification "reasonably practicable".

[334] At the end of this section on stormwater, we address each of these issues, the conditions relating to them and our findings to resolve the differences in the wording of some of the conditions proposed by the Applicants and WRC.

Necessity and practicability of pre-treatment of stormwater runoff to the treatment swales

[335] Mr Wilson proposed that gross pollutant traps be installed in the berm upstream of the treatment swales servicing flows from SH2 and at the northern end of the riverside carpark servicing flows from the new Melling Bridge.

[336] Mr Ingles does not agree. His evidence is that the first 5 – 10 metres of the treatment swale will act in a similar manner to a gross pollutant trap and that coarse fraction sediments will settle in this section of the swale. The design of the treatment swales with point source discharges should therefore allow for at least a 5m forebay from the point outlet for the capture of coarse fraction sediments.

[337] While Mr Wilson accepts that forebays in stormwater swales will capture coarse sediments, his outstanding concern is around litter removal which he says supports the installation of gross pollutant traps. He said that on a site visit in April 2022, he had counted more than 350 items of litter and sediment on the existing Melling Bridge and the southbound lane of SH2 north of the existing Melling intersection and at their drainage outlets.

[338] Mr Ingles does not agree with Mr Wilson's concern about litter volumes. He said that in addition to a number of *drive-overs*, he had walked the catchments for SH2 and the Melling Link Bridge on three occasions. His observation from these inspections is that significant litter is not a problem with the majority of sediment in the gutters being finer silt fractions from

overflows of systems serving the upstream catchments. He said that he had seen no evidence of accumulated litter on the existing outlet servicing the state highway catchment. He was confident that the forebays of the swales would capture the litter which could then be easily and frequently removed as part of general site maintenance.

[339] A gross pollutant trap (indicatively around 3m in diameter) would require a deep excavation in the berm within 10m of the river. This would increase the risk of scour during floods with the potential for this scour to extend into the adjoining stopbank compromising its integrity.

[340] He had also discounted gross pollutant traps because of Safety in Design considerations with practical safe access for maintenance in confined spaces deemed not achievable. He added that these safety and maintenance considerations were reasons why these traps were not favoured by Wellington Water.

[341] The swales downstream of the gross pollutant traps would also need to be deepened with the consequence of increased frequency of flooding of the swales.

[342] Mr Ingles said that gross pollutant traps were generally most effective when installed at the source of the stormwater pipeline or in the line, rather than at the outlet (as proposed by Mr Wilson). He said that sump inserts were not appropriate on SH2, the Melling Bridge and some of the Rutherford Street area from a safety perspective as people would have to enter traffic lanes to provide maintenance. In-line and off-line systems would only be possible in the river berm floodway and (as already stated), the inclusion of such systems within the flood channel was typically to be avoided.

[343] Mr Wilson suggested that this outstanding matter of pre-treatment of piped discharges to swales in the river berm could be addressed through a consent condition. Such a condition could require pre-treatment via a gross pollutant trap or alternatively, prior to starting detailed design, a pre-treatment options assessment could be undertaken for the relevant catchments. He said that this pre-treatment options assessment condition could have similar wording to the stormwater treatment options assessment condition currently in the stormwater conditions.

[344] Having considered the evidence of the two experts on the provision (or not) of gross pollutant traps, we find in favour of the evidence of Mr Ingles. This is that the advantages of installing these traps would be more than outweighed by the negatives of the safety risks during

maintenance and the potential for the traps to initiate scour during floods in the berms and into the stopbanks.

[345] We accept that provided they are appropriately designed and regularly maintained, swales with forebays should be simple and effective devices for controlling the release into the river of debris (including litter) during normal flows.

[346] In flood flows, the river will have high suspended solids concentrations well in excess of those present in any stormwater run-off and any effects from this run-off on the receiving environment would be negligible.

Treatment of the Rutherford Street sub-catchments

[347] Mr Ingles notes that with respect to the Rutherford Street area, following the conferencing he had confirmed that there was no land available for stormwater treatment in the area of the low point bounded by buildings, including the Harvey Norman building.

[348] While there is space available to the north for the treatment of run-off from the new Melling stub carpark, he said that this is insufficient to accommodate the area required for the treatment of the run-off from the wider Rutherford catchment. He added that there were no other reasonably practicable options for the treatment of run-off from this sub-catchment.

[349] Mr Wilson's response was that while he did not have information on site levels in this area, he had observed that the landscape drawings showed areas of planting which might be able to be used to provide treatment if the road could be designed to drain to these locations.

[350] We respond on these differences of view in our discussion on the conditions which follow.

Stormwater Conditions

[351] During the hearing, WRC Regulatory, through Mr Wilson, submitted a version of Condition 107 containing a number of proposed amendments to some of the sub-sections of Ms O'Callahan's 28 April 2022 version of this condition.[36]

[352] Subsequently, in a further version of the Applicants' proposed conditions attached to their Closing Submissions, the Applicants noted that they had accepted some, but not all, of these proposed amendments. We discuss here the differences between the two versions. In

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36 WRC Exhibit 2

doing so, we note that the numbering is slightly different in each version. We have used the Applicants' numbering.

[353] There is a table at 107 b) listing the location of each catchment, the indicative area of the catchment and the treatment device to be provided. There is full agreement between the Applicants and WRC on this table and we accept it as presented.

[354] In both versions of Condition 107 c), the Consent Holder is required to prepare a Stormwater Option Assessment Report addressing run off from Queens Drive between Rutherford Street and High Street. In addition, the WRC Regulatory version would require an equivalent report to be prepared for the run-off from Rutherford Street north of Queens Drive.

[355] As noted above, Mr Ingles considers that it would not be reasonably practicable to provide treatment in this northern Rutherford Street area as there was no land available for this. He added that the stormwater regime in this northern area would not be significantly different from the status quo and that not being able to provide treatment would be offset by the reduced catchment area and the treatment to be provided in the area to the south.

[356] We accept Mr Ingles' evidence that in the absence of any suitable area to provide for treatment of the run-off, the Rutherford Street area north of Queens Drive should not be included in Condition 107 c).

[357] Also, in this same Condition 107 c), the Applicants' wording requires that the adverse effects of the stormwater discharge must have been minimised *to the extent practicable.* WRC's version has deleted the italicised words.

[358] At their expert conference the experts agreed that a subsurface treatment system would not be practicable in this location unless an area of land was available at the low point of the road.

[359] Such an area of land has yet to be identified by either expert. Accordingly, we accept the inclusion of the Applicants' *"to the extent practicable"* wording, and *"if determined to be practicable"* in the next sentence and also for Note at the end of Condition 107 c) in the Applicants' version to be retained.

[360] In Condition 107 g) WRC Regulatory has deleted the Applicants' words *"to the extent practicable"* at the end of the condition. It is not clear to us from the evidence as to why the

Applicants consider it necessary to include this qualification in this condition. We find that these words are to be deleted from the Applicants version of the condition.

[361] In Condition 107 h), while some of the wording in the two versions is different, the required outcomes are the same. We find that the wording in the WRC regulatory version should be adopted in the final condition set with the exception that the *to the extent possible* wording at the end is to be deleted. There is also an editorial correction required with the reference to h) being replaced with g).

[362] WRC Regulatory has included in its version a condition requiring that a screened hydrodynamic separator or gross pollutant trap be located in the river berm to provide pre-treatment for piped flow discharging to treatment devices in the berm. We have found against the installation of gross pollutant traps in the berms.

[363] Condition 108 requires the Consent Holder to submit final detailed design(s) of the stormwater treatment devices to the Manager for certification against the criteria set down in Condition 107 with these design(s) to be prepared by a Chartered Professional Engineer.

[364] Condition 109 requires these devices to be constructed in accordance with the certified design(s) and Condition 110 for as built drawings to be prepared.

[365] There is a separate set of stormwater related conditions in a section headed Culverts and Bridges (Conditions 111-115B).

[366] Condition 111 requires that the upgrade of the culvert conveying the Tirohanga Intersection Stream must include provision for fish passage.

[367] Condition 112 requires that the stormwater pipes and culverts under the newly constructed section of stopbank must be designed to combine stormwater pipes and culverts where possible, to provide for the effects of climate change and to include automated gates for back flow prevention.

[368] The balance of the culverts and bridges conditions set out requirements for the certification of the designs for the culverts and bridges; that these structures must be designed in accordance with the certified designs, and that following the completion of construction, the information required by the relevant regulations of the Resource Management (National

Environmental Standards for Freshwater) Regulations 2020 must be submitted to the Manager.

[369] We accept these culverts and bridges conditions as drafted.

Compliance with Policy P73 of the Proposed Natural Resources Plan (PNRP)

[370] The Applicants' position is that the stormwater component Project is compliant with Policy 73 of the PNRP, pointing to:

- there is currently little or no treatment of stormwater discharges in the Project area catchments;
- the proposed stormwater design includes treatment of discharges from the area of the highway upgrade, the railway station development, the new bridge and areas of road narrowing and carpark upgrade;
- Mr Ingles' evidence that the addition of the proposed treatments will result in a reduction in the contaminant load discharged to Te Awa Kairangi with consequent and water quality improvements, a positive effect although minor.

[371] We accept this submission and find that the stormwater treatment and disposal system proposed for the Project will satisfy Policy P73 of the PNRP.

Noise and Vibration

[372] Expert evidence on noise and vibration was provided by Mr Christian Vossart for the Applicants and Mr Stephen Arden for HCC Regulatory. These two experts participated in an expert witness conference undertaken via AVL on 17 March 2022 and in a follow up conference on 5 April 2022 to discuss noise and vibration issues for the Project.

[373] In the JWS from the first conference, the experts recorded their agreement with the primary data, methodologies, standards, and key facts and assumptions set out in Technical Report #10 Noise and Vibration of the AEE.

[374] Disagreements between them which were still live at the time of the first conference, related to aspects of operational rail vibration, operational road traffic vibration on SH 2 and operational vibration on the local road network.

[375] Even though modelled construction noise had predicted extremely high levels of noise at many locations across the Project, we note to our surprise, from the two joint witness

statements, that this had not been raised as a matter of concern by either expert at the two conferences.

[376] Having first worked through the operational vibration issues which were at issue between the experts at their conference, we follow this by addressing the very high levels of noise (and vibration) predicted to be generated at many locations during the construction of the Project.

Railway Operational Vibration

[377] The experts agreed that, with the relocation of the Melling Station and the associated railway line, it was unlikely that there would be any perceptible adverse change in rail vibration levels in the future and that the appropriate standard for measuring rail vibration was NS8176.[37]

[378] They agreed also that there should be a condition limiting vibration levels to within baseline levels and/or reasonable rail vibration levels and that this condition should exclude the potential for KiwiRail being required to remedy historic exceedances. This recommendation does not appear to have been carried through into the conditions.

[379] They disagreed on the level of the existing rail vibration levels, with Mr Arden proposing that baseline rail vibration measurements should be undertaken to confirm these. This disagreement was resolved at their second conference where they accepted a new condition (57G in the closing submission condition set) which requires that the detailed design for the realigned railway line must, as far as practicable, include the vibration reducing design features listed in the condition.

State Highway and Local Road Operational Vibration

[380] For state highway operational vibration, the experts agreed that vibrational effects were low risk because of the distance of receiver setbacks from the highway.

[381] They agreed also that there was the potential for there to be adverse road traffic vibration effects resulting from changes to the local road network and that the relevant NS8176 limits could be exceeded. Mr Arden had a reservation that there could be perceptible changes in operational road traffic vibration resulting from changes in current traffic patterns while Mr Vossart expressed reservations that there could be changes in vibration arising from changes in the network.

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37 NS 8176: Vibration and Shock - measurement of vibration in buildings from land-based transport, vibration classification and guidance to evaluation of effects on human beings

[382] This issue was resolved to their satisfaction at the second expert conference where they accepted a new Condition 57H requiring that the detailed design on any raised traffic calming devices in reconstructed local roads must include opportunities to minimise vibration risk.

[383] In his evidence Mr Vossart discusses the effects of changes in operational road traffic noise levels resulting from changes in the local road network. In particular, he notes that there are properties in High Street which in the future could receive an increase in noise levels of around 6 dBA which would he said would be a noticeable increase. He proposed that these properties be offered building modification mitigation to reduce the level of the increase. This has been addressed in Condition DH1 which provides for mitigation where predicted increases in traffic noise levels at any sensitive receiver are 5 dBA or more above the 2036 "Do Nothing" traffic model scenario. If this situation were to eventuate, the Requiring Authority would be required to engage with the relevant property owner with an offer to undertake noise reduction via building modification methods to reduce the level of the road traffic noise. This would include the offer of mechanical ventilation to a specification defined in the condition.

[384] The condition includes two footnotes for exemptions to this condition, the first to apply for certain types of heritage buildings and the second if updated modelling demonstrated that the final predicted noise level would be less than 5 dBA following adjustments to traffic movements and road layouts in the affected area.

[385] We have no comment on this condition other than to note that it should provide a degree of comfort to property owners potentially affected by a 5 dBA or more increase in the level of road traffic noise resulting from changes made under the Project to the layout of local roads in the vicinity of their properties.

Findings on Operational Vibration

[386] With the proposed two new conditions having resolved their differences on operational vibration for rail and local roads, the two experts recorded in their second joint witness statement that there were no remaining issues of contention between them.

[387] Overall, we find no reason to disagree with their conclusions on operational rail and road vibration issues for the Project.

Construction Noise

[388] Technical Assessment #10 of the AEE notes that the Project has been divided into six indicative construction stages with six indicative durations for each as shown in the following table:

Stage	Indicative Works	Indicative Duration (months)
1	Pharazyn Street stopbank and realignment	12
2	Daly Street stopbanks, Melling pedestrian bridge and Pharazyn Street realignment	9
3	Melling Station and carpark	8
4	Melling Interchange Start and Pharazyn Street stopbank completion	13
5	Northbound Melling Interchange and bridge	15
6	Melling Interchange on ramp and SH2 northbound	7

[389] While the durations for each stage are qualified as being indicative only, they do at least give some idea as to how long the construction works might be expected to take for each stage across the Project site.

[390] These six stages will be preceded by enabling works which are predicted to last about four months. Noisy components of the enabling works are likely to include the construction of the site access tracks, construction yards and temporary carparks as well as temporary road realignments. These facilities include contractor site compounds, site staging areas, haul roads and temporary works and are shown on the plans attached at Appendix A to Mr Whaley's evidence for the six stages of construction. A proposed aggregates processing plant for all stages is to be implemented towards the Belmont area.

[391] Modelling undertaken as part of Technical Assessment #10 has predicted construction noise levels at 207 properties. These properties have been identified in Table 15 of the assessment as being at the first layer of sensitive receivers within 100 metres of the Project area. The noise levels listed in the table are unmitigated noise levels based on the two loudest items of construction equipment typically expected to be operating at full power for 15-minute periods. The table does not identify whether the 207 properties are residences or commercial/industrial premises.

[392] As well as listing predicted noise levels for each of the six construction stages, Table 15 also lists, for each property, the predicted noise levels from the impact driven piling works from the construction of the new bridges. Mr Whaley anticipated each individual pile to take between four and six weeks to install but with bridge piling taking up to 6 and 12 months depending on whether there is a consistent run at it. He had assumed the piling rig would go

from one bridge to the other, as opposed to doubling up the equipment and then, potentially, over-congesting the site. We note that Condition 57 contains restrictions on hours for driven piling works for the construction of the new Melling Bridge and proposed pedestrian bridge to 7.30am – 6.00 pm Monday to Friday, as far as practicable.

[393] The assessment notes that the noise levels listed in Table 15 would reduce significantly with mitigation measures in place and that their duration during a particular construction activity also needs to be considered in terms of the significance of the adverse effects of the noise on the affected properties.

[394] The assessment identifies that any noise level 11 dB or more above the recommended limit is a *significant exceedance*.

[395] A range of mitigation measures are recommended for good construction noise (and vibration) management. These include:

- community engagement on the basis that if affected receivers are informed, inherently high noise and vibration levels are generally tolerated because of the transitory nature of the construction works;
- the noisiest works being undertaken within standard construction working hours where reasonably practicable, suggested as 7.30am to 6pm Monday to Friday for at least the driven piling works;
- using construction equipment which is modern, well maintained, fitted with residential grade exhaust silencers wherever possible and fit for purpose in terms of power requirements;
- where all other forms of mitigation have been exhausted and there is a significant level of exceedance, temporary relocation of affected parties as a measure of last resort.

[396] The assessment recommends that the contractor be required to develop and implement a Project Construction Noise and Vibration Management Plan (CNVMP) and includes details of what this should contain as a minimum (for both construction noise and vibration) based on the appendix to NZS 6803[38] and the NZTA Construction Guide.

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38 NZS 6803:1999 Acoustics-Construction Noise

[397] We return later to discuss the conditions which have been proposed for the development of the CNVMP and the more detailed Site Specific Construction Noise and Vibration Management Plans (SSCNVMPs).

[398] The Technical Assessment notes that the recommended upper limits of construction noise are those copied from NZS 6803, which is the standard adopted for the assessment of construction noise in Rule 14C 2.1(f) of the District Plan.

[399] Table 3 of NZS 6803 lists a range of recommended upper limits for noise received in residential zones (and rural areas) which vary depending on the day of the week, the time of the day and the anticipated duration of the noise. Table 4 of the standard lists the recommended upper limits for industrial and commercial areas which also vary depending on the time of the day and the duration of the noise.

[400] Of particular significance in terms of our evaluation is which duration limit in NZS 6803 should apply. While we accept that the times listed in the AEE for completing the construction of each stage are indicative only, it would be reasonable to assume that it will take a minimum of 6 months to complete any individual stage. It would be reasonable also to assume that, even if there was intermittent construction in each of the six stages, the long-term duration limits in the standard should apply for all construction activity for the Project.

[401] This means that during daytime (7.30am to 6pm) Monday to Saturday the noise limit should be 70dB[39] and that the long-term limits listed in Tables 3 and 4 of the NZS 6803 should apply for the different night-time periods listed in the tables.

[402] These are consistent with the long-term limits recommended for the Project in the Technical Assessment (notwithstanding the advice in the assessment that for some activities such as local road works, construction may take less than 20 weeks).

[403] For the purposes of the assessment of the effects of noise inside buildings, these should be the noise levels in Tables 3 and 4 of NZS 6803, reduced by 20 dB as recommended in both NZS 6803 and in the Technical Assessment.

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39 The dB noise metric we have used throughout this section of the decision is shorthand for dBA Leq which is referenced in NZS 6803 as being a representative assessment duration between 15 and 60 minutes

[404] Based on the information contained in Table 15 of the Technical Assessment, there are around 80 properties which are predicted to receive unmitigated construction noise levels in the range from 70 – 79 dB; 60 properties in the range from 80 – 89 dB; 45 properties in the range from 90 – 100 dB, and 6 properties (in Pharazyn Street, Dudley Street and Rutherford Street) with levels in excess of 100 dB.

[405] From the HCC s87F report, we note that the Council's regulatory noise expert Mr Arden:

- considers that the noise and vibration levels, will generally be reasonable subject to adopting BPO measures as part of the CNVMP.

and that:

- Condition 4 states that the CNVMP will be prepared in accordance with the NZTA guidance document that requires an independent peer review and that therefore there is no requirement for certification by HCC in its regulatory capacity, and that this was considered an acceptable approach.

[406] We repeat also that the noise and vibration expert conferencing statement prepared by the two experts did not identify any disagreements between them on construction noise (and vibration) issues.

[407] For our part, based on the noise predictions in the Technical Assessment and having read the relevant sections of the HCC s87F Report, the expert evidence and the noise and vibration joint witness statements, we were left with major concerns over the lack of detail about how construction noise should be managed.

[408] While no party had indicated to the Court that it sought to question either of the noise and vibration experts, at our request both experts attended the hearing. Our objective was to obtain a better understanding of the Applicants' proposals for managing the adverse effects of noise during the construction of the Project.

[409] In their closing submissions, the Applicants set out their proposals for responding to the issues of concern raised by the Court with the noise experts at the hearing which we now summarise. The predicted construction noise levels have been based on a worst-case scenario with the loudest possible equipment operating at full power in close proximity to the receivers, without mitigation. In reality the noise durations will be less than the long-term exposure levels, the loudest possible equipment will not be running all of the time and there will be mitigation as appropriate to achieve the BPO.

[410] While we acknowledge the validity of each of these responses, we must point out that the predicted noise levels in Table 15 were the only levels which we were provided with in evidence. While we accept that these levels will represent the worst-case scenario, it would have been of considerable assistance to us if the experts had provided additional evidence as to what these levels might reduce to with noise mitigation measures in place. We still do not know what these mitigated levels might be.

[411] Also, while the Technical Assessment identified that any exceedance greater than 11 dB above the recommended limit would be a significant exceedance, there was no evidence about the effects of higher exceedances, notwithstanding that Table 15 identified some 50 or so properties where the predicted exceedances were more than 11 dB above the recommended limit of 70 dB.

[412] The Applicants' closing submissions note that the updated noise and vibration conditions appended to the submission, have been adapted from the conditions for NZTA's East West Link project[40] and that the final conditions for the Construction Noise and Vibration Management Plan (CNVMP) and the Site Specific Construction Noise and Vibration Management Plan (SSCNMP) for the Riverlink Project include a number of requirements which are over and above those adopted for the East West Link Project.

[413] As well as reviewing the East West Link conditions, we have also reviewed the noise and vibration conditions for the Northern Corridor[41] Project decision which was released at about the same time as the East West Link decision.

[414] The Northern Corridor decision includes a table of helpful information on the potential effects for a range of external noise levels up to 90 dB outdoors; for the corresponding internal noise levels (based on a 20 dB reduction from outdoors to indoors), and for the potential effects on people's amenity of these indoor noise levels.

[415] For noise levels in the range 70 to 75 dB, the likely adverse effects from this noise are described as causing considerable disruption outdoors, while indoors phone conversations would become difficult and while office work could generally continue, this would be at about a tipping point. In residential properties, TV and radio volumes would need to be increased.

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40 East West Link Proposal Final Report and Decision (December 2017)

41 Northern Corridor Improvements Proposal Final Report and Decision (November 2017)

[416] For noise levels in the range from 75 to 80 dB, outdoors, some people might choose hearing protection for long exposure periods and conversation would be very difficult even with raised voices. For this outdoor range, indoors it would be extremely difficult and unproductive to carry out office work and people in residences would actively seek respite.

[417] Outdoors, for noise levels in the 80 to 90 dB range, hearing protection would be required for prolonged exposure (8 hours at 85 dB) to prevent hearing loss. Indoors, the noise level would be untenable for office workers while in residences, the noise would be unlikely to be tolerated for any extent of time.

[418] A footnote to this Northern Corridor information notes that the internal noise levels in these assessments were based on the assumption that windows in the buildings would be closed to provide the 20 dB reduction in noise level from outside to inside. The footnote adds that unless there was air-conditioning, the occupants would need to make a choice between lower noise levels with closed windows, or fresh air cooling with windows open (which would lower the reduction in noise levels from outside to inside from 20 dB to between 10 and 15 dB).

[419] The Northern Corridor decision does not include any information on the likely effects of noise levels above 90 dB, presumably because construction noise levels on that project were not predicted to exceed 90 dB.

[420] In summary, as construction noise levels rise above 70 dB, the noise becomes increasingly disruptive for people working both outdoors and indoors as well as those living in residences.

[421] From these assessments we conclude that for RiverLink, even with the best possible physical mitigation measures in place, based on the modelling undertaken to date, the effects of the construction noise levels received at many properties are likely to be significantly adverse.

Construction Vibration

[422] Technical Assessment #10 notes that there are no relevant provisions in the District Plan for construction vibration, although BS 5228-2:2009+A1:2014 Code of Practice for noise and vibration control on construction and open sites Part 2: Vibration (BS 5228-2) is referenced in Rules for Scheduled Sites and Designation Conditions.

[423] The NZTA Construction Guide incorporates construction vibration criteria based on standards BS 5228 – 2 and German Industrial Standard DIN 4150-3 (1999).

[424] The Technical Assessment recommends that construction vibration criteria from this NZTA Guide be adopted for the Project (as set out in Table 5 of the assessment).

[425] The Technical Assessment identifies that construction vibration levels exceeding 5 mm/s PPV (peak particle velocity) have a high risk of causing cosmetic damage to buildings; levels between 1 and 5 mm/s PPV are unlikely to cause cosmetic building damage but are likely to be an annoyance to building occupants, and levels below 1 mm/s PPV are perceptible but unlikely to cause annoyance to building occupants.

[426] At the upper end, vibration levels that cause structural damage are typically higher than 10 mm/s at 10 Hz in dwellings and buildings with similar designs.

[427] Based on the construction equipment likely to be used on the Project in combination with expected local ground conditions, Technical Assessment #10 at Table 17 identifies set-back distances for a range of vibration risks for the construction activities of vibratory fill compaction, and impact driven piling. These are:

Activity	**Set-back Distances**		
	Low Risk	**Medium Risk**	**Higher Risk**
Vibratory Fill Compaction	>60 metres	15-60 metres	15 metres
Impact Driven Piling	230 metres	65-230 metres	65 metres

[428] Though not stated explicitly in the Technical Assessment we take it that low risk relates to vibration levels below 1 mm/s PPV, medium risk in the range from 1 to 5 mm/s PPV and higher risk above 5 mm/s PPV.

[429] Table 18 of the Technical Assessment sets out the predicted degree of risk of vibration damage to the buildings listed in this table from each of the two types of construction activity. For the activity of vibratory fill compaction, around 120 buildings have been identified as being subject to a higher degree of risk, 75 to medium risk and 40 to low risk.

[430] For the impact driven piling, the equivalent numbers are 3 buildings being subject to higher risk, around 75 to medium risk, and around 160 to low risk.

[431] Typical options for mitigating construction vibration effects include selecting equipment and construction methods which minimise vibration transmission, community communications,

avoiding works at sensitive times and, as for construction noise, and as a last resort, temporary relocation.

[432] Once the details of site-specific information including the vibration mitigation measures have been identified by the construction contractor, further modelling is to be undertaken to refine the vibration results. We note that this has been provided for in Condition 57A.

[433] The Technical Assessment recommends also that assessments be undertaken by a suitably qualified and experienced building surveyor to establish the condition of all of the buildings predicted to be affected by construction both prior to and post completion of construction. We come back to this when we evaluate the proposed vibration conditions.

[434] Heritage buildings and structures predicted to be affected by construction vibration are the residential buildings at 125 and 760 Western Hutt Road (medium risk), the Lower Hutt Post Office at 149-151 High Street (medium risk), the Little Theatre and Library Building at 2 Queens Drive (low risk), St James Church at 61-69 Woburn Road (higher risk) and Gatehouse, Vogel House at 75 Woburn Road (medium risk).

[435] Factors which will impact on the potential for cosmetic damage to the buildings will be the dominant frequencies generated by the construction works and the buildings' sensitivities to vibration.

[436] We note that each of these heritage buildings has been included in the list of buildings in Condition 57A which require a Suitably Qualified Person to determine their sensitivity to vibration.

[437] As a final comment, we note that those buildings predicted to be affected by construction vibration are for the most part the same buildings as are predicted to be affected by construction noise in excess of the noise limits set out in Condition 54.

Construction Noise and Vibration Conditions

[438] The Applicants' closing submission describes how the final condition set includes mandatory provisions for the CNVMP to include a list of houses and other sensitive locations where noise levels have been assessed as potentially exceeding the noise limits; a requirement in the communications plan for consultation with affected landowners and occupiers of these properties and receipt of their feedback; conditions under which relocation

must be offered and requirements for adopting additional mitigation and management measures to respond to monitoring outcomes.

[439] We now examine in some detail how the conditions respond to each of these matters. We start with limits and then work down through the management plans setting out procedures for dealing with noise and vibration to meet the substantive requirements of the conditions. As we noted in our Minute to the parties conditions must be certain, workable, enforceable and clear as to their purpose and effect on their face.

Some specific requirements in conditions for construction noise and vibration

[440] We note that the specific conditions on driven piling works for the construction of the new Melling Bridge and proposed pedestrian bridge:

- the restriction of these works to 7.30am-6pm Monday to Friday, as far as practicable (Condition 57); and
- works are to be attenuated using a timber cushioning shoe and shrouding noise curtains if practicable (Condition 56).

[441] Condition 55 states that surgical procedures carried out at PetVet's premises at 53 Rutherford Street may necessitate the application of a lower (more onerous) vibration criterion than in the limits.

[442] Condition 57G requires detailed design for the realigned railway line to include, as far as practicable, the vibration reducing features of new clean ballast or overlay of new ballast, concrete sleepers and continually welded track.

[443] Condition 57H requires the consent to consider opportunities to minimise vibration risk when undertaking the detailed design of any raised traffic calming devices required within reconstructed local roads and for information to be provided to the Manager with a brief written statement summarising the design process and measures incorporated.

[444] There are also specific conditions related to the Harvey Norman Centre (Condition 57F) allowing their comment on draft management plans and requiring the consent holder to address those, and giving reasons where comments are not accepted, in the final management plans.

The Limits for Construction Noise and Vibration

[445] Condition 54(a) includes two tables copied directly from NZS6803. These tables include what are described in the introduction to the condition as criteria for the purposes of the CNVMP. The tables include noise levels for three different durations of construction works, a typical duration, short-term duration and long-term duration as provided for in NZS 6803.

[446] As noted above, we have found that the long-term duration limits are to apply in all situations.

[447] The two tables in Condition 54(a) are therefore to be amended to exclude the typical duration and short-term duration columns and also the three footnotes to the table are to be deleted.

[448] It is unclear to us as to why the noise levels in Condition 54(a) have been described as criteria when the NZS 6803 uses the term Recommended Upper Limits and the Technical Assessment construction noise limits.

[449] Based on the terminology adopted in NZS 6803 and the Technical Assessment, the term *criteria* is to be replaced with limits in Condition 54a) and also, where the term criteria has been used in other noise and vibration conditions, this term is to be replaced with limits.

What is to happen when these limits cannot be met?

[450] Conditions 54(b) for noise and 55(b) for vibration respectively provide that where compliance with these limits is not practicable the preparation of Site Specific Construction Noise and Vibration Management Plans (SSCNVMP) in accordance with the methodology in Conditions 57D (for noise) and 57E (for vibration) are required.

[451] Condition 57D(a) sets out the requirements for the preparation of an SSCNMP when construction noise is either predicted or measured to exceed the criteria in Condition 54, except where the exceedance of the criteria is no greater than 5 decibels and does not exceed one period of up to 2 consecutive weeks in any 2 months between 6.30am and 8pm or one period of up to 2 consecutive nights between 8pm and 6.30am in any 10 days.

[452] We do not recall having received any evidence about why a "no greater than 5 dB criterion" should apply nor about the proposed hours and time period exemptions excusing an SSCNMP from having to be prepared for an affected property.

[453] The noise limits proposed in table at Condition 54 in the condition set attached to the closing submission did not include a 5dB exceedance criterion and nor have we in our amended wording for this noise limit condition.

[454] If the noise levels provided for in Condition 57D(a) of the closing submission condition set were to apply (exceedance no greater than 5 dB), then construction could proceed without consultation with the owners and occupiers of all of the properties so affected by this exemption.

[455] This would then be inconsistent with our proposed amended wording of Condition 19(j) (as set out below).

[456] We find that the provisions of Condition 19(j) should apply to Condition 57D(a) and that an SSCNMP is to be prepared for all properties where the construction noise levels are either predicted or measured to exceed the relevant limits in Condition 54.

[457] Even though we did not receive any evidence justifying the time periods listed in Condition 57D(a)(i) and (ii), we accept that these time periods should apply.

[458] The wording of Condition 57D(a) is to be amended to exclude the 5 dB exceedance criterion.

What are the identified properties for noise and vibration?

[459] In Condition 57C(d), our understanding is that affected houses and other sensitive locations where vibration limits apply is the list identified in Condition 57A and the list of the noise affected properties is that to be identified under Condition 57C(e) (with our comments on this condition as set out below).

[460] Condition 57C(d) should therefore be amended to include only the yellow highlighted section of the tracked change version starting with the words "Identification of businesses which operate ... be prepared and implemented".

[461] As we have identified from the Northern Corridor decision, outdoor noise levels in the range from 70 to 75dB are the tipping point for adverse effects on indoor office workers, 75 to 80 dB would make indoor office work extremely difficult and unproductive and for outdoor levels in the 80 to 90 dB range, noise levels within buildings would be untenable for office workers.

[462] We conclude therefore, that all properties affected by noise levels over 70dB should be treated equally in terms of the effects of the noise on the occupants of buildings at these properties irrespective of whether these are commercial or residential buildings.

[463] The wording in Condition 57C(e) which refers to noise starts with the words "A list of houses and other sensitive receivers" should be replaced with the following which also includes a requirement for the clarification and identification process to be undertaken by a Suitably Qualified Person:

> *A list of properties where the noise levels were assessed in Table 15 of Technical Assessment #10 Noise and Vibration (this list is to be reproduced as an Appendix to these conditions) as potentially exceeding the relevant noise limits in the tables at condition 54*[42] *with clarification and identification of any properties no longer identified as receiving construction noise levels exceeding the limits in these tables after final construction methodologies, detailed design and mitigation measures are applied. A SSCNMP in accordance with condition 57D (amended as set out below) is to be prepared for each property where, following this clarification and identification process, the predicted construction noise level still exceeds the condition 54 limits at the property.*
>
> *This process is to be undertaken by a Suitably Qualified Person.*

[464] Condition 57A requires the buildings listed in this condition to be classified in accordance with DIN 4150-3 to allow for the BPO mitigation measures to be implemented (as needed) under the CNVMP and any schedules or SSCVMPs therein. We will come back to this when considering the management plans.

Construction noise and vibration during enabling works

[465] We note that the effects of construction noise (and vibration) are not included in the enabling works Conditions 20 and 21 even though these two conditions address other adverse effects such as asbestos removal, air quality and contaminated land. We were unable to find any reasons in the evidence explaining why the management of the effects of construction noise and vibration during the forecast four-month period of the enabling works have not been provided for in the conditions.

[466] Any properties where construction noise from the enabling works is predicted to exceed the limits in Condition 54 are to be added to the list to be identified in Condition 57C(e).

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42 The condition as drafted refers to exceeding the noise limits in NZS 6803 without identifying which of the limits in NZS 6803 are to apply

Likewise any properties where vibration is predicted to exceed Category A vibration limits set out in the table in Condition 55.

Building condition surveys and repair of any damage

[467] Condition 57C(f) sets out the requirements for the SSCNVMP to address building condition surveys at locations close to activities generating significant vibration, prior to and after completion of construction (including all buildings predicted to exceed the Category A vibration criteria shown in Condition 55 and the process for repair of any damage caused by Construction Work. (Note also that a closing comma needs to be added after "Condition 55").

[468] It is our understanding from Technical Assessment #10 that these would be the buildings listed in Condition 57A where vibration levels are predicted to exceed 5mm/s PPV. If so, the condition should be reworded to suit.

[469] While Condition 57C(f) requires, for each building, the identification of the processes for repair, we could not find a condition requiring the consent holder to carry out these repairs. To assist, we note the following condition from the Northern Corridor Condition (CNV.9):

> If any damage to buildings or pipe work is shown to have occurred, by reference to pre-condition survey findings from condition CNV.7 (c), as a result of vibration from construction of the Project, any such damage shall be remedied by the Requiring Authority as soon as reasonably practicable subject to any associated asset and/or owner agreement.

An equivalently worded condition is to be included in the RiverLink conditions.

What is to inform the Construction Noise and Vibration Management Plans?

[470] Condition 4 sets out the conditions proposed for the overall management plan process for the Project (which we respond to elsewhere in this decision), our comments here being restricted to the proposed construction noise and vibration management plans (CNVMPs and SSCNVMPs) and the Communications Plan (Conditions 18 and 19).

[471] In Table 1 of Condition 4 there is a footnote requiring the CNVMP to be prepared in accordance with the NZTA guidance document which requires an independent peer review of the CNVMP (but not the SSCNVMPs). The footnote states that there is no requirement for further certification as the guideline represents best practice and requires an independent review which will relate to the CNVMP for the entire Project.

[472] Technical Assessment #10 identifies that triggers exist in this Guide for the assessment and measurement and management of construction vibration and lists typical mitigation

options from this Guide. It also recommends that the contractor be required to develop a Project CNVMP based on both NZS 6803 and the NZTA Guide.

[473] In his evidence in chief Mr Vossart also discusses the use of a CNVMP and SSCNVMPs noting that Schedules for these management plans are to be submitted to Council following approval by an independent peer reviewer prior to discrete items of work being undertaken. He makes no reference in this evidence to the NZTA Guide nor to its independent peer review process.

[474] It is not obvious to us why the Guide should be adopted for the entire Project when most of the works (particularly stopbank construction) are unrelated to highway works. Also, given the predicted levels of construction noise, it is not clear to us why the Council should be excluded from certifying that the noise and vibration management plans are consistent with the relevant conditions (even if the management plans have been subject to a peer review by a Suitably Qualified Person).

[475] Condition 57B requires a Suitably Qualified Person to prepare a CNVMP in accordance with the requirements of Annexure E to NZS 6803 and the State Highway Construction and Maintenance Noise and Vibration Guide (August 2019). As we have discussed above under Condition 4, it is not clear to us why the state highway guide should be adopted for the entire Project when most of the works (particularly stopbank construction) are unrelated to highway works.

[476] In addition to the Guide, we query why the condition requires that the CNVMP is also to be prepared in accordance with Annexure E to NZS 6803 and the matters listed in Condition 57C.

[477] This must create, in our view, the very real potential for conflicts to arise if the CNVMP is to be drafted to satisfy the requirements of the Guide, the Annexure and the matters currently listed in Condition 57C.

[478] Condition 57C is to be redrafted to include all of the matters considered essential including those from the Guide and from the Annexure. The references to these two documents can then be deleted from Condition 57B.

[479] While this redrafting of Condition 57C may take some time, it will mean that when the time comes to draft the CNVMP, there should be clarity and certainty as to what the content of

the plan should be. It should also greatly assist the Manager when the time comes for the certification of the plan.

The Communications Plan for Construction Noise and Vibration

[480] New provisions numbered 19(i) and (j) have been added to previous versions of the condition set.

[481] Condition 19(i) sets out requirements for the Communications Plan to include methods for communicating with nearby residents and businesses about predicted noise levels prior to and during Construction Works including those properties identified in Condition 57C(e) where the relevant noise limits are predicted to be exceeded.

[482] We note that this condition does not include an equivalent requirement for communication with residents and businesses predicted to be affected by high levels of vibration during construction.

[483] This condition is to be amended to provide for this equivalent communication on vibration along the following lines:

> Methods to communicate with nearby residents and businesses prior to and during Construction Works and in particular those residents and businesses identified following the clarification and identification process to be undertaken under Condition 57C(e) and those listed in Condition 57A (which lists those buildings predicted to be sensitive to construction vibration.

[484] Condition 19(j) requires details of those properties where the relevant noise limits in Conditions 54 and 57D(a)(i) and /or (ii) are predicted to be exceeded to be included in an appendix to the Communications Plan. The condition requires the Communication Plan to include methods, integrated with any SSCNMP under Condition 57D, to notify these land owners and occupiers in advance of any relevant Construction Works commencing, to offer to meet with them to discuss and explain construction noise and to invite them to provide comments on construction noise effects.

[485] It is not clear what the difference is between the list of properties to be identified under Condition 57C(e) (in Condition 19(i)) and the list of properties to be identified under Condition 19(j) which refers to Conditions 54 and 57D(a)(i) and (ii). Should Condition 19(j) refer to the list of properties referred to in Condition 19(i)?

[486] Also, Condition 19(j) needs to be amended to include discussions with landowners and occupiers of the buildings listed in vibration Condition 57A.

[487] The wording of Condition 19(j) is to be amended to suit.

The SSCNMP

[488] Condition 57D(c)(iii) requires that the SSCNMP must as a minimum set out the noise limit to be applied for the duration of the activity. This begs the question as to what limit applies and what is to happen if that limit is exceeded? The condition is to be amended to include details of what the limits are and the consequences if there is non-compliance.

[489] We note that this management plan (for both noise and vibration) is the "engine room" of the conditions. It gives considerable discretion to the consent holder to decide what is the BPO for noise and also to what options are "not practicable" for vibration, with HCC regulatory having a certifier role (up to a point). The conditions require documentation of the mitigation options selected and the options discounted and reasons for that.

[490] Condition 57D(c)(vi) requires that, if having applied the mitigations set out in condition 57D(c)(v) the noise limits still exceed the standards in Condition 54(a), relocation is to be offered to the occupiers unless that is unreasonable taking into account:

- the anticipated duration and day/time of the noise exceedance;
- the nature and type of the noise exceedance;
- the sensitivity of the receiver;
- the cost and feasibility of relocation.

[491] In the absence of any direction as to when each of these qualifiers should apply, we doubt that any could be applied in practice in any meaningful way.

[492] The condition is to be amended to include better direction for determining the conditions under which each qualifier would apply. Also, clarification is to be provided as to whether the test of unreasonableness is based on the consideration of all of the qualifiers as an integrated package or if the exemption for having to offer relocation applies if only one of the individual qualifiers is triggered.

[493] Condition 57E(b)(iii) requires an assessment of each building and any pipework to determine susceptibility to damage. Condition 57A requires a Suitably Qualified Person to determine sensitivity of buildings to vibration. Condition 57E (b)(vii) requires the SSCVMP to

set out (information) on the pre-condition surveys which document their current condition and any existing damage. For clarity, these three conditions should be cross referenced with each other.

[494] While Condition 57D(c)(vi) sets out provisions for relocation as a measure of last resort for construction noise, there is no equivalent "measure of last resort" condition for construction vibration. This needs to be added.

Hydrogeology

[495] Evidence on the effects of the Project on the hydrogeology of the Project site was provided by Dr Theodora Avanidou for the Applicants and Ms Katy Grant for WRC Regulatory.

[496] Te Awa Kairangi has a significant role in the hydrogeology of Lower Hutt's groundwater as it is one of the main recharge sources for the underlying groundwater system, with the confined Waiwhetu aquifer being particularly sensitive as it is utilised for potable water supply.

[497] Aspects of the Project works which will intercept groundwater include the river channel and stopbank earthworks, earthworks and ground improvements for the new Melling Interchange, piling for the new Melling Bridge, and the new pedestrian and cycling bridge which will penetrate the Waiwhetu aquifer - and the relocation of various network utilities.

[498] Condition 34 requires the assessment of dewatering and potential settlement effects once the locations of the network utilities, culvert outlets and stormwater pump station have been finalised, with the findings of these assessments to be incorporated into the Construction Environmental Management Plan (CEMP).

[499] The proposed construction methodology for the installation of the piles for the two new bridges requires the use of double casings and grout sealing around the casing of the aquiclude[43] to address potential quality and quantity risks to groundwater. Based on this proposed methodology, the effects of these piling works on the aquifer have been assessed as minor adverse. Specific details of this construction requirement are as set out in Condition 119.

[500] When the existing Melling Bridge is removed, its piles are to be cut off near to riverbed to avoid any disturbance to the underlying aquifers. We were unable to find a condition

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43 An aquiclude is a geologic formation or stratum which confines water in an adjacent aquifer

confirming this requirement. A condition to this effect is to be added to the Groundwater section of the conditions.

[501] An extensive programme has been designed to monitor the levels of the shallow and deep groundwater and its quality pre, during and post construction, to confirm that the assessed envelope of effects will be as set out in Condition 116 which informs a Ground Water Management Plan (GMP).

[502] Ms Grant noted in the WRC s87F report that while she was supportive of the proposal, she had identified a number of concerns which would need to be addressed to confirm the assumptions made in the Applicants' groundwater assessments. Subsequently in her evidence in chief, she advised that following a s92 request listing her concerns, these had been addressed through amendments made by the Applicants to the consent conditions.

[503] These amendments were for additional investigations and monitoring to be undertaken and for the results of these investigations and monitoring to be assessed prior to the start of construction, addressed in Conditions 118,119 and 121 which require drilling investigations to be undertaken prior to the installation of the bridge piles and also under Condition 116 for additional monitoring bores to be installed.

[504] She confirmed also that once these bores had been installed, the conceptual and numerical models would need to be reviewed to ensure they are representative of site conditions and if necessary, the GMP updated to suit. This had been provided for in condition 120 with site-specific investigations and assessments for local construction dewatering to be addressed through Condition 34x.

[505] Following a request from Wellington Water Ltd, further hydrogeological modelling was undertaken using the Hutt Aquifer 3D Model known as HAM3. This 3D modelling confirmed that groundwater level changes due to the proposed river works were consistent with those established through the earlier 2D modelling undertaken by Dr Avanidou.

[506] Ms Grant confirmed that the additional modelling had provided her with reassurance that there will only be minor effects on the Waterloo borefield as a result of river-bed regrading.

[507] To confirm, following the installation of the proposed bores as provided for in Condition 116 and the draft GMP, Condition 120 provides for the assumptions made in the modelling to

be reviewed and if necessary the model adjusted, to ensure that the results are representative of existing conditions. If necessary, the GMP would then need to be updated to suit.

[508] As we have noted earlier in this decision, in a joint memorandum to the Court dated 25 February 2022 the Applicants and Wellington Water advised that they had reached agreement on the modelling and on amendments made to the relevant conditions. They had also established a Relationship Agreement between them.

[509] We find no reason to disagree with the evidence of Dr Avanidou and Ms Grant that the conditions which have now been developed for:

- the initial modelling of the effects of the construction of the Project on the underlying groundwater system,
- the progressive updating of the modelling as more information becomes available, and
- the consequent progressive updating and application of the GMP in combination will provide adequate safeguards for the protection of the underlying groundwater system.

[510] To repeat, an additional condition is to be included defining the cut off levels for the piles during the demolition of the existing Melling Bridge.

Natural Hazards

[511] Evidence on natural hazards was received from Mr Geoffrey Farquhar on behalf of the Applicants. Mr Farquhar noted that his evidence did not address flooding natural hazards as these had been dealt with in separate evidence and accordingly we have responded to the issue of flooding hazard in our section on Te Awa Kairangi Hutt River.

[512] The existing environment has the potential for a range of hazards, most of which are earthquake related and interconnected. These include fault rupture, ground shaking, regional uplift/subsidence, slope instability, liquefaction and tsunami, all of which have the potential to cause severe damage to different elements of the Project.

[513] A Site-Specific Seismic Hazard Assessment (as required by the NZTA Bridge Manual) is to be prepared to better define the earthquake hazards and the earthquake loads to be applied in the designs of each of the elements of the Project. This is to include a hazard assessment of the behaviour of the Wellington fault.

[514] The elements of the Project, which include the new Melling Interchange, the two new river bridges and the stopbanks, are to be designed to comply with the Building Act 2004 in such a way that they are readily repairable if they are damaged during a natural hazard event.

[515] Mr Farquhar has adopted a risk matrix based on GNS guidelines which uses a five-step range of likelihoods of risk varying from likely to very rare and a corresponding five-step range of consequences of risk varying from insignificant to catastrophic.[44] Using this matrix, he has undertaken risk assessments of potential damage to each of the elements of the Project from each of the natural hazards which he has identified. From these assessments he has concluded that all of these hazards present either an acceptable or a tolerable risk with no hazard presenting an intolerable risk.[45]

[516] In the context of Policy 27(b) of the PNRP, Mr Farquhar's assessment is that, at worst, the risks of damage from natural hazards are tolerable and cannot be avoided (unless the Project is not constructed). In terms of Policy 27(d), his evidence is that the Project does not cause or exacerbate natural hazards in other areas.[46]

[517] His evidence also is that the designation and resource consent conditions do not need to include any requirements for the mitigation of the effects of the non-flooding related natural hazards which he has identified.

[518] We accept Mr Farquhar's evidence.

Air Quality

[519] Mr Jason Pene gave supplementary evidence to his AEE Technical Report #11, Air Quality Assessment. Ms Deborah Ryan, who prepared a part of the Officer's Report for HCC Regulatory, also gave evidence for HCC Regulatory. Both agreed on two condition clauses in contention at joint witness conferencing. Neither were called for questioning.

[520] Mr Pene's evidence, based on air quality measurements conducted by WRC in Lower Hutt, is that existing ambient air quality in the Project area overall is likely to be of a reasonable standard. He said that the local urban environment contains activities varying in sensitivity to air pollutants, including: high sensitivity activities such as dwellings, medical facilities, schools, childcare facilities and elderly care homes that are termed as highly sensitive receivers (HSRs)

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44 Technical Assessment #15 at Table 3
45 Technical Assessment #15 at Table 11
46 Technical Assessment #15 at [178]

under NZTA guidance on air quality impact assessment of roading projects; moderate sensitivity commercial activities; and relatively low sensitivity light industrial activities.

[521] Mr Pene's evidence was that that the Project construction works will involve a number of activities that have a potential to generate dust and, to a lesser degree, odour and other contaminants. He assessed the potential air quality impacts of these emissions during the construction phase through a qualitative assessment of the frequency, intensity and duration of anticipated exposure, the offensiveness/character of the contaminants and sensitivity to dust in adjacent areas associated with construction activities in each geographical sector of the Project.

[522] Mr Pene's evidence was to the effect that construction activities including demolition, earthworks, vehicle movement and material handling will result in the generation of dust and other construction emissions to air. The local receiving environment is reasonably sensitive and includes high and moderate sensitivity urban activities within 200m of the works in places. As a result, he recommended a high standard of dust management to mitigate potential air quality impacts.

[523] In Mr Pene's opinion provided the control, management and monitoring measures for dust and other construction phase emissions that have been incorporated into the Applicants' proposed conditions of consent are rigorously implemented:

(a) the potential effects on air quality during the construction phase will be able to be appropriately mitigated;
(b) offensive or objectionable nuisance or significant air quality impacts are likely to be avoided; and
(c) any residual effects are likely to be localised within close proximity of the Project Area and no more than minor in scale.

[524] Condition 48 specifies that discharges to air must not result in odour or dust that is offensive or objectionable at or beyond the boundary of the Project Area. Condition 49 also contains minimum requirements. For example under (g) aggregate crushing is limited to the aggregate processing area identified on the Construction Staging Drawings and within other parameters, fine excavated material is not to become dry and potentially airborne or tracked, and the monitoring plan under (h) contains specific standards such as provision for at least three continuous particulate monitors for use across the Project area to provide continuous feedback in real time to Project staff in relation to ambient particulate matter concentrations.

[525] Under Condition 49, a Construction Air Quality Management Plan (CAQMP) prepared by a Suitably Qualified Person (with HCC and WRC Regulatory to certify that document) is to include details of and confirm the procedures and measures to be used to ensure compliance with the standards in Condition 48. That Management Plan must have regard to construction air quality management guidance (contained in the Good Practice Guide for Assessing and Managing Dust, Ministry for Environment, (2016) and the Guide to assessing air quality impacts from state highway projects (version 2.3) (NZTA, October 2019).

[526] We accept the evidence of Mr Pene and the approach in the conditions agreed on by Ms Ryan to secure the measures required to adequately deal with potential adverse effects from construction.

[527] On the effects of road emissions from operation of the completed Project, in his Technical Report Mr Pene concluded that ambient air quality is likely to be of a reasonable standard in the local area overall. Also that predicted contributions of road emissions in the area are relatively small and while impacts of traffic emissions from SH2 are predicted to increase, the increases are small in scale and ambient levels of traffic pollutants in the local area are predicted to remain well within the relevant health-based assessment criteria following completion of the Project. This would indicate that operation of the Project is unlikely to result in any material increase in exposure of people in the local environment to airborne health contaminants. He referred to his predictions of reductions in air quality impacts of road emissions from key local road links including Ewen Bridge and the adjacent section of Queens Drive.

[528] In evidence Mr Pene updated his predictions on ambient PM^{10} and NO^2, with his conclusions remaining the same. The annual average NO^2 (the WHO criterion, which is generally used in the absence of an annual New Zealand criterion) was updated in 2021. The update resulted in a significant reduction of the annual average NO^2 WHO guideline from 40 $\mu g/m^3$ to 10 $\mu g/m^3$, meaning the annual criterion is now predicted to be exceeded in the vicinity of the Project.

[529] Ms Ryan gave evidence that currently there is no policy context in New Zealand for understanding the implications of not meeting the WHO annual average criteria. However, she considered there to be little difference in the predictions reported by Mr Pene for the "with" and "without" project scenarios. There continue to be some small increases in concentrations predicted at some locations and some small decreases at other locations. As the incremental change is small, it was also her view that the effect on air quality is minimal.

[530] Ms Ryan also referred to Mr Pene's analysis to correlate the highest predicted annual average NO^2 with a 1-hour average value to compare against the 1-hour average value in the National Environmental Standards for Air Quality (NESAQ). She said that Mr Pene's estimated 1-hour NO^2 value is predicted to be 28% of the NESAQ which indicates the maximum short-term exposures will be acceptable.

[531] We accept the evidence of Mr Pene and Ms Ryan on operational air quality effects.

Contaminated Land

[532] Ms Sarah Schiess gave evidence supplementary to her AEE Contaminated Land Assessment (Technical Report #13). Mr Bo Simkin, who prepared a part of the Officer's Report for HCC regulatory, also gave evidence. Only Mr Simkin appeared before the Court.

[533] As we note elsewhere the NES Soil is relevant to addressing contaminated land effects. We deal with the effects in the context of those Regulations.

[534] The Project area contains a number of potentially contaminated sites, arising from historical hazardous land use activities. A Preliminary Site Investigation (PSI) identified 22 potentially contaminated sites (based on the presence of current and historic HAIL[47] Activity) within, and adjoining, the Project area. Of those, the following are high risk: 31 Marsden Street, 33 Marsden Street and 28 Bridge Street (former timber treatment activity), and 69-95 High Street (former dry-cleaning activity).

[535] Earthworks in or near contaminated sites have the potential to have adverse effects on human health, including project construction workers, site workers and the public, and the environment during construction. Construction works associated with the Project will require significant soil disturbance. There is the potential for contaminated soils to be disturbed during the construction resulting in discharges of contaminants to air, land and water (surface and groundwater).

[536] The issue in contention between the Applicants and HCC regulatory on contaminated land is whether Condition 41 should require certification of the updated Preliminary Site

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47 The Hazardous Activities and Industries List (HAIL) is a compilation of activities and industries that are considered likely to cause land contamination resulting from hazardous substance use, storage or disposal

Investigation (PSI) and not just self-certification by the SQEP[48] who prepares the PSI. We are satisfied we have the ability to impose such a condition under the NES Soil if necessary.

[537] We accept the evidence of Mr Simkin that the multiple further assessment and certification steps relating to contaminated land all depend on the foundation of a robust starting point of identifying contamination risks in the PSI. Mr Simkin also gave evidence that it is not unusual for councils looking at more complex contaminated sites to seek independent peer review or certification of reports submitted under the NES Soil. He said:[49]

> The scale and complexity of the RiverLink projects and the overall site means that this is not what would be considered a conventional contaminated land project as ... [it] covers a large area, has a long history of development, there are multiple HAIL activities within the project area and given the overall prominence of this project I would argue that certification of the PSI would be considered a best practice approach. ...
>
> So the requirements to certify the PSI would provide the council with the assurance that these matters had been addressed and that the updating PSI met the standard that was expected for a project of this type.
>
> I'd also highlight that a PSI needs to be sufficiently robust to provide reasonable certainty around the potential risk for contaminated land and as the first stage of the assessment of contaminated land it's imperative that the PSI is sufficiently comprehensive and reliable as the scope of any subsequent work is based on the findings of the PSI.

[538] We agree with Mr Simkin's view that certification provides that independent check for a site of this scale, with its multiple land uses, and the necessary certainty for the Detailed Site Investigations (DSI) and the following remedial plans, all of which must be certified by the Manager. Condition 41 is to be modified accordingly.

[539] We note that leaded paint and asbestos surveys will be completed prior to Enabling Works or Construction Works, including buildings being demolished, and the findings added into the updated PSI as is appropriate.

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48 The conditions define and explain the SQEP as: "Suitably qualified and experienced practitioners for the purposes of the assessment of contaminated land (Guidance on what is expected of the SQEP is provided in the *NES Soil Users' Guide 2012*)". Note this is different from the term "Suitably Qualified Person" defined as: "A person (or persons) who can provide sufficient evidence to demonstrate their suitability and competence in the relevant field of expertise".

49 Transcript at 116

[540] The conditions contain a series of further steps that need to be undertaken for listed and other sites rated as moderate and high risk identified through the PSI update and before any enabling or construction works are started in those sites. These generally involve investigations and reports to be undertaken by a suitably qualified and experienced person (SQEP) in accordance with various Ministry for the Environment contaminated land management and reporting guidelines to be submitted to and certified by the Manager.

[541] Condition 42 prescribes DSI to be undertaken that assess the suitability of each site for the intended land uses and identifies areas requiring further assessment, management and remediation prior to the change of land use. Any recommendations are to be followed.

[542] Under Condition 43 a Contaminated Land Site Management Plan (CLSMP) will then be developed to detail the procedures (e.g. on site soil management practices, off-site soil transport and disposal, implementation of the Project ESCP, and the management of dust and odour) to ensure effective control of the health, safety and potential environmental risk from contaminated land associated with the Project.

[543] Under Condition 43A where the DIS concludes remediation is required there is a Remedial Action Plan (RAP) step before beginning remedial works. Condition 45 requires any off-site disposal or treatment of contaminated soil and material to be to a facility licensed and suitable to accept such materials. On completion of remediation Condition 46 requires a site validation step.

[544] Condition 47 has a step requiring that in the event of known or suspected contaminated soil remaining on site at the completion of works, an Ongoing Monitoring and Management Plan is to manage this risk. That must set out the nature, spatial extent and degree of residual contamination and detail how this information will be made available to other parties who may be affected by in-ground contamination during site operations, along with any long-term water quality monitoring and discharge conditions.

[545] The evidence was that subject to appropriate mitigation and remediation measures being implemented, the site will likely be suitable for the intended land uses, and the overall post mitigation level of effects from contaminated soil on the Project will likely be minor.

[546] In the context of the approach in NES Soil and in the light of the evidence, we are satisfied that the proposed conditions appropriately deal with addressing the risks associated with contaminated land.

Social and recreation impact

[547] Ms Michala Lander gave supplementary evidence to her AEE Technical Report #17, Social Impact and Recreation. She did not appear before the Court.

[548] Ms Lander gives evidence that there are 18 social and recreational infrastructure facilities within the Project Area: four early childhood education facilities (two to be demolished to construct the stopbanks within the Pharazyn and Marsden Street areas), one school, a cemetery, two places of worship, a government service, a fire station, four medical facilities and four recreational facilities. Ms Lander also refers to various social activities which also contribute to the character of the Project Area, including: the walking and cycling trails along the riverbanks, with the Hutt River Trail a popular destination to walk, run, cycle and to exercise dogs; key recreation features on the western banks, such as the portion of Jubilee Park running adjacent to SH 2 below Tirohanga and, further north, the Block Road Skateboard Park near the Melling Train station; an 854-space public carpark on the eastern bank that hosts an informal basketball court in the evenings and weekends, and the Riverbank Market each Saturday; and a 200-person strong 'ParkRun' event, which takes place on Saturdays, a 5km course out-and-back along the existing Hutt River stop bank starting on the Hutt River Trail immediately south of the Riverbank Carpark with runners visiting the market and local cafes afterwards.

[549] Ms Lander's opinion is that the Project will have an overall positive effect on social and recreation values. Positive effects include increased social wellbeing and security from the flood protection measures, improved access to active transport infrastructure and the railway station, reductions in congestion, improved access to the river and urban regeneration. The Project will have significant benefits for recreation including walking and cycling improvements, new open spaces, children's playgrounds and improved access to the River. Negative impacts of the Project are mostly confined to the pre-construction and construction phase and people's concerns and uncertainty about effects, such as the noise and health impacts of construction. Ms Lander also considers the Project has a high level of support from the community because of the social benefits that are anticipated.

[550] A key mitigation measure for Ms Lander is the development and implementation of a communication plan that requires ongoing and regular communication with the public and stakeholders (including directly affected and adjacent owners and occupiers of land). Communication should include information about alternative access and travel options, details of the complaint management process, and updates on construction phasing. Conditions 18

and 19 provide for a communications plan for the construction phase of the Project, with Conditions 19A and 19B catering for site-specific communications plans for the owners of Casa Loma at 760 Western Hutt Road and the owners of the Harvey Norman Centre.

[551] There are several conditions the consent holder is to meet that address specific adverse effects under the heading of public access and recreation:

- Construction of a replacement skate park of no less a standard than the existing skate park at Melling before that is removed (Condition 122).
- Investigation of opportunities to relocate the informal basketball court in the Riverbank carpark including consideration of potential co-location with the relocated skate park (Condition 123).
- Continued consultation with the Riverbank Market operators to determine and make available an appropriate temporary site during construction works (Condition 124).
- Throughout construction the consent holder is to maintain recreational connectivity along the river, by either developing a new walking and cycling trail with a minimum width of 3 m (subject to localised narrowing to accommodate specific constraints and maintaining access to the existing Hutt River Trail, on at least one side of Te Awa Kairangi, with signposting installed for any necessary detours (Condition 125).
- During construction, areas of the riverbank will be closed off for a significant period of time and this will affect the ParkRun course as well as arrangements for the start and the finish of the run. Condition 19 requires the Communications Plan to include "methods of engagement with Lower Hutt ParkRun, prior to and during construction works affecting the area from the south end of the Riverbank Carpark to Ewen Bridge, to enable continuity of ParkRun events".
- Condition 36 requires provision for appropriate short stay recreation parking, including in areas adjacent to suitable river corridor access points to mitigate concerns about the removal of the recreational parking area north of Block Road.

[552] We accept that the social and recreation impacts of the Project are (or can be) adequately dealt with in conditions and in conjunction with measures covered under other topics such as noise and vibration. We acknowledge the desirability of there being certainty for people about the effects, particularly during construction, and recognise the contribution the conditions and the timing of the implementation of the Project can make to that.

Archaeology and historic heritage

[553] Ms Victoria Grouden gave supplementary evidence to her AEE Technical Report #12, Archaeology and Historic Heritage Assessment. Ms Mary O'Keeffe, an archaeologist, provided supplementary evidence on her report attached to the Officer's Report on behalf of HCC Regulatory and accepted the archaeological assessment of Ms Grouden. Mr Ian Bowman, heritage architect, gave supplementary evidence to his two reports appended to the AEE Technical Assessment # 12, covering specific buildings with known heritage values - Melling Railway Station, Casa Loma (760 Western Hutt Road) and Lochaber/Prospect College (125 Western Hutt Road).

[554] The Project is located in an area associated with both Māori and early European settlement. The Project area is already heavily modified, and most archaeological and historic heritage material and features are likely to have already been destroyed as a result of previous river protection and general settlement and city development works. This includes the Maraenuku Pā site (described as a transitional Pa in the Cultural Impact Assessment, most probably located on the left-bank of Te Awa Kairangi in close proximity to the Boulcott Substation, built around the time of colonisation and destroyed soon after the battle of Boulcott's Farm in 1846), and Te Ahi-o-Manono Kāinga. There are significant areas across the Project area which have a very low likelihood of archaeology or historic heritage values being present, as no pre-1900 or listed 20th century developments or buildings have been identified in these areas.

[555] Ms Grouden's evidence does not assess or define effects on Māori cultural values as these encompass a wider range of values than those associated with archaeological sites and architectural heritage. We have dealt with sites of significance to Māori under the cultural effects heading.

Archaeological Sites

[556] Nine archaeological sites have been identified and recorded within the Project Area itself. There is only one recorded archaeological site within the Project Area (Wesleyan Cemetery, Bridge Street) that has been physically identified by surviving, visible heritage features (gravestones, and ground penetrating radar readings). Although the main remnant of this site has been excluded from the Project area, part of the original cemetery included 57 Marsden Street within the Project area with the north-eastern corner included within the proposed new alignment of the north-bound Marsden Street carriageway.

[557] The remaining eight recorded sites were identified through historic documentation such as survey plans and ethnographic texts, and their surviving physical presence are, to some degree, unknown. These sites are either located within the current Te Awa Kairangi riverbed, underneath and around the existing stopbanks, or underneath present Lower Hutt city streets. The recorded archaeological sites include Māori settlements as well as 19th century domestic, commercial and military settlements relating to the development of the first Hutt River bridges and the occupation that grew up around them. Ms Grouden considers them all typical of New Zealand Archaeological sites of this period.

[558] Ms Grouden's evidence is that the primary, potential adverse effect of the Project is the damage or destruction of archaeological sites through earthwork activities. Four of the archaeological sites have high significance but are largely avoided by the Project, with the exception of works within the existing road corridor. The remaining archaeological sites are all heavily modified by previous activity with little remaining material and have moderate to low significance overall. She considers the risk of encountering additional unrecorded sites to be low.

[559] Ms Grouden said that proposed works have been minimised for the possible original cemetery extent within 57 Marsden Street, with Condition 51 specifying no works are to be carried out within it. Details about the Bridge Street site and its exclusion and protection from Project works are to be included in the Archaeology and Heritage Management Plan (AHMP) and the overarching Construction Environmental Management Plan (Condition 34(w)). She considered the depth of any archaeological remains are likely to be at a depth below 1m with Project works anticipated to be up to 800mm deep.

[560] The main mitigation measure to address effects on archaeological sites outlined by Ms Grouden is to apply for a single general archaeological authority for the Project from Heritage New Zealand Pouhere Taonga, separate to the RMA approval process. There is also an On Call Procedure for unexpected archaeological or kōiwi encounters during construction to be prepared in collaboration with Mana Whenua and consultation with HNZPT (Condition 53). There is reliance on mitigation measures to be included in the AHMP.

Built historic heritage

[561] Mr Bowman gave evidence on built heritage directly affected by, or within 1 kilometre of, the Project area. The only significant heritage building directly impacted by the Project is the Melling Railway Station, which is within the footprint of the proposed Melling interchange and therefore must be either demolished or relocated. The Melling Railway Station is not currently

listed in the Hutt City District Plan or New Zealand Heritage List/Rārangi Kōrero, but in Mr Bowman's opinion is of high regional significance.

[562] The Applicants have agreed that the Melling Railway Station building will not be demolished, but will instead be relocated and incorporated into the New Melling Station facilities proposed as part of the Project. Mr Bowman gave evidence that although the relocation of the Melling Railway Station building retains its railway function and setting, it will have an adverse impact on its heritage value. That impact is unavoidable, but will be mitigated through: the development of a conservation plan to guide relocation and incorporation into the new station; being located as close as possible to the existing location; and retaining the orientation, prominence and most significant physical elements of the Melling Station Building.

[563] There may need to be some alterations to the Melling Railway Station building (potentially including the removal of asbestos before the building is moved) to ensure the New Melling Station facility functions as a safe, modern and fit-for-purpose public transport hub. Overall, however, he considered that, given the need to remove the building from its site, the proposal to relocate the Melling Railway Station building is an appropriate response to retaining heritage values of the building as far as possible.

[564] Condition 50 deals with the existing Melling Station Building and requires a Conservation Plan for the existing Melling Station building to provide guidance on the relocation and adaptive reuse of the building as part of the new Melling Station facilities. There are requirements for the detailed design for the new Melling Station, but also exceptions for specific types of additions and alterations that can be carried out in consultation with the conservation architect and guided by a HNZPT guidance document.

[565] As noted earlier, there are two listed heritage buildings (both in the New Zealand Heritage List/Rārangi Kōrero and the Hutt City District Plan) near the Project Area - Lochaber/Prospect College at 125 Western Hutt Road, and Casa Loma, 760 Western Hutt Road – near the Project Area. Condition 50A requires the consent holder to engage a heritage landscape architect to assist with developing the detailed design drawings for the altered accessway to Lochaber at 125 Western Road, with certification of those drawings by the Manager. The condition states that "as many of the mature trees along the boundary … must be retained, as practicable" and "where removal is required which opens up views to and from the currently screened heritage property, mitigation planting to reinstate must be set out" in the detailed design drawings or a separate landscape plan. Confirmed heritage landscape mitigation must be installed and maintained in accordance with Condition 71. For Casa Loma

there is Condition 50B requiring that when preparing detailed design drawings of the retaining wall to be constructed adjacent to the entrance to Casa Loma as part of the Urban and Landscape Master Plan under Condition 63, the consent holder is to have particular regard to Casa Loma's heritage values.

[566] A significant number of buildings are scheduled for demolition or removal, mainly in the areas of Marsden and Pharazyn Streets. Mr Bowman gave evidence about a house at 86 Marsden Street that is to be removed, considering its heritage values are not sufficient for listing. This house was built between 1881 and 1891 to house Police and was relocated to the current site and modified in 1930. Condition 52(d) requires the building to be documented fully prior to its relocation or demolition.

[567] Mr Bowman also gave evidence that potential effects on other heritage buildings are limited to dust, noise and vibration effects during construction. There will potentially be on-going noise effects on the former Lower Hutt Post Office (at 151-155 High Street) associated with increased traffic levels once the Project is complete. Mr Bowman considers potential effects are not significant in heritage terms, and although somewhat outside his field of expertise he considers will be appropriately managed through the proposed conditions of consent and the Applicants offer to provide noise mitigation for the most affected apartment at the former Lower Hutt Post Office, (presumably by way of a side agreement).

Archaeological and Heritage Management Plan

[568] There are specific conditions that deal with an AHMP (Condition 52) prior to the start of Enabling and Construction Works and covering the duration of those works and to be certified by the HCC (although the outcome of this is somewhat uncertain in the light of a lack of specific outcomes for some matters against which certification is to occur). That document is to identify and include known historic heritage and archaeological sites and places and areas of historic heritage and archaeological potential within the Project area. It is also to include measures to avoid or minimise adverse effects on those sites, places and areas, including guidelines for excavation and tikanga protocols as identified by the MWSG.

[569] It is also to include methods for recording and documenting of all heritage, archaeological and potential archaeological sites prior to Enabling and Construction Works including the buildings in Marsden, Pharazyn and Daly Streets requiring removal or demolition. Specific areas to be investigated and actively monitored by a Suitably Qualified Person and recorded to the extent they are directly affected by Enabling or Construction Works, include in the Maraenuku Pā area, the area of Te Ahi-o-Manono Kāinga (intersection of Margaret and Daly

Streets), around the Hutt River Bridge Settlement area and Hutt River Bridges, 57 Marsden Street (investigation to include ground penetrating radar) and specific properties (in High, Marsden, and Pharazyn Streets) and the Bridge Street carriageway adjacent to the Bridge Street Cemetery.

[570] In addition, that document is to include methods for protecting or minimising adverse effects on historic heritage and archaeological sites methods, including construction methods that minimise vibration such as fencing around sites. It is also to contain measures to achieve positive heritage outcomes including installation of interpretative material detailing specific archaeological and historic heritage sites and general history of Māori occupation and culture.

Finding on archaeological and historic heritage

[571] We accept the evidence that overall adverse effects on known and potential archaeological and historic heritage and values in the light of the conditions are likely to be low.

Ecology

[572] Ecology effects of the Project were assessed using the Environment Institute of Australia and New Zealand Ecological Impact Assessment Guidelines 2018 (second edition) (EcIA Guidelines) - a three step process to ascertain the level of ecological value of the environment, the magnitude of ecological effect and the overall level of effect to determine whether an effects management response (i.e. mitigation) is required. The magnitude and overall level of effects are assessed both (without) and after (with) measures to avoid, remedy or mitigate those effects. We had evidence that the EcIA Guidelines generally require effects management measures to address potential effects assessed as Moderate or above, with the objective to reduce the overall level of effects to Low.

[573] There are extensive conditions addressing freshwater, terrestrial and marine ecology and coastal avifauna. We note that there has been the opportunity to further develop draft consent conditions since lodgement of the application through consultation with key submitters, including the Department of Conservation and Wellington Fish and Game Council, in response to s92 requests and in response to issues raised in Greater Wellington Regional Council's s87F report. We have reviewed the conditions with that background and in the context of the evidence.

Freshwater ecology

[574] Dean Miller, gave evidence supplementary to his AEE Freshwater Ecology Assessment Technical Report #6. Dr Alex James, who prepared a report attached to the Officers Report, gave supplementary evidence on behalf of WRC Regulatory. There was no disagreement between the witnesses. Neither witness was required to appear before the Court.

[575] The Project area includes approximately 3 kilometres of Te Awa Kairangi and three tributaries as part of the realignment of SH2 for the Melling Interchange works (Harbour View Stream, Tirohanga Intersection Stream and the Tirohanga Stream).

[576] Mr Miller gave evidence that despite the heavily managed nature of the river, macroinvertebrate indices within the Project area were indicative of 'fair' to 'excellent' water habitat quality and with high taxa diversity, species richness and abundance. Fish communities were typically diverse and abundant. The river is important as habitat and a migratory pathway for several At-Risk indigenous fish species including longfin eel, īnanga, bluegill and giant bully, and lamprey and one Nationally Vulnerable species (lamprey). At and around Ewen Bridge īnanga spawning habitat is present and Te Awa Kairangi in general has important trout fishery value.

[577] Mr Miller also said that the tributary sites had fish communities that were less diverse than that of the main river, and predominantly provided habitat and/or a migratory pathway for non-threatened native migratory fish. Additionally, the tributary sites had moderate habitat quality and complete and partial fish passage barriers were present within two of the tributaries (Harbour View Stream and Tirohanga Intersection Stream respectively).

[578] Mr Miller assessed Te Awa Kairangi within and downstream of the project to be of high ecological value and the three tributary sites relevant to the Project to be of moderate ecological value.

[579] Without mitigation, Mr Miller assessed the level of effects of the Project on the various freshwater ecology values to range from high to low. He found effects identified as moderate or above (without mitigation) include construction related effects on water quality, habitat and freshwater fauna values of Te Awa Kairangi and stream habitat loss and further fish passage restriction in Harbour View Stream. He assessed the Project as having a permanent positive effect by improving fish passage at Tirohanga Intersection Stream.

[580] Potential adverse effects included:

- temporary disturbance associated with the modification of approx. 28 ha of freshwater habitats assessed as high ecological value through gravel extraction and associated construction activities within Te Awa Kairangi;
- direct mortality or injury of freshwater fauna (e.g. fish) that may be harmed or displaced during earthworks and river works activities, and temporary disruption to migration and spawning for freshwater fish;
- degradation of freshwater habitat quality downstream of river and earthworks activities due to sediment and cement wash discharges. Key potential habitats affected are the river downstream of and within the Project area with both areas identified as significant under the PNRP;
- changes to hydrology that may result in changes in growth rates of cyanobacteria and periphyton species;
- reduced fish passage within the tributary sites; and
- loss of stream habitat and further restriction of fish passage within Harbour View Stream.

[581] He referred to measures to avoid, remedy or mitigate construction potential effects and as captured in the conditions to include:

- stand down periods for key fish life cycle stages;
- construction and erosion sediment control methodologies;
- monitoring of impacted habitats and fauna to feed into a response regime;
- pre-works fish removal;
- retraining the river channel so there is not a loss in natural character;
- designing culverts to accommodate fish passage where practicable.

He acknowledged that conditions include the requirement for management plans to be developed that document the detailed methods to implement the above measures to an appropriate standard.

[582] Mr Miller said while many of the potential effects have been avoided, or remedied and mitigated to the extent possible, after considering various options there are still residual adverse effects due to the loss of stream habitat and further fish passage restriction within Harbour View Stream. The high level of residual effects within Harbour View Stream are proposed to be addressed by way of an offset aimed at achieving no net loss of ecological function (Conditions 82 and 83).

[583] Overall, he concluded that the effects of the Project on freshwater ecology of Te Awa Kairangi, Tirohanga Stream and Tirohanga Intersection Stream can be avoided, remedied or

mitigated to low or very low levels. No further effects management is needed (e.g. offsetting) beyond that summarised in his evidence.

Terrestrial ecology

[584] Mr Joshua Markham gave supplementary evidence to his Terrestrial Ecology Assessment Report #7. Dr Roger Urys, who prepared a report attached to the Officers Report, gave supplementary evidence on behalf of WRC Regulatory. We note the evolution of the Project and conditions in the course of Further Information Requests, following the WRC Regulatory Report and in consultation with submitters There was no disagreement between the witnesses. Neither witness was required to appear before the Court.

[585] Mr Markham gave evidence that the current land use within and adjacent to the Project area is dominated by recreational, urban, residential and industrial uses. Indigenous forest and scrubland persist on the northern hillsides on the western side of Te Awa Kairangi/ Hutt River.

[586] Mr Markham said that multiple areas of ecological significance have been identified in the landscape surrounding the Project area, both in the PNRP and the District Plan, but while two significant natural resources sites (SNR14 and SNR21) occur in close vicinity to the Project area, none of these areas overlap with the proposed designation boundary.

[587] He said that the Project area is located immediately adjacent to Lower Hutt central city and all of the vegetation/habitat types assessed were subject to varying degrees of modification and degradation, such as fragmentation and pest plant incursions, resulting from the intensive development in the surrounding area. In addition, five *Threatened*[50] and *At Risk* plant species were identified in the Project area, and several other regionally *Threatened* or *At Risk* species could potentially occur in the Project area but were not confirmed during site investigations.

[588] The native land snail *Wainuia urnula* (not classified) and the peripatus (velvet worm) Peripatoides *novaezealandiae* (*Not Threatened*) were observed in the exotic-dominated vegetation on the river margin and in the mixed broadleaved forest adjacent to SH2 respectively. Mr Markham assessed the Project area as very unlikely to be used by native bats.

[589] A single species of lizard, the *Not Threatened* Northern Grass Skink, was detected during comprehensive site investigations. However multiple other species have been recorded in

50 NZ Threat Classification System

close vicinity to the Project area and may still be present without being detected in surveys. The vegetation and habitats within the river corridor were assessed as having negligible value for native lizards. Conversely the 'mixed broadleaved forest and scrub' supports northern grass skink as well as potentially supporting other *Not Threatened* and *At Risk* species. Hence it was assessed as high value habitat for native lizards.

[590] Mr Markham gave evidence that numerous *Threatened* or *At Risk* bird species are known to use habitat downstream of the Project area and likely disperse along the river corridor, through the Project area, on occasion. Notable species confirmed as regularly using the Project area include red-billed gulls, pied shag, black shag and New Zealand pipit. (Potential effects on coastal avifauna are addressed in the evidence of Dr Leigh Bull.)

[591] Mr Markham's evidence was that, without mitigation, potential adverse effects on terrestrial values during and after construction of the Project include:

- the removal of approximately 1.65ha of mixed broadleaved forest and scrub assessed as 'Moderate' ecological value, and an additional loss of 22.25ha of low or negligible value habitat through vegetation clearance and earthworks;
- the temporary removal of all 'High' value gravel beach habitat within the Project area, covering approximately a 3.7 km length of the river;
- the creation of habitat edge effects, altering the composition and health of adjacent vegetation (ie habitat degradation), which may affect habitat suitability for flora and fauna. This potential effect primarily applies to the mixed broadleaved forest and scrub adjacent to SH2 as other habitats across the project footprint are fragmented and already highly modified;
- accidental introductions of pest plants from imported soils associated with construction (noting the risk is low given the level of development the Project area has already been subject to and the numerous pest plant incursions observed across the site);
- direct mortality or injury to species, for example less mobile species (e.g. invertebrates and lizards) that may be harmed during vegetation clearance or earthworks activities;
- during breeding season, vegetation removal has the potential to result in the destruction of nests, and the mortality of eggs and fledglings;
- construction and operations related noise and vibrations or dust effects which can disturb animals, and/or degrade habitat (noting that operational noise and vibration is unlikely to notably increase compared to the baseline conditions);

- degradation of habitat quality downstream due to sediment runoff. Key potential habitats affected are the estuarine habitat at the mouth of the river and the Harbour. Both areas are identified as significant under the PNRP;
- potential (but unlikely) permanent loss of gravel beach habitat resulting from gravel not being deposited as anticipated due to changes in hydrology from the river works;
- increased disturbance to wildlife, namely birds, resulting from increased connectivity between the CBD and the river corridor, which could potentially result in greater use of the riparian area for recreation; and
- bird mortality or injury through vehicle strike on the new Melling Bridge and interchange upgrade for some species (noting that several bridges already cross the river and hence it is likely that birds dispersing along the river corridor will adapt to this change quickly).

[592] Mr Markham referred to measures to avoid, remedy or mitigate construction potential effects and as captured in the conditions, with a particular focus on the revegetation programme, required by proposed Conditions 70, 71, 72 and 74. That has been designed in collaboration with the Project landscape architects to address the loss of the mixed broadleaved forest and scrub from the hillslope above SH2 as well as the loss of the 'tall stature exotic planting (flood protection)' from the river corridor. Although the latter vegetation type was only assigned a 'Low' ecological value using the EcIA Guidelines, the tall stature exotic vegetation is considered important in the context of providing habitat structure otherwise missing from the heavily deforested floodplain environment. A key aspect of the revegetation programme is to return parts of the river corridor (while noting its function to convey floodwater) to indigenous vegetation that would have historically covered the area, improving habitat connectivity across the valley floor between the forested hill slopes that bound the east and the west of the Hutt Valley.

[593] The replanting programme includes:

(a) 7.73 ha of exotic willow planting with an indigenous understory for flood protection adjacent to the active channel along the upper reach of the Project area. There are limitations to using slower-growing native trees immediately adjacent to the active channel. Instead, this area will initially comprise willow plantings that will be underplanted with native species with the aim of facilitating a successional trajectory toward a native riparian vegetation in the long-term (noting the effect of flood events). Key native canopy species proposed for the plant mix include kahikatea, pukatea, tōtara, matai, and swamp maire. These species have been

chosen to re-establish the historic vegetation types that previously dominated the floodplain. These being: tōtara, mataī, ribbonwood forest and kahikatea, pukatea forest;

(b) a further 0.57 ha (approximately 720 trees) of indigenous tree groves proposed in the river corridor. These groves will be maintained as treeland areas without an indigenous understory, but they will provide additional tall stature native vegetation in the river corridor to contribute to replacing the loss of tall stature willows; and

(c) 10.98 ha of indigenous broadleaved forest and scrub revegetation. This area includes 4.58 ha of a tall stature 'forest' mix and 6.40 ha of a medium stature 'scrub' mix depending on the placement of the plantings relative to the active channel. The proposed edge protection (rock linings) means bioengineered flood protection along the lower reach is not required and a resilient riparian 'medium stature' indigenous plant mix can be used instead of willows. Away from the river edge along both reaches the tall stature indigenous forest mix is proposed. It should be noted that the overall composition of these mixes is similar and enrichment planting of the medium stature mix with secondary species such as tōtara, miro and mataī are proposed. Hence it is intended that all the above areas have a successional trajectory towards the historic vegetation types that originally dominated the floodplain but with different management initially to respond to flood protection constraints.

[594] Mr Markham also referred to appropriate construction methodology, revegetation planting, infill planting and weed control, pre-clearance fauna surveys, accidental discovery protocols and sediment controls. The detailed methodology required to implement the recommendations to an appropriate standard will require the preparation and certification of management plans, as in Condition 73.

[595] Without mitigation, Mr Markham was of the opinion that the level of effects of the Project on the various terrestrial ecology values ranged from High to Very Low. With mitigation applied to potential effects assessed as Moderate or above these effects are reduced to Low or Very Low.

[596] Mr Markham termed replacement of the mixed broadleaved forest and scrub habitat being removed from the hillslope above SH2 with planting in the river corridor as *offset*. This is because replacing hillslope vegetation with planting in the alluvial floodplain is not 'like for like' remediation. Instead, the vegetation removed will be replaced with better quality vegetation in a more threatened land environment - the alluvial floodplain as opposed to the

hillslope ecosystem. He considered *offset* to be an appropriate approach in this instance because:

(a) the majority of the 1.65 ha of mixed broadleaved vegetation being removed is in early stages of regeneration and does not reflect the hillslope vegetation that historically covered the area;

(b) unvegetated areas on the western hill slopes are very limited, hence, to achieve the required area of revegetation in this 'like-for-like' environment, the revegetation would need to be undertaken some distance from the point of impact compared to replacement in the nearby floodplain; and

(c) the topography of the hills means that development has been more limited in this area, and it is a less threatened ecosystem type compared to the indigenous forest that once covered the floodplain, which is now almost entirely removed across the developed areas of the Hutt Valley.

[597] He reported on a Biodiversity Offset Accounting Model (BOAM) run to test whether no net loss and preferably net gain would be achieved with the above offset planting areas. He concluded that based on the type and quantum of revegetation proposed, the BOAM indicates that key attributes can be offset to a verifiable net gain within 35 years. He noted that the above result cannot be viewed in isolation, but is part of a wider restoration program which includes mitigation for 15.89ha of exotic dominated flood protection with 7.68ha of bioengineered willow planting with an indigenous understory and the excess 7.98ha of indigenous forest and shrubland.

Marine ecology

[598] Dr Jacqueline Bell gave supplementary evidence to her marine ecology components of the AEE Marine Ecology and Coastal Avifauna Assessment Technical Report #8. She was not required to appear before the Court.

[599] Dr Bell gave evidence the Te Awa Kairangi (Hutt River) mouth consists of moderate to low benthic invertebrate species richness, diversity and abundance, with high numbers of opportunistic and tolerant taxa. Although some sensitive species exist (such as pipi), the marine sediments are moderately muddy, and oxygenation is limited to the shallow sediment layer. Furthermore, marine biota are impacted by extraction and scouring of the river during flood events. On balance, the ecological value of the river mouth is assessed as low.

[600] She said that Korokoro Estuary is characterised by relatively (and naturally) low benthic invertebrate species richness and diversity. The benthic invertebrate community composition

is dominated by tolerant taxa. Sediments grain size composition is mainly sand and gravels, with oxygenated surface sediments and low levels of contaminants. There is no macroalgae habitat. The Estuary has a high degree of habitat modification in parts. On balance, the ecological value of the Korokoro Estuary and intertidal Pito-One (Petone) foreshore is assessed as low.

[601] Dr Bell assessed that the benthic invertebrate community along the Ngā Ūranga to Pito-one (Ngauranga to Petone) foreshore typically has high diversity, species richness and abundance (soft sediment subtidal communities in particular). This area contains many taxa that are sensitive, including bivalves, gastropods, ostracods. Marine sediments are typically comprised of 50% smaller grain sizes (ie fine sand, very fine sand, silt and clay). Contaminant concentrations in surface sediment exceed the Auckland Regional Council Environmental Response Criteria and Australia and New Zealand Environment Conservation Council's Default Guideline Value for threshold concentrations at a number of sites. (We assume this document is still current.) Due to the existing fine sediment deposition from Te Awa Kairangi, stormwater inputs and the degree of harbour shore that has been modified, the habitat is regarded as reasonably modified. On balance, the value of the subtidal soft sediment environment within Wellington Harbour is assessed as moderate.

[602] Overall, Dr Bell assessed that the marine ecological value of the receiving environment that is most likely to be influenced by the Project has an overall value of moderate.

[603] Dr Bell gave evidence that potential adverse effects of the Project on the marine ecological values may occur from the discharge of construction phase fine sediment. Based on conservative estimates, provided by Mr Gary Williams and Mr Kyle Christianson (geomorphologists) and Mr Ed Breese (construction water quality), the amount of silt and clay sized particles likely to be present within the entire project footprint represents less than 0.5% of the natural supply of the entire catchment. She considered the contribution of the Project to the suspended sediment, deposition or long-term sedimentation of the harbour is negligible as there is unlikely to be more than a very small amount of fine (silt and clay sized) sediment particles within the proposed project footprint. In her opinion, a moderate marine ecological value and a negligible magnitude of effect of construction activities will result in an overall very low level of effect of the Project's construction phase. We have discussed the conditions around controlling the release of sediment into Te Awa Kairangi during the construction of the Project earlier in this decision.

[604] She considered that potential positive effects of the Project on marine ecological values may occur from the discharge of operational phase stormwater. Currently, stormwater contaminants in surface sediment of the receiving environment are generally high. Stormwater treatment will be provided for in the Project where space and gradient allows for it to be built into the design, and will improve operational phase water quality. This is discussed in more detail in the Stormwater section of this decision.

[605] In Dr Bell's opinion, a moderate marine ecological value and a positive magnitude of effect will result in an overall net gain during the Project's operational phase. In terms of proposed mitigation measures Dr Bell based her assessment of effects on technical advice provided by Mr Williams and Mr Christianson in AEE Technical Report #5, Geomorphology Assessment, that describes the material within the riverbed and adjacent floodplains of the project footprint as containing negligible fine (<60μm) particles. She acknowledged that this assumption will be verified by the Erosion and Sediment Control monitoring immediately prior to and throughout the construction period. Dr Bell also refers to recommended measures to minimise sediment runoff including erosion and sediment control designed to GW and NZTA guidelines and standards, staging of works and storm event weather forecasting in order to stabilise open areas prior to the storm event occurring. To repeat, there are a range of conditions for controlling sediment releases into the river during construction of the Project.

[606] We accept the evidence of Dr Bell.

Coastal Avifauna

[607] The coastal avifauna components of Technical Report #8 were prepared by Karin Sievwright. Dr Leigh Bull gave evidence on coastal avifauna by peer reviewing and revising the executive summary in the Technical Report. Dr Bull was not required to appear before the Court.

[608] Dr Bull agreed with Ms Sievwright that the coastal avifauna assemblage of Te Awa Kairangi (Hutt River) mouth/estuary, Korokoro estuary, the Ngā Ūranga to Pito-one (Ngauranga to Petone) foreshore and wider Wellington Harbour is diverse and includes a number of *At Risk* and *Threatened* species. These habitats (a number of which are significant areas as identified in Schedule F2c of the PNRP) provide foraging, nesting and roosting opportunities for coastal avifauna. Foraging habitat includes intertidal areas, near-shore and off-shore areas. Roosting and nesting habitat are above mean high water springs. The ecological value of these species ranges from low to very high.

[609] She also agreed that potential adverse effects of the Project on the marine and coastal avifauna ecological values may occur from the discharge of construction phase fine sediment. She also agreed with Ms Sievwright's conclusions on potential adverse effects:

(a) low to very high avifauna ecological values along with a negligible magnitude of effect of construction-generated deposited sediment on prey will result in an overall very low to low level of effect on coastal avifauna; and

(b) low to very high avifauna ecological values along with a negligible magnitude of effect of construction-generated suspended sediment on the foraging ability of coastal avifauna will result in an overall very low to low level of effect.

As with Dr Bell she agreed with the recommended measures to minimise sediment runoff.

[610] Further, she agreed that potential positive effects of the Project on the marine and coastal avifauna ecological values may occur from the discharge of operational phase stormwater. Currently, stormwater contaminants in surface sediment of the receiving environment are generally high. Stormwater treatment will be provided for in the Project where space and gradient allow for it to be built into the design, and will improve operational phase water quality.

[611] Finally, she agreed with Ms Sievwright's conclusion that low to very high avifauna ecological values along with an improvement in stormwater quality will result in an overall net gain level of effect for coastal avifauna.

[612] We accept the evidence of Dr Bull.

The Conditions on Ecology

[613] The key conditions under the heading of Freshwater Ecology (see also Erosion and Sediment Control and Culverts) (78-84) direct:

- Construction of specified freshwater habitat features as illustrated on geomorphology drawings labelled "Figure 4 and 5 RiverLink Design Rock Features & Access" (Condition 78). These are habitat appropriate riffle and deep pool sections, boulders, boulder clusters and rock spurs, and increased indigenous vegetation within the immediate riparian zone. In additions areas of replacement īnanga spawning habitat are also to be included, where required by Condition 79, along with any opportunity for further īnanga spawning habitat areas in locations resilient to future sea level rise within the lower Project area.
- Prior to construction works within the river channel of Te Awa Kairangi there are requirements of survey of īnanga spawning habitat on the true left bank for 250m

upstream of Ewen Bridge within the Project area to confirm the extent of the habitat. No confirmed spawning habitat on the river bank must be removed between March to June (inclusive). Removal outside of these times must be replaced within the lower river reach once Project works within the potential spawning locality are completed and before the next spawning season. But if removed riparian vegetation is unable to be re-established by then the consent holder is to install temporary artificial spawning substrate such as straw bales (Condition 79).

- As we have noted, the Erosion and Sediment Control section of this decision describes the conditions for controlling the release of sediment into the river during the construction of the Project.
- Offsetting of the adverse effects on freshwater arising from the loss of stream habitat with the piping of approximately 32 linear metres of stream habitat at the Harbour View Road tributary to result in no net loss of ecological function through the provision of an offset(s) for loss of stream ecological value and function (Condition 82). The quantum of the offset and its design and location is to be set out in a Stream Offset Plan and be consistent with and provide the information required by PNRP Schedule G2: Principles to be applied when proposing and considering a biodiversity offset. (Condition 83). For operation and maintenance regional resource consent conditions for Waka Kotahi COW1 Fish Passage through Tirohanga Intersection Stream and under Offset Mitigation COW6 for the duration of the Project following its opening the maintenance and protection of the offset mitigation areas identified and established through Conditions 82 and 83.
- A Fish Management Protocol subsection of the Ecology Management Plan (as referred to below) is to be prepared containing details of the methodology for fish salvage and relocation, and the Protocol implemented during all construction works within Te Awa Kairangi and the tributaries (Condition 84). A Freshwater Habitat Management subsection of the Ecology Management Plan detailing the key design features within Te Awa Kairangi that will maintain and where possible increase habitat diversity and spawning habit for key fish species (e.g. blue gill bully, inanga and trout) affected by Project works (Condition 78).
- We have addressed Conditions 85-87A requiring monitoring of the effects of construction on the ecological health of Te Awa Kairangi in the Erosion and Sediment Control section of our decision.

[614] The key conditions under the heading of Terrestrial Ecology (Conditions 64-72) direct:

- No vegetation clearance within the mixed broadleaved forest and scrub habitat is to occur during the peak bird nesting season (September to January inclusive) (Condition 64).
- Elsewhere vegetation clearance to be preceded by pre-clearance nesting surveys and not to proceed within 50m (for *At Risk* or *Threatened* species) or 20m (other native birds) of the active nest in any direction. For forest birds nesting within tall stature exotic planting serving a flood protection purposes nests can be relocated subject to the any requirements of the Wildlife Act 1953 (Condition 65).
- Measures to avoid unanticipated effects on black shag roosting/nesting sites hosted on two macrocarpa trees adjacent to the proposed new Melling Interchange (Condition 66).
- Pre-vegetation clearance lizard surveys and salvage prior to vegetation clearance in the mixed broadleaved forest and scrub habitat adjacent to SH2, but avoiding all these activities during May-August inclusive (Condition 67).
- Prior to vegetation clearance in tall stature exotic planting (flood protection habitat) pre-vegetation clearance surveys and salvage for *W.urnula* snails and velvet worm (*Peripatus spp.*), with any captured to be relocated to Jubilee Park or a relocation site established for lizard relocation required by Condition 75 and/or (Condition 68). Where practicable sufficient habitat to re-establish populations within the RiverLink reach should be taken back to the river corridor once the minimum vegetation maintenance requirements of other conditions have been satisfied but there is no requirement to monitor its success once returned.
- If any *At Risk* or *Threatened* flora and fauna are discovered on site not specifically addressed by other conditions of the consent, works must stop and the Project ecologist, MWSG and DOC notified and the consent holder is to have regard to any advice from the Project ecologist and any feedback from the other two bodies in determining the appropriate course of action to minimise construction effects and implement any actions it determines to be practicable for recommending before works recommence (Condition 69).
- Revegetation is specified for the planting areas on the Indicative Landscape Plans and sections, or at an alternative area of the same type and size and achieving at least the same ecological outcomes and must occur concurrently as construction stages are completed (Condition 70). Minimum replanting required to mitigate and offset the ecological value of vegetation to be removed for the Project, and to mitigate amenity effects is specified. Condition 71 specifies minimum maintenance requirements for particular periods. Where planting maintenance for longer than 5 years post construction is required to achieve the canopy or underplanting

performance standard this is managed by conditions on the operational phase designations. (The requirements in performance Conditions (DG1, DW1 and DH2) are for native canopy planting, until 80% canopy closure is achieved; and where native planting does not comprise the canopy, i.e. underplanting of bioengineered flood protection planting, maintenance should be undertaken until the native understory reaches a 60% cover.[51])

- Within six months of the maintenance period for each planting/revegetation area there is to be a review of the success of the planting/revegetation identifying any required remedial actions and additional monitoring or maintenance and a timeframe for implementation with a copy of this programme to be provided to the Manager. (Condition 72) This condition does not appear to have any follow-up prescribed to implement those remedial actions.

[615] Condition 73 requires an Ecology Management Plan. It requires details of how the consent holder will comply or be consistent with the limits, management triggers and thresholds established in Conditions 64-72, 79-81 and 85-88 and required by the specialist management subsections – Vegetation Removal Management (Condition 74), Planting Establishment and Management (Condition 77), Avifauna Management (Condition 76), Fish Management Protocol and Monitoring (Condition 84) and Freshwater Habitat Monitoring (Condition 78).

[616] We find the conditions directed at the ecology outcomes to be appropriate.

Natural Character, Landscape and Visual Amenity

[617] Ms Lisa Rimmer gave supplementary evidence to her AEE Technical Report #14, Landscape, Visual and Natural Character Assessment. Ms Julia Williams, who prepared a part of the Officer's Report for HCC Regulatory on natural character, landscape and visual amenity, and Morten Gjerde who did likewise for urban design, also gave evidence. None of these witnesses were required to appear before the Court.

[618] We did not find the summary assessment by the two landscape witnesses addressing the overall impact of the Project on natural character and landscape and visual amenity values relevant, given it conflated topics that should be dealt with separately. However, nothing hinges

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51 Operation and maintenance of RiverLink – designation Conditions 4.1 DG1 (maintaining revegetation areas) for GWRC flood protection designation, 4.3 DW1 (maintaining revegetation areas) for Waka Kotahi state highway designation and 4.4 DH2 (Planting – maintaining revegetation areas) for HCC urban renewal designation conditions

on that given both witnesses separately considered natural character, landscape and visual amenity effects.

[619] Ms Rimmer gave evidence that the receiving environment for the Project, where the works will result in potential landscape, visual, natural character, and public access effects, includes the proposed designation footprint, the visual catchment of the works and other areas where natural and urban landscape systems will be influenced. The existing environment varies by river reach, and for the purposes of this assessment is divided up into two sectors – the Upper Reach – Kennedy Good Bridge to Mills Street - and the Lower Reach – Mills Street to Ewen Bridge.

[620] Both sectors include the backdrop of the Wellington Fault escarpment to the west, the Pareraho (Belmont) hills behind this, and the Remutaka ranges to the east. The Project is set in a broad river plain between these landforms. The receiving environment features important regional transport connections, the Hutt City Centre and varied urban land uses, and is of great significance to Taranaki Whānui and Ngāti Toa Rangatira. In landscape terms this receiving environment combines river landscape, transport corridor and diverse city-river-community connections.

[621] There are no operative outstanding or high natural character areas shown in the planning documents. There are no operative Landscape Protection areas, and the Technical Assessment did not identify any Outstanding Natural Features or Landscapes (ONFLs) in the vicinity of the Project. Draft ONFLs have been identified as part of a preliminary technical study in 2016 for HCC, as are required under RPS Policy 25. Te Awa Kairangi was identified as a Special Amenity Landscape (SAL) in that study, including the areas between the existing flood banks of the Project site, in line with the RPS Policy 27. To date, the recognition of these areas has not been progressed in the District Plan review.

[622] Ms Rimmer assessed there to be moderate natural character values in the Upper Reach and low natural character values in the Lower Reach. She concurred with the recent district wide technical assessment of the river throughout the district as 'Te Awa Kairangi' SAL.

The Project Approach

[623] Ms Rimmer and Ms Williams gave evidence acknowledging measures that have been integrated into the consent design to avoid, remedy or mitigate effects including the principles, design themes, and outcomes and opportunities described within the Project Urban and Landscape Design Framework (ULDF). This includes the intention set for cultural expression

and the underpinning Kaitiaki Strategy to be integrated in the overall form and articulation of the consent design along with specific elements to be resolved in future stages of the Project).

[624] Under the heading of *Landscape and Visual* and under Condition 63 the Project is to proceed in accordance with a certified Urban Landscape Management Plan (ULMP) with its purpose to:

- Integrate the permanent works into the surrounding landscape and urban context and integrate the cultural and environmental elements of the Project;
- Support the achievement of the purpose of the Ecology Management Plan and specifically its Planting Establishment and Management sub-section through combining landscape planting, restoration planting and habitat rehabilitation where practicable;
- Specify quality urban design and landscape treatments.

[625] That ULMP is to be prepared in consultation with the MWSG and must demonstrate how the RiverLink Kaitiaki Strategy principles and the urban and landscape design principles, themes, outcomes, and opportunities in the ULDF submitted with the application will be taken into account in the development of the detailed design concepts for the Project. There are specific outcomes directed for aspects of the ULMP, along with procedural requirements. Where a finer grain of urban design detailing is yet to be undertaken there is provision for later Site Specific Design Plans and also certification.

[626] Detailed construction management and sequencing will be required to limit the extent of adverse effects at any one time and to ensure long-term positive effects of the Project are realised as soon as possible in the programme. This includes early establishment of all planting types including for flood protection and a return of the public to the river's edge as soon as it is practicable to do so. There are conditions to ensure this.

Natural character

[627] In the Upper Reach the two landscape witnesses agreed that based on the mitigation set out in the ULDF and the Indicative Landscape Plans, natural character effects are Moderate-Low positive and effects of construction will be temporary but varying from Low to Very High adverse. Potential adverse effects on natural character relate to the future active channel and lower berm works including the interface of operating machinery with members of the public using the path network and beach areas. Also the extent of naturalised indigenous planting that can be achieved at the outset and the way in which this will be perceived from the path network and the river.

[628] The mitigation integrated into the proposed design and the outcomes sought by the ULDF will establish a naturalised river landscape with enhanced natural character compared to the status quo. The design of the active channel will provide for greater variation in water movement, and natural character gains are ensured by a range of other design elements. Measures to ensure long term operational requirements can be integrated to reduce their perceived dominance and the intended indigenous planting for flood protection and limiting the use of willows long term are key to natural character restoration and enhancement. Overall, with these measures in place, the Project will establish moderate natural character benefits in this sector and these effects would increase over time with the transition to indigenous cover.

[629] In the Lower Reach the potential adverse effects on natural character relate to earthworks and vegetation removal required to facilitate a deeper and wider river channel; modifications to the natural escarpment landform, and partially culverting a stream. Works associated with the SH2 interchange will require modification to the natural escarpment landform and the removal of regenerating vegetation and a further section of the stream to be culverted. Both witnesses concluded that the outcomes sought, as set out in the proposed design and ULDF, will enhance natural character. The active channel will feature greater variation in water movement and, although there will be additional structures in and on the edge of the river, natural character gains are ensured by their quality and articulation. Measures to ensure operational requirements can be integrated are also important in this sector along with habitat management; to limit the effects of likely greater disturbance by people. Overall, the Project will establish moderate-low natural character benefits in this sector and these effects could increase once detailed design measures are confirmed.

[630] Given time for the naturalised patterns in the active channel and the significant areas of planting to establish, we accept the evidence and the conditions to ensure there will ultimately be positive effects on the natural character of the river.

Natural features and landscape

[631] In the Upper Reach - Kennedy Good Bridge to Mills Street - there are few remaining natural landforms within the proposed designation boundary. This is a highly modified environment managed for the purpose of flood protection. As the channel is wider and less confined in this reach, it has established a more braided or naturalised pattern. On the True Right Bank near the Kennedy Good Bridge, there are a number of short sections of channelised watercourses which are daylighted. There is a minor pattern of indigenous

vegetation associated with these features and one is linked to the recently planted biodiversity wetland (the Belmont Wetland).

[632] Ms Rimmer gave evidence that the Project has given priority to enhancing naturalised features in its design and mitigation approach. Given time for the constructed active channel features to naturalise and the plan to reduce the use of willows, the effects on the natural landscape will be Moderate-Low positive. Ms Williams agreed that based on the mitigation set out in the ULDF and the Indicative Landscape Plans, natural landscape effects are Moderate-Low positive, and that urban (built) landscape effects are Moderate positive and effects of construction will be temporary but varying from Low to Very High adverse.

[633] In the Lower Reach - Mills Street to Ewen Bridge - the existing landforms in the river landscape are highly modified including limited riffles within the active channel. Sections of the active channel edge are rock lined, in addition large areas of the lower berm on the True Left Bank are occupied by car parking and the interface with the city streets feature retaining wall structures from Fraser Street to Melling Bridge.

[634] Ms Rimmer gave evidence that Project activities with the potential to create adverse effects on natural landscape are: removal of the minor pattern of naturalised features in the river landscape during construction; the Melling interchange works requiring earthworks and vegetation removal along the edge of SH2, which will have an impact on the escarpment landform and the habitats it supports along with 3 notable trees listed in the HCC district plan (31# black beech, #33 silver fir and #34 pohutukawa); and road works within the dripline of other notable trees (where kerb lines remain unchanged). While the design has provided for additional naturalised features in the river landscape it also removes existing unmodified natural landforms and vegetation along SH2. Given time for establishment, the proposed planting will mitigate some of these potential effects, but there will be a permanent moderate-high adverse effect on the natural landscape features around the interchange.

[635] Both landscape witnesses agreed that considering all components of the works and based on the mitigation set out in the ULDF and the Indicative Landscape Plans, while there will be localised Moderate-High adverse effects on the landform and vegetation at Melling intersection overall effects on the natural landscape are Moderate-Low positive.

[636] We accept the evidence and the related conditions to secure the outcomes for natural features and landscape.

Visual amenity

[637] Visual amenity covers effects on views from public and private places, considering the places from where the Project will be visible, sensitivity of audience, prominence, and amenity of the Project.

[638] In both reaches Ms Rimmer and Ms Williams agreed that that effects of construction on visual amenity will be high and very high adverse, but temporary. Based on the mitigation set out in the ULDF and the Indicative Landscape Plans both agreed that the effects on visual amenity for all viewers/users are positive.

[639] For the Lower Reach Ms Williams did not agree with Ms Rimmer's overall assessment of post-construction effects "on balance" as high and positive compared to the existing environment. Ms Williams had a concern that effects vary and that the effects for a diverse range of viewers/users cannot be aggregated into a single overall rating as Ms Rimmer has done.

[640] Ms Williams was concerned about the potential for High and Very High adverse visual amenity effects in the lower reach for the remaining Mills Street and Marsden Street community that will look out at the works and the commercial properties interfacing with the stop bank works. She was also concerned about effects on residents of properties on Mills Street and Connolly Street close to Te Awa Kairangi with an open outlook toward the river landscape who will be impacted by the increase in stop bank height, and for residents at 39A, 39B and 54A Mills Street by the removal of intervening houses.

[641] To address concerns about the certainty of outcomes Ms Williams agreed with an amendment to Condition 63 to require that the purpose of the ULMP includes quality urban design and landscape treatments and provides for Site Specific Design Plans to be certified, as necessary, for areas requiring a finer grain of urban design detailing. She considered these provide assurance on the quality of the mitigation to be undertaken for effects on the visual amenity of cyclists, pedestrians, motorists, people in commercial properties the look out to the river, residents with distant views of the proposed works and residents on properties on Marsden Street and William Grove, who will have their near neighbourhood transformed by the removal of buildings along the river side of the street.

[642] We also note the inclusion in Condition 63 on the ULMP of specific clauses:

> (p) Site specific design details for the mitigation of potential effects on visual amenity and privacy developed following consultation with owners of the properties at 54A Mills

Street and the rear unit at 17A Connolly Street. Such mitigation may include planting and/or fencing within these adjoining sites or no work, depending on the preferences identified and site constraints. Any comments and inputs received from the owners must be clearly documented, along with clear explanation of where any comments have not been incorporated and the reasons why.

(q) Design measures to deter the public from using the maintenance track between Melling Road and the driveway serving 39A and 39B Mills Street.

[643] We accept the amended conditions as being appropriate to deal with visual amenity effects.

Urban Design

[644] We acknowledge Mr Gjerde's opinion that the ULDF is well informed in terms of the quality of urban design outcomes. He said the outcomes are clearly stated and, while most invite interpretation, they provide clear direction and accompanying illustrations also further guidance for designers preparing the ULMP. In terms of the Riverlink City Edge focus area, Mr Gjerde noted that parts of the area are privately owned sites, and these may not change within the timeframe of the current project. Nevertheless, he considered that it should be anticipated that when these sites are redeveloped, the District Plan and other Council documents will help guide development toward the desired outcomes. On the other hand, a range of outcomes sought for the city's streets and laneways would appear to be within the Project's ability to deliver.

[645] He noted that the Applicants' Further Information Response extended the scope of the Riverlink project further along Melling Link, Queens Drive and Margaret Street to their intersections with High Street, respectively. He considered this an important and positive change as it can help stitch the RiverLink project more effectively into the city along these public streets.

[646] Mr Gjerde reviewed the conditions relating to the ULDF and the ULMP, approving the process by which the ULMP is prepared and how it is to be presented for assessment by the Council under Condition 63. He considered the approach will appropriately enable the urban design outcomes of the project to be confirmed against those anticipated by the ULDF.

[647] We find that evidence reassuring.

Network Utilities

[648] There are a large number of existing infrastructure networks throughout the Project area ranging from local service connections to regionally significant rail, water, electricity and gas transmission infrastructure. The Project will have both direct and indirect effects on existing infrastructure networks including effects associated with temporarily or permanently relocating existing network utilities, and effects on network utilities from construction of the Project including from dust, ground settlement, and the accidental striking of services.

[649] We accept that there are well-established procedures across the industry associated with the relocation and protection of network utilities and that the Project team has consulted with network utility operators to discuss the relocation and protection required during construction and operation of the Project and to develop appropriate measures to achieve either avoidance through design of the Project, or mitigation. We note that the necessary mitigation works will be undertaken as enabling works prior to the main Project construction works. We also accept that any adverse effects during construction can be managed through appropriate construction management measures.

[650] A significant amount of earthworks and underground excavation is required to complete the proposed utility works, with almost all of the utility services within the Project area needing to be demolished, replaced, and realigned. The bulk of the impacted services are uncomplicated and will be straightforward to realign and an economical and practical solution has been advanced (and one we note that has the added benefit of reducing existing and potential adverse visual effects) which is a shared service trench to contain (where possible) the network utilities in an accessible and shared space. Otherwise an alternative location will be agreed with the relevant network utility operator. Condition 59 states:

> The Consent Holder must consult with Network Utility Operators during the detailed design phase to identify opportunities to enable, or not preclude, the development of new or upgraded network utility facilities (including co-location of services in shared service trenches, as appropriate) to address required levels of service for anticipated future demand where practicable to do so.

[651] Under the heading of *network utilities* there are specific conditions. Condition 58 requires that the consent holder ensures that the Project does not adversely affect the ongoing safe and efficient operation or access to Network Utility Operations. Condition 59 requires consultation during the detailed design phase. There are requirements in relation to Transpower's overhead transmission and distribution assets (Condition 60) with a supporting Electrical Infrastructure Management Plan (Condition 60A) and Conditions 61 and 62 specify

the design and construction requirements of Wellington Water for all replacement water supply, wastewater and stormwater infrastructure.

[652] We accept the evidence and the conditions on the treatment of the effects on network infrastructure including its relocation and replacement.

Property and Land Use

[653] The main property-related effects are on properties with land that is directly required for the Project. Owners of properties in close proximity to the Project are also subject to potential adverse effects. Land acquisition and compensation questions come under the Public Works Act 1981 and are outside the remit of the RMA. We have dealt with the positive and adverse effects that relate to construction and operation of the Project relevant to the RMA elsewhere in this decision. We note the resolutions of particular property and land use issues referred to in other parts of this decision and in particular in relation to the Harvey Norman Centre and to a childcare centre which occurred just prior to and after the hearing. We are satisfied that the outcomes reflected in new conditions are appropriate.

Parsons Green Limited and Parsons Green Trust (PGL) 5 Daly Street

[654] In its final memorandum of 5 May 2022 counsel for PGL submitted that since the filing of the s274 notice, PGL attended mediation with the Applicants and has been working towards an agreement with WRC in respect of their property at 5 Daly Street.

[655] As part of those discussions, the Regional Council had sent two letters to PGL concerning the acquisition of the Property for the purposes of the RiverLink project. PGL's position was that, while those letters have assisted discussions, PGL remained concerned that promises that are not captured in the consent or decision are not enforceable. Counsel sought that a condition be included requiring the requiring authority not to act in a manner inconsistent with the commitments made in those letters.

[656] The Court had expressed reservations about the ability to include such a condition into a notice of agreement that refers to other documents recording agreements between parties.[52] Counsel instead identified that a simpler way would be to extract the particular representations made in those letters and impose these as conditions. Ms Anderson's response was that if the requirements are put into a condition, that would be fine, as long as they relate to the proposal and are relevant and reasonable.

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52 Memorandum on behalf of Parsons Green Limited and Parsons Green Trust dated 29 April 2022 at [14]. See Transcript at [407]

[657] Accordingly, counsel for PGL sought to add the following three conditions to the Section 3 General Conditions:

(a) Condition X: WRC will take all reasonable steps to acquire the freehold interest in the property at 5 Daly Street by 1 April 2022 or as soon as is practicable thereafter.

(b) Condition X: WRC will not require the property at 5 Daly Street to be vacated by Millie's House until at least 1 January 2024.

(c) Condition X: WRC must let Millie's House cancel the lease early. WRC will reimburse the reasonable costs of relocation for Millie's House, in accordance with the Public Works Act 1981 (whether the lease is cancelled early, or not).

The abbreviations used above are those defined in Section 1 "Definitions and explanation of terms" of the proposed conditions. For clarity, PGL sought the definitions of the following terms in this section:

Abbreviation/acronym	**Term**
PGL	Parsons Green Trust and Parsons Green Limited. Parsons Green Limited is the registered proprietor of the property at 5 Daly Street.
5 Daly Street	The property located at 5 Daly Street, Lower Hutt, legally described as Lot 6 DP 12645.
Millie's House	The tenant of the property at 5 Daly Street.

[658] Counsel submitted that these conditions will sufficiently protect PGL's interests, and ensure that the commitments made by WRC to PGL in respect of 5 Daly Street are enforceable. We have no record of any response from the Applicants (or any other party) directly on the PGL proposal. We accept the conditions (and the associated definitions) subject to any matters that affected parties may wish to raise.

Harvey Norman Centre

[659] Currently, Harvey Norman leases 107 carpark spaces down in the riverside carpark. These are to be removed as part of the Project.

[660] The Court was provided with a copy of the agreement entered into with Harvey Norman. What is proposed is that the Melling stub road, which as originally proposed did not have a carpark, will have a car park on part of it. The intersection has four arms so it will be a four-armed intersection into the carpark and if Harvey Norman wishes, it can put an ingress and egress from that carpark into its building or it can just have the carpark sitting there.

[661] Specific provisions that relate to the agreement with Harvey Norman Centre are:

Indicative Carpark Layout Plan Melling Stub – A16-4381-C601 Rev A (1 sheet) referred to in condition 3(b) and attached to the evidence-in-chief of Mr Carey Morris.

There are also specific references in the following conditions to the Harvey Norman Centre in the following Management Plans or other Plans:

19(l) Communications Plan

19B: Site-Specific Communications Plan

37(d) Construction Traffic Management Plan

39 Site Specific Traffic Management Plan

49(d), (f), (g), (h) Construction Air Quality Management Plan

57F Provision of draft CNVMP or any SSCNMP or SSCVMP relevant to the Harvey Norman Centre for comment.

[662] We accept the approach to the issues raised by the Harvey Norman Centre.

Economics

[663] Evidence on the economics of the Project was provided by Mr David Norman on behalf of the Applicants.

[664] Mr Norman advised that economists use cost benefit analysis (CBA) to weigh up the benefits of a proposal against the costs to assist decision makers decide whether a proposal (such as the Project) stacks up.

[665] In the CBA, benefits and costs are presented in *net present value* terms. Mr Norman describes this as examining a stream of costs or benefits from the Project over a 60-year time frame (or out to 2082) and then applying what is described as a *real discount rate* to reflect that costs and benefits in the future are worth less than if they occurred today.

[666] For the Project Mr Norman has used a 4% real discount rate for testing outcomes which he says is consistent with rates adopted by many economists undertaking similar quantifications in New Zealand (such as those adopted by Auckland Council and NZTA). He has also tested the economics of the Project using an alternative and more conservative real discount rate of 6%.

[667] Adopting the 4% real discount rate, his mid-point estimate of the quantified benefits is $1,064 million from which the discounted estimated construction costs of $625 million are deducted to produce a net benefit of over $430 million. With the alternative 6% real discount

rate, the quantified benefits have been estimated at around $645 million, the costs at $586 million and the net benefit at $59 million.

[668] Based on these estimates, the CBA for Project would have a positive benefit cost ratio (or BCR) of between 1.10 and 1.70.

[669] Mr Norman said that while he had been able to assign dollar values to most of the benefits and costs of the Project, there were some of the benefits and costs which he had not been able to quantify, While these were highly intangible, they still needed to be taken into account in the overall economic evaluation of the Project.

[670] For example, he identified that non quantified benefits from the Project would include compact housing development close to jobs and public transport in times of housing shortages, improved economic resilience for the city centre, improved health as a result of less pollution, and an improved public realm and sense of safety from the revitalisation.

[671] Conversely, intangible costs for the Project included adverse environmental effects, disruption impacts and a loss of carparking and housing.

[672] He said that evidence from other technical experts suggested that the adverse environmental effects of the Project including the loss of carparking would be outweighed by the environmental gains. Also, while some houses would need to be demolished to accommodate the realigned stopbanks, these losses needed to be viewed in the context of the positive effects which would result from the protection afforded by the realigned stopbanks to over 3,000 houses currently susceptible to flooding.

[673] We did not find other evidence on the topic of economics of any substance apart from brief references in GW s87F Report and the HCC s 87F Report with the concluding remark in the HCC report being that the Project would result in a significant net positive economic benefit.

Conclusions on Economics

[674] In the absence of other evidence, if Mr Norman's estimates of the costs and benefits for the Project are realised, the Project should have a positive benefit cost ratio in the range from 1.10 to 1.70 based on real discount rates of between 4% and 6%.

[675] On this same issue, we note that it is not for us to reach a finding on the adequacy of the BCR for the Project. That is a decision for the boardroom.

[676] With respect to non-quantified intangible benefits, we acknowledge that over and above the quantified benefits, the Project will also deliver a range of non-quantified intangible benefits including those identified by Mr Norman.

[677] For the non-quantified intangible costs identified by Mr Norman (including adverse environmental effects, disruption impacts and the loss of carparking), we have made findings on each of these adverse environmental effects in other sections of this decision including the measures required in the conditions for the management and mitigation of each of the effects.

Cultural Effects

[678] We outlined Mana Whenua involvement and how this is integrated into the Project including through the conditions. We now look at cultural effects.

[679] As background to the development of the Project we note that a Cultural Impact Assessment (CIA), contained in the AEE Technical Report #16, was prepared on behalf of Ngāti Toa Rangatira and Taranaki Whānui as Mana Whenua and Project Partners. The CIA identifies historical sites of significance for Mana Whenua and the cultural values historically in the Project area and its wider environs along with the cultural values and uses of the Project area today. It identified key sites of significance to Māori and Te Awa Kairangi to be of particular importance. Key sites are: Maraenuku Pā, which is now located in the bed of the river; Motutawa Pā, which historically extended into the Project Area (this pā was short-lived and not highly developed) and the Te Ahi-o-Manono kāinga (located along the river near the current Lower Hutt city centre, although nothing remains today). There are no known Māori urupa within the site.

[680] The CIA concluded that the Project is unlikely to further damage or destroy existing culturally significant sites and most have little if any archaeology associated with them and few have been investigated by any archaeological process. Each of these sites is to be archaeologically examined and possible responses to them will be identified. A general archaeological authority will be sought and conditions require development of an On-Call Procedure to manage unexpected finds.

[681] The CIA identifies that:

- the nature and design of the flood protection works are important to Mana Whenua with respect to the character and ecological health of the river, particularly to maintain indigenous fish species such as tuna/eels (long and short finned), kokopu

(banded, giant and short jawed) and the īnanga that make up part of what are known as whitebait.

- the planting of the berms in particular with a transition to indigenous trees and shrubs will help change the appearance of the river to something more like what it was prior to colonisation.
- there will be an improvement of the quality of stormwater runoff from the Melling intersection and bridge, following treatment, with the reduction of the contaminant load discharging into Te Awa Kairangi.
- there will be benefits from: the new Melling pedestrian bridge, particularly with improvements to access through public transport; places for recreation and improved cycle and walking paths; urban renewal and revitalisation due to improvements in access to public transport and recreation facilities.

[682] Specific measures to deal with potential adverse effects on cultural values in the Project area referenced in the CIA include:

- the ULDF underpinned by the Kaitiaki Strategy and the He Korowai o Te Aawa Kairangi narrative (He Korowai) developed by Mana Whenua and advisers for the Project. He Korowai is drawn from the narrative of Te Ara Tupua, which is woven through all outcomes and opportunities set out in the ULDF. The further development and integration of He Korowai in the detailed design of the Project is supported in the CIA (and the conditions).
- the mitigation measures for works in the river channel and berms proposed, including restriction of works in the river channel in spring on account of the upstream migration of indigenous fish and planting of active channel borders to enhance indigenous fish habitat.
- mitigation measures for the Melling Intersection and bridges proposed to manage stormwater runoff from roads and carparks to Te Awa Kairangi; and
- an Accidental Discovery Protocol in place for Māori cultural material found during construction.

[683] We acknowledge the evidence of Ms Skelton on the benefits of the Project to Taranaki Whānui and its alignment with strategic goals for environmental well-being, cultural well-being, social and whanau well-being, and economic and financial well-being.

[684] We are satisfied from the evidence of Ms Skelton and Ms Ngarimu that the Project and the associated conditions are supported by Mana Whenua.

Regulations, Policy and Planning documents under the RMA

[685] Along with the AEE, there was evidence before the Court from Ms O'Callahan for the Applicants, as well as from Mr Daniel Kellow (planning witness for the regulator HCC) and Ms Michelle Conland (planning witness for the regulator WRC) who prepared the Statutory Assessment in the s87F reports on the national, regional and district planning instruments relevant to the application and notices of requirement. A focus in the s87F reports was filling in gaps in the application material.

[686] There was a high level of consensus between the planners as to the relevant provisions of statutory planning instruments. While the planning witnesses all agreed that the Project with its proposed suite of conditions is generally consistent with the statutory framework there were some exceptions in terms of the direction and intent of particular provisions (as dealt with earlier in this decision). In the course of our decision we have traversed particular provisions that we find require further consideration and attention.

National Environmental Standards

[687] The applicable National Environmental Standards for this proposal are the NES for Freshwater provisions that came into force on 3 September 2020, the NES Soil, the NES for Air Quality, the NES for Sources of Drinking Water, the NES for Telecommunication Facilities and the NES for Electricity Transmission Activities Regulations.

[688] Aside from a question we deal with in relation to the NES Soil and the justification for requiring a step other than self-certification, we are satisfied that there are no matters in the national environmental standards of concern.

National Policy Statements

[689] We are mindful that the National Policy Statement for Freshwater Management 2020 (NPS-FM 2020) and National Policy Statement on Urban Development 2020 (NPSUD) represent a considerable change in national direction from the approach in the regional planning instruments and the district plan. The lower order regional and district planning instruments are yet to be reviewed to give full effect to the new national direction. There was no argument about the extent to which the RPS gives effect to the New Zealand Coastal Policy Statement 2010 in relation to any of the provisions in lower order instruments.

NPS-FM 2020

[690] The NPS-FM 2020 makes a major change to how we manage freshwater with its fundamental concept of Te Mana o te Wai and the hierarchy of obligations that prioritises:

(a) first, the health and well-being of water bodies and freshwater ecosystems;

(b) second, the health needs of people (such as drinking water);

(c) third, the ability of people and communities to provide for their social, economic, and cultural well-being, now and in the future.

There are also six principles of Te Mana o te Wai relating to the roles of tangata whenua and other New Zealanders in the management of freshwater that inform the NPS-FM 2020 and its implementation.

[691] Policy 1 of the NPS-FM requires that freshwater is managed in a way that gives effect to Te Mana o te Wai. In terms of the health and the well-being of water bodies having the highest priority, witnesses gave evidence that after the works the river corridor will be wider, with more space within the active channel for natural processes to occur, and less intrusive management of the river will be required, and there will be a better bed material deposition regime for sediment management.

[692] Policy 2 relates to Tangata Whenua being actively involved in freshwater management (including decision-making processes), and Māori freshwater values being identified and provided for. Witnesses for the Applicants drew to our attention mana whenua's role as a Project Partner, the MWSG, the Kaitiaki Strategy developed to support the Project and the Mana Whenua Values Plan (MWVP) as evidence of the Applicants' ongoing commitment to working alongside mana whenua throughout the Project's construction and operation. We were also referred to conditions in relation to the MWSG and the MWVP as assisting with meeting the hierarchy and principles of Te Mana o te Wai.

[693] Policy 3 requires that freshwater is managed in an integrated way that considers the effects of the use and development of land on a whole-of-catchment basis, including the effects on receiving environments. Ms O'Callahan described the Project as following an integrated management process for assessment of effects and specialist evidence, considering potential effects on the immediate receiving environment as well as the downstream coastal environment.

[694] Policy 4 requires that freshwater is managed as part of New Zealand's integrated response to climate change. Ms O'Callahan considered minimising the effects of flooding on private property and infrastructure as providing an integrated response to the effects of climate change. Ms Conland acknowledged that climate change has been taken into account through the assessment of the flood hazard.

[695] Policy 7 relates to the loss of river extent and values being avoided to the extent practicable and Policy 9 to the protection of habitats of indigenous freshwater species. A 25 metre length of Harbour View Stream is to be lost as a result of the works. Ms Conland's s87F report states:

> I accept the explanation in the AEE and the s92 response that the stream needs to be reclaimed as this is the only practicable location for the abutment of the Melling Interchange bridge, given the highly constrained area with significant natural (Te Awa Kairangi and the Western Hills escarpment) and physical (existing railway, SH2 and Melling bridge alignments and the Lower Hutt city centre) features. I also note the number of alternative solutions that were investigated but were ultimately not practicable. [Otherwise] the habitats of indigenous freshwater species will be protected during the construction works.

[696] Policy 10 provides for the protection of trout habitat insofar as this is consistent with the protection of habitats of indigenous freshwater species. There were no concerns raised about the Project's effects on trout habitat. There was evidence that trout spawning habitats in the main stem of Te Awa Kairangi are some 20 km upstream of the Project area and will not be affected by the works.

[697] The NPS-FM 2020 also sets an expectation that the health and well-being of degraded water bodies and freshwater ecosystems is to be improved (Policies 5, 12 and 13) and community and tangata whenua aspirations for their waterbodies are met.

[698] Policy 15 sets out that communities are enabled to provide for their social, economic and cultural well-being in a way that is consistent with the NPS-FM 2020. Ms Conland agreed with Ms O'Callahan that the proposal is consistent with this policy and in particular in relation to the matters identified in the CIA.

[699] We accept there is much for the WRC to do in implementing the NPS-FM 2020 and giving effect to the fundamental concept of Te Mana o te Wai. That requires the preparation of long-term visions for and their inclusion in its RPS. There is also the revision of regional land and water planning provisions in order to give the necessary policy direction on a whole of catchment basis (notwithstanding the whaitua work referred to under *other matters*).

[700] In this light we consider that any finding of "consistency" is a stretch. Of more moment is that we find the provisions of the NPS-FM 2020 not to be an impediment to approving the NORs and resource consent applications.

National Policy Statement On Urban Design 2020 (NPSUD)

[701] Objective 1 is that New Zealand has well-functioning urban environments that enable all people and communities to provide for their social, economic, and cultural well-being, and for their health and safety, now and into the future. Policy 1 is that planning decisions contribute to well-functioning urban environments, which are urban environments that, as a minimum have particular attributes. One of those is good accessibility for all people between housing, jobs, community services, natural spaces, and open spaces, including by way of public or active transport. Others are to support resilience to the likely current and future effects of climate change, and to have or enable a variety of sites that are suitable for different business sectors in terms of location and site size. Policy 1 also seeks to limit the adverse impacts on the competitive operation of land and development markets.

[702] The Project will increase accessibility between Te Awa Kairangi and the city centre and urban spaces and provide improved access to the city centre from the new Melling Station. Improved flood resilience and transport improvements respond to the current and future effects of climate change by minimising the effects of flooding events on private property and infrastructures. Public realm investment supports a variety of uses and occupation and is expected to increase urban development uptake within the Lower Hutt city centre and nearby urban environments. New facilities will attract people to the river corridor for active and passive recreation pursuits into the future.

[703] Objective 3 requires a regional policy statement and district plan to enable more people to live in, and more businesses and community services to be located in, areas of an urban environment near a centre zone and well serviced by public transport. Policy 2 requires HCC, because it is a Tier 1 urban environment, to provide at least sufficient development capacity to meet expected demand for housing and for business land over the short term, medium term, and long term.

[704] There will be a loss of land supply for residential and business purposes, including existing dwellings and business premises. The designations on the western side of Te Awa Kairangi will allow land within the Project area to be used for non-residential purposes and will result in the loss of numerous dwellings. It is not known at this stage what the yield from development of intended vacant sites for mixed use and residential purposes along the western edge of the CBD at 6, 7, 10 and 12 Daly Street will be.

[705] There are also steps Wellington local authorities are yet to take to prepare and publicly notify plan changes by August 2022 to achieve specific directions on intensification in the NPSUD. In particular:

> Policy 3: In relation to tier 1 urban environments, regional policy statements and district plans enable:
>
> (a) in city centre zones, building heights and density of urban form to realise as much development capacity as possible, to maximise benefits of intensification; and
>
> (b) in metropolitan centre zones, building heights and density of urban form to reflect demand for housing and business use in those locations, and in all cases building heights of at least 6 storeys; and
>
> (c) building heights of at least 6 storeys within at least a walkable catchment of the following:
>
> (i) existing and planned rapid transit stops
>
> (ii) the edge of city centre zones
>
> (iii) the edge of metropolitan centre zones; and
>
> (d) within and adjacent to neighbourhood centre zones, local centre zones, and town centre zones (or equivalent), building heights and densities of urban form commensurate with the level of commercial activity and community services.
>
> Policy 4: Regional policy statements and district plans applying to tier 1 urban environments modify the relevant building height or density requirements under Policy 3 only to the extent necessary (as specified in subpart 6) to accommodate a qualifying matter in that area.

[706] In addition, there is the Resource Management (Enabling Housing Supply and Other Matters) Amendment Act 2021 requiring Tier 1 councils to apply medium density residential standards to most of their existing residential areas as part of their plans from August 2022. These standards will enable people to develop up to three dwellings on each site, each being up to three storeys, without needing to apply for a resource consent. This is provided all other rules and standards in relevant plans have been complied with.

[707] Objective 4 has an acceptance that New Zealand's urban environments, including their amenity values, develop and change over time in response to the diverse and changing needs of people, communities, and future generations. The major changes involved with the Project and its contribution to turning the city towards and improving the condition of and accessibility to Te Awa Kairangi, building in floodplain management that caters for future climate change, providing greater transport choices for everyday activities, contributing to opportunities for intensification and revitalisation of the central city, are all part of the equation under this objective.

[708] Objective 5 requires that planning decisions take into account the principles of the Treaty of Waitangi (Te Tiriti o Waitangi) and Policy 9 sets out related engagement and consultation requirements In relation to "tangata whenua involvement". As referred to earlier we had evidence from the Applicants of their commitment to implementing the Kaitiaki Strategy and working alongside Mana Whenua throughout the Project's design, construction and operation to provide for the values and aspirations of Mana Whenua. We also had supporting evidence from witnesses from Mana Whenua on the partnership approach with RiverLink including an ongoing level of engagement in terms of design, construction and operation.

[709] Objective 6 requires that local authority decisions on urban development that affect urban environments are integrated with infrastructure planning and funding decisions, are strategic over the medium and long term, and respond to proposals that would supply significant development capacity. Policy 10 encourages councils to work together with infrastructure providers to achieve integrated land use and the development sector to identify opportunities to increase urban development. As discussed earlier, the Project arrangements, design and funding have involved an integrated approach, working with infrastructure providers, and will improve the opportunities to provide for significant urban development capacity in future.

[710] In terms of Objective 8 we find the flood control improvements factoring in future effects of climate change improve the resilience of the urban environments not only in the Project area but outside it. The relocation of the Melling railway station and suitable infrastructure will encourage greater use of (and mode share) for walking, cycling and the use of public transport not just for commuting but for meeting school, shopping and recreational transport needs.

[711] We have considered the evidence on other relevant provisions and accept that the proposal is not inconsistent with the NPSUD (notwithstanding the loss of dwellings). We also note the possibilities and opportunities the Project presents to progressing matters that are yet to be addressed and actioned through the RPS and district plan.

New Zealand Coastal Policy Statement (NZCPS)

[712] While not in the coastal environment, the Project has the potential to affect the downstream coastal environment covered by the New Zealand Coastal Policy Statement (NZCPS) as a result of sediment discharges and changes to water quality from construction activities. If not carefully regulated, these discharges have the potential to impact negatively on sensitive natural ecosystems and indigenous coastal flora and fauna. Of particular note is NZCPS Policy 11 and its direction to protect indigenous biological diversity in the coastal environment.

[713] Policy 11(a) species are black-billed gull, reef heron and caspian tern (*Threatened*) and little blue penguin, red-billed gull, South Island pied oystercatcher, white-fronted tern, australasian pied stilt royal spoonbill, pied shag variable oystercatcher, fluttering shearwater, black shag and little black shag (*At Risk*). Sedimentation during the construction works could potentially disrupt foraging habitat and behaviour of some species. The habitats identified in relation to Policy 11(b) are Te Awa Kairangi River Mouth, Petone Foreshore and Korokoro Estuary which are identified as habitats that are sensitive to modification, with the river mouth and Korokoro Estuary noted as being important routes for migratory fish.

[714] The evidence of Mr Breese, Dr Bull and Dr Bell is that elevated levels of total suspended sediments and sediment deposition based on disturbance of sand-sized particles within the water column are unlikely to reach effects thresholds of concern for sensitive marine organisms or affect foraging habitat or behaviour of *Threatened* or *At Risk* coastal birds or migration of indigenous fish or aquatic fauna. Their evidence assesses the magnitude of effect as a result of sedimentation in the coastal marine area as negligible and positive effects likely as a result of stormwater contaminant improvement. In response to Dr Urys' review for the regulator conditions to reduce the risk of adverse effects from sedimentation there have been added monitoring of sediment levels from the work area, prompting investigation and action if discharge does not return to ambient clarity.

[715] We are satisfied the assessment of effects and associated conditions of consent including monitoring and remedial action adequately address identifying and reducing the risks from sedimentation not only in terms of Policy 11 but also Policy 22 on sedimentation. Policy 22 requires assessment and monitoring of sedimentation levels and impacts on the coastal environment, development not to result in a significant increase in sedimentation in the coastal marine area, and reducing sediment loads in runoff and stormwater systems and from vegetation removal through controls on land use activities.

[716] We have considered the evidence on other relevant provisions and accept that the proposal is consistent with the NZCPS.

Regional Policy Statement for the Wellington Region 2013 (RPS)

[717] Objectives and policies of relevance relate to natural hazards, regionally significant infrastructure, public access, air discharges, development form and function, heritage, Te Tiriti o Waitangi and matters of significance to tangata whenua, and water takes, damming and diversion.

[718] We have referred to and considered material disagreements over the Project's consistency with provisions of the RPS in submissions and evidence earlier in this decision. With our amendments to the Project reflected in conditions we are satisfied that the Project is consistent with the RPS.

Operative Regional Plans

[719] The operative plans that the PNRP is to replace are the Regional Freshwater Plan (RFP), Regional Plan for Discharges to Land (RPDL), Regional Soil Plan (RSP) and Regional Air Quality Management Plan (RAQMP), and those plans remain operative until such time as appeals on the PNRP are resolved. The RFP and RDLP were updated in July 2014.

[720] Ms O'Callahan's opinion is that only limited weight should be afforded to the operative regional plans at this stage, as the PNRP is near to being finalised, following mediation.

[721] Given the advanced stage of the PNRP and the resolution of appeals, the operative plan provisions will continue to 'fall away' as further appeals are resolved. We note no particular provisions that have not yet fallen away were identified to us as warranting our attention.

Proposed Natural Resources Plan

[722] In brief we now look at the PNRP recognising that the planning witnesses, except on some limited issues, agreed that the Project (including the conditions) is generally consistent with that document. We note the planning witnesses updated their evidence as the PNRP was progressively amended by way of Environment Court consent order. We have referred to and considered material disagreements over the Project's consistency with provisions of the PNRP in submissions and evidence earlier in this decision. We find the Project does not raise any "red flags".

[723] We acknowledge that:

- The principles of integrated catchment management for air, land, freshwater bodies and the coastal marine area recognising *ki uta ki tai* (mountains to the sea) in the PNRP have been adequately addressed in the context of the Project area.
- The Project is consistent with objectives and policies in relation to *beneficial use and development* including not just the provisions that relate to regionally significant infrastructure but also the cultural, social, economic and environmental benefits of using land and water for various purposes as proposed.

- The Project satisfactorily deals with objectives and policies for *Māori relationships* and *sites of significance to Mana Whenua*, with the latter informed by a cultural impact assessment. Regard has been had to statutory acknowledgments in considering the resource consent applications as required by Policy P21.
- The Project achieves forward looking objectives and policies on *natural hazards* and hazard mitigation measures in terms of its approach to dealing with the risk of adverse effects from natural hazards and climate change, on people, the community, the environment and infrastructure.
- The Project addresses the objectives and policies in relation to *biodiversity, aquatic ecosystem health and mahinga kai* and *sites with significant biodiversity values* and their respective protection and restoration approaches along with the consideration of their effects management hierarchy (for adverse effects). The opportunity provided in policy for biodiversity offsetting applying the biodiversity principles has been taken up for the Harbour View Stream. The Project meets policy requirements on the approach to effects on the spawning and migration and the habitat of indigenous fish species.
- The Project accords with objectives and policies on other *sites with significant values* including the protection of significant historic heritage and its values.
- The Project, once complete, achieves the objective and policy directions for *natural character* in the Project Area. That is also the case for policy on *natural features and landscapes*.
- The Project meets *air quality* objectives and policies for construction and operational effects.
- On *discharges to land and water*, the Project accords with objectives and policies in minimising the runoff or leaching of contaminants to water from discharges to land and the amount of silt and sediment-laden runoff entering water and on land use activities, erosion and associated discharges. That includes the identification of contaminated land and the management of the discharges of contaminants to protect the environment.
- On *water quality* the Project meets objectives and policies including to improve water quality and for contact recreation and Māori customary use.
- The Project's *land use and development* is satisfactorily managed in terms of policy on runoff volumes and peak flows and their effects on scour and erosion of stream beds and banks and risk to human health or safety, or inundation, erosion or damage to property or to infrastructure. That includes the effects on aquatic ecosystem health and mahinga kai, contact recreation and Māori customary use, and from the discharge of stormwater from a state highway.

- The Project does not cut across policies on *activities in beds of lakes and rivers* concerning reclamation, drainage, extraction of gravel or the removal of aquatic vegetation and accumulated sediment.
- The Project does not infringe policies on *flows and water levels* to maintain aquatic ecosystem health and sediment transport. There will be temporary damming and diversion of water for river recontouring and gravel extraction to permanently divert flow contained within the new riverbed design alignment, with acceptable effects on aquatic fish and fauna and their habitat.
- The Project accords with the policies on groundwater and bores and the measures now proposed in the conditions will provide adequate safeguards for the protection of the underlying aquifers.

[724] In the light of the evidence and with our amendments to the Project reflected in conditions we are satisfied that the Project is generally consistent with the policy direction in the PNRP.

Hutt City District Plan

[725] For the District Plan, there are relevant objectives and policies of Chapter 4A General Residential Activity Area, Chapter 5A Central Commercial Activity Area and Chapter 7C River Recreation Activity Area (the Project traverses these various zones), and the chapters relating to area wide issues, network utilities, transport, noise, natural hazards, and earthworks.

[726] In the long term, the Project is expected to result in an improvement to the amenity values of the General Residential Activity Area through enhanced streetscapes and supporting access and connections to the river corridor. In the short term, there will be adverse effects from disruption and construction noise and vibration as has been dealt with earlier.

[727] The District Plan also seeks to accommodate residential growth and consolidate urban areas, particularly through infill development. We accept that there will be the removal of houses. We also acknowledge that the Project may encourage and facilitate development which will likely include more intensive residential development in and around the central city.

[728] The Project will enhance urban design within the Central Commercial Activity Area and the amenity, natural and recreational values of Te Awa Kairangi through the desired outcomes and measures outlined in the ULDF (and as discussed earlier). That includes a promenade and increasing public access to the river, and controls on integration of the proposed infrastructure work with existing and future mixed-use development. An Outline Plan is required for any temporary activities within the "city edge" sites designated by HCC, plus site

access and alterations to integrate retained buildings with the new stopbanks, and for any future integration works to connect and integrate new buildings into the flood protection structures. The Outline Plan is to promote quality urban design which contributes to the outcomes sought for the Central Commercial Activity Area.

[729] In terms of the objectives and policies for activities on rivers and their banks in the River Recreation Activity Area (Chapter 7C), the evidence of Ms Lander and Ms Rimmer is that development and implementation of the Management Plan to achieve the outcomes in the ULDF will enhance public access to the river and will improve natural, recreational and amenity values of the river corridor. Key engineered components of the Project (such as stopbanks, river edge protection works, bridges, roads and related access connections) will be designed to generate positive urban and landscape outcomes. That will improve the integration of the River Recreation Activity Area with the Commercial Activity Area.

[730] In terms of the policy direction in Chapter 13 supporting infrastructure we acknowledge that a core component of RiverLink is to provide the infrastructure (with flood protection works and transport improvements) to support, enable and unlock the development potential of the Hutt City centre and surrounding areas. Chapter 13 also refers to managing effects and we have required additional attention to dealing adequately with adverse construction noise and vibration effects and reducing the potential for risks from contaminated land.

[731] We do not find the Project to be consistent with the direction of Chapter 14C Noise, which seeks to maintain or enhance amenity value in all activity areas by avoiding the adverse effects of excessive noise. We do not agree with Ms O'Callahan (relying on the evidence of Mr Vossart) that although construction noise modelling indicates that construction noise levels are likely to exceed the recommended construction noise limits at a number of noise sensitive receivers, the implementation of proposed BPO mitigation measures will mitigate construction noise effects to an acceptable level. We have covered our concerns on construction noise, including the revised conditions the Applicants advanced in closing, in some detail under the effects heading. This includes our directions that a range of amendments are to be made to these revised conditions (on construction noise as well as vibration)

[732] We accept the evidence of Mr Vossart and Mr Arden that following the construction of the Project, people's amenity values will be protected from the adverse effects of road traffic and rail operational noise, noting that Condition DH1 requires the Requiring Authority to offer building modifications if at some time in the future, local road traffic noise increases above certain defined limits (5 dBA or more above the predicted 2036 Do-nothing traffic model

scenario). We also note there is an exception where it is demonstrated that it is not practicable to comply because of the existing built heritage nature of a property.

[733] Living Streets Aotearoa submitted that of particular note are the objectives and policies for transport in Chapter 14A "Transport":

> Objective 14A 3.1 – A safe, efficient, resilient and well-connected transport network that is integrated with land use patterns, meets local, regional and national transport needs, facilities and enables urban growth and economic development, and provides for all modes of transport.
>
> Policy 14A 4.1 – Additions and upgrades to the transport network should seek to improve connectivity across all modes and be designed to meet industry standards that ensure that the safety, efficiency and resilience of the transport network are maintained.
>
> Policy 14A 4.7 – The transport network, land use, subdivision and development should provide for all transport modes.

[734] The Project will contribute to achieving these outcomes, through developing or upgrading infrastructure supporting a range of transport modes – including cycling, walking, improved road transport and better integration of the city centre with the rail network. We have dealt earlier in this decision with the issue of adequacy of provision for active modes of cycling and walking and what is required to provide for and improve connectivity for all transport modes.

[735] Three notable street trees (Chapter 14G) cannot be avoided and must be removed, with street trees replanted throughout the Project area mitigating amenity effects arising from this loss over time.

[736] In relation to objectives and policies on natural hazards (Chapter 14H and elsewhere) we are satisfied with the priority given in the Project to reducing the flood risk to people, property and the environment over the Te Awa Kairangi floodplain factoring in assumptions for the probability and consequences of climate change over the next 100 years. The Project straddles the Wellington fault and is located within the Wellington Fault Special Study Area overlay and we acknowledge that the Project design was refined to minimise issues associated with the Wellington Fault and geotechnical uncertainty. We also note that structural controls will be implemented through design to mitigate any residual land instability or seismic risks in accordance with best practice design standards (e.g. NZTA Bridge Manual) and the Building Act.

[737] As dealt with under *effects*, we also find the Project gives proper consideration to objectives, policies and other provisions for retaining the heritage and archaeological values

of buildings, structures and features and has conditions that are fit for that purpose (Chapter 14F and Chapter 1).

[738] In relation to other Area Wide Issues (Chapter 1) the Project is consistent with the provisions related to Tangata Whenua and the Treaty of Waitangi and in its treatment of 'cultural resource', with the use of Accidental Discovery Protocols preventing the further damage or destruction of the resource.

Assessment of Alternatives - Overview

[739] The AEE (*Detailed Assessment of Alternatives*) (the Alternatives Assessment) is some 100 pages long. It describes in considerable detail the assessment of the alternatives undertaken by the Applicants for the Project.

[740] Drawing on the content of this Alternatives Assessment, we set out here our overview of the assessment concluding with our finding on whether there has been adequate consideration of the alternatives in the context of RMA s171(1)(b). We note that in the interests of brevity we have consolidated some of the information contained in the assessment. While we have considered it all we do not refer to it all.

[741] The Alternatives Assessment identifies three key infrastructure issues currently affecting Lower Hutt as being (in no particular order):

- the existing level of service for flood protection from Te Awa Kairangi (the Hutt River) causes flood protection issues within the city;
- there is difficulty attracting investment to the city centre due in part to the flooding and transport problems and this is hindering renewal and regeneration;
- the city's existing transport infrastructure has a lack of resilience and there are accessibility, efficiency and safety issues at the Melling Intersection on SH2.

[742] In relation to the first two of these issues:

- following 10 years of investigations, in 2001 the Hutt River Floodplain Management Plan (HRFMP) was published by WRC;
- prior to 2012, various studies had been undertaken by HCC on the future development of Lower Hutt City which culminated in the release of a series of reports on development options.
- while these "pre-2012" studies and reports had been developed in broad terms, none had been progressed to the stage of consenting and construction.

[743] In 2012, WRC, NZTA and HCC reached agreement to work together to develop and deliver three interrelated projects addressing the issues of flood protection (WRC), the city centre development (HCC),[53] and transport infrastructure (NZTA) – overall, *the Project*.

[744] This joint approach was undertaken in three phases. The first of these, the development phase, got underway in 2013 and concluded in 2016. The next phase from 2016 to 2019 involved translating the options identified in the development phase from conceptual optioneering to more detailed design options. The final phase concluding in 2021 involved finalising the options and preparing the necessary documentation for the four NOR and associated consent applications for the Project.

Pre-2012 Studies

[745] In terms of the issue of attracting investment to the city, prior to 2012 HCC had commissioned a series of studies which culminated in the release of a number of reports including the following:

- the 1987 CBD Structure Plan,
- the 1999 CBD Master Plan,
- the 2005 Hutt CBD Vision 2030 and
- the first CBD Making Places long term development strategy in 2009.

[746] The focus of these reports is reasonably self-evident from their titles and we do not need to expand further on their content here.

[747] Conversely, as protecting the central city area from long term flooding is fundamental to the success of the Project, how this is to be achieved warrants a more detailed explanation.

[748] The HRFMP prepared by WRC identified that the existing stopbanks along the river provided varying levels of flood protection. Upstream of Kennedy Good Bridge the stopbanks were found to be generally adequate for the 2,800 cumec design flood while reaches downstream of this bridge had a much lower capacity with some sections liable to breach in a 50-year return period flood.

[749] The HRFMP defines the design standards to be adopted for flood improvement works, river management activities, other management uses in the river corridor and land use planning for the wider Hutt Valley. The physical works identified in the HRFMP include

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53 KiwiRail's Melling Line reconfiguration did not become part of the Project until later

stopbanks, bank edge protection and river realignment, house-raising and bridge replacement/upgrading. Non-structural options identified include land use controls and emergency management for flood response. There is also an environmental strategy for enhancing the environment of the river.

[750] Other factors identified in the HRFMP to be taken into consideration in the design of flood protection include land requirements, costs, benefits and economic efficiency, visual impact, development pressure, and social/community values regarding perceived risk and level of protection.

[751] All of HRFMP design standards and structural and non-structural measures were decided on following public consultation. They are all risk-based with different protection standards applying to different areas of the floodplain depending on the area's vulnerability to flooding.

[752] In summary, the HRFMP defines the following[54]:

Structural measures

- *Upgrades to stopbanks protecting major urban areas to be designed to the 2,800 cumec standard and for smaller urban areas to the 2,300 cumec standard.*
- *Bank-edge protection works and major realignment to be undertaken in the Ava to Ewen Bridge reach.*
- *An option to raise houses above the 1,900 cumec flood level for residents of Bridge Road-Gemstone Drive (Upper Hutt) and Belmont (Lower Hutt).*
- *When bridges reach the end of their useful life, new bridges to be designed to the 2,800 cumec standard*

Non-structural measures

- *Land use: through policies and rules in district plans or voluntary actions that deal with constructing buildings and structures, doing earthworks and using land in a wise manner.*
- *Emergency management through preparing the community to cope with flooding*
- *An Environmental Strategy that identifies opportunities to enhance Te Awa Kairangi's environment*

[753] These design standards and measures have been used as a key foundation stone for the subsequent development of each of the elements of the RiverLink Project.

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54 Alternatives Assessment at [3.3.4]

Project Development Phase: 2013 - 2016
The Hutt River City Centre Upgrade

[754] As already noted, the Project development phase of the Project was undertaken in a combined approach by WRC, HCC and NZTA.

[755] The *Hutt City Centre Upgrade Project -Options Evaluation Report* (2015) investigated 10 options for physical works for the RiverLink Project. The report included the consideration of a range of factors including:

- base flood protection for the city;
- "making places" for improved investment opportunities for the city;
- the development of a river promenade;
- parking and connections;
- transport design options to improve the SH2 intersection performance in conjunction with a new bridge or the retention of the existing Melling bridge.

[756] Also considered were policy options for managing land use on the flood plain with or without physical works and staging options to allow for adaption over time to accommodate changing climate impacts and flood frequency.

[757] Evaluation of each of the options was based on a combination of multi criteria assessment (MCA) to allow the relative merits of each option to be evaluated, cost evaluation through the "value for money' method and adaptive pathways for the assessment of "use by dates" for the flood protection options when compared with the HRFMP design standards and measures.

[758] An adaptive pathways evaluation was undertaken separately to determine which of the flood protection option(s) enabled the best match of investment to uncertainties about the timing and extent of changing flood risk from climate change flood risks and the value of staging options.

[759] This evaluation process confirmed that regardless of weightings assigned to each of the evaluation criteria, the two top ranking options remained the same.

[760] The first of these options had a channel width of 90m and capacity for a 1 in 440 year flood in 2105. It provided for a medium level of flood protection. It also provided moderate opportunity for apartments and commercial development abutting the river as well as

maintaining parking in the river corridor. It required traffic diversion at Dudley/Rutherford Street and a new bridge for pedestrians and cyclists crossing the river to the new Melling Railway Station.

[761] The second option had a channel width of 70m and capacity for a 1 in 440 year flood in 2045. It provided for moderate apartment and commercial development abutting the river with the same traffic diversion as for the first option and the same connecting pedestrian/cycling bridge to the new Melling Station. As opposed to the first option, this option did not require any private property purchases.

[762] The downside of this second option was that it provided minimal flood protection and little flexibility for addressing the impacts of climate change on flood frequency and magnitude. This meant that by about 2035 the planning process would need to be revisited to accommodate further upgrades with the likely requirement for additional land for widening the river corridor and maintaining protection for the 2,800 cumec design standard.

[763] On the other hand, the first option provided a significantly improved level of flood protection with a longer period of resilience benefits. It also enabled city side commercial property investments through providing certainty on the edge of the river corridor potentially enabling urban amenity improvements and roading changes. It did, however, require the purchase of private property and therefore had a greater cost than the second option.

[764] Each of the other options evaluated in this investigation was less favoured as these were either very long term and provided levels of protection well in excess of current needs, were very expensive because of property acquisition costs or provided a lesser level of flood protection over time than that being sought by the community.

[765] A further report titled *Hutt River City Centre Upgrade Project River Corridor Options Report* was prepared in 2015 to provide additional technical detail for flood protection options.

[766] The flood protection options evaluated in this report considered a range of channel widths, the flood defence capacity of the stopbanks, berm widths, private properties required for purchase, channel capacity at both an upgraded and a new Melling Bridge, hydraulics of the river in terms of flood levels, velocity, turbulence and scour, flood security, landscape, ecological, historical and cultural opportunities and the effects on roading and traffic.

[767] A key conclusion from this report was that the overall achievement of the Project objectives required the replacement of the existing Melling Bridge to accommodate the 2,800 cumec design flood by increasing the width of the river channel at this location.

Melling Gateway Strategic and Business Cases

[768] The primary purpose of the *Melling Gateway Strategic Case (2014)* was to provide confidence to NZTA, WRC and HCC that a coordinated investment in the Melling Gateway Project would align with the strategic priorities of each of the parties in an effective manner.

[769] The findings from the *Strategic Case* were that to deliver the desired benefits of the Gateway Project:

- flood protection measures needed to be aligned with the HRFMP;
- transport network operations needed to be optimised with minor infrastructure improvements;
- urban design plans needed to be integrated with flood protection and transport network plans;
- the transport network needed to be progressively enhanced with major infrastructure improvements;
- the three agencies involved needed to coordinate future investment activities in response to the interdependence of these strategic responses.

[770] Key assessment success criteria specifically addressed in a subsequent *Melling Gateway Programme Business Case (2015)* were the need for:

- a connected, resilient and secure flood plain;
- an integrated, resilient, safe and efficient transport network;
- a more liveable Hutt City;
- enhanced economic growth.

[771] Staging and different packages of transport related project elements assessed in this *Business Case* centred on three primary options:

- short-term intersection and network improvements at the existing Melling Bridge;
- a new "at-grade" Melling Bridge;
- a grade separated interchange with a new Melling Bridge.

[772] Workshops were held with representatives of GW, NZTA, HCC and technical experts to evaluate these options against the following criteria:

- the chosen option must provide protection against a 1 in 440 year flood;

- traffic and transport requirements must be achieved in the short, medium and long term;
- HCC's *"Making Places"* objectives must be achieved in an acceptable timeframe.

[773] From these workshops, components of the preferred option identified at that time to be taken forward for further development in the next phase of the project were:

- *for flood protection*:
  - a new Melling Bridge to be completed by 2019/2020;
  - stopbank works between the Melling and Ewen Bridges to be completed by 2026/2027 (including any necessary land acquisitions).
- *for network operation/intersection improvements*:
  - a new Melling Bridge to be completed by 2019/2020;
  - a new grade separated interchange to be completed by 2019/2020;
  - connectivity for cyclists/pedestrians on the new Melling Bridge and potentially via a footbridge across the river.
- *for "Making Places"*
  - stopbanks and associated works to be integrated with the new Melling Bridge.

Preliminary Design Phase 2017-2019

[774] This preliminary design phase involved detailed assessment of options for the following elements of the Project:

- River channel configurations;
- Transport including Melling intersection improvements;
- Interface structures;
- Stormwater, wastewater, and water services;
- Landscape architecture and urban design;
- Ecological design;
- Stopbanks.

River Channel Configurations

[775] Following on from evaluations undertaken in earlier phases of the Project, a short-list of two options for river channel configurations was chosen for detailed assessment in this preliminary design phase.

[776] The first of these options was for:

- a channel width of 90m over the length of the river from the Kennedy Good Bridge to the Ewen Bridge;
- the section of the river between the Transpower transformer station and the Ewen Bridge configured with a narrow 5m lower berm set within a 25m berm;
- the section between the Transpower site and the Kennedy Good Bridge configured with a lower 10m wide berm within an edge vegetation buffer.

[777] The second option was for:

- a 70m active channel width extending from the Ewen Bridge upstream to just past the Melling Bridge;
- each bank within this section of the river configured with 10m wide lower berms within the overall 90m channel limits and at least 25m wide upper berms on each side;
- a minimum width of river corridor of approximately 120m at the Ewen Bridge and 140m at the new Melling Road Bridge.
- above Melling Bridge, widening of the active channel from 70m to 100m over a transition length with a 30m wide berm on each side of the river.

[778] From a technical perspective, the second option was preferred on the basis that the variable channel width would be easier to manage in small to medium flood events.

[779] As well as from this technical perspective, these two options were evaluated in a series of MCA workshops against the broader objectives and associated attributes of flood resilience, Mana Whenua values, environmental, social and recreational values and sustainability.

[780] The finding from these workshops was that the variable channel option (Option 2) best met these objectives and their associated attributes and that this was independent of the importance of any one objective or attribute.

[781] The variable channel option was confirmed as the option to be taken forward for consent development.

Melling Intersection and River Crossing Improvements

[782] Drawing on a combination of options developed in previous phases of the Project as well as a number of new options not previously considered, a long list of 43 options was drawn up for the Melling Intersection and River Crossing Improvements based on the following key principles:

- traffic should connect into the edge of Lower Hutt City;
- routes for all modes must be legible and existing connectivity should be retained;
- there should be full pedestrian and cycling connectivity;
- provision should be made for the future north-wards extension of the Melling rail line;
- the intersection improvements must be designed to fit within the flood protection works required to accommodate a 1 in 440-year flood in the river;
- Melling should be maintained as the western gateway to Lower Hutt;
- any new bridge across the river should connect into the road network adjacent to the river.

[783] Following a preliminary evaluation, 30 of the 43 options were discarded leaving 13 options from which four were chosen for further evaluation. Each of these four options was tested for road safety, traffic modelling and topographic impact and in addition, evaluations were also undertaken to consider whether:

- the new Melling Interchange should incorporate a roundabout or a diamond configuration;
- Tirohanga Street should be connected to Harbour View Road or to Pharazyn Street;
- the new river bridge from the Melling Interchange should connect with the eastern end of the existing Melling Bridge or with Queen's Drive including the form of the Queens Drive connection to the existing road network.

[784] This led on to a workshop in which key stakeholders from WRC, NZTA and HCC selected three river crossing options for final evaluation:[55]

- a bridge linking the Melling Interchange directly with Queens Drive; (*Option 9*)
- a dog leg link from the Melling Interchange to Queens Drive comprising a road along the top of the stopbank connecting with a bridge across the river; (*Option 9A)*
- a bridge link from the Melling Interchange connecting more or less with the eastern end of the existing Melling bridge. (*Option 9B)*

[785] This final evaluation was undertaken in an MCA workshop held in June 2018 which recorded the following outcomes:[56]

- Transport benefits: *Option 9A* was favoured as it had a better bus route alignment and provided a more direct connection for active modes to the new Melling Station.

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55 Undertaken in February 2018

56 In June 2018

- Fit with the local road system: *Option 9* was favoured as it provided a more legible connection to the local road network.
- Visual and landscape impacts: *Option 9A* was the least favoured as it required the road to run along the western stopbank, *Option 9B* had the advantage of familiarity for residents compared with a bridge constructed at a new location - although there was little to choose between this option and *Option 9.*
- Natural hazards management fit: *Option 9B* had a very significant disadvantage in that it would lock in the existing river channel constraints for the long term whereas the two bridge options connecting with Queens Drive both provided for extra width for future flood protection. Seismic, landslide and tsunami hazards were similar for all three options.
- Land-use effects: All three options had impacts on the city centre side of the river as either Queens Drive needed widening or the Melling Link needed realignment. *Option 9A* also required a lift of 5m for Rutherford Street while *Option 9* required a 2-3 m lift, this lower lift being favoured by a narrow margin.
- Urban Design Opportunities: *Option 9B* did not create the gateway entrance into the city centre as desired by HCC. *Option 9* was therefore preferred although it was decided that further urban design development would be required to establish how the new level of Rutherford Street level would tie in with the existing city centre blocks.
- Consenting: *Option 9B* was not favoured as it did not provide for the widening of the existing river channel. It was therefore inconsistent with RMA s6(h) *the management of significant risks from natural hazards.* Both *Options 9* and *9A* would both accommodate widening of the existing river channel over the full length of the river from upstream of the existing Melling Bridge to the Ewen Bridge.
- Engineering Degree of Difficulty: *Option 9B* had the considerable engineering challenge of the need to partially remove a segment of the existing bridge to enable construction of a new bridge at this location with *Option 9* being favoured as it avoided interaction with the stopbanks (which would be required for *Option 9B*), involved a lower lift of Rutherford Street and largely avoided existing traffic.
- Ability for Staging: There was no significant advantage of any one option over any other although *Options 9 and 9A* were favoured.
- Cost: The cost estimates for the options were likely to be within 20% of each other with *Option 9A* being the most expensive as it had the longest bridge and the additional cost of construction along the western stopbank.

[786] When tested for sensitivity over a range of weighted attributes, the overall finding of the workshop was that irrespective of the weighting assigned to any particular attribute, *Option 9* was most favoured followed by *Option 9A* followed by *Option 9B.*

[787] Option 9, (a new bridge connecting directly across the river from the Melling Interchange to Queens Drive) was subsequently endorsed as the preferred option by the NZTA Board at its December 2018 meeting.

The Pedestrian and Cycle Bridge

[788] Three options were considered for the form of the pedestrian and cycle bridge linking the new Melling Railway Station with the city centre, these options being identified as a trunk bridge (straight across the river), a bow bridge (curved across the river) and a branch bridge (curved across the river with separate exit and entry ramps on the city side).

[789] When evaluated against the assessment criteria of resilience, consenting, cost, constructability and Awa values and experience, the trunk bridge option was chosen as the preferred form as it scored more highly against the assessment criteria compared with the other two options.

City Edge Urban Development

[790] In the 2017-2019 preliminary design phase, the following options for city edge urban development were evaluated in an MCA workshop process:

- the retention of the existing city edge with raised stopbanks;
- the retention of the existing buildings with a wider stopbank;
- a south bank park with urban regeneration;
- an integrated development;
- a new development with wider stopbanks;
- the location of the promenade.

[791] The evaluation criteria for this MCA workshop process took into account:

- urban design based on the design principles in the City Transformation Plan;
- Te Mana o te Wai;
- development feasibility and economics;
- cost and implementation;
- flood resilience;
- transport effects;
- environmental effects.

[792] The outcome of this process were recommendations which combined elements from each of the options for final option testing at six locations, Marsden Street, South Daly Street, North Daly Street (City Edge), Chamber of Commerce and Auto Point House, Melling Bridge/Rutherford Street and River Design Upstream of Melling.

[793] This final option testing, also undertaken through an MCA process, identified a preferred option for development at each of these locations with these preferred options being carried forward for refinement in the consent design phase of the Project.

New Melling Railway Station

[794] The Project requires the relocation of the Melling Station to the south to accommodate the footprint required for the new Melling Interchange.

[795] The key design requirements identified for the relocated station are that it needs to be on the alignment of the existing rail corridor, it requires good bus and car connections, it requires space for parking and it needs to provide for good connectivity across the river to the Lower Hutt City Centre.

[796] Two location options 250m and 500m south of the existing station were considered with the 500m location being chosen as this best met each of the following key design requirements:

- it has the required space for the state highway;
- its exit and entry ramp geometry can accommodate the river flood protection works;
- the space remaining has a natural fit for accommodating the station itself and its associated infrastructure;
- its location provides for a direct connection to the city centre.

Cycleway/Pedestrian Pathways

[797] The Alternatives Report notes that during preliminary design (2017-2019), a number of options were developed and assessed for cycling and pedestrian pathways.

[798] Some of these options included::

A: In the Vicinity of Pharazyn Street

- a shared pathway of minimum width 4.5m along the western side of Pharazyn Street to Bridge Street;
- a separate bi-directional pathway along the western side of Pharazyn Street to Bridge Street;

- a separated bi-directional cycleway along the east side of Marsden Street from Bridge Street to the new Melling Bridge;

B: Along the Riverbanks

- shared pathways of minimum 3.0m and 4.5m width along the stopbank and riverbank respectively on both sides of the river;
- a combination of shared and segregated pathways along the stopbank and riverbank respectively on the TRB;
- shared pathways of minimum 3m and 4.5m width along the stopbank and riverbank respectively on the TLB;
- a shared pathway along the riverbank transitioning to the stopbank on the TRB.

C: Across the River

- a shared pedestrian and cycle bridge across the river;
- a segregated pedestrian and cycle bridge across the river;

D: On the New Melling Bridge

- a separated one-way cycleway on each side of the new Melling Bridge;
- a separated bi-directional cycleway on the southern side of the new Melling Bridge;

E: On State Highway 2

- the shoulder on SH2 northbound up to the existing interchange utilising exit ramps to connect to bridges over SH2 and the river;
- the shoulder on SH2 southbound with underpasses to remove conflict at exit and entry ramp gore locations

[799] Following discussions with cycle advocacy and interest groups in the Wellington and Hutt Valley regions, as well as with HCC walking and cycling representatives, the preferred options from these elements taken forward by the Applicants for consideration in the consent design development phase of the Project, concluding in 2021 were:

- a separated bi-directional cycleway along the railway corridor from Parliament Street to the new Melling Station;
- on the TLB, a shared pathway of minimum 3m and 4.5m widths along the stopbank and riverbank respectively;
- on the TRB, a shared pathway of minimum width 4.5m along the riverbank transitioning to the stopbank;
- a separated bi-directional cycleway on the southern side of the new Melling Bridge;
- the shoulder on SH2 *northbound* up to the existing interchange utilising exit ramps to connect to bridges over SH2 and the river;

- the shoulder on SH2 *southbound* with underpasses to remove conflict at exit and entry ramp gore locations.

[800] The option of constructing the new pedestrian/cycle river bridge to incorporate an overbridge over Pharazyn Street was discounted because of the long ramps which would be required to connect this bridge to the stopbank and to the new Melling Station. Instead, the Applicants' preferred option was for the new bridge to land on top of the stopbank or at the same level as Pharazyn Street.

[801] The option of constructing a pedestrian bridge over SH2 to the western hill suburbs was also considered and discounted because it was assessed to provide only a very small benefit for the very limited number of pedestrians who would use it, based on the small catchment and the steep gradient which would be required for the bridge.

[802] The Alternatives Assessment notes that the development of the consent design plans was based on a three-stage methodology of design freezes (DFs) to allow for specialist input to the pathway designs. The first stage based on the outcomes of the Alternatives Assessment resulted in the preparation of plans identified as DF1. The next stage involved the inputs of technical specialists to the content of DF1 plans leading to the preparation of DF2 plans. The third and final stage involved final reviews and the preparation of DF3 plans for the consent design.

[803] While this process involved ongoing consultations with the cycling and pedestrian advocacy groups, the Applicants and these groups were not able to agree on the final configurations of at least some of the pathways shown in the DF3 plans. As can be seen, we have set out the differences of views between the parties and our findings on each in the cycling and pedestrian issues sections of this decision.

Findings on Assessment of Alternatives

[804] In determining whether adequate consideration has been given to the consideration of alternatives, we have been guided by the following principles derived from the Final Report and Decision of the Board of Inquiry into the Upper North Island Grid Upgrade Project:

- *The focus is on the process, not the outcome; whether the requiring authority has made sufficient investigations of alternatives proposed, rather than acting arbitrarily, or giving only cursory consideration to alternatives;*
- *Adequate consideration does not mean exhaustive or meticulous consideration;*

- *The question is not whether the best route, site or method has been chosen, nor whether there are more appropriate routes, sites or methods;*
- *That there may be routes sites or methods which may be considered by some (including submitters) to be more suitable is irrelevant;*
- *The Act does not entrust to the decision maker the policy function of deciding the most suitable route; the executive responsibility for selecting the site remains with the requiring authority;*
- *The Act does not require every alternative, however speculative, to have been fully considered; the requiring authority is not required to eliminate speculative alternatives or suppositious options.*

[805] We adopt that summary.

[806] Applying these principles for our assessment of the adequacy of the Applicants' consideration of alternatives for the Project:

- The Alternatives Report notes that the form of the RiverLink Project has been developed and refined over many years. As can be seen from our overview of this Report, there have been extensive and detailed investigations of a very wide range of alternatives and their environmental effects for both the Project overall and for its individual components.
- Prior to and during the hearing and in conditions put forward in closing the Applicants acknowledged the need to further investigate alternatives and refine the approach to some routes, sites and methods involved in the Project, primarily for cycling and pedestrian activity. The approaches to many but not all of these conditions were supported or not opposed by submitters or witnesses.
- In considering the effects on the environment of allowing the requirement in relation to the consideration of alternatives, we made findings on the Project that include the provision for cycling and walking and several other matters (along with conditions that involve further consideration and sometimes consultation on alternative routes, sites and methods).

[807] We are satisfied that we will be able to conclude that adequate consideration has been given to the consideration of alternatives for the Project in relation to the effects on the environment once issues highlighted in this decision and on which we have made directions have been appropriately addressed.

Project Objectives

[808] When considering a requirement and any submissions received, a territorial authority (or in this case, the Court) must, subject to Part 2, consider the effects on the environment of allowing the requirement, having particular regard to, under s171(c), *whether the work and designation are reasonably necessary for achieving the objectives of the requiring authority for which the designation is sought.*

[809] In this section of our decision we start by listing the Project Component Objectives for the three new designations being sought under NORs of the requiring authorities (WRC, NZTA and HCC), their justifications as to why they consider that their proposed works or designation are reasonably necessary for achieving these Project Component Objectives and their principal reasons for seeking the designations.

[810] We then set out our own evaluations of each of these proposed works and designations against the requirements of s171(c) followed by our findings as to whether we consider that these requirements of the Act have been satisfied.

[811] We note also that in addition to the applications for these three new NORs, alterations to existing designations are being sought by:

- NZTA for an alteration to designation reference TNZ1 in the City of Lower Hutt District Plan to change the boundary in an area of land of approximately 12.4 hectares identified as SH2;
- HCC for an alteration to designation reference HCC4 in the District Plan to change the boundary in an area of land of approximately 1.64 hectares identified as the Riverbank carpark; and

[812] The Project Component Objectives, justifications and principal reasons for the alterations to the existing designations being sought by NZTA and HCC are the same as those being sought for their new designations. We have not therefore, undertaken separate evaluations for their two altered designations on the basis that our findings on the new designations apply equally to the altered designations.

[813] An alteration to designation reference NZR1 in the District Plan has also been lodged by KiwiRail for enabling the relocation of the Melling rail line and to protect KiwiRail's ability to extend the rail line beyond the relocated Melling Station and through the new Melling Interchange.

[814] Unlike NZTA and HCC, as KiwiRail's application is restricted to altering its existing designation only, (there is no KiwiRail application for a new designation), we have evaluated this alteration separately.

[815] We conclude this section of our decision with a brief evaluation to confirm whether in our view the Project Component Objectives of the individual requiring authorities are consistent with and support the Project's Collective Objectives.

Project Component: Flood Protection Works on Te Awa Kairangi Hutt River

[816] WRC's Project Component Objectives as the requiring authority for the Flood Protection Works component of the Project are:

- *To protect Lower Hutt's city centre and adjacent residential areas from flood flows of up to 2,800 cumecs by improving flood protection along Te Awa Kairangi between Kennedy Good Bridge and Ewen Bridge.*
- *To design and develop the flood protection works so that they integrate with and support the transport works and urban renewal and revitalisation of Lower Hutt city centre.*

[817] WRC considers that (this component) of the Project is reasonably necessary for achieving these objectives because:

- *it will allow for increased flood conveyance and flood security to meet the requirements of the Hutt River Floodplain Management Plan.*
  and:
- *the proposal is reasonably necessary as a planning tool as it identifies and protects land required for the Project and will enable GW to carry out the proposed work.*

[818] WRC's principal reasons for requiring a designation to facilitate the work to which this requirement relates are that:

- *it will provide certainty for landowners of the intended use of the land and the work to be undertaken at some time in the future, and*
- *it will protect the land from future development which may otherwise preclude construction of the Project.*

Discussion and Findings on WRC's Flood Protection Designation

[819] The Project incorporates upgraded measures for protecting the city's major urban areas from floods of up to 2,800 cumecs. With the existing stop-banking, in a 100-year ARI flood under current climate conditions, some 4,030 buildings have been estimated to be

compromised in that they could not be used for their intended purpose immediately after such a flood. Once the Project works are completed, in the same flood event, this number has been estimated to reduce to only 104 compromised buildings.

[820] Projected forward to forecast climate conditions in 2130, with the same 100- year flood return period, some 8,652 buildings are estimated to be functionally compromised without the Project works with this number reducing to an estimated 1,027 buildings once the Project works are in place.

[821] The Project works will also result in a reduction in the duration of inundation between the Kennedy Good and Ewen Bridges during floods with a consequent reduction in flood risk. In addition, the replacement of the existing Melling Bridge with a new longer bridge will overcome the flooding risk caused by the "choking" effect of the existing bridge on the passage of flood flows in the river.

[822] The net value of tangible and intangible benefits of avoided damages from the flood protection works have been estimated by Mr Norman at $323m.

[823] Mr Martell for WRC Regulatory raised a concern about the risk of stopbank overtopping below Ewen Bridge (until such time as the existing Ava Bridge is replaced). We have responded to this issue in the section of this decision which addresses the effects of the Project on Te Awa Kairangi. Apart from this, the river hydraulics experts did not identify any other technical issues about the level of protection which would be provided by the reconfigured stopbanks.

[824] As will be seen in our overview of the Applicants' assessments of alternatives, a key consideration throughout the assessment of alternatives has been the "fit" or integration of other components of the Project with the proposed flood protection works. We are satisfied that this "fit" has been achieved.

Discussion and finding on WRC's Flood Protection Works designation

[825] Taking account of WRC's justifications and principal reasons supplemented with our own evaluation, our finding is that the flood protection works and designation being sought by WRC are reasonably necessary for achieving WRC's twin Project Component Objectives of improving the flood protection of the city centre and adjacent residential areas between the Kennedy Good Bridge and Ewen Bridge and for these works to be developed and designed to integrate and support the transport works, urban renewal and revitalisation of the city centre.

Project Component: Construction, operation and maintenance of a new Melling Station

[826] WRC's Project Component Objectives as the requiring authority for the new Melling Station component of the Project are:

> To provide for a new Melling station (to replace the existing Melling Station) and associated facilities and access for users, by:
>
> - providing rail platform(s), access infrastructure and station building(s), as well as multi-modal access and associated facilities (including park and ride) for people using the new Melling Station; and
> - providing these facilities in a form that provides improved connections and accessibility to the Lower Hutt CBD, as compared to the existing Melling Station.

[827] WRC considers that (this component) of the Project is reasonably necessary for achieving these Project Component Objectives because it will:

- provide for new and integrated facilities, in this new location closer to the Hutt CBD.

WRC's principal reasons for requiring a designation to facilitate the work to which this requirement relates are that:

- it provides a clear signal in the District Plan as to the location and importance of the new Melling Station, and
- ensures that this essential public transport asset is secured against inconsistent development.

Discussion and Findings on WRC's Melling Station Relocation Designation

[828] The existing Melling Railway Station and its associated facilities (such as carparking) are to be relocated to a site some 500m to the south. Compared with the site of the existing station, the new location will provide for a direct connection across the river from the station to the Lower Hutt City Centre for pedestrians and cyclists.

[829] As noted also in the Alternatives section of this decision, the new location of the station has the required space for the state highway, the station's exit and entry ramp geometry can accommodate the river flood protection works and the site has a natural fit for accommodating the station and its associated infrastructure.

[830] While there were a number of contested issues left unresolved at the end of the hearing related to the form of the pathways to be provided for cyclists and pedestrians at and adjacent to the station, we find that these to be matters of detail in the context of whether the objectives as defined for the new station meet the Act's reasonable necessity criteria.

[831] Our finding is that we are satisfied that the work and designation required for the new Melling Station and its associated facilities are reasonably necessary for achieving the WRC's designation objectives for WRC's Project Component Objective.

Project Component: Construction, operation and maintenance of the Melling Interchange improvements including associated activities

[832] NZTA's Project Component Objectives as the requiring authority for this component of the Project are:

> *To provide for an interchange on SH2 at Melling, and a new Melling Bridge which:*
>
> - *improve the resilience and safety of SH2 at Melling;*
> - *enhance modal accessibility and transport connection at Melling, including to a new rail station, and to the Lower Hutt city centre;*
> - *improve travel time reliability along SH2, and to the Lower Hutt city centre and the Western Hills, and*
>
> *To design and develop the transport works so that they integrate with and support the flood protection works and the urban renewal and revitalisation of Lower Hutt city centre.*

[833] NZTA considers that (this component) of the Project is reasonably necessary for achieving these objectives because it will:

- *provide safer journeys for road users, including improved access along SH2 and between SH2 and Lower Hutt CBD;*
- *support safe cycling and walking by providing linkages where feasible as part of the Project scope (such as across interchanges, on SH2, and on local roads where the Project passes over on a bridge structure);*
- *improve freight performance in terms of improved travel times, improve route quality and safety, resilience, and travel time reliability; and*
- *(provide) better multi-modal accessibility and transport connections.*

[834] NZTA's principal reasons for requiring a designation to facilitate the work to which this requirement relates to are:

- *it will allow the land required to be identified in the Lower Hutt District Plan, giving a clear indication of the intended use of the land;*
- *it will provide certainty for landowners of the intended use of the land and the work to be undertaken at some time in the future; and*

- *it will protect the land from future development which may otherwise preclude construction of this component of the Project.*

Discussion and Findings on NZTA's Melling Interchange Improvements Designation

[835] General safety issues with the existing intersection include that queuing in the right turn from SH2 into Lower Hutt causes a high number of rear-end obstruction type crashes. The intersection is also at capacity in peak periods and the existing Melling Bridge lacks segregated paths for cyclists and pedestrians.

[836] With the new Interchange in place, the injury annual crash rate has been assessed to reduce from an average of 4 per annum over the last 5 years to an average of 0.3 per annum with the transport/cycling experts agreeing in their JWS that a Safe System Assessment has established that safety of the Project will be net beneficial[57].

[837] The existing intersection is at capacity in peak periods with the new Interchange estimated to result in travel time savings of about 1 min in the morning peak and 5.5 mins in the evening peak in the route from Lower Hutt central city to SH 2 north and savings of about 1.5 mins in the morning peak and 3 minutes in the evening peak for the route from Lower Hutt central city to SH 2 south.

[838] Unlike the existing bridge, the waterway under the new bridge has been designed to accommodate the HRFMP flood flows which reduce the flooding risk for properties in the surrounding areas by at least two orders of magnitude.

[839] The chosen alignment of the new bridge will also provide a direct linkage from the new Interchange to the city centre.

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57 A Safe System Assessment requires the designers, managers and operators of a land transport system to consider:

- **safe roads and roadsides** that are predictable, promote safe behaviour and are forgiving of human error
- **safe speeds** that suit the function and level of safety of the road, the skill of the driver and the safety of the vehicle
- **safe vehicles** that incorporate emerging collision avoidance technologies and modern warning systems, and are well maintained to help prevent crashes and protect road users from crash forces, and
- **safe use** by having drivers, motorcyclists, cyclists and pedestrians who are skilled and competent, proactive in managing hazards, predictable, alert, unimpaired, compliant and make safe choices

[840] We find that the new Interchange and Melling Bridge works and the related designation are reasonably necessary to meet NZTA's Project Component Objectives of improving the resilience and safety of SH2 at Melling, enhancing transport connections at Melling, improving travel time reliability along SH2 and to the Lower Hutt City Centre and the Western Hills, integrating with GW's flood protection works and integrating with the urban renewal and revitalisation Objectives for Lower Hutt City Centre.

[841] Having reached this finding on these Project Component Objectives at a high level, at a more detailed level, we note that at the end of the hearing there had been no agreement between the cycling and pedestrian experts and proponents as to how both the new Interchange and the paths on each side of the new Melling Bridge should be configured to provide for the safe passage of pedestrians and cyclists. We have set out our findings on each of these configurations in the cycling section of this decision.

> *Project Component: Construction, operation and maintenance of urban renewal and revitalisation works, including local road and parking changes, new and improved landscape, pedestrian and cycling infrastructure, amenity infrastructure and public spaces and places, and integration of existing and/or future buildings with flood protection structures.*

[842] HCC's Project Component Objectives as the requiring authority for this component of the Project are:

> *To support the urban renewal and revitalisation of Lower Hutt City Centre by promoting Te Awa Kairangi, between Ewen Bridge and Kennedy Good Bridge, as the centre piece of the city through:*
>
> - *enhancing walking and cycling connections and amenity along and across Te Awa Kairangi and to the city centre;*
> - *providing opportunities for future mixed-use development and public space that integrate the city centre with Te Awa Kairangi;*
> - *promoting the urban renewal and revitalisation of Lower Hutt centre so that it integrates with and supports the flood protection works and the transport works.*

[843] HCC considers that this component of the Project is reasonably necessary for achieving these objectives because it will:

- *provide for a new pedestrian and cycling bridge over Te Awa Kairangi to better connect the city centre with a new train station and allow future development of the new station and surrounds;*

- *support opportunities for economic and urban renewal of Lower Hutt city centre, and*
- *better connect the city centre with Te Awa Kairangi.*

[844] HCC's principal reasons for requiring a designation to facilitate the work to which this requirement relates to are:

- *it will protect the land from future development which may otherwise preclude construction of the Project, and*
- *it will provide certainty for land-owners of the intended use of the land and the work to be undertaken at some time in the future*

Discussion and Findings on Hutt City Council's Urban Renewal and Revitalisation Works Designation

[845] In terms of reasonable necessity, we agree with HCC that the new pedestrian and cycling bridge responds directly to the first of its Project objectives (to enhance walking and cycling connections and amenity).

[846] Our understanding is that the Project is to provide for the construction of some 6 km of new cycling and pedestrian paths. At a high level we find that these new paths will contribute directly to the achievement of the reasonably necessary criteria for the first of HCC's Project Component Objectives. However, we note that at a more detailed level, at the end of the hearing there remained disagreement between the Applicants and the cycling and pedestrian proponents as to how some of these paths should be configured to provide for their safe use by each user group. As for the Melling Interchange and Bridge, we have set out our findings on those contended pathway configurations in the cycling section of this decision.

[847] HCC's second and third Project Component Objectives to provide opportunities for future mixed-use development and public space which integrate the city centre with Te Awa Kairangi, promote urban renewal and revitalisation of the city centre and integrate with the proposed flood protection works.

[848] Elsewhere in this decision, we set out our assessment of the very detailed processes followed by the Applicants in developing the options for how the city edge might be integrated with Te Awa Kairangi. In these assessments we noted that the matters against which the finally selected development options were evaluated included urban design based on the design principles in the City Transformation Plan; Te Mana o te Wai; development feasibility and

economics; cost and implementation; flood resilience; transport effects and environmental effects.

[849] We note that these matters mirror those listed in HCC's second and third Project Component Objectives.

[850] We find that the works and designation proposed by HCC for the urban renewal and revitalisation of the city centre are reasonably necessary for achieving HCC's second and third Project Component Objectives.

Project Component: KiwiRail Alteration to Existing Designation

[851] KiwiRail is seeking an alteration to designation reference NZR1 in the District Plan to enable the relocation of the Melling rail line and to protect KiwiRail's ability to extend the rail line beyond the relocated Melling Station and through the new Melling Interchange.

[852] The Project Component Objectives being sought by KiwiRail for this alteration are to:

- *Allow a potential future grade separated extension to the Melling Line under the Melling Interchange;*
- *On completion of the Project and as a result on any ongoing impact caused by the Project to the operation of the rail network, be, and continue to be, in no worse position than it was prior to the commencement of the Project in terms of longevity, value, safety and ongoing operational costs, quality, security of tenure or otherwise of the Melling Line*

[853] The existing Melling Railway Station and its associated facilities (such as carparking) are to be relocated to a site some 500m to the south. The alteration to the designation being sought by KiwiRail relates to protecting a rail corridor from the site of the new station to the site of the existing station and then northwards under the new Interchange.

Discussion and finding on KiwiRail's alteration of earlier Designation

[854] We find that the alteration to the existing designation being sought by KiwiRail is reasonably necessary to secure this corridor for the potential future north-wards extension of the Melling railway line.

Project's overall Objectives

[855] We have found that, on the basis that the conditions are amended as we have set out in this decision, the individual works and designations are reasonably necessary to achieve the

objectives for each of the project components. The Project's overall objectives are to integrate the flood protection work, and urban renewal and revitalisation along Te Awa Kairangi/Hutt River between Ewen Bridge and Kennedy Good Bridge, which collectively:

- Increase the level of flood protection for Lower Hutt's city centre and adjacent residential areas;
- Improve safety, resilience and efficiency along SH2 at Melling, and the connection between SH 2 and Lower Hutt City centre, and improve accessibility between transport modes;
- Support the urban renewal and revitalisation of the Lower Hutt city centre by promoting Te Awa Kairangi/Hutt River as the centre piece of Lower hutt City; and
- Enhance the mana and mauri of Te Awa Kairangi/Hutt River and its people between Ewen bridge and Kennedy Good Bridge through design and the practice of kaitiakitanga.

Standing back from the objectives for each of the individual designations, we find that there is no doubt that the integrated approach reflected in the works and designations, on the basis that the conditions are amended as set out in this decision, is reasonably necessary to achieve the Project's overall objectives.

Sections 105 and 107

[856] Sections 105 and 107 of the RMA are relevant to the applications for consents for discharges to air and discharges of contaminants into water or onto land.

Section 105

[857] Section 105(1) of the RMA sets out the matters that a consent authority must have regard to when considering a resource consent application for a discharge permit, in addition to those under s104(1). The Court must consider:

> (a) the nature of the discharge and the sensitivity of the receiving environment to adverse effects; and
>
> (b) the applicant's reasons for the proposed choice; and
>
> (c) any possible alternative methods of discharge, including discharge into any other receiving environment.

Discharge to Waterways

[858] As addressed in the erosion and sediment control and stormwater sections of this decision, during construction of the Project, discharges largely consisting of sediment run-off from earthworks and general construction activities, and suspended sediment as a result of

activities within the active channel, will occur to Te Awa Kairangi and affected tributaries. The effect of construction activities is that stormwater discharges, and the river, will contain higher levels of sediment than normal during the construction period.

[859] We had extensive evidence summarising the sensitivity of the receiving environments, which we have considered under the heading *Effects*. With particular reference to the river environment, it was described as:

> (a) Te Awa Kairangi is identified as a river with significant indigenous biodiversity values in the PNRP. The water quality is assessed as excellent. Te Awa Kairangi has been assessed as having high ecological value.
> (b) The affected tributaries are assessed as having moderate ecological value.
> (c) The Te Awa Kairangi River Mouth and Estuary and Korokoro Estuary have low ecological value. Wellington Harbour generally has moderate ecological values - except the Petone to Ngauranga Foreshore has high ecological value.

[860] We accept that the Project design and indicative construction methodologies developed to date have endeavoured to avoid creating adverse effects on sensitive receiving environments. Direct discharges to water have been avoided where spatial constraints and access restrictions allow. In circumstances where this has not been achievable construction methodologies and on-site management are to be employed to remedy or mitigate any actual and potential effects on these areas.

[861] During construction of the Project, discharges will occur to the Te Awa Kairangi (and affected tributaries) receiving environment which will at times consist of sediment run off from earthworks and general construction activities, and re-suspended sediment from the bed disturbance works required to create the new river channel and permanent structures (including the realigned stopbanks and the two new bridges). We accept the evidence that these discharges are a necessary part of the construction process and in some instances an alternative receiving environment is not a realistic option due to their geographic location.

[862] We have addressed in some detail earlier in this decision the range of methods proposed for erosion and sediment control for the relevant receiving environment. Contaminated land and any water which cannot be appropriately treated on-site and discharged to the receiving environment will be discharged to trade waste or off-site disposal (landfill) as an alternative to discharging into the natural environment.

[863] Post construction, operation of the Project will result in discharges of stormwater from new and altered road surfaces and pavements/hardstand areas including shared paths and carparks. Contaminants will be picked up in this stormwater, which are to be treated before discharge to the receiving environment. The consideration of options and choice of treatment methods has involved many elements as outlined earlier in the stormwater section of this decision.

Discharge to air

[864] In terms of discharges to air during construction of the Project, dust emissions will occur as a result of earthworks, gravel extraction, building removal and demolition activities. We refer to the evidence of Mr Pene and Ms Ryan on the range of methods for dust control to be used during the construction phase to minimise effects on people and the environment covered earlier.

[865] We also refer to the evidence of Mr Pene and Ms Ryan on the assessment of the effects of the operation of the Project against the relevant health-based air quality criteria. That is to the effect that concentrations of particulate matter from vehicle movements generated during operation of the Project are unlikely to result in any material increase in exposure to airborne health contaminants.

Finding on s105

[866] We are satisfied from the evidence and with the conditions that the Project meets the requirements of s105.

Section 107

[867] The Project involves discharges to water during both the construction and operational phases. Section 107(1) sets out restrictions on granting discharge permits if, after reasonable mixing, the contaminant or water discharged is likely to give rise to certain effects in the receiving waters (as listed in s107(1)(c)-(g)).

[868] Ms O'Callahan and Ms Conland agreed that the discharges meet the tests of s107, allowing the grant of discharge permits for the following reasons:

(a) The potential for effects associated with odours, conspicuous oils, floatable or suspended materials on receiving waters from construction and operational discharges is assessed in the evidence of Mr Pene, Mr Breese and Mr Ingles. These effects are assessed as minor (see s107(1)(c) and (e)).

(b) The evidence of Mr Breese concludes that there will be minor effects on the colour and visual clarity of Te Awa Kairangi post mitigation as a result of suspended sediment. Any effects will be of localised extent and temporary duration, as they are limited to construction activities and the construction period. After reasonable mixing these discharges are not expected to be conspicuous (s107(1)(d)).

(c) The evidence of Dr Bell and Mr Miller conclude that there will be no significant adverse effects from the discharge of contaminants on aquatic life during construction and operation of the Project (see s107(1)(g)).

Finding on s107

[869] In the light of the evidence and conditions we find there is no impediment in s107 to granting the discharge permits.

Non-RMA planning documents – national, regional and local

[870] There were many statutory and non-statutory documents drawn to our attention as warranting consideration as "... any other matter the consent authority considers relevant and reasonably necessary to determine the application" (under s104(1)(c)) and "... any other matter the territorial authority considers reasonably necessary in order to make a [recommendation] on the requirement" (under s171(1)(d)). To discuss all of them would be a very lengthy exercise – references to some will suffice to make the necessary points.

Government Policy Statement on Land Transport 2021

[871] This document sets four strategic priorities:

- Safety – Developing a transport system where no one is killed or injured
- Better Travel Options – Providing people with better travel options to access social and economic opportunities
- Improving Freight Connections – Improving freight connections for economic development.
- Climate Change – Developing a low carbon transport system that supports emissions reductions while improving safety and inclusive access.

[872] We note the emphasis on developing a transport system where no one is killed or injured. We also consider that safe and well-connected walking and cycling infrastructure is needed to not only to access public transport options and support future urban development, but to provide people with better travel options to access social and economic opportunities. That does not just involve commuting and access to the Lower Hutt city centre and the railway station, which was the focus of much of the evidence.

Wellington Regional Land Transport Plan (RLTP 2021)

[873] Ms O'Callahan considered the Project to be aligned with this document given it seeks the development of the region's transport network, with a long term vision of 'a connected region, with safe, accessible and liveable places – where people can easily, safely and sustainably access the things that matter to them – and where goods are moved efficiently, sustainably and reliably'. She also said that the document has specific goals of increasing the mode share of public transport and improving accessibility to public transport. RiverLink is a key part of this, and the RLTP lists it as a significant opportunity to increase mode shift towards public transport, and RiverLink will deliver a safer commuter cycle route that, together with other proposed connections such as Te Ara Tupua cycleway running from Petone through to the Wellington city centre is expected to move existing cyclists off SH2 and encourage new riders to use this mode of transport.

[874] We note the RLTP's priority of:

> *Travel Choice – make walking, cycling and public transport a safe and attractive option for more trips throughout the region.*

That requires considering walking and cycling on a broader front than just commuting and includes walking and cycling as a way of accessing public transport. We dealt with these issues when discussing *mode shift*.

Wellington Regional Growth Framework July 2020

[875] The Wellington Regional Growth Framework (the Framework) is described as a spatial plan that has been developed by local government, central government and iwi partners in the Wellington-Horowhenua region to provide councils and iwi in the region with an agreed regional direction for growth and investment, and deliver on the Urban Growth Agenda objectives of the Government. The Framework contemplates a 30-year timeframe. We accept that the Project will help to implement its objectives (with the improvements we find are needed to the conditions) by improving access to multi-modal transportation options, delivering infrastructure to enable future urban development investment that will connect the river and the city and encourage further growth and revitalisation of Lower Hutt.

Hutt River Floodplain Management Plan 2001

[876] Mr Kellow describes the HRFMP as a 40-year blueprint for managing and implementing programmes that will gradually reduce the effects of flooding from Te Awa Kairangi. The Plan was prepared by WRC over a 10 year period with significant input from Upper Hutt City Council, HCC and Mana Whenua through the Hutt River Floodplain Management Sub-Committee, as

well as community groups and organisations in the Hutt Valley. The HRFMP states *... major floodplain areas that could suffer significant flood damages will gain upgraded and new stopbanks to the 2800 cumec capacity*. Overall, it is clear the proposal is supported by the policies within the HRFMP.

[877] Ms O'Callahan's evidence is that RiverLink is a key component of the hazard risk management strategy for Te Awa Kairangi (the HRFMP) and the flood protection works and the removal of Melling Bridge are necessary to protect existing development and property from unacceptable risk from natural hazards. The HRFMP establishes a risk-based design standard for flood protection within the Te Awa Kairangi floodplain, with the ultimate goal of improving the community's resilience to flooding and to enable Hutt City to maintain or enhance its economic vitality and quality of life. RiverLink is a key Project for achieving this outcome. RiverLink is consistent with the HRFMP design standard, including the realigned stopbanks; the height and width of the new Melling Bridge, and the pedestrian/cycle bridge across the river.

Hutt River Environmental Strategy and Action Plan 2018

[878] Ms O'Callahan gave evidence that RiverLink is consistent with this document which recognises the changes that will occur as a result of an identified suite of projects (including RiverLink) which will drive changes in the intensity and types of land use between Kennedy Good and Ewen Bridges. There is a specific objective (Objective 14) which seeks to "Identify and develop enhancement opportunities for recreation through the RiverLink project" and the Action Plan includes actions to deliver RiverLink, including to remediate (treat) stormwater flows. She said that the concept plans for the Kennedy Good to Ewen Bridge reach in the Hutt River Environmental Strategy and Action Plan 2018 have been taken into account in the development of the ULDF and the recreation opportunities in the RiverLink design.

Spatial planning and growth strategies for the Hutt

[879] We had evidence that the concept of a river promenade, a key component of RiverLink, was first raised in the Hutt City Council 1987 CBD Structure Plan, and further refined in the 1999 CBD Master Plan, 2005 Hutt CBD Heart, the 2008 CBD Vision 2030 and the first CB Making Places long term development strategy in 2009 (all prepared by HCC). Also, that those plans have largely been consolidated and reframed as reflected in the Central City Transformation Plan (CCTP) (2019).

[880] Mr Kellow's report refers to the CCTP as a strategic framework to guide further development in the city and that it aims to create a 24-hour city focused on the river. RiverLink is one of the key initiatives that is hoped will act as a catalyst for development. The CCTP has nine transformation principles which RiverLink will help to achieve. The most relevant transformation principles are Principle 1 – Consolidate the City's Core; Principle 2 – Turn to Face the River, and Principle 4 – A clear distinct route between the bridges. He is clear that the RiverLink will contribute towards achieving those outcomes.

[881] Ms O'Callahan's evidence is the Project aligns with key themes in the above master plans (including the CCTP) of the development of a river promenade; the importance of turning the city centre to face the river; potential for mixed use development, and a river plain as a high amenity landscape. In particular, she considers RiverLink will assist HCC with plans to concentrate retail within a pedestrian-orientated area bounded by Dudley and Margaret Streets, Queens Drive and Laings Road, and enhance the connections between the river and city centre, with the aim of creating a more distinctive character and more economically competitive and vibrant area.

Urban design guidance

[882] This includes the New Zealand Urban Design Protocol and National Crime Prevention Through Environmental Design Guidelines (CPTED). Ms O'Callahan referred to non-statutory guidance and design strategies such as the Central City Transformation Plan and the District Plan's Central Area Design Guide, Bridging the Gap; and the NZ Transport Agency Urban Design Guidelines as aligning with the NZ Urban Design Protocol and guiding the Project's design. She considered the Project, and in particular the HCC objectives and aspects of the Project, to be aligned with the direction and vision of the New Zealand Urban Design Protocol. She said these objectives have been considered throughout the design of RiverLink through the preparation of the ULDF establishing the framework to achieve the intended urban and landscape design outcomes and that CPTED principles will continue to be incorporated into detailed design and construction. We note there are several conditions that mention CPTED with varying degrees of direction.

Whanganui-a-tara Whaitua Implementation Programme (WP)

[883] Ms O'Callahan gave evidence that this Programme was developed through a community process and that it aims to improve the integration of activities and achieve better resource management practices which reflect local aspirations for water, together with Te Mahere Wai a Mana Whenua Whaitua Implementation Programme.

[884] She considered that at a high level the Project is consistent with recommendations to meet the objectives of the community for the whaitua, with the overall objective to restore and improve water quality and ecosystem health in line with *Te Mana o te Wai*:

- Strengthening community connections with water, including the pedestrian/cycling bridge and river access points, as well as provision for naturalising stream outlets.
- Addressing sources of pollution and reducing future risks, with appropriate stormwater management and avoiding and managing risks from the use of contaminants that will minimise the risk of contaminants in the long term.
- Balancing the needs of nature and people in the places we live, informed by principles that include making water sensitive design the norm, approaching flooding risks in ways that better respect natural processes, and letting fish move freely throughout the whaitua. The Project will incorporate water urban design principles, allow more room for the river to move and restore a more natural meander pattern and improve and restore fish passage where this can be achieved.

She also considered that RiverLink will contribute to the Whaitua te Whanganui-a-Tara's overall purpose through the co-ordinated programme of flood protection and stormwater improvement works which will contribute to the improvement of the water quality and ecosystem health of Te Awa Kairangi.

[885] Ms O'Callahan gave evidence that Te Mahere Wai objectives (in summary) for Te Awa Kairangi that align closely with the objectives, design and consent conditions for RiverLink are:

(a) The voice and personality of the awa reflects the natural variations in flow, the movement of bed material, and bird and insect life within the river corridor.
(b) The water is clear with good clarity so that the bed of the awa is easily visible.
(c) The presence of native flora and fauna can be observed and heard in the water spaces.
(d) The awa is able to express its natural form and has a natural pattern of pools, runs and riffles.
(e) The full extent of the banks of the awa and the river corridor is vegetated and there is a dominance of indigenous flora that shad the water and provide habitat for native fauna.
(f) The flood hazard risk to communities near Te Awa Kairangi is managed so that the river is able to exhibit its natural form and character and river management includes opportunities for positive design such as recreating ngā ūranga.
(g) The whole catchment supports the entire life cycle of mahinga kai species and mahinga kai species are safe to harvest and eat.

(h) The water conditions, level, and habitat in the awa, and its corridor support the presence, abundance, survival, and recovery of benthic macroinvertebrates/freshwater bugs, *At Risk* and *Threatened* indigenous fish species and Native birds.

(i) The water is suitable for primary contact throughout the catchment.

Conclusions and Directions as to conditions

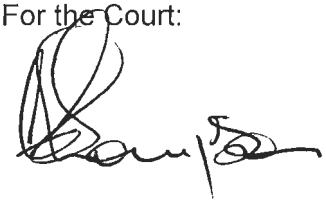
[886] This has been an unusual decision in its focus on the Condition set that is to secure the outcomes of an integrated Project. In undertaking our evaluation of all the necessary statutory matters under the RMA we have found that there is a need to further address conditions (and their evidence base) in several topic areas before they can be finalised. Of major concern is noise and vibration, on which we have directed wide ranging amendments to Conditions that were put before us. Another important area of concern is the adequacy of cycling (and pedestrian) provision in the conditions. There are also other conditions that need refinement and improvement.

[887] Appendix 1 (which, we do emphasise, is intended as a guide only and may not be exhaustive) sets out actions required to follow up on the conditions. They include requirements for amendments, with the reason for the amendment either noted in brackets or so obvious as not to require explanation. Given the large number and complex nature of the Conditions this decision may have overlooked areas that need addressing to ensure clarity and certainty of the outcome of the Conditions. There may also be a need to make consequential amendments to conditions including to address inconsistencies in drafting.

[888] We suggest that the relevant parties confer on the issues raised. It would be helpful if the Applicants first prepare a set of updated Conditions addressing matters raised by the Court, and provide them to each of the other parties for comment by 9 September 2022. The parties are to provide comment to the Applicants by 16 September 2022; and having taken account of the comments received, the Applicants are to submit their proposed set of revised Conditions by 30 September 2022.

Dated at Wellington this 25th day of August 2022

For the Court:



C J Thompson
Alternate Environment Judge

APPENDIX 1

Issues referred to parties for completion or modification (noting that this list may not be exhaustive)

1. Para [52] - disability issues to be included in design and conditions.
2. Paras [89]-[92] – amendment to Condition 3.
3. Paras [93]-[101] – amendment to Condition 5.
4. Paras [102]-[104] – revision of Conditions 20 and 21.
5. Para [116] – definition of word *practicable* to be removed.
6. Para [123] – reference to be removed from Condition 34.
7. Para [204] – clarify wording of condition 36B.
8. Para [212] - amendment of conditions 36A, 36B and 3A.
9. Para [256] - dog parks/cycleways separation.
10. Para [266]-[267] – addition to Conditions 3A and 36A.
11. Para [267] – Condition 36A(d) – width of separated cycle path and indicative drawing.
12. Para [271] – amend Condition 3A(a)(ii).
13. Para [279] – wording of Condition 3A(b)(ii).
14. Para [295] – amend Condition 36B.
15. Para [304] – amendment of condition or other addressing placement of lighting poles.
16. Para [310] – additional Condition in Section 4 re responsibilities for maintenance.
17. Paras [360]-[361] - amend Conditions 107(g) and 107(h).
18. Para [447] – amend Tables in condition 54(a).
19. Para [449] – amend Condition 54(a).
20. Para [456] – Condition 19(j) to apply to Condition 57D(a).
21. Para [458] – amend Condition 57D(a).
22. Para [460]– amend Condition 57C(d).
23. Para [463] – amend Condition 57C(e).
34. Para [466] – properties to be added to Condition 55 and Condition 57C(e) lists.
35. Para [469] – redraft Condition 57C(f).
36. Para [478] - Conditions 57B and 57C.
37. Para [483] – amend Condition 19(i).
38. Para [485] – possible addition to Condition 19(j).
39. Para [488] – amendment of Condition 57D(c)(iii).
40. Para [490]-[492] – condition 57D(c)(vi).
41. Para [494] – Condition 57D(c)(vi) – re construction vibration.
42. Para [510] – additional Condition required – re Melling Bridge piles.
43. Para [538] – Condition 41 to be amended.
44. Paras [657]-[658] – addition of three conditions and related definitions for 5 Daly Street (and reserved ability for affected parties to raise any matters of concern).

Other matters requiring consideration and changes to conditions are as follows:

- A new definition of "Segregated path" is included and Condition 36A (c) refers to segregated cycle paths illustrated on the drawing titled Indicative Active Transport Plan Long Plot referred to in Condition 3 does not appear to show any "Segregated path" in its key.

- Plan sets listed in Condition 3 are not fully and accurately described e.g. Stormwater Treatment, Melling Bridge.

- Conditions 3A, 5, 49, 88 "Objectives" should be "purposes" to be consistent with the approach elsewhere in the condition set (and similarly in other places) and as outlined in the Applicants' opening.

- Condition 52 Add "has" before" been granted"

- Condition 70 Replace "Suitability" with "Suitably" Qualified Person

- Condition 73 This condition implies there is a choice between "comply" or "be consistent with" limits, management triggers and thresholds established in conditions 64-72, 79-81 and 85-88". The condition should make it clear that it is the requirements in the listed conditions that are to be complied with.

- Condition 89 Remove the word "current" in front of the dated version of the Code of Practice for River Management Activities.

Public health interventions: the elephant in the room of the health system crisis

Caroline Shaw, Christine Cleghorn

Since 2020, the "rules of engagement" for our health system, the expected and relatively predictable level of ill-health in the community, have changed.[1] COVID-19 has increased demand for healthcare through multiple pathways. Firstly, through managing those acutely unwell with COVID-19 infection, which during 2022 has been a significant source of hospitalisation over the three waves. Secondly, by creating a large burden of "catch up" care needed for those people whose care was delayed due to beds being occupied by those infected with COVID-19. Thirdly, as a result of long COVID, which, for some people, requires ongoing multidisciplinary specialist care. Fourthly, because of a deterioration in mental health associated with the pandemic and the public health measures to manage it.[2] Finally, due to the loss of children and young people from the education system or from lower educational attainment which has been caused by disrupted education—may also lead to poorer health later in life through altered life opportunities and trajectories.[3] So, even if COVID-19 disappeared tomorrow, the legacy of health impacts through other pathways will remain.

This increased demand for healthcare is being managed by a workforce experiencing illness itself, causing high levels of shortages. Long-standing health workforce shortages have been amplified by COVID-19, and burnout, exhaustion and distress amongst clinical staff are endemic and acute. We see this healthcare supply/demand mismatch playing out in the media, with multiple stories of long waits and delays in care in the emergency department (ED), sometimes with catastrophic results. There will also be disasters happening that are less visible but will ultimately lead to poorer health outcomes. For example, delays in diagnosis or initiation of care for cancer or heart disease, or poorer management of diabetes because of difficulty accessing primary care.

We also know that a stressed health system exacerbates inequities. For example, the drop off in childhood vaccinations for all children in recent years has been worse for Māori and Pacific children,[4] and lung cancer registrations and investigations seemed to reduce for Māori, but not for non-Māori/non-Pacific people, during the 2020 lockdown.[5] An under pressure health system is the type of setting in which healthcare provider implicit bias may be more likely to impact on healthcare decisions, potentially disadvantaging Māori further.[6]

There are no easy or quick fixes to increasing the capacity of the health system. Health professionals take many years to train and almost every high-income country is in the same situation as us,[7,8] fighting over the same international pool of health professionals.[9] Recruiting healthcare workers from low-income countries, with less resilient health systems, to plug gaps in our own workforce is ethically dubious.[10] Moreover, Aotearoa New Zealand is a signatory to a World Health Organization (WHO) Voluntary Code of Practice aimed at ensuring that low-income countries are not disadvantaged by this practice.[11]

This is a grim analysis, and it demands that we do things differently. And we can. Alongside training more health professionals and creating a healthy and safe work environment that allows for their sustainable long-term employment, we also need to focus on how we can reduce demand for healthcare.

We recently coordinated a series of blogs in which we asked topic experts to identify two to three evidence-based public health interventions that, if put in place, would rapidly reduce demand for healthcare in Aotearoa New Zealand. These covered topics such as child health, population mental health, injury, infectious diseases, housing, transport and food (the full blog series can be found here: https://blogs.otago.ac.nz/pubhealthexpert/).

While there is common perception that public health actions take decades to have impacts, the authors of these blogs identified a wide range of interventions that would have immediate and enduring impacts on health, and thus on our health system. These included interventions

such as vaccination, raising alcohol taxes, lowering drink driving levels, a health-based approach to drug harms, speed limit reductions, increasing benefit levels, alterations to streets to promote cycling and walking and reformulation of processed foods.[12–17] These interventions would impact on a wide range of health conditions, both physical and mental. Many would also have benefits to other sectors, for example through improved productivity or reduced greenhouse gas emissions.[18,19] Finally, many of them have already been recommended by reviews or are suggested actions in Government strategies.

As a detailed example, alterations to urban streets to promote cycling and walking through speed limit reductions, establishing car free areas, low traffic neighbourhoods and pop-up cycling infrastructure rapidly create measurable changes in injury risk, air and noise pollution exposure, crime, and physical activity.[20–24] These improvements in health risk factors have immediate as well as long-term effects on physical and mental health. For example, moderate or vigorous physical activity such as cycling is associated with reductions in anxiety and depression,[25–28] and air pollution improvements are associated with immediate reductions in asthma and respiratory admissions (and associated with long-term health improvements).[29,30] Temporary street furniture like planter boxes can be used to create networks of cycle lanes and eliminate through traffic on suburban streets—changes such as these can then be made permanent over time. These changes have been made rapidly and cheaply both in New Zealand during the 2020 lockdown and internationally over the same time period.[31] We also know that the Government actually wants to enable these types of changes, as they have recently finished consulting on a regulatory package that would make it easier for councils to take action.[32] However, if the Government is serious about delivering the health gains that are possible then it would be more proactive, rather than just enabling councils to do so if they chose to. This would include setting targets and funding delivery of the length of separated cycleways that evidence suggests is needed to maximise cycling uptake (around 150–200km/100,000 people[33]), and creating ambitious targets for low traffic neighbourhoods (such as in London where some local councils are planning to convert entire boroughs into low traffic neighbourhoods).

There is a wealth of resources to support the use of public health measures as a part of our solution to the health system crisis. We have a new Public Health Agency tasked with strengthening population and public health, ministers who support public health action, the re-formed Public Health Advisory Committee providing independent science-based advice to the Minister of Health, colleges and professional organisations with powerful voices when it comes to public health action,[34] as well as motivated and supportive professionals who are trusted by the community.

Putting in place public health interventions that reduce the need for healthcare should be an explicit part of our strategy to manage the health system crisis. There is a direct link between the speed limit or the level of alcohol tax, and the time people are waiting for care in ED or the length of surgical waitlists. The Government has shown that it can act quickly and decisively in a crisis, and policy that seemed impossible can be delivered rapidly. Now is the time for policymakers and the health sector to leverage all available solutions to our present crisis.

COMPETING INTERESTS
Nil.

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REFERENCES

1. McCay L. Covid continues to disrupt: what is the plan to deal with it? BMJ. 2022;378:o1780. doi:10.1136/bmj.o1780.
2. World Health Organization. Mental Health and COVID-19: Early evidence of the pandemic's impact: Scientific brief. 2022.
3. Zajacova A, Lawrence EM. The Relationship Between Education and Health: Reducing Disparities Through a Contextual Approach. Annu Rev Public Health. 2018;39(1):273-289. doi:10.1146/annurev-publhealth-031816-044628.
4. The Immunisation Advisory Centre. National Immunisation Coverage for New Zealand, up to May 2021. 2021. Available at: https://www.immune.org.nz/sites/default/files/publications/Coverage%20Report%20-%20July%202021.pdf.
5. Gurney JK, Dunn A, Liu M, et al. The impact of COVID-19 on lung cancer detection, diagnosis and treatment for Māori in Aotearoa New Zealand. N Z Med J. Jun 10 2022;135(1556):23-43.
6. Zestcott CA, Blair IV, Stone J. Examining the presence, consequences, and reduction of implicit bias in health care: A narrative review. Group Process Interg. Jul 2016;19(4):528-542. Doi:10.1177/1368430216642029.
7. McLellan A, Abbasi K. The NHS is not living with covid, it's dying from it. BMJ. 2022;378:o1779. Doi:10.1136/bmj.o1779.
8. Pagel C, Yates CA. The NHS is facing the bleakest midwinter. BMJ. 2022;379:o2550. doi:10.1136/bmj.o2550.
9. Lorgelly P. Despite what political leaders say, New Zealand's health workforce is in crisis – but it's the same everywhere else blog. 2022. Available at: https://theconversation.com/despite-what-political-leaders-say-new-zealands-health-workforce-is-in-crisis-but-its-the-same-everywhere-else-187256.
10. Saluja S, Rudolfson N, Massenburg BB, Meara JG, Shrime MG. The impact of physician migration on mortality in low and middle-income countries: an economic modelling study. BMJ Glob Health. 2020;5(1):e001535. Doi:10.1136/bmjgh-2019-001535.
11. World Health Assembly. WHO Global Code of Practice on the International Recruitment of Health Personnel. 2010. Available at: https://www.un.org/en/development/desa/population/migration/generalassembly/docs/globalcompact/WHA_RES_63.16.pdf.
12. Shaw C, Macmillan A, Woodward A. Public Health Solutions Series: Simple transport system changes could quickly relieve the crisis in our hospitals. Public Health Expert blog. 2022. Available at: https://blogs.otago.ac.nz/pubhealthexpert/public-health-solutions-series-simple-transport-system-changes-could-quickly-relieve-the-crisis-in-our-hospitals/.
13. Cleghorn C, MacKay S. Public Health Solutions Series: Improving the cost, composition and availability of foods can save lives. Public Health Expert blog. 2022. Available at: https://blogs.otago.ac.nz/pubhealthexpert/public-health-solutions-series-improving-the-cost-composition-and-availability-of-foods-can-save-lives/.
14. Wilson N. Public Health Solutions Series: Two Injury Prevention Strategies to Reduce Pressure on the Health System. Public Health Expert blog. 2022. Available at: https://blogs.otago.ac.nz/pubhealthexpert/public-health-solutions-series-two-injury-prevention-strategies-to-reduce-pressure-on-the-health-system/.
15. Chambers T, A. M. Public Health Solutions Series: Public policy options to address alcohol-related harm in Aotearoa. Public Health Expert blog. 2022. Available at: https://blogs.otago.ac.nz/pubhealthexpert/public-health-solutions-series-public-policy-options-to-address-alcohol-related-harm-in-aotearoa/.
16. Cunningham R. Public Health Solutions Series: Mental health services can't solve a mental health crisis: public mental health priorities in Aotearoa. Public Health Expert blog. 2022. https://blogs.otago.ac.nz/pubhealthexpert/public-health-solutions-series-mental-health-services-cant-solve-a-mental-health-crisis-public-mental-health-priorities-in-aotearoa/.
17. D'Souza A, Turner N. Public Health Solutions Series: Good health in childhood is vital for lifelong wellbeing: time for a preventive approach. Public Health Expert blog. 2022. Available at: https://blogs.otago.ac.nz/pubhealthexpert/

IN THE ENVIRONMENT COURT OF NEW ZEALAND
WELLINGTON REGISTRY

I MUA I TE KŌTI TAIAO O AOTEAROA
TE WHANGANUI-Ā-TARA ROHE

ENV-2021-WLG-000039

Under	**The Resource Management Act 1991**
In the matter of	the direct referral of applications for resource consents and notices of requirement under sections 87G and 198E of the Act for the RiverLink Project
By	NEW ZEALAND TRANSPORT AGENCY WELLINGTON REGIONAL COUNCIL HUTT CITY COUNCIL KIWIRAIL HOLDINGS LIMITED **Applicants**

STATEMENT OF EVIDENCE OF CAROLINE SHAW

11 March 2022

Counsel: Tom Bennion
Bennion Law
Barristers and Solicitors
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1. My full name is Caroline Victoria Shaw.
2. I am an epidemiologist and public health medicine specialist. I hold the position of Associate Professor in the Department of Public Health, University of Otago Wellington.
3. I have the following qualifications and experience:
    a. I hold a Medical degree (MBChB) awarded by the University of Otago in 1998.
    b. I hold a Master of Public Health (MPH) awarded by the University of Otago in 2005.
    c. I hold a PhD awarded by the University of Otago in 2016. The topic of my thesis was the health co-benefits of decarbonising the transport sector.
    d. I am vocationally registered with the Medical Council of New Zealand and am a Fellow of the NZ College of Public Health Medicine, having completed vocational training in Public Health Medicine in 2007.
    e. I currently work primarily as an epidemiologist and my area of research is transport. This research is within the broad theme of decarbonising the transport sector with a particular focus on mode shift and the health and equity impacts of transport policy. I have previously worked in health policy and service delivery.
    f. I am lead investigator on a $1.2m research grant from the Health Research Council which is examining different approaches to decarbonising the transport system and comparing economic, health, environmental and equity outcomes of these approaches. As part of this project I have undertaken an extensive literature review on the evidence of effectiveness of different policy tools that aim to reduce transport carbon emissions and promote mode shift.
    g. I have over 60 research publications. These include papers on transport equity, evaluations of transport interventions in NZ, the health impacts of transport, and low-carbon mobility.
4. I confirm that I have read the Code of Conduct for expert witnesses contained in the Environment Court Practice Note 2014. My evidence has been prepared in compliance with that

Code. In particular, unless I state otherwise, this evidence is within my area of expertise and I have not omitted to consider material facts known to me that might alter or detract from the opinions I express.

5. In preparing this statement I have read the following documents:
    a. Riverlink Technical Assessment #9, Traffic Impacts and Transport Integration Assessment
    b. Statement of evidence of Mr Duncan Tindall
    c. Statement of evidence of Mr Barry Fryer
    d. Statement of evidence of Mr Simon Kennett
    e. Statement of evidence of Ms Harriet Fraser
    f. Hutt City Cycling and Micromobility SSBC
    g. Ngā Ūranga ki Pito-One Shared Path Project: Shared path demand and design assessment
    h. Evidence of Mr David Norman.
6. In preparing this statement I have also drawn on research literature (some of which is referenced), policy documents and knowledge from previous and current research projects.

Summary

7. There are ongoing significant changes in the direction of transport policy in New Zealand to address the Climate Change Response Act and a wider range of social, environmental and economic outcomes to which transport contributes. Alongside electrification, there is a focus on mode shift and significant VKT reduction as important tools in a transition to a low-carbon urban transport system. The evidence provided by the applicants claims significant mode shift towards public and active modes will result from this project. However, this is mostly unquantified, and I consider different components of the Riverlink project are in conflict in this regard.

8. International and local evidence strongly suggests there is potential for substantial mode shift towards cycling in the Hutt Valley. This is most likely to be achieved if the Riverlink cycling components are considered part of a much larger high-quality network throughout the Hutt Valley. A key component of a high-quality network is cycling facilities separated from vehicles and pedestrians. I provide evidence for how separated cycling facilities are particularly important to increase cycling amongst women and make evidence-based recommendations to increase the likelihood that cycling infrastructure in the Riverlink project can support mode shift.

Scope of Evidence

9. I have been asked to provide evidence on:
    a. Discuss evidence-based approaches to mode shift and how RiverlInk fits with these approaches.
    b. Discuss the most effective ways to increase cycling and mode shift to cycling particularly in groups that do not currently cycle.
    c. Make evidence-based recommendations about any improvements to the design of the cycling infrastructure.
10. This evidence statement covers:
    a. The changing policy environment
    b. My view on mode shift in the Riverlink project
    c. Cycling infrastructure and mode shift potential
    d. Features of cycling infrastructure that support uptake of cycling
    e. What the evidence suggests would make the proposed active transport infrastructure fit for purpose.

Policy environment

11. There has been a marked shift in the focus of transport policy in the last four to five years. This is underpinned by the Climate Change Response (Zero Carbon) Act 2019, and is reflected in the Transport Outcomes Framework,[1] the Government Policy Statement on Transport,[2] *Ināia tonu nei: a low emissions future for Aotearoa* (the final report of the Climate Commission)[3], *Hīkina te Kohupara – Kia mauri ora ai te iwi, Transport Emissions: Pathways to Net Zero* from the Ministry of Transport[4] as well as regional documents such as the Regional Land Transport plan[5] and the inaugural Regional mode shift plan for Wellington.[6]

12. These documents outline the need to significantly reduce the environmental impacts of transport and focus on a more representative and diverse set of transport outcomes including inclusive access and healthy and safe people.

13. While the Government Emissions Reduction Plan has not yet been published (due May 2022), the transport pathway has been clearly signalled in *Hīkina te Kohupara – Kia mauri ora ai te iwi, Transport Emissions: Pathways to Net Zero*. Vehicle kilometres travelled (VKT) reductions in the light fleet are a part of **all** pathways modelled of how the transport system reaches net zero by 2050. The Minister of Transport (Hon. Michael Wood) reaffirmed a commitment to reducing light vehicle VKT by 20% at a conference on decarbonising transport on 1 March 2022. Of note, reductions in VKT are in addition to the savings in GHG emissions estimated for electrification of the light vehicle fleet.

14. VKT reduction on this scale is unprecedented and requires transformation of our entire approach to the transport system. It will be achieved through two complementary approaches: a reduction in the number of car trips taken **and** a shift in mode of some trips towards low-carbon transport options.[4] All transport system policy and projects will need to be aligned to this goal to achieve it.

15. While the genesis of the Riverlink project predates this shift in policy, it is relevant to how different components are considered.

Mode shift in Riverlink

16. Mr Duncan Tindall attests in both the Riverlink Technical Assessment #9, Traffic Impacts and Transport Integration Assessment and his evidence statement that this project will generate mode shift towards active and public transport modes. (For example, see Evidence of Mr Tindall (Traffic Impacts and Transport Integration), para 9(a)).

17. International and local research shows that successful mode shift towards low-carbon modes (walking, cycling and public transport) requires both 'sticks' and 'carrots'. The 'stick' is to make the mode that you are moving from (private vehicles) more difficult/unattractive, while the 'carrot' simultaneously making the modes you are trying to move people to (walking, cycling and public transport) much easier. This is done most effectively by using a combination of legal, fiscal, infrastructure and soft/encouragement policies on both sides of the 'stick' and 'carrot' equation.[7,8]

18. Individual projects, such as Riverlink, are integral to delivering mode shift. These individual projects embed both 'carrots' and 'sticks' within the infrastructure design and implementation. For example, infrastructure design can both deliberately prioritise the convenience and experience of walkers and cyclists over cars while also making driving less attractive by using the design to reduce vehicle speed and limit access to specific areas.

19. In my view the different transport components of the Riverlink project are in conflict as to whether they encourage mode shift. It is not possible to be confident that Riverlink will create *net* mode shift towards active and public transport. I do not agree with Mr Tindall in his that this project will have "significant positive effect on the mode share, as considered in terms of the

reduced reliance on motorised vehicles for travel." (Riverlink Technical Assessment #9, Traffic Impacts and Transport Integration Assessment, section 6.1, page 37) The following paragraphs outline my reasons for this opinion.

20. **Traffic impacts:** The new road bridge and grade-separated interchanges are forecast to reduce journey times for cars both in the Hutt urban area and along SH2 by 1-5.5 minutes depending on location and time of day (Riverlink Technical Assessment #9, Traffic Impacts and Transport Integration Assessment, para 234). Improvements in journey time are counter to mode shift in two ways. Firstly, redesigning infrastructure to make car journeys easier and more efficient disincentivizes mode shift away from cars (i.e. it does not act as a 'stick' in the mode shift policy framework outlined above). Secondly, this increased efficiency may in fact increase car trips through the concept of induced demand, in which additional car journeys are taken as a result of the improvements that would not have been taken otherwise. I was unable to locate an assessment of induced demand as part of the Riverlink Technical Assessment #9, Traffic Impacts and Transport Integration Assessment (although it is mentioned in paragraph 57 (ii) as an issue that must be considered). However, a recent review confirms the importance of induced demand, and that it is likely to be greater in projects that are in urban areas and along highly congested routes.[9] Any induced trips are likely to be substituted from a mix of other modes (including active and PT) and new trips.

21. **Cycling and walking infrastructure**: There are different sources of estimates of mode change for cycling in the materials. Mr Kennett's evidence suggests that by 2050 an additional 70 cycling and 24 walking trips will occur on the true left of the river (peak hour). This is based on counter data of current trips with an assumed increase. Use on the true right of the river in 2050 is predicted to be higher, up to 250 cyclists and 50 walkers in the peak period. The true right estimates are predominantly based on assumptions around the presumed flow of commuter cyclists to and from Te Ara Tupua, which in turn were estimated in the Ngā Ūranga ki Pito-One

Shared Path Project: Shared path demand and design assessment. No estimates are provided in his evidence of what modes these trips are substituting; although evidence suggests that around 50% of ebike trips come from cars.[10,11] (we have good evidence of mode substitution from ebikes as they are a new technology so well studied). The final CIPA spreadsheet (provided by applicants) uses slightly different numbers, based on section 7.3 of the SH2 Melling Interchange Transport Assessment, Flow Transportation Specialists. This assumes an extra 300 walking and cycling trips per day in Melling interchange. Of these 300 trips, 150 of these trips are assumed to be non-recreational (thus relevant to mode shift). About 50% of these (i.e. 75 walking or cycling trips) are assumed to come from private vehicles. The cycling and walking infrastructure, as proposed currently, is not of a quality that evidence suggests has the best chance of maximizing mode shift (see below).

22. **Carparking:** The removal of 598 public carparks (711 when private parks are included) and proposed parking management (assuming this includes pricing) may encourage mode shift in trips to the Hutt City urban precinct. Removing parking and parking pricing can be effective tools to discourage cars and promote mode shift to other modes.[12,13] I note that carpark removal is seen as a key adverse effect of the project needing to be mitigated (Riverlink Technical Assessment #9, Traffic Impacts and Transport Integration Assessment page 88). In any case an assessment of how much parking changes might impact mode shift has not been undertaken.

23. **Public transport improvements:** The project includes improvements to bus reliability (with modest time impacts on services), easier walking and cycling access to the Melling train station from the Hutt urban precinct, a more pleasant station environment for rail users, and better integration of modes at the station. In the Single Stage Business Case (section 11.1) these improvements were assumed to result in an increase of 226 trips at peak times (a 30% increase). No assumptions around where these trips are coming from was available. (Other evidence suggests that around half of new PT trips may come from cars with the remainder from walking

and cycling,[13] although it is probably context specific). A previous review of international evidence noted that the evidence around the impact of service quality on PT demand was limited in comparison to the well-established evidence for PT pricing and service level on demand. [14,15] There are no plans for expansion of train or bus services, nor any mention of changes in pricing (evidence of Mr Barry Fryer).

24. Other policies and projects that both align and lie outside, the direct Riverlink scope may create mode shift (for example, in Mr Tindall's evidence in paragraph 187 he refers to the impact of Lower Hutt central city growth on mode shift). However, any impact from these policy and projects will depend on whether they are implemented and, if so, how well. These elements include:

    a. The **Central City Transformation Plan,** which includes a proposal for "high-quality medium-rise apartments" in the revitalised urban precinct (changes to the District Plan and NPSUD are also relevant to this). There is good evidence that built environment interventions that promote density and mixed land use increase walking, cycling and public transport use in the long term (i.e. 10-30 years) in residents of that area.[16-18] When taken out to 2047 the number of people this may apply to ranges from 2,600-7,300 (evidence of Mr David Norman paragraph 41). Hutt City had a population of 108,600 in 2018 and is forecast to grow to 122,300 in 2048 under the Statistics New Zealand medium projection.[*] Thus, assuming the density and mixed land use changes are successfully delivered, higher levels of active and public transport use will apply to between 2-6% of the 2048 Hutt population. I was unable to find any estimates of the level of mode shift to active and public transport use for these residents in the documentation.

[*] https://figure.nz/chart/CLaMLJ4sqPsSQMCU-WIsfdeuDKlKI8LWr

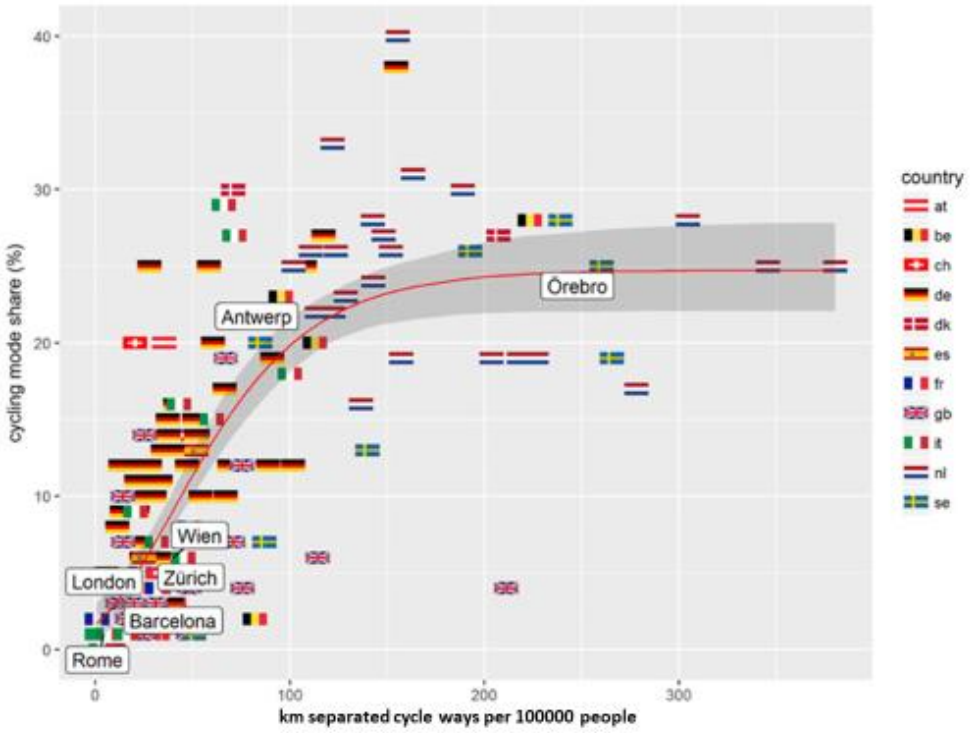
b. The options for an expanded cycling network in the **Hutt City Cycling and Micromobility SSBC**. Depending on the location, extent and quality of infrastructure this will potentially create mode shift towards cycling (see below) in the entire Hutt Valley.

25. In summary, while I could find some quantitative estimates of change in mode for some of the components, I was unable to find any estimates of net mode shift for the entire project. Moreover, the different components of this project are not all aligned in a way that would guarantee net mode shift.
26. Finally, the Regional Land Transport Plan articulates a vision for a 40% increase in cycling, walking and public transport by 2030, equivalent to a 39% mode share for these modes.[5] (Accounting for population growth a 50% increase in active and public transport is actually needed). Currently Hutt City sits at 26% active and public transport mode for trips to work.[6] Trips to work comprise only around 20% of all trips,[19] and the mode distribution of the remaining 80% of trips is much more car dominated than commuting trips.[20] Even if Riverlink does generate net mode shift, any shift is likely to be small and certainly not at the scale needed to deliver on the Regional Land Transport Plan goal in 8 years.

Cycling infrastructure and mode shift potential

27. There is an increasing body of international (and some local) evidence around the change in overall mode share of cycling when substantial investment in a comprehensive cycling network occurs. This evidence is based on real-world observations of infrastructure and cycling uptake.
28. One useful example is in the figure below, which graphs the association between cycling mode share as a percent of trips and cycling infrastructure (km of *separated* urban cycleways per 100,000 people) across 167 cities of varying sizes in Europe and the UK.[21] There is a clear association between an increasing amount of high-quality infrastructure and an increased mode

share of cycling. As a point of comparison for the figure Christchurch has the highest mode share for cycling in NZ of around 4% of all trips,[20] however these findings are generalisable to NZ.[22]



Source: Mueller N, et al. Health impact assessment of cycling network expansions in European cities. Preventive Medicine. 2018;109:62-70

29. This figure illustrates a key point about the Riverlink cycling infrastructure: on its own it would not deliver a large mode change; but, as part of a larger high-quality network, which includes Te Ara Tupua and the proposed urban cycling infrastructure in Hutt City, very significant mode shift towards cycling can occur.
30. Hence the quality and design specifications should support a mode share that is considerably above the demand that current models might predict would be created by individual components. Quality and design specifications should support the anticipated mode share for a network.
31. Hutt City cycling mode share is currently 1.6% for trips to work and school only. For other trips the rate of cycling is likely to be even lower.[20] This is despite many parts of the Hutt being flat and for those who work and live in Hutt City (around half of workers) trip lengths are very

suitable for cycling. There is also large capacity for other utility cycling (to the shops, taking children to activities etc) that is currently done by private vehicle. The Hutt City Cycling and Micromobility SSBC outlines an ambition to increase this mode share to 5% by 2028. To successfully achieve this will require a substantial increase in the km of separated urban cycling infrastructure in Hutt City, of which the Riverlink cycling infrastructure would be an important component.

Features of cycling infrastructure that support uptake of cycling

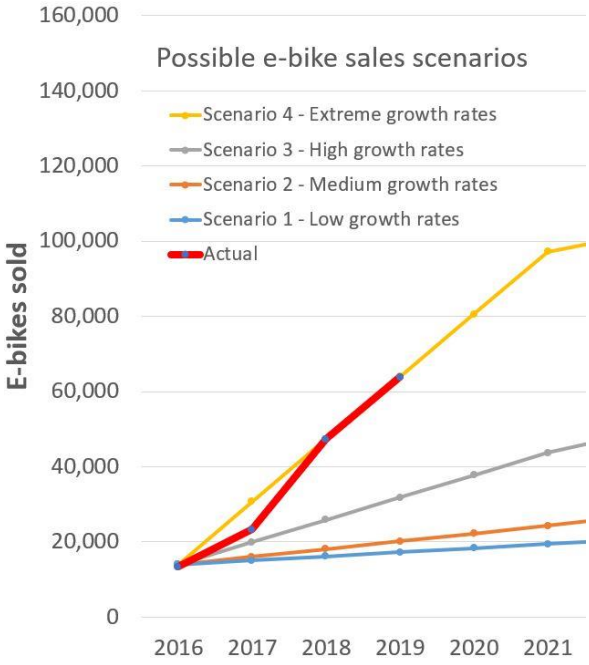
32. The quality and design of cycling infrastructure is key to encouraging new people into cycling. A survey of New Zealanders undertaken for a Waka Kotahi Research report in 2011 showed that people in NZ place the highest preference on separated cycle paths, i.e. not shared with anyone except other cyclists.[23]
33. We also know that some groups of people are more sensitive to design than others, which is relevant to providing inclusive access to better transport options (which are an outcome and strategic priority respectively of the current GPS[2]). Specifically, it has been consistently shown that women prefer separated infrastructure over other cycling infrastructure:
    a. An international review of 54 studies shows women have stronger preferences for separated cycleways than men. Both genders prefer separated cycleways compared to any other situation, including on-road cycling or shared paths with pedestrians, but women preferred them more strongly.[24]
    b. Evidence from Christchurch demonstrates that their ongoing programme of building a network of predominately separated cycleways has increased the proportion of women who cycle. In the central city the overall number of cyclists in the morning peak period has doubled between 2016 and 2021. In this same time period and location, the proportion of cyclists who are women increased from 32% to 46%. (These data were

provided by Christchurch City Council). Other interventions in NZ that have relied less on segregated infrastructure have not seen the same increase in female cycling.[25]

c. Women who participated in research in the Hutt Valley in 2019 that I was involved in also noted that to improve women's cycling there was a need for separated, continuous cycle lanes that "get you to the places that you can go in a car". The three focus groups of wāhine Māori in this research also highlighted that for Māori (who have some of the lowest rates of cycling) wide cycle lanes that support travel with whānau are desirable.[19]

34. Women have a double safety burden when it comes to active modes. They are not only impacted by concerns about safety from interacting with cars as cyclists and pedestrians, but also personal safety.[19] This means design that promotes women's personal safety with adequate lighting, and placement of infrastructure in areas with other people (as much as possible) are also likely to result in better uptake by women.

35. Ebikes provide a further reason to provide fully separated cycleways in the Riverlink project. Ebike sales are growing quickly (see below). Policy to promote and subsidise ebike purchase has started (with the Public Sector ebike scheme[26]) and is likely to expand, meaning ebikes will become a larger component of the bike fleet. Ebikes are used more often by their owners, ridden further and are significantly heavier than regular bikes.[26] People riding ebikes on shared paths travel, on average, faster than regular bikes,[27] although increasing numbers of pedestrians slows down average cyclist speed. This means that the chances of collision between walkers and people on ebikes on shared paths may be higher and the consequences of a collision more severe, particularly for children and the elderly.



Source: https://viastrada.nz/e-bike-sales NB: Up to 40% of these may be e-scooters as customs does not distinguish between them for reporting purposes.

36. Finally, it is worth noting that recent NZ Pedestrian Network Guidance suggests that shared paths have a very limited role in good walking and cycling infrastructure (see Mr Koorey's statement for further detail). Moreover in the UK their national strategy aiming to radically increase walking and cycling has stated that shared paths for cyclists and pedestrians in urban areas will no longer be funded as they are not considered adequate to deliver on the strategy.[28]

Recommendations for changes to proposed cycling infrastructure

37. This final section describes what the evidence indicates would make it more likely that the Riverview cycle infrastructure would be an effective component of an overall cycling network. These recommendations also have implications for the walking infrastructure.
38. The **replacement of shared paths in the design with separated cycling and walking paths**. For example:

a. On both the Melling Interchange and Melling River bridges connecting to SH2 and Harborview to the city

b. On the true right bank of the river: replacing the shared paths with separated facilities, particularly from the pedestrian/cyclist bridge leading south, which is important for people coming from Alicetown up to the city as there are currently no specific facilities for cyclists across the Ewen Bridge.

c. On the true left bank of the river: replacing shared paths north of the new pedestrian/cyclist bridge with separate walking and cycling facilities. The two shared slow zones predominately south of the new pedestrian/cyclist bridge should have one option with separate cycling and walking facilities. This is a key connection from the north down to schools (such as Hutt Valley High school) and employment at Gracefield.

39. **Providing good lighting** in all areas, especially slightly more remote locations such as on the west side of the river near Kennedy Good bridge.

40. A **clearly specified plan for plentiful, high-quality bike parking at Melling Station**. While the Riverlink Technical Assessment #9, Traffic Impacts and Transport Integration Assessment specifies a clear location and size for the park and ride for cars, little detail is provided on the amount or quality of bike parking.

41. In summary, these changes will maximise the ability of the Riverlink cycling infrastructure to deliver substantial mode shift as part of a wider network because:

    a. Separated cycleways are:

        i. Preferred by New Zealanders over any other kind of cycling infrastructure

        ii. They are likely to result in high mode share as part of a larger network

        iii. Show greater uptake in groups that currently have low levels of cycling (e.g. women)

        iv. Safer for both cyclists and walkers

v. Aligned with current pedestrian guidance, international practice, GPS outcomes and strategic priority of inclusive access and better transport options.[2]

b. Ensuring good lighting is important for the personal safety of women who cycle.[19]

c. International evidence reviews show that well-located, plentiful and high-quality bike parking at public transport stops increases mode share of both cycling and public transport.[29]

Dr Caroline Shaw

11 March 2022

References

1. Ministry of Transport. *A framework for shaping our transport system: Transport outcomes and mode neutrality.* Wellington: Ministry of Transport 2018.
2. Ministry of Transport. *Government Policy Statement on Land Transport 2021/22-30/31* Wellington: Ministry of Transport;2021.
3. He Pou a Rangi/Climate Change Commission. *Ināia tonu nei: a low emissions future for Aotearoa.* Wellington Climate Change Commission;2021.
4. Ministry of Transport. *Hīkina te Kohupara – Kia mauri ora ai te iwi. Transport Emissions: Pathways to Net Zero by 2050.* Wellington Ministry of Transport 2021.
5. Greater Wellington. *Wellington Regional Land Transport Plan 2021.* Wellington: Greater Wellington 2021.
6. Waka Kotahi NZ Transport Agency. *Regional Mode Shift Plan Wellington: Focusing our regional effort on mode shift.* Wellington Waka Kotahi NZ Transport Agency;2020.
7. Santos G, Behrendt H, Maconi L, Shirvani T, Teytelboym A. Part I: Externalities and economic policies in road transport. *Research in Transportation Economics.* 2010;28(1):2-45.
8. Santos G, Behrendt H, Teytelboym A. Part II: Policy instruments for sustainable road transport. *Research in Transportation Economics.* 2010;28(1):46-91.
9. WSP. *Latest evidence on induced travel demand: An evidence review.* Manchester Department for Transport 2018.
10. Bigazzi A, Wong K. Electric bicycle mode substitution for driving, public transit, conventional cycling, and walking. *Transportation Research Part D: Transport and Environment.* 2020;85:102412.
11. Cairns S, Behrendt F, Raffo D, Beaumont C, Kiefer C. Electrically-assisted bikes: Potential impacts on travel behaviour. *Transportation Research Part A: Policy and Practice.* 2017;103:327-342.
12. Litman T. *Understanding Transport Demands and Elasticities: How Prices and Other Factors Affect Travel Behavior.* Victoria, B.C.: Victoria Transport Policy Institute 2021.
13. International Transport Forum/OECD. Transport Climate Action Directory International Transport Forum/OECD. https://www.itf-oecd.org/transport-climate-action-directory-measures. Published 2021. Accessed.
14. Paulley N, Balcombe R, Mackett R, et al. The demand for public transport: The effects of fares, quality of service, income and car ownership. *Transport Policy.* 2006;13(4):295-306.
15. Litman T. *Transit Price Elasticities and Cross-Elasticities 5 November 2021.* Victoria, B.C.: Victoria Transport Policy Institute 2021.
16. Yang Y, Wu X, Zhou P, Gou Z, Lu Y. Towards a cycling-friendly city: An updated review of the associations between built environment and cycling behaviors (2007–2017). *J Transp Health.* 2019;14:100613.
17. Aston L, Currie G, Delbosc A, Kamruzzaman M, Teller D. Exploring built environment impacts on transit use – an updated meta-analysis. *Transport Reviews.* 2021;41(1):73-96.
18. Ewing R, Cervero R. Travel and the Built Environment. *Journal of the American Planning Association.* 2010;76(3):265-294.
19. Russell M, Davies C, Wild K, Shaw C. Pedalling towards equity: Exploring women's cycling in a New Zealand city. *Journal of Transport Geography.* 2021;91:102987.
20. Shaw C, Russell M, van Sparrentak K, Merrett A, Clegg H. *Benchmarking cycling and walking in six New Zealand cities: Pilot study 2015.* Wellington: New Zealand Centre for Sustainable Cities;2016.
21. Mueller N, Rojas-Rueda D, Salmon M, et al. Health impact assessment of cycling network expansions in European cities. *Preventive Medicine.* 2018;109:62-70.
22. Shaw C, Mizdrak A, Gage R. More than 147km – the transformative potential of the Wellington bike network plan. In: Cleghorn C, ed. *Public Health Expert.* Vol 2022. University of Otago Wellington University of Otago; 2021.

23. NZ Transport Agency. *Assessment of the type of cycling infrastructure required to attract new cyclists.* Wellington NZ Transport Agency 2011.
24. Aldred R, Elliott B, Woodcock J, Goodman A. Cycling provision separated from motor traffic: a systematic review exploring whether stated preferences vary by gender and age. *Transport Reviews.* 2017;37(1):29-55.
25. Keall M, Chapman R, Howden-Chapman P, Witten K, Abrahamse W, Woodward A. Increasing active travel: results of a quasi-experimental study of an intervention to encourage walking and cycling. *J Epidemiol Community Health.* 2015;69(12):1184-1190.
26. Blewden M, Hawley G., Raja A, Thorne R, Mackie H. *Impacts of a public sector e-bike scheme: Final evaluation report.* Wellington Waka Kotahi NZ Transport Agency 2021.
27. Eriksson J, Forsman Å, Niska A, Gustafsson S, Sörensen G. An analysis of cyclists' speed at combined pedestrian and cycle paths. *Traffic Injury Prevention.* 2019;20(sup3):56-61.
28. Department for Transport. *Gear change: a bold vision for cycling and walking.* London Department for Transport 2020.
29. Heinen E, Buehler R. Bicycle parking: a systematic review of scientific literature on parking behaviour, parking preferences, and their influence on cycling and travel behaviour. *Transport Reviews.* 2019;39(5):630-656.

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Health impact assessment of cycling network expansions in European cities

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ABSTRACT

We conducted a health impact assessment (HIA) of cycling network expansions in seven European cities. We modeled the association between cycling network length and cycling mode share and estimated health impacts of the expansion of cycling networks. First, we performed a non-linear least square regression to assess the relationship between cycling network length and cycling mode share for 167 European cities. Second, we conducted a quantitative HIA for the seven cities of different scenarios (S) assessing how an expansion of the cycling network [i.e. 10% (S1); 50% (S2); 100% (S3), and all-streets (S4)] would lead to an increase in cycling mode share and estimated mortality impacts thereof. We quantified mortality impacts for changes in physical activity, air pollution and traffic incidents. Third, we conducted a cost–benefit analysis. The cycling network length was associated with a cycling mode share of up to 24.7% in European cities. The all-streets scenario (S4) produced greatest benefits through increases in cycling for London with 1,210 premature deaths (95% CI: 447–1,972) avoidable annually, followed by Rome (433; 95% CI: 170–695), Barcelona (248; 95% CI: 86–410), Vienna (146; 95% CI: 40–252), Zurich (58; 95% CI: 16–100) and Antwerp (7; 95% CI: 3–11). The largest cost–benefit ratios were found for the 10% increase in cycling networks (S1). If all 167 European cities achieved a cycling mode share of 24.7% over 10,000 premature deaths could be avoided annually. In European cities, expansions of cycling networks were associated with increases in cycling and estimated to provide health and economic benefits.

1. Introduction

There is increasing awareness of the adverse effects of the car-centric urban mobility plans of previous decades (Nieuwenhuijsen and Khreis, 2016). Concerns relate to contemporary sedentarism, ecological issues of air and noise pollution, greenhouse gas emissions and the loss of natural outdoor environments, but also to economic issues of space scarcity, congestion costs and financing infrastructure (Khreis et al., 2016; Marqués et al., 2015). Promoting a mode shift to cycling for transport has been proposed as a promising strategy in urban environments to overcome these issues (Mueller et al., 2015). Cycling can increase total physical activity (PA) levels (Foley et al., 2015; Goodman

Abbreviations: CI, confidence interval; EPOMM, European Platform on Mobility Management; ERF, exposure response function; GADM, Database of Global Administrative Areas; HIA, health impact assessment; MET, metabolic equivalent of task; OSM, OpenStreetMap; PA, physical activity; PAF, population attributable fraction; PASTA, Physical Activity through Sustainable Transport Approaches; $PM_{2.5}$, particulate matter with a diameter of $\leq 2.5\ \mu g/m^3$; RR, relative risk; S, scenario; SD, standard deviation; TEMS, European Platform on Mobility Management Modal Split Tool; VoSL, value of statistical life

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et al., 2014; Sahlqvist et al., 2013), and is a non-emitting mode of transport. However, to facilitate a shift to cycling, well-designed and safe infrastructure is needed (Mertens et al., 2016a; Pucher et al., 2010).

Recent research evidence indicates positive associations between cycling network length and cycling mode share (i.e. percentage of all trips done cycling) (Buehler and Dill, 2016; Habib et al., 2014; Marqués et al., 2015; Schoner and Levinson, 2014; Schoner et al., 2015). In fact, designated cycling infrastructure is a crucial factor for preferring cycling for transport (de Geus et al., 2008; Heesch et al., 2015; Mertens et al., 2016a, 2016b). By protecting against motor traffic, designated cycling infrastructure is especially important for attracting new cyclists (Mertens et al., 2016b; Sallis et al., 2013). Thus, expansions of designated cycling networks may be a strategy to increase cycling for transport, which in return may contribute to improvements in public health.

Until now, however, the exposure response relationship between cycling network and cycling mode share in European cities is unknown. Therefore, we assessed (1) the association between cycling network length (km) and cycling mode share (%) and (2) how an increase in cycling mode share might alter expected mortality in terms of changes in PA, air pollution and traffic incidents. We also estimated the cost–benefit trade-off between cycling network expansions and monetized health benefits.

2. Methods

2.1. Association between cycling network and cycling mode share

2.1.1. Non-linear least square regression

Data preparations steps and coding are documented in a public GitHub repository (Salmon and Mueller, 2017). We obtained data on population size, cycling mode share and cycling network length for 167 cities located in 11 European countries (4 Austria, 7 Belgium, 2 Denmark, 20 France, 47 Germany, 15 Italy, 23 Netherlands, 14 Spain, 9 Sweden, 2 Switzerland, 24 United Kingdom) (Table S.1). Among the 167 cities were the seven case study cities of the Physical Activity through Sustainable Transport Approaches (PASTA) project (i.e. Antwerp, Barcelona, London, Rome, Örebro, Vienna, Zurich) (Fig. 1) (Gerike et al., 2016). The other 160 cities were chosen based on (1) their geographic representativeness of Northern, Central and Southern Europe, (2) population size ≥ 100,000 persons, (3) the availability of mode share data not being older than 2006 and (4) the availability of spatial boundaries.

Data on mode share and population size were obtained through the European Platform on Mobility Management (EPOMM) Modal Split Tool (TEMS) (EPOMM, 2011). Spatial administrative municipality boundaries were obtained from the Database of Global Administrative Areas (GADM) (Hijmans, 2009), the UK data service (Office for National Statistics, 2011), and the Swedish lantmäteriet (Swedish Ministry of Enterprise and Innovation, 2016). We used OpenStreetMap (OSM) to compute cycling network lengths for all 167 cities (Table 1) using labels of designated, non-shared cycling ways (Table S.2) (OpenStreetMap contributors, 2017). We also computed the street network length (km) for the PASTA cities. Analyses were conducted in R (version 3.1.1) (Table S.3) and Microsoft Excel.

We standardized the computed cycling network length of the 167 cities by population size. We used 'cycling network km/100,000 persons' as the explanatory variable and performed a non-linear least square regression (i.e. Gompertz growth model) to calculate the corresponding cycling mode share (%) with $y(t) = ae^{-be^{-ct}}$, where a is the asymptote (i.e. maximal cycling mode share associated with cycling network), b sets the displacement along the x-axis and c sets the displacement along the y-axis (i.e. growth rate), t is the cycling network km/100,000 persons. We assumed that the explanatory properties of cycling network being associated with cycling mode share are non-linear (i.e. city-specific sensitivity to cycling network expansions in the process of becoming cycle-friendly and users starting to appreciate the increased connectivity) and limited (i.e. covariate dependence). We added bootstrap confidence intervals (CIs) based on the empirical 0.025-quantile and 0.975-quantile of the distribution resulting from 1,000 bootstrap samples.

2.2. Health impact assessment

We performed a health impact assessment (HIA) for the PASTA cities to estimate how an increase in cycling might impact public health. Baseline transport, demographic and mortality data were available on city level (i.e. total population) through the PASTA project (Table 1, Tables S.4–S.14) (Dons et al., 2015; Gerike et al., 2016).

2.2.1. Scenarios

Across different scenarios (S), we assessed how the cycling mode share might change with an increase in the cycling network length by 10% (S1); 50% (S2); 100% (S3); and if all streets (km/100,000 persons) of the city provided designated cycling infrastructure (S4 – all-streets).

2.2.2. Health impact assessment model

The new cycling trips were assumed to be shifted from previous car (25%) and public transport (75%) trips (Rojas-Rueda et al., 2016), to have a distance of 5 km and being traveled at a speed of 13 km/h [we considered this distance not exceeding the willingness to cycle at a speed requiring a light effort (Ainsworth et al., 2011; Rabl and de Nazelle, 2012)]. The walking share was assumed to stay constant. We estimated the impact on all-cause mortality due to changes in PA, air pollution exposure for the cyclist and the risk for fatal traffic incidents. Baseline data on all-cause mortality, PA and air pollution levels as well as traffic fatalities were collected for all seven cities (Tables S.4–S.14). 95% CIs for the overall impact were based on the pooled standard deviation (SD) of PA, air pollution and fatal traffic incidents. We assumed the mortality risk to be normally distributed.

2.2.2.1. Physical activity. Metabolic equivalents of task (METs) were used as a measure of energy expenditure during PA. We calculated the gain in marginal METs for persons substituting car and public transport trips with cycling considering baseline PA levels (Tables S.5–S.11). A public transport trip was assumed to include a 10 min walk to public transport (Rojas-Rueda et al., 2012). We assigned the new bicycle trip 6.8 METs (Ainsworth et al., 2011; WHO. Regional Office for Europe, 2014a), and the 10 min walk to public transport 3.5 METs (Ainsworth et al., 2011).

The association between PA and mortality was quantified using a curvilinear exposure response function (ERF) (Relative Risk (RR) = 0.81; 95% CI: 0.76–0.85 per 11 MET-h/week), applying a 0.25 power transformation (Woodcock et al., 2011). We calculated the RR and the population attributable fraction (PAF) for both baseline PA and gained PA. The estimated preventable deaths for current PA were subtracted from estimated preventable deaths for the additional PA.

2.2.2.2. Air pollution exposure cyclist. Particulate matter (PM) with a diameter of $\leq 2.5\,\mu g/m^3$ ($PM_{2.5}$) is a commonly used proxy for air pollution from motor transport (Table S.12) (Mueller et al., 2015). We considered the altered air pollution exposure for persons shifting from car or public transport (including a 10 min walk) to cycling. $PM_{2.5}$ concentration to which car drivers, public transport users, pedestrians and cyclists are exposed to were set 2.5, 1.9, 1.9 and 2.0 times higher,

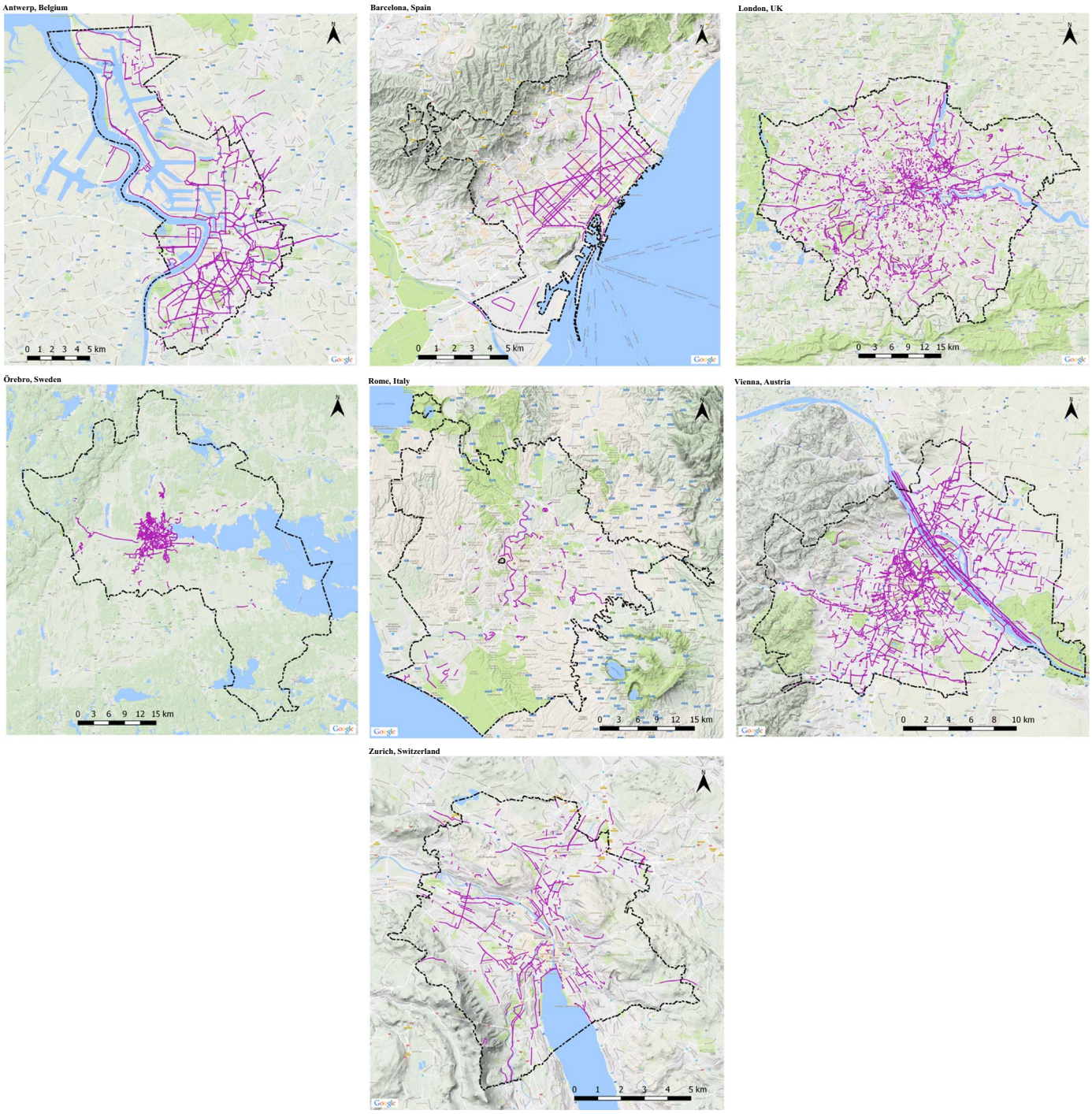

Fig. 1. Cycling networks of the seven PASTA cities. Maps were produced with QGIS (version 2.18) using Google maps and OSM data.

respectively, than background concentrations (Table S.13) (de Nazelle et al., 2017). Ventilation rates for different leisure and transport activities were available from previous assessments (Rojas-Rueda et al., 2016, 2012). We calculated the daily inhaled $PM_{2.5}$ dose (μg/m^3/24-h) stratified by activity and the total dose (μg/m^3/24-h) stratified by transport mode. We calculated the equivalent $PM_{2.5}$ dose difference between cycling and motor transport (de Hartog et al., 2010). We used a linear ERF (RR = 1.07; 95% CI: 1.04–1.09 per 10 μg/m^3 $PM_{2.5}$ annual mean) to quantify the association between $PM_{2.5}$ exposure and mortality (WHO. Regional Office for Europe, 2014b). We calculated the corresponding RR and PAF. No societal co-benefits of expected air pollution reductions with a mode shift to cycling were considered.

2.2.2.3. Traffic incidents. Traffic fatalities were estimated based on injury records and distance traveled. For each transport mode the risk for a fatal traffic incident per billion kilometers traveled was estimated using the reported annual average number of fatalities and kilometers traveled (Table S.14). We calculated the RR for a fatal incident for a 5 km cycling trip and compared this risk to a car and public transport

trip (including a 10 min walk) of the same distance.

2.2.2.4. Sensitivity and additional analyses. As sensitivity analyses, we assumed the new cycling trips to be shifted by 75% from car and by 25% from public transport trips (Table S.15). We also applied a safety-in-numbers effect (i.e. a less than proportional increase in traffic incidents with increases in cycling) using the summary coefficient of 0.43 for cycle volume (Elvik and Bjørnskau, 2017) (Table S.16). Finally, we performed a HIA for all 167 cities, supposing achievement of the maximal cycling mode share predicted by our model (i.e. 24.7%). For model inputs, we used the mean of the PASTA city data for transport, exposures and mortality (Tables S.17–S.19).

2.3. Cost–benefit analysis

We estimated economic costs of cycling network expansions and compared them to estimated economic benefits of avoided premature mortality. Following the example of the Netherlands, where cycling infrastructure is commonly well-developed, we assumed that each 1 km of cycling infrastructure would cost € 2 million, which were estimated costs for reconstructing a road with mixed traffic (Schepers et al., 2015). An additional € 4,000 per km/year were considered for maintenance purposes (Schepers et al., 2015). We considered a 5-year buildup of health benefits and a discounting rate of 5% (WHO. Regional Office for Europe, 2014a). We applied a time horizon of 30 years (Schepers et al., 2015), as strategic transport planning typically plans for 20–40 years ahead (Litman, 2014). We monetized health benefits by applying country-specific value of statistical life (VoSL) estimates (i.e.€ 3,202,968 for Spain to € 7,236,492 for Switzerland) (Table S.20) (WHO. Regional Office for Europe, 2014a). No de-congestion or other benefits were monetized.

3. Results

3.1. Association between cycling network distance and cycling mode share

The estimated non-linear association between cycling network size and cycling mode share in 167 European cities is described in Fig. 2. According to our model and dataset, a cycling network of 315 km/100,000 persons was associated with a maximal cycling mode share of 24.7% (99.9% of asymptotic value).

Regarding the PASTA cities, Örebro and Antwerp showed to have the largest standardized cycling network lengths (i.e. 260 and 95 km/100,000 persons, respectively) followed by Vienna, Zurich, London, Barcelona and Rome (Table 1). Likewise, Örebro and Antwerp had the largest cycling mode share at baseline (25% and 23%, respectively) followed by Vienna, Zurich, London, Barcelona and Rome (Table 2). According to our model, the PASTA cities, except Örebro and Antwerp, had great potential to increase their cycling mode share through cycling network expansions, even though growth rates were expected to vary depending on baseline cycling network length and corresponding mode share. Because our model caps the cycling mode share at 24.7%, no increase in cycling was expected for Örebro as at baseline already 25% of all trips were carried out cycling. Also in Antwerp where already

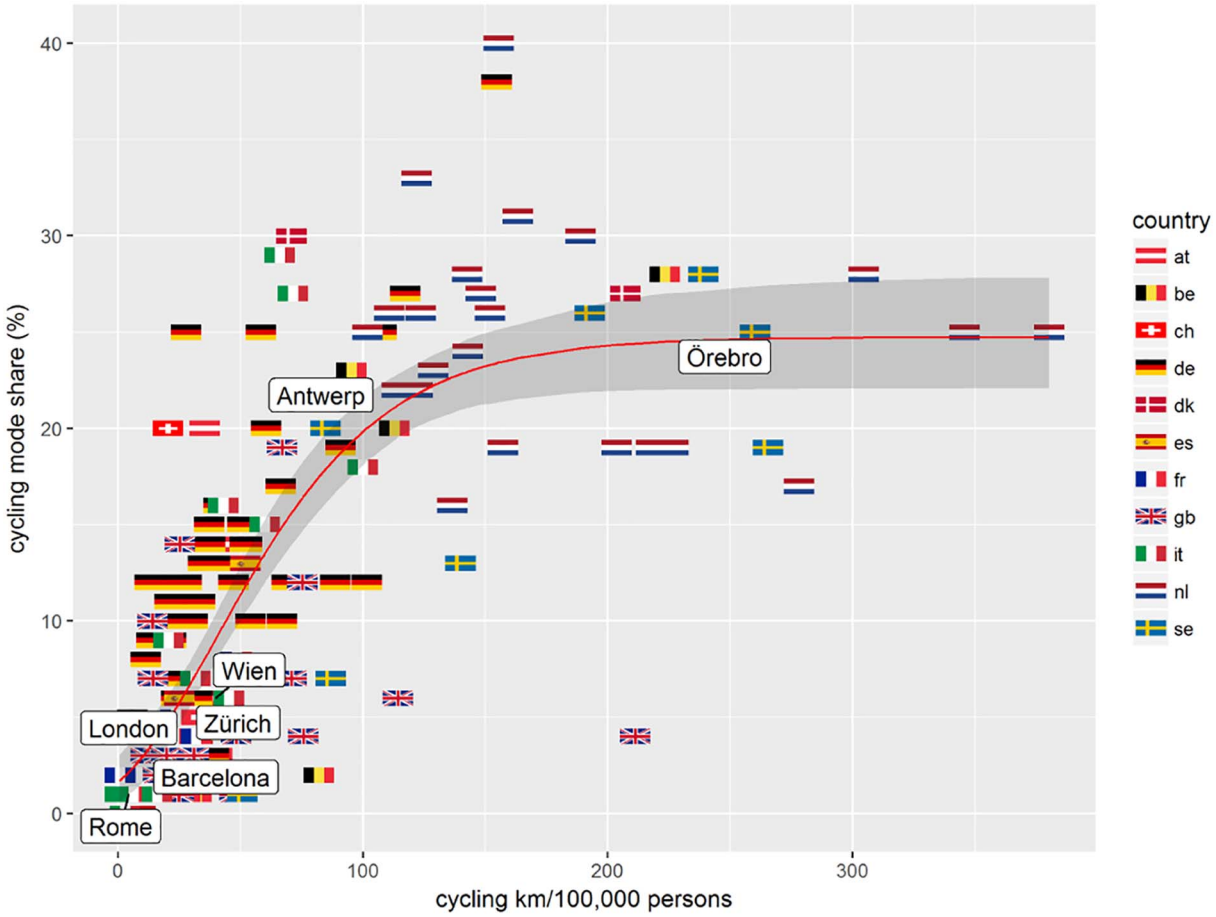

Fig. 2. Association between cycling network length and cycling mode share in European cities. Cycling network length (km) and mode share (%) data were available for 167 European cities. The cycling network length was available through OpenStreetMap (OSM) and the mode share data through the European Platform on Mobility Management (EPOMM). Confidence intervals (CIs) are based on basic bootstrapping and represent the empirical 0.025-quantile (lower CI) and 0.975-quantile (upper CI) of the distribution resulting from 1,000 bootstrap samples.

Table 1
Transport infrastructure of the seven PASTA cities.

City	Country	Cycling network distance		Street network distance	
		Cycling network km (OSM)[a]	km/ 100,000 persons	Street network km (OSM)[a]	km/ 100,000 persons
Antwerp	Belgium	469.17	95.07	1,651.74	334.69
Barcelona	Spain	159.54	9.84	1,554.56	95.90
London	United Kingdom	969.17	11.17	16,439.74	189.54
Örebro	Sweden	361.35	260.05	3,045.27	2,191.60
Rome	Italy	120.64	4.20	8,281.36	288.60
Vienna	Austria	715.63	39.82	3,946.11	219.55
Zurich	Switzerland	118.36	28.84	1,193.59	290.83

[a] OpenStreetMap (OSM) data from 10/02/2017.

23% of all trips were done cycling, the cycling network length would need to be doubled to achieve a 1% increase in cycling mode share (Table 3).

3.2. Estimated health impacts

The PASTA cities were estimated to benefit from an increase in cycling, except for Örebro, and Antwerp benefiting only to a small extent (Table 4). The all-streets scenario (S4) produced the greatest health benefits through increases in cycling for London with 1,210 premature deaths (95% CI: 447–1,972) avoided each year, followed by Rome (433; 95% CI: 170–695), Barcelona (248; 95% CI: 86–410), Vienna (146; 95% CI: 40–252), Zurich (58; 95% CI: 16–100) and Antwerp (7; 95% CI: 3–11).

In standardized terms, and throughout the proportional increases in cycling network length (S1 to S3), Vienna and Zurich reaped most benefits (annually 2 to 6 premature deaths/100,000 persons avoided). In the all-streets (S4) scenario (absolute increase) and in standardized terms, Barcelona, Rome, London and Zurich reaped most benefits (annually 14 or 15 premature deaths/100,000 persons avoided). Already small increases in cycling network length (i.e. S1; 10%) provided substantial health benefits with Vienna benefiting the most in absolute terms with 31 premature deaths (95% CI: 9–54) avoided each year, followed by Rome (21; 95% CI: 8–34), London (18; 95% CI: 7–30), Barcelona (16; 95% CI: 5–26) and Zurich (9; 95% CI: 2–16).

Throughout the scenarios, estimated benefits were due to increases in PA that outweighed estimated detriments of air pollution and traffic incidents. The increase in cycling provided greater risks in terms of air pollution exposure than the expected increase in fatal traffic incidents.

The sensitivity analysis assuming the new cycling trips being shifted by 75% from car and by 25% from public transport trips, showed even greater health benefits (Table S.15). Also the safety-in-numbers effect provided additional benefits (Table S.16). The HIA for all 167 European cities, with a total population of 75.2 million people, achieving a cycling mode share of 24.7% resulted in 10,091 premature deaths (95% CI: 3,401–16,781) avoided annually (Table S.19).

3.3. Estimated cost–benefit impacts

The cost–benefit analysis showed generally positive cost–benefit trade-offs, except for Örebro and Antwerp where no or only small health benefits were expected. The largest cost–benefit ratios were found for the 10% increase in cycling network (S1) (Rome € 70:1; Zurich € 62:1; Barcelona € 35:1 Vienna € 22:1; London € 8:1) due to the non-linearity of the cycling network-cycling mode share ERF (Table S.21).

Table 2
Baseline transport data for the seven PASTA cities.

Demographic and transport data				Mode share data													
				Car			Public transport			Bicycle			Walking					
City	Population	Trips/day	Trips/ person/day	%	Persons/day	Mean distance (km)	Mean time(h)	%	Persons/day	Mean distance (km)	Mean time (h)	%	Persons/day	Mean distance (km)	Mean time (h)	%	Persons/day	Mean distance (km)	Mean time (h)
Antwerp[a]	493,517	1,362,107	2.8	41	202,342	11.81	0.30	16	78,963	9.81	0.57	23	113,509	3.84	0.24	20	98,703	1.31	0.35
Barcelona[b]	1,620,943	4,908,402	3.7	26	344,915	8.77	0.43	40	530,638	6.71	0.55	2	26,532	3.50	0.27	32	424,510	1.35	0.27
London[c]	8,673,713	19,740,640	2.5	38	2,980,311	7.00	0.38	29	2,274,448	7.00	0.75	3	235,288	3.00	0.38	30	2,352,877	1.00	0.27
Örebro[d]	138,952	276,000	2.6	55	58,385	7.90	0.30	9	9,554	10.00	0.62	25	26,538	3.30	0.27	11	11,677	1.20	0.25
Rome[e]	2,869,461	4,900,000	2.6	54	1,017,692	13.00	0.73	29	546,538	11.50	0.82	1	18,846	7.70	0.40	16	301,538	1.35	0.27
Vienna[f]	1,797,337	4,251,000	3.4	27	340,585	12.00	0.40	39	491,955	8.20	0.47	6	75,685	3.30	0.31	28	353,199	1.00	0.25
Zurich[g]	410,404	1,559,535	3.8	30	123,121	5.27	0.31	39	160,058	7.84	0.52	4	16,416	2.77	0.24	27	110,809	1.13	0.27

[a] Demographic data is from 2011, mode share data is from 2011, and mean distance and time traveled is from 2013.
[b] Demographic data is from 2012, mode share data is from 2012, and mean distance and time traveled is from 2006, 2015.
[c] Demographic data is from 2015, mode share data is for 2012, and mean distance and time traveled is for 2013.
[d] Demographic data is from 2012, mode share data is for 2011, and mean distance and time traveled is for 2011.
[e] Demographic data is from 2014, mode share data is for 2014, and mean distance and time traveled is for 2014.
[f] Demographic data is from 2015, mode share data is for 2012, and mean distance and time traveled is for 2013.
[g] Demographic data is from 2015, mode share data is for 2010, and mean distance and time traveled is for 2010.

Table 3
Scenarios and mode share estimations.

City	Mode share				Cycling network	
	Car (%)	Public transport (%)	Cycling (%)	Walking (%)	Cycling km	Cycling km/100,000 persons
Antwerp (baseline)	41.00	16.00	23.00	20.00	469.17	95.07
S1 10%	41.67	18.02	20.31	20.00	516.09	104.57
S2 50%	41.02	16.05	22.93	20.00	703.76	142.60
S3 100%	40.71	15.12	24.18	20.00	938.34	190.13
S4 all-streets	40.57	14.70	24.74	20.00	1,651.74	334.69
Barcelona (baseline)	26.00	40.00	2.00	32.00	159.54	9.84
S1 10%	25.73	39.18	3.09	32.00	175.49	10.83
S2 50%	25.56	38.68	3.76	32.00	239.31	14.76
S3 100%	25.33	37.99	4.68	32.00	319.08	19.68
S4 all-streets	21.68	27.03	19.30	32.00	1,554.56	95.90
London (baseline)	38.00	29.00	3.00	30.00	969.17	11.17
S1 10%	37.92	28.76	3.32	30.00	1,066.09	12.29
S2 50%	37.72	28.16	4.12	30.00	1,453.76	16.76
S3 100%	37.45	27.34	5.21	30.00	1,938.34	22.35
S4 all-streets	32.70	13.09	24.21	30.00	1,6439.74	189.54
Örebro (baseline)	55.00	9.00	25.00	11.00	361.35	260.05
S1 10%	55.08	9.23	24.69	11.00	397.49	286.06
S2 50%	55.07	9.20	24.74	11.00	542.03	390.08
S3 100%	55.07	9.20	24.74	11.00	722.70	520.11
S4 all-streets	55.07	9.20	24.74	11.00	3,045.27	2,191.60
Rome (baseline)	54.00	29.00	1.00	16.00	120.64	4.20
S1 10%	53.71	28.12	2.17	16.00	132.70	4.62
S2 50%	53.65	27.95	2.40	16.00	180.96	6.31
S3 100%	53.57	27.72	2.71	16.00	241.28	8.41
S4 all-streets	48.07	11.22	24.71	16.00	8,281.36	288.60
Vienna (baseline)	27.00	39.00	6.00	28.00	715.63	39.82
S1 10%	26.01	36.02	9.97	28.00	787.19	43.80
S2 50%	25.14	33.41	13.46	28.00	1,073.45	59.72
S3 100%	24.23	30.68	17.10	28.00	1,431.26	79.63
S4 all-streets	22.38	25.13	24.49	28.00	3,946.11	219.55
Zurich (baseline)	30.00	39.00	4.00	27.00	118.36	28.84
S1 10%	29.19	36.58	7.23	27.00	130.20	31.72
S2 50%	28.54	34.61	9.85	27.00	177.54	43.26
S3 100%	27.75	32.24	13.01	27.00	236.72	57.68
S4 all-streets	24.82	23.47	24.71	27.00	1,193.59	290.83

S = Scenario.

4. Discussion

European data on cycling network length and mode share suggest that a designated cycling network is associated with a cycling mode share of up to 24.7%. We estimated that a large number of premature deaths (i.e. 2,102) could be prevented annually in six of the seven PASTA cities if the cycling network was the same as the city's street network. However, already with a 10% expansion of the cycling network, a considerable number of premature deaths (i.e. 95) was estimated to be avoidable annually in five of the seven PASTA cities, which was also the most cost-effective scenario. If all 167 European cities achieved a cycling mode share of 24.7% over 10,000 premature deaths were estimated to be avoidable annually.

To our knowledge, this is the first study evaluating the potential associations between cycling network length, mode share and associated health impacts across European cities. We found the length of the cycling network to be associated with cycling mode share, which coincides with previous findings (Buehler and Dill, 2016; Buehler and Pucher, 2012; Heesch et al., 2015; Panter et al., 2016). We also estimated increases in cycling to result in net health benefits, which also agrees with previous findings (de Hartog et al., 2010; Mueller et al., 2015; Rojas-Rueda et al., 2016, 2013; Woodcock et al., 2014).

Our result of over 10,000 premature deaths avoidable in all 167 cities achieving the maximal cycling mode share of 24.7% is in line with a recent WHO study that estimated 10,000 premature deaths avoidable in over 50 major cities worldwide assuming achievement of the Copenhagen cycling mode share (i.e. 26%) for a similar population size of nearly 75 million people (WHO. Regional Office for Europe, 2014c). Thus, our study adds to the growing evidence that cycling for transport does provide substantial health benefits and should be facilitated for health promotion in the urban context.

The benefits of PA were estimated to outweigh detrimental effects of air pollution and traffic incidents and therefore net benefits of cycling are independent of geographical context (Mueller et al., 2015). In contrast to some studies (Buekers et al., 2015; Dhondt et al., 2013; Rabl and de Nazelle, 2012; Woodcock et al., 2014), but in agreement with others (Rojas-Rueda et al., 2012, 2011), we found air pollution exposure for the cyclist to be a greater mortality risk than having a fatal traffic incident. This is due to our modeling assumptions: (1) cycling a distance of 5 km implies a longer exposure duration than traveling the same distance by motor transport, because of varying speeds; (2) a cyclist has a higher ventilation rate due to implied physical strain. Thus, a cyclist experiences a higher uptake of pollutants for a longer duration; (3) we assumed a public transport trip to include a 10 min walk. Across all PASTA cities, walking (per km traveled) was the most hazardous mode of transport concerning traffic safety (Table S.14). Hence, the assumption that 75% of the new cycling trips substitute previous public transport trips, also shifts the risk for fatal traffic incidents. The reduced risk for a fatal traffic incident while walking to public transport makes the estimated increased risk while cycling appear less severe. Nonetheless, we did not consider health benefits resulting of reductions in air pollution background levels succeeding reductions in motor transport, thus the air pollution risk for the cyclist might have been overestimated.

As the length of the cycling network was associated with a cycling mode share of up to 24.7%, for Örebro and Antwerp no or only small increases in cycling due to increases in cycling network are expected,

Table 4
Mortality impact (avoided premature deaths/year) for each scenario.

City	Physical activity (deaths avoided) (95% CI)	Air pollution active traveler (additional deaths) (95% CI)	Traffic incidents (additional deaths) (95% CI)	Total deaths avoided (95% CI)	Total deaths (per 100,000 persons) avoided (95% CI)
Antwerp					
S1 10%	0 (0;0)	0 (0;0)	0 (0;0)	0 (0;0)	0 (0;0)
S2 50%	0 (0;0)	0 (0;0)	0 (0;0)	0 (0;0)	0 (0;0)
S3 100%	−6 (−9;−5)	1 (1;2)	0 (−2;2)	−5 (−8;−2)	−1 (−2;0)
S4 all-streets	−9 (−13;−7)	2 (1;2)	0 (−3;3)	−7 (−11;−3)	−1 (−2;0)
Barcelona					
S1 10%	−21 (−30;−16)	4 (1;5)	2 (−5;9)	−16 (−26;-5)	−1 (−2;0)
S2 50%	−35 (−48;−25)	6 (1;8)	3 (−8;15)	−25 (−42;−9)	−2 (−4;1)
S3 100%	−53 (−73;−39)	9 (2;12)	5 (−13;22)	−38 (−64;−13)	−2 (−6;1)
S4 all-streets	−340 (−474;−249)	60 (12;77)	31 (−81;144)	−248 (−410;−86)	−15 (−36;5)
London					
S1 10%	−24 (−34;−18)	4 (2;5)	2 (−6;10)	−18 (−30;−7)	0 (−1;0)
S2 50%	−85 (−119;−63)	14 (8;18)	8 (−21;36)	−64 (−104;-24)	−1 (−3;1)
S3 100%	−169 (−235;−123)	28 (16;35)	15 (−41;70)	−126 (−206;−47)	−1 (−6;3)
S4 all-streets	−1,617 (−2,255;−1,185)	265 (155;337)	142 (−393;677)	−1,210 (−1,972;−447)	−14 (−56;28)
Örebro					
S1 10%	0 (0;0)	0 (0;0)	0 (0;0)	0 (0;0)	0 (0;0)
S2 50%	0 (0;0)	0 (0;0)	0 (0;0)	0 (0;0)	0 (0;0)
S3 100%	0 (0;0)	0 (0;0)	0 (0;0)	0 (0;0)	0 (0;0)
S4 all-streets	0 (0;0)	0 (0;0)	0 (0;0)	0 (0;0)	0 (0;0)
Rome					
S1 10%	−27 (−38;−20)	5 (3;6)	2 (−8;11)	−21 (−34;−8)	−1 (−2;0)
S2 50%	−33 (−46;−24)	6 (3;7)	2 (−9;13)	−26 (−41;−10)	−1 (−2;1)
S3 100%	−40 (−56;−29)	7 (4;9)	2 (−11;15)	−31 (−50;−12)	−1 (−3;1)
S4 all-streets	−557 (−776; −408)	94 (55;119)	31 (−153;215)	−433 (−695; −170)	−15 (−40;10)
Vienna					
S1 10%	−47 (−66;−34)	13 (8;17)	2 (−14;18)	−31 (−54;-9)	−2 (−4;1)
S2 50%	−88 (−124;−64)	25 (15;32)	4 (−25;34)	−59 (−102;−16)	−3 (−8;2)
S3 100%	−131 (−184;−96)	38 (22;48)	6 (−38;50)	−88 (−151;−24)	−5 (−13;3)
S4 all-streets	−219 (−307;−160)	63 (36;79)	10 (−63;84)	−146 (−252;−40)	−8 (−21;5)
Zurich					
S1 10%	−14 (−19;−10)	3 (2;3)	2 (−3;7)	−9 (−16;−2)	−2 (−4;−1)
S2 50%	−25 (−35;−18)	5 (3;6)	3 (−5;12)	−16 (−28;−4)	−4 (−7;−1)
S3 100%	−38 (−53;-28)	7 (4;9)	5 (−7;18)	−25 (−43;−7)	−6 (−11;−2)
S4 all-streets	−87 (−122;−63)	17 (10;21)	12 (−17;42)	−58 (−100;−16)	−14 (−25;−3)

S = Scenario; 95% CI = 95% confidence interval.

which in return results in no or only small health benefits. However, if the true association between cycling network length and cycling mode share was better represented by the 0.975-quantile of the distribution of the 1,000 bootstrap samples (i.e. upper CI), then also Örebro and Antwerp could expect larger health benefits. Yet, in Örebro and Antwerp, potentially other policies should be prioritized to further promote cycling. Vienna and Zurich, on the other hand, appear to have great potential to benefit from proportional increases in cycling network length because they are at the steeper slope of the growth curve (Fig. 2). Thus, their cycling mode share appears more sensitive to expansions of the cycling network (Table 3).

London, Rome and Barcelona are expected to benefit most in absolute and standardized terms in the all-streets (S4) scenario. These three cities: (1) have larger populations; (2) benefit particularly from the large absolute increase in cycling mode share (i.e. 3%, 1% and 2% at baseline, respectively (Table 3); and (3) benefit greatly from the estimated large increases in PA [i.e. PA levels were lowest at baseline (Tables S.4–S.10)]. Generally, the cities baseline levels of PA, air pollution and traffic fatalities impact benefit estimations significantly (Rojas-Rueda et al., 2016; Tainio et al., 2016). Health benefits will be largest if at baseline the population is less physically active (and has high incidence rates for non-communicable diseases), air pollution levels are lower and traffic fatalities occur less. Despite health equity commonly being a subsidiary factor in the transport calculus, transport policies strongly determine the access to and use of the different modes of transport and thus their social significance and associated (often unequal) health pathway exposure distribution. As demonstrated in the sensitivity analysis, the greatest health benefits occur by getting people out of their own cars, because public transport provides health benefits through implied PA (i.e. 10 min walk) (Rojas-Rueda et al., 2012), and by being the safest mode of transport (Mueller et al., 2015). Hence, the parallel implementation of 'push' (e.g. making cars unattractive) and 'pull' (e.g. cycling network expansions) policies that consider equity impacts may best cater to adopt healthy transport behaviors, resulting in the largest benefits.

Policy implications of our findings may be – also under consideration of the supportive literature – that expansions of cycling networks may increase cycling, therefore, contributing to global health promotion and meeting sustainable development goals (United Nations, 2015). While other research also provides insight on 'where' cycling infrastructure should be located (e.g. the propensity to cycle tool) (Lovelace et al., 2016) and 'how it should best look like' (Mertens et al., 2016b), we simply like to express 'that' cycling networks should be high up on the agendas of city governments which have direct local accountability for providing 'healthy choices' to their citizens. Especially in cities with a low cycling mode share (i.e. Rome, Barcelona, London, Zurich and Vienna), already a 10% increase in cycling network length, which we perceive as an achievable policy for city governments, was estimated to provide considerable health and economic benefits.

4.1. Limitations and strengths

Notwithstanding, our study has limitations. First, no longitudinal data on cycling network length and mode share were available.

Consequently, no conclusions on causal inferences can be drawn. Indeed, reverse causality (i.e. many cyclists leading to reinforcements of the cycling network) cannot be ruled-out. Furthermore, cities that invest in cycling infrastructure might already be congenial places for cycling. Data on other built-environment, transport and socio-economic factors that were shown to influence cycling [e.g. mixed land-use, street density and connectivity, gasoline prices, traffic safety, students among the population, urban greenery, etc. (Beenackers et al., 2012; Buehler and Pucher, 2012; Heesch et al., 2015; Sallis et al., 2015)] were not available, however, are expected to alter variability in cycling mode share considerably.

As with most HIAs, our analyses were limited by data availability and assumptions on causal inferences. Benefit estimations are sensitive to the contextual setting and underlying population and exposure parameters. Moreover, we considered exclusively the impacts for the actively traveling person. Societal co-benefits of reduced air and noise pollution (Buekers et al., 2015; Mueller et al., 2017b), reduced greenhouse gas emissions (Woodcock et al., 2009), and improved social cohesion and mental health (Litman, 2016a, 2016b) are expected with reductions in motor traffic and increases in active transport. Also, quality of life or morbidity impacts have not been considered, but are expected to be considerable (Mueller et al., 2017a). Additionally, we did not stratify our impact estimations by age, sex, or socioeconomic status even though benefit variations thereof are expected (Mueller et al., 2015). Finally, the presented cost–benefit estimations should be regarded as a robust overall estimate of which investments in infrastructure will be offset by health benefits in the long-term. The chosen Dutch cost estimates, despite considering the reconstruction of roads, may overestimate elsewhere; also the VoSL is country-specific, which will result in differing cost–benefit ratios in other settings.

Strengths of this analysis include the novelty of being the first study to look holistically into the associations between cycling network, cycling mode share and associated health impacts across European cities. Using open-access OSM data, which for cycling infrastructure has been described of fairly good quality (Hochmair et al., 2013), and applying the same standardized data extraction method (Salmon and Mueller, 2017) add strength and ensure reproducibility.

5. Conclusions

Expansions of cycling networks were associated with increases in cycling in European cities. Increases in cycling were estimated to provide considerable health and economic benefits.

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Conflict of interest

None.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.ypmed.2017.12.011.

References

Ainsworth, B.E., Haskell, W.L., Herrmann, S.D., Meckes, N., Bassett, D.R., Tudor-Locke, C., Greer, J.L., Vezina, J., Whitt-Glover, M.C., Leon, A.S., 2011. 2011 Compendium of physical activities: a second update of codes and MET values. Med. Sci. Sports Exerc. 43, 1575–1581. http://dx.doi.org/10.1249/MSS.0b013e31821ece12.

Beenackers, M.a., Foster, S., Kamphuis, C.B.M., Titze, S., Divitini, M., Knuiman, M., Van Lenthe, F.J., Giles-Corti, B., 2012. Taking up cycling after residential relocation: built environment factors. Am. J. Prev. Med. 42, 610–615. http://dx.doi.org/10.1016/j.amepre.2012.02.021.

Buehler, R., Dill, J., 2016. Bikeway networks: a review of effects on cycling. Transp. Rev. 1647, 1–19. http://dx.doi.org/10.1080/01441647.2015.1069908.

Buehler, R., Pucher, J., 2012. Cycling to work in 90 large American cities: New evidence on the role of bike paths and lanes. Transportation (Amst). 39, 409–432. http://dx.doi.org/10.1007/s11116-011-9355-8.

Buekers, J., Dons, E., Elen, B., Int Panis, L., 2015. Health impact model for modal shift from car use to cycling or walking in Flanders: Application to two bicycle highways. J. Transp. Health 2, 549–562. http://dx.doi.org/10.1016/j.jth.2015.08.003.

De Geus, B., Van Hoof, E., Aerts, I., Meeusen, R., 2008. Cycling to work: influence on indexes of health in untrained men and women in Flanders. Coronary heart disease and quality of life. Scand. J. Med. Sci. Sports 18, 498–510. http://dx.doi.org/10.1111/j.1600-0838.2007.00729.x.

De Hartog, J., Boogaard, H., Nijland, H., Hoek, G., 2010. Do the health benefits of cycling outweigh the risks? Environ. Health Perspect. 118, 1109–1116. http://dx.doi.org/10.1289/ehp.0901747.

De Nazelle, A., Bode, O., Orjuela, J., 2017. Comparison of air pollution exposures in active vs. passive modes in Europe: A quantitative review. Environ. Int. 99, 151–160.

Dhondt, S., Kochan, B., Beckx, C., Lefebvre, W., Pirdavani, A., Degraeuwe, B., Bellemans, T., Int Panis, L., Macharis, C., Putman, K., 2013. Integrated health impact assessment of travel behaviour: model exploration and application to a fuel price increase. Environ. Int. 51, 45–58. http://dx.doi.org/10.1016/j.envint.2012.10.005.

Dons, E., Götschi, T., Nieuwenhuijsen, M., de Nazelle, A., Anaya, E., Avila-Palencia, I., Brand, C., Cole-Hunter, T., Gaupp-Berghausen, M., Kahlmeier, S., Laeremans, M., Mueller, N., Orjuela, J.P., Raser, E., Rojas-Rueda, D., Standaert, A., Stigell, E., Uhlmann, T., Gerike, R., Int Panis, L., 2015. Physical Activity through Sustainable Transport Approaches (PASTA): protocol for a multi-centre, longitudinal study. BMC Public Health 15, 1–11. http://dx.doi.org/10.1186/s12889-015-2453-3.

Elvik, R., Bjørnskau, T., 2017. Safety-in-numbers: a systematic review and meta-analysis of evidence. Saf. Sci. 92, 274–282. http://dx.doi.org/10.1016/j.ssci.2015.07.017.

EPOMM, 2011. European Platform on Mobility Management (EOPMM) Modal Splity Tool (TEMS) [WWW Document]. http://www.epomm.eu/tems/about_tems.phtml, Accessed date: 19 August 2016.

Foley, L., Panter, J., Heinen, E., Prins, R., Ogilvie, D., 2015. Changes in active commuting and changes in physical activity in adults: a cohort study. Int. J. Behav. Nutr. Phys. Act. 12 (1). http://dx.doi.org/10.1186/s12966-015-0323-0.

Gerike, R., de Nazelle, A., Nieuwenhuijsen, M., Panis, L.I., Anaya, E., Avila-Palencia, I., Boschetti, F., Brand, C., Cole-Hunter, T., Dons, E., Eriksson, U., Gaupp-Berghausen, M., Kahlmeier, S., Laeremans, M., Mueller, N., Orjuela, J.P., Racioppi, F., Raser, E., Rojas-Rueda, D., Schweizer, C., Standaert, A., Uhlmann, T., Wegener, S., Götschi, T., 2016. Physical Activity through Sustainable Transport Approaches (PASTA): A study protocol for a multicentre project. BMJ Open 6, 1–11. http://dx.doi.org/10.1136/bmjopen-2015-009924.

Goodman, A., Sahlqvist, S., Ogilvie, D., 2014. New walking and cycling routes and increased physical activity: One- and 2-year findings from the UK iConnect study. Am. J. Public Health 104, e1–e9. http://dx.doi.org/10.2105/AJPH.2014.302059.

Habib, K.N., Mann, J., Mahmoud, M., Weiss, A., 2014. Synopsis of bicycle demand in the city of Toronto: investigating the effects of perception, consciousness and comfortability on the purpose of biking and bike ownership. Transp. Res. A Policy Pract. 70, 67–80. http://dx.doi.org/10.1016/j.tra.2014.09.012.

Heesch, K.C., Giles-Corti, B., Turrell, G., 2015. Cycling for transport and recreation: associations with the socio-economic, natural and built environment. Health Place 36, 152–161. http://dx.doi.org/10.1016/j.healthplace.2015.10.004.

Hijmans, R., 2009. Database of Global Administrative Areas (GADM).

Hochmair, H., Zielstra, D., Neis, P., 2013. Assessing the Completeness of Bicycle Train and Designated Lane Features in OpenStreetMap for the United States and Europe. In: Transportation Research Board - 92nd Annual Meeting, Washington, D.C.

Khreis, H., Warsow, K.M., Verlinghieri, E., Guzman, A., Pellecuer, L., Ian Jones, A.F., Heinen, E., Rojas-Rueda, D., Mueller, N., Schepers, P., Lucas, K., Nieuwenhuijsen, M., 2016. The health impacts of traffic-related exposures in urban areas: Understanding real effects, underlying driving forces and co-producing future directions. J. Transp. Health 3, 249–267. http://dx.doi.org/10.1016/j.jth.2016.07.002.

Litman, T., 2014. Introduction to Multi-Modal Transportation Planning: Principles and Practices. In: Victoria Transport Policy Institute, http://dx.doi.org/10.1080/00420987620080731.

Litman, T., 2016a. Community Cohesion As A Transport Planning Objective. In: Victoria

Transport Policy Institute.
Litman, T., 2016b. Urban Sanity: Understanding Urban Mental Health Impacts and How to Create Saner, Happier Cities. In: Victoria Transport Policy Institute.
Lovelace, R., Goodman, A., Aldred, R., Berkoff, N., Abbas, A., Woodcock, J., 2016. The Propensity to Cycle Tool: An open source online system for sustainable transport planning. J. Transp. Land Use 10, 505–528. http://dx.doi.org/10.5198/jtlu.2016.862.
Marqués, R., Hernández-Herrador, V., Calvo-Salazar, M., García-Cebrián, J., 2015. How infrastructure can promote cycling in cities: lessons from Seville. Res. Transp. Econ. 53. http://dx.doi.org/10.1016/j.retrec.2015.10.017.
Mertens, L., Van Cauwenberg, J., Ghekiere, A., De Bourdeaudhuij, I., Deforche, B., Van De Weghe, N., Van Dyck, D., 2016a. Differences in environmental preferences towards cycling for transport among adults: a latent class analysis. BMC Public Health 16, 1–10. http://dx.doi.org/10.1186/s12889-016-3471-5.
Mertens, L., Van Dyck, D., Ghekiere, A., De Bourdeaudhuij, I., Deforche, B., Van de Weghe, N., Van Cauwenberg, J., 2016b. Which environmental factors most strongly influence a street's appeal for bicycle transport among adults? A conjoint study using manipulated photographs. Int. J. Health Geogr. 15, 1–14. http://dx.doi.org/10.1186/s12942-016-0058-4.
Mueller, N., Rojas-Rueda, D., Cole-Hunter, T., de Nazelle, A., Dons, E., Gerike, R., Götschi, T., Panis, L.I., Kahlmeier, S., Nieuwenhuijsen, M., 2015. Health impact assessment of active transportation: a systematic review. Prev. Med. (Baltim.) 76, 103–114. http://dx.doi.org/10.1016/j.ypmed.2015.04.010.
Mueller, N., Rojas-Rueda, D., Basagaña, X., Cirach, M., Cole-Hunter, T., Dadvand, P., Donaire-Gonzales, D., Foraster, M., Gascon, M., Martinez, D., Tonne, C., Triguero-Mas, M., Vaneltín, A., Nieuwenhuijsen, M., 2017a. Health impacts related to urban and transport planning: A burden of disease assessment. Environ. Int. 107, 243–257. http://dx.doi.org/10.1016/j.envint.2017.07.020.
Mueller, N., Rojas-Rueda, D., Basagaña, X., Cirach, M., Cole-Hunter, T., Dadvand, P., Donaire-Gonzalez, D., Foraster, M., Gascon, M., Martinez, D., Tonne, C., Triguero-Mas, M., Valentín, A., Nieuwenhuijsen, M., 2017b. Urban and transport planning related exposures and mortality: a health impact assessment for cities. Environ. Health Perspect. 125, 89–96. http://dx.doi.org/10.1289/EHP220.
Nieuwenhuijsen, M.J., Khreis, H., 2016. Car free cities: Pathway to healthy urban living. Environ. Int. 94, 251–262. http://dx.doi.org/10.1016/j.envint.2016.05.032.
Office for National Statistics, 2011. 2011 Census: Boundary Data (England and Wales).
OpenStreetMap contributors, 2017. Planet Dump (Retrieved from http://planet.osm.org [WWW Document]. URL http://www.openstreetmap.org) (accessed February 10, 2017).
Panter, J., Heinen, E., Mackett, R., Ogilvie, D., 2016. Impact of new transport infrastructure on walking, cycling, and physical activity. Am. J. Prev. Med. 50, 45–53. http://dx.doi.org/10.1016/j.amepre.2015.09.021.
Pucher, J., Dill, J., Handy, S., 2010. Infrastructure, programs, and policies to increase bicycling: an international review. Prev. Med. (Baltim.) 50, S106–S125. http://dx.doi.org/10.1016/j.ypmed.2009.07.028.
Rabl, A., de Nazelle, A., 2012. Benefits of shift from car to active transport. Transp. Policy 19, 121–131. http://dx.doi.org/10.1016/j.tranpol.2011.09.008.
Rojas-Rueda, D., de Nazelle, A., Tainio, M., Nieuwenhuijsen, M.J., 2011. The health risks and benefits of cycling in urban environments compared with car use: health impact assessment study. BMJ 343, 1–8. http://dx.doi.org/10.1136/bmj.d4521.
Rojas-Rueda, D., de Nazelle, A., Teixidó, O., Nieuwenhuijsen, M.J., 2012. Replacing car trips by increasing bike and public transport in the greater Barcelona metropolitan area: a health impact assessment study. Environ. Int. 49, 100–109. http://dx.doi.org/10.1016/j.envint.2012.08.009.
Rojas-Rueda, D., de Nazelle, A., Teixidó, O., Nieuwenhuijsen, M.J., 2013. Health impact assessment of increasing public transport and cycling use in Barcelona: a morbidity and burden of disease approach. Prev. Med. (Baltim.) 57, 573–579. http://dx.doi.org/10.1016/j.ypmed.2013.07.021.
Rojas-Rueda, D., De Nazelle, A., Andersen, Z.J., Braun-Fahrländer, C., Bruha, J., Bruhova-Foltynova, H., Desqueyroux, H., Praznoczy, C., Ragettli, M.S., Tainio, M., Nieuwenhuijsen, M.J., 2016. Health impacts of active transportation in Europe. PLoS One 11, 1–14. http://dx.doi.org/10.1371/journal.pone.0149990.
Sahlqvist, S., Goodman, A., Cooper, A.R., Ogilvie, D., 2013. Change in active travel and changes in recreational and total physical activity in adults: longitudinal findings from the iConnect study. Int. J. Behav. Nutr. Phys. Act. 10, 28. http://dx.doi.org/10.1186/1479-5868-10-28.
Sallis, J., Conway, T., Dillon, L., Frank, L., Adams, M., Cain, K., Saelens, B., 2013. Environmental and demographic correlated of bicycling. Prev. Med. (Baltim.) 57, 456–460. http://dx.doi.org/10.1016/j.ypmed.2013.06.014.ENVIRONMENTAL.
Sallis, J.F., Spoon, C., Cavill, N., Engelberg, J.K., Gebel, K., Parker, M., Thornton, C.M., Lou, D., Wilson, A.L., Cutter, C.L., Ding, D., 2015. Co-benefits of designing communities for active living: an exploration of literature. Int. J. Behav. Nutr. Phys. Act. 12, 1–10. http://dx.doi.org/10.1186/s12966-015-0188-2.
Salmon, M., Mueller, N., 2017. cycle_infrastructure_modeshare. [WWW Document]. https://zenodo.org/record/439009http://dx.doi.org/10.5281/zenodo.439009.
Schepers, P., Fishman, E., Beelen, R., Heinen, E., Wijnen, W., Parkin, J., 2015. The mortality impact of bicycle paths and lanes related to physical activity, air pollution exposure and road safety. J. Transp. Health 2, 460–473. http://dx.doi.org/10.1016/j.jth.2015.09.004.
Schoner, J.E., Levinson, D.M., 2014. The missing link: bicycle infrastructure networks and ridership in 74 US cities. Transportation (Amst.) 41, 1187–1204. http://dx.doi.org/10.1007/s11116-014-9538-1.
Schoner, J.E., Cao, J., Levinson, D.M., 2015. Catalysts and magnets: Built environment and bicycle commuting. J. Transp. Geogr. 47, 100–108. http://dx.doi.org/10.1016/j.jtrangeo.2015.07.007.
Swedish Ministry of Enterprise and Innovation, 2016. Sverige Lantmäteriet.
Tainio, M., de Nazelle, A.J., Götschi, T., Kahlmeier, S., Rojas-Rueda, D., Nieuwenhuijsen, M.J., de Sá, T.H., Kelly, P., Woodcock, J., 2016. Can air pollution negate the health benefits of cycling and walking? Prev. Med. (Baltim.) 87, 233–236. http://dx.doi.org/10.1016/j.ypmed.2016.02.002.
United Nations, 2015. Transforming Our World: The 2030 Agenda for Sustainable Development. New York. http://dx.doi.org/10.1007/s13398-014-0173-7.2.
WHO. Regional Office for Europe, 2014a. Health Economic Assessment Tools (HEAT) for Walking and for Cycling, 2014 Update. Copenhagen.
WHO. Regional Office for Europe, 2014b. WHO Expert Meeting: Methods and Tools for Assessing the Health Risks of Air Pollution at Local, National and International Level. Copenhagen.
WHO. Regional Office for Europe, 2014c. Unlocking New Opportunities: Jobs in Green and Healthy Transport. Copenhagen.
Woodcock, J., Edwards, P., Tonne, C., Armstrong, B.G., Ashiru, O., Banister, D., Beevers, S., Chalabi, Z., Chowdhury, Z., Cohen, A., Franco, O.H., Haines, A., Hickman, R., Lindsay, G., Mittal, I., Mohan, D., Tiwari, G., Woodward, A., Roberts, I., 2009. Public health benefits of strategies to reduce greenhouse-gas emissions: urban land transport. Lancet 374, 1930–1943. http://dx.doi.org/10.1016/S0140-6736(09)61714-1.
Woodcock, J., Franco, O.H., Orsini, N., Roberts, I., 2011. Non-vigorous physical activity and all-cause mortality: systematic review and meta-analysis of cohort studies. Int. J. Epidemiol. 40, 121–138. http://dx.doi.org/10.1093/ije/dyq104.
Woodcock, J., Tainio, M., Cheshire, J., O'Brien, O., Goodman, A., 2014. Health effects of the London bicycle sharing system: health impact modelling study. BMJ 348, 1–14. http://dx.doi.org/10.1136/bmj.g425.