Before a Board of Inquiry
MacKays to Peka Peka Expressway Proposal

under: the Resource Management Act 1991

in the matter of: Notice of requirement for designation and resource consent applications by the NZ Transport Agency for the MacKays to Peka Peka Expressway Proposal

applicant: **NZ Transport Agency**
Requiring Authority

Statement of evidence of **Noel Nancekivell** (Design – MacKays to Peka Peka Expressway) for the NZ Transport Agency

Dated: 5 September 2012

REFERENCE: John Hassan (john.hassan@chapmantripp.com)
Suzanne Janissen (suzanne.janissen@chapmantripp.com)

Chapman Tripp
T: +64 4 499 5999
F: +64 4 472 7111

10 Customhouse Quay
PO Box 993, Wellington 6140
New Zealand

www.chapmantripp.com
Auckland, Wellington,
Christchurch

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STATEMENT OF EVIDENCE OF NOEL NANCEKIVELL FOR THE NZ TRANSPORT AGENCY

QUALIFICATIONS AND EXPERIENCE

1 My full name is Noel Robert Nancekivell.

2 I am a Technical Director - Civil with Beca Infrastructure Limited. I hold a Diploma in Business, Engineering Management from the University of Auckland and a New Zealand Certificate of Engineering from the Auckland Technical Institute. I am a Chartered Professional Engineer: New Zealand and am a member of the Institution of Professional Engineers of New Zealand (MIPENZ).

3 I have more than thirty years' experience in civil engineering, transportation and road infrastructure, involving the design and construction of roads and associated infrastructure, having been involved in projects both in New Zealand and overseas. The projects I have been involved with range from scheme assessments through to detailed design and construction. In the last fifteen years I have led design teams on local road, State highway and motorway design projects. My particular areas of expertise include geometric design and safety standards of road design.

4 Some projects similar to the MacKays to Peka Peka Expressway Proposal (*the Project*) with which I have been involved include:

4.1 SH20 Mount Roskill Extension for the NZ Transport Agency (*NZTA)*, (detailed design development). In my role as Civil Design Manager, I led the liaison with the then Auckland City Council regarding impacts on local roads, major services design and design of a cycleway for the entire 4.5km route.

4.2 The Northern Gateway Toll Road for the NZTA, (Alliance delivery model). I led the civil design for the first eight months and then took over the role as Design Manager to the completion of the project (4 ½ years). As the design manager, I was responsible for all aspects of design but with a particular emphasis on geometric design and safety standards. I led the design of a number of innovative solutions that improved safety while minimising costs. I played a key role addressing design issues in consultation with the Rodney District Council and the Auckland Regional Council for the numerous designation and consent changes required to complete the project. In obtaining these additional consents, and amendments to the designation, I met many stakeholders and individual property owners to explain the engineering and design issues. I also presented regularly at the monthly community liaison meetings.

4.3 Kawakawa Bypass for Transit New Zealand. I was the Design Manager for this project which included the preparation of a scheme assessment report and assessment of environmental effects for a number of possible bypass routes to the east and west of Kawakawa Township.

4.4 The road/bridge link between Beach Haven and Glenfield, North Shore (Kaipatiki Road link), for North Shore City Council. I was the Team Leader for this project, responsible for design management and for supporting the principal planner in the preparation of resource consent applications for the project. This road created a new link between two communities. I also presented at public meetings.

5 My evidence is given in support of the Notice of Requirement (*NoR*) and applications for resource consent lodged with the Environmental Protection Authority (*EPA*) by the NZTA for the construction, maintenance and operation of the Project.

6 I am familiar with the area that the Project covers and the State highway and local roading network in the vicinity of the Project.

7 I have responsibility for matters of design in relation to the Project.

8 I have read the Code of Conduct for Expert Witnesses as contained in the Environment Court Consolidated Practice Note (2011), and I agree to comply with it as if this Inquiry were before the Environment Court. My qualifications as an expert are set out above. I confirm that the issues addressed in this brief of evidence are within my area of expertise. I have not omitted to consider material facts known to me that might alter or detract from the opinions expressed.

SCOPE OF EVIDENCE

9 My evidence will deal with the following:

9.1 Background and role;

9.2 The Project objectives, design philosophy and standards;

9.3 Environmental and other factors influencing design;

9.4 Project function and design;

9.5 Property access issues;

9.6 Response to section 149G(3) Key Issues report;

9.7 Response to submissions; and

9.8 Response to section 42A report(s).

EXECUTIVE SUMMARY

10 A design philosophy was developed for the Project according to the Project Objectives. This is formalised in the Design Philosophy Statement (*DPS*).[1] This approach to design has ensured that specific attention has been given to meeting criteria in relation to economic and regional development, movement and accessibility, time, cost and affordability, safety and security, and social and environmental outcomes.

11 A number of environmental and social factors have impacted on the design of the Project. These factors include geotechnical considerations (in particular the presence of peat along the alignment, groundwater and seismic risk), stormwater management, ecology, landscape, urban design, noise, lighting and other environmental considerations.

12 The key areas where design decisions needed to be made relate to Expressway alignment and footprint, interchanges, intersections, the inclusion of a cycleway/walkway along the length of the Project, provision for a bridleway, stream crossings and the ongoing access to property. My evidence discusses design options considered and approaches taken in relation to those features.

13 Generally the proposed Expressway will follow the existing designation for the Kāpiti Western Link Road (*WLR*). However, there are some variations in alignment. I also note that, as the Project is functionally different from the WLR, this has significant consequences for its design.

14 Several submitters raise matters as to design, or related to the Project's design constraints and I respond to these later in my evidence.

BACKGROUND AND ROLE

15 I led the road and general civil design for the Project from May 2010 until December 2010. I took over the role of Design Manager in January 2011. More recently my role has included the review of design issues for input to the Assessment of Environmental Effects (*AEE*). I also reviewed the DPS[2] that formed part of the AEE.

16 As Design Manager, I have also played an active role in consultation where design input was required. This has included liaison with other statutory bodies such as Kāpiti Coast District Council (*KCDC*)

[1] Technical Report 1.

[2] Technical Report 1.

and Greater Wellington Regional Council (*GWRC*), and consultation with residents whose properties are required for the Project and the wider community. I also attended a hui with the local iwi and continue to provide design input into discussions with the Takamore Trust.

THE PROJECT OBJECTIVES, DESIGN PHILOSOPHY AND STANDARDS

NZTA Project Objectives and the Design Philosophy Statement

17 The Project Objectives provided the overall direction for the design of the Project. In order to meet the Project Objectives, a set of design outcome statements was developed, as set out in the DPS.[3]

18 The DPS includes the design standards and design criteria that has been adopted in the Scheme Assessment Design that the AEE is based on. The DPS is intended as a live document, as it is important to maintain sufficient design flexibility, not to reduce standards but to allow for innovation, normal (and, sometimes, unexpected) variations in ground conditions and construction quality as might be reasonably expected in the construction of a major project of this kind. The DPS identifies the general and specific standards and guidelines for the Project. Key criteria for the design of the Project are discussed under the following headings, which relate to the Project Objectives:

18.1 Economic and regional development,

18.2 Movement and accessibility,

18.3 Time, cost and affordability,

18.4 Safety and security,

18.5 Social outcomes,

18.6 Environmental outcomes.

Expressway design and other roading standards

19 By reference to the DPS document, in this section of my evidence I discuss various design issues and restraints, and the process by which these have been approached.

20 As the Project Objectives specify, the Project is an Expressway. It is a component of the Wellington Northern Corridor Roads of the Government's National Significance (*RoNS*) programme, the intention of which is 'to reduce congestion, improve safety, and

[3] Technical Report 1 (TR1) in Volume 3 of the AEE.

support economic growth'.[4] Its primary function is to be a safe and efficient component of State Highway 1 (*SH1*).

21 The proposed Expressway traverses a mix of rural and urban environments. As such, it is designed to ensure that changes in the typical section due to the environment (e.g. median width and clear zone)[5] are 'readable' to the motorist. The recently re-developed Austroads Guide to Road Design (*AGRD*) uses the term 'Driver Domains'. These define the desirable range of values for design parameters, given the prevailing topography, site constraints, expected traffic volumes and other relevant factors.

22 These 'driver domains' are discussed in section 4 of the DPS.[6] The relevant 'driver domains' for the Project include:

22.1 Operating and design speed (a design speed of 110 kph) for the Expressway,

22.2 Intended "Level of Service"[7] for the design life of the Expressway and local road components of the Project (LOS B for the Expressway, and LOS C for intersections, in the year 2026),

22.3 Geometric design standards (for example, minimum horizontal and vertical curve radii, maximum gradient and super-elevation[8], warp rate,[9] etc),

22.4 Cross section, allowing for two 3.5m traffic lanes in each direction, median barriers and separation, shoulders and other requirements,

22.5 Intersection arrangements (all grade separated interchanges),

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4 Government Policy Statement May 2009, clause 22.

5 A clear zone is the area adjacent to the traffic lane that should be kept free from features that would be potentially hazardous to errant vehicles *Guide to Road Design – Part 6 Roadside Design, Safety and Barriers*, Section 4.2.2.

6 See pages 11 – 23.

7 Level of Service ("LOS") is a term defined in the *Austroads Guide to Traffic Management Part 3: Traffic Studies and Analysis, 2009*. It has a range from A (best) to F (worst). The DPS sets out a more detailed definition of LOS at pages 12-13.

8 Super-elevation is the transverse slope of the road surface around horizontal curves constructed to reduce sideways forces that try to throw a vehicle outwards. Conversely, on straights, roads usually have 'cross-fall' where the road surface slopes away from the central median towards the outside edges.

9 The rate at which the super-elevation or crosssfall changes along the road.

22.6 Sight distances, based on expected/assumed/average driver reaction times, for the main alignment, off-ramps and on-ramps, and local road intersections,

22.7 Design vehicle size assumptions to inform the design of the alignment, including intersections and curves,

22.8 Vertical clearances for local road overbridges, and local road width requirements for overbridge spans. The NZTA Bridge manual specifies a 4.9m minimum clearance to cater for standard maximum legal vehicle height requirements with a suitable margin of safety. In the case of Raumati Road, a clearance of 6.0m is needed to allow 'oversize' vehicles to cross the Expressway corridor south of the Waikanae River.

23 In relation to these matters, the DPS lists the various NZTA and other New Zealand and international guidelines and standards that have informed the approach to design. Those include:

23.1 The NZTA's Roads of National Significance Design Standards and Guidelines (*RoNS Guidelines*),

23.2 The AGRD, and

23.3 A range of other design standard documents on matters of geometric design.[10] The design elements these apply to include:

(a) alignment,

(b) interchanges and different types of intersections,

(c) cross-sections,

(d) safety barriers,

(e) signs and line markings,

(f) drainage and stormwater management,

(g) bridges, including vertical clearance and structural performance, and

(h) pedestrian and cyclist facilities.

24 Standards and guidelines require interpretation and application according to the specific issues identified in the context, and that has occurred for this Project. As the Project traverses the

[10] See Table 2, pages 15 – 16 of the DPS.

communities of the Kāpiti Coast and is intended to serve both regional and local trips, there has been regular discussion between the NTZA and KCDC members of the Alliance and their respective asset managers.

Road Safety Audits

25 Road safety audits (*RSAs*) are undertaken on all capital and road improvement projects to ensure all safety aspects are identified and opportunities for improvement are considered. These are undertaken by independent road safety specialists, considering issues purely from a safety perspective. Issues are typically identified and rated from serious to minor.

26 In response to a RSA, there is a formal process of assessing the issues raised and deciding on the nature of any improvements that should be made to design, having regard also to costs and other factors.

27 For the Project, so far three RSA processes have been undertaken, and two further RSAs will be carried out. A further RSA will be undertaken prior to construction, and a final RSA will be undertaken following completion of construction and prior to opening the Expressway to the public.

28 The initial RSA was carried out during the option selection stage. It found that there were no serious issues that differentiated the options. However, this initial review identified the potential for sun strike if Kāpiti Road was taken over the Expressway. The RSA concluded 'that the proposed Expressway will significantly improve road safety through Paraparaumu and Waikanae'.[11] It identified a list of issues for the Alliance designers to address in the design development. The NZTA's decisions on these issues are detailed in the Scheme Assessment Report.[12]

29 A subsequent RSA of the Scheme Design was undertaken in August 2011. Of the safety issues it identified, all but one have or will be addressed through the detailed design process. The exception is in the concern the RSA raised about allowing cyclists to ride on the shoulder of the Expressway. It is currently legal for cyclists to ride on the shoulder, and the NZTA is reviewing this issue.

30 A further Road Safety Audit (RSA) was completed in August 2012 which identified some of the aspects of the temporary tie in with the existing SH1 at Peka Peka which need to be considered further. These safety issues are currently being considered and it is anticipated that only minor adjustments to the proposal will be required to resolve the issues.

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[11] Road Safety Review Reference 10341, February 2011.

[12] Scheme Assessment Report Rev B final draft, 31 August 2012.

ENVIRONMENTAL AND OTHER FACTORS INFLUENCING DESIGN

Geotechnical factors and implications

31 The Project route traverses sand dunes and low lying inter-dunal deposits. **Mr Gavin Alexander** provides more detail on settlement issues in his evidence. This issue is also discussed in section 6 of the DPS.

Peat

32 Peat deposits present in the inter-dunal depressions are typically very soft with a high proportion of organic content and high compressibility. Typically these are 0.5m to 4m thick, although up to 6m thick in some locations.

33 Peat deposits present a number of design challenges. Specifically, the compressibility of peat can create post construction settlement including differential settlement. This can lead to poor rideability and surface drainage issues, and potential effects on underground services.[13]

34 The chosen design solution will limit post construction settlement and long term impact on the Expressway pavement to ensure NZTA's requirements are met.[14] There are two treatment methods proposed:

34.1 "Excavate and replace", for shallower peat deposits generally less than 3m,

34.2 "Preload and surcharge", for deeper and more extensive deposits.

35 **Mr Andrew Goldie** discusses the use of these treatment methods from a construction methodology point of view in his evidence.

Seismic Design

36 The Project is located within a highly seismic area. It is close to known active fault lines which potentially cross the northern end of the alignment. A moderate to significant seismic event would present risks of:

36.1 Liquefaction and settlement of the sand deposits,

36.2 Slope instability and horizontal movement of existing dunes and new embankments constructed on these deposits, and

[13] DPS 15 December 2011 section 6.4.

[14] DPS 15 December 2011 section 6.4.

36.3 Extensive damage and possible collapse of bridge structures leading to potential loss of life and loss of the bridge's lifeline function post-earthquake, as well as the economic cost of damage to infrastructure.

37 The above risks have been assessed in design. Seismic design criteria are set out in the NZTA Bridge Manual and AS1170. However, a Site Specific Seismic Hazard Assessment has been undertaken for the Project area and the ground acceleration values have been slightly reduced from those in the standard.[15] Design responses to these risks involve:

37.1 Ground improvement measures:

(a) at each bridge structure, to mitigate liquefaction and the movement in approach embankments, and

(b) in road embankments over 6m in height, to limit movement.

37.2 Design of all bridge structures:

(a) to seismic design standards, meaning they will be designed to be undamaged under a serviceability limit state[16] earthquake with a return period of 1:25 years,[17] and to not collapse under the maximum credible earthquake that could be expected in the locality.

(b) to enable the passage of emergency vehicles within 3 days following the ultimate limit state[18] design earthquake (1:2500 years for bridges that carry the Expressway and 1:1000 years for bridges that carry local roads over the Expressway).

(c) to be economically repairable and able to be reinstated to their full design capacity within a period of 12 months following the ultimate limit state design earthquake.

Watercourses, groundwater flows and stormwater management

38 The Project will cross or interact with several watercourses and wetlands (a number of which have ecological and/or cultural

[15] Site Specific Seismic Hazard Assessment 7 December 2011.

[16] NZTA Bridge Manual section 2.1.5.

[17] Return period is the possibility of a particular size event occurring within in a time period.

[18] NZTA Bridge manual section 2.1.6.

significance) drains and floodplains. A list of these (including the Waikanae River) is set out on page 36 of the DPS.

39 The site is also underlain by a series of shallow unconfined aquifers, with high connectivity. In low lying areas, groundwater is close to existing ground level. Groundwater has importance not only for adjacent wetlands but also for a host of shallow residential bores used for drinking water and irrigation purposes.[19]

40 The effects of potential changes in groundwater flows arising from the Project are addressed by **Ms Ann Williams** and related ecological effects are addressed by **Mr Matiu Park**. In addition, the Project includes provision for some wetland enhancement works, as explained by **Mr Park**.

41 Stormwater management also imposes various constraints on how the Project is designed. The stormwater management implications are discussed in section 7 of the DPS, in particular on page 38. **Mr Graham Levy** also describes the hydrological environment, the potential effects and how they will be mitigated.

Other environmental matters

42 The Project Objectives[20] explicitly refer to managing social, cultural, land use and other current and future environmental impacts of the Project on the Kāpiti District and its communities. The Objectives refer to this being achieved, as far as practicable, by avoiding, remedying or mitigating any such effects through route and alignment selection, Expressway design, and consent conditions.

43 A Multi Criteria Assessment (*MCA*) process was employed to help integrate the design into the environment, and this is discussed more fully by **Dr James Bentley** and **Mr Robert Schofield**. More broadly, other witnesses discuss how avoidance and management of environmental matters have shaped the Project.[21]

44 These matters have had a significant influence on both the design and footprint of the Project. The DPS discusses these matters in sections 7–12.

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19 See page 29, DPS.

20 DPS, 15 December 2011, section 2.1.

21 In particular I refer to the evidence of **Mr Amos Kamo** (cultural), **Mr Marc Baily** (urban design), **Mr Keith Gibson** (lighting), **Mr Park** (wetlands), **Mr Stephen Fuller** (ecology), **Ms Siiri Wilkening** (noise), **Ms Julie Meade Rose** (social effects) and **Mr Boyden Evans** (landscape).

PROJECT FUNCTION AND DESIGN

The proposed alignment and comparison with the Kāpiti Western Link Road

45 Chapter 7 in Part D of Volume 2 of the AEE describes the Project's design and form. These design features are also illustrated in the Scheme Plans in Volume 5: Plan Set.

46 The proposed Expressway will extend approximately 16 km[22] from just south of Poplar Avenue, Raumati, to just north of Peka Peka Road.[23] Part D of Volume 2 of the AEE, section 7.2[24] includes a general description of the Project, and section 7.3[25] gives a more detailed sector by sector description.[26]

Variations from the Kāpiti Western Link Road designation

47 As Figure 7.5 of the AEE shows,[27] the Expressway route will generally follow the existing Kāpiti WLR designation, which itself generally followed the original Wellington to Foxton Motorway designation. However, there are some variations, the most significant of which are:

47.1 At the southern end, where the proposed alignment crosses over Poplar Avenue before deviating from the existing SH1 alignment and curving west to merge with the WLR designation on the approach to Raumati Road (the WLR designation instead connected via Poplar Avenue).

47.2 Between Otaihanga and Te Moana Road, where the Expressway alignment is significantly different from the WLR designation. On the southern approach to the Waikanae River, the alignment curves to the west of the WLR designation, with the Waikanae River bridge being located near the western edge of the WLR designation. The alignment then curves eastwards from the existing designation, with the benefit of not bisecting the wāhi tapu area. While the alignment still traverses part of the registered wāhi tapu area, it is located to the east of the urupā and to the west of what is known as the "Maketu tree" (leaving both physically unaffected by the Expressway). In this vicinity, the alignment first follows the toe of a dune,

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[22] While 16 km expressway is discussed here a further 2 km was initially to be included in the consent however this has been removed.

[23] The Project starts at approximately chainage 1900 (Poplar Avenue), and finishes at approximately chainage 18050 (Peka Peka Road).

[24] At pages 141 – 163.

[25] At pages 163 – 181.

[26] Sector 1 being "Raumati South", Sector 2 being "Raumati/Paraparaumu", Sector 3 being "Otaihanga/Waikanae" and Sector 4 being "Waikanae North".

[27] Page 164 of Chapter 7.

passing through man-made ponds, and just beyond the urupā, cutting through a crescent-shaped dune before proceeding to Te Moana Road. At this point, the Expressway more or less abuts the existing WLR designation but again curves eastward before overlaying the WLR designation again to the north of Ngarara Road. At this location, the alignment goes to the west of the WLR designation so as to avoid another significant ecological area, namely the Ngarara Wetland.

47.3 The Expressway alignment extends further north than the WLR designation (which terminated south of Peka Peka Road), merging with the existing SH1 alignment just north of Peka Peka Road.

Works outside proposed new designation

48 At the southern end of the project (Raumati Straight), from MacKays Crossing to the southern interchange at Poplar Avenue, it is proposed to rehabilitate the existing pavement but not to widen the road. These works can proceed under the NZTA's existing designation for SH1, and therefore do not form part of the Project application.

Functional and design comparisons with WLR

49 The Project is functionally different from the WLR and that has significant consequences for design.

50 I understand that the design of the proposed WLR evolved over time (for example traffic signals proposed at Te Moana Road changed to a roundabout, and the original four lanes proposed were scaled back to two). My discussion below has not compared the Project with a specific WLR design but has compared the Project and the WLR at a higher level based on my understanding of the overarching function/design components of the WLR.

Expressway function and design comparisons

51 One key point of difference is that the design speed of the Expressway is 110 kph and its posted speed is 100 kph (as compared with 50 kph in urban areas and 70 kph in rural areas for the WLR). That higher design and posted speed results in quite different safety and efficiency design requirements. For instance:

51.1 Greater sight stopping distances for drivers must be provided. This means that there is a need for straighter horizontal and vertical alignments and a wider footprint. Meandering curves, possible with a local road, are not suitable for an Expressway.

51.2 There are quite different imperatives for intersection treatment and accesses. Typically, "at grade" intersections are appropriate for a local road, and property access is

commonly direct to and from the road. For an Expressway, however, safety and efficiency needs lead to grade separation of intersections and no direct property accesses.

51.3 Median barriers are important features of an Expressway design, but not typically of a local road. The higher speed environment makes elimination of the risk of head on accidents a design imperative. For similar reasons, edge shoulders are provided as they allow vehicles to leave the Expressway safely, for instance in the event of a vehicle incident.

Dual Expressway and local road function comparisons

52 Another important functional difference between the WLR and the proposed Expressway is that the latter is serving a dual function, namely for both inter-regional journeys on SH1 and local access between Paraparaumu and Waikanae, as **Mr Andrew Murray** explains in his evidence. By contrast, the WLR was a local road only. The Expressway's dual function has design implications, particularly in relation to the location and design of the interchanges which provide for entry and exit points for use of the Expressway by local traffic.[28] The urban design and traffic engineering reasons for those different design approaches are explained by **Mr Baily** and **Mr Murray**.

The Expressway cross-section

53 A typical cross section is illustrated in Figure 7.1 of the AEE.[29] This consists of two 3.5m wide traffic lanes in each direction, separated by a central median with a wire-rope barrier, a nearside (left hand) shoulder width of 3.0m (to barrier), and an offside (right hand) shoulder width of 1.0m plus 1 to 2m (to barrier), (except for the Raumati Straight).

54 For most of the route, the Expressway has a 4 metre wide median (although the section from just south of Raumati Road to just north of Mazengarb Road has a 6 metre median, to provide greater width for separate bridges at the proposed urban local road crossings).

55 The typical section dimensions described above are the standard requirements for Expressways as set out by the AGRD Parts 3, 6 and 6B. Traffic on an Expressway requires greater side clearances than the WLR due to the higher speed limit.

Access control, intersections and interchanges

56 **Mr Murray's** evidence discusses the existing accident history for the current road environment.

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[28] Full interchanges are provided at Kāpiti Road and Te Moana Road, and partial interchanges at Poplar Avenue and Peka Peka Road.

[29] Chapter 7, page 142.

57 To provide safe and efficient traffic movements, access on and off the Expressway is to be controlled at grade separated interchanges. A deliberate design choice is that there are no direct property accesses or at grade intersections. The Expressway proposal has nine grade-separated crossings of local roads and four interchanges.[30]

58 Leinster Avenue in the south is the only east/west connection not being maintained.

59 To the north, Smithfield Road is severed by the Expressway but a new local road is proposed 600 metres to the south. This road provides access to Nga Manu Nature Reserve and the properties to the east of the Expressway.

60 In liaison with KCDC, a case-by-case evaluation informed choices about whether the Expressway would pass over or under the local road at each of the crossings. This took into account factors such as the optimum elevation of the Expressway at the road crossing, local topography, the proximity and nature of development in the vicinity of the Expressway and/or local road, Expressway and local road geometrics, construction sequencing, drainage considerations, appearance, cost and the required use of the Expressway and local roads by all modes of transport.

61 The following describes the interchanges and road crossings from south to north.

Poplar Avenue interchange

62 At Poplar Avenue, a partial interchange is proposed, with a southbound on-ramp and a north bound off-ramp allowing vehicles to exit the Expressway heading north, and to access the Expressway heading south.[31] The Expressway will cross over Poplar Avenue by a bridge, with Poplar Avenue remaining at grade but being slightly realigned to the north of its existing location. Two roundabouts are provided at ground level on Poplar Avenue, on each side of the Expressway. These are to provide movements and capacity for the necessary connections. The on-ramps, off-ramps and roundabouts are single lane.

63 The Expressway's horizontal geometry is such that it needs to transition from the designation to the existing SH1 alignment through curves with a design speed of 110kph.

64 Another option considered for this southern end was for the Expressway to cut through the corner of Queen Elizabeth Park and

[30] Interchanges are junctions with on-ramps and off-ramps to connect the Expressway to the local road network.

[31] See Sheets 4 and 5 of the Scheme Plans in the Plan Set (Volume 5).

Te Ra School. This option would have required a north bound off ramp bridge in the Park and another bridge to carry Poplar Avenue over the Expressway. As **Dr Bentley** explains, the decision for the chosen alignment was made following the MCA process.

Raumati Road over bridges

65 The Expressway would cross over Raumati Road via twin over bridges, with Raumati Road remaining at grade.[32]

66 The alternative of taking Raumati Road over the Expressway was investigated. However this would have required a significant number of additional properties in order to raise Raumati Road to an acceptable gradient (5% max.). In addition, the close proximity of the Rata Road intersection and the need for good geometric design would have meant further property would have been needed.

Kāpiti Road interchange

67 At Kāpiti Road, a "full diamond" interchange is proposed, with north and south facing on-ramps and off-ramps.[33] The Expressway will cross over Kāpiti Road.

68 Kāpiti Road will be upgraded to cope with the traffic turning to and from the Expressway, including by being widened to 6 lanes over a length of approximately 350 metres. This is to provide for two through lanes in each direction and turning lanes on the approaches to the Expressway at the interchange. Most of the widening will be on the southern side of Kāpiti Road, so as to minimise property impacts. However, modifications will need to be made to accesses to commercial properties on the northern side of Kāpiti Road, both east and west of the Expressway, due to their proximity to the interchange. While a preliminary design has been undertaken, final design arrangements will need to be confirmed with property owners.

69 The traffic signals will incorporate pedestrian movements. The off-ramps will have two lanes to maximise the efficiency of the traffic signals, while the on-ramps will each have a single lane. These provide for all possible turning movements at the signalised intersections.

70 Space is provided on the road for cyclists travelling in either direction along Kāpiti Road, with footpaths also provided on both sides of the road.

71 Retaining walls will be constructed to minimise the footprint of the interchange.

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[32] See sheet 7 of the Scheme Plans in the Plan Set (Volume 5).

[33] See sheet 10 of the Scheme Plans in the Plan Set (Volume 5).

Kāpiti Road interchange design options

72 A full diamond interchange was considered the only option suitable for this location. In particular as Kāpiti Road is already a busy arterial access north and south is required, and the interchange needs to service the Paraparaumu Town Centre and the airport.

73 Other design options involving Kāpiti Road passing over the Expressway were investigated. However, these options were seen as less desirable by the wider experts' team including KCDC officers. One of these options involved lowering the Expressway. This gave rise to significant additional construction and maintenance costs as a result of the high groundwater levels. The other option kept the Expressway at existing ground level while taking Kāpiti Road over at a higher elevation. Both of these options gave rise to property access complications and safety (sun strike) issues.[34]

Mazengarb Road over bridges

74 It is proposed that the Expressway would cross over Mazengarb Road via twin over-bridges.[35] To reduce environmental effects while maintaining the necessary vertical clearance, Mazengarb Road would be lowered by a maximum of 2m over a distance of 250m. The ability to lower Mazengarb Road at this location is helped by the fact that the road currently rises slightly where it is proposed that the Expressway will cross it.[36]

Otaihanga Road over bridge

75 The proposal is that the Expressway will cross over Otaihanga Road via a single over-bridge, with Otaihanga Road remaining at grade and in its current location.[37] The Road Safety Audit identified that, with the curvilinear alignment of the existing road, there could be potential for the new bridge columns to reduce driver sight stopping distances. This will need to be checked in the detailed design phase. Any issue will be able to be addressed either by shifting the bridge columns or realigning Otaihanga Road slightly. Some of the review team saw the retention of the 'curved' local road in its current alignment as a desirable factor.

Te Moana Road interchange

76 At Te Moana Road, a full diamond interchange is proposed.[38] South facing ramps provide connection to the second crossing of the Waikanae River. North facing ramps allow for the significant current and future planned development just north of Te Moana Road. A

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[34] Road Safety Audit Feb 2011 section 2.5.3.

[35] See sheet 14 of the Scheme Plans in the Plan Set (Volume 5).

[36] Sheet CV-GP-130 in Part 3 of Geometric Plans in Plan set (Volume 5).

[37] See sheet 16 in Part 3 of the Scheme Plans in the Plan Set (Volume 5).

[38] Figure 7.8, in Chapter 7, page 175 of the AEE and sheet 20 of the Scheme Plans in the Plan Set (Volume 5).

partial interchange would not have addressed these issues adequately.

77 On-ramps and off-ramps will connect the Expressway to Te Moana Road, via two roundabouts. An alternative signal controlled arrangement was considered, in view of the perceived improvement to pedestrian and cyclist safety. The roundabout design was preferred because traffic signals would require up to six lanes (compared with two for roundabouts) and the operation of the signals would have meant significant delays for pedestrians seeking to cross. It was considered that these related factors would mean an undesirably greater safety hazard for pedestrians who may elect to cross the road when they are not signalled to do so.

78 The Expressway would cross Te Moana Road and the Waimeha Stream via a single over-bridge. Space on each side of Te Moana Road is provided on road for cyclists. The road is widened with ramps just prior to the roundabout to allow cyclists to ride on the adjacent footpath through the interchange. Crossing points for pedestrians and cyclists will be located where there is good visibility and where the section of the road to be crossed is narrow.

79 Flood risk issues in this vicinity have also influenced the design. The Expressway bridge length is longer than is required to accommodate crossing both Te Moana Road and the Waimeha Stream. The bridge has also been lengthened to provide adequate width for an alternative flow path should the Waikanae River stop banks be breached in a severe storm event. Separate bridge structures are proposed for both the north facing on-ramp and off-ramp over the Waimeha Stream. These short bridges have been designed to a height that accommodates the risk of flood levels in the Waimeha Stream. As a result, it is proposed that Te Moana Road will be raised by approximately 0.5m to allow the ramps to tie into Te Moana Road at an acceptable gradient.

80 The interchange design enables the future construction of access roads to serve planned Waikanae North developments on both sides of the Expressway to the north of Te Moana Road.

81 Options for taking Te Moana Road over the Expressway were investigated. However, these were seen as less desirable by the experts' team. In particular, this was by reason of, additional land severance consequences, stormwater management issues, impacts on overland flow paths, safety issues arising from realignment of Te Moana Road, the fact that this alternative design approach would mean longer trips for local users and a significant increase in cost due to a greater length of bridge structure required.

Ngarara Road over bridge

82 Ngarara Road would be taken over the Expressway via an over-bridge, and be realigned for a distance of 400m.[39]

83 The decision to take Ngarara Road over the Expressway was to allow the Expressway to sit better in the landscape.

84 At this location, the cycleway/walkway (which I discuss further below) joins Ngarara Road on the eastern side of the Expressway and then crosses over the Expressway on the Ngarara Road Bridge to the western side of the Expressway.

85 The alternative of taking the Expressway over Ngarara Road was investigated. The topography at this location would have necessitated a very large amount of fill and reduced the amount of cut material available for use elsewhere on the project. This alternative design was also considered to be out of context with the surrounding environment. The additional cost was a further reason that counted against this alternative.

Smithfield Road replacement

86 A new local road and Expressway over-bridge would provide access for properties currently accessed by Smithfield Road, and for the Nga Manu Nature Reserve.[40] This location will assist with KCDC's long term plan to have an east west connection from the existing SH1 to the coast.

87 Again it was considered that the bridging of the local road over the Expressway would allow the Expressway to sit better in the landscape and also assist with the cut to fill balance.

88 I discuss the other options considered in relation to Smithfield Road in paragraphs 113 and 114 below.

Peka Peka Road/existing SH1 interchange

89 A partial interchange is proposed at Peka Peka Road.[41] As can be seen from the Scheme Plans, the design involves the construction of two roundabouts. It is referred to as a "partial interchange" because it would not allow for all forms of possible traffic movement to and from the local road network. That is:

89.1 Travellers from either Peka Peka Road, Hadfield Road or Te Kowhai Road seeking to go north on SH1 will be able to use the interchange to do so (in due course, that will be via the intended Peka Peka to Otaki expressway section),

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[39] Sheets 23 - 24 of the Scheme Plans in the Plan Set (Volume 5).

[40] See Sheets 24-26 of the Scheme Plans in the Plan Set (Volume 5).

[41] See Sheets 29 - 32 and sheet SP160 of the Scheme Plans.

89.2 Travellers from either Peka Peka Road, Hadfield Road or Te Kowhai Road seeking to go south will be directed to the existing SH1 alignment (and be able to join the Expressway at the Te Moana Road interchange in Waikanae),

89.3 Travellers going north on the Expressway will not be able to exit the Expressway at this interchange (those going to either Peka Peka Road or Hadfield Road would do so by exiting at the Te Moana Road interchange, and travel north using the existing SH1 alignment from Waikanae), and

89.4 Travellers going south on the Expressway will be able to exit the Expressway at the interchange.

90 As a period of time may elapse following construction of the proposed Expressway before the Peka Peka to Otaki Project is completed, a temporary tie in is proposed.[42] It is noted that, during this interim period while the existing SH1 remains north of Te Kowhai Road, it would be possible for travellers north of Te Kowhai Road to enter the Expressway heading south and leave the Expressway heading north. I note that I have discussed the temporary tie in earlier in my evidence in relation to the August 2012 RSA.

Interchange options considered

91 A full diamond interchange at this location was investigated. This investigation identified that it would be significantly more expensive to construct than the partial interchange proposed. The depth of peat in this location means that the cost of constructing south facing ramps is relatively high. However, I note that construction of the partial interchange proposed would not jeopardise any future provision of south facing ramps. That is, it would be possible to modify the current roundabouts and provide the additional connections.

92 I note that various design options for the partial interchange were also considered. In particular, that included the option of connecting Peka Peka Road more directly with Hadfield Road including by a grade separated rail crossing. Analysis showed this option as offering few additional benefits but significantly increasing property impacts and construction cost. In addition to the rail grade separation cost, this option would have required extensive ground improvements in view of the much larger footprint on an area of deep peat.

[42] Refer Drawing No CV-SP-150 in the Scheme Plan set (Volume 5).

Stream bridges

93 The principal bridge structures are set out in a table at page 57 of the DPS. With the exception of the Waikanae River Bridge, these are relatively small scale structures.[43]

Waikanae River bridge

94 It is proposed that the Expressway cross the Waikanae River with a single bridge located between a line of prominent sand dunes in the south and a constructed embankment in the north.[44] The bridge will cross over a new access road from Kauri Road to the Waikanae Christian Holiday Park (known as El Rancho), on the river flood plain.

95 The river itself is of relatively modest size, but the flood plain is quite wide. Hence, a bridge span of 182 metres is necessary. The river and its riparian margins are of course a very important community amenity. Mindful of these matters, a bridge architect was engaged to help develop concepts for the structures. Particular consideration was given to the spaces beneath the bridges where pedestrian and cyclists would pass. **Mr Baily** discusses the bridge design in his evidence.

Consideration of other options

96 As discussed above, the alignment of the bridge was constrained by the design standards required for an Expressway.

97 Options for the Waikanae River Bridge included abutment location and pier arrangement but all were evaluated on a similar horizontal alignment. This was driven by the constraints on the overall geometric alignment required by the Expressway. Actual bridge lengths for options considered spanned similar distances. A separate cyclist/pedestrian bridge was considered. However, this tended to clutter the river environment and resulted in little cost saving as it is required to span the same length as the road bridge (due to flood way constraints).

98 A further design constraint is the clearance required above the Waikanae River for flood conditions. This required a higher alignment than would otherwise have been necessary, and is discussed further in **Mr Levy's** evidence.

Cycling and walking

99 The Project incorporates a 16 km, 3m wide shared cycleway/walkway from Poplar Avenue in the south to Te Kowhai Road in the north.[45] The cycleway/walkway will be sealed in urban

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[43] See section 8 of the DPS for further information relating to bridge structures.

[44] See Sheets 18 and 19 of the Scheme Plans and sheets 450 and 451 of the Structures Bridge Plans in the Plan Set (Volume 5).

[45] See sheets 4 - 32 of Part 5 of the Scheme Plans in the Plan Set (Volume 5).

areas, and have a compacted stone chip (gravel) surface in rural areas. The 3m width is to allow for two-way cycle traffic and to allow room for pedestrians to move beside cyclists with minimal conflicts.

100 The facility will generally be located along the western side of the Expressway. It will run along the eastern side of the Expressway between Otaihanga Road and Ngarara Road, due to space constraints just north of the Waikanae River. The cycleway/walkway will vary in its distance from the edge of the Expressway carriageway, to take advantage of landforms and landscape features such as wetland areas.

101 At Leinster Avenue, and between Kāpiti Road and Mazengarb Road, two cycling/pedestrian bridges are proposed to cross over the Expressway (approximately 58 m long, 4 m wide, with 6.2m vertical clearance over the Expressway). These bridges maintain connectivity that would otherwise be severed by the Expressway.

102 Where practicable, the cycleway/walkway is proposed to connect with local roads and existing cycle/walkway networks, to provide parallel and cross corridor connection. In particular:

102.1 In Sector 1,[46] commencing at the intersection of Leinster Avenue and Poplar Avenue, the facility will run parallel to Poplar Avenue through to the existing highway. The cycleway/walkway will branch off this path and head north on the west side of the Expressway. There are two connections proposed to local roads at Harry Shaw Way and Fincham Road. The cycleway/walkway passes over Raumati Road on a widened road bridge, separated by standard barrier and railing. This is due to the steep topography at this location. A local connection is made to Raumati Road on the northern side of the road.

102.2 In Sector 2, an additional cycleway/walkway connection would be provided to connect back to the local network in the vicinity of 58 Kiwi Road. A connection will be made also to the popular Wharemauku Stream Walkway. At Kāpiti Road, there will be an at-grade pedestrian/cyclist crossing on the west side of the Expressway. The crossing will be controlled by the traffic signals.

102.3 In Sector 3, the cycleway/walkway re-connects with the local road network at Otaihanga Road, where it crosses to the eastern side of the Expressway. The Waikanae River Bridge

[46] A cycleway/walk way is planned for QE park and there is opportunity to improve the connection on Poplar Ave but these works do not form part of this notice of requirement.

will incorporate a cycleway/walkway on its eastern side. In addition to this, there will be links connecting the cycleway/walkway to the existing east-west pathway along each bank[47] of the River. Just north of the bridge, the cycleway/walkway diverts onto the local road network before reconnecting with the Expressway corridor at the western end of Puriri Road to continue adjacent to the eastern side of the Expressway. A connection with Te Moana Road is made just east of the interchange.

102.4 In Sector 4, the cycleway/walkway will connect to Ngarara Road and cross over the Expressway on the new Ngarara Road bridge. From here, it will run along the western side of the Expressway again joining eventually with Peka Peka Road in the north. It will also be possible to make a connection to Nga Manu Nature Reserve on the local road.

Bridleway

103 As a recreational facility, bridleways are proposed. These will consist of a grassed flat berm approximately 1m in width adjacent to relevant sections of the cycleway/walkway.

104 The bridleways are intended to enhance recreational experiences for horse riding in facilities such as Queen Elizabeth Park and the Waikanae River public reserve areas. Bridleways will be provided from Poplar Avenue to south of Raumati Road (although not directly on to Raumati Road), from Otaihanga Road to the Waikanae River (connecting with the well-used river trail) and from Te Moana Road to Peka Peka Road.

PROPERTY ACCESS ISSUES

105 Property access and access to the local road network and local services was carefully considered in developing the design of the Expressway and its impact on residents. There are a number of locations that required access to be changed to accommodate the Expressway and provide convenient access. These are discussed below.

Leinster Avenue

106 The Expressway crosses the eastern end of Leinster Avenue, severing the connection with the existing SH1. Vehicle access for Leinster Avenue will be via its western end to Poplar Avenue. Consideration was given to maintaining a connection to the existing

[47] Note that while on plan CV-SP-118, a dashed line is shown linking the northern river track to the Expressway cycleway/walkway, the exact location is yet to be determined.

SH1 from Leinster Ave but this proved very expensive and difficult to achieve without requiring more property.

107 A pedestrian/cycle bridge is proposed over the Expressway near the eastern end of Leinster Avenue. A 450m long and 6m wide cul-du-sac will be formed as a public access road to the six properties to the north of Leinster Avenue (which would otherwise be severed).[48]

108 Since lodgement of the Project application with the EPA, I understand that KCDC has agreed that the access road that serves the six properties will be able to be used as part of the cycleway as this access road will have low traffic usage. This would allow for further enhancement of the landscaping and noise bund at this location.

Kāpiti Road

109 A number properties either side of the interchange on Kāpiti Road will require modification to their street access. Preliminary designs have been prepared and consultation with each of the owners has taken place. The properties affected include; numbers 90 to 96 on the eastern side of the Expressway and numbers 102 to 108 on the western side.

Mazengarb Road

110 One property access will require regrading to meet the altered level of Mazengarb Road. Retaining walls will be required on the eastern side of the Expressway to prevent earthworks extending into private property.[49]

Otaihanga Road

111 Currently, a number of properties south of the Waikanae River gain access via a long private right of way (*ROW*) that joins Otaihanga Road to the west of the proposed Expressway. The Expressway will sever this ROW. To mitigate for this, a new 730m long ROW is to be constructed. This will be at the eastern edge of the proposed Expressway designation, and connect the existing ROW to Otaihanga Road. Utility services which currently are located within the existing ROW will be disconnected and replacement services will be provided along the proposed new ROW.[50]

Kauri Road

112 The Expressway crosses to the west of the western end of Kauri Road. It will sever the access to El Rancho beyond the end of the public road. It is proposed to relocate the access under the Waikanae River Bridge, near the northern abutment. In this location, the access will be within the Waikanae River floodway, for

[48] Sheet 6 of the Scheme Plans in the Plan Set (Volume 5).

[49] Sheet 14 of the Scheme Plans in the Plan Set (Volume 5).

[50] Sheet 16 of the Scheme Plans in the Plan Set (Volume 5).

a 300m length. The El Rancho access way pavement will be specifically designed to be able to cope with inundation in flood events from the Waikanae River. It is currently proposed to use a concrete pavement. However, this will be investigated further during the detailed design stage. An alternative emergency access is available for El Rancho to Weggery Drive.[51]

Puriri Road

113 The Expressway crosses to the west of the western end of Puriri Road. It would sever access to one property and the Takamore urupā beyond the end of the public road. Five properties at the western end of Puriri Road are required to be purchased to enable a cul-du-sac and noise bund to be constructed. Access to the urupā is proposed off Te Moana Road via a new road just to the west of the proposed interchange.[52]

Smithfield Road

114 As discussed earlier in my evidence, the Expressway severs Smithfield Road approximately 400m from the intersection with Ngarara Road. There are currently three properties that gain access from the severed section of Smithfield Road. In addition, the access to Nga Manu Nature Reserve is severed. As stated above, access to these properties will be provided via a new local road.

115 For completeness, I also note that the following design options were considered in consultation with KCDC to provide access to properties to the east of the Expressway as a result of the closure of Smithfield Road. At the same time consideration was given to providing access to the Nga Manu Nature Reserve. The options considered were:

115.1 Provision of a bridge across the Expressway in the approximate location of the existing Smithfield Road with a link back to the Nga Manu Nature Reserve. As there is a sharp curve just to the west of the Expressway alignment, the new local road over the Expressway would need to be straightened to comply with design standards. While this adequately met the connectivity for the Smithfield Road residents, it was considered to be less desirable for Nga Manu Nature Reserve.

115.2 Provision of an at grade access off the local road commencing prior to the realigned Ngarara Road located on the eastern side of the Expressway. This option did not address KCDC's future plan for an east/west connection between the existing SH1 and the coast.

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[51] Sheet 18 of the Scheme Plans in the Plan Set (Volume 5).

[52] Sheets 19-20 of the Scheme Plans in the Plan Set (Volume 5).

115.3 A two bridge option was also investigated, one bridge at Smithfield Road and a second where the Nga Manu Nature Reserve access is currently located. This added significant cost and would have required the construction of embankments and bridges that would be out of context with the surrounding landscape. This was not considered a satisfactory option by the team of experts.

116 A number of other options combining the above and the preferred alignment were also investigated. None addressed all the issues as well as the preferred option.

RESPONSE TO SUBMISSIONS

117 A number of submitters have raised matters relating to the design of the Project and/or issues which relate to the design constraints for the Project. I have addressed these submissions below. I note that I have addressed the submissions of key stakeholders by responding to their specific submissions, and addressed the balance by grouping submissions by reference to the issues they raise.

KCDC

118 My responses to KCDC's submission (by reference to paragraph numbers) are as follows. I note that KCDC seek that various matters be explored in further discussion and conferencing sessions.

Signage – para 138

119 Further development of directional signage will be undertaken during the detailed design phase, where such key destinations like Southwards Car Museum etc. can be identified and included.[53]

Nga Manu access – para 143

120 Concepts have been developed for alternative access to Nga Manu and I understand these are in line with the outcome sought by KCDC. The Notice of Requirement includes provision to allow for an extension to the road. Should part funding not be available from KCDC, an alternative access to that shown on plan CV-SP-125 has been developed. That will allow access to Nga Manu from the west and ability for future access from the east should the link road be constructed to the existing State Highway.

Design and placement of pedestrian over-bridges – para 145

121 It is intended the KCDC will be included in the process to determine the final design and placement of the pedestrian bridges similar to the way the KCDC was involved in the MCA phase that was previously undertaken. This will occur at the commencement of detailed design. KCDC will also have the opportunity to request

[53] See also submissions of El Rancho (0477), Betteridge (0695).

changes to the proposed design of the over-bridges when the outline plan for these works is submitted.[54]

Bridge design – para 148

122 The design/appearance and configuration has undergone a joint development process, in conjunction with KCDC. It is anticipated that only minor changes would now occur. Should this be the case, KCDC will be consulted similarly to how it was involved in the MCA process.

Mazengarb Road bridge – para 149

123 It is acknowledged that there are some design issues relating to the retaining walls with the current Mazengarb Road underpass, and consideration is being given to alternative solutions. Similarly to the above, the KCDC will be included in the decision regarding the final option.

Te Moana Road roundabout – para 161

124 The selection of roundabouts as the preferred treatment for the Te Moana Road interchange is also discussed by **Mr Murray** from a traffic modelling perspective. I have referred to the selection in paragraph 74 of my evidence. I point out that KCDC, in developing the WLR, finally selected a large roundabout as the most suitable treatment for this intersection.[55] Further consideration to the inclusion of traffic signals could be undertaken during the detailed design phase where all modes of transport could be investigated further. It is noted that submissions from the wider public were received on this issue.[56]

Details for KCDC certification – para 162

125 Each site where a bridge is required has had a preliminary assessment undertaken to determine the use of the local road. This includes the requirements for pedestrian movements, traffic present and future, utility services, over dimension route etc. As part of the detailed design, this will be developed further in conjunction with Council. This process is discussed further by **Mr Baily**.

Standards of design for cycleway, walkway and bridleway – para 172

126 It is proposed to design the cycleway/walkway in accordance with the AGRD – part 6A. This covers geometric alignment, treatment at intersections, signage etc. Where the standard cannot be met, discussions will occur with KCDC so as to find an appropriate solution.

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[54] **Mr Schofield** discusses the outline plan of works process that will be undertaken in relation to these over-bridges.

[55] Council Meeting: 2 October 2008; Western Link Road – Project Scope, Macroscope and Alignment.

[56] See submissions of: Pomare (0309), Lewis (0427), Gummer (0484).

Design of pedestrian/cycle bridges – para 173

127 Refer to my response to KCDC paragraph 145 above.

KCDC services – paras 228-229

128 Consideration has been given to providing a common services corridor along the Expressway, following request from some Network Service providers. Capacity exists for this and could be provided within the footprint of the designation. Allowance has been made in the Waikanae River Bridge for future watermains and wastewater rising main to be installed between the super Tee beams. Similarly, allowance has been made on the proposed Ngarara Road Bridge for a watermain to be installed. On the other structures smaller services can be accommodated within the double hollow core beams.

KCDC water supply bores – para 230

129 The design of the Expressway and associated works has taken into account the location of the existing KCDC water bores. In the case of K10, at Te Moana Road, the intersection has been revised to allow the existing bore to be retained. The detailed design will be discussed with KCDC prior to construction.

KCDC pipeline – para 231

130 Where the Expressway crosses an existing KCDC service, the effects of construction (including settlement) have been assessed. Proposed works to either replace or protect this pipeline will be discussed with KCDC and their approval sought.

Wellington Regional Council (0684)

131 The Wellington Regional Council (*WRC*) submission recommends provision of a utilities services corridor (at page 4). I refer to my earlier response concerning KCDC's submission (paras 228-229 of their submission). I note there is also potential for additional communications services in the ducts installed for the ATMS.

Nga Manu Nature Reserve (0090)

132 In response to the submission from Nga Manu Nature Reserve (0090) concerning access to Nga Manu, I refer to my earlier response to KCDC's submission on this matter (ie my response to para 143 of KCDC's submission).

Western Link Road

133 A number of submissions seek that the WLR be built instead of the Project.[57] I have discussed earlier in my evidence why I do not consider that the WLR would be viable to achieve the Project Objectives from an engineering perspective. Fundamentally, the

[57] See submissions of: Booth (0002), Ellis (0005), Hunter (0008), Simpson (0037), McCallum (0042), Hagar and Laird (0056), Hutcheson (0066), Hawken (0072), McGavin (0097), plus another 50 submissions (approximate).

WLR was to serve a different function and that fundamentally bears upon design. These matters are also discussed by **Mr Murray**.

134 A number of submissions seek that, as well as building the WLR, the existing highway be improved and retained for through traffic.[58] Making minor safety improvements would not meet the project objectives and deliver an expressway standard highway. Grade separation of intersections and construction of local access roads to severed properties would still be required. These matters are also discussed by **Mr Murray**.

Full interchange at Peka Peka

135 A number of submissions seek to have north facing ramps constructed at the Peka Peka interchange, providing full access.[59] Paragraphs 89 to 92 of my evidence discuss this issue.

Seismic risk

136 A number of submissions express concern that the location of the proposed Expressway is inappropriate due to seismic events including liquefaction.[60] The constraint imposed by seismic events is one of many constraints that must be considered when evaluating the most appropriate location for an Expressway. I have discussed the standards and criteria used at paragraphs 36-37 of my evidence. As I explain there, the design allows for seismic events of the specified magnitudes. **Mr Alexander** also discusses this in his evidence.

Access to property

137 A number of submissions raise concerns, or seek confirmation and/or clarification of how the Expressway would impact on their property access. The response I provide below is the current status (although I note that some matters may have progressed further by the time I present evidence).

281 Ngarara Road[61]

138 Access to this property is linked to the Nga Manu access and is discussed at paragraph 120 above.

267 SH1 Waikanae[62]

139 As the proposed Expressway severs the house and existing infrastructure from a large portion of the farm property, access and

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58 See submissions of: Simpson (0037), Hawken (0072), Wallace (0121), Save Kāpiti Incorporated (0505), plus others.

59 See submissions of: Brown (0018), Foskett (0036), Riding (000092) Reid (457) and 8 others.

60 See submissions of : Hare (0150), Burton (0297), Downie (0346), Love (0470), Baxter (0422), Inge (0429), Lattey (0466), Gummer (0484), plus 15 others.

61 See submission of M^{c}Kenzie (0038).

62 Brown (0068).

future management issues will need to be resolved. NZTA and its Agent are currently working with the property owner to resolve these issues.

92-94 Kāpiti Road[63]

140 Due to the proximity of the Medical Centre to the proposed Kāpiti Road interchange, the existing access cannot be maintained. The submitter also identifies a number of issues that would make operating the facility during the construction of the Expressway very difficult. NZTA and its Agent are currently working with the property owners to find an agreeable solution. **Mr Andrew Quinn** and **Dr David Black** also addresses this submission.

Waikanae Christian Holiday Park[64]

141 I have discussed the proposed new access to El Rancho in paragraph 112 of my evidence. The submitter requests a number of other details regarding maintenance and operation which are required due to the change to the access, which NZTA would commit to. A footpath/cycleway will be provided adjacent to the access road.

108 Kāpiti Road[65]

142 Due to the proximity of this property to the proposed Kāpiti Road interchange the existing access cannot be maintained. NZTA and its Agent are currently working with the property owners to find an agreeable solution.

Project Cost

143 A number of submissions express concern at the increases in the Project budget.[66] The figure released in 2009 of $389m was a very preliminary estimate. Since that time, the Project scope has changed and considerable investigation and design has been undertaken giving a greater level of confidence with the current figure of $632.6m.

Vector Gas Transmission line

144 A number of submissions express concern at the proposed relocation of the dual high pressure gas mains.[67] The NZTA is working very closely with Vector to ensure the relocation works are undertaken safely and in accordance with the appropriate standards. The cost for this relocation is included in the Project budget. A separate land use consent will be sought for this work.

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63 See submission of Paraparaumu Medical Centre (0521).

64 See submission of El Rancho (0477).

65 See submission of Baray Holdings Ltd (0635), Kāpiti Car Clinic (0612).

66 See submissions of: Pomare (0309), Edbrooke (0517), Rational Transport Society (0611), Engman (736).

67 See submissions of Pomare (0309), Sisarich (0328), O'Sullivan (0675).

Friends of the Waikanae River Inc.[68]

145 The Friends of Waikanae River raise a concern that the bridge over the Waikanae River will be one structure rather than two separate structures which would allow light between the bridges. Consideration was given to this issue but it was decided for the following reasons that a single structure was the better option at this location:

145.1 The additional cost for separate structures, particularly given its length (182m), is significant.

145.2 Just north of the bridge the Expressway crosses the corner of the registered wāhi tapu area, passing to the west of the Maketu Tree and to the east of the Urupā. At this location a narrow footprint is required, i.e. a narrow 4m median. It is also important from a safety perspective to maintain a consistent median and minimise changes. The width of two separate structures would be greater than the footprint required for one structure. Having two bridges cross the Waikanae River would mean that the requirement for a narrow footprint in this area would not be met.

Waikanae On One[69]

146 Waikanae On One request that the structures over the Waikanae River and the Waimeha Streams be lower than currently proposed.

147 I refer to paragraph 81 above where I discuss options for keeping the Expressway low and taking Te Moana Road over the Expressway. The height of the Expressway over Te Moana Road is determined by the minimum height clearance for traffic to pass under the bridge (4.9m). The height of the Expressway over the Waikanae River is determined by the flood debris clearance and the 4.5m height clearance required for the El Rancho access.

148 I therefore do not consider that the Expressway could be lowered in this area as sought by Waikanae On One.

[68] Submitter number 0059.

[69] Submitter number 0514.

RESPONSE TO SECTION 149G(3) KEY ISSUES REPORTS

149 The section 149G(3) report prepared by KCDC raised seismic risk, liquefaction, flooding and the degree to which the Expressway is resilient in the event of a natural disaster as an issue.[70] This issue has already been addressed in paragraphs 36-37 and 136 of this statement of evidence, and is expanded on further in sections 6 and 7 of the DPS.[71]

Noel Robert Nancekivell
5 September 2012

[70] See pages 10, 21-22, 24 and 36-37 of the Section 149G(3) Key Issues Report prepared by KCDC.

[71] Technical Report 1.