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Tēna koe Pam

**KiwiRail Regional Freight Hub – Notice of Requirement**  
**Further information required pursuant to s 92 of the Resource Management**  
**Act 1991 (RMA)**

The Council's Reporting Officers have reviewed the Notice of Requirement (NoR) and supporting documentation lodged by KiwiRail for the Regional Freight Hub Project ("the Project"). The Reporting Officers have compiled a list of requests for further information in accordance with s 92 RMA.

The information requested will assist the notified public, Reporting Officers, and subsequently the Hearing Panel, to understand the full nature of the Project and the scale of the potential and actual effects on the environment arising from the Notice of Requirement.

The request for further information under s 92(1) is set out at Schedule 1, attached to this letter.

The Reporting Officers welcome a response to the request for further information in accordance with s 92A(1) within 20 working days, pursuant to the extension granted to enable thorough preparation of responses. By our calculations, this is the 1<sup>st</sup> February 2021 .

If you have any questions about this letter, or would like to discuss it in more detail, please contact Anita Coplestone on [anita@perceptionplanning.co.nz](mailto:anita@perceptionplanning.co.nz).



Yours sincerely

**Anita Coplestone**  
**S42A Reporting Planner**  
**for the KiwiRail Regional Freight Hub Notice of Requirement**  
PALMERSTON NORTH CITY COUNCIL

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# Schedule 1

## Design and Construction

### 1.1 Effects from Land Disturbance

The Assessment of Environmental Effects ('AEE') (section 9.2.3) states that erosion and sediment controls will be fully detailed in an Erosion and Sediment Control Plan, prepared in accordance with the "Erosion and Sediment Control Guide for Land Disturbing Activities in the Auckland Region: Guideline Document 2016/005" (GD05). The Stormwater Management and Monitoring Plan condition in Appendix 3 does not refer to or require a ESCM or require compliance with any particular standards.

**1) How does KiwiRail propose to demonstrate compliance with these standards?**

### 1.2 Dust and Air Quality Effects (AEE, Sections 9.2.3.2 and 9.13)

The assessment of the effects of dust in the AEE focuses predominantly on dust generated during the construction stage. Despite this, section 10.2.3 (Stage 2 – Site Layout) explains that the potential adverse effects of dust generation during operation was a site layout consideration (e.g. in relation to location of the log loading area, arrival/departure and marshalling areas).

**2) What is the potential for dust generation from operation of these areas and is an operational dust management plan appropriate to manage these potential effects?**

## Lighting Design

As the effects on Sangsters Road residential properties are an important consideration, the lighting layout in Technical Report A – Design, Construction and Operation Report - Appendix B Lighting Design Report should be updated to reflect the current proposed Regional Freight Hub design.

**3) Please provide an updated lighting layout showing light contours and the boundary of the NoR.**

**4) Please provide the following, in relation to the lighting layouts:**

**(i) The lighting calculations for the worst-case effects situation, which is with a maintenance factor of 1.0 (i.e. the initial values without depreciation for luminaire/LED aging and dirt accumulation).**

**(ii) Obtrusive lighting calculations for vertical illuminance spill light and luminaire maximum luminous intensity on the window line of surrounding residential properties (these could be simplified by a common calculation plane along the line of the closest dwelling).**

**(iii) Identify whether any of the proposed acoustic barriers along the site boundaries are considered to provide a level of mitigation of light effects to surrounding**

*residential dwellings (if this mitigation is to be considered then these should be included in the lighting model).*

- (iv) Calculation of the Upward Light Ratio in accordance with AS/NZS 4282:2019.*
  - (v) Identify how the lighting addresses the requirements of North East Industrial Zone ('NEIZ') assessment criteria (h)(iii).*
- 5) Please identify and assess any effects of train headlight sweep resulting from site train movements within the site, with particular regard to surrounding residential dwellings.**
- 6) With reference to Technical Report A - Design, Construction and Operation, please provide the following clarifications:**
- (i) 3.2 Key Elements, 3rd to last bullet point, states: "Overhead lighting in all yards with the possibility of providing underside lighting on tracks". What will this underside lighting on tracks consist of?*
  - (ii) 4.1 Luminaire and Mounting Parameters: there appears to be a typo error in the mounting height quoted for Type K luminaire. We expect this should be 22.078m. Please confirm.*
  - (iii) Throughout the Lighting Design Report reference is made to 'low level lighting'. What is this referring to?*

## **Noise and Vibration**

- 7) Please specify any appropriate noise criteria or explain why that would not be appropriate.**
- 8) Please provide predictions of noise management boundaries for the Regional Freight Hub.**
- \*Note - This would be a similar concept to airport noise management for example, except using the  $L_{Aeq(1hr)}$  descriptor. The noise management boundaries would be represented by reasonably conservative noise contour predictions that would allow the Regional Freight Hub activities to take place, whilst adopting the best practicable option to mitigate the noise. The inner boundary would establish maximum noise from the Regional Freight Hub either for maximum daytime noise or maximum night-time noise (if noise emissions are substantially different at these times).*
- 9) Please identify the expected maximum levels of noise from daytime activity and the expected maximum levels of noise from night-time activity based on  $L_{Aeq(1 hr)}$  descriptor and the  $L_{Amax}$  descriptor for night-time activity. If any duration corrections are assumed in the daytime predictions, please describe the assumptions.**

- 10) ***With respect to 8 & 9 above please provide night-time noise management boundaries predicted at 5 dB increments between 70 dB  $L_{Aeq}$  (1hr) and 40 dB  $L_{Aeq}$  (1hr) and 100 dB  $L_{Amax}$  and 70 dB  $L_{Amax}$ .***
- 11) ***With respect to 8 & 9 above please provide daytime noise management boundaries predicted at 5 dB increments between 70 dB  $L_{Aeq}$  (1hr) and 50 dB  $L_{Aeq}$  (1hr).***

***\* Note - it is intended that these noise management boundaries will provide the baseline information on the noise impacts of future predicted/allowable Freight Hub noise on dwellings. Noise conditions will need to protect existing dwellings and the sites for future dwellings that could be constructed as permitted activities.***

Figure 9 and Figure 12 in the Technical Report D - Acoustic Assessment provide the baseline information on potential noise management boundaries for operational noise. Figure 12 includes a conceptual 5 m high bund/concrete wall 3 km long on the eastern side. This wall will vary in height according to topography and have a visual impact.

- 12) ***Given the different character of effects associated with the mitigation measure, please provide additional modelling of the acoustic screen height for daytime and night-time activity levels at the following height scenarios:***
- (i) ***no bund or barrier;***
  - (ii) ***3 m screen;***
  - (iii) ***5 m screen.***
- 13) ***The height of the acoustic screen is taken from the Regional Freight Hub side. Please provide additional sections through the high points on Sangsters Road, e.g. 27 & 91 Sangsters Road.***

It is not possible to identify the dwellings (or eliminate the commercial buildings) that are impacted in Figure 9 and Figure 12 of the Acoustic Assessment, and predicted noise impacts on those properties and predicted effectiveness of the proposed mitigation measures need to be properly understood.

- 14) ***Please provide the predicted noise levels for individual dwellings or representative groups of dwellings with the predicted levels for the various scenarios (i.e. for the different screen heights). Sites on which dwellings can be constructed as a permitted activity and commercial buildings also need to be identified.***
- 15) ***Please provide the addresses of dwellings or groups of dwellings within the 50 metre and 200 metre buffers illustrated in Figure 11 of the Acoustic Assessment for construction noise impacts.***

A 3 m high bund or wall is proposed along the south side of Maple Street properties. There are three two-storey dwellings for which the upper storey windows would not appear to be screened by the proposed acoustic bund/wall.

- 16) *Please confirm whether the proposed acoustic bund/wall will provide mitigation for the upper level of these residences and if not, what will the significance of effect be on these three residences?*
- 17) *Assumed noise measures in the Acoustic Assessment include quiet road surfacing measures (stone mastic asphalt). What precisely will the road surfacing material be and where should this surfacing start and finish?*
- 18) *There are no NPS or NZS criteria for operational noise controls and the Acoustic Assessment derives 'Recommended Noise Criteria' in Table 5. In relation to the Categories (A, B and C):*
- (i) Did the development of the criteria take into account the Residential Zone of Bunnythorpe?*
  - (ii) Did the development of the criteria take into account the noise limits of the adjacent Rural Zone?*
  - (iii) At page 19 it is specified that no corrections for Special Audible Characteristics (SACs) were made for railway activity such as impulsive noises associated with shunting. Why not?*
- 19) *Please list any/all railway activities in the railway yards (e.g. possibly shunting, reversing beepers on forklift trucks, the log yard or roots blower noise) that would have special audible characteristics?*
- 20) *Is noise to be assessed in accordance with NZS 6801 and NZS 6802? If the answer is no, please explain why the standard is not appropriate, and identify which standards should be applied?*
- 21) *Please provide noise measurements or predictions for:*
- (i) the noise of shunting rolling stock (including short term impulsive noise of the freight wagon couplings on small shunts); and*
  - (ii) starting, stopping (braking) noise of assembled trains.*

The efficiency of noise barriers in a downwind direction is strongly reduced by refraction of sound.

- 22) *Has the potential for refraction caused by Palmerston North's predominant westerly winds been taken into account in relation to the 5 metre continuous barrier on the eastern boundary? How might refraction in this location impact the effectiveness of the barrier?*

The road traffic noise assessment (page 20, Acoustic Assessment) is based on future forecast traffic flows when the site is first opened for operation (2031).

- 23) *Please provide an assessment of noise from future traffic flows at expected full-build out, i.e. 2050.*

Substantial earthworks are required to establish a uniform platform for construction of the Freight Hub. Works to construct the new North Island Main Trunk Line (NIMT) track will take place before noise mitigation works on the eastern boundary of the Regional Freight Hub, over a period of three years.

- 24) What temporary mitigation measures are available (if any) for this phase to protect sensitive receptors on the eastern boundary of the Regional Freight Hub during these construction activities?**
- 25) If existing vibration levels are to be relied upon as a baseline at any dwellings, then please undertake vibration monitoring of the existing NIMT line at those dwellings.**

The Acoustic Assessment concludes that the residual noise and vibration should be at reasonable levels and “effects should be acceptable in this environment”.

- 26) What is “this environment” as referred to in this conclusion?**
- 27) What changes will occur to noise levels on the NIMT line north of the Regional Freight Hub as trains approach and pass through Bunnythorpe, e.g. would additional brake squeal occur that would increase nuisance noise? How would this be mitigated?**
- 28) Is it intended that any shunting will occur on the NIMT, outside of the proposed designation? If yes, has that been taken into account in the noise assessment?**

Several references are made in the Acoustic Assessment of noise mitigations that might be implemented if they are “practicable”.

- 29) What does practicable mean in this context (for example, see page 20), and how will practicability of potential mitigation options be assessed?**

Page 19 of the Acoustic Assessment states that the methodology of the assessment included to: “Identify areas where noise criteria (Category A) might be exceeded and work with the project team to adapt and refine the indicative site layout to reduce noise emissions at houses where practicable”.

- 30) Please identify what practicable adaptations or refinements to the site layout were recommended to reduce noise emissions?**
- 31) The following questions concern general good practice to be addressed in the Noise Management Plan:**
- (i) Is it practicable to avoid the use of tonal alarms at night?**
  - (ii) Is a swing nose crossing practicable?**
  - (iii) Is it practicable to maintain the couplings on the general freight wagons in line with these noise mitigation requirements?**
  - (iv) Will internal container handling areas and vehicle circulation areas be sealed?**
  - (v) Would the noise insulation investigation for dwellings include ventilation?**

- (vi) *Are two permanent noise monitoring locations adequate for an operation of this size?*

## Landscape and Visual

### 4.1 Mitigation

Technical Report E – Landscape and Visual Effects Assessment (“LVA”) discusses several mitigation measures, with many described as “benefits” or as having positive effects (for example paragraph 10).

- 32) *By reference to identified mitigation measures, please clearly identify and delineate between those which are predicted to mitigate adverse effects, and those which are predicted to provide distinct positive environmental effects.***

The LVA recommended future stage mitigation measures in circumstances where effects are identified as being “more than moderate” (paragraph 11). Some of these further mitigations would appear to be appropriate measures whether or not a “more than moderate” threshold is met.

- 33) *Please identify how and when an assessment will be carried out in relation to potential residual effects (as discussed), and what the resulting effects are once further mitigation has been put in place.***
- 34) *Please clearly list in a table all proposed mitigation measures for adverse landscape character, natural character and visual amenity effects, and identify which ones will be carried out as part of the proposal, and which ones depend on further future assessment.***

When discussing visual amenity effects, the LVA states that “The relocation of the NIMT line will help reduce visual effects along Te Araroa Trail, as the noise mitigation wall can be located on top of the existing embankment and, providing this can be rehabilitated with growing media, the area between the wall and the Sangsters Rd reserve planted” (paragraph 6.77). The Landscape Plan shows Tall River Plains Planting (10-15m high) along Sangsters Road. Some sections of this boundary will have a high embankment (as illustrated in Cross Section 8). Embankments can be dry, making planting difficult.

- 35) *Please comment on the likelihood of this embankment being planted and the likely success of this planting, and what alternatives have been considered if planting is not possible or unsuccessful.***
- 36) *Please provide information on how the absence of this planting would affect the landscape and natural character, and visual amenity effects assessment.***

On several occasions throughout the LVA, there is reference to “the NEIZ Design Guide”. It is noted that “A detailed design, prepared in accordance with the NEIZ Design Guide principles (as I understand KiwiRail intends to do), will ensure a design that minimises perceptions of bulk and scale” (paragraph 11.b). While this design guide provides some guidance, it is high level and not specific to this project.

**37) Please provide confirmation of KiwiRail's intention to:**

- (i) follow the North East Industrial Zone (NEIZ) Design Guide principles; and/or**
- (ii) create a design framework which is specific to this project.**

## **4.2 Visual Amenity**

The visual amenity assessment discusses visual amenity effects on Maple Street: “while the Landscape Plan currently shows the bund planted, it could be retained in pasture, which would reduce its perceived height” (paragraph 6.91).

**38) Please provide information as to whether removal of planting on the bund adjacent to Maple Street will affect assessment ratings for landscape and natural character, and, if so, what these effects will be.**

Currently, the Tararua Range is visible from houses on Maple Street and the Maple Street cemetery.

**39) Please provide information as to whether views of the Tararua Ranges will be retained post project completion.**

The visual amenity assessment comments that residents “with unobstructed, open, views in close proximity to the Site are most likely to experience adverse visual amenity effects” (paragraph 6.78). These include properties along: Roberts Line, Clevely Line west, Te Ngaio Road, Maple St, Clevely Line east, Sangsters Road, Parrs Road, and Tutaki Road. However, viewpoints have not been provided for: Roberts Line west, Clevely Line west, Te Ngaio Road, or for Sangsters Road. Motorist views along Sangsters Road are also absent from the representative viewpoints.

**40) Please provide representative residential viewpoints from Roberts Line west, Clevely Line west, Te Ngaio Road, and Sangsters Road, as well as viewpoints for motorists travelling on Sangsters Road.**

“Visual effects as experienced from individual properties has not formed part of this assessment process” (paragraph 6.56, LVA). Due to the potential scale of adverse effects it is important to look at the visual amenity effects of particularly affected properties.

**41) Please identify all individual residences at the locations specified at paragraph 6.78 (properties with unobstructed, open views in close proximity to the site), and identify, so far as possible, what the predicted scale of adverse visual amenity effects will be, with proposed mitigation measures.**

**42) Please provide viewpoints from individual residences at the locations specified at paragraph 6.78 (LVA) (including properties with unobstructed, open views in close proximity to the site).**

**43) In addition to mitigation planting, has consideration been given to any other design constraints (e.g. setbacks) or mitigation measures for affected properties (including those specified at paragraph 6.78 (LVA) with existing unobstructed, open views in close proximity to the site)?**

In the Technical Report D – Acoustic Assessment the noise mitigation wall is described as either being constructed of timber or concrete. The LVA describes it as a concrete wall.

- 44) Please clarify what material the wall will be made of, and provide further details on the effects of the appearance of the noise mitigation wall in terms of landscape character and visual amenity.**

### 4.3 Graphics

Technical Report E Appendix 1 - Context Photographs has provided photographs of the existing environment from identified representative viewpoints. Visual simulations of the proposal are appropriate from the identified viewpoints. Preparation of any simulations of visual change to assist this process should be guided by best practice as identified by the NZILA.<sup>1</sup>

- 45) Please provide visual simulations from the identified viewpoints and requested viewpoints (as above), preferably with a 40° field of view (as per the NZILA guidelines). Please provide two versions of the simulations, one version depicted without mitigation planting and one with mitigation planting at a growth height anticipated after three years. Please also provide comparable 'before' photographs of these viewpoints with a 40° field of view, alongside the simulations.**

### 4.4 Scale of Assessment

The LVA considers the existing environment at three scales: the Manawatū Plains, the Bunnythorpe – Palmerston North environs, and the immediate site (paragraph 4.1). It would be helpful for these areas to be depicted visually. It is also unclear which spatial extent is considered in the assessment of effects and this needs to be clarified.

- 46) Please provide an illustration depicting the extent of the three identified scale areas (ref LVA, paragraph 4.1).**
- 47) Please confirm which of the three scales the assessment of effects for landscape and natural character relate to (or if all scales have been considered).**

### 4.5 Existing Environment

The existing environment description provided in the LVA is helpful for understanding the context of the project, but what is considered to be the existing environment (including existing natural and landscape character values) is not clearly articulated. Additionally, landscape and natural character values are not discussed independently from one another.

- 48) Please identify:**
- (i) the existing landscape character values at the identified spatial scales in the LVA.**

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<sup>1</sup> NZILA Best Practice Guide 10.2.

- (ii) the existing natural character values at the identified spatial scales in the LVA; and**
- (iii) provide assessment ratings for these existing values for the three spatial scales identified in the LVA.**

At paragraph 3.9 of the LVA the following comment is made:

Effects are assessed against the existing environment, i.e. positive and adverse effects are assessed in relation to the landscape 'baseline' including the reasonably foreseeable future environment, as provided for by operative planning instruments such as the NEIZ within the PN District Plan.

- 49) Please identify what was specifically considered the "landscape baseline" for the purposes of the LVA.**

#### **4.6 Natural Character**

It appears that natural and landscape character elements are conflated in the natural character assessment. For example, the LVA considers planting along the perimeter road (paragraph 6.53) and earth bunds (paragraph 4) as mitigation for natural character effects. However, where these elements are not connected with the naturalised channel and its margins, they do not necessarily contribute towards natural character (but are relevant for landscape character). Stormwater ponds are also considered as mitigating natural character but are disconnected from the streams located within the site and are not natural in themselves as they are constructed.<sup>2</sup>

- 50) Please identify and distinguish between landscape and natural character elements considered for the LVA, giving reasons where appropriate.**
- 51) What would the assessment of effects on natural character values be if the naturalised channel is not constructed?**

Despite reference in the LVA to relevant Horizons One Plan and RMA natural character provisions, no direct assessment is provided.

- 52) Please provide an assessment of the proposal in relation to the relevant objectives and policies of Chapter 6 of the Horizons One Plan, including Objective 6.2 and Policies 6-8 and 6-9, and relevant provisions of the RMA, including Part 2.**

\*Note that Natural Character questions are also raised under section 5 below.

#### **4.7 Landscape Character**

The landscape character assessment considers natural landscape and urban landscape separately. It is unclear why this distinction has been made, and why rural character has not been considered in

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<sup>2</sup> In the National Policy Statement for Freshwater Management 2020, under 3.21 *Definitions relating to wetlands and rivers*, a natural wetland is not "(a) a wetland constructed by artificial means (unless it was constructed to offset impacts on, or restore, an existing or former natural wetland)".

the landscape character assessment. It also appears that the natural landscape assessment has primarily focused on landform (which is identified in the LVA as only one aspect of landscape character).

- 53) Please provide information on those attributes of landscape character considered for natural landscape and urban landscape, and reasoning as to why the natural landscape and urban landscape have been assessed separately, rather than considering landscape character as a whole.**

Cultural values have not been considered as part of the landscape character assessment, and a cultural impact assessment has not been provided to date.

- 54) Please provide further information on cultural value effects in relation to the landscape character assessment.**

There are nine houses, house sites and buildings of known or potential nineteenth century origin located within the NoR (paragraph 5.2.7.3, AEE) which have not been considered as part of the shared and recognised values in the landscape character assessment.

- 55) What is the effect of removing the identified sites in terms of landscape character assessment?**

#### **4.8 Sensory values and factors**

Sensory values can include 'vividness, scenic, or transient' values. Natural character encompasses experiential attributes, such as natural darkness of the night sky, as well as wild and transient values. Sensory and experiential values are not limited to visual attributes. The LVA does not clearly identify sensory factors contributing to landscape or natural character, in particular those effects on sensory aspects other than those experienced visually are not articulated.

- 56) Please identify the sensory attributes of landscape character (including both experiential and aesthetic attributes); and assess how they are affected by the proposal, with effects of noise and lighting forming part of this assessment.**

- 57) Please identify the experiential attributes of natural character and assess how they are affected by the proposal, with effects of noise and lighting forming part of this assessment.**

- 58) Please assess lighting effects on visual amenity.**

#### **4.9 Cumulative Effects**

The LVA has not considered cumulative effects for landscape character, natural character, or visual amenity. This is particularly important for natural character due to the loss of streams resulting from the project and considering Objective 6-2 of the Horizons One Plan.

- 59) Please provide a cumulative effects assessment with other existing modifications within the assessed scales, for landscape and natural character, and visual amenity.**

#### 4.10 Effects Rating Scale

- 60) *Please clarify if the seven-point rating scale used to assess natural character has also been applied in the assessment of effects for landscape character and visual amenity. If the seven-point rating scale has been used, please explain how the rating guide provided at paragraph 3.3 of the LVA translates for landscape character and visual amenity.*

It appears that moderate effects represent a threshold of effects: “Where effects are identified as being more than moderate, the following matters should be considered through further technical assessment” (paragraph 11).

- 61) *Please clarify the significance of “more than moderate effects”, i.e. what does this mean?*

#### 4.11 Proposed Conditions

The LVA notes that “Overall, and assuming mitigation planting can occur early, the adverse effects of construction for landscape and visual amenity are likely to range from high to moderate-high. The construction process will occur over 20 years” (paragraph 9). The LVA recommends early implementation of mitigation planting to reduce visual amenity effects (paragraph 11.e).

- 62) *Please confirm when the intended mitigation planting will occur. If mitigation planting is to occur prior to the submission of the Landscape Management Plan, please clarify how the timing of planting will be specified.*

The proposal involves large scale earthworks and changes to the landform. From a landscape perspective, the treatment of finalised landforms is important, particularly regarding how these integrate with the surrounding landscape.

- 63) *Please confirm how KiwiRail will ensure that finished landforms will be well integrated with adjacent land and at suitable gradients to enable mitigation planting.*
- 64) *A number of mitigation measures are outlined in the LVA. Please review all recommended mitigation measures in the LVA and clarify whether and how KiwiRail intends to implement the recommendations for mitigation of landscape character, natural character and visual amenity effects.*

## Ecology

### 5.1 Landscape ecology context

- 65) *Given the location of the NoR between two developed/developing areas, please provide further information as to the actual and potential effects of the NoR on ecology at a landscape level (including for example, connectivity, habitat fragmentation, etc).*

## 5.2 Terrestrial ecology

- 66) *In Technical Report F - Assessment of Ecological Values and Effects ('AEcE'), it appears there are some anomalies between the method for assessment (outlined within section 3.1) and the ecological values and magnitude of effects obtained. Please review these and provide updated values that align with the method used and recognising the limitations to the survey approach used.*

### 5.2.1 Fauna

- 67) *Please provide an assessment of whether any consideration was made as to bats being affected by the project.*
- 68) *Please clarify what insects were included in the assessment of effects (noting the conclusion includes reference to insects at page 27 but no further information is included in the report).*
- 69) *A substantial amount of planting seems to be proposed to be undertaken across the site. Much of this is landscape planting. Please explain whether any of this vegetation might contribute to benefits to fauna post development.*

Recommendations are provided for management of lizards during construction, however no reference is made to managing birds (also protected under the Wildlife Act 1953). Further, there appear to be no conditions proposed to address the effects on wildlife.

- 70) *Please identify whether or how KiwiRail intends to manage birdlife during construction.*

### 5.2.2 Wetlands

- 71) *Given the limitations of the site access and the timing of the field survey in the context of the newly released National Policy Statement for Freshwater Management 2020 (NPS FM) and National Environmental Standards for Freshwater (NES Freshwater), please provide further information regarding the wetland assessment to provide confidence that there are in fact no wetlands (as defined within the NPS FM) within the NoR site. If wetlands were to be identified during future consenting phases, has there been any consideration of how effects on these may be addressed, considering relevant provisions of the NPS FM and Horizons One Plan?*

## 5.3 Freshwater ecology

### 5.3.1 Classification of streams

The AEcE states that the definitions within the Auckland Unitary Plan were referred to (page 9) however, the descriptions of the streams and the associated photos do not align with these definitions. For example, an ephemeral stream always has its bed above the water table, however Image 1 shows an 'ephemeral stream' which has water present. Conclusions are drawn that the entire Stream 1 catchment is ephemeral, based on the small amount of stream length that could be accessed. When comparing the size of this catchment (623ha) and adjacent catchments (including the central perennial 'Northern tributary', with a catchment area of 596ha), it is expected that at least some of

the stream is intermittent or permanent. The stormwater report identifies that much of the stream length is activity eroding (page 8), suggesting flows may be more than ephemeral. Further, some stream length appears to have been excluded from the site maps.

- 72) Please clarify the approach taken to classifying streams and provide further information as to the justification for the classification and values of streams that have not been visually inspected and, where appropriate, identify whether or how any uncertainty pertaining to affected stream length and values has factored into the assessment.**

### **5.3.2 Freshwater fauna**

In the absence of field surveys, the AECE relies on the NZ Freshwater Fish Database and the 'surveyors experience' to inform the potential species present within the NoR. Six species of native fish, kōura and kākahi being present within the wider catchment (table 7, page 19), but the AECE concludes that only one species would likely be present within the NoR. The size of the upstream catchments intuitively suggests it is likely that multiple species would be present, either permanently or temporarily passing through to upper reaches.

- 73) Noting the above, what level of certainty can be given to the conclusions as to the ecological values of the site, including as to the presence of fish species.**

### **5.3.3 Macroinvertebrate communities**

No macroinvertebrate sampling was undertaken to inform the AECE and the report considers that the community composition could be reliably estimated without sampling. While it is accepted that the existing environment is degraded, macroinvertebrate community indices aid in determining the extent of degradation and can guide effects management approaches.

- 74) Please undertake sampling if possible to inform the current ecological values of the site.**

### **5.3.4 Overall stream values**

While the use of the Ecological Impact Assessment (EclA). EIANZ guidelines for use in New Zealand: Terrestrial and freshwater ecosystems (2nd ed.) 2018 (EclAG) is helpful, the criteria within the EclAG for freshwater systems are not as easy to apply as those for terrestrial systems. In other projects, Boffa Miskell have adapted those criteria to utilise standard measures of freshwater ecosystem health (refer for example to the table appended to these questions). This approach does not include 'negligible' ecological value, which is more typically associated with concrete lined channels that completely lack in-stream habitat or riparian margin.

- 75) Did the assessment take into account the adapted criteria as set out in Appendix A, and if not, please make comment on the suitability of this approach for the affected streams.**

### **5.3.5 Receiving environments**

- 76) Please provide assessment of the environment that will receive flows from the proposed freight hub, including but not limited to, those areas that would be impacted by**

***sediment discharges, water quality changes, changes in flow regime resulting from the proposed modification and stormwater management approach. Note that this receiving environment includes stream reaches outside of the NoR.***

There does not appear to be a clear link between what ultimately comes off the site and the resulting effects on the receiving environment.

- 77) *Please provide further information on the link between what is expected to be discharged from the sediment controls and the receiving environment, how this is measured, and what is considered an acceptable discharge from the site to the receiving environment.***

The stormwater report identifies that stream erosion is a 'limited concern' as the affected streams are already highly modified.

- 78) *Please assess stream erosion in light of relevant policies of the NPS FM.***

The Stormwater Flooding Assessment (page 9) recommends an Erosion and Sediment Control Plan as part of the construction management but there is no reference to this in conditions.

- 79) *Please clarify whether KiwiRail intends to include an Erosion and Sediment Control Plan as part of a construction management plan.***

### **5.3.6 Fish passage**

The AEcE report states that if designed correctly, culverts can have a positive magnitude of effect on fish passage (page 29). Please clarify what was considered to be an "upgrade" for the purposes of the AEcE.

- 80) *Please provide further clarification and/or technical justification to support this assertion, considering:***
- (i) The extent of proposed piping relative to total length of streams;***
  - (ii) The overall length of culverted sections that fish will be expected to traverse;***
  - (iii) The lack of definitive aquatic ecology assessment for affected areas; and***
  - (iv) The New Zealand Fish Passage Guidelines, the NPS FM and NES Freshwater.***
- 81) *Has sufficient space been allocated in the NoR for proper measures to be implemented?***

### **5.3.7 Stream loss and modification**

The proposed development will result in the loss of at least 3.8 km of stream. Some of this stream will retain some hydrological function through culverts, however some length will be lost entirely. The AEcE states that this will have a 'negligible magnitude of effect' at the Mangaone catchment scale and a 'low magnitude of effect' at the more local stream catchment scale (being Stream System 1 and

Stream System 2) (page 27 and 28). At the point of impact and within the NoR, the stream systems will be altered through development.

- 82) Please provide an assessment of the magnitude of effect at this scale and outline what measures are available to address these effects, through either mitigation, offset or compensation. Please also identify the likely area requirements/ location for any identified measures, taking into account all relevant provisions of the NPS FM, if any.**

The stormwater report states that there is opportunity to enhance retained or reconstructed stream length (page 9).

- 83) Please identify numerically the likely length of streams that will remain available for enhancement following the development, as intended by the draft indicative Landscape Plan.**

### **5.3.8 Natural character (ecology)**

- 84) Please advise what field data (if any) was utilised to inform the natural character assessment for the existing environment and what features/parameters were relied upon.**

### **5.3.9 Natural character (LVA report)**

In the order of 3.8 km of stream length will be modified, primarily through culverting, to enable development of the site. Following development, a constructed stream is proposed to remain as open channel.

- 85) Please provide further information with clear rationale as to how culverting 3.8 km of stream will result in moderate positive natural character effects. In particular, please provide an assessment at both the reach and within site scale, with specific regard to the quantum of open stream length that will remain that could have natural character values.**

### **5.3.10 Policy direction**

- 86) Please identify all relevant provisions of the NPS FM, and provide an assessment of the proposal against any identified provisions, including as to the proposed stream loss and associated considerations including sediment, water quality and flow regime change.**

## **5.4 Effects management and conditions**

Recommendations are made within the AECE concerning management of effects which do not appear to have been carried through into the conditions of consent.

- 87) Please clarify whether and how KiwiRail intends to implement the recommendations contained within the AECE, particularly in relation to fauna salvage and the maximisation of ecological enhancement opportunities within the site to address effects resulting from terrestrial and freshwater habitat loss.**

## Stormwater flooding

The AEE notes that the proposal has a number of positive effects associated with stormwater (section 9.1.8, section 9.7.1).

- 88) Further technical information or justification is required to support some of these statements, specifically:**
- (i) That there will be improved measures for fish passage resulting from culverting of streams on the site: Please clarify if the AEE is claiming whether upgrades of existing culverts will result in improved fish passage or if extensions of culverts for streams that are not currently culverted will result in improved fish passage. In both cases, please provide any additional justification for this claim.**
  - (ii) That there will be opportunity to improve the ecological value of streams where retained: This claim should be clarified as to whether it takes into account the overall proportion of stream loss that is projected due to the development. i.e. is the claim that there is an overall net positive effect? If yes, please provide additional justification for this claim.**
  - (iii) There will be a change from rural to urban land use. Please provide additional technical justification to support the claim that development of the rail hub site is comparable to typical urban land use, including characterisation of industrial rail hub stormwater contamination profiles, and further details on the proposed stormwater quality treatment system.**

The AEE notes that potential effects from contaminated stormwater are likely to be very low or even positive with suitable treatment (section 9.6.4).

- 89) Please provide further information on the contamination profile of runoff from an industrial rail hub, the type and size of any proposed stormwater quality treatment measures, and the expected treatment effectiveness of the proposed measures for key contaminants of interest.**

It is also not clear that sufficient space has been allocated for effective stormwater quality treatment measures (i.e. section 6.2 in Technical Report G – Stormwater Flooding Assessment).

- 90) Please identify the area requirements for effective stormwater quality treatment measures, and where they can be located within the NoR.**

The AEE notes that a Stormwater Management Report ('SMR') and Stormwater Management and Monitoring Plan ('SMMP') will be prepared (section 9.7.3), which is consistent with the Draft NoR Conditions. However, the Stormwater Management Framework, described as a key document in the Stormwater Flooding Assessment Technical Report, is not a requirement of Draft NoR conditions, and suggests a stormwater approach that does not directly align with the NoR conditions. As well, the Stormwater Flooding Assessment notes several positive effects (section 5.1.1) that will be realised through "active consideration of them during the design and site development phases", and they are not accounted for in the draft NoR conditions.

- 91) Please clarify whether KiwiRail intends to prepare and provide a Stormwater Management Framework, as identified in Technical Report G - Stormwater Flooding Assessment at Appendix B. Please also identify what level of certainty there is that the potential positive effects identified at section 5.1.1 of the Stormwater Flooding Assessment will materialise, and what is meant by “active consideration”?**

The Stormwater Design Report proposed to be submitted at the detailed design stage appears to be limited to considering the sizing of stormwater ponds to mitigate flood impacts. Usually, a Stormwater Design Report would and should include all elements important to the function of the stormwater system, including quality treatment (type, size, placement) and Water Sensitive Design measures, internal site stormwater conveyance, specific measures for high contaminant risk areas, erosion impacts to the receiving watercourses, fish passage measures for piped watercourses, operations and maintenance requirements for all system components, and any other relevant items.

- 92) Please clarify the intended scope of the proposed Stormwater Design Report, specifically whether it is intended to address all those matters (identified above) usually found in a professionally prepared Stormwater Design Report?**

The Stormwater Flooding Assessment provides an estimate of stormwater detention required based on pre- and post-development runoff volume differential (section 6.2), which is considered appropriate.

- 93) Please provide further details on how that estimate was calculated.**
- 94) Please identify how and at what stage of stormwater system design relevant standards for stormwater design will be considered, including PNCC’s Engineering Standards for Land Development, Horizons One Plan, and PNCC’s Strategic Direction Goals (i.e., Eco City), NPS FM, NES Freshwater, NZCPS, etc.**

## **Effects on values or relationships of importance to tangata whenua**

The AEE states at section 7.4.1 that Ngāti Raukawa ki te tonga will provide a cultural value assessment to support the application.

- 95) Please provide this assessment or identify when it is expected. Further Information is necessary to understand the potential impacts on values or relationships of significance to tangata whenua.**
- 96) Are cultural value assessments being sought from or provided by other iwi mentioned at section 9.10?**

The draft conditions provide for preparation of a Mana Whenua Engagement Framework. The condition states this will be prepared “prior to commencement of construction” and is to “recognise and provide for” mana whenua values in the area, and there is a requirement to engage with mana whenua to develop the framework.

- 97) Please clarify the intentions of KiwiRail in relation to these conditions, for example:**

- (i) *How will the values be identified in order to determine how they can be recognised and provided for?;*
- (ii) *When is it intended that the engagement process occurs?*
- (iii) *What processes are intended for engagement with mana whenua and what happens if this does not occur?*
- (iv) *Is there an intention to provide the Framework to relevant consent authorities and if so, when?*
- (v) *Are there any intended mandatory elements of the Framework or engagement process?*

## Social Impacts

The Community Engagement Report (Appendix E) states that mitigation measures have been developed from community feedback but doesn't go as far as to identify what mitigation was introduced as a result of the feedback.

**98) Please provide further details on the changes made.**

### 8.1 Mapping of Features and Areas of Interest

Section 3 of Technical Report J - Social Impact Assessment ('Existing Environment') would benefit from the inclusion of more maps to more clearly show the existing road and rail network, the location of community facilities and services, historic features and recreation/leisure features in the local impact area in relation to the local community identified for assessment. This will assist in understanding where these features are and how they relate to the defined communities.

**99) Please prepare and provide additional maps showing the local impact area, including information on location of features, and defining the 'local impact area' that has been included in the description of population and demographic considerations.**

### 8.2 2: Socio-cultural and Communities of Interest

The Social Impact Assessment does not consider cultural impacts as it is stated that these are better addressed through a cultural impact assessment. It is not disputed that cultural values can be assessed and reported by specialists (including representation from mana whenua themselves). In the absence of a cultural impacts assessment it is considered that sense of place and cultural values to Māori are a relevant consideration for social impacts and should be assessed.

**100) Please provide information as to the cultural values of the area to Māori and effects of the NoR on those values, or identify when this Information will be available.**

There is no consideration of whether there are any 'communities of interest' within the local area which may be defined by socio-cultural or other community characteristics, particularly vulnerable communities (e.g. rental residents or retired residents who may have reduced accessibility) or different 'user' groups (e.g. church groups, school communities, sports communities or others).

**101) Please identify any specific communities of interest (or rationale as to why they are not present), and provide consideration of any potential effects on these communities.**

### **8.3 3: Local Community Definition**

The “local impact area” is defined as the NoR area, plus an approximate 1km catchment around the NoR footprint. The assessment also notes that Bunnythorpe itself has a population of 648, while the local impact area has 2,655 residents (triple the population of Bunnythorpe).

The rationale for the 1km extent is unclear. There is a mapping gap (noted in 1 above) on the definition of this local impact area which makes further discussion on this issue difficult. Any relevant data (age, population size etc) that has been collected from Census data at the meshblock level or higher for the local impact area would be useful to understand the methodology behind the community profile.

**102) Please provide more information on the rationale for selecting the local impact area and details on meshblock and Census data that has been used to construct the local impact area profile.**

There is a risk that in making the ‘local impact area’ the smallest unit of analysis, effects on Bunnythorpe (and potentially specific streets within Bunnythorpe or other ‘communities of interest’ discussed above) may become obscured. Reconfiguring the shape of the local impact area, or including a ‘neighbourhood community’ or equivalent impact area may help to more clearly elucidate the differing impacts likely to be experienced by, say, residents on Clevely Line and within Bunnythorpe, as opposed to those living in the rural areas on the outskirts of Bunnythorpe. It is important that consideration is given to the scale of effects by these different ‘communities’ so we can recognise whether there are different effects experienced by different groups within the ‘local area’ versus impacts for the local community as a whole.

For example, consideration of travel time changes may be appropriate for any community of interest (such as resident on the Clevely Line) and whether there is any impact for residents who use this road to access to the school or community facilities to the north in Bunnythorpe, and the changes to their accessibility with local road closures and diversions etc.

**103) Please provide assessment on either impacts at differing spatial scales – acknowledging the neighbour community as compared to the wider 1km local impact area community – or more explicit rationale as to why this assessment is not required. In particular, this includes the Bunnythorpe community, the rural residential community surrounding the site and potentially specific residential areas such as the Clevely Line, Maple Street and Sangsters Road.**

### **8.4 Residual Effects and Effectiveness of Mitigation**

The Social Impact Assessment makes a number of recommendations for mitigation and monitoring. However:

- (a) These mitigation measures do not appear to have been reflected in the proposed conditions as at Appendix 3 to volume 1 of the NoR.

- (b) The assessment (i.e. in Table 7.1) lists the scale of impact expected without mitigation or management, but does not state what the reduction in impact would be expected to be if mitigation was implemented. This makes it difficult to assess the predicted effectiveness of the recommended mitigation measures on reducing social impacts.

**104) How does KiwiRail propose to reflect the recommendations in the SIA in the conditions? Alternatively, please state where these recommendations are not accepted, and the extent to which identified social impacts are mitigated or managed through those proposed conditions in place.**

**105) Please provide confirmation that for any other recommended mitigation measures that are not provided in the conditions, that these are not factored in the social effects assessment (e.g. that the Social Impact Assessment stands).**

## 8.5 Community Facilities

The Social Impact Assessment does not currently consider potential social impacts on some community facilities; for example, on users of Bunnythorpe Cemetery or Bunnythorpe School. The assessment notes that a significant proportion of the individuals required to relocate will likely need to move out of Bunnythorpe into the wider area, and this may affect the school's roll size (understood to be some 21-25 students) and provision of this community facility.

**106) Please identify and assess potential social impacts of the construction and operation of the Rail Hub on key community facilities including (but not limited to) Bunnythorpe Cemetery (and its community use) and schools.**

## 8.6 Quality of Life Effects and Reliance

The assessment of effects relating to noise and lighting does not address how the change in character of noise and lighting from the Regional Freight Hub may affect the character and amenity of what is currently a quiet, largely rural-residential neighbourhood (noting the North-East Industrial zoning to the south). For example, page 23 of the Social Impact Assessment notes that "in most locations the daytime noise would be compatible with residential activity (less than 55dB)". From a social impact perspective, it would be beneficial to consider these changes. It is acknowledged that this is reflected in the overall assessment of impacts, but not on commentary for impact on the community in the neighbourhood area.

**107) Please provide an assessment of how any change in character of noise and lighting effects from the Freight Hub might affect residential amenity, quality and character of the environment, and social impact.**

## 8.7 Construction Disruption

The Social Impact Assessment (page 18) notes that "residents may find their usual patterns of movement disrupted at times" during construction. A more detailed analysis of who may have their movements disrupted, and how would enrich this section of the assessment, and assist to clarify how the impact rating of low-moderate negative was reached.

**108) Please provide more detailed assessment and explanation of the nature of expected travel disruptions during construction.**

There is some inconsistency in the language used to describe effects throughout the report. For example, in the Executive Summary of the Social Impact Assessment the reduction in amenity for residents is rated as 'high negative' for the local impact area, however on page 24 the same impact is described as 'significant'.

**109) Please review the report and clarify the impact ratings scale in respect of any identified inconsistencies.**

## **8.8 Cohesion Impacts**

The Social Impact Assessment considers changes to community amenity, but community cohesion has not been directly considered. With 24 houses being acquired and changes to the population of Bunnythorpe likely (people relocating elsewhere, and construction workforce potentially moving in) it is appropriate to consider how these changes may impact on existing community connections and how community cohesion may be altered, at the various stages of development. Similarly, the Regional Freight Hub and associated road closures will create a degree of severance between communities on either side of the Hub, and the impact of the severance on community cohesion should be considered.

**110) Please provide an assessment of potential impacts on community cohesion and any available mitigation measures.**

## **8.9 Sense of Place / Aspirations Impacts**

There is no assessment of the impact of the Regional Freight Hub on the fears and aspirations identified in the assessment (e.g. for Bunnythorpe to retain its small, village feel – Village Plan), and the impacts the Regional Freight Hub may have on the sense of place values and aspirations for the community overall.

The Council and community have identified a number of wider land use and connectivity aspirations (e.g. in respect of the North-East Industrial Area and the potential connectivity of this area to the wider region via the Bypass Route). In the case of the former, this is a planned aspiration (with zoning providing for growth and land use change).

**111) Please provide an assessment considering 'sense of place' and the aspirations the community has, both for the 'local' Bunnythorpe, but also in respect of opportunities the project has to support (or conversely impact on) the planned growth of the area as an industrial hub; and in respect of economic connectivity and growth in the wider area.**

## **8.10 Quality of Environment Impacts**

While the proposed noise walls may have acoustic justification, they may also have associated negative effects, for example on outlook, rural character and amenity. In addition, issues of light spill from the facility (with an industrial rather than residential or rural use) appear potentially high (or at

least high change). It would be valuable for the social impact assessment to consider the potential impacts of these aspects of the proposal on the community.

The social impacts on the 'quality of the environment' can provide a useful evaluation of potential 'trade-offs' in mitigation (e.g. balancing changes in noise with amenity/shading effects etc). This requires assessment of the potential effects of the mitigation measures themselves, and this may be relevant in some areas such as Sangsters Road, where the mitigation for noise and light effects may exacerbate amenity and rural character effects.

**112) Please provide an assessment of potential operational changes to the environment in respect of light effects and the proposed noise mitigation methods, such as impacts on privacy, shading, amenity, and all aspects of the quality of environment and value the community has in that environment. It is acknowledged that this information largely arises from information requests from other physical environmental assessments.**

## **8.11 Social Benefits**

The Social Impact Assessment assesses the impacts on the wider impact area as largely positive. If these benefits, including socio-economic benefits, are being relied on for the overall assessment of the potential impacts of the project, it is considered they could be more clearly assessed and evaluated, including reference and citation to the assessment from other specialists to inform any qualitative assessment in the Social Impact Assessment. For example, the scale and nature of employment benefits in terms of people's way of life and wellbeing may be quantified from economic assessment and accessibility / connectivity outcomes from the transport assessment. In particular, the assessment of the aspirations of economic growth in the wider District and the contribution of the project to those (e.g. the North-East Industrial area and the role of a transport hub to the functioning of this area) could also benefit from specific consideration.

**113) Depending on the reliance on socio-economic benefits, please provide a more detailed assessment of anticipated positive social impacts.**

## **Regional Freight Ring Road**

**114) Please provide an assessment of the proposed Regional Freight Hub roading network in relation to strategic plans for the Regional Freight Ring Road ('Ring Road'), including assessment of the extent to which the proposed Regional Freight Hub roading network:**

- (i) includes optimal connections between the Regional Freight Hub and future Ring Road route;**
- (ii) allows for optimal connections between the Regional Freight Hub and future Ring Road to be developed in future;**
- (iii) impacts on the ability for the Ring Road to be developed in a manner consistent with existing strategic plans, including plans for a southern bypass of Bunnythorpe.**

**115) Please provide a description of:**

- (i) *what KiwiRail's optimal Regional Freight Hub roading network would look like assuming there was certainty that the Regional Freight Ring Road would be in place by the time the Regional Freight Hub became operational;*
- (ii) *the feasibility and approximate cost implications of changing the Regional Freight Hub roading network from the network outlined in the NoR to the network envisaged in paragraph (i), including a demonstration of how the northern Perimeter Road route could transition to a southern bypass of Bunnythorpe.*

## **Potential effects on the North East Industrial Zone**

116) *Please provide an assessment of traffic effects on activities in the NEIZ, including:*

- (i) *Identify and assess the access to the Regional Freight Hub intended to be used by NEIZ customers;*
- (ii) *Assess the safety impacts on each of the existing Foodstuffs driveways, given the proximity to Railway Road and the additional vehicle flows that will be along the frontage with Railway Road diverted.*

117) *Please also provide, from a traffic and economic perspective, an assessment of the effects that KiwiRail's proposed roading changes may have on the ability of current and future occupants of the NEIZ to move freely to and from their sites (e.g. closure of Railway Road and resulting diversion of traffic onto Roberts Line, closure of Roberts Line level crossing) and details of mitigation measures that could be taken to alleviate any identified impact).*

118) *Please explain what an efficient connectivity solution for moving freight between the NEIZ and Regional Freight Hub could look like, including but not limited to a dedicated freight corridor.*

119) *Please confirm whether there is sufficient space within the NoR for the southern access to the Regional Freight Hub to be grade separated if required, including allowance for the movement of containers between the NEIZ and the Regional Freight Hub via a private access?*

120) *Please explain how the road layout proposals provide for alternative access for existing businesses in the NEIZ to the freight road network, with regard to District Plan Rule 12A.8.4?*

## **Economic Impacts**

121) *Please provide a quantitative assessment of the positive and negative economic impacts of the project on Palmerston North City and the Manawatu-Whanganui Region, including but not limited to:*

- (i) *a detailed assessment of the positive and negative impacts on Bunnythorpe and the NEIZ;*

- (ii) *benefits for Regional Freight Hub users and/or their customers associated with improved rail freight handling facilities, including time and cost savings;*
- (iii) *benefits associated with opportunities for local businesses to support the activities of the Regional Freight Hub;*
- (iv) *benefits associated with the potential for the Regional Freight Hub to attract new businesses to the region;*
- (v) *impacts on employment, and related impacts on housing demand;*
- (vi) *benefits for businesses located in the NEIZ associated with the efficient movement of goods between the NEIZ and the Regional Freight Hub;*
- (vii) *negative impacts of changes in the roading network and traffic flows on road network users, including businesses located in the NEIZ;*
- (viii) *impacts associated with freeing up the existing rail yard land for alternative uses, and justification for assessment of these impacts as “moderate/high positive”;*
- (ix) *impacts of changes in land use resulting from the NoR, e.g. accelerated uptake of NEIZ land and rural land, including opportunity costs; and*
- (x) *other material positive and negative economic impacts of the project.*

*Note: All impacts should be assessed relative to a reasonable counterfactual, e.g. KiwiRail remains at the existing rail yard on Tremaine Avenue, the NEIZ continues to develop without the Regional Freight Hub, etc. Please clearly describe the counterfactual that underpins the assessment of economic impacts.*

- 122) *Please provide clarity regarding areas where Technical Report K - Economics relies on the expertise of others, for example, does the conclusion regarding the impacts of increased traffic flows on Roberts Line being a “small negative” (section 4.4) rely on the findings of transportation experts?.*
- 123) *Please provide additional detail regarding the potential mitigation measures referenced in relation to access issues on Roberts Line (section 4.4).*

## **Rail design and operational issues**

### **12.1 Safety in design**

The submitted information in the NoR provides limited risk and safety assessment, referred to in industry practice as 'Safety in Design, SiD'. This process begins in the conceptual and planning phases of a project.

- 124) *Please outline risks, safety, hazards identification etc. for the Regional Freight Hub's lifecycle (concept, design, construction, maintenance, operation, decommissioning), including derailment risk, safety point, track switches, and stop blocks.*

## 12.2 Requirements

With reference to the Primary, Secondary, and Additional functions identified in section 1.3.1 of Technical Report A - Design, Construction and Operation, and how those requirements are described as being addressed in the concept design.

**125) Please provide further justification, explanation, or information to identify how the elements of the concept design plan (including size, quantity, spatial requirements) meet or fulfil the associated functional requirement.**

## 12.3 Forecast freight and operational network growth

The Regional Freight Hub traffic demand is based on the MoT National Freight Demand Study dated back to 2014. Technical Report C - Integrated Transport Assessment (section 9.3) acknowledges that this report has recently been updated and reflects a lower forecast growth for rail due to several factors.

**126) Please explain why the 2018 National Freight Demand Study was not chosen to inform the concept design described in section 1.3.1 of the Design, Construction and Operation Report.**

It is understood that the new Regional Freight Hub tracks will be electrified either in full or partially. There is limited information on the extent of electrification.

**127) Please clarify which tracks will be electrified and the staging of these tracks for electrification.**

The provided information is not clear on how the Regional Freight Hub will operate in stages/over time with respect to marshalling, shunting, incoming and outgoing train movement.

**128) Please advise by plans or sketches.**

Section 1.3.1 of the Design, Construction and Operation report refers to "8 arrival and departure tracks and 13 mixed length marshalling tracks. Arrival and departure tracks can each accommodate the longest 1500m trains".

**129) Please clarify how trains move in/to/from the area.**

The Design, Construction and Operation report does not address the potential for decommissioning of facilities, tracks and assets both for temporary and permanent assets and installations.

**130) Will this occur and if so, how will this be managed?**

Section 1.3.3.2 of the Design, Construction and Operation report addresses relocation of the NIMT.

**131) How will the NIMT be relocated, what works are required for the relocation, and how will that affect the continuity of the NIMT operation?**

In relation to Technical Parameters at section 2.1 of the Design, Construction and Operation report:

- 132) Have crossings/ frog (flange bearing, moveable frog) been considered as a means of minimising operation noise?**
- 133) Has KiwiRail confirmed that the area of the NoR is sufficient, accounting for:**
- (i) KiwiRail track design standards with the requirement of minimum track centre spacing between tracks;**
  - (ii) The fouling point combined with minimum radii, which could potentially limit the required shunt lengths of the track.**
- 134) Please provide a plan that identifies and names of all of the tracks that are referred to in the Design, Construction and Operation Report. For example, what are the arrival/departure yard tracks, yard track, shunting tracks, marshalling yard, back shunts?**

2.4.1 of the Design, Construction and Operation report says "In addition, onsite fire capacity must allow for a minimum of 120 minutes storage plus normal days operation for fire cells less than 800m<sup>2</sup> in area. For larger areas and activities with high fire loads the specific fire hazard rating makes fire engineering assessment necessary".

- 135) Has a complete fire hazard assessment been carried out for all activities within the proposed Regional Freight Hub? If so, please provide a copy.**

Section 3 of the Design, Construction and Operation report refers to the KiwiRail Operating requirements.

- 136) Please provide a copy of the operational requirements.**

Section 3 of the Design, Construction and Operation report states 'KiwiRail has developed a master plan for intermodal freight hubs'.

- 137) Please clarify whether this is the document "Intermodal Freight Hub Master Plan – Palmerston North Report". If not, please provide a copy.**

The Design, Construction and Operation Report states that there will be "Fuelling on the Marshalling Yard and Arrival/Departure Tracks with fuel stored onsite (underground tanks) piped to the tracks. LPG will also be stored onsite. Air will also be supplied to the Arrival/Departure tracks".

- 138) Please identify any associated hazards and risks at the designed location.**

Section 9.2 of the Integrated Transport Assessment sets out indicative staging for assessment purposes.

- 139) Please provide more clarity, perhaps by way of providing a staging plan/diagram, on intended staging details. Which tracks are considered to be built in the initial stage?**
- 140) Please provide a concept of train operations to and from the Regional Freight Hub. Of specific interest, the 'operation concept' should address how (or if) braking of trains will be carried out through Bunnythorpe.**

## Impacts on the Road Network

### 13.1 Positive Effects

- 141) *From a network wide perspective, what is the approximate overall reduction of road freight in terms of truck movements, caused by the provision of the additional rail freight capacity?*
- 142) *Please provide an assessment of the predicted character and magnitude of the effect of any overall reduction of road freight in terms of truck movements.*

### 13.2 Analysis

- 143) *To better reflect the intended use of the road network, please include the following in the Do Minimum and future road networks in the traffic model:*
- (i) Flyers Line to each side of SH3 as access only;*
  - (ii) The closure of Richardson Line at the western end; and*
  - (iii) A roundabout at the Roberts Line/ KB Road intersection.*
- 144) *To assist with understanding the particular traffic effects of the Regional Freight Hub, rather than the effects resulting from an implied permitted baseline, please develop and report on the following traffic model scenarios:*
- (i) An ultimate year Do Minimum which includes the 2041 PNATM demands with the NEIZ developed but not into the Regional Freight Hub area; and*
  - (ii) An ultimate year with Regional Freight Hub which includes at least an indicative vehicle bypass to the south and west of Bunnythorpe.*
- 145) *Assuming the strategic road network is in place (as per Figure 12.3), including a ring road around Bunnythorpe and no through traffic on Flyers Line; are there still any performance challenges within the road network, e.g. on Tremaine Ave?*
- 146) *Please provide further detailed traffic effects assessment within Bunnythorpe, addressing the following:*
- (i) traffic effects at local intersections (e.g. detailed analysis of KB Rd/ Campbell Rd, Stoney Creek Rd/ Ashhurst Rd, Maple St/ Railway Rd);*
  - (ii) traffic effects including safety at the intersections. Include consideration of changes to available sight lines at the intersection of Maple Street and Railway Road and the adequacy of existing sight lines at the intersections of Kairanga-Bunnythorpe Road and Railway Road, and Stoney Creek Road with Ashhurst Road;*
  - (iii) pedestrian and cyclist delay/ safety;*

- (iv) access to services for local residents and businesses; and
- (v) access to the relocated bus stop.

**147) Please provide an explanation\* as to how the traffic model is fit for the purpose of determining localised traffic effects in this northeastern part of the network, noting that the model was validated in 2013 for strategic rather than local use. In particular:**

- (i) Level of calibration of traffic volumes for local roading network (including Tremaine Ave, Railway Road, Richardsons Line, Roberts Line and through Bunnythorpe) including light/heavy split;
- (ii) Calibration of distribution for the existing rail hub;
- (iii) Calibration of intersection performance and delays (Table 8.6). The effects included in Figures 9.4 and 9.6 can only be relied on if the model is proven to be fit for purpose with regard to modelling intersection delay at this local level;
- (iv) Travel time calibration for key local routes (Palmerston North to/from Bunnythorpe and Feilding, and between the existing KiwiRail yard and the NoR site);
- (v) Calibration of NEIZ trip generations from counts with current activity.

**\*Note that a peer review of the model confirming that it is fit for purpose would be acceptable as a means of providing this information.**

### **13.3 Mitigation**

**148) Identify, describe, and assess the appropriateness of any mitigations at the Bunnythorpe 'node' and associated traffic effects. For example, grade separation of the level crossing, achieving safe sight lines at the Railway Road/ Kairanga-Bunnythorpe Road intersection and satisfactory performance of the Campbell Road/ Kairanga-Bunnythorpe Road intersection.**

**149) Figure 9.2 of Technical Report C - Integrated Transport Assessment shows two intersection upgrades in Bunnythorpe as part of the Regional Freight Hub network. Are these upgrades to be provided by KiwiRail, and what is the nature of the upgrades? Are there any local property or access effects as a result of the upgrades?**

### **13.4 Other**

**150) Is it intended that the Network Integration Plan be geographically limited to areas within the NoR?**

The existing Te Araroa Trail is primarily a walkway with sections (the unformed section of Sangsters Road) that are not suitable for cyclist use. Palmerston North City Council has been planning a shared path within the existing Railway Road corridor which would be suitable for use by commuter cyclists travelling between Feilding and Bunnythorpe and Palmerston North. The Te Araroa Trail is not an option for these cyclists due to the unformed sections combined with vertical alignment in parts (goes

through a paddock with steep slopes). The existing Railway Road corridor provides an option for a reasonably steady vertical and horizontal alignment with a limited number of side roads to cross, each with low traffic volumes. A shared path along the alignment of the perimeter road will be longer and will require negotiating a number of busy intersections.

**151) Please Provide an assessment of the effect of the change of alignment of Railway Road, and identify any available means of mitigating those effects, including by reference to Palmerston North City Council's plans for a shared path for active modes?**

### **13.5 Rooding Design**

**152) What will be the treatment at the ends of the roads that will be closed (Te Ngaio Road, Clevely Line and Roberts Line)? Consider, for example:**

- (i) Will turning heads be included?**
- (ii) Will there be any changes in the formation at the connections of each of Tutaki Road and Parrs Road with Sangster Road?**
- (iii) Will there be any change at the Clevely Line connection with Sangsters Road other than the closure of the level crossing?**

**153) For the north and west accesses to the Regional Freight Hub from the perimeter road and the Roberts Line intersection with the perimeter road, can the Austroads requirements for intersection sight lines be met?**

**154) Is there any risk of traffic blocking back through the Perimeter Road intersections from the internal Regional Freight Hub level crossings which are shown just into the site from the southern and northern site entry points?**

**155) Is there sufficient space within the NoR to accommodate roundabouts, if required, for the north and west accesses and the Roberts Line intersection? If not, how much additional space would be required?**

### **13.6 Analysis**

**156) Explain whether the perimeter road has a function of accommodating internal trips for the Regional Freight Hub? If so, what proportion of trips on the perimeter road will be effectively internal Regional Freight Hub trips?**

**157) Explain the basis of the assumptions regarding:**

- (i) Capacities of each road type in the V/C Level of Service calculations (Tables 8.2 and 8.5). How do these compare with One Network Road Classification (ONRC) expectations?**
- (ii) 25%/ 75% external/ local traffic attraction and whether this split would remain the same as the Regional Freight Hub develops?**

- (iii) *Figures 9.4 and 9.6 show little if any heavy vehicle movements between Regional Freight Hub and central Palmerston North (within inner ring road) and south of the river and also little if any to/from SH3 to the east. Why are these distributions of external trips different to those included in Figure 6.4?*
- 158) *Explain how trucks are modelled in the model. Are they included as multiple car equivalents? Is there any allowance for slower acceleration from intersections and larger minimum gap requirements?*
- 159) *Explain the use of average month rail volume data rather than 85th percentile to factor traffic counts. What would be the 85th percentile daily traffic generation for the Regional Freight Hub?*
- 160) *Are any trips included in the model between the NEIZ and the Regional Freight Hub, if so how many and what is the heavy/light split?*
- 161) *Provide an assessment of any effects on the safety of the following intersections and accesses as a result of at least the initial stage of the Regional Freight Hub compared with existing safety performance:*
- (i) *Avenue intersections between North Street and Railway Road inclusive;*
  - (ii) *Railway Road/ Airport Drive;*
  - (iii) *Existing Railway Road intersections and accesses including with Setters Line, The Cutting Way, El Prado Drive and DKSH New Zealand;*
  - (iv) *Future accesses from NEIZ lots to Railway Road where the only practical access is to Railway Road;*
  - (v) *Each of the Foodstuffs driveways onto Roberts Line;*
  - (vi) *Railway Road/ Maple St and also the property accesses on Railway Road between Maple Street and KB Road;*
  - (vii) *Railway Road/ KB Road;*
  - (viii) *Kairanga-Bunnythorpe Road/ Campbell Road;*
  - (ix) *The property accesses onto Campbell Road within central Bunnythorpe between Dixons Line and Stoney Creek Road;*
  - (x) *Richardsons Line/ Milson Line;*
  - (xi) *SH54/ Waughs Road; and*
  - (xii) *The intersections and accesses along Stoney Creek Road between Ashhurst Road and Kelvin Grove Road inclusive.*

For the intersections included in the above point, plus the new intersections around the Perimeter Road, provide Sidra analysis of the intersection performance for the existing/base scenario and at least the initial stage with and without the Regional Freight Hub.

**162) Explain the impact on school bus routes, including (if any) Ministry of Education funded rural school bus services.**

### **13.7 Reporting**

**163) When reporting outputs from Sidra analysis of intersections include traffic volumes and performance on each approach to the intersection.**

**164) At tables 10.6 and 10.7, include Flyers Line to each side of SH3.**

**165) Provide versions of Figures 9.4 and 9.6 for light vehicles.**

**166) Compare the following traffic flows for central Bunnythorpe:**

**(i) Existing/base traffic flows;**

**(ii) Initial stage without Regional Freight Hub; and**

**(iii) Initial stage with Regional Freight Hub.**

**167) Provide a select link analysis for the main central Feilding and central Bunnythorpe zones to see the change in routes between the existing/base and the initial stages both without and with the Regional Freight Hub.**

### **13.8 Design and Construction**

**168) If fill material is sourced further afield and transported by rail, would it be stockpiled on or off-site? If stockpiled off-site, where would this likely be and what would be the predicted traffic effects?**

**169) In section 3.2 of the Design, Construction and Operation report there is reference to being able to include an inland port facility. What does this mean?**

### **Effects on Network Utilities**

**170) Please provide a plan showing the location/designated extent of each asset listed in Table 5-2: Network Utilities of the AEE, overlaid with the Concept Plan. In particular, please show the location of the transmission line and pylon relative to the operational areas of the Regional Freight Hub.**

The Horizons One Plan requires the Palmerston North City Council to ensure adverse effects from other activities on existing regionally and nationally important infrastructure are avoided, as reasonably practicable. Section 23: Network Utilities of the District Plan contains provisions which seek to address adverse effects on existing infrastructure, particularly regionally and nationally significant infrastructure, as defined in that chapter. The introductory text indicates that the provisions are

intended to be used to “help assess any notices of requirement for new designations”. Section 12A: North East Industrial Estate contains assessment criteria with respect to essential services in the NEIZ, which are relevant to our assessment.

**171) Please provide an assessment of any potential effects on existing services/network utilities within the extent of the NoR, including by identifying and addressing the relevant provisions (and existing designations) in the NPSs, Horizons One Plan and Palmerston North City Council District Plan (in section 10 of the AEE).**

## **Contaminated Land**

**172) The operation of the Regional Freight Hub creates a HAIL site (F6 and F7). Technical Report 1 - Contaminated Land Assessment states that these activities can be largely mitigated through appropriate project site design, which can be addressed in more detail at a later stage, once more is known about these design aspects. How does KiwiRail propose to ensure that project layout, design and associated mitigation measures will prevent contamination of the receiving environment?**

**173) Please provide an assessment of the potential for adverse effects on neighbouring properties and land use activities, the natural environment and the health and wellbeing of the City’s residents from the use, storage and transportation of hazardous substances associated with the Regional Freight Hub (ref section 14.3, Objective 1 of the District Plan). Is KiwiRail satisfied these effects can be prevented or mitigated, as per Policy 1.1 of the Palmerston North City District Plan?**

**174) What are the likely effects on amenity or public health and safety of contaminated dust from rail operations settling on nearby properties (particularly contaminated dust landing on rooves which are used for rainwater collection)?**

Discretionary Activity Rule 14.6.1 of the Palmerston North City District Plan relates to Major Hazardous Facilities. Major Hazardous Facilities are defined as:

*... any Hazardous Facility which involves one or more of the following activities:*

- a) Manufacturing and associated storage of hazardous substances (including the manufacture of agrichemicals, fertilisers, acids/alkalis or paints)*
- b) Oil and gas exploration and extraction*
- c) Purpose built bulk storage facilities for the storage of hazardous substances (other than petrol, diesel or LPG) for wholesale or restricted commercial supply*
- d) The storage of more than 100,000L of petrol*
- e) The storage of more than 50,000L of diesel*

- f) The storage of more than 6 tonnes of LPG
- g) Galvanising plants
- h) Electroplating and metal treatment
- i) Tanneries

**175) Would the the Regional Freight Hub be categorised as a major hazardous facility under this definition? If so, please provide a risk assessment prepared in accordance with the special information requirements listed in section 5.4(h) of the District Plan.**

## Geotechnical constraints

**176) Is there any potential for cumulative adverse effects from lateral spreading and/or differential settlement in conjunction with flooding (some areas of the Regional Freight Hub will be located within Flood Prone Areas), in the event of a seismic event?**

## Relevant Planning Framework

**177) Please provide a specific assessment against each relevant objective and/or policy in the National Policy Statements (identifying these by reference to the specific provision).**

The grouping of policies and commentary in Table 10-1 and 10-2 of the AEE makes it difficult to determine whether all relevant elements of these provisions have been assessed. For example, Objective 3-1 and Policy 3-1 of the Horizons One Plan are considered of particular relevance to the proposals. The assessment of these provisions does not address the importance of the establishment, operation or upgrading of the strategic road network; and instead focuses on rail only.

**178) Please address all relevant matters raised in each provision to ensure these provisions are adequately assessed.**

The 'relevant planning framework' assessment in section 10.1 of the AEE does not identify or assess:

- (a) the Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) 2011 (NESCS);
- (b) relevant provisions in the Horizons One Plan (see section 3.4.5 which relates to contaminated sites);
- (c) relevant provisions in Section 14: Hazardous Substances of the Palmerston North City Council District Plan.

**179) The findings of Technical Report I - Contaminated Land Assessment suggest that the above provisions are relevant. Please provide an assessment.**

## **17.1 Horizons Regional Policy Statement ('Horizons One Plan') (10.1.5 of the AEE)**

### **17.1.1 Objective 5-1 Water management values and Policy 5-1 (RPS)**

*180) Please identify the Schedule Values for the water management zone and relevant sub zone, and assess the proposal in relation to these values.*

### **17.1.2 Policy 9-2 and 9-3**

The AEE states that Policy 9-2 development in areas prone to flooding of the Horizons One Plan does not apply, as the Regional Freight Hub is critical infrastructure. No assessment is provided against Policy 9-3 – new critical infrastructure.

*181) Please provide an assessment against Policy 9-3 and Policy 9-5 Climate change.*

## **17.2 Palmerston North City District Plan (10.1.6 of the AEE)**

### **17.2.1 Permitted baseline established by the NEIZ**

A number of the supporting technical assessments infer that a 'permitted baseline' exists with respect to the provisions in the Palmerston North City Council District Plan for the NEIZ and consideration of the existing environment. It is unlikely the Freight Hub proposals would meet many of the Permitted Activity standards established for this zone. In addition, while elements of the Regional Freight Hub activities fall within the definition of 'industrial activity' in the District Plan, many of the other activities anticipated in the Regional Freight Hub would not.

*182) Please clarify what KiwiRail considers to be a permitted baseline (if any) in respect of the areas of NEIZ land within the Regional Freight Hub.*

## **17.3 Any Other Matter (section 10.4 of the AEE)**

### **17.3.1 National Policy Statement for Freshwater Management 2020 (NPS FM)**

*183) Please provide an assessment of the proposal in relation to the NPS FM. This assessment may be informed by the response to the questions in section 5.*

### **17.3.2 Government Policy Statement on Land Transport (GPS LT)**

*184) Please provide an assessment as to how the Regional Freight Hub proposals align with the four 'strategic priorities' in the Government Policy Statement on Land Transport.*

*185) Section 10.4.3 of the AEE notes that the Government Policy Statement on Land Transport 2021 implements the findings of the Future of Rail Review. Please provide further detail as to how the proposals will assist in delivering the draft New Zealand Rail Plan.*

### **17.3.3 Other Council strategies and strategic planning documents**

*186) The Council considers the following documents are important 'other matters' that it is required to have particular regard to in accordance with s171(1)(d). Please provide an assessment of how the project aligns with the strategic priorities in the following documents:*

- (i) Regional Land Transport Plan (2015-2025) 2018 Review;*
- (ii) Accelerate25 Regional Economic Development Strategy;*
- (iii) PNCC 10 Year Plan;*
- (iv) Economic Development Strategy 2018;*
- (v) City Development Strategy 2018;*
- (vi) Strategic Transport Plan 2018/202.1*

## **Land Requirement Plans**

*187) Please provide the total area of land for each affected parcel.*

## **Concept Plan**

*188) The Concept Plan would be more helpful if it was labelled or a key was provided. It is difficult to read the notations on the Masterplan. Please provide an appropriately labelled Concept Plan.*

## Appendix A

Table 1: Criteria for assigning ecological value to streams and watercourses (adapted from Roper-Lindsay et al. 2018).

VALUE	EXPLANATION	CHARACTERISTICS
<b>Very High</b>	A reference quality watercourse in condition close to its pre-human condition with the expected assemblages of flora and fauna and no contributions of contaminants from human induced activities including agriculture. Negligible degradation e.g., stream within a native forest catchment.	<ul style="list-style-type: none"> <li>Benthic invertebrate community typically has high diversity, species richness and abundance.</li> <li>Benthic invertebrate community contains many taxa that are sensitive to organic enrichment and settled sediments.</li> <li>Benthic community typically with no single dominant species or group of species.</li> <li>MCI scores typically 120 or greater.</li> <li>EPT richness and proportion of overall benthic invertebrate community typically high.</li> <li>SEV scores high, typically &gt;0.8.</li> <li>Fish communities typically diverse and abundant.</li> <li>Riparian vegetation typically with a well-established closed canopy.</li> <li>Stream channel and morphology natural.</li> <li>Stream banks natural typically with limited erosion.</li> <li>Habitat natural and unmodified.</li> </ul>
<b>High</b>	A watercourse with high ecological or conservation value but which has been modified through loss of riparian vegetation, fish barriers, and stock access or similar, to the extent it is no longer reference quality. Slight to moderate degradation e.g., exotic forest or mixed forest/agriculture catchment.	<ul style="list-style-type: none"> <li>Benthic invertebrate community typically has high diversity, species richness and abundance.</li> <li>Benthic invertebrate community contains many taxa that are sensitive to organic enrichment and settled sediments.</li> <li>Benthic community typically with no single dominant species or group of species.</li> <li>MCI scores typically 80-100 or greater.</li> <li>EPT richness and proportion of overall benthic invertebrate community typically moderate to high.</li> <li>SEV scores moderate to high, typically 0.6-0.8.</li> <li>Fish communities typically diverse and abundant.</li> <li>Riparian vegetation typically with a well-established closed canopy.</li> <li>No pest or invasive fish (excluding trout and salmon) species present.</li> <li>Stream channel and morphology natural.</li> <li>Stream banks natural typically with limited erosion.</li> <li>Habitat largely unmodified.</li> </ul>
<b>Moderate</b>	A watercourse which contains fragments of its former values but has a high proportion of tolerant fauna, obvious water quality issues and/or sedimentation issues. Moderate to high degradation e.g., high-intensity agriculture catchment.	<ul style="list-style-type: none"> <li>Benthic invertebrate community typically has low diversity, species richness and abundance.</li> <li>Benthic invertebrate community dominated by taxa that are not sensitive to organic enrichment and settled sediments.</li> <li>Benthic community typically with dominant species or group of species.</li> <li>MCI scores typically 40-80.</li> <li>EPT richness and proportion of overall benthic invertebrate community typically low.</li> <li>SEV scores moderate, typically 0.4-0.6.</li> <li>Fish communities typically moderate diversity of only 3-4 species.</li> <li>Pest or invasive fish species (excluding trout and salmon) may be present.</li> <li>Stream channel and morphology typically modified (e.g., channelised)</li> <li>Stream banks may be modified or managed and may be highly engineered and/or evidence of significant erosion.</li> <li>Riparian vegetation may have a well-established closed canopy.</li> <li>Habitat modified.</li> </ul>
<b>Low</b>	A highly modified watercourse with poor diversity and abundance of aquatic fauna and significant water quality issues. Very high degradation e.g., modified urban stream.	<ul style="list-style-type: none"> <li>Benthic invertebrate community typically has low diversity, species richness and abundance.</li> <li>Benthic invertebrate community dominated by taxa that are not sensitive to organic enrichment and settled sediments.</li> <li>Benthic community typically with dominant species or group of species.</li> <li>MCI scores typically 60 or lower.</li> <li>EPT richness and proportion of overall benthic invertebrate community typically low or zero.</li> <li>SEV scores moderate to high, typically less than 0.4.</li> <li>Fish communities typically low diversity of only 1-2 species.</li> <li>Pest or invasive fish (excluding trout and salmon) species present.</li> <li>Stream channel and morphology typically modified (e.g., channelised).</li> <li>Stream banks often highly modified or managed and maybe highly engineered and/or evidence of significant erosion.</li> <li>Riparian vegetation typically without a well-established closed canopy.</li> <li>Habitat highly modified.</li> </ul>