



Report pursuant to s42A Resource Management Act 1991

In the matter of:	A Notice of Requirement to construct and operate a new intermodal rail and freight hub on land between Palmerston North and Bunnythorpe
And:	A hearing by Palmerston North City Council pursuant to s100A
Requiring Authority:	KiwiRail Holdings Ltd
Hearing date:	9 August 2021

S42A Technical Evidence: Air Quality

By: Deborah Ryan

1 Executive Summary

1. The information that KiwiRail has provided with both the Notice of Requirement ("NoR") and the replies to the s92 requests for further information relating to air quality are not sufficiently thorough to properly understand the air quality effects of the activity or to fully inform what mitigation methods may be appropriate. I have reviewed information presented more generally in the application to inform my overall assessment of the potential effects on air quality from the construction and operation of the Freight Hub.
2. From an air quality perspective, the existing environment is not well described in the NoR, other than a narrative provided on the surrounding activities. While KiwiRail characterised the existing environment as being predominantly rural, with some residential and industrial in the southern third of the Freight Hub, the air quality assessment information does not adequately characterise the locations of sensitive receptors relative to activities giving rise to discharges to air. It is, therefore, difficult to determine the potential scale and nature of effects of the air discharges from the activities.
3. It would have been helpful for understanding the nature and scale of the potential effects if, as part of an air quality assessment, KiwiRail had provided a clearer analysis of locations within the site, including maps, that showed the various activities forming the proposal and an analysis of distances to the sensitive receptors in the receiving environment.
4. Kāhu Environmental (Kāhu) developed a map of sensitive receptors, and I have used KiwiRail's concept and landscape plans to understand the nature and scale of the activities relative to the sensitive receptors identified by Kāhu.
5. I have used the available information provided with the NoR to undertake my own analysis. I have considered whether separation distances as proposed are adequate to avoid or minimise the potential for adverse effects resulting from discharges to air from Freight Hub construction and operation; or if further additional information and assessment or additional mitigation is needed, for example, restrictions on idling of vehicles or train engines.
6. KiwiRail's air quality assessment does not characterise air quality relative to national air quality standards and guidelines. Nor have the relevant assessment criteria for air quality been clearly defined by KiwiRail. I have included additional characterisation of the project area based on information

provided by Kāhu and my knowledge and experience of the project area, and the relevant regulatory instruments and associated guidance.

7. The location and scale of the construction activities is not well described relative to the separation to sensitive receptors. While the scale and periods of construction works will be significant, these activities are not well characterised in KiwiRail's consideration of the effects on air quality. It is also clear that, at times, works will be undertaken in very close proximity to existing dwellings, which are considered sensitive to dust. In my opinion, there is therefore significant potential for adverse effects on air quality, in particular amenity values, and potential to contaminate roof water supplies from dust during construction.
8. The dust management methods that KiwiRail identified as the measures for incorporating in a Construction Dust Management Plan, are relatively generic and reflect good practices. I consider, however, that specific mitigation measures should be identified for the receptors at high risk of dust effects such as those that are very close to and downwind of construction activities.
9. KiwiRail proposes monitoring of dust deposition as a 30-day average, however, this will not be adequate for active management of dust because of the lag between monitoring and results. Additionally, the 30-day averaging period can mask impacts that may occur over shorter timeframes. KiwiRail also recommends real-time monitoring total suspended particulate matter (TSP). My preference is for continuous real-time monitoring for particulate matter smaller than ten microns in diameter (PM₁₀) as a monitoring trigger for action, which is now commonly being used for dust management of large-scale construction projects and quarries. The real-time monitoring will provide feedback and assurance over the adequacy of the dust management during construction. It can also provide information that can be used as an indicator of air quality impacts relative to the National Environmental Standard for PM₁₀, which is set for human health effects.
10. The nature and scale of the potential discharges to air for the operational phase of the Freight Hub is not well described either. For example, the number and nature of movements of trucks and trains on-site, and the nature and quantity of the emissions that could arise from on-site activities. Therefore, it is difficult to understand the potential effects or to develop recommendations for specific mitigation measures to form conditions of the designation. I have

used available information about the Freight Hub proposal, and the concept and landscape plans, where possible to form a view on the operational effects of some of the activities on air quality.

11. It is still largely unclear if the operation of the Freight Hub will have effects on air quality that are at an acceptable level for air contaminants, odour and dust in relation to impacts on health and amenity. While I have assessed that some activities are likely to have effects that are acceptable, this is subject to the site layout and separation distances in the Concept Plan; possibly restricting engine idling; the design of an appropriate air pollution control system on the engine maintenance facility; and a comprehensive Operational Air Quality Management Plan. I consider that further information on the nature and scale of the Freight Hub diesel train and vehicle movements is needed to understand if a more detailed effects assessment should be required.
12. Submissions received raise concerns about effects of dust and air contaminants, in particular affecting roof water supplies and health. I agree with the submitters that there is significant potential for adverse effects on amenity from dust and impacts of roof water. KiwiRail has advised that the impacts on roof-water drinking supplies and mitigation will be further addressed in evidence.
13. Health effects of the Freight Hub operation are unclear and, in my opinion, further information on the operational effects of the Freight Hub in relation to air quality standards and health effects is also needed.
14. If the designation is granted, I would recommend detailed conditions relating to requirements for construction and operational management plans; and monitoring with adaptive controls for dust management during construction. Continued monitoring during the operational phase could be appropriate contingent on the outcomes of further assessment. Any designation should be contingent on the operational phase being in accordance with a site layout plan that provides adequate separation distances for specific activities to ensure that effects on air quality beyond the site boundary will be at an acceptable level.

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2 Introduction

15. My full name is Deborah Anne Ryan. I am a Technical Director – Air Quality at Pattle Delamore Partners Limited (PDP).
16. I have prepared this evidence on behalf of the determining authority, Palmerston North City Council (PNCC), in relation to the Notice of Requirement (NoR) for the KiwiRail Regional Freight Hub ("the Freight Hub") lodged by KiwiRail Holdings Ltd ("KiwiRail"). I understand that my evidence will accompany the planning report being prepared by the determining authority under section 42A of the Resource Management Act 1991 (the "Act").
17. I have a Bachelor's degree in Biotechnology and Bioprocess Engineering from Massey University, Palmerston North (1991) and a PG Dip Business with sustainability (2021).
18. I am Secretary of the Clean Air Society of Australia and New Zealand, NZ Branch, and a Certified Air Quality Professional (CAQP) with CASANZ. I am certified under the Ministry for the Environment's 'Making Good Decisions' programme as an independent commissioner for hearings under the Resource Management Act 1991.
19. I have close to 30 years of experience in the air quality and resource management fields. My first eight years were within regional councils, and I have been an Air Quality Consultant since 2000, principally with Jacobs New Zealand Limited (formerly SKM), and currently with PDP. I have extensive experience in air pollution impact studies, in particular, preparing and reviewing a wide range of air quality effects assessments and in managing and reporting on air quality monitoring programmes. I have been responsible for reporting and presenting specialist air quality advice to council resource consent hearings on multiple projects across all sectors.
20. My experience with effects of discharges to air includes NoRs for the women's and men's prisons at Wiri, Auckland, and roading projects: Ara Tūhono – Pūhoi to Wellsford & Walkworth to Wellsford; Whangarei and Port Marsden Highway; Te Hana to Whangarei; Mt Victoria Tunnel duplication; and the Te Ahu a Turanga: Manawatū Tararua Highway project.
21. I was the principal author of the Ministry for the Environment's Good Practice Guide for Assessing and Managing Odour in New Zealand (2003) and I was

contracted as the peer reviewer for the Ministry for the Environment's Good Practice Guide for Assessing Discharges to Air from Industry (2008).

2.1 Expert Witnesses – Code of Conduct

22. I confirm that I have read the Code of Conduct for Expert Witnesses in the Environment Court Practice Note 2014 and that I agree to comply with it. I confirm that I have considered all the material facts that I am aware of that might alter or detract from the opinions that I express, and that except where I state I am relying on information provided by another party, the content of this evidence is within my area of expertise.

3 Background and Scope of Evidence

3.1 Background

23. KiwiRail is seeking to designate approximately 177.7 hectares of land between Palmerston North Airport and Bunnythorpe for a new Regional Freight Hub proposal combining a container terminal, warehousing, bulk goods and forestry loading operations with KiwiRail's train operations and maintenance facilities.
24. The Freight Hub will consist of a centralised hub incorporating tracks, marshalling yards, maintenance and service facilities, a train control and operation centre, freight handling and storage facilities (including for logs and bulk liquids), provision of access, including road and intersection upgrades where required, and specific mitigation works including noise walls/bunds, stormwater management devices and landscaping. In addition, the NIMT rail line will be relocated to sit within the new designation area and directly adjacent to the Regional Freight Hub. The activities that take place at KiwiRail's Tremaine Avenue freight yard (apart from the passenger terminal and the network communications centre) will be relocated to the new site to form part of the new Regional Freight Hub.
25. A detailed description of the Project is set out in 6.3 of the AEE submitted by KiwiRail and a summary description in the s42A Planning Assessment. All activities are proposed to operate on a 24 hrs per day 7 days per week basis.
26. No detailed air quality assessment was provided by KiwiRail.

3.2 Scope of evidence

27. I have been asked to assess the air quality aspects of the NoR. My assessment considers the following matters:
- a. The statutory context.
 - b. An overview of the existing environment.
 - c. Adequacy of KiwiRail's investigations and interpretation of the findings of those investigations.
 - d. Likely key effects on the environment of allowing the Project.
 - e. Appropriateness of any proposed mitigation measures or monitoring.
 - f. Submissions relating to air quality and dust.
28. My evidence should be read in conjunction with expert evidence of the other experts that have contributed to the s42A Planning Assessment.

3.3 Reports and material considered

29. As part of preparing this statement of evidence, I have read the following reports and documents prepared for the NoR by Stantec:
- a. Notice of Requirement:
 - Volume 2 - Appendix B: Concept Plan; and Appendix C: Landscape Plan and Cross Sections - which address the proposed layout of the site.
 - The Assessment of Environmental Effects (AEE) - description of the proposed freight hub activities and a section on air quality effects.
 - Appendix B: the updated draft condition set, which contains the Operative Dust Management Plan (ODMP) condition.
 - Attachment 5: s92 Response - Contaminated Land - which explains the background to the ODMP condition volunteered.
 - b. KiwiRail's response to PNCC request for further information specific to air quality and dust effects dated 24 May 2021 (Second S92 response).

30. Kāhu Environmental (Kāhu) provided a map of dwellings within 100 metres of the designation boundary that I have considered in my report. Figure 1 below provides the map and **Attachment A** provides a table summarising property addresses and dwelling proximity to aid in understanding of the potential for effects from discharges to air.

3.4 Assumptions

31. For this report I have assumed that the site layout and operation will be in accordance with the Concept Plan provided with the s92 response.¹ I have not specifically considered further development of adjacent properties where owners could establish additional dwellings. I have assumed that the dwelling on Te Ngaio Road that intersects with the designation boundary will be acquired, and therefore does not form part of the receiving environment for the assessment.

3.5 Site visit

32. I undertook a site visit on 2 June 2021, and I am familiar with the surrounding environment.

3.6 Statutory Context

33. The statutory documents and provisions relevant to the evaluation of the NoR have been set out in the s42A Planning Assessment prepared by Ms Copplestone. For the purposes of preparing this evidence, I have had regard to the PNCC District Plan with the objectives and policies for the various zones within the receiving environment around the NoR and, particularly the relevant amenity provisions.
34. The Horizons' One Plan is also relevant to discharges to Air, however, KiwiRail has indicated in its 24 May 2021 response to a s92 information request that "...it is not anticipated that any regional resource consents would be required for discharges to air from the Freight Hub." Although I am not certain as to the accuracy of that statement, I nevertheless regard the One Plan as relevant to the assessment of discharges to air.

¹ Attachment 5, Response #188 dated 15 February 2021 to S92 RFI.

4 Existing Environment

35. The site is nearly 3 kilometres long from north to south. Section 5 of the AEE describes the environmental context. The residential zones in Bunnythorpe to north are identified by KiwiRail as having occupied dwellings closest to the Freight Hub at Maple Street, Railway Road, Kairanga - Bunnythorpe Road, Stoney Creek Road and on Nathan Place. There are also local businesses and a school. Industrial land is noted as being zoned to the south, albeit largely undeveloped, and the remaining land surrounding the site is rural residential.
36. The southern portion of the NoR is zoned North East Industrial ("NEIZ") but has yet to be developed. The Foodstuffs Distribution Centre is the northern most development within the North East Industrial Estate (corner of Railway Road and Roberts Line). Figure 1 shows that nearly all of the northern portion of the NoR is rural zoned except for residentially zoned sections that are at the extreme northern end on Maple Street. Figure 1 also shows there are 81 dwellings within 100 metres of the site boundary, which are clustered to the north and along Sangsters Road to the east.
37. The AEE does not characterise the existing air quality. While I am not aware of publicly available ambient air quality monitoring in the vicinity of the Freight Hub, the air quality can be characterised referencing approaches in the Ministry for Environment (MfE) Good Practice Guide for Assessing Effects from Industry² (MfE 2016), which recommends using default background air quality values. Based on my experience with similar locations on the fringe of Palmerston North, Table A2 in **Attachment B** provides the relevant reference information and a summary table of assessed background contaminant concentrations. In summary, the existing air quality in the vicinity of the site is expected to be good, with contaminant concentrations below the relevant guidelines and standards for ambient air shown in Table A2.
38. Levels of dust and odour in the environment will be typical of those associated with predominantly pastoral rural activities.

² MfE, *Good Practice Guide for Assessing Discharges to Air from Industry*, November 2016.

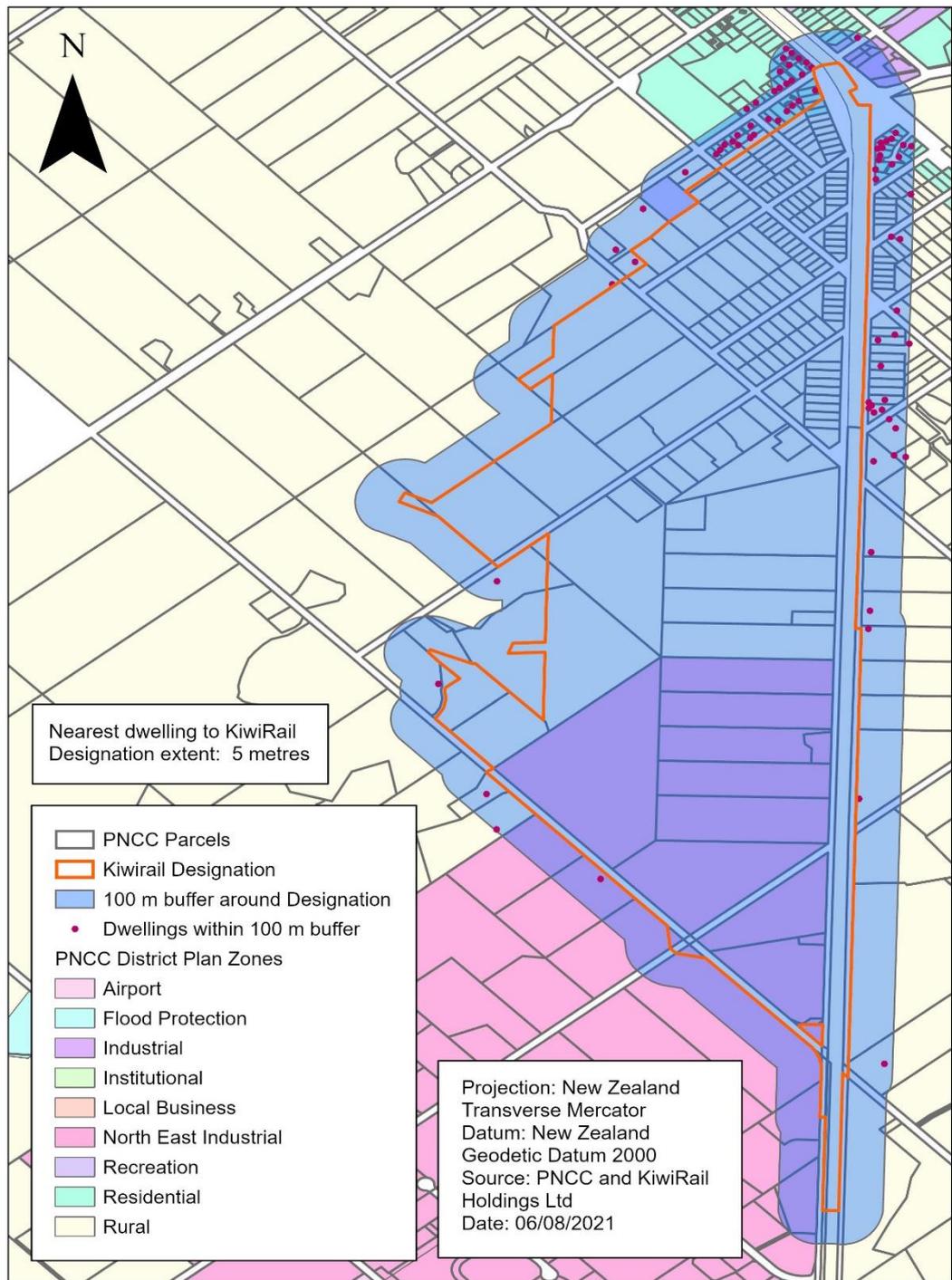


Figure 1. Dwellings within 100 metres of designation boundary (Source Kāhu)

5 Data Collection and Assessment Techniques

39. The NoR provided a non-quantitative assessment approach to help inform assessment of the potential effects on air quality from the proposed construction and operation of the Freight Hub. I found that KiwiRail's assessment was not specific enough as to the nature and scale, and location of the activities relative to the locations of sensitive receptors for me to have confidence in the conclusions and the recommended mitigation.
40. I therefore used available information to try to understand the likely scale, nature and location of the activities and their separation to sensitive receptors. This was so that I could independently form a view of the likely impacts on air quality and the potential for effects on health and amenity. Gaps in the information, however, mean that my findings are not conclusive, particularly for considering the impacts of contaminant discharges from the operational phase relative to standards and guidelines for air quality and human health impacts.

5.1 Air Quality Assessment Criteria

41. KiwiRail did not clearly define assessment criteria applicable for air quality. I have considered the following primary sources of criteria as relevant to the potential impacts on air quality of the project. The air quality criteria are provided in Table A2 Attachment B are principally based on the:
- a. Ministry for the Environment, Resource Management (National Environmental Standards for Air Quality) Regulations, 2004 (NESAQ); and
 - b. Ministry for the Environment, Ambient Air Quality Guidelines 2002 update (NZAAQG).
42. In the Second s92 Response, KiwiRail references the Ministry for the Environment's Good Practice Guide for Assessing and Managing Dust (Dust GPG, MfE, 2016) for determining the effects of dust. While KiwiRail states, based on the Dust GPG, that the effects of dust may be assessed qualitatively having

regard to the FIDOL³ factors, KiwiRail does not set out the relevant assessment criteria.

43. As per the Dust GPG, the recommended assessment criteria for particulate matter are the NESAQ 24-hour average and the NZAAQG annual average for PM10. While for qualitative assessment of dust impacts, including in relation to effects on amenity, the criteria generally adopted is:

...that there shall be no noxious, dangerous, objectionable or offensive dust to the extent that the discharge causes an adverse effect at or beyond the site boundary.

44. The assessment criteria for odour is essentially the same as that for dust, and the FIDOL assessment method is also applicable for odour, as set out in the *Good Practice Guide for Assessing and Managing Odour in New Zealand* (Odour GPG, MfE 2016).

45. As I discuss starting at paragraph 51 below, KiwiRail has assessed some activities proposed to be undertaken at the Freight Hub as being permitted activities for discharges to air under the One Plan. I have therefore, also considered the permitted activity conditions as relevant assessment criteria in this report, which are provided in **Attachment C**. Of relevance are the following One Plan permitted activity conditions for Rule 15-14 that relate to the NESAQ, and criteria for odour, dust, and health impacts:

- a. The discharge must not cause a breach of any of the National Environmental Standards for ambient air* quality set out in Table 7.1 (in Chapter 7).
- b. The discharge must not result in any offensive or objectionable odour, dust, smoke or water vapour beyond the boundary of the property.
- c. The discharge must not result in any noxious or dangerous levels of gases or particulates beyond the boundary of the property.

³ Frequency, intensity, duration, offensiveness and location.

6 Air Quality Effects

46. The Freight Hub proposal has potential effects on air quality from both construction and operation of the facility. Neither the construction nor operational sources, or effects, of discharges to air are well described by KiwiRail.
47. The construction operations have the potential for dust to have amenity impacts, including dust from earthworks such as cut and fill operations, bund construction and vehicle movements.
48. Air discharges associated with the operation of facility are likely to include dust from yard operations, for example, from vehicle traffic or from spills of dusty materials. It is unclear if there will be any unsealed areas, which may also contribute to dust effects, but the facilities include a log handling yard, which could accumulate dusty materials.
49. The emissions from land transport, diesel trains and heavy vehicles, also have the potential to result in effects on air quality, principally from PM₁₀, particulate matter smaller than 2.5 microns in diameter (PM_{2.5}) and oxides of nitrogen (NOX) emissions. Sulphur dioxide (SO₂) is a potential concern, although I assume that low sulphur fuel is used as per the road fleet in New Zealand so that SO₂ emissions will be negligible.
50. The AEE considers the air quality effects in section 9.13, which KiwiRail states are based on "concerns raised" as follows:
 - a. Odour from diesel from freight hub operation. I have assumed the odour would be from on-site fuel storage. I understand that diesel fuel storage greater than 50,000L is proposed, and potentially also petrol up to 100,000L;⁴
 - b. Particulate matter from diesel fuel combustion; and
 - c. Dust particularly risks to rainwater drinking water supplies.
51. The AEE essentially indicates that discharges to air would be addressed through compliance with regional requirements and consents, however, no assessment was made of the regional plan requirements that were potentially

⁴ Attachment 5, Response #174 dated 15 February 2021 to s92 RFI.

applicable. In the Second s92 Response (24 May 2021) KiwiRail provided some assessment of the One Plan requirements and concluded that regional consents were unlikely to be needed for the Freight Hub operations.

52. I am not convinced as to the accuracy of that assessment, however, if it is correct, it is even more important to ensure the land use controls through this NoR process are adequate to manage the impacts on air quality.
53. KiwiRail identified⁵ that there are locomotive and rolling stock maintenance activities that are covered by a permitted activity Rule 15-14(h). In addition, development and construction activities are permitted under Rule 15-14(u), subject to conditions. Subject to compliance with conditions in **Attachment C**, in my view, there is a potential that discharges from the site could be captured by Rule 15-17, which is a default discretionary activity rule, but the degree of uncertainty with the NoR makes this difficult to assess.
54. I consider that the AEE is incomplete in its consideration of the potential air quality effects of the Freight Hub proposal. In my view, the AEE should have clearly and separately considered the potential effects on air quality of both construction and operation of the project. Further, consideration of the scale and nature of the activities likely to result in discharges to air is needed to understand the potential effects. I note that I recommended that the applicant could consider several sources and approaches to further assessing the effects of the Freight Hub proposal on air quality. I have set these out in **Attachment D** for reference, although other approaches may also be valid. For example, KiwiRail could consider applying the Dust Risk Index methodology and/or air quality screening model from the *Guide to assessing air quality impacts from state highways projects*⁶.
55. An initial s92 request was issued by PNCC that included questions relating to air quality. The reply was provided within the response on contaminated land (Attachment 5 to the s92 response). KiwiRail identified that the known sources with potential for dust generation from operational activities included:
 - a. The log yard;

⁵ Second s92 Response, Issue 1, Page 1.

⁶ Waka Kotahi, *Guide to assessing air quality impacts from state highway projects v2.3*, October 2019.

- b. Bulk material loading and unloading as part of freight handling; and
 - c. Particulate from the movement of engines, rolling stock, trucks freight forwarding (including engine exhaust emissions).
56. KiwiRail states⁷ that source controls will be applied to dust, and the log yard will have impacts mitigated by its central location, but limited details are provided e.g. applicable separation distances. Operational controls are identified as log washing, either at source or on-site, and minimising log movements to reduce dust.
57. For bulk granular materials, KiwiRail states that operational practices will be developed and implemented, and that dust emission controls will be an important aspect of handling protocols for dust management. Again, the potential nature and scale and the location of the bulk materials activity are not identified by KiwiRail, nor are the details of the applicable controls stated.
58. KiwiRail identifies boundary plantings and boundary water spray mists as mitigations for dust. While densely planted mature trees can reduce wind and attenuate dust in the near vicinity of planting, in my opinion, neither immature planting or boundary water misting will be particularly effective or proven measures for dust mitigation. I consider that site design and at source mitigation measures are preferable.
59. KiwiRail considers⁸ that an Operational Dust Management Plan (ODMP) is an appropriate mechanism for documenting mitigation measures and indicates that any ODMP would be “updated as experience is gained with the Plan”. KiwiRail identifies the outline proposed for the ODMP contents⁹, and while the headings are consistent with the recommended contents of a dust management plan as per the Dust GPG, due to the lack of detail I have little confidence in a DMP achieving the objectives for dust management. Any condition of the designation requiring a DMP should specify a requirement for independent certification. As I advise in paragraph 105 below, I consider that a comprehensive air quality management plan is appropriate for the operating phase of the Freight Hub, while a DMP is needed for the construction phase.

⁷ Attachment 5, Response #2 dated 15 February 2021 to s92 RFI.

⁸ Attachment 5, Response #2 dated 15 February 2021 to s92 RFI.

⁹ Attachment 5, Response #2 dated 15 February 2021 to s92 RFI.

60. The first s92 request, Question 174, sought further information on the likely effects on amenity or public health and safety of contaminated dust affecting nearby properties and particularly on roof collected drinking water. KiwiRail¹⁰ provided a generic discussion of the potential effects of PM₁₀, and the gases from fuel combustion, but did not provide any basis to assess the impacts of these discharges from the Freight Hub. While I consider that there is uncertainty with the assessment of contaminated dust from rail operations affecting roof water supplies, first-flush diversion would help address the potential for any issue with water supplies to occur.
61. KiwiRail states that effective management measures have been devised based on the operation of rail yards internationally. But no reference is provided to support KiwiRail's statement, and in any case, KiwiRail does not reference any specific measures that manage contaminated dust or other contaminants to air other than restating adherence to an unsighted future management plan and landscape planting.
62. Having reviewed the landscape plans, I agree that the proposed planting is considerable in height and depth at some locations. As such, I consider the mature planting would be expected to attenuate some dust. In other locations, planting is less thick, although still indicated as around four trees deep, which should also have some attenuation effect at maturity. But it is unclear how established the boundary/landscape planting will be, if at all, when construction works commence.
63. KiwiRail also references community liaison and complaint management as mitigation, but these are not dust mitigation per se.
64. KiwiRail states that the above measures should be "fully effective in minimising the potential impacts to negligible levels¹¹". Given the lack of an effects assessment, or reference to specific mitigation measures, it is difficult to understand how KiwiRail has formed this view.
65. I have used the available information to consider the potential effects on air quality in more detail as below.

¹⁰ Attachment 5, Response #174 dated 15 February 2021 to s92 RFI.

¹¹ Attachment 5, Response #174 dated 15 February 2021 to s92 RFI.

6.1 Construction Phase Effects

66. The construction phase will involve site preparation prior to any operation commencing. Construction will involve heavy earthmoving equipment over a large area of the site and will take around 3.5 years to complete.
67. The second s92 request asked KiwiRail to provide an assessment of the potential effects on air quality from the construction works. KiwiRail's reply¹² referenced the bulk earthworks activities as set out in the Design, Construction and Operation Report¹³, including bund construction, internal roads, on-site cut and fill; and importing, stockpiling and placement of fill.
68. Depending on the source, imported fill is to be brought on-site by truck and trailer, or by rail. Total fill is estimated at 2.83 million cubic metres with imported fill making up 1.55 million cubic metres, described as clay through to granular materials. KiwiRail identifies that imported material will require an estimated 145,000 trips over a 2-year period with winter breaks of 3 months.
69. KiwiRail provided a wind rose for Palmerston North¹⁴, but did not provide a detailed analysis of the data in the context of the receiving environment, specific construction and operational activities and the potential for offsite effects from dust. I consider the prevailing wind directions and strengths as being informative for understanding which locations are most at risk of experiencing adverse effects from discharges to air, particularly for construction dust.
70. The wind rose provided by KiwiRail is not presented in metres per second (m/s), which is typically used for discussing the potential effects as they relate to wind speeds. I have therefore provided as Figure 2, a windrose prepared by PDP for the Palmerston North Airport to help inform my assessment. PDP's windrose shows the same general patterns but has a more useful parametrisation of the wind speeds.
71. The winds occur predominantly along the west-northwest and east-southeast axis. Winds from the west-northwest are also the strongest with the highest

¹² Second S92 Response, Issue 3, Page 3.

¹³ Stantec, Design, Construction and Operation Report, October 2020, Page 19.

¹⁴ Second S92 Response, Issue 3, Page 5.

frequency of wind speeds greater than 7 m/s, with winds greater than 10 m/s from the west-northwest occurring around 0.8% of the time.

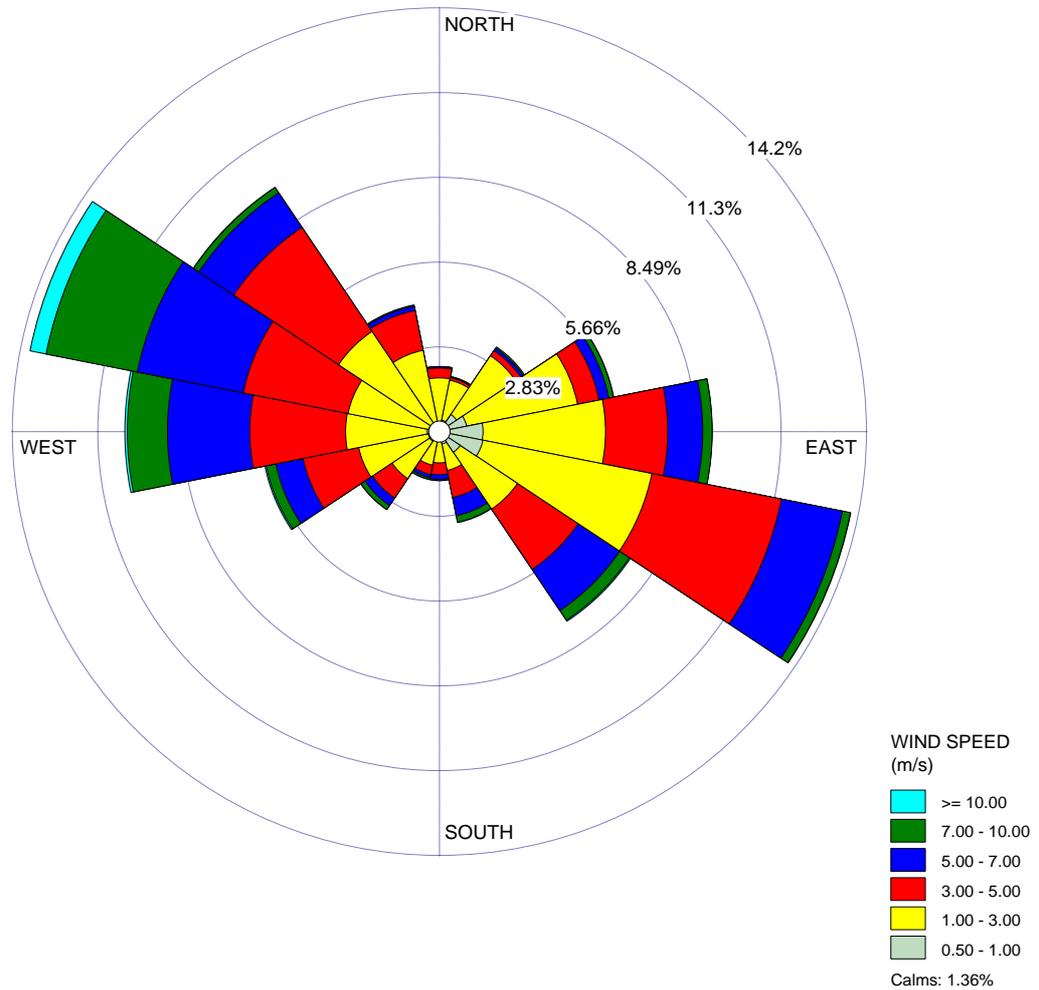


Figure 2. Palmerston North Airport Wind Rose, 2015 – 2019

72. Dust may be generated by wind on exposed surfaces and remain suspended in air when speeds exceed 7 m/s. Regardless of wind, dust may also be generated through mechanical activities undertaken on-site, such as vehicle movements on unsealed haul roads or placement of fill. Dwellings that are either very close to the boundary where activities such as bund construction will occur, or downwind of exposed surfaces when wind speeds exceed 7 m/s are at the highest risk of experiencing adverse effects from dust.
73. While the Dust GPG states that 10 m/s can be a wind speed trigger for work to cease, the relevant wind speed depends on the height that monitoring is being undertaken. I understand that the Dust GPG level relates to wind

monitoring at a height of 10 metres. I am aware that some quarries are applying a 7 m/s wind speed to cease dust producing activities, particularly near boundaries with nearby dwellings and that on-site meteorological monitoring is typically undertaken at lower heights. I have recommended on-site monitoring of wind conditions at a height not exceeding 5 metres to inform dust management.

74. From the information provided by Kāhu, there are 81 dwellings within 100 metres of the boundary that I have considered in relation the risk of effects from dust.
75. Freight Hub construction dust will be generated for more than three years. While this will likely be staged and spread over a wide area, some locations such as internal roads could impact locations for the full construction period. In my opinion, consideration should be given to locating haul roads away from dwellings at risk of dust impacts.
76. Figure 1 above shows dwellings within 100 metres of the designation boundary and is useful to help identify sensitive receptors for considering the potential for construction dust impacts.
 - a. Dwellings on Maple Street and Te Ngaio Road are potentially exposed to dust when winds are principally from the east through to the south south-east (around 34% of time, 1.3 percent of which are greater than 7 m/s).
 - b. Dwellings along Sangsters Road and Nathan Place are potentially exposed to dust when winds are from the south-southwest through to the north-northwest (around 49% of time, 5.9 percent of which are greater than 7 m/s).
 - c. There are isolated dwellings on Cleverly Line and Roberts Line that may be downwind of the site when winds are from the north through to the southeast.
77. All dwellings within 50 metres of construction works and/or those downwind of strong winds greater than 7m/s will be potentially significantly affected by dust. I consider that specific mitigation measures are likely to be needed during construction due to the sensitivity of the environment particularly, when works are near to the northern and eastern boundaries of the Freight Hub site or

individual dwellings at Roberts Line and Cleverly Line. Additional mitigation measures for dwellings at high risk of dust effects are set out in paragraphs 87 and 88 below.

78. KiwiRail indicates¹⁵ that dust will be monitored using dust deposition methods according to the threshold in the Dust GPG of 4 g/m²/30 days above background compared with a control site.
79. In general, I do not support dust deposition monitoring because of the lag between monitoring over a 30-day period and the results. Additionally, the 30-day averaging period can also mask impacts that may occur over shorter timeframes. While there may be some value in dust deposition monitoring to investigate accumulated dust deposits, given concerns raised about the impacts on roof collected water supplies, I consider investment in mitigation such as first flush diversion would be preferable.
80. In my opinion, active management of dust will be needed to avoid adverse effects and real-time monitoring for particulate matter is needed. KiwiRail has suggested using continuous total suspended particulate matter (TSP) monitoring. My preference would be for PM₁₀ monitoring, which is now often used for dust monitoring and management of large-scale construction projects and quarries. This monitoring provides real-time feedback and assurance over the dust management approaches allowing for action to be taken to increase dust mitigation if, and when, trigger levels are exceeded.
81. The recommended dust management trigger level is as per the Dust GPG at a 1-hour average PM₁₀ concentration of 150 µg/m³. The monitoring programme would need to include upwind and downwind locations. Monitoring should be undertaken at site boundaries where there are dwellings adjacent. The exact locations would need to be adapted depending on the location and scale of the earthworks at different stages of construction i.e. the instruments should be mobile.
82. If the PM₁₀ monitoring trigger is exceeded, an investigation as to the source of the increase in dust levels would need to be undertaken. Additional controls may need to be applied and or works may need to cease, such as if weather conditions are a key factor and dust abatement measures are insufficient to

¹⁵ Second s92 Response, Issue 3, Page 4.

control dust to an acceptable level. Measures such as these should be incorporated into conditions of the designation.

83. I recommend a monitoring requirement for real-time PM₁₀ to be specified as a condition of the consent, and that a more detailed monitoring and action plan requirement be incorporated into the CDMP condition. In addition, wind direction and strength should be measured at the site to inform dust management; the need for activities to cease; and to assist to interpret the air quality monitoring data.
84. KiwiRail's landscaping plans show significant areas of planting along the site boundaries, with tall trees and multiple rows. While at maturity such planting could contribute to providing some level of mitigation for air discharges, the extent of any planting in place during construction is unclear. I note that KiwiRail¹⁶, states screen plantings will be established prior to site development activities where appropriate to maximise coverage prior to construction. Therefore, boundary planting may be considered as at least a partial mitigation measure for the construction phase.
85. KiwiRail¹⁷ identifies mitigation measures to address the potential adverse effects from dust during construction as:
 - a. Limiting the extent of open or bare areas; and
 - b. Use of dust suppressants.
86. KiwiRail goes on to state that a construction dust management plan (CDMP) will be required for earthworks as part of regional consenting and what the contents would typically contain, including details of a dust management toolbox encompassing:
 - a. Water carts, dust suppressants, and progressive stabilization of bare areas;
 - b. Training to minimise drop heights of delivered potentially dusty loads;
 - c. Management of stockpiles, including locating stockpiles at least 100 metres away from sensitive receptors and controlling stockpile heights;

¹⁶ Second s92 Response, Issue 3, Page 8.

¹⁷ Second s92 Response, Issue 3, Page 7.

- d. Measures to clean roads adjacent to entranceways if vehicles track dirty materials onto local roads, such as a road sweeper and water carts;
 - e. Staging to minimise open areas;
 - f. Limitations on vehicle speeds (for example 15 km/hour during dry weather when sensitive receptors are within 100 metres of the construction activities);
 - g. Materials to be applied on surfaces to minimise dust generation;
 - h. Use of visual observations, weather forecast and daily planning of activities to manage potential dust impacts;
 - i. Specifications for meteorological monitoring with wind speed alerts;
 - j. Management of the temporary roadway surfaces including maintenance & sweeping; and
 - k. Water sprays.
87. The above mitigations are a reasonably complete list of typical good practice measures that should be considered as part of a comprehensive dust management programme. Management controls as set out in the Dust GPG¹⁸ that I also consider may be appropriate given the high risk of adverse effects from dust during construction include:
- a. Wheel wash;
 - b. Covering loads; and
 - c. Wind trigger levels for work to cease.
88. I am also aware for other projects that some construction works in high-risk areas are scheduled for wetter seasons to avoid hot and dry periods that are more at risk of dust generation. This measure could be an appropriate mitigation for high-risk works where Freight Hub construction is very close to boundaries with dwellings. In reality, given the lack of separation of many dwellings as set out in Table A1 **Attachment A**, the best option maybe to

¹⁸ Section 5.2

providing services to nearby dwellings such as water supply and cleaning; or moving people to alternative accommodation for a period.

89. KiwiRail¹⁹, indicates that the number of houses that rely on roof collected rainwater for domestic water supply have not been confirmed. KiwiRail states, however, there are eight submissions that raise this issue for dwellings located to the north and east of the Freight Hub site. KiwiRail identifies that first flush diversion for rain water collection is being considered and the issue will be further addressed in evidence.
90. KiwiRail notes that a community liaison forum will be established, this and the proposed monitoring will provide feedback on the adequacy of the dust management measures; and help to ensure dust is managed to avoid significant adverse effects. I note that adverse effects from dust during construction would result in a non-compliance of the One Plan permitted activity conditions triggering a requirement for regional consents.

6.2 Operational Phase Effects

91. KiwiRail states that noise buffers and landscaping provided around the site will provide separation of the activities to sensitive receptors. KiwiRail considers that that dwellings within 100 metres of the site boundary are potentially impacted by effects on air quality from site activities, although KiwiRail does not indicate how it formed this view.
92. In my view, the potential for adverse effects on air quality will be more closely associated with the scale and nature of the activities within the site and the site layout relative to the locations of dwellings. KiwiRail has not assessed the potential effects on air quality through considering the impacts due to the scale of the activities and emissions to air. For, example, KiwiRail has not provided details on the scale of train engine combustion activities to provide context for assessing the potential effects.
93. Areas to be developed within the site for various Freight Hub activities are identified in the Second s92 Response²⁰ including:
 - a. The marshalling yard – 106,500 square metres; and

¹⁹ Second s92 Response, Issue 3, Page 6.

²⁰ Second s92 Response, Issue 3, Page 3.

- b. Lag handling facility – 51,600 square metres.
94. Train engines and trucks operating at the site will be staged with the base year for the initial Freight Hub build as at 2031, and the maximum operations at full buildout at 2051. The effects from air emissions will therefore increase overtime, although they will also vary with the fleet characteristics. Vehicle and train engine technology improvements also have the potential to contribute to emissions reductions by 2051.
95. KiwiRail²¹ indicates that traffic generation from the Freight Hub will generate a total traffic demand of 12,000 vehicles per day at full build out (2051), with a light to heavy vehicle split of 60%/40%. Considering traffic offsetting due to the Freight Hub, the projected increase in traffic is approximately 6,900 vehicles per day. For the total traffic, forty percent heavy vehicles could generate significant emissions from diesel combustion with the existing fleet, from on average around 200 heavy vehicle movements per hour for a 24-hour operation.
96. Section 1.3.2 of the Design, Construction and Operation²² report indicates three Freight Hub accesses are proposed:
- a. Southern and principal access to the Freight Hub - the freight forwarding and container areas. This will be located at the upgraded Roberts/Richardsons Intersection.
 - b. Western access off the perimeter road providing access to the Tank farm, administration facilities and freight forwarding facilities.
 - c. Northern access also off the perimeter road providing access to the Log handling facility, maintenance and service areas, and storage facilities.
97. The landscape plan shows that the main site entrance is to the southern end of the site within the industrial area, which is reasonably remote from any dwellings. If there are to be multiple access points then, the total traffic will be distributed amongst these reducing the total impact at any one location. In my view, however, further information is needed to understand the effects on

²¹ Stantec, Technical Report C, Regional Freight Hub, Integrated Transport Assessment, 23 October 2020, page iii.

²² Stantec, Technical Report A, Regional Freight Hub – Design, Construction and Operation, October 2020, Page 3.

at dwellings from traffic accessing the Freight Hub. I consider that dwellings along Roberts Line and in Bunnythorpe from traffic accessing the Freight Hub/perimeter road are potentially impacted by increased traffic emissions, and further consideration by KiwiRail is needed to understand the potential effects.

98. Stage 1 of the Freight Hub development²³ is anticipated to provide sufficient track and facilities for rail operation to fully demobilise from the Tremaine Ave area. I agree that there will be a positive effect within Palmerston North resulting from moving the existing marshalling yards in Tremaine Avenue, which is surrounded by urban development.
99. In Table 1 of the Second s92 Response²⁴ KiwiRail has considered the operational effects by overviewing key elements of the operational phase of the Freight Hub. I have considered the information in Table 1 and the Freight Hub revised Concept Plan²⁵ showing the proposed internal site layout as follows:
- a. Arrival and Departure Yard – Eight tracks all electrified, limited diesel trains to operate in this area. The arrival and departure tracks are nearest to the sensitive receptors located along Sangsters Road, with the NMIT being relocated to within the Freight Hub operational footprint at this boundary. The nearest dwellings are between 50 and 100 metres of the arrival and departure tracks. In my view, providing that there is no idling of diesel trains on these tracks, then this element would be likely to result in acceptable concentrations of contaminants in air.
 - b. Marshalling Yard Tracks - Twelve tracks with diesel powered trains to arrive & depart into the Marshalling yard on Marshalling Tracks 1 & 2. The nearest marshalling tracks are between 100 and 200 m to the nearest sensitive receptors on Sangsters Road. Whether the operation of diesel engines in the marshalling yard area would be likely to result in unacceptable concentrations of contaminants in air depends on the frequency, scale and nature of train movements that could occur in this area.

²³ Attachment 5, Response #139 dated 15 February 2021 to s92 RFI.

²⁴ Second s92 Response, Issue 3, Table 1, Page 10.

²⁵ Attachment 5, Response #188 dated 15 February 2021 to S92 RFI.

As I state above, as far as I am aware, KiwiRail has not provided details on the scale of this activity and has not provided sufficient assessment of the potential effects on air quality. One approach would be to understand the likely maximum and average fuel consumption on an hourly basis. Fuel consumption rates could be used to derive contaminant discharge rates, that would allow for comparison of similar activities, and or experience from other sites nationally or internationally, to provide a context for the potential effects and determine if further assessment is needed. Management practices that avoid or minimise engine idling in this area may be appropriate.

- c. Container area – Four tracks with two hardstand pads for loading and unloading containers – the container storage area and tracks are well separated from Sangsters Road. The nearest house to any container storage track is on Richardson's line between 50 and 100 m from the track. The landscape plan shows a vertical noise wall and planting 10 – 15 metres high, which should assist with mitigation of the emissions to air from diesel engines operating on this stretch of track, which KiwiRail indicates are expected to be at a low level. Therefore, in my opinion, this element of the operation would be likely to result in acceptable concentrations of contaminants in air.
- d. Maintenance facility – the maintenance building is located more than 150 metres to the east of the nearest house, which is on Sangsters Road. In Table 1 KiwiRail identifies that engine testing and optimization to be undertaken within the building with exhaust emissions collected and treated via a scrubber to control particulate matter emissions prior to discharge to air. I query the effectiveness of a scrubber to control emission to air from a combustion source and would recommend that the KiwiRail demonstrates compliance with the permitted activity rule 15-14(h) under the One Plan in relation to this activity.
- e. The maintenance facility includes sand and fuel storage tanks at the northern end of the site between 50 to 100 m to the nearest house on Sangsters Road. Provided the sand and fuel are stored in enclosed tanks and these activities are relatively small scale, then in my view they are unlikely to result in adverse effects of dust or odour beyond the site boundary.

- f. Log loading area and storage – KiwiRail identifies the log yard as a source of particulate matter and dust, with the log handling facility being over 50,000 square metres²⁶. I agree that the log handling facility is potentially a significant source of dust from the Freight Hub, particularly if unpeeled logs are bought on-site for handling. Measures to reduce the potential for dust are stated as log washing facilities to remove soil and bark, and a log handling protocol to minimise log movement on site.

KiwiRail also states that perimeter water misting sprays and boundary plantings will mitigate emissions. I disagree that boundary misting sprays are an effective control for dust discharges and would prefer to see emphasis on source controls.

The nearest house is about 200 m to the north on Te Ngaio Road. Given the separation distance, at maturity extensive tall planting proposed in the area between the log yard and the site boundary, and the low incidence of winds from the south, the log yard is not expected to contribute to adverse effects from dust off site.

- g. I understand from the NoR that there may be storage of bulk granular materials that are potentially dusty. I consider that clarification of the location, nature and scale of bulk materials operations is required to better understand the potential for effects and appropriate mitigation measures.
- h. Likewise, KiwiRail mentions bulk hazardous substance storage²⁷, further details of this activity are needed to understand if there is a potential for discharges to air from this activity.
- i. KiwiRail has not identified the general yard operations as a potential source of dust. I consider that clarification of the surfaces used to form the site e.g. extent of paved or unpaved areas for various operations and surface maintenance is required to better understand the potential for effects and appropriate mitigation measures.

100. KiwiRail did not discuss the bulk liquids storage area in Table 1 of the second s92 response. I assume this facility relates to the fuel tanks shown to the east of

²⁶ Second s92 Response, Issue 3, page 4.

²⁷ Attachment 5, Response #172 dated 15 February 2021 to s92 RFI.

the site in the Concept Plan²⁸. The Plan shows the nearest existing dwellings are to the west at Te Ngaio Road, more than 200 metres from the bulk liquids storage area. If I understand the scale of the activity correctly as referenced in paragraph 50 above, I agree that this separation will be adequate to avoid offsite effects from odour and contaminants from bulk fuel storage and fuel transfer for the existing dwellings.

101. KiwiRail²⁹ identifies that procedures for managing the effects from the Freight Hub when operational will be set out in an Operational Dust Management Plan. In my view, the Plan scope should clearly include air quality, not dust, i.e. an Operational Air Quality Management Plan should be required that addresses all operations, including good practice management procedures for trucks and diesel train engine operations, materials handling, yard management (housekeeping), and emissions control at the engine maintenance and optimisation facility.

7 Mitigation

7.1 Construction Air Quality Mitigation

102. Generic controls for dust are as set out by KiwiRail in relation to the contents of a CDMP. I consider the mix of measures in conjunction with real-time dust monitoring are generally appropriate but given the small separation distances to some properties it may be very difficult to control dust to acceptable levels. I would recommend that specific targeted measures, such as wind speed triggers for ceasing works, should be considered for works that are undertaken near the site boundaries where there are residences closer than 50 metres to the boundary. Consideration of providing cleaning services, and or alternative accommodation may need to be considered for some very high-risk locations.

7.2 Operational Air Quality Mitigation

103. The operational effects of the Freight Hub on air quality are unclear. Based on the proposed locations of activities, in alignment with the concept plan, some of the Freight Hub activities have adequate separation distances and with the

²⁸ Attachment 5, Response #188 dated 15 February 2021 to s92 RFI.

²⁹ Second s92 Response, Issue 4, Page 12.

height and depth of landscape planting at maturity the effects of some activities are likely to be at an acceptable level.

104. However, clarification of the nature and scale of some activities is still required to understand the potential effects Freight Hub operations including:
- a. bulk materials and/or fuel handling;
 - b. yard surfaces and management of these;
 - c. frequency, scale and nature of train and traffic movements and a screening level effects assessment to determine if a more detailed assessment is required; and
 - d. assessment of the maintenance facility emissions against the permitted activity conditions should be undertaken.
105. As a minimum, I recommend controls on engine idling be considered to minimise the potential impacts of vehicle and train engine emissions. I also consider that an OAQMP is required to capture procedures and practices that will be implemented to manage contaminant discharges and ensure acceptable air quality impacts for the operational phase.

8 Review of submissions

106. There are 32 submissions that address air quality and dust. Submitters who are either neutral or in opposition raise concerns about the impact on air quality that will result from construction and the operational of the Freight Hub. Matters raised in the submissions are discussed below:
- a. Dust including inadequate controls on dust during construction, especially during strong winds from the west – I agree that there is little certainty provided on the management methods that will be applied for construction dust and whether they will be adequate. I have discussed effects of construction dust starting at paragraph 74. I agree that there is significant potential for adverse effects of dust from construction and I have recommended specific mitigation measures be incorporated to a CDMP and real-time dust monitoring be required.

- b. Diesel fumes – The effect of diesel fumes is unclear because there is insufficient information on the nature and scale of the operational phase activities i.e. truck and train operations within the designation.
 - c. Potable water contamination and health effects from dust and airborne contaminants, including polymers, affecting rainwater roof supplies during construction and operation. KiwiRail has indicated that it will provide further information on this aspect in evidence. I support provision of first-flush diverters as a proposed mitigation measure for affected dwellings.
 - d. Dust from the log yards – provided that the management measures for the log yard e.g. log washing and preferably peeled before being transported to site, then given the location of the log yard within the site, I consider that it is unlikely the log yard would result in unacceptable effects from dust.
 - e. Time for vegetative planting to establish to provide effective screening – I agree that clarification on the timeframes for establishing planting in relation to works commencing, particularly at sensitive boundary locations, is needed.
 - f. Inadequate screening, being a fence & small row of trees, to the east with Sangsters Road – as I understand it, the landscape plans indicate that planting is four trees deep at Sangsters Road. As I discuss starting at paragraph 99(f), I prefer controls to be in place at source, therefore, I consider that from an air discharge perspective the mature screening is likely to be adequate for operational activities.
 - g. The impacts on health relating to emissions to air from the marshalling yards – I agree that the potential effects on health, in particular, from discharges of PM₁₀ and PM_{2.5} relative to ambient air quality criteria, are unclear from the information provided by the KiwiRail.
107. The Mid Central District Health Board's (MDHB) submission, Submission 94, related to the two management plans. The MDHB agrees that dust mitigation for construction is needed but considers that the proposed condition 53(d) for the Construction Management Plan does not provide adequate detail as to how construction dust will be minimised. The submitter notes that there are more comprehensive requirements proposed within the conditions relating to

the Operational Dust Management Plan, but that there is no rationale as to why there is this difference in proposed requirements i.e. for construction vs operation. The MDHB seeks a more comprehensive specific construction dust management plan condition, including an objective. I agree with the submitter and have made recommendations later in my evidence.

108. For the Operational Dust Management Plan MDHB notes that the AEE identifies operational effects of deposition onto roof water collections systems within 250 metres but does not assess the effects of airborne contamination on health. The MDHB seeks a specific objective for the plan be stated and to include human health protection.
109. Further information on the operational effects, is needed to understand if these can be managed to an acceptable level including confirmation of the proposed site layout, scale and nature of the engine emissions and controls on the maintenance facility discharges.

9 Draft Requirement Conditions

110. KiwiRail has offered conditions to provide for dust within a Construction Management Plan (condition 53(c)) and an Operational Dust Management Plan (condition 78) to capture the controls for managing impacts on air quality as set out below:

53 (c) measures to be implemented to minimise dust from construction and related earthworks;

78 The Operational Dust Management Plan shall outline:

(a) The details and location of dust generating activities on the site;

(b) A description of any sensitive receptor locations;

(c) A qualitative assessment of the risk of impacts of dust generation from dust generating activities, including the typical frequency and duration of exposure to dust for each activity;

(d) A description of the intensity and character (including offensiveness) of each type of dust discharge;

(e) The mitigation and management practices to minimise dust emissions;

(f) The process for monitoring dust generation and dust generating activities;

(g) The roles and responsibilities of staff in relation to the Operational Dust Management Plan; and

(h) The training required for staff to implement the Operational Dust Management Plan.

111. In my opinion, the CDMP condition is inadequate, it should be considerably more comprehensive and specific. I also consider the operational plan should be broadened to an air quality management plan to cover both dust and emissions.
112. For the construction phase I recommend incorporating conditions relating to monitoring, in particular:
- a. Requiring real-time continuous PM₁₀;
 - b. An action trigger value for the PM₁₀ monitoring of 150 µg/m³ as a 1-hour average;
 - c. On-site wind direction and strength monitoring measured at no higher than 5 m above ground level; and
 - d. Works to cease at anytime when winds exceed 10 metres per second and blowing towards a dwelling; or if winds exceed 7 metres per second and a dwelling is within 100 metres downwind.
113. Following further evidence from KiwiRail, additional conditions may also be necessary in relation to potentially contaminated dust and impacts on roof-rainwater supplies. I would support appropriately designed first-flush diverters being installed on dwellings out to at least 100 meters of the boundary or provision of alternate water supplies.
114. Depending on the outcomes of any further assessment, it may also be appropriate to consider continuing air quality monitoring for PM₁₀ throughout the operational phase.
115. I consider that both the CDMP and OAQMP should be independently certified by an appropriately qualified and experienced professional, particularly given the level of uncertainty at this stage of the Freight Hub development.

116. As suggested by MDHB, I agree that the plans should be required to incorporate an objective or objectives for managing the effects on air quality, in particular addressing management of the potential for effects on human health and amenity. I recommend that both the CDMP and OAQMP should include objectives that are aligned with achieving the assessment criteria I outlined starting at paragraph 41.

10 Conclusions

117. The level of information provided by KiwiRail does not give confidence that the measures will be “fully effective in minimising the potential effects to negligible levels” as is stated by KiwiRail.
118. I have provided further assessment of the potential effects based on my understanding of the activities, the receiving environment and experience elsewhere to help address gaps in KiwiRail's assessment, but there are still gaps in the assessment where further information from KiwiRail should be provided.
119. I conclude that there is significant risk of adverse effects from dust during construction based on the nature and scale of the construction works and the proximity of the works to existing dwellings around the site perimeter. A comprehensive CDMP, and real-time monitoring will be needed to manage dust, but given the small separation distances at some locations dust may not be able to be managed to acceptable levels and specific additional mitigation may be needed.
120. I understand that further information is to be provided in evidence by KiwiRail to better understand the potential effects on roof water supplies.
121. For the operational effects on air quality, there is insufficient information to assess if these will be at an acceptable level to avoid significant adverse effects on health and amenity. Any conclusion would be contingent on receiving further information in relation to:
- a. Yard surfaces and maintenance;
 - b. Bulk granular materials storage;
 - c. Bulk hazardous substances storage;

- d. Compliance of the maintenance facility operation with the One Plan permitted activity conditions;
 - e. The frequency, scale and nature of the diesel train movements and associated fuel consumption and emission estimates for air contaminants, particularly within the marshalling yard; and
 - f. An assessment of the potential impacts of vehicle traffic accessing the site and activity such as idling while onsite.
122. I also recommend adherence to the Concept Plan and landscape plans, and management of key activities that will result in emissions to air via an OAQMP to be detailed via conditions.

A handwritten signature in black ink, appearing to read 'Deborah Ryan', with a long horizontal stroke extending to the right.

Deborah Ryan

18 June 2021

Attachment A Receiving Environment Sensitive Receptors

Table A1 Properties with dwellings within 100 metres of the Designation

ID	Address	Distance from Designation (metres)
1	1 Maple Street, Bunnythorpe	9
2	1A Maple Street, Bunnythorpe	31
3	3 Maple Street, Bunnythorpe	29
4	5 Maple Street, Bunnythorpe	25
6	7 Maple Street, Bunnythorpe	17
7	7A Maple Street, Bunnythorpe	36
8	9A Maple Street, Bunnythorpe	23
9	11A Maple Street, Bunnythorpe	21
10	13 Maple Street, Bunnythorpe	45
11	15 Maple Street, Bunnythorpe	45
12	17 Maple Street, Bunnythorpe	40
13	19 Maple Street, Bunnythorpe	36
14	21 Maple Street, Bunnythorpe	43
15	57 Maple Street, Bunnythorpe	70
16	241 Te Ngaio Road, Bunnythorpe	34
17	245 Te Ngaio Road, Bunnythorpe	15
18	242 Te Ngaio Road, Bunnythorpe	5
19	163 Clevely Line, Bunnythorpe	43
21	824A Roberts Line, Bunnythorpe	19
22	803 Roberts Line, Bunnythorpe	42
23	787 Roberts Line, Bunnythorpe	96
24	761 Roberts Line, Bunnythorpe	19
25	682 Roberts Line, Kelvin Grove, Palmerston North	80
26	422 Railway Road, Bunnythorpe	6
27	95 Sangsters Road, Bunnythorpe	15
28	91 Sangsters Road, Bunnythorpe	31
29	73 Sangsters Road, Bunnythorpe	29
30	43 Sangsters Road, Bunnythorpe	28
31	59 Parrs Road, Bunnythorpe	61
32	27 Sangsters Road, Bunnythorpe	13
33	27 Sangsters Road, Bunnythorpe	26
34	27 Sangsters Road, Bunnythorpe	44

35	27 Sangsters Road, Bunnythorpe	19
36	25 Sangsters Road, Bunnythorpe	13
37	25 Sangsters Road, Bunnythorpe	49
38	15 Sangsters Road, Bunnythorpe	37
39	9 Sangsters Road, Bunnythorpe	29
40	11 Sangsters Road, Bunnythorpe	99
41	41B Clevely Line, Bunnythorpe	67
42	41A Clevely Line, Bunnythorpe	69
43	22 Clevely Line, Bunnythorpe	51
44	819 Stoney Creek Road, Bunnythorpe	94
45	7 Nathan Place, Bunnythorpe	15
46	6 Nathan Place, Bunnythorpe	14
47	8 Nathan Place, Bunnythorpe	50
48	9 Nathan Place, Bunnythorpe	65
49	5 Nathan Place, Bunnythorpe	20
50	5 Nathan Place, Bunnythorpe	23
51	4 Nathan Place, Bunnythorpe	28
52	3 Nathan Place, Bunnythorpe	37
53	3 Nathan Place, Bunnythorpe	24
54	4 Nathan Place, Bunnythorpe	17
55	2 Nathan Place, Bunnythorpe	48
56	1 Nathan Place, Bunnythorpe	57
57	833 Stoney Creek Road, Bunnythorpe	93
58	10 Nathan Place, Bunnythorpe	75
59	22 Baring Street, Bunnythorpe	87
60	21A Railway Road, Bunnythorpe	5
61	21 Railway Road, Bunnythorpe	25
62	2 Maple Street, Bunnythorpe	26
63	23A Railway Road, Bunnythorpe	55
64	23 Railway Road, Bunnythorpe	45
65	25 Railway Road, Bunnythorpe	68
66	27 Railway Road, Bunnythorpe	86
67	25A Railway Road, Bunnythorpe	75
68	4B Maple Street, Bunnythorpe	75
69	4 Maple Street, Bunnythorpe	53
70	4A Maple Street, Bunnythorpe	66
71	6 Maple Street, Bunnythorpe	85
72	8 Maple Street, Bunnythorpe	88

73	10 Maple Street, Bunnythorpe	91
74	12 Maple Street, Bunnythorpe	91
75	55D Parrs Road, Bunnythorpe	73
76	55D Parrs Road, Bunnythorpe	99
77	59 Parrs Road, Bunnythorpe	75
78	22 Clevely Line, Bunnythorpe	72
79	9 Maple Street, Bunnythorpe	47
80	11 Maple Street, Bunnythorpe	47
81	13 Maple Street, Bunnythorpe	40

Attachment B Background Air Quality Assessment

Summary

In the absence of an assessment provided with the application, PDP has applied experience with similar locations to categorise air quality in the vicinity of the project. The existing air quality is assessed as compliant with the relevant standards and guidelines for air quality as set out below.

Assessment

In circumstances where there is no publicly available air quality monitoring data, the *Ministry for Environment (MfE) Good Practice Guide*³⁰ (MfE, 2016) recommends using default background air quality values developed by the New Zealand Transport Agency (NZTA, 2014) for PM₁₀ and NO₂ by census area units (CAU). The NZTA maps indicate that the default background values applicable for the site are as for the site are as per the main urban area of Palmerston North of 21.95 µg/m³ for PM₁₀ as a 24-hour average.

Default background values for the main urban area of Palmerston North for NO₂ are 65, 43 and 16 µg/m³ for 1-hour, 24-hour, and annual average concentrations, respectively. These values are expected to be conservative for the rural fringe of Palmerston North. Other values or averaging periods for PM₁₀, CO and SO₂ were obtained from default background values provided in the *MfE Good Practice Guide* (2016) and are expected to conservatively represent the semi-rural location of the site's receiving environment.

To estimate the PM_{2.5} background concentrations, it has been assumed that the PM_{2.5} to PM₁₀ ratio is 50%, which is consistent with assumptions for rural areas³¹.

Table A1 provides the assessed background concentrations for the contaminants of concern along with the relevant air quality guidelines (NZZAQG³²) and standards (NESAQ³³) for the relevant averaging periods.

Table A1: Summary of Background Air Quality Concentrations			
Contaminant	Criteria (µg/m ³) & Averaging Period	Background Concentration (µg/m ³)	Guideline & Data Source
PM ₁₀	50 24-hour	21.95	NESAQ, NZTA

³⁰ MfE, *Good Practice Guide for Assessing Discharges to Air from Industry*, November 2016.

³¹ NIWA, *PM_{2.5} in New Zealand Modelling the Current (2018) Levels of Fine Particulate Air Pollution*, December 2019.

³² MfE, *Ambient Air Quality Guidelines*, 2002.

³³ National Environmental Standards for Air Quality, Regulations, 2004.

	20, Annual	14	NZAAQG, MfE 2016
PM _{2.5}	25, 24-hour	9.4	WHO ² , NZTA ¹
	10, Annual	7	WHO ² , NZTA ¹
NO ₂	200, 1-hour	65	NESAQ, NZTA
	100, 24-hour	43	NAAQG, NZTA
	30, Annual	16	WHO ² , NZTA
CO	10,000, 1-hour	5,000	NESAQ, MfE 2016
	30,000, 8-hour	2,000	NZAAQG, MfE 2016
SO ₂	350 1-hour	20	NESAQ, MfE 2016
	120, 24-hour	8	NAAQG, MfE 2016
Notes:			
1. Background PM _{2.5} concentrations assumed to be 50% of background PM ₁₀ .			
2. World Health Organisation			

Attachment C Horizons One Plan Permitted Activity Conditions

Rule 15-14 Miscellaneous discharges into air from industrial or trade premises are permitted subject to:

- (a) The discharge[^] must not cause a breach of any of the National Environmental Standards[^] for ambient air* quality set out in Table 7.1 (in Chapter 7).
- (b) The discharge[^] must not result in any offensive or objectionable odour, dust, smoke or water[^] vapour beyond the boundary of the property*.
- (c) The discharge[^] must not result in any noxious or dangerous levels of gases or particulates beyond the boundary of the property*.
- (d) The discharge[^] must not cause a reduction in visibility on any designated commercial or military flight path.
- (e) The vertical velocity of the discharge[^] must not exceed 4.3 m/s, at 60 m above ground level or the discharge[^] must not penetrate the obstacle limitation surface of an aerodrome.

Attachment D Suggested approaches to undertaking additional assessment.

The following advice on suggested approaches to undertaking additional assessment of effects on air quality is extracted from a PDP memo Deborah Ryan to Anita Copplestone dated 20 April 2021.

It would be helpful if the applicant provided some context for the emissions from locomotive engines and trucks i.e. quantification relative to road transport (what would be the equivalent traffic volume associated with the project). In PDP's view consideration of the impacts of idling and any mitigation would be helpful.

In the absence of a specific framework for assessment of rail projects in New Zealand, the NZTA publications for highways could be used as a starting point for the Environmental and Social Responsibility Screening of air quality effects, which would help to assess if a more detailed assessment should be undertaken. The NZTA Guide to assessing air quality impacts from state highway projects would, in PDP's view, also provide a suitable framework in the absence of specific guidance for rail projects. This guide covers both construction and operational effects.

PDP considers that information to support the effects assessment should be provided. As a matter of good practice, this could include information based on experience elsewhere i.e. from similar facilities KiwiRail operates and consideration of the following:

- Has there been any air quality monitoring around these sites?*
- Have there been any complaints relating to air quality from these operations and if so how have these been managed?*
- What is the potential for adverse effects at the proposed site based on a comparative analysis of the scale and nature of facilities and relative distances to potentially affected parties?*

In the absence of information from New Zealand, international information could/should be referenced.