24 May 2021

Palmerston North City Council

Private Bag 11034

Attention: Anita Copplestone

By email: anita@kahuenviro.co.nz, craig.auckram@pncc.govt.nz

Dear Anita

KiwiRail Regional Freight Hub – Notice of Requirement - Response to Further information request pursuant to section 92 of the Resource Management Act 1991 – Air quality and dust effects

We refer to your letter of 28 April 2021 on behalf of the Palmerston North City Council requesting further information under section 92 of the Resource Management Act 1991 (RMA) in relation to KiwiRail Holdings Limited's Notice of Requirement for the Regional Freight Hub.

On 18 May 2021, KiwiRail requested an extension to the timeframe for providing a response to 24 May 2021. The Council confirmed this extension on 20 May 2021.

Accordingly, please find enclosed KiwiRail's response to the further information request in relation to air quality and dust effects.

If you have any queries regarding the information contained in this response, please do not hesitate to contact the undersigned.

Yours faithfully,

Pam Butler

Senior RMA Advisor

KiwiRail Holdings Limited

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KiwiRail Freight Hub – Notice of Requirement

Response to Further Information Request from Palmerston North City Council

Introduction

A Further Information Request pursuant to s92 of the Resource Management Act 1991 and dated 28 April 2021 has been received from Palmerston North City Council. This specific request relates to air quality and dust effects and is set out under three sub-headings, these being the need for regional consents; construction effects; and operational effects.

KiwiRail's response to each question is set out below.

Requirement for regional consents

Issue #1: *Please advise whether or not the proposed Freight Hub will be an 'industrial or trade premises' for the purposes of s 15 of the RMA?*

KiwiRail Response:

"Industrial or trade premises" is defined in section 2 of the Resource Management Act 1991 (RMA). The definition is broad and includes "any premises used for any industrial or trade purposes". In the absence of any definition of "industrial" or "trade" purposes in the RMA, the terms should be given their plain and ordinary meaning, being:

- "Industrial" as *used in or characterised by industry*; and
- "Trade" as the *buying and selling of goods and services*

In light of this, aspects of the Freight Hub would fall within this definition by the nature of the activities occurring on the site. For example, the maintenance facilities and any bulk liquid storage facilities would likely be considered as industrial premises and the freight forwarding facilities would likely be captured as trade premises. Notwithstanding this, as set out below in response to question two, it is not anticipated that any regional resource consents would be required for discharges to air from the Freight Hub.

Question 2: *Stantec indicates that KiwiRail will comply with the air quality requirements of the regional council or will obtain resource consents. Please provide information on what air quality requirements from the regional council KiwiRail will seek to comply with. Please also advise what activities could require regional consents for air discharges, and what the activity status of these activities would be under the One Plan.*

KiwiRail Response:

The Horizons Regional Council's One Plan outlines requirements and direction for the management of discharges to air.

Rule 15-6 applies to small-scale fuel burning devices which do not cover moveable sources and so the rule is not relevant to the operation of the Freight Hub.

Rule 15-14 applies to "miscellaneous discharges into air from industrial or trade premises" and identifies a wide variety of activities as being permitted. Of particular relevance is sub-clause (h) which provides for:

the sale, servicing, or repairs of motor vehicles, trains, trailers, boats or like equipment, including body and engine repairs, panel beating, fibre-glassing, and painting when carried out in a booth or enclosure that has been designed to contain any emission of paint overspray.

At least one aspect of the proposed activities at the Freight Hub site is specifically permitted by this Rule 15-14, this being the proposed maintenance activities to be undertaken on locomotives and rolling stock at a specific part of the Freight Hub footprint.

Rule 15-14(u) states that:

> *The discharge of contaminants into air and any subsequent discharge of contaminants onto land or into water pursuant to ss15(1) or 15(2A) RMA from the following activities on industrial or trade premises:*
>
> *(u) the development, maintenance, use, upgrade, or demolition of industrial or trade premises and which are not otherwise provided for by rules in this Plan, including site development, subdivision and landscaping, and the installation, construction, maintenance, use or demolition of roads, paved areas, buildings, structures or equipment.*

This is applicable to the development and use of the Freight Hub as proposed, and this is therefore permitted under this rule.

Rule 15-16 refers to "Discharges from specified mobile sources" and states that certain types of discharge from particular mobile sources are permitted, as follows;

> *The discharge of contaminants into air pursuant to ss15(1) or 15(2A) RMA from: (a) equipment to treat road surfaces by heat to remove impaired surfaces except where the burning of bitumen is involved (b) mobile aggregate crushing and screening plants (c) mobile asphalt plants (d) earthmoving or harvesting equipment.*

The sources are only four in number and each of these is a quite specialised type of plant or equipment item, and not remotely connected to trains, locomotives or railway operations in general. This rule therefore does not apply.

Finally, Rule 15-17 states that:

> *The discharge of contaminants into air pursuant to ss15(1) or 15(2A) RMA and any subsequent discharge of contaminants onto land from activities which either: (a) are located on industrial or trade premises and are not addressed by any other rule in this Plan, or (b) do not comply with one or more conditions, standards or terms of a permitted activity rule, but which are not expressly classified as a controlled activity, restricted discretionary activity, discretionary activity, noncomplying activity or prohibited activity. Discharges that are covered by this rule under (a) include, but are not limited to, those activities listed in the rule guide following this rule table.*

The rule is of a catch-all nature and states that "other discharges" that do not fit into other rule specifications are to be considered as discretionary activities, with a lengthy list then being provided of the nature of various activities that are likely to be captured by Rule 15-17. None of these are relevant to railway freight hub operations, nor indeed to railways or trains at all.

In summary, there are no specific rules in the One Plan that outline requirements relevant to activities for the operation of the KiwiRail Freight Hub for which consent would be required. Therefore, no regional consents are anticipated to be necessary for air discharges.

Construction effects

Issue #3: *Please provide an assessment of the potential effects on air quality from the construction works. This should include but not be limited to:*

> *a) A description of the activities that will give rise to dust e.g. earthworks (cut & fill, bund construction) & vehicle movements. Include approximate location, scale and construction schedule for major earthworks in as much detail as is known or can be assumed.*

KiwiRail Response:

As set out at section 1.3.3.2 of the Design, Construction and Operation Report, the bulk site earthworks are expected to proceed in a sequential manner, a summary of which is as follows:

- Excavate and prepare stormwater detention ponds and plant this area
- Construct northern noise mitigation bund and plant this area
- Construct site perimeter and perimeter road
- Build the structure required to relocate the NIMT - includes cut and fill activities, place new ballast, and construction of track
- Complete earthworks on eastern boundary, including noise mitigation bunding and plant this area
- Continue with internal site layout surface development activities, including cut and fill and completing box culverts through middle of the Site, the northern section and forming the open channel
- Stockpile imported material, prior to using that material to bring the site up to formation level
- Place imported material to bring Site to formation level

Each of these activities has the potential to give rise to dust. To provide an indication of the potential for dust emissions, the approximate areas of the various site elements that will be developed are as follows:

ACTIVITY	APPROXIMATE AREA
Arrival/departure yard	83,100m^2
Marshalling yard	106,500m^2
Wagon storage yard	14,400m^2
Container terminal	176,000m^2
Wagons/locomotives maintenance	130,000m^2
Network equipment sheds	43,000m
Depot and terminal building	2,700m^2
Freight forwarding facility - prime	90,000m^2

ACTIVITY	APPROXIMATE AREA
Freight forwarding facility – secondary	60,000m^2
Log handling facility	51,600m^2
Tanks	87,500m^2

These areas give a broad sense of the relative dust emissions risk posed by the development of each facility. These site development steps are proposed to take place over approximately three and a half years.

Materials transported to and stored on site prior to use in various construction activities include imported cleanfill and topsoil material, quarry rock, and river gravels for higher quality fill (estimated to be 45% of the total volume of site development materials requirements), with the remaining 55% being material sourced directly from the surface scrapings of the site footprint itself. As outlined at section 2.2.2 of the Design, Construction and Operation Report, the likely method of moving material to the Site will be by truck and trailer if sourced locally. Alternatively, material sourced from further afield may be transported by rail.

b) A discussion of the relevant air quality assessment criteria.

KiwiRail Response:

The relevant air quality assessment criteria for emissions to air associated with the construction phase of the Freight Hub project have been primarily focused on dust arising from construction activities, in accordance with Ministry for the Environment's "Good Practice Guide for Assessing and Managing Dust" (MfE, 2016).

The guidance identifies that the effects of dust are often assessed and managed qualitatively. For the purposes of this assessment, a qualitative assessment has been undertaken having regard to the FIDOL factors, which is set out in response to question (c) below.

To assist with the assessment of air quality effects, a wind rose has been derived from meteorological data for Palmerston North to understand the potential risks of emissions from site construction activities impacting on sensitive receptors (see Figure 1). Further investigation of directions and strengths ranges of prevailing winds will enable better targeting of response measures to those areas likely to be impacted by effects of dust emissions during construction.

To determine background levels to assist with evaluating compliance with the air quality assessment criteria, a control dust deposition monitoring site should be established upwind of the earthworks activities associated with construction on the Freight Hub site. This control monitoring site would be established upwind of the prevailing wind direction in an area having at least a 150 m setback from the nearest site earthworks activities. Results from monitoring dust concentrations over time at the control site will establish the background parameters of deposited dust concentrations in this part of the Manawatu area that form part of the existing environment. The impacts of dust from construction can then be monitored during construction activities and compared with this background data. The recommended value for assessing the dust deposition results will be 4 g/m^2/30 days above the background level established at the control site, in accordance with Table 6 of the Good Practice Guide.

Monitoring of total suspended particulate (TSP) is recommended as the best practice method for active management of dust and particulate emissions. TSP refers to particles that are suspended in air at the time of sampling. The equipment for TSP measurements is intended to collect all particles, from less than

0.1 µm up to about 100 µm, thus including PM_{10} particulate within the monitored particle size range. Continuous monitoring equipment is now available that can collect TSP. This type of continuous monitoring provides real-time information for active management of on-site activities that generate dust and particulate.

Particulate concentrations in various size ranges (total respirable dusts, inhalable and respirable particulate, and fine particulate ($PM_{2.5}$)) have been considered in accordance with the air quality criteria outlined above.

Assessment of odour will use the "no offensive or objectionable odour at the property boundary" yardstick of acceptability, as discussed and endorsed by the "Good Practice Guide for Assessing and Managing Odour in New Zealand" (MfE, 2016). This is widely accepted in New Zealand as the qualitative yardstick of assessing odour acceptability.

The possibility of encountering potentially contaminated dust is assessed in relation to the risk of such airborne materials being encountered based on the likelihood of contamination being found. While this is assessed as being very low, an accidental discovery protocol will be in place for quantifying the associated risk if it becomes apparent that the presence of contaminated dust is possible.

Monthly wind direction and strength distribution

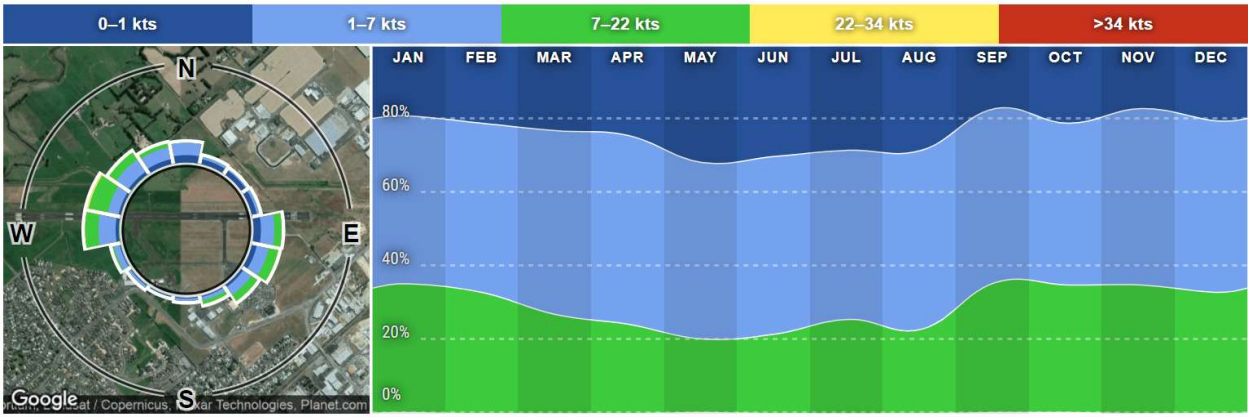

Figure 1: Wind rose and frequency data for Palmerston North

c) A description of the receiving environment, locations of sensitive receptors, (principally dwellings and including distances relative to construction activities), identification of dwellings with roof water collection and evaluation of the risk to roof water supplies.

KiwiRail Response:

The Designation Extent and surrounding landscape is characterised by:

- Relatively open, rolling contoured land with rural and recent rural-residential land uses
- Unmodified landforms of the Mangaone Stream catchment, including its tributaries, with contours varying across the site by approximately 5m
- Predominant pasture landcover with minor pattens of vegetation
- The existing North Island Main Trunk (NIMT) line
- The arterial roads connecting Palmerston North, Bunnythorpe, Feilding and the links to SH54 and SH3
- The grid pattern of connecting streets and cadastral boundaries off Railway Road

The land around the Freight Hub is subject to the Rural Zone and to the North Eastern Industrial Zone (NEIZ). The land subject to the Rural Zone is a mix of both lifestyle properties with some accessory activities occurring on them such as firewood storage, and pastoral activities with grazing.

The area included in the Designation Extent includes provision for stormwater ponds and a new Perimeter Road on the western and northern edges of the Freight Hub site, along with noise buffers and landscaping around the site. These will provide separation distances that will assist in reducing the risk to existing sensitive receptors from dust.

The prevailing winds of the Manawatu province in general and of this locality in particular are from the westerly and north-westerly quarters. However, winds from other directions occur from time to time and therefore owners and occupiers of dwellings within approximately 100m of the site boundary are assessed as being potentially impacted by discharges to air from the site activities.

The exact number and location of residences within the area of impact who rely on roof-top rainwater collection systems for their domestic water supply has not yet been confirmed. There are a total of eight individual submissions received that express concerns about the effect of Freight Hub construction (and operational) activities on the integrity of their water supply and these lie to the immediate east and north-east of the Freight Hub boundary.

The prevailing mainly westerly winds could disperse any emissions from the Freight Hub site over these properties, if no mitigation was in place. However, a number of options for effective mitigation of the contamination of roof-top rainwater collection systems are being considered (including first flush diversion systems) and will be addressed further in KiwiRail's evidence.

> *d) A FIDOL assessment to identify the relative risks of dust discharges to result in adverse effects.*

KiwiRail Response:

A FIDOL assessment of the dust emissions during the Freight Hub construction activities is set out below.

Frequency: There could be relatively frequent emissions of dust during construction activities if effective mitigation is not in place at all times (but as set out below, mitigation is proposed to manage these emissions). The winds from the prevailing west and north-west quarter will potentially extend a dust plume over approximately 30 properties that are within 100m of the Freight Hub site boundary in the down-wind direction. The wind rose and frequency data of Figure 1 show that prevailing winds blow for approximately 50% of the time.

Intensity: From time to time, intense emissions of dust may occur from construction activities, unless relevant management measures are in place to prevent this which will be provided for in the Construction Dust Management Plan (CDMP) (as discussed below).

Duration: The duration of conditions that may result in adverse environmental effects is dependent on a wide range of interactive factors, including the extent of on-site activities, the movements of heavy machinery and the disturbance of topsoil and other materials, the prevailing wind strength and direction, and other weather conditions including rainfall and the ambient soil moisture levels. Because of the number of factors and associated uncertainties involved, it is essential that the matter of duration of adverse effects be reduced to the lowest possible levels, with the means of achieving this being set out in detail in the CDMP document.

Offensiveness: The degree of offensiveness of dust emissions from the Freight Hub site will be linked to adverse effects on people's levels of amenity, for example the soiling of washing or fine dust in the interior of houses. Appropriate mitigation will be provided for in the CDMP.

Location: The location of sensitive receptors is relevant with respect to the prevailing wind conditions. Sensitive receptors within 100m of the Freight Hub site boundary are assessed as potentially being

impacted by the adverse effects of dust discharges from Freight Hub construction activities. As noted above, the essential mitigation measures are those detailed in the CDMP for the site construction activities. If effectively and continuously applied these measures will be effective in mitigating adverse effects from dust emissions.

As noted elsewhere, the monitoring of dust emissions during the entirety of construction activities (and beyond, into the operational phase of the Freight Hub) is an important quantitative means of measuring the effectiveness of dust mitigation; comparison of findings of monitoring of, particularly, deposited dust against previously established baseline levels will enable KiwiRail to proactively assess the effectiveness of the mitigation measures being applied and to adjust these measures if the results indicate that this should happen.

> *e) Recommendations for specific mitigation measures to address the potential adverse effects of dust to ensure effects are acceptable, including monitoring if appropriate.*

KiwiRail Response:

The mitigation measures with respect to adverse effects resulting from construction activities will centre mainly on management and mitigation of emissions of dust. A primary tool to manage the effects of dust is to limit the extent of open / bare areas from which dust can be entrained by strong winds and back that up with the application of protective spray-applied temporary dust suppressing coatings if extra protection is required. The Construction Management Plan (CMP) proposed in the conditions on the Notice of Requirement will include measures to manage dust effects.

As part of the regional consent process for bulk earthworks, it is anticipated that KiwiRail will be required to prepare and implement a specific construction dust management plan (CDMP) for earthworks.

A Construction Dust Management Plan (as will be required through the regional consent process) typically comprises:

Draft Contents Headings/Sections for a Construction Dust Management Plan

- A description of the site location and sensitive receptor locations
- A summary of site activities
- Identification of the potential dust generating sources, typical frequency and duration of exposure, and a qualitative assessment of the risk that each individual on-site source could/would generate dust impacts
- A description of the intensity and character (including offensiveness if relevant) of the various potential types of dust discharges
- Mitigation and management practices to reduce dust emissions. This would include summaries of the individual site activity plans for dust-generating activities in which mitigation measures have been discussed
- Inspection and monitoring programmes – to the extent that these relate to day-to-day site walk-over audit activities to monitor all operational impacts of the Freight Hub operations
- Complaints recording and responses
- Training of personnel necessary for the CDMP to be implemented
- Record keeping
- Roles and responsibilities of staff in relation to the CDMP. This is a very important area – and deputies for the key roles also need to be named
- Requirements for and regularity of update of the CDMP

A CDMP would likely set out the detail of a Dust Management toolbox including the use of water carts, dust suppressants, progressive stabilization of bare areas, training to minimise drop heights of delivered potentially dusty loads, and management of stockpiles where appropriate. It would also include locating

stockpiles at least 100m (which is considered an appropriate distance) away from sensitive receptors, controlling stockpile heights and having measures to clean roads adjacent to entranceways if vehicles track dirty materials onto local roads, such as a road sweeper and having hoses on the water carts.

A CDMP would likely identify that the earthworks will be staged to minimise open areas and limitations on vehicle speeds (for example 15 km/hour during dry weather when sensitive receptors are within 100 metres of the construction activities). Materials will be applied on surfaces to minimise dust generation.

CDMP's typically take a proactive rather than a reactive approach to dust management. A CDMP will address dust generation from earthworks, materials movements, vehicle movements and exposed soil surfaces, particularly during dry, windy weather conditions; and in particular to manage nuisance to residents.

A CDMP will be expected to describe qualitative monitoring requirements, including at least daily visual observations of active areas by staff on-site, checking weather forecasts for rain and wind in relation to planning daily activities, and advising of dust risks to potentially affected parties in advance, by considering the relative locations of sensitive receptors in proximity to the predicted dusty activities.

A CDMP will also be expected to include the methodological basis for proposed meteorological monitoring for wind speed and direction, using a high mast fitted with relevant sensors to assist with dust management. Data would be continuously logged and recorded, and alerts would be advised visually and electronically when the wind speed exceeds 10 metres per second from a direction that increases the vulnerability of particular sensitive receptors.

It is proposed that screening plantings will be established prior to site development activities where appropriate to maximise coverage prior to construction. The desired locations of these screening plantings have been identified in the Landscape Plan.

Ballast for track laying would be initially brought onto the site by truck transport but once the various proposed road closures take place, a siding could be constructed which would allow for delivery of ballast by train from its likely source at the Otaki River, or from other sites linked to the railway network. This would further reduce the likelihood of dust emissions.

For vehicle movements associated with transport of construction materials and movement and placement of materials on the site, management of the temporary roadway surfaces will be an important aspect of dust mitigation. A CDMP would provide for road surfaces to be continually maintained and swept to remove extraneous material tracked onto these surfaces.

Water sprays are an important aspect of dust control that would be expected to be included in a CDMP. Such spray systems will be effective in knocking down dusts arising from all aspects of Freight Hub site construction activities including from areas of bare earth, stockpiles, and site movements of vehicles. However, care must be taken to minimise water use so that muddy conditions are not created – this would be counter-productive to preventing the distribution of fine material across site roadways and, eventually, release of ensuing dust particles into the air with continuous movement of trucks and other traffic once the surfaces have dried out.

The proposed conditions of the Freight Hub designation also provide for establishment of a Community Liaison Forum and complaints process for managing and responding to dust complaints during construction.

Operational effects

Issue #4: *Please provide an assessment of the potential effects on air quality from the operational phase (opening year and a future design year at full operational level). This should include but not be limited to:*

a) A description of the activities that will give rise to air emissions e.g. vehicle/trucks movements; locomotive movements; idling; bulk storage and transfer. Include approximate location and scale in as much detail as is known or can be assumed. Air emissions should be considered as a minimum as dust, PM10 and PM2.5.

KiwiRail Response: The key elements of the operational phase of the site, together with an assessment of their expected emissions to air are set out in Table 1 below. Figure 2 outlines the locations of these site elements.

Table 1: Operational Phase Emissions to Air in Opening Year and at 2050

Site Facilities	Activity Description	Air Quality Impacts - Opening Year	Air Quality Impacts - 2050 Year (fully operational)
Arrival and Departure Yard	An 8-track configuration to provide the ability to stage a long train on any track. Yard will have some / all tracks provided with overhead electrification. The contribution of this area to total air emissions from the Freight Hub site is expected to be limited because few if any diesel-powered trains will operate in this area of the site, given that the NIMT will enter and leave through this area and this is electrified.	Limited contribution to site emissions to air	Continued limited emissions to air from this part of the Freight Hub site
Marshalling Yard	A 12-track configuration to provide the ability to build 900m and 1,500m long trains. In addition, yard will have two "bad order" roads (tracks to hold broken or damaged wagons for repair) which are 300m long, and a run-round track to allow movement from one end of the yard to the other.	Emissions to air from the Marshalling Yard will make a large contribution (relative to other aspects of the site) to total particulate emissions arising from operational use of the Freight Hub site, although these emissions will still be limited. There will be a considerable amount of activity in terms of locomotive movements as this area is the focus for wagon consolidation and train make-up. The nature of these emissions will mainly comprise combustion products from diesel locomotives operating in this part of the site will in the main be diesel-powered. The majority of emissions are expected to be fine particulates, including both PM_{10} and $PM_{2.5}$.	Moderate increases in emissions are expected, since movements and activity in this part of the site will have increased as more and more of the other site elements are brought on-stream and the projected traffic through the Freight Hub steadily increases. Again, the majority of the emissions are expected to be fine particulates, being both PM_{10} and $PM_{2.5}$.
Container Terminal	Four tracks providing easy access for direct arrival and departure of unit trains. The proposed configuration has two hardstand islands where containers are removed from or loaded on to wagons and where containers are stored in stacks (up to three high), and the ability to connect to power for refrigerated units.	Only limited emissions to air are expected from this operational area. Access by trains will be brief and associated train movements only occasional.	While an increase in use of this area of the site will occur over time, the emissions will marginally increase accordingly but will still not represent a significant part of overall site emissions to air.
Maintenance facilities	Where wagons, locomotives (diesel and electric) and rail-related equipment are maintained and repaired, with 15 tracks and a maintenance yard that includes four equipment storage tracks, a triangle to turn locomotives, maintenance tracks for containers and side-curtain wagons, as well as locomotive fueling and sand loading facilities.	This operation will gradually increase in use over time, but this is expected to be limited in the initial year of Freight Hub operations. There will be relatively significant exhaust gas emissions from diesel fuel combustion as locomotive performance is optimized and engines are tested. KiwiRail should install a wet scrubber system to remove particulates from the exhaust gases released within this (enclosed) building. The extracted gases will be passed through the scrubber whose optimised performance will ensure that air leaving through the roof stack has particulate concentrations at negligible levels.	There is expected to be a significant increase in use of this maintenance facility over time. Scrubbers will continue to provide effective control over emissions of particulate to air.
Wagon and locomotive storage	An area where currently unutilised wagons and locomotives are stored while awaiting deployment	There will be essentially no emissions to air associated with this particular site operation	The status quo will be maintained and there will be no emissions to air from this part of the site.
Network Services Depot	This depot is where the regional teams responsible for the maintenance and repair of the track, structures, signals, power, and other railway infrastructure store materials and operate from. This is different from the maintenance facilities and will largely operate as a storage area and administrative space.	Any contributions to emissions from the depot will be negligible.	There will be no change with time with respect to the continued negligible emissions to air from this site area.
Freight Forwarding Private Sidings	Approx. 17ha in area with buildings that are expected to be up to three floors in height, and with access to a common loading and unloading track so they can be serviced directly from rail.	Usage of this facility will gradually increase in the first year but emissions to air will be very limited and will mostly be associated with truck engine exhaust emissions.	Operations at this part of the site will be in full swing by this time but emissions to air will remain limited and of no significant consequence.
Tank Siding	This facility can be serviced directly by rail	Emissions to air will be of little importance at this location as train movements into and out of this area will be infrequent in the first year of operation. Truck movements will be similarly infrequent.	While use of this facility will have increased, emissions to air will remain of little importance.
Log Loading Area and Siding	This area will be serviced directly by two 450-metre-long tracks.	The Log Loading and Storage area could represent another large proportion of emissions to air from the operational Freight Hub site. It is not expected that the Log Yard will operate at full capacity in the opening year but there will be a high potential for particulate/dust emissions from this facility. Measures will be in place to mitigate emissions from the Log Yard, in the form of washing facilities to remove adhering soil and bark particles, either prior to or upon reception of logs into the Yard, a protocol of log handling that minimises log movements, and more general measures around the site perimeter of water misting sprays and boundary plantings.	By this year it is expected that the Log Yard will be operating at full capacity, with a concomitant need to exercise extra care and attention to mitigate dust and bark particulate emissions. Mitigation measures at the Log Yard will require continual review and, if necessary, readjustment, on an annual basis as part of best practice site management of the Freight Hub.

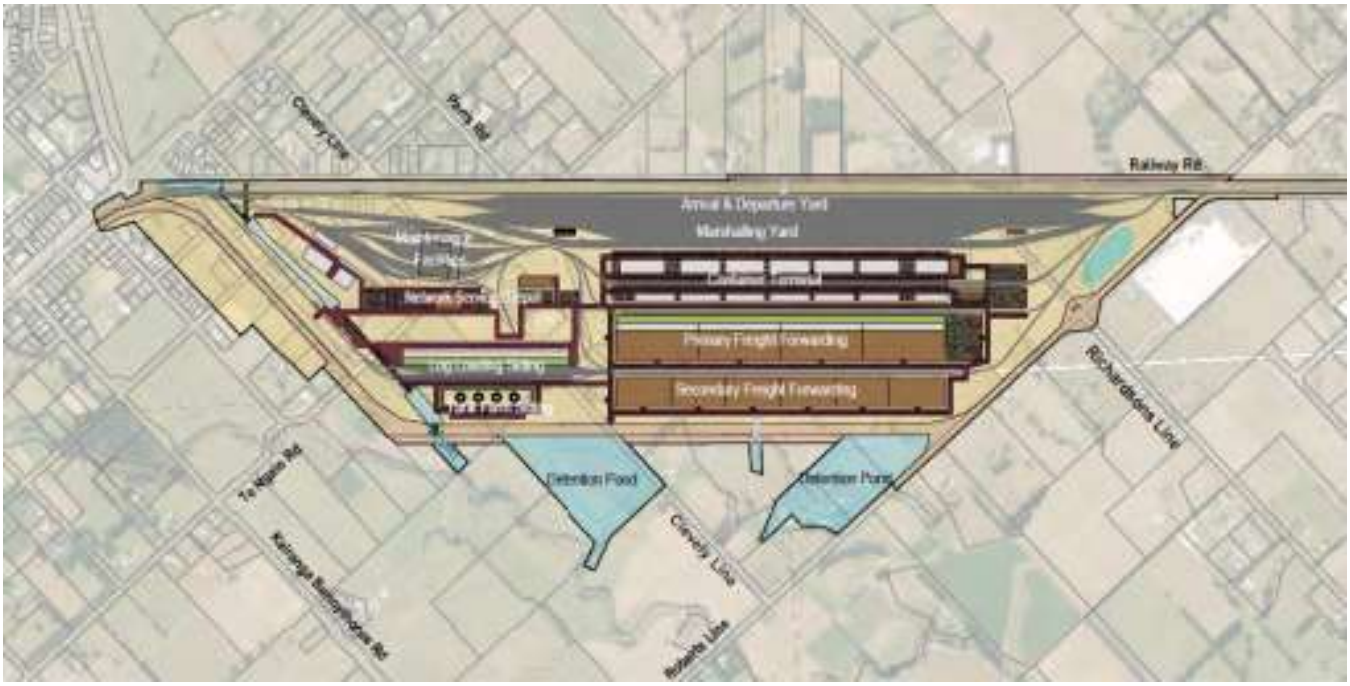

Figure 2: Freight Hub Concept Design with Key Elements Identified

As discussed further in this document in several places, the mitigation measures will be consolidated into an Operational Dust Management Plan for the site.

b) A discussion of the relevant air quality assessment criteria.

KiwiRail Response:

The relevant air quality assessment criteria that have been considered for emissions to air associated with the operational phase of the Freight Hub project have been focused on dust and particulate emissions arising from operational activities of the Freight Hub, in accordance with Ministry for the Environment's "Good Practice Guide for Assessing and Managing Dust".

As outlined in response to question 3(b) above, a qualitative assessment using the FIDOL factors has been used as the basis for considering the potential for dust and particulate impacts at sensitive locations. The FIDOL assessment categorises locations where the risk of dust and particulate impacts is potentially high (domestic residences, in particular) and uses this assessment to inform the basis of the recommended mitigation and monitoring.

As discussed earlier in relation to construction effects from dust and other discharges, there is a high frequency of winds and particularly strong winds, from the west to northwest, as shown in Figure 1 above.

The FIDOL assessment (see response to item (d) below) shows that there are a number of sensitive receptors that are downwind of prevailing winds. Based on the location of some of the receptors relative to the prevailing winds, there would be moderate to high levels of dust deposition if dusts from operational activities are not well managed. The proposed mitigation measures will be effective in reducing dust to acceptable levels.

In relation to odour emissions from Freight Hub activities, particularly from diesel fuels use, the criteria are set out in the "Good Practice Guide for Assessing and Managing Odour in New Zealand".

Consideration has been given in the assessment to the effects of dust and particulate emissions on neighbouring residences (including in relation to the potential for contamination of roof top rainwater collection systems for domestic use), odour emissions from diesel fuels, the emissions from operating machinery, potential effects from contaminated dusts arising from the disturbance of soils that may be historically contaminated with fuel residues, pesticides and other contaminants, and ambient air quality effects generally.

Particulate concentrations in various size ranges (total respirable dusts, inhalable and respirable particulate, and fine particulate ($PM_{2.5}$) have also been considered in accordance with these criteria.

Assessment of odour uses the "no offensive or objectionable odour at the property boundary" yardstick of acceptability, as per the criteria from the Good Practice Guide for Assessing and Managing Odour in New Zealand referred to earlier in this response.

> *c) A description of the receiving environment, locations of sensitive receptors (principally dwellings), identification of dwellings with roof water collection.*

KiwiRail Response:

The receiving environment is described above in response to question 3(c).

> *d) A FIDOL assessment to identify the relative risks of dust discharges to result in adverse effects.*

KiwiRail Response:

A FIDOL assessment of the likelihood that emissions of dust to air arising from Freight Hub operational activities will result in adverse effects is described below.

Frequency: There could be emissions of dust and particulate during operational activities at the Freight Hub that could give rise to adverse effects for sensitive receptors within approximately 100m of the Freight Hub site boundary if effective mitigation is not in place and effectively implemented at all times. The winds from the prevailing west and north-west quarters will potentially extend a dust plume over a number of residents at up to 100m from the Freight Hub boundary (approximately 30 dwellings would be affected) and a number of these have roof top rainwater collection systems for their domestic supply (as previously discussed). The wind rose and frequency data of Figure 1 show that prevailing winds blow for approximately 50% of the time.

The primary mitigation measures are the use of water sprays to minimise dust emissions, boundary plantings to effectively mix and disperse entrained contaminants via turbulence-induced dilution, and various other management and practical measures as will be set out in the Operational Dust Management Plan (ODMP) for the Freight Hub.

Intensity: From time to time, the potential will be present because of particular site activities being undertaken, especially intensive movement of freight, for relatively intense emissions of particulates generally and products of diesel fuel combustion in particular into the ambient air, unless relevant management and practical intervention measures are in place to prevent such a situation from developing. Compliance with the procedures set out in the ODMP will be important to the management of such situations.

Duration: The duration of adverse conditions in relation to dust and particulate discharges that may result in adverse environmental effects is dependent on a wide range of interactive factors, including the extent of on-site activities, the movements of heavy machinery (in particular, diesel locomotive operations), the prevailing wind strength and direction, and other weather conditions including rainfall. Because of the number of factors and associated uncertainties involved it is essential that the matter of

duration of adverse effects be reduced to their lowest practicable level by conscientious and diligent application of all ameliorative measures, in particular those included in the ODMP document.

Offensiveness: The degree of offensiveness of emissions to air from the Freight Hub site will be linked to adverse effects on people's levels of amenity, for example, soiling of washing, and the pervasive intervention of fine particulate into the interior of people's houses. As set out above, the primary method of providing effective mitigation down to negligible levels of these particular effects is the thorough application of the protective measures set out in detail in the ODMP.

Location: The key matter of relevance here is the location of sensitive receptors with respect to the prevailing wind conditions. In reality, sensitive receptors within approximately 100m of the Freight Hub site could potentially be impacted by the adverse effects of discharges to dust and particulate from Freight Hub operational activities. The mitigation measures are those detailed in the ODMP for the site activities. If effectively and continuously applied, these measures will be effective in mitigating adverse effects from emissions to air to the lowest practicable levels.

As noted elsewhere, the monitoring of particulate emissions during operational activities at the Freight Hub is an important quantitative means of measuring the effectiveness of mitigation. Comparison of the results from monitoring of, particularly, deposited particulate against previously established baseline levels will enable KiwiRail to proactively assess the effectiveness of the mitigation measures being applied and to adjust these measures if the results indicate that this should happen.

> *e) Consideration of the potential effects of airborne contaminants on human health, including land transport sources.*

KiwiRail Response:

Dust and airborne particulates can be irritating to the upper respiratory system and will adversely affect individuals with existing allergies, asthma, and respiratory diseases. Factors that determine the possible health effects of particulates are likely to include the length of exposure (i.e., how long the person breathed in the particulates), the type and toxicity of the particulates, the concentration (quantity of particulates in a person's breathing zone), the size range of the particulates (which affects how deep within the respiratory system the particulate matter can reach and also how long the dust particles will remain suspended in the air), the exposed person's activity level and breathing rate, and matters of age and overall health.

Potential effects could also arise from dusts emanating from ballast under tracks, uncovered wagons that have potentially dust-releasing loads and from the use of diesel engines. Exacerbated respiratory conditions such as bronchitis and asthma can be caused by prolonged exposure to dust, including fine particles (e.g. PM10 which is particulate matter smaller than 10 µm). Gases such as carbon monoxide (CO) and nitrogen dioxide (NO2) produced from diesel fuel combustion could cause effects such as increased frequency of coughing, wheezing and breathlessness, an increased susceptibility to infections and asthma attacks, headaches, or dizziness. These impacts will relate to the type of engines used, the surfaces on the hub, the specific layout of the site in relation to the proximity of receptors, wind conditions and the management regime operating on the site. The effects could impact on more sensitive receivers and, as suggested by the matter of roof rainwater collection, on those who collect rainwater for domestic use.

"Respirable Dust" refers to particulate of sizes < 10 µm (so-called PM_{10} particulate); these particles are small enough to penetrate the nose and upper respiratory system and move deep into the lungs. Such particles are generally beyond the body's natural clearance mechanisms of cilia and mucous within the breathing passages and are more likely to be retained and cause adverse health effects.

"Inhalable Dust" is a term that describes dust and particulates that enter the body through the nose but are trapped by the defence mechanisms of the nose, throat, and upper respiratory tract. These particles are greater than 10 µm in size.

"Total Dust", as the term implies, refers to all airborne particles, regardless of their size or composition. In the context of the Freight Hub and associated dust emissions, the term "nuisance dust" refers to dusts that are non-respirable; this fraction will make up the great majority of emitted dust from both construction and operational activities at the Freight Hub.

Particulates associated with diesel fuels combustion encompass a range of particle sizes, some of which are respirable. This respirable fraction includes both PM_{10} and $PM_{2.5}$-sized particles. Combustion of diesel fuel also releases limited quantities of oxides of nitrogen and carbon monoxide but it is anticipated that these gases will not present a risk to neighbouring residents. The distances of sensitive receptors from the Freight Hub are sufficient to ensure that exposure to diesel fuel combustion particulate will be a negligible risk to health, and this risk is further reduced by proposed mitigation measures such as boundary plantings that encourage turbulent and thus dispersive wind flows and the regular maintenance regime for diesel locomotives that is an essential element of KiwiRail asset management practices to ensure optimisation of fuel use and traction power of the locomotives.

The sulphur content of New Zealand diesel fuels was reduced from a maximum of 50 ppm in 2008 down to 10 ppm. This further reduces the minor risk posed by release of sulphur dioxide as a combustion product from diesel fuels use in both locomotives and trucks at the Freight Hub down to negligible levels.

Investigations to identify the extent of contaminated soils within the Freight Hub footprint have not found any significant sites or areas of such contamination. It may be that unexpected contamination is discovered when the Freight Hub site is disturbed during construction activities but, even in that event, the mitigation measures in place including boundary plantings and dust emissions controls will ensure that potentially contaminated dust and other airborne particulates that may possibly include contaminants will not be carried beyond the boundaries of the Freight Hub site and effects on human health will be minimised to a negligible/acceptable level.

> *f) Recommendations for specific mitigation measures to address the potential adverse effects of air contaminants to ensure effects are acceptable, including monitoring if appropriate.*

<u>KiwiRail Response:</u>

A number of recommendations have been discussed above in relation to mitigation measures for construction effects in response to question 3(e) above and these are also applicable to operations at the Freight Hub site.

A number of operational activities may contribute to dust and other particulate generation, including:

- The Log Yard;
- Activities such as bulk materials loading and unloading where such materials will be handled as part of freight movements within the Freight Hub boundaries under circumstances where releases of generated particulate to the ambient air can occur; and
- Particulates generated by the movement of engines, rolling stock and trucks servicing freight forwarding activities with these emissions, at least in part, being associated with exhaust emissions from combustion engines, in particular from combustion of diesel fuel in locomotives or trucks.

At-source controls will be applied to the greatest practicable extent to minimise the impacts of the various sources of dust. The Log Yard, as a particular example, will have its dust-related impacts mitigated by its proposed central location (i.e., furtherest from the Freight Hub site boundaries). Operational controls will also result in reductions in dust emissions from the Log Yard, such as log washing to remove mud and

dirt either on-site in the Log Yard or immediately prior to loading post-harvest for transport to the Log Yard area. Debarked logs are also especially prone to generate particulate when handled so minimising the extent of log movements on the Freight Hub site will be an important part of the management of Log Yard activities.

For handling of other bulk granular materials individual best operational practices will be developed and implemented. Dust emissions controls will be an important aspect of such handling protocols for material with elevated potentials to generate dusts. Typical dust control methods can include specialised bulk loading and unloading equipment that provides a maximum level of enclosure; conditioning of certain products with the addition of moisture, if practicable and achievable; and receipt of pelletised material as preferred bulk granular freight.

Besides the specific practices for operational controls on particular dust generating activities, more general site management practices to mitigate dust must be implemented. This will include the beneficial impacts of boundary plantings (i.e. creation of turbulent air flows which lead to improved mixing and dilution and also knock-down of dust) and, as and if necessary, boundary water misting sprays will be installed to further mitigate particulate concentrations in the ambient air. Such misting sprays will already be located on-site from their use to mitigate dust emanating from soil excavations associated with site construction activities and thus they can be reconfigured for use as boundary sprays as and where necessary.

To bring all of these mitigation aspects into one place, an Operational Dust Management Plan (ODMP) is proposed to be prepared and implemented as part of the conditions on the designation.

> *g) Deposition of particles on roof water supplies during operation – Stantec notes deposition within 250 metres of the marshalling yards could be an issue and recommends a first flush diverter as a mitigation for roof water collection. Please provide supporting information or reference material in relation to the conclusions reached in section 9.13 of the AEE. In addition, please clarify why only the marshalling yards have been identified as a source that could impact water supplies.*

KiwiRail Response:

The reference to the “marshalling yards” was used as a generic term for the overall operations and footprint of the Freight Hub and it would have been more appropriate to use the term “Freight Hub” itself to delineate the total ambit of the source of roof-top contaminants potentially emanating from project activities. Further, as noted above, it is considered that sensitive receptors within approximately 100m (rather than 250m, as noted in the AEE) are those likely to be most affected by potential deposition of particles on roof water supplies.

KiwiRail is continuing to evaluate options to address contamination of roof-top rainwater collection for domestic supplies which will be explained as part of KiwiRail's evidence.

> *h) Comments on odour potential from diesel combustion sources are noted. Are there any other activities associated with the operation that could impact on odour? If so, please assess the potential effect and recommend mitigation.*

KiwiRail Response:

The odour of diesel is distinctive but limited in spatial extent and effect, partly because the low volatility of diesel fuel means that it is not discernible more than a short distance from the source of release. At distances greater than 50m from source diesel odour is typically not detectable, unless a very significant quantity has been released. The nearest residences will be of the order of approximately 100m distance from the site.

An additional mitigation measure, and one that will deal effectively with many of the potential emissions from the Freight Hub site, is the boundary planting of trees and dense growing plants which, inter alia, will act to create turbulent wind flows that significantly assist the mixing and dilution of airborne contaminants, including any evolved diesel vapour.

The maintenance and workshop building which will occupy a central position within the Freight Hub site will see intensive work on the diesel engines of locomotives from time to time and this will give rise to localised emissions that, if allowed to leave the building from, say, an uncontrolled vent, could represent a significant emissions point source of diesel combustion particulates. A wet scrubber system in the maintenance workshop design to remove particulates from the extracted maintenance workshop airstream could assist in managing the effects.

There are no other anticipated sources of odour arising from site activities. It remains a possibility however that odour may be released from freight items transferred through the Freight Hub. It is not possible to identify what these might be in advance of their potential occurrence, but the Community Liaison Forum and associated complaints process provide mechanisms where potentially affected receptors will be responded to.

> *i) 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?*

KiwiRail Response:

The need for the preparation of an Operational Dust Management Plan has been discussed under section (f) above. At-source controls will be applied to the greatest practicable extent to minimise the impacts of these various sources of dust.

Readily identified operational sources of emissions to air such as the Log Yard will have their dust-related impacts mitigated by spatial location if this is relevant and feasible. Operational controls to reduce emissions will also be applied. For the handling of bulk granular materials, individual best operational practices will be developed and implemented.

Along with specific practices for operational controls on particular dust generating activities, more general site management practices to mitigate dust will be implemented, including boundary plantings to create turbulent airflows to dilute and knock-down dust, and water misting sprays to further mitigate particulate concentrations in the ambient air.