RANGITIKEI DISTRICT COUNCIL

MARTON RAIL HUB - COMPREHENSIVE DEVELOPMENT PLAN

ACOUSTIC ASSESSMENT

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Marton Rail Hub - Comprehensive Development Plan
Acoustic Assessment

Rangitikei District Council

Reference: *210810-6-WT696-GvH-R1-Comprehensive Development Plan, Marton*

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REV	DATE	DETAILS
Draft	11 June 2021	For comment
Draft	30 June 2021	For comment
Issue	10 August 2021	Updated from feedback

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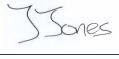
Prepared by:	George van Hout	10 August 2021	
Reviewed by:	Jon Jones	10 August 2021	
Approved by:	Chris Bradley	10 August 2021	

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EXECUTIVE SUMMARY

WSP has undertaken an assessment of the cumulative operational noise associated with the Comprehensive Development Plan of Marton Rail Hub development. Marton Rail Hub will be established as part of a proposed Plan Change (1165, 1151 and 1091 State Highway 1), and will be rezoned from rural land to industrial, identified as an 'Industrial Development Area' in the Rangitikei District Plan.

WSP has assessed the operational noise of the entire Marton Rail development to provide an indication of whether compliance with relevant acoustic criteria can be achieved, to support the Comprehensive Development Plan.

There is currently limited information available regarding equipment and processes that will occur within Marton Rail Hub. Each site will be designed and constructed independently, and therefore each area within the development is required to apply for Resource Consent, in which specific analysis of noise from each site will be undertaken.

Cumulative noise from the entire Marton Rail Hub development, including locomotives within the rail siding exceeds the District Plan daytime and night time noise limits at multiple properties. Noise from each area can achieve reasonable noise levels It with appropriate selection of equipment, design of buildings and/or enclosures and location of noise generating activities on site. Train movements within the siding may need to be controlled during the night-time period, depending on the ambient noise levels.

Reasonable noise limits shall be decided with consideration of the ambient noise levels. Ambient noise measurements should be undertaken before determining appropriate limits at these properties.

The rail siding is one of two areas that will be developed first on the site and therefore a detailed analysis of the operational noise of this area has been undertaken to support the area specific resource consent application.

The rail siding is predicted to achieve the District Plan daytime and night time noise limits when a locomotive is idling in the siding. When a locomotive pulls into or exits the site, noise from these train movements are predicted to be above the District Plan noise limits at nearby properties. However, when considering the existing acoustic environment (existing trains on the North Island Main Trunk Line and road traffic noise), and the infrequent nature of the trains moving in the siding, noise levels during the daytime are predicted to be at reasonable level at surrounding properties. Ambient noise measurements should be undertaken during the night time to determine whether trains moving in the siding are considered reasonable.

The log yard is another area that will be developed first on the site. A specific analysis of the operational noise of this area has been undertaken to support the resource consent application. Noise from the log yard is predicted to comply with the daytime and night time noise limits.

1 INTRODUCTION

It is proposed that an area of approximately 60 hectares of land near Marton is rezoned from a rural zone designation to a new industrial zone designation. This proposed Plan Change (1165, 1151 and 1091 State Highway 1) was released for public consultation in June 2019. A Council decision on the Plan Change was made in August 2020 which approved the rezoning of land adjoining the North Island Main Trunk Railway from Rural to Industrial, overlain with an 'Industrial Development Area' notation. The Plan Change is currently under appeal.

This Industrial Development Area overlay will introduce a set of provisions that specifically apply to the site which is in addition to the provisions within the District Plan for industrial zones. Specifically, the overlay requires a Comprehensive Development Plan (CDP) for the overall site to be submitted, along with specific Resource Consents for each proposed activity that is located on the site. The CDP site is known as the "Marton Rail Hub".

WSP has been appointed to provide acoustic consultancy services for this project. The purpose of this report is to:

1. In the event where the rule framework set out in the Council decision of the proposed Plan Change is confirmed and applied to the development, provide an assessment of the noise effects associated with the CDP. This is to be included as part of a Resource Consent to approve the CDP for the overall site.
2. Provide an operational noise assessment of the proposed rail siding and of the log yard for inclusion as part of the associated resource consent applications for these aspects of the site

It is proposed that the log yard and rail sidings are developed on site initially, ahead of the rest of the site. Therefore, a detailed noise assessment for these aspects are included for Resource Consent purposes. Further information on the CDP is presented in the wider CDP Planning Report.

The scope of this report does not extend to the assessment of noise associated with construction of the development.

1.1 DOCUMENTATION

This assessment is based on our correspondence with the design team, discussions with the proposed tenants (where known) of areas within Marton Rail Hub, and the following documentation:

- Development plan area, titled *Marton Rail Hub*, sheet number SK32(A)-OPT5-CDP, received by email on 3 June 2021
- Site layout drawing titled *Marton Rail Hub; Proposed layout*, sheet number SK30(A)-OTP6, received by email on 21 May 2021
- Rail movements document titled *Makirikiri Road Level Crossing 529 – Level Crossing Safety Impact Assessment, Appendix B – Crossing Characteristics* (being Appendix E to *WSP Traffic Impact Assessment – Rangitikei District Council Industrial Plan Change* – November 2019), prepared by WSP and dated October 2019

2 SITE DESCRIPTION

Under the proposed conditions, the rezoning of the current rural land to industrial land requires a CDP which considers the location of the land, layout of the site, and consideration of the future noise emissions. Further details on the site and proposals are provided below.

2.1 SITE LOCATION

The location of the proposed Marton Rail Hub and surrounding area is presented in Figure 2.1. The site is located between Makirikiri Road to the south, State Highway 1 to the east, Wings Line further to the north and the North Island Main Trunk Line (NIMTL) in Marton to the west.

The proposed site and majority of the surrounding area is designated as rural zoned land. Marton, to the northwest, is designated as Residential, and there is an area of land to the southeast of Marton designated as Industrial Zoned land. This industrial area contains the existing Malteurop production facility. An existing rail siding and station is located to the north of the site near the residential and industrial zones.

Figure 2.1 Location of the proposed rezoned land and surrounds (Google Earth accessed May 2021)

2.2 PROPOSED SITE LAYOUT

The CDP for Marton Rail Hub sites includes multiple industrial area, a new rail siding, and internal roads. Access into the proposed Marton Rail Hub site is solely from Makirikiri Road to the south, with two entry/exit points.

The proposed developments on the site include:

- A weighbridge and security gate for access into the wider industrial zoned site;
- Log yard and de-barker with pump station;
- Rail siding and container area;
- Internal sealed roads for staff and transport trucks to access the sites;
- PLA and PHA plastics manufacturing plant;
- Small business and service area;
- Energy plant; and,
- A food producer.

The proposed layout showing the development areas along with the internal roads are provided in Figure 2.2.

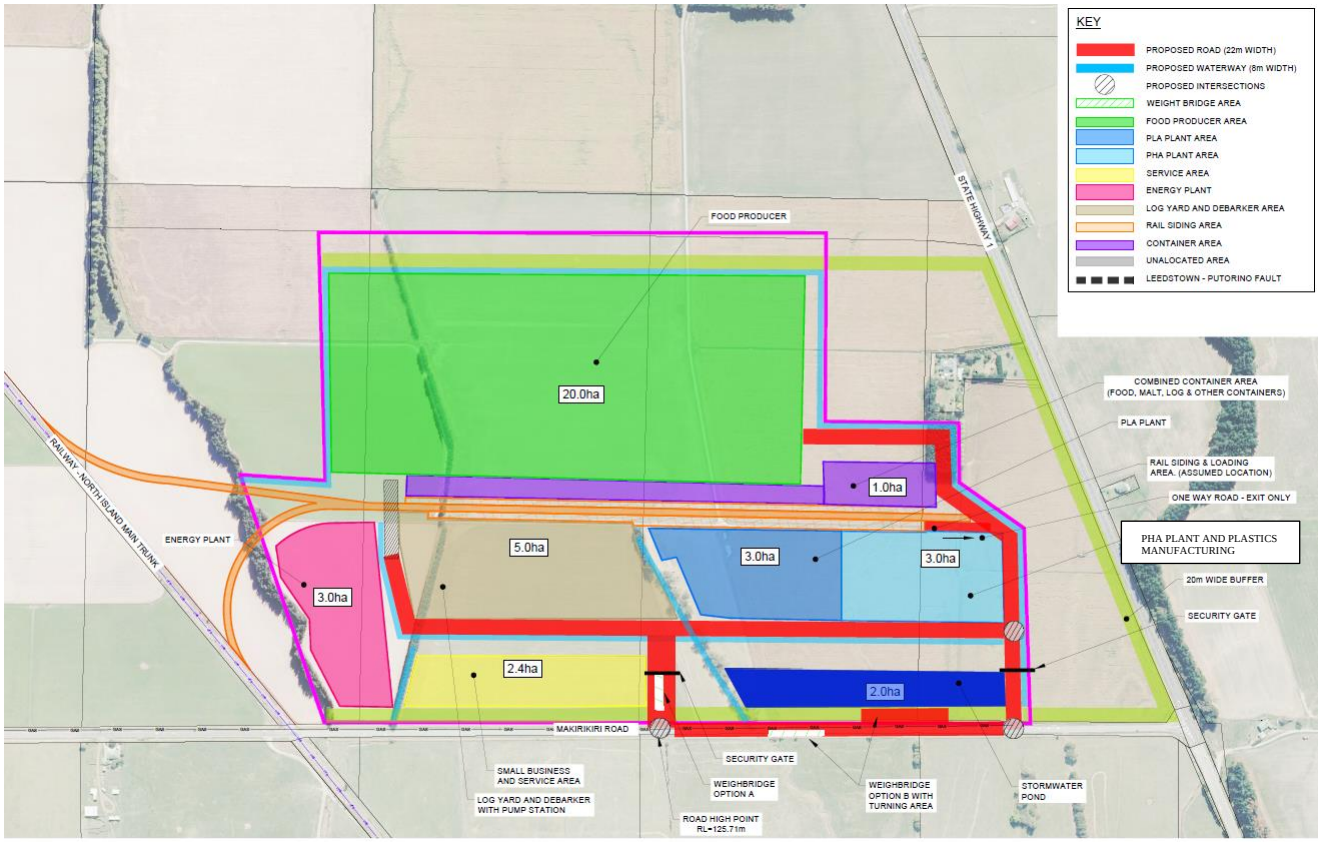


Figure 2.2 Marton Rail Hub site layout and location

Operations within the Marton Rail Hub development have the potential to operate 24 hours a day, 7 days a week.

The noise assessments within this document have been undertaken based on the equipment and processes which are currently expected. Any varied or alternative activities which have the same or lower noise emissions will not affect the noise impacts as discussed in this report.

All development areas within the Marton Rail Hub site will be required to gain specific Resource Consent and prove each proposal complies with the relevant noise limits. Therefore, any changes to the specific activities or processes within each area will be documented and assessed at the time of the specific resource consent submission.

2.3 PROPOSED SITE ACTIVITIES

The proposed Marton Rail Hub site includes eight different main areas, along with a rail siding area, stormwater pond, internal roads and a weighbridge, as outlined in Figure 2.2. Proposed industrial activities have been outlined which have allowed a noise assessment to determine whether it is practicable for the cumulative noise emissions from the Marton Rail Hub to achieve relevant noise limits.

Based on a description of the site activities provided by the Client, typical equipment and associated noise emissions from each development area have been determined.

There are likely to be additional noise sources such as people talking outdoors or walking between buildings on each site, general office mechanical ventilation plant (such as external condenser units and/or fans), and general office noise break-out, which have not been considered in this analysis. The noise associated with these activities is expected to be low or easily mitigated, such that it will not influence the overall noise emissions generated on the site.

The details of each of the development area within Marton Rail Hub is provided in Appendix A

2.4 PROPOSED NOISE SOURCES

Full details of the highest noise generating sources on each of the areas is provided in Appendix B. This outlines the highest noise generating equipment and assumed sound power levels. These are the levels which have been used as the basis of the subsequent noise assessments.

These noise levels can be used as a base for any future Resource Consent Applications for each of the areas. The sound power level provided by the manufacturer of the actual equipment proposed on site should be used when assessing each site in detail, when available. Where it is established that noise emissions from any equipment or activity might exceed the levels included within this report, a further investigation into the associated potential impacts should be undertaken.

2.5 SURROUNDING PROPERTIES

The surrounding properties which may be affected by noise generated by the proposed industrial activities are as follows:

- 73 Wings Line (Fraser Auret Racing)
- 76 Wings Line
- Malteurop
- 19 Goldings Line
- 33 Goldings Line
- 67/77 Goldings Line
- 45 Stantialls Road
- 74 Stantialls Road
- 1020 State Highway 1
- 1066 State Highway 1
- 1091 State Highway 1
- 1108 State Highway 1
- 1165 State Highway 1
- 157 Makirikiri Road
- 97 and 104 Alexandra Street

The properties at 1165 and 1091 State Highway 1 are to be acquired as part of this proposal for land development. Therefore, noise effects at these properties do not need to be assessed or considered in the context of the resource consent application. However, for completeness we have provided the predicted noise levels at these properties.

The listed properties in relation to the proposed rezoned industrial land are presented in Figure 2.3.

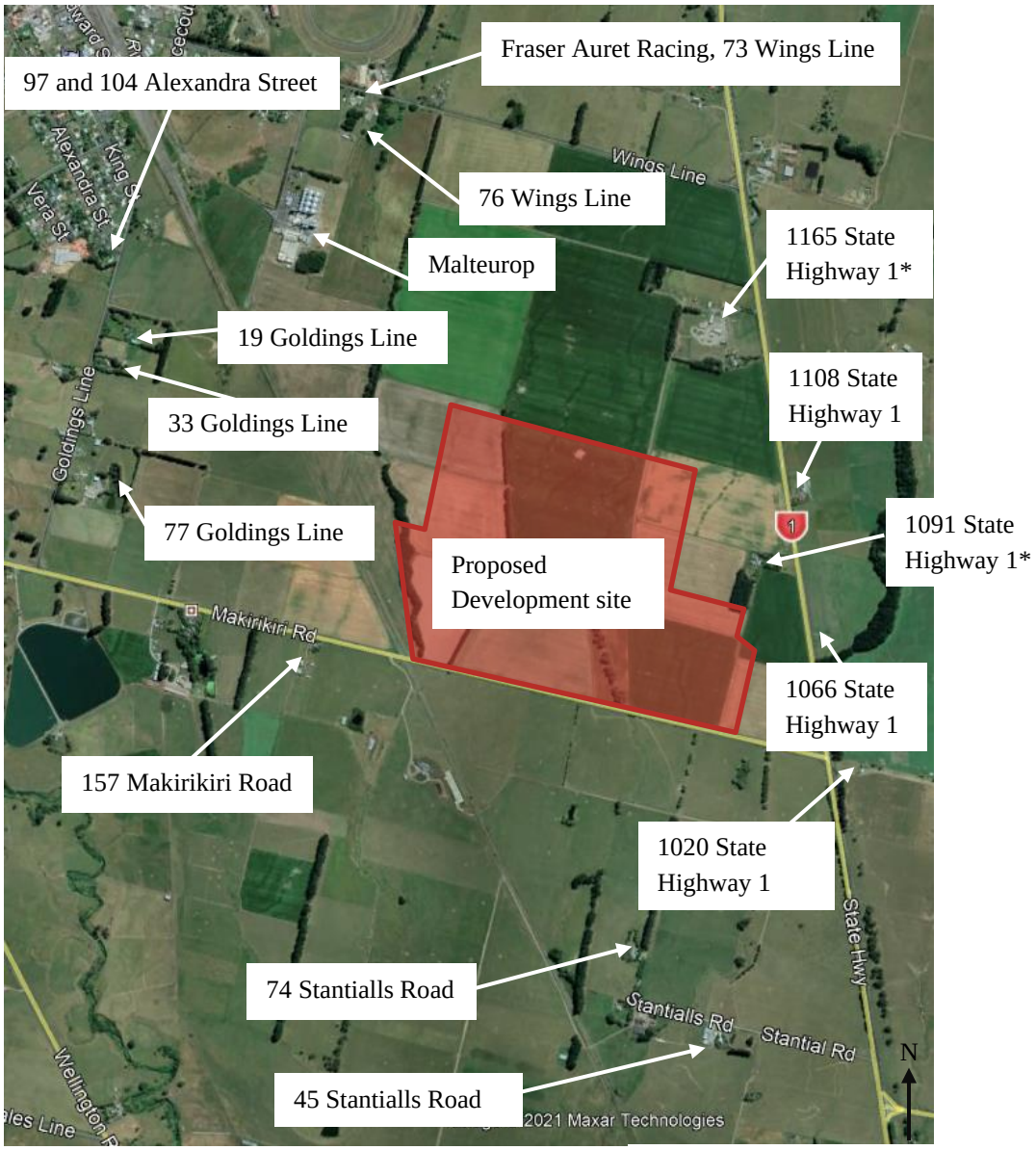


Figure 2.3 Location of surrounding properties

* property to be acquired as part of the overall redevelopment

3 ACOUSTIC CRITERIA

Section 16 of the Resource Management Act (RMA) requires occupiers of land to ensure any noise generated is of a reasonable level. Guidance as to a reasonable level of noise received at adjacent noise sensitive receptors is provided in a number of national and international sources as outlined in Section 3.1.

3.1 ACOUSTIC GUIDANCE AND LEGISLATION

3.1.1 RANGITIKEI DISTRICT PLAN

The noise limits for industrial activities impacting adjacent industrial, residential, or rural zoned land are outlined in Part B *Rules*, Section B1.7 *Noise*, Part B1.7-1 of the Rangitikei District Plan, and reproduced in Table 3.1.

Table 3.1 Rangitikei District Plan noise limits

ZONE	TIME	NOISE LIMITS
Rural, Rural Living and Residential Zones	Daytime (0700 to 2200 hours)	50 dB $L_{Aeq(15\ min)}$
	Night-time (2200 to 0700 hours)	45 dB $L_{Aeq(15\ min)}$ 70 dB L_{AFmax}
Education, Commercial and Industrial Zones	Daytime (0700 to 2200 hours)	65 dB $L_{Aeq(15\ min)}$
	Night time (2200 to 0700 hours)	55 dB $L_{Aeq(15\ min)}$ 75 dB L_{AFmax}

As outlined in section B1.7-2 of the District Plan, the noise from any activities apply either at any point within any residential zone, or at the notional boundary of any residential dwelling within a rural zone.

Noise is to be measured in accordance with New Zealand Standard NZS 6801:2008 and assessed against NZS 6802:2008, as outlined in B1.7-4 of the Rangitikei District Plan.

3.1.2 NEW ZEALAND STANDARD NZS 6802:2008

New Zealand Standard NZS 6802 provides guidance for noise limits which have been set "for the reasonable protection of health and amenity associated with use of land for residential purposes" for human health and amenity, and is not intended for the assessment of animal health and safety. Noise limits recommended in NZS 6802:2008 are in Table 3.2.

Table 3.2 Recommended noise limits in NZS 6802:2008

ZONE	TIME	NOISE LIMITS
Residential zones	Daytime (0700 – 2000 hours)	55 dB $L_{Aeq(15\ min)}$
	Evening (2000 – 2200 hours)	50 dB $L_{Aeq(15\ min)}$
	Night time (2200 to 0700 hours the following day)	45 dB $L_{Aeq(15\ min)}$. 70 dB L_{AFmax}
Industrial zones	At all times	75 dB $L_{Aeq(15\ min}$

For residential properties, these limits apply at the site boundary, while for rural dwellings, the assessment location is at the notional boundary, 20 metres from the façade of any dwelling.

The use of the notional boundary for the assessment of noise is generally accepted and used throughout New Zealand as this is the area where the majority of residential living activities occur and is a more practical approach for noise assessment in rural areas where there is typically significant undeveloped and uninhabited land.

The guidance limits within NZS 6802:2008 are similar or less stringent than the noise limits outlined in the District Plan.

3.2 EXISTING AMBIENT NOISE ENVIRONMENT

The proposed Marton Rail Hub site is located adjacent to State Highway 1 and the North Island Main Trunk Line (NIMTL). The ambient noise around these key infrastructure routes near the site is predicted to be above the District Plan noise limits. Table 3.3 provides the predicted ambient noise level at the closest properties to the relevant infrastructure.

Table 3.3 Predicted ambient noise levels

PROPERTY	PREDICTED NOISE FROM TRAFFIC	PREDICTED NOISE FROM RAIL
1020 State Highway 1	57 dB $L_{Aeq(24\ hrs)}$	40 dB $L_{Aeq,T}$
1066 State Highway 1	65 dB $L_{Aeq(24\ hrs)}$	40 dB $L_{Aeq,T}$
1091 State Highway 1*	56 dB $L_{Aeq(24\ hrs)}$	40 dB $L_{Aeq,T}$
1108 State Highway 1	63 dB $L_{Aeq(24\ hrs)}$	-
1165 State Highway 1*	57 dB $L_{Aeq(24\ hrs}$	-
73 Wings Line (Fraser Auret Racing)	-	45 dB $L_{Aeq,T}$
76 Wings Line	-	45 dB $L_{Aeq,T}$
19 Goldings Line	-	54 dB $L_{Aeq,T}$
33 Goldings Line	-	56 dB $L_{Aeq,T}$
67/77 Goldings Line	-	49 dB $L_{Aeq,T}$
45 and 74 Stantialls Road	-	56 dB $L_{Aeq,T}$
157 Makirikiri Road	-	59 dB $L_{Aeq,T}$
97 and 104 Alexandra Street	-	51 dB $L_{Aeq,T}$

* Properties being acquired as part of this development

Further information on the assumptions and calculation methodology is provided in Appendix C, along with a discussion of relevant noise limits based on the predicted ambient noise levels..

The noise effects as a result of the proposal should be considered in the context of the existing noise environment , as some properties already receive levels greater than the District Plan noise limits.

3.2.1 RECOMMENDATIONS FOR ENVIRONMENTAL NOISE SURVEY

Due to traffic on the roading network and existing train movements, the ambient noise around the site and surrounding area is predicted to be higher than the Rangitikei District Plan noise limits, especially at properties close to the train line and State Highway 1. This prediction is based on road traffic counts and the number of daily locomotive movements on the rail line, using industry-standard calculation methods.

However, the noise sources can vary during the day and night (noise will be higher as a locomotive movements, then low, until the next locomotive movement, or vary as traffic movements are higher during daytime than night-time). Consequently, there is an element of uncertainty associated with the existing environmental noise estimations.

An environmental noise survey can be undertaken to validate and confirm the modelling assumptions and predicted noise levels, to provide additional certainty of the environmental noise at properties near State Highway 1 and the NIMTL. This is recommended to establish the actual existing environmental noise conditions and will remove a degree of risk associated with the current estimations, and allow a more detailed assessment of effects to be considered.

4 ASSESSMENT METHODOLOGY

SoundPLAN (Version 8.2) 3D computational noise modelling software has been used to assess the transmission of noise from the proposed Marton Rail Hub to adjacent properties, based on the methodology contained within ISO 9613-2. The assessment takes into account attenuation due to distance, terrain and absorption by the atmosphere and ground. The assessment assumes worst-case downwind conditions in all directions from all sources, which provides a conservative approach for assessment. 1:50,000 ground elevation contours have been sourced from Land Information New Zealand (LINZ), which provide contours at 20 metre vertical intervals for the site and surrounding area.

In accordance with NZS 6802:2008, where an activity has a distinctive character which may affect its subjective acceptability (Special Audible Characteristic (SAC)), a 5 dB penalty shall apply. For the Marton Rail Hub, we have allowed a 5 dB penalty for all industrial activities as there are potential noise sources which may be tonal or be impulsive. As locomotive movements are in keeping with the current ambient noise of the surrounding environment, we have not added any penalty to locomotive noise.

We have not allowed for any duration adjustment within the assessment. This is due to the unknown nature around the timing of the activities on the site and as it cannot be included during the night-time period assessment.

The majority of the areas are expected to have a large building which will house most of the equipment. The reduction due to a typical industrial building (corrugated steel) has been allowed for in the calculations where appropriate.

The specific internal layout of the each of the areas (where each piece of equipment and/or machinery is located within each area) is not currently confirmed, and therefore the bulk and location of any buildings on these sites cannot be determined. Our analysis assumes that there are no buildings, containers, or other objects that may obstruct noise on site. In reality, buildings within the Marton Rail Hub will provide acoustic screening, potentially reducing the noise emissions at the receptors.

It has been assumed a locomotive is idling in the siding whilst it is being unloaded or loaded, at the closest location to each receptor. Locomotives should be turned off once in the siding, but it has been indicated that idling will occur for 30 – 60 minutes after a locomotive has sided.

The three scenarios assessed assumed daytime and night time operation is the same. If activity reduces over the night-time period, then the noise received and associated noise impact at any property may reduce.

5 COMPREHENSIVE DEVELOPMENT PLAN OUTLINE NOISE ASSESSMENT

5.1 SPECIFIC METHODOLOGY

We have assessed a typical scenario of on-site activity which given the 24 hours operation could occur daytime and night time. This is a worst-case operating scenario which includes:

- All equipment/machinery on all sites operating;
- Truck and trailer units and light vehicles on the internal roads;
- A locomotive arriving / departing or idling within the siding; and,
- Logs and/or containers being unloaded and/or loaded onto carriages.

The sources for each area outlined in Appendix B and are modelled in the middle of each specific area, as the layout of each area are yet to be developed. This provides a suitable location based on multiple sources across each area.

We have undertaken an analysis of two scenarios:

- Scenario 1: Noise from all areas of the site with a locomotive idling in the siding (typical worst case scenario). This will be a more typical operation of the rail siding
- Scenario 2: Noise from all areas of the site with a locomotive moving in the siding (worst-case scenario).

Trains moving in the rail yard is not typical operation that would happen frequently (up to six times per day). However, a scenario where they are operating has been assessed this scenario for completeness. Noise data from locomotive movements assume the locomotive is moving. We note that the locomotive may produce higher noise as the work required to pull wagons from a stop is higher. However, this makes up a small portion of the overall time the train moves within the siding.

5.2 PREDICTED NOISE LEVELS

5.2.1 SCENARIO 1

Table 5.1 details the predicted noise from Marton Rail Hub development with a locomotive is idling within the siding.

Table 5.1 Predicted noise from the Marton Rail Hub with a locomotive idling

PROPERTY	DISTRICT PLAN NOISE CRITERIA (DAY / NIGHT) (dB $L_{Aeq(15\ min)}$)	PREDICTED NOISE LEVEL (dB $L_{Aeq(15\ min)}$)	MEETS CRITERIA?	
			DAY	NIGHT
73 Wings Line (Fraser Auret Racing)	50/45	42	Yes	Yes
76 Wings Line	50/45	41	Yes	Yes
Malteurop	65/55	44	Yes	Yes
19 Goldings Line	50/45	42	Yes	Yes
33 Goldings Line	50/45	45	Yes	Yes
67/77 Goldings Line	50/45	43	Yes	Yes
45 and 74 Stantialls Road	50/45	44	Yes	Yes
1020 State Highway 1	50/45	49	Yes	No
1066 State Highway 1	50/45	54	No	No
1091 State Highway 1*	-	57	n/a	n/a
1108 State Highway 1	50/45	50	Yes	No
1165 State Highway 1*	-	48	n/a	n/a
157 Makirikiri Road	50/45	52	No	No
97 and 104 Alexandra Street	50/45	40	Yes	Yes

*property to be acquired as part of the overall redevelopment and therefore noise has not been assessed

A general noise contour map of the site operation is provided in Appendix D. This shows how noise from the site activities propagates across the site and to the surrounding areas.

5.2.2 SCENARIO 2

Table 5.2 details the predicted noise from the Marton Rail Hub development assuming that a locomotive is moving within the siding.

Table 5.2 Predicted noise levels from the complete development with a locomotive coming into the siding

PROPERTY	DISTRICT PLAN NOISE CRITERIA DAY/NIGHT, dB $L_{Aeq(15\ min)}$	PREDICTED LOCOMOTIVE MOVEMENT NOISE LEVELS, dB $L_{Aeq(15\ min)}$	MEETS CRITERIA?	
			DAY	NIGHT
73 Wings Line (Fraser Auret Racing)	50/45	37 - 41	Yes	Yes
76 Wings Line	50/45	36 - 40	Yes	Yes
Malteurop	65/55	40 - 46	Yes	Yes
19 Goldings Line	50/45	37 - 45	Yes	Yes
33 Goldings Line	50/45	38 - 48	Yes	No

PROPERTY	DISTRICT PLAN NOISE CRITERIA DAY/NIGHT, dB $L_{Aeq(15\ min)}$	PREDICTED LOCOMOTIVE MOVEMENT NOISE LEVELS, dB $L_{Aeq(15\ min)}$	MEETS CRITERIA?	
			DAY	NIGHT
67/77 Goldings Line	50/45	38 - 46	Yes	No
45 and 74 Stantialls Road	50/45	38 - 43	Yes	Yes
1020 State Highway 1	50/45	44 - 54	No	No
1066 State Highway 1	50/45	50 - 62	No	No
1091 State Highway 1*	-	52 - 63	-	-
1108 State Highway 1	50/45	46 - 52	No	No
1165 State Highway 1*	-	44 - 49	-	-
157 Makirikiri Road	50/45	48 - 52	No	No
97 and 104 Alexandra Street	50/45	35 - 41	Yes	Yes

*property to be acquired as part of the overall redevelopment and therefore noise has not been assessed

5.2.3 MAXIMUM NOISE LEVELS

The predicted maximum noise levels are outlined in Table 5.3.

Table 5.3 Predicted maximum noise levels

PROPERTY	MAXIMUM NOISE LEVEL (L_{AFmax})	DISTRICT PLAN NOISE LIMIT (L_{AFmax})	COMPLIES?
Closest property	68 dB	70 dB	Yes

5.3 DISCUSSION

5.3.1 SCENARIO 1

DAYTIME NOISE SCENARIO

Based on the assessed scenario noise associated with the complete Marton Rail Hub development are predicted to achieve the District Plan noise limits during the daytime (0700 to 2200 hours), apart from at 1066 State Highway 1 and 157 Makirikiri Road. We have the following comments regarding this non-compliance:

1066 State Highway 1

- The predicted noise level at 1066 State Highway 1, while over the District Plan noise limits, is below the recommended 55 dB L_{Aeq} daytime noise limit in NZS 6802:2008. Therefore, the noise may still be acceptable.
- The main contribution to the exceedances are from the PHA Plant and PLA Plant. Operational and physical mitigation strategies to reduce noise include:

- **Building design:** The location and building design is yet to be confirmed for the PHA Plant and PLA Plant. It is feasible that the overall building can be designed and constructed to reduce internal equipment to achieve the District Plan noise limits.
- **Equipment selection:** During the detailed design, equipment shall be selected with noise in mind. Where machinery has "low noise" models, or built-in acoustic enclosures, these should be prioritised, where practicable. Specific high noise generating plant (fans, turbines, etc.), could be further enclosed within the building. Mufflers on any exhaust flues or stacks will also need to be considered.

- Each of the PHA Plant and PLA Plant requires a Resource Consent, in which the actual machinery used is to be specifically assessed. As part of this specific acoustic reduction measures will be incorporated to ensure that noise from each of the area, along with cumulative noise will achieve the District Plan noise limits.

157 Makirikiri Road

- The predicted noise level at 157 Makirikiri Road, while over the District Plan noise limits, is below the recommended 55 dB L_{Aeq} daytime noise limit in NZS 6802:2008. Therefore, the noise may still be acceptable.
- Noise from the biomass energy plant and de-barker are the dominant noise sources at 157 Makirikiri Road. Operational and physical mitigation strategies to reduce noise include:
  - **Building Design:** Specific acoustic design of the biomass energy powerplant building will be undertaken during the Resource Consent application for the site. It is expected that specific acoustic design of the building can be accommodated within the detailed design process of this area to reduce the noise emissions from the facility to within acceptable levels in accordance with the District Plan.
  - **Equipment selection:** During the detailed design of each area, equipment shall be selected with noise in mind. Where machinery has "low noise" models, or built-in acoustic enclosures, these should be prioritised, where practicable. Specific high noise generating plant (fans, turbines, etc.), could be further enclosed within the building. Mufflers on any exhaust flues or stacks will also need to be considered.
  - **De-Barker Enclosure:** The de-barker in the log yard does comply when assessed independently. However, when assessed in a cumulative scenario, the noise criteria at 157 Makirikiri Road is exceeded by 2 dB. To reduce noise, along with reducing noise from other sites, the de-barker should either be located in a semi-enclosed, a fully enclosed building or behind an acoustic screen.

It is reasonable to assume that during the specific design and operation of the PHA Plant, PLA Plant, biomass energy plant, and de-barker areas can operate within the District Plan daytime noise limits (a 2 dB sound reduction overall).

NIGHT-TIME NOISE SCENARIO

During the night time, the District Plan night time noise limits are achieved, apart from at 1020, 1066 and 1108 State Highway 1 and 157 Makirikiri Road.

We have the following comments:

1020, 1066 and 1108 State Highway 1

- The ambient noise level at the properties located on State Highway 1 are heavily influenced by vehicles on State Highway 1. The noise from the existing roading network is predicted to be higher than the District Plan noise limits at 1066 and 1108 State Highway 1. This may mask the noise emissions from Marton Rail Hub and so will reduce any noise impact.
- The difference between predicted noise from Marton Rail Hub and estimated noise from State Highway 1 received at properties on State Highway 1 is outlined in Table 5.4.

Table 5.4 Ambient noise comparison

LOCATION	PREDICTED EXISTING AMBIENT NOISE FROM TRAFFIC ON SH1, (dB $L_{Aeq(24hr)}$)	PREDICTED NOISE FROM MARTON RAIL HUB, (dB $L_{Aeq(15\ min)}$)	DIFFERENCE, dB
1020 State Highway 1	57	49	-8
1066 State Highway 1	65	54	-11
1108 State Highway 1	63	50	-13

- The 24-hour average noise level from vehicles on State Highway 1 is higher than the worst-case predicted noise level from scenario 1. It is expected that even during lower traffic periods on State Highway 1, noise from the roading network is expected to be similar or higher than noise received from the Marton Rail Hub. Therefore, any impact from the Marton Rail Hub is likely to be reduced by the existing traffic noise. Environmental noise testing could be undertaken to confirm and validate the predicted existing ambient noise levels around the site.
- The three areas within Marton Rail Hub which are predicted to exceed of the District Plan noise limits at 1020, 1066 and 1108 State Highway 1 are the container yard, PHA Plant and PLA Plant. Operational and physical mitigation strategies to reduce noise at these properties will be required. These can include:
  - **Building Design:** We have currently assumed that all noise within the PHA and PLA plant sites are within a typical industrial building (corrugated steel building). It is likely that buildings which the equipment and machinery are located within can be designed and constructed to reduce noise from equipment and machinery inside further, and therefore comply with the District Plan noise limits. The acoustic reduction provided by the building can be designed when the final equipment and machinery selected, and so this specific analysis cannot be undertaken at this stage.
  - **Equipment selection:** During the detailed design of each area, equipment shall be selected with noise in mind. Where machinery has “low noise” models, or built-in acoustic enclosures, these should be prioritised, where practicable.
  - **Specific acoustic enclosures:** Noise from specific machinery which generate high levels of noise can be further attenuated in acoustic enclosures within a building. Other measures for consideration include designing to reduce noise in their operation (such as installing rubber linings in steel decks which material drops into), but this will need to be considered on a case by case basis as part of the specific resource consent acoustic assessments.
  - **Acoustic fencing/bunding:** Practicalities may restrict the use of bunding or fencing. Fencing and/or bunding is only effective where it removes line of sight from the noise source to the noise receptor. It is therefore most effective when installed close to the noise source.

157 Makirikiri Road

- Noise from existing locomotive movements are also predicted to make up a significant part of the ambient noise environment in the local area and are predicted to be higher than the District Plan noise limits at 157 Makirikiri Road. Therefore, during times when locomotives pass this property, they will mask noise from Marton Rail Hub.
- Noise from the biomass energy plant and log yard are the two areas which lead to the exceedance of the District Plan noise limits at 157 Makirikiri Road. Operational and physical mitigation strategies to reduce noise are outlined for the daytime in Section 4.2, along with the following:
  - **Acoustic fencing/bunding:** use of bunding / fencing around the perimeter of the site. The bund and/or fence would need to extend 1.0 metres higher than the height of the de-barker. Practicalities may restrict the use of bunding or fencing. Fencing and/or bunding is only effective where it.

- **Operational hours:** Consideration could be given to only operating this plant during the daytime hours.

A detailed design for each site will be developed to present the preferred mitigation strategies that can be implemented to achieve the night time noise limit targets.

5.3.2 SCENARIO 2

We have the following comments regarding the cumulative levels with all areas operating and a locomotive moving in the siding .

- Noise from a diesel locomotive in the siding is predicted to be similar in character and level as other locomotives travelling along the NIMTL.
- The noise from this scenario would only occur for a maximum of six times per day when a locomotive enters or exists the rail siding. This would not be constant throughout the day or night period. It is expected that a locomotive movement would take no more than 15 minutes to complete. Therefore, comparing the noise emissions from this scenario with the District Plan limits may not be a reasonable where locomotive noise dominates.
- The properties near the proposed Marton Rail Hub development on State Highway 1 are predicted to receive higher noise during a locomotive coming into the siding than a locomotive on the NIMTL due to the relative separation distances. However, noise from locomotives on the siding is predicted to be no higher than noise level from traffic on State Highway 1 at these properties. This may mask noise from the locomotive operating. This scenario has been considered against the predicted ambient noise levels in Table 5.5.

Table 5.5 Ambient noise comparison for locomotive movements on the sidings

PROPERTY	PREDICTED EXISTING AMBIENT NOISE FROM TRAFFIC ON SH1 ($DB L_{Aeq(24 Hrs)}$)	PREDICTED EXISTING NOISE FROM LOCOMOTIVES ON THE NIMTL ($DB L_{Aeq,T}$)	PREDICTED NOISE FROM MARTON RAIL HUB ($DB L_{Aeq,T}$)
33 Goldings Line	<40	56	38 - 48
67/77 Goldings Line	<40	49	38 - 46
1020 State Highway 1	57	40	44 - 54
1066 State Highway 1	65	40	50 - 62
1108 State Highway 1	63	39	46 - 52
157 Makirikiri Road	<40	59	48 - 52

- Properties close to the NIMTL are predicted to already receive noise above the District Plan noise limits from the existing locomotive movements on the line (up to 32 per day). Therefore, the additional (up to) six movements a day to the sidings is in line with the noise level and character of the existing environment.
- Ambient environmental noise testing should be undertaken to confirm the ambient noise near properties which are predicted to exceed the District Plan noise limits. Relevant noise criteria could then be considered, and further impacts of train movements considered.

Where ambient noise levels are measured to be close to the District Plan noise limits, the following design options could be considered to reduce noise from locomotive movements on the siding as part of the detailed design. These would need to be fully coordinated to ensure they are compatible with the proposed site operations:

- **Acoustic fence/Bund**: An acoustic bund with a solid fence (0.5 metres higher than the maximum height of the locomotive in the siding) could be installed directly adjacent to the rail tracks along the entire length of the siding.

However, this may not be practicable where access is required to the train line for loading and unloading the carriages, and therefore the effectiveness of the physical mitigation may be reduced.

Acoustic fencing along the eastern portion (end) of the siding to screen properties to the east.

- **Timing:** Limit locomotive movements to the daytime period (0700 to 2200 hours) to limit any impacts this may have during the night time period.

Due to the limited nature of locomotive movements at the siding, along with the existing high levels of locomotive and road noise in the area, noise from locomotives on the siding when combined with all other noise within the development is expected to be reasonable, due to the estimated existing ambient noise environment.

5.3.3 INCREASE IN LOCOMOTIVE MOVEMENTS ON NIMTL

We have reviewed the change in the noise environment from the additional locomotive movements along NIMTL associated with the proposed new Marton Rail Hub development.

Currently, on average there are 32 train movements along the NIMTL adjacent to Marton Rail Hub. Once the entire development is built (which may take .multiple years), an addition 6 movements each day may occur on the NIMTL (i.e. 38 locomotive movements per day).

The increase in locomotive movements is expected to result in the following:

- The NIMTL is a single train line in the vicinity of the site (apart from at the Marton Rail siding and Marton station), and so only one locomotive movement will occur at a time. Therefore, the magnitude of noise from each locomotive movement will not increase (i.e. there is no cumulative impacts of multiple locomotives passing a single site). The additional locomotive movements will be keeping in line with that already received at adjacent properties.
- The average number of locomotive movements per hour (assuming locomotive movements are spread evenly over 24-hours) increases from around 1.3 locomotive movements per hour (32 per day) to around 1.6 locomotive movements per hour (38 per day). The number of train movements increases by approximately 16%.
- Assessing the average locomotive movements during an hour or a day period, the increase in noise from 32 locomotive movements (existing) to 38 movements (proposed movements) are predicted to be less than 1 dB over a 24-hr period. Subjectively a 1B change in noise level is an imperceptible change.
- It should also be noted that locomotive movements on the NIMTL are on KiwiRail designated land which is not part of the proposed Marton Rail Hub site. Operations within the designation do not need to achieve the District Plan noise limits, nor is it the responsibility of the operators within Marton Rail Hub to control noise. In addition, as this is not part of the site, noise from the rail corridor cannot be controlled.
- Noise will be included within the Joint Operations Plan for locomotive movements into and out of the Marton Rail Hub site. Therefore, managerial mitigation of noise from locomotive movements associated with Marton Rail Hub can be controlled for locomotive movements specific to Marton Rail Hub.

6 DETAILED RAIL SIDING NOISE ASSESSMENT

The following section provides a detailed analysis of the noise generated by the rail siding. The assessment is intended to be included as part of a specific resource consent application for the rail siding and is in addition to the overarching CDP noise assessment included in Section 4 of this report.

6.1 SPECIFIC METHODOLOGY

A description of the activities occurring on site is provided in Appendix A. Detailed noise data for each of the proposed pieces of equipment and/or machinery is provided in Appendix B. Noise from other general activities including people talking on the rail siding may be present from time-to-time. These sources are expected to be low such that they will not add to the overall noise level received at adjacent noise sensitive receptors.

Two locomotive operational scenarios for the siding have been assessed:

Scenario 1: A locomotive idling while at the siding; and;

Scenario 2: A locomotive moving from the North Island Main Trunk Line into the siding. This includes the locomotive stopping (and so carriages stopping behind), starting, and pulling away (including the locomotive taking the strain of the carriages).

6.2 PREDICTED NOISE LEVELS

6.2.1 SCENARIO 1

The predicted noise levels for Scenario 1 is given in Table 6.1.

Table 6.1 Predicted noise levels from Scenario 1: locomotive idling in siding

PROPERTY	NOISE CRITERIA (DAY / NIGHT) (dB $L_{Aeq(15\ min)}$)	PREDICTED NOISE LEVEL (dB $L_{Aeq(15\ min)}$)	MEETS CRITERIA?	
			DAY	NIGHT
73 Wings Line (Fraser Auret Racing)	50/45	22	Yes	Yes
76 Wings Line	50/45	21	Yes	Yes
Malteurop	65/55	28	Yes	Yes
19 Goldings Line	50/45	22	Yes	Yes
33 Goldings Line	50/45	25	Yes	Yes
67/77 Goldings Line	50/45	25	Yes	Yes
45 and 74 Stantialls Road	50/45	23	Yes	Yes
1020 State Highway 1	50/45	35	Yes	Yes
1066 State Highway 1	50/45	43	Yes	Yes
1091 State Highway 1*	-	45	-	-
1108 State Highway 1	50/45	38	Yes	Yes

PROPERTY	NOISE CRITERIA (DAY / NIGHT) (dB $L_{Aeq(15\ min)}$)	PREDICTED NOISE LEVEL (dB $L_{Aeq(15\ min)}$)	MEETS CRITERIA?	
			DAY	NIGHT
1165 State Highway 1*	-	30	-	-
157 Makirikiri Road	50/45	36	Yes	Yes
97 and 104 Alexandra Street	50/45	20	Yes	Yes

*property to be acquired as part of the overall redevelopment and therefore noise has not been assessed

6.2.2 SCENARIO 2

The predicted noise emissions for Scenario 2 are provided in Table 6.2

Table 6.2 Predicted noise levels from the Scenario 2: locomotive moving in or out of siding

PROPERTY	DISTRICT PLAN NOISE CRITERIA (DAY / NIGHT) (dB, $L_{Aeq(15\ min)}$)	WORST-CASE PREDICTED NOISE LEVEL (dB, $L_{Aeq(15\ min)}$)	MEETS CRITERIA?	
			DAY	NIGHT
73 Wings Line (Fraser Auret Racing)	50/45	40	Yes	Yes
76 Wings Line	50/45	39	Yes	Yes
Malteurop	65/55	45	Yes	Yes
19 Goldings Line	50/45	44	Yes	Yes
33 Goldings Line	50/45	48	Yes	No
67/77 Goldings Line	50/45	45	Yes	Yes
45 and 74 Stantialls Road	50/45	43	Yes	Yes
1020 State Highway 1	50/45	53	No	No
1066 State Highway 1	50/45	62	No	No
1091 State Highway 1*	-	63	-	-
1108 State Highway 1	50/45	51	No	No
1165 State Highway 1*	-	48	-	-
157 Makirikiri Road	50/45	51	No	No
97 and 104 Alexandra Street	50/45	41	Yes	Yes

*property to be acquired as part of the overall redevelopment and therefore noise has not been assessed

The general noise contour maps of a locomotive idling in the rail yard is provided in Appendix E.

The predicted maximum noise levels are outlined in Table 5.3.

Table 6.3 Predicted maximum noise levels

PROPERTY	MAXIMUM NOISE LEVEL (L_{AFmax})	DISTRICT PLAN NOISE LIMIT (L_{AFmax})	COMPLIES?
Closest property	68 dB	70 dB	Yes

6.2.3 DISCUSSION

SCENARIO 1

Noise emissions from when a locomotive idles in the rail yard achieves the District Plan noise limits. Therefore it is anticipated that noise effects associated with a train idling in the rail yard is acceptable.

SCENARIO 2

When a locomotive comes into the siding, the noise is predicted to exceed the District Plan at a number of properties. However, comparing the noise generated by the siding to the District Plan noise may not be an accurate indication of effects in this scenario. The noise limits relate to a constant noise over a period; whereas the use of the siding will be short (locomotive come in and leaving) and be a limited number of times each day (up to six movements at peak operating), which is discussed further in Section 5.3.2.

In summary, noise from existing locomotive movements on the NIMTL are already predicted to be elevated at properties adjacent to the existing rail line. Existing noise in the vicinity of the State Highway is also predicted to be elevated from traffic. The existing locomotive movements on the NIMTL or traffic on State Highway 1 are at a level greater than a locomotive moving into the siding. Therefore, the minimal additional movements (up to six) is in line with the character and noise already in the vicinity of the site. Environmental noise testing could be undertaken to confirm and validate the predicted existing ambient noise levels around the site.

Where train movements occur during the night time, there is an exceedance of up to 17 dB at 1066 State Highway 1. While ambient noise may be above the District Plan, it is unlikely to be at this level during the night time period (when typically, there are less vehicle movements on the road). However, this may only occur once or twice during the night time period and not each night. Therefore, the impact of this exceedance is considered minimal.

Ambient noise measurements of the existing environment should be undertaken to determine an appropriate noise limit at 1066 State Highway 1 during the night time period. If existing ambient noise levels are measured to be near the District Plan noise limits, then restrictions to train movements would be recommended. This could either be restricting trains to access the siding at night on specific days, limiting the number of movements between 2200 to 0700 hours, or exempting locomotive movements in the rail siding to between 0700 and 2200 hours.

With mitigation management to be decided once the ambient noise environment is known, noise from a locomotive arriving and departing the siding to be reasonable.

7 DETAILED LOG YARD NOISE ASSESSMENT

A log yard and de-barking facility is proposed to be established in the Marton Rail Hub. A specific resource consent will be required.

It is expected that the log yard will be the first industrial operation to be established on the site and specific information regarding the equipment used on site and operational aspects are available and included within this specific noise assessment. As this is one of the first activities to establish, we have assumed that no other building is constructed on site. As the Marton Rail Hub site is developed, buildings on adjacent sites may screen neighbouring properties, reducing noise from this development.

The following section provides a detailed analysis of the noise expected to be generated by the log yard site and is intended to inform the specific resource consent application.

7.1 SPECIFIC ASSESSMENT

A description of the log yard and activities that will occur within this area is provided in Appendix A. Detailed noise data for each of the proposed pieces of equipment and/or machinery is provided in Appendix B.

A finalised site layout is not yet available however, it has been assumed that the de-barker and associated equipment is located in the centre of the site, with logs stored around the perimeter of the site. The front loaders are to operate across the site moving logs stored around the perimeter to the de-barker, and load/unload the log wagons. We have assumed that logs located on site do not provide any screening to adjacent properties (in reality, the logs, depending on the height they are stacked to may provide some acoustic screening).

At times, road trucks may enter and exit the site bringing in logs to be de-barked, and removing de-barked logs. Road trucks will access the log yard site from the south internal road. It is assumed the log trucks will be loaded/unloaded on the site. Any cleaning of the road trucks would occur off-site.

Other activity on site may include an office building and associated mechanical plant (outdoor condenser units for air conditioning, and extract ventilation fans), people walking and talking on-site and staff and/or visitor light vehicles. These sources are comparatively low, such that they will not add to the overall noise level received at the surrounding properties.

7.2 PREDICTED NOISE LEVELS

Based on the description of the log yard as outlined in Appendix A, and the sound level data for the equipment/machinery outlined in Appendix B, the predicted noise levels at the surrounding properties are given in Table 7.1.

Table 7.1 Predicted noise levels from the log yard

PROPERTY	DISTRICT PLAN NOISE CRITERIA (dB, $L_{Aeq(15\ min)}$)	PREDICTED LOG YARD NOISE LEVEL (dB $L_{Aeq(15\ min)}$)	MEETS CRITERIA?	
			DAY	NIGHT
73 Wings Line (Fraser Auret Racing)	50/45	33	Yes	Yes
76 Wings Line	50/45	32	Yes	Yes
Malteurop	65/55	39	Yes	Yes
19 Goldings Line	50/45	34	Yes	Yes
33 Goldings Line	50/45	35	Yes	Yes
67/77 Goldings Line	50/45	35	Yes	Yes
45 and 74 Stantialls Road	50/45	36	Yes	Yes
1020 State Highway 1	50/45	40	Yes	Yes
1066 State Highway 1	50/45	42	Yes	Yes
1091 State Highway 1*	-	43	-	-
1108 State Highway 1	50/45	40	Yes	Yes
1165 State Highway 1*	-	42	-	-
157 Makirikiri Road	50/45	45	Yes	Yes
97 and 104 Alexandra Street	50/45	31	Yes	Yes

*property to be acquired as part of the overall redevelopment and therefore noise has not been assessed

The general noise propagation maps for this scenario are provided in Appendix F.

The predicted maximum noise levels are outlined in Table 5.3.

Table 7.2 Predicted maximum noise levels

PROPERTY	MAXIMUM NOISE LEVEL (L_{AFmax})	DISTRICT PLAN NOISE LIMIT (L_{AFmax})	COMPLIES?
Closest property	62 dB	70 dB	Yes

The effects of maximum noise levels are reasonable.

7.2.1 DISCUSSION

Noise associated with the operation of the log yard is predicted to comply with both the proposed noise limits along with the Rangitikei District Plan daytime and night time noise limits. Therefore, effects with the operation of the log yard (including de-barker) are predicted to be reasonable.

Maximum noise levels generated by the log yard are below the 70 dB L_{AFmax} at residential and rural properties and 75 dB L_{AFmax} at industrial and commercial properties District Plan noise limits.

Where equipment is located in other areas of the site, the noise propagation, and therefore resultant noise levels at adjacent properties may change. An updated analysis may be required to quantify the noise received at adjacent properties.

8 CONCLUSIONS

WSP has undertaken an acoustic review of the noise associated with the proposed Marton Rail Hub to inform preparation of a CDP for the Marton Rail Hub industrial development area, and to support resolution of an appeal Plan Change (1165, 1151 and 1091 State Highway 1).

A CDP for Marton Rail Hub is required as part of the current proposed conditions of consent in the determination of the Plan Change prior to any industrial development of the site.

The majority of the operators at the Marton Rail Hub site have yet to be confirmed, and therefore the final machinery, equipment and processes which have been assessed are subject to change. Any change to information this report is based on will be captured in the Resource Consent for each specific development at the time of submittal. For this report it has been conservatively assumed that all sites are to operate 24-hours a day, 7 days a week.

WSP has assessed the operational noise of the entire Marton Rail development to provide an indication of whether compliance with relevant acoustic criteria can be achieved, to support the CPD.

Cumulative noise associated with the entire Marton Rail Hub development exceeds the District Plan noise limits at 1020, 1066, 1108 State Highway 1 and 157 Makirikiri Road during the night time. However, it is likely that during the detailed design of the site, when specific machinery is selected (considering the acoustic properties), the design of each building and/or specific acoustic enclosures around high noise generating plant can be developed to control noise. Any assessment of noise emissions shall also consider the existing ambient noise environment, which is predicted to be above the District Plan noise limits at properties adjacent to road and rail infrastructure.

The rail siding is one of two areas that will be developed first on the site. A specific analysis of the operational noise of this area has been undertaken. This detailed review shows that when a locomotive is idling, noise complies with the District Plan noise limits.

Noise from locomotives entering and exiting the siding exceeds the District Plan noise limits at various properties. However, noise from the existing locomotive movements on the NIMTL are predicted to be higher than locomotives using the rail siding at the majority of properties in the surrounding area. Furthermore, movements on the NIMTL occur significantly more frequently, with only 6 movements a day planned for the siding. Ambient noise measurements are recommended be undertaken at the properties predicted to exceed the District Plan noise limits. Where ambient noise levels are below the predicted noise levels from locomotives moving on site, managerial mitigation measures (such as restricting locomotive movements at night) shall be considered. Through implementation of these measures, noise impacts from locomotives moving in the rail siding are predicted to be reasonable.

The log yard is another area that will be developed first on the site. A specific analysis of the operational noise of this area has been undertaken. A detailed operational noise assessment of the log yard operating has shown it complies with the District Plan noise limits, and therefore the noise effects associated with the log yard are reasonable.

When considering the use of design mitigation (selection of low noise equipment and building design) to reduce noise generated in each area, cumulative noise from the overall CDP, along with a detailed review of both the rail siding, and log yard presented in this report, noise is not considered to be a material constraint to the reasonable operation of the Marton Rail Hub development.

APPENDIX A

SITE ACTIVITIES DESCRIPTION

RAIL SIDING

A proposed new rail siding intersects the site to allow the import and export of goods from Marton Rail Hub. Primarily locomotives will bring unprocessed tree logs for use at the log yard along with industrial inputs via containers. The locomotives will also carry de-barked logs and other finished products from the log yard to NZ sea ports. Locomotives can access the rail siding from the NIMTL either coming from the north or south. The log yard is located to the south of the rail siding, with the container area and food processor to the north.

A Joint Operating Plan (JOP) will be developed between Rangitikei Forestry Holdings and Kiwirail to manage the operation of the trains within the siding. As part of the JOP, noise management will be included.

Once the entire industrial area is established, it is anticipated that up to three locomotives (DL Class 108 Tonne double cab locomotive) would access the rail siding per day (6 locomotive movements). It is expected that it would take 10 minutes for a locomotive to access the siding and come to a complete stop. Once at a complete stop, locomotives will take 30 to 60 minutes to carry out testing while idling. Once the testing has been undertaken the locomotive will be switched off. Time to unload and load the train depends on the length and number of hoists / reach stackers used, which is currently unknown, and may change over time.

Whilst locomotives should be switched off when not in use, there is a chance that they will be required to move around the site and at times be left idling. Operationally this will need to be managed to minimise the noise emissions. Nevertheless, a worst-case operational scenario with locomotives idling has been considered within the noise assessment.

LOG YARD

The log yard area is located adjacent to the rail siding to allow for ease of loading and unloading of log wagons, which will be the primary way unprocessed logs come onto site, and loading of de-barked logs. Equipment on site includes two rubber-wheeled loaders (one 34.5 and one 54 tonne front loaders), along with a de-barker and pump station. The wheeled loaders will be used to load/unload the rail wagons, load and unload the de-barker and move logs around site. The pump station is used to pump waste from the de-barker in the form of a slurry to the PHA plant. It is assumed any pumps will be located within a pump room.

A single A8 Nicholson ring de-barker will be located on site, which is assumed to be outdoors. The de-barker is automatically loaded with a stacker infeed and two-drop cradle out feed. A conveyor system will remove bark from the machine for storage in bins.

Waste bark will be turned into a slurry and pumped to the PHA plant for processing into plastics.

Logs will be tested for sugar content prior to de-barking. Where a high sugar content log is found, this will be directly transported to the PLA plant.

It is assumed that all activity will occur outdoors, and so no noise reduction from being inside a building has been accounted for. The only noisy processing that occurs on site is from the de-barker.

While rail will be the predominant transport method, where necessary, trucks will also access site to bring in unprocessed logs and removed de-barked logs, along with moving logs between the log yard and PLA plant. It is assumed during a worst-case 15 minute period; 6 truck movements would occur.

WEIGHBRIDGE AND INTERNAL ROADS

There are two weighbridge options currently proposed for the road trucks; one at the entry to the site, and another on Makirikiri Road. Road trucks (and trailers) are to be weighed as they come onto the site and as they leave. Only one weighbridge option will be developed.

Light vehicles (such as from staff and visitors) along with road trucks will enter the industrial development area and travel around the internal roading network before entering a site. They will then leave the industrial development area site via the internal roads.

The following equipment and activity has been assumed for the weighbridge and internal roads:

- 20 truck movements in a worst-case 15 minute period including trucks using the weighbridge and generally travelling around site;
- Electric 50 kW motor associated with the control gate; and,
- Pumps would be located within a pump/plant room around the control gates to pump sewerage off site. All sewerage will be pre-processed on site prior to pumping into the Council sewerage system.

SMALL BUSINESS AND SERVICE AREA

The small business area allows for smaller businesses which can support the wider industrial site including (but not limited to):

- Café / truck stop
- Truck wash area
- Truck repair workshop
- Truck tyre replacement workshop
- Offices
- Fuel pumps

It is assumed that any activities that occur in this area will generally be evenly distributed throughout the area.

PHA PLANT AND PLASTICS MANUFACTURING AREA

A PHA plant takes forestry waste and turns it into a bio-plastic. Wood waste is transported from the log yard to the PHA plant via a slurry. Dairy slurry will be transported to Marton Rail Hub via train and piped to the PHA plant area. This wood and dairy slurry is then fermented using specific cultures from which the resulting product is then removed and dried. This is turned into pellets which are transported to the plastics manufacturing plant.

It has been assumed that all processing and manufacturing will be undertaken indoors.

The plastics manufacturing is located on the same site as the PHA plant, outlined in Figure 2.2. The plastics manufacturing plant combines separate PHA and PLA plastics into a single bio-plastic. The mixture of each of the plastics can be changed during manufacturing depending on scarcity, price, and quality of plastics requested.

Motors, pumps, reaction chambers, tanks, a dryer and granulation plants are expected to be associated with this area. All of which will occur within the manufacturing buildings.

Road trucks (worst-case 6 movements in a 15 minute period) will bring in raw material and remove waste material or final plastic product. A rubber wheeled loader is expected to be used for moving products around site. PLA Plant area

This plant uses wood-based feedstock to create a bio-plastic. Where high-sugar content logs are found within the log yard, they are transported to the PLA plant area. The logs are run through a chipper or other similar machine to break-up the logs. These are then processed though reaction and distillation chambers and dried to create plastics.

It has been assumed that all processing and manufacturing will be undertaken indoors.

Raw material along with wood-waste product is trucked off-site or to the energy plant (worst-case 6 movements in a 15 minute period). The resultant PLA plastics is stored on-site and conveyed to the plastics manufacturing plant when needed to be turned into a composite bio-plastic.

ENERGY PLANT AREA

The energy plant takes dairy waste delivered by train, and wood-waste from the PHA/PLA plants and uses waste heat that is piped from the food producer to either burn the wood-waste to create electricity, or to create bio-char which is either stored for burning in the future or trucked off-site (worst-case 15 minute period would see 6 heavy vehicle movements on site).

The heat produced goes through a heat exchanger which the heated medium turns a turbine to create electricity. A large flue, fans, and turbines will be located on this site for the boiler and energy producing. Waste from the PHA/PLA plant will be pumped to the energy plant. All processes in this area will occur within a building.

CONTAINER AREA

The proposed container area is where containers are stored prior to being trained off-site or stored once taken off a train. In addition to serving Marton Rail Hub, the container hub may also serve the wider area (including the malt factory to the north).

Container storage will occur to the northeast of the rail siding, with access across the entire northern area of the rail siding. Reach stackers or hoists will be used in the container area to move containers around site.

During a worst-case 15 minute period (such as when a train is being unloaded and trucks are waiting to take goods away) a total of 10 heavy vehicle movements may occur in a worst case period are expected.

FOOD PRODUCER AREA

A large food producer is to be located along the northern portion of the site, adjacent to the container area. This area contains a large car and truck park, office and staff areas, utilities, silos milling, processing and packing food goods. Goods will be exported offsite via either truck or train.

The majority of operations at the food processor will be internal, and so the building structure will help reduce noise emissions to the surrounding areas. Some activity (such as boilers or dryers), while inside, will have exhaust flues that will need to be carefully considered during the design and Resource Consent of the site to ensure the associated noise limits are achieved.

Waste heat from the food producer will be piped to the energy plant, to be used to burn wood waste for electricity.

Although the size and extent of the production facility are not yet known, they are expected to be substantial and likely to reduce noise emissions to the north from the rest of the site. However, the benefits of this have not been included within this assessment due to the uncertainties.

APPENDIX B

EQUIPMENT SCHEDULE

AREA	NOISE SOURCE	SOUND POWER LEVEL (dB $L_{wA(15\ MIN)}$)	COMMENTS
Log Yard	A8 Nicholson de-barker	104	-
	log infeed process	95	-
	L260 wheel loaders	108	-
	Feed out chains with stacker feeds	100	-
	6 x heavy vehicle movements	89	SEL of a single truck movement: 82 dBA at 10 metres
	Pumps to take the waste as slurry	75	Located within a pump house
	Motors of conveyors for transporting waste to storage bins	88	-
	Maximum noise levels		The logs being dropped either on the ground or into the de-barker hopper are expected to be in the order of 85 – 90 dB L_{AFmax} at 10 metres.
Train sidings	Locomotive travelling with 30+ carriages	120	
	Maximum noise levels		The locomotive stops, from shunting when wagons bangs, or from banging of containers due to movement. The maximum sound pressure levels are in the order of 90 – 95 dB L_{AFmax} at 10 metres.
	Locomotive idling	102	-
Service Area	Café, 20 outdoor seats	81	20 people outdoors, 10 people speaking in raised voice effort. Raised voice effort being 71 dB L_{Aeq} at 10 metres
	4 x high flow fuel pumps	105	-
	8 x heavy vehicle movements	90	SEL of a single truck movement: 82 dBA at 10 metres
	10 x light vehicle movements	83	SEL of a single vehicle movement: 74 dBA at 10 metres
	Rattle guns	106	-
	Compressors	65	It has been assumed this activity will occur within the building. This accounts for losses from the building fabric
	Other handheld tools	65	It has been assumed this activity will occur within the building. This accounts for losses from the building fabric
	Same as tyre workshop	65	It has been assumed this activity will occur within the building. This accounts for losses from the building fabric

AREA	NOISE SOURCE	SOUND POWER LEVEL (dB $L_{wA(15\ MIN)}$)	COMMENTS
	Multiple compressors	87	It has been assumed this activity will occur within the building. This accounts for losses from the building fabric
	Electric water blaster + handheld hose	85	It has been assumed this activity will occur within the building. This accounts for losses from the building fabric
Weigh bridge	4 x heavy vehicle movements	87	SEL of a single truck movement: 82 dBA at 10 metres
Control Gate	50 kW (max) electric motor	81	-
PLA Plant	6 x heavy vehicle movements	89	SEL of a single truck movement: 82 dBA at 10 metres
	1 x chipper	115	It has been assumed this activity will occur within the building. This accounts for losses from the building fabric
	4 x reactor chambers	80	It has been assumed this activity will occur within the building. This accounts for losses from the building fabric
	4 x distillation chamber	80	It has been assumed this activity will occur within the building. This accounts for losses from the building fabric
	4 x post reactor	80	It has been assumed this activity will occur within the building. This accounts for losses from the building fabric
	2 x crystaliser	80	It has been assumed this activity will occur within the building. This accounts for losses from the building fabric
	2 x dryer	80	It has been assumed this activity will occur within the building. This accounts for losses from the building fabric
	Motor associated with conveyor	88	-
PHA Plant	Noise radiated by waste pipes	70	It has been assumed this activity will occur within the building. This accounts for losses from the building fabric
	Motors and pumps	60	It has been assumed this activity will occur within the building. This accounts for losses from the building fabric
	Reactor + centrifugal tanks	80	It has been assumed this activity will occur within the building. This accounts for losses from the building fabric
	Dryer	80	It has been assumed this activity will occur within the building. This accounts for losses from the building fabric
	Granulation plant	80	It has been assumed this activity will occur within the building. This accounts for losses from the building fabric
	1 x loader	108	-
	6 x heavy vehicle movements	89	SEL of a single truck movement: 82 dBA at 10 metres

AREA	NOISE SOURCE	SOUND POWER LEVEL (dB $L_{wA(15\ MIN)}$)	COMMENTS
Plastic Manufacturing	Boilers	90	It has been assumed this activity will occur within the building. This accounts for losses from the building fabric
	Mixing tanks	80	It has been assumed this activity will occur within the building. This accounts for losses from the building fabric
	Motors and pumps	60	It has been assumed this activity will occur within the building. This accounts for losses from the building fabric
	Dryer/cooler	80	It has been assumed this activity will occur within the building. This accounts for losses from the building fabric
	1 x loader	108	-
	4 x heavy vehicle movements	87	SEL of a single truck movement: 82 dBA at 10 metres
	Noise radiated by waste pipes	70	-
Biomass Energy Plant	Boiler	80	It has been assumed this activity will occur within the building. This accounts for losses from the building fabric
	Boiler flue	90	Assume minimum of 10 metres above ground
	Turbines within acoustic enclosure	80	It has been assumed this activity will occur within the building. This accounts for losses from the building fabric
	Safety valve outlet	108	-
	4 x heavy vehicle movements	87	SEL of a single truck movement: 82 dBA at 10 metres
Container area	2x reach stackers and/or wheeled toplift hoists	95	-
	10 x heavy vehicle movements	92	SEL of a single truck movement: 82 dBA at 10 metres
	4 x 500 kW pumps in pump room to pump waste to PHA	80	It has been assumed this activity will occur within the building. This accounts for losses from the building fabric
Internal Roads	8 x heavy vehicle movements	90	SEL of a single truck movement: 82 dBA at 10 metres
	10 x light vehicle movements	83	SEL of a single vehicle movement: 74 dBA at 10 metres
Food producer	4 x heavy vehicle movements	87	SEL of a single truck movement: 82 dBA at 10 metres
	Internal processing	90	It has been assumed this activity will occur within the building. This accounts for losses from the building fabric
	Boiler flue	90	Flue of boilers min. 10 metres off ground

AREA	NOISE SOURCE	SOUND POWER LEVEL (dB $L_{wA(15\ MIN)}$)	COMMENTS
	10 x light vehicle movements	83	SEL of a single vehicle movement: 74 dBA at 10 metres

APPENDIX C

EXISTING NOISE FROM ROAD AND RAIL

TRAFFIC NOISE

Noise from vehicles on State Highway 1 to adjacent noise sensitive receptors has been assessed. Traffic volumes for the portion of State Highway 1 between Makirikiri Road and Wings Line has been taken from Waka Kotahi New Zealand Transport Agency (NZTA) *State highway volumes by region 2019* document. In 2019, average daily traffic (ADT) volumes were measured to be 6,875, with 16% being heavy vehicles. Traffic levels at properties adjacent to State Highway 1 have been calculated using the Calculation of Road Traffic Noise (CoRTN) method, modified for New Zealand conditions. Based on the distance between State Highway 1 and the façade of the nearest dwelling and/or properties, noise levels are predicted to be

- 1020 State Highway 1: 57 dB $L_{Aeq(24\ hrs)}$
- 1066 State Highway 1: 65 dB $L_{Aeq(24\ hrs)}$
- 1091 State Highway 1: 56 dB $L_{Aeq(24\ hrs)}$
- 1108 State Highway 1: 63 dB $L_{Aeq(24\ hrs)}$
- 1165 State Highway 1: 57 dB $L_{Aeq(24\ hrs)}$

Noise from state highway traffic at the façade of the dwellings located on State Highway 1 is predicted to be above the Rangitikei District Plan noise limits. While traffic noise is not assessed against the typical noise limits outlined in the District Plan, the predicted traffic noise levels are higher than the District Plan limits for other activities and provide ome context to the existing noise environment from which future impacts can be considered.

Noise from traffic is estimated over a 24 hour period, and therefore the 15 minute average noise level is like to fluctuate over a 24-hour period.

RAIL NOISE

To the west of the site is the North Island Main Trunk Line (NIMTL). WSP prepared a Level Crossing Safety Impact Assessment in October 2019, this records the number of locomotive movements were recorded in 2019 at the Makirikiri Road rail crossing. In 2019 a total of 32 locomotives were recorded each day. Locomotive speed over the crossing was recorded at between 100 and 110 km/hr. Based on the information contained within the New South Wales Rail Noise Database, *Stage III Measurements and Analysis* (dated January 2015), the typical sound pressure level during a diesel locomotive pass-by is 85 - 90 dB $L_{Aeq,T}$ at 15 metres. .

Based on the closest distance between the NIMTL and the façade of the nearest dwellings and/or properties, noise from a single locomotive movements are predicted to be as follows:

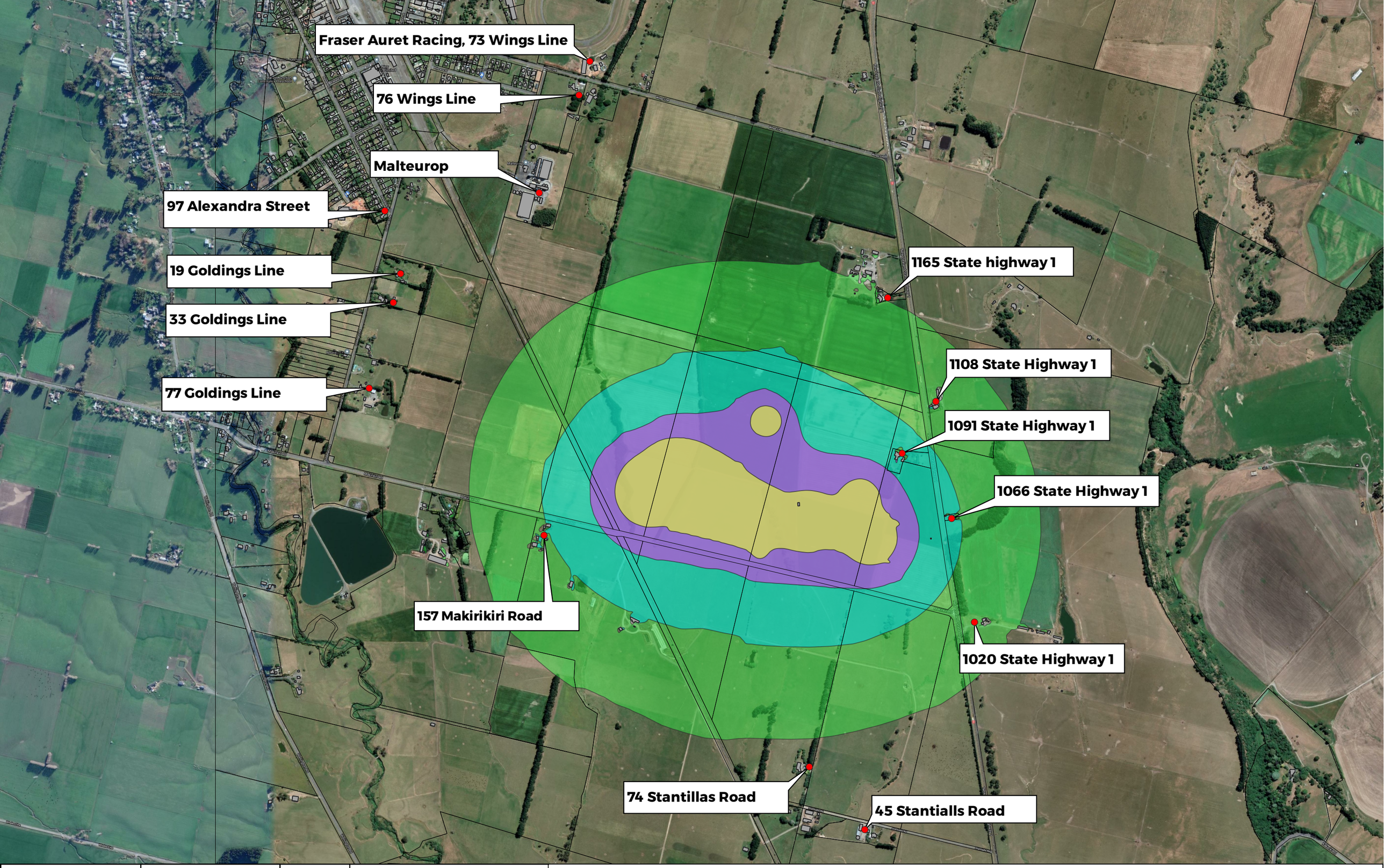
- 73 Wings Line (Fraser Auret Racing): 45 dB $L_{Aeq,T}$
- 76 Wings Line: 45 dB $L_{Aeq,T}$
- 19 Goldings Line: 54 dB $L_{Aeq,T}$
- 33 Goldings Line: 56 dB $L_{Aeq,T}$
- 67/77 Goldings Line: 49 dB $L_{Aeq,T}$
- 45 and 74 Stantialls Road: 56 dB $L_{Aeq,T}$
- 1020, 1066, 1091 State Highway 1: 40 dB $L_{Aeq,T}$
- 1108 and 1165 State Highway 1: 39 dB $L_{Aeq,T}$
- 157 Makirikiri Road: 59 dB $L_{Aeq,T}$
- 97 and 104 Alexandra Street: 51 dB $L_{Aeq,T}$

During times when locomotives pass, there are many properties near the train line which currently experience noise greater than the District Plan noise limits. These locomotive movement levels would be similar in nature to events where locomotives side within Marton Rail Hub.

In consideration of the existing noise environment across the area surrounding the site, while compliance with the District Plan noise limits may be achievable, any exceedance of the targets should be considered in the context of the existing environment. It may be suitable at some properties which already receive noise from road traffic or locomotives above the District Plan noise limits, to allow a higher noise level from the site without increasing impacts.

APPENDIX D

NOISE CONTOUR MAP – MARTON RAIL CDP



Map: Appendix C	Author: GvH
Date: 29/06/2021	Approved by: JJ

N

To be read in conjunction with WSP document: <REPORT_ID>

Map Source: Google Maps

0 200 400 600 m

1:16000 at A3

Legend

- 65 dB LAeq
- 60 dB LAeq
- 55 dB LAeq
- 50 dB LAeq
- 45 dB LAeq

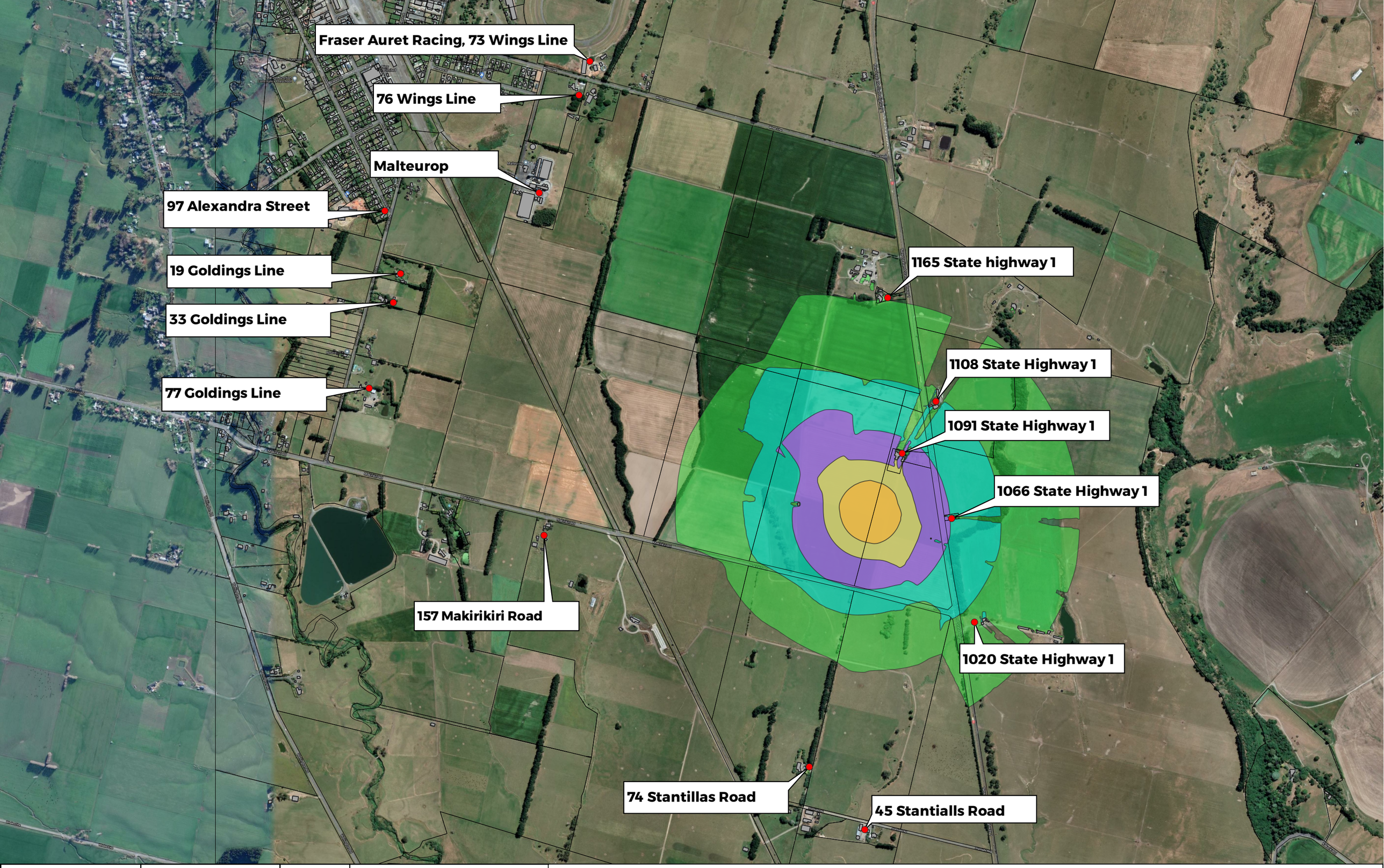
Marton Rail Hub - Comprehensive Development Plan

Comprehensive Development Plan Scenario

wsp

APPENDIX E

NOISE CONTOUR MAP – RAIL SIDING



Map: Appendix D	Author: GvH
Date: 15/06/2021	Approved by: JJ

N

0 200 400 600 m

1:16000 at A3

Legend

- 65 dB LAeq
- 60 dB LAeq
- 55 dB LAeq
- 50 dB LAeq
- 45 dB LAeq

Marton Rail Hub - Comprehensive Development Plan

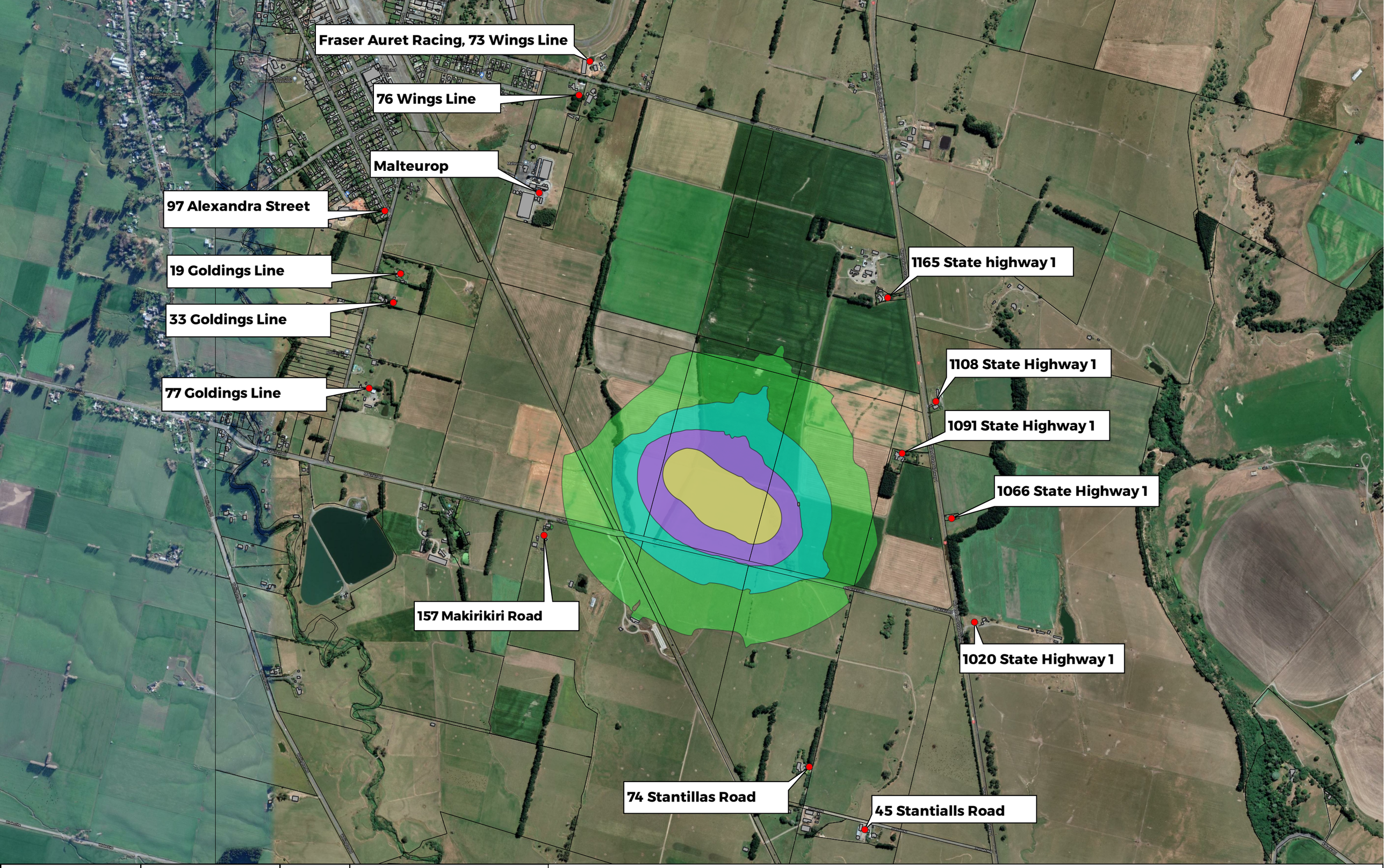
Rail Siding Scenario

To be read in conjunction with WSP document:

Map Source: Google Maps

APPENDIX F

NOISE CONTOUR MAP – LOG YARD



Map: Appendix E	Author: GvH
Date: 29/06/2021	Approved by: JJ

N

To be read in conjunction with WSP document: <REPORT_ID>

Map Source: Google Maps

0 200 400 600 m

1:16000 at A3

Legend

- 65 dB LAeq
- 60 dB LAeq
- 55 dB LAeq
- 50 dB LAeq
- 45 dB LAeq

Marton Rail Hub - Comprehensive Development Plan

Log Yard Scenario

wsp