



# Waikato Thoroughbred Racetrack, Pencarrow Road – Acoustic Report, Fast Track Referral Project No. 26037

Date: 22/04/2026

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Project No. 26037  
Waikato Thoroughbred Racetrack, Pencarrow Road – Acoustic Report, Fast Track Referral  
Waikato Thoroughbred Racing  
Revision: 1.0 Date: 22/04/2026

## 1. Introduction

Bladon Bronka Acoustics Ltd (BBA) has been appointed to provide an acoustic assessment of the proposed Waikato Thoroughbred Racetrack (WTR) at Pencarrow Road, Tamahere. The acoustic report is required as part of the Referral for the Fast Track Resource Consent Application.

This acoustic report considers the noise emissions to the neighbouring receivers around the site, including PA sound system and vehicle noise in addition to construction noise and vibration. The proposed residential and commercial activities on site are also considered with respect to reverse sensitivity. The report assesses noise emissions against the permitted limits of the Waikato District Plan – Operative in Part (WDC-OP) and considers the potential effects with respect to S16 of the RMA.

At this stage in the project, the available information in terms of the operations related to proposed noise sources is limited and expected to be confirmed at the future Substantive application stage of the Fast Track process. This report, therefore, provides an overview of the typical noise emission levels and ratings based on estimated operations, discussion of potential effects and mitigation measures. The report also identifies areas requiring further refinement or investigation for the substantive application.

### 1.1. Site and Proposal

The proposed site is located within a predominantly rural area to the south of SH1, with Pencarrow Road to the west, Hooker Road to the South and Duncan Road to the east. The surrounding receivers include mainly residential lifestyle blocks, with those located closer to SH1 to the north being subject to background noise dominated by SH1.

The project site and all surrounding receivers are zoned as GRUZ – General Rural Zone in accordance with the WDP-OP as shown in indicated in Figure 6 of Appendix A.

An aerial showing the project site extents is presented in Figure 7 of Appendix A, with detailed receivers and corresponding addresses shown in the following Figure 8 to Figure 14.

A masterplan site layout showing the proposed racetracks, training areas, equine areas, and events buildings is presented in Figure 1 below. The development will also incorporate designated residential areas in the south-east corner, and commercial areas to the south of the site.



**Figure 1. Proposed WTR Masterplan Site Layout**

WTR proposed the following general operations for either Thoroughbred or Harness race days:

**Table 1. WTR Proposed Activities**

Info.	Thoroughbred Racing	Harness Racing
Operational Times	1230 – 1730 Monday to Saturday	1730 – 2130 Monday to Saturday
Large events	1 per year 6000 spectators	2 per year 3000 spectators
Medium events	6 per year 1700-3000 spectators	8 per year 500 spectators
Small Events	26 per year 750-1500 spectators	40 per year 250 spectators
Total events per year	33	50
Training	Monday to Sunday 0430-0930 Unlimited times per year Approx. 80-250 attendees per day	Monday to Sunday 0500-11am Unlimited times per year Approx. 90 attendees per day
Trials	Monday to Saturday 1230 – 1730 12 per year	-

Info.	Thoroughbred Racing	Harness Racing
	Approx. 150 spectators	

The proposed site will incorporate the following key noise generating sources and reverse sensitivity considerations:

**Operational Noise:**

- PA system and crowd noise for the main events & operations building
- PA system for the Tie-Ups bay (lower levels for information only)
- Car parking and vehicles noise

**Reverse Sensitivity**

- Reverse sensitivity effects from the residential activity in the Lifestyle Block to the WTR, State Highway and to Commercial Areas

**Construction Noise and Vibration**

- Predominantly comprising earthworks for site levelling, roading and general construction activities related to buildings

## 1.2. Receivers

A list of the residential receiver sites surrounding the proposed WTR is presented below (see maps shown in Appendix A). All receivers are currently used for residential activity.

**Table 2. Receivers surrounding the WTR site**

West	South	East	North
644 Pencarrow	480 Pencarrow Road	18 Duncan Road	110 Duncan Road
643 Pencarrow Road	14 Hooker Road	47 Duncan Road	112 Duncan Road
635B Pencarrow Road	20 Hooker Road	70 Duncan Road	104B Duncan Road
635A Pencarrow Road	34 Hooker Road	71A Duncan Road	104A Duncan Road
605 Pencarrow Road	48A Hooker Road	77 Duncan Road	537 Hautapu Road
599 Pencarrow Road	62 Hooker Road	93 Duncan Road	78 Hautapu Road
587 Pencarrow Road	70 Hooker Road	108 Duncan Road	
4 Summerfield Lane	72 Hooker Road		
5 Summerfield Lane	82 Hooker Road		
563 Pencarrow Road	100 Hooker Road		
535 Pencarrow Road	104C Duncan Road		
557 Pencarrow Road	101 Hooker Road		
531 Pencarrow Road			
525 Pencarrow Road			

West	South	East	North
511C Pencarrow Road			
526 Pencarrow Road			

## 2. Criteria

### 2.1. WDP-OP Operational Noise Limits

The permitted noise limits of the GRUZ are stated within Rule Noise R8 of the WDC-OP as shown below.

NOISE-R8	Noise - general
GRUZ - General rural zone	<p><b>(1) Activity status: PER</b> Where:</p> <p>(a) Noise measured at the <u>notional boundary</u> on any other <u>site</u> in the GRUZ - General Rural Zone must not exceed:</p> <p>(i) 50dB L<sub>Aeq</sub>' 7am to 7pm every day;            (ii) 45dB L<sub>Aeq</sub>' 7pm to 10pm every day;            (iii) 40dB L<sub>Aeq</sub> and 65dB L<sub>Amax</sub>' 10pm to 7am the following day.</p> <p>(b) Noise measured within any <u>site</u> in any zone, other than the GRUZ - General rural zone, must meet the permitted <u>noise</u> levels for that zone.</p> <p>(c) Noise levels must be measured in accordance with the requirements of New Zealand Standard NZS 6801:2008 "Acoustics - Measurement of Environmental Sound".</p> <p>(d) Noise levels must be assessed in accordance with the requirements of New Zealand Standard NZS 6802:2008 "Acoustic - Environmental <u>noise</u>".</p> <p><b>(2) Activity status where compliance not achieved: DIS</b></p>

### 2.2. WDP-OP State Highway Reverse Sensitivity

Part 4, APP1, 8 of the WDP-OP provides the reverse sensitivity requirements for noise sensitive spaces in close proximity to the State Highway as follows:

#### 8. - State Highway and Rail Corridor Noise Control Boundary

##### 8. State Highway and Rail Corridor Noise Control Boundary

The State Highway and Rail Corridor Noise Control Boundary overlays shown on the planning maps identify areas that have the potential to experience high noise levels from road and rail traffic. New buildings and alterations to habitable rooms in buildings used for sensitive land uses are required to demonstrate that adverse noise effects have been appropriately managed by demonstrating compliance with the standards specified in section 8.1.

##### 8.1 Standards for permitted activities within the State Highway and Rail Corridor Noise Control Boundary overlays

(1) Prior to the construction or alteration of, or change of use within, any building to which this standard applies, a design report shall be submitted to the Council demonstrating compliance with the maximum indoor design noise levels specified in Table 28, applying the assumptions in sections 8.1(2) and 8.1(3) below. Alternatively, the design report may be substituted with confirmation that the construction or alteration of, or change of use within, the building will meet the construction schedule requirements in Table 29.

Table 28 – Maximum indoor design noise levels for state highway and rail corridor noise

Type of Noise Control Boundary	Activity	Rail Corridor maximum indoor design noise level	State Highway maximum indoor design noise level
State Highway and Rail Corridor	Bedrooms	35 dB L <sub>Aeq (1hour)</sub>	40 dB L <sub>Aeq (24hour)</sub>
	Lecture rooms / theatres, music studios, assembly halls	35 dB L <sub>Aeq (1hour)</sub>	35 dB L <sub>Aeq (24hour)</sub>
	Conference rooms, drama studios, libraries and designated sleeping rooms for children aged 6 years or younger in schools, early childhood centres or tertiary institutions	40 dB L <sub>Aeq (1hour)</sub>	40 dB L <sub>Aeq (24hour)</sub>
	Sensitive activities in hospitals including overnight medical care, wards, clinics, consulting rooms, theatres, nurses' stations	40 dB L <sub>Aeq (1hour)</sub>	40 dB L <sub>Aeq (24hour)</sub>
	Places of assembly including churches, places of worship and marae	35 dB L <sub>Aeq (1hour)</sub>	35 dB L <sub>Aeq (24hour)</sub>
	Other habitable rooms	40 dB L <sub>Aeq (1hour)</sub>	40 dB L <sub>Aeq (24hour)</sub>

(2) For State Highways, the design road noise is to be based on measured or predicted external noise levels plus 3 dB\*.

(3) For the Rail Corridor:

- (a) The source level for railway noise is 70 L<sub>Aeq(1h)</sub> at a distance of 12 metres from the nearest track; and
- (b) The attenuation over distance is:
  - (i) 3 dB per doubling of distance up to 40 metres and 6 dB per doubling of distance beyond 40 metres; or
  - (ii) As modelled by a Suitably Qualified and Experienced Acoustic Consultant using a recognised computer modelling method for freight trains with diesel locomotives, having regard to factors such as barrier attenuation, the location of the dwelling relative to the orientation of the track, topographical features and any intervening structures.

Table 29 - Construction Schedule

Elements	Minimum construction schedule for controlling noise in State Highway and Railway Noise Effects Areas in addition to the requirements of the New Zealand Building Code	
Exterior walls	Wall cavity infill of fibrous insulation, batts or similar (minimum density of 9kg/m <sup>3</sup> )	
	Cladding and internal wall lining complying with either Options A, B or C below:	
	Option A - Light cladding: timber weatherboard or sheet materials with surface mass between 8kg/m <sup>2</sup> and 30 kg/m <sup>2</sup> of wall cladding	Internal lining of minimum 17 kg/m <sup>2</sup> plasterboard, such as two layers of 10 mm thick high-density plasterboard, on resilient/isolating mountings
	Option B - Medium cladding: surface mass between 30 kg/m <sup>2</sup> and 80 kg/m <sup>2</sup> of wall cladding	Internal lining of minimum 17 kg/m <sup>2</sup> plasterboard, such as two layers of 10 mm thick high-density plasterboard
	Option C - Heavy cladding: surface mass between 80 kg/m <sup>2</sup> and 220 kg/m <sup>2</sup> of wall cladding	No requirements additional to New Zealand Building Code
Roof/ceiling	Ceiling cavity infill of fibrous insulation, batts or similar (minimum density of 7 kg/m <sup>3</sup> )	
	Ceiling penetrations, such as for recessed lighting or ventilation, shall not allow additional noise break-in	
	Roof type and internal ceiling lining complying with either Options A, B or C below:	
	Option A - Skillion roof with light cladding: surface mass up to 20 kg/m <sup>2</sup> of roof cladding	Internal lining of minimum 25 kg/m <sup>2</sup> plasterboard, such as two layers of 13 mm thick high-density plasterboard
	Option B - Pitched roof with light cladding: surface mass up to 20 kg/m <sup>2</sup> of roof cladding.	Internal lining of minimum 17 kg/m <sup>2</sup> plasterboard, such as two layers of 10 mm thick high-density plasterboard
	Option C - Roof with heavy cladding: surface mass between 20 kg/m <sup>2</sup> and 60 kg/m <sup>2</sup> of roof cladding	No requirements additional to New Zealand Building Code
Glazed areas	Aluminium frames with full compression seals on opening panes	
	Glazed areas shall be less than 35% of each room's gross floor area	
	Either: <ul style="list-style-type: none"> <li>• double-glazing with:               <ul style="list-style-type: none"> <li>o a laminated pane of glass at least 6 mm thick;</li> <li>o a cavity between the two panes of glass at least 12 mm deep; and</li> <li>o a second pane of glass at least 4 mm thick</li> </ul> </li> <li>Or</li> <li>• any other glazing with a minimum performance of Rw 33 dB</li> </ul>	
Exterior doors	Exterior door: <ul style="list-style-type: none"> <li>• within the state highway noise effects area with a line-of-sight to any part of the state highway road surface; or</li> <li>• within the railway corridor noise effects area with a line-of-sight to any point 3.8m directly above the formed railway track.</li> </ul>	Solid core exterior door, minimum surface mass 24 kg/m <sup>2</sup> , with edge and threshold compression seals; or other doorset with minimum performance of Rw 30 dB

(4) If opening windows must be closed to achieve the design noise levels in Table 28 or if a building is constructed in accordance with the construction schedule in Table 29, the building must be designed, constructed and maintained with a mechanical ventilation system that:

(a) For habitable rooms located within the State Highway or Rail Corridor Noise effects area containing a residential activity, achieves the following requirements:

- (i) Provides mechanical ventilation that can operate continuously to satisfy clause G4 of the New Zealand Building Code and that provides at least 1 air change per hour, but no less than 7.5L/s per occupant;
- (ii) Provides cooling and heating that is controllable by the occupant and can maintain the inside temperature between 18°C and 25°C when assessed using a 2.5% design weather condition for the applicable location. An acceptable design weather set would include IRHACE Yearbook 2009 NIWA weather data; and
- (iii) A HVAC system installed in compliance with (4)(a)(i) and (ii) above, must not generate more than 35 dB L<sub>Aeq(30s)</sub> when measured 1 metre away from any grille or diffuser. The noise level must be measured after the system has cooled the rooms to the temperatures in (4)(a)(ii), or after a period of 30 minutes from the commencement of cooling (whichever is the lesser).

(b) Alternatively, in lieu of section (4)(a) above, a design verified by a suitably qualified and experienced HVAC expert stating the design proposed will provide ventilation and internal space temperature controls to meet or exceed the outcomes described in parts (4)(a).

(5) A commissioning report must be submitted to the Council prior to occupation of the building demonstrating compliance with all of the mechanical ventilation system performance requirements in 8.1(4). \*The State Highway Noise Effects Area is based on national road-traffic noise modelling by AECOM. The inputs for key parameters are as follows:

- **Date of input datasets:** 2021 (generally reflecting 2020/21 conditions)
- **Traffic volumes (AADT):** CoreLogic National Road Centreline dataset; 24h traffic data entered in CRTN as 18h traffic
- **Heavy vehicles (%HV):** CoreLogic National Road Centreline dataset
- **Speed:** CoreLogic National Road Centreline dataset; Posted speed limit
- **Road surface:** Surface types as recorded in NZTA RAMM database; Surface corrections in accordance with NZTA Guide to state highway road surface noise, including a -2 dB correction from CRTN to a reference AC-10 surface.
- **Bridge locations:** CoreLogic National Road Centreline dataset; Height interpolated from start and end points
- **Terrain:** LIDAR where available; NZ School of Surveying 15 m nationwide DEM in other areas; Data combined in GIS to produce 1 m×1 m DEM for noise model
- **Building footprints:** LINZ NZ Building Outlines dataset
- **Building heights:** Where available, calculated from DSM median height minus DEM median height, otherwise: 6 m residential / 8 m commercial
- **Noise barriers:** None modelled

### 2.3. WDC-OP Construction Noise Limits

The permitted construction noise limits are specified within Rule Noise R4 of the WDP-OP as shown below.

NOISE-R4	Noise - construction	
All zones	<p><b>(1) Activity status: PER</b>  <b>Where:</b>            (a) Noise from any construction, maintenance, or demolition activity that is measured, assessed and managed in accordance with the requirements of NZS6803:1999 'Acoustics - Construction Noise'.</p>	<p><b>(2) Activity status where compliance not achieved: RDIS</b>            (a) Effects on amenity values;            (b) Hours and days of construction;            (c) Noise levels;            (d) Timing and duration; and            (e) Methods of construction.</p>

As construction activities are expected to take place between the hours of 0730 – 1800 Monday to Saturdays, the following noise limits specified within NZS 6803: 1999 are applicable for “long term” projects lasting longer than 20 weeks:

- 70 dB  $L_{Aeq(30min)}$  and 85 dB  $L_{Amax}$
- Measured and assessed at 1m from the receiver façade in accordance with the methodology stated within NZS 6803: 2008

## 2.4. Construction Vibration

Construction vibration limits are not provided within the WDP-OP, however Appendix I Vibration provides an overview of typical vibration levels and associated effects (applicability to operational or construction vibration is not specified).

In the absence of specific construction vibration limits within the WDP-OP, the following vibration limits are recommended based on similar rules in other NZ district Plans:

- Building Damage: DIN 4150-3 Line 2 (Residential)
- Human Amenity:
  - PPV 2mm/s at all times, or
  - PPV 5mm/s for no longer than 3 days in total, with prior notice

## 2.5. Resource Management Act 1991

The Resource Management Act 1991 (RMA) is the principal legislation regarding land use. Section 16 (1) of the RMA describes the overarching duty to limit noise emissions as follows:

### ***Duty to avoid unreasonable noise***

- (1) *Every occupier of land (including any premises and any coastal marine area), and every person carrying out an activity in, on, or under a water body or the coastal marine area, shall adopt the best practicable option to ensure that the emission of noise from that land or water does not exceed a reasonable level.*

## 3. Operational Noise Emissions

### 3.1. PA System / Crowd

The key noise generating activity related to the WTR events is related to the PA system for announcements, music and race alarms. The WTR events areas (Thoroughbred and Harness) will not incorporate large stands with raked seats, but will rely on ground and balcony level audience areas outside and around the events building. A PA system is also required at lower levels in the Horse Tie Ups areas for information only (non-entertainment coverage).

Noise levels shown from Resource Consent compliance measurements of other horseracing establishments (Te Rapa Racecourse, Hamilton) show the following levels from PA systems, crowds and starter alarms at distances of approx. 170m:

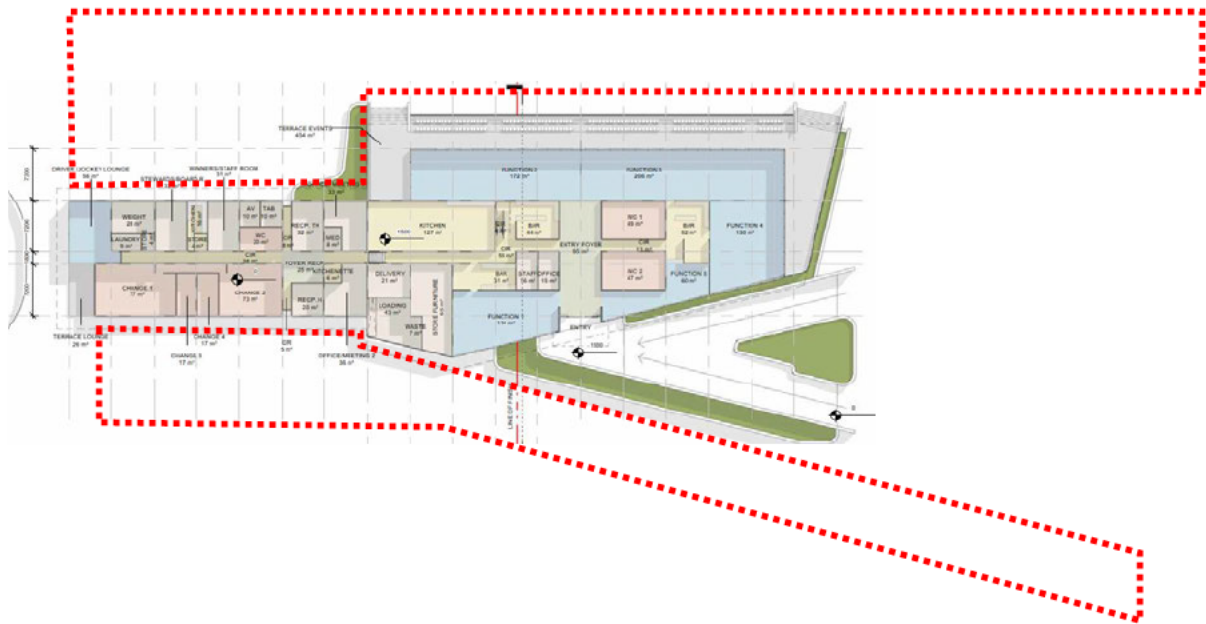
- ~50 - 70B  $L_{Aeq(15min)}$  across a typical race day event
- Average levels of 60dB  $L_{Aeq}$  across race day operations
- Maximum instantaneous levels up to 87dB  $L_{AFmax}$  across a whole race day

The levels above provide an approximation of the 15-minute average levels ( $L_{Aeq}$ ) compared to the maximum instantaneous levels ( $L_{AFmax}$ ) across a typical race day.

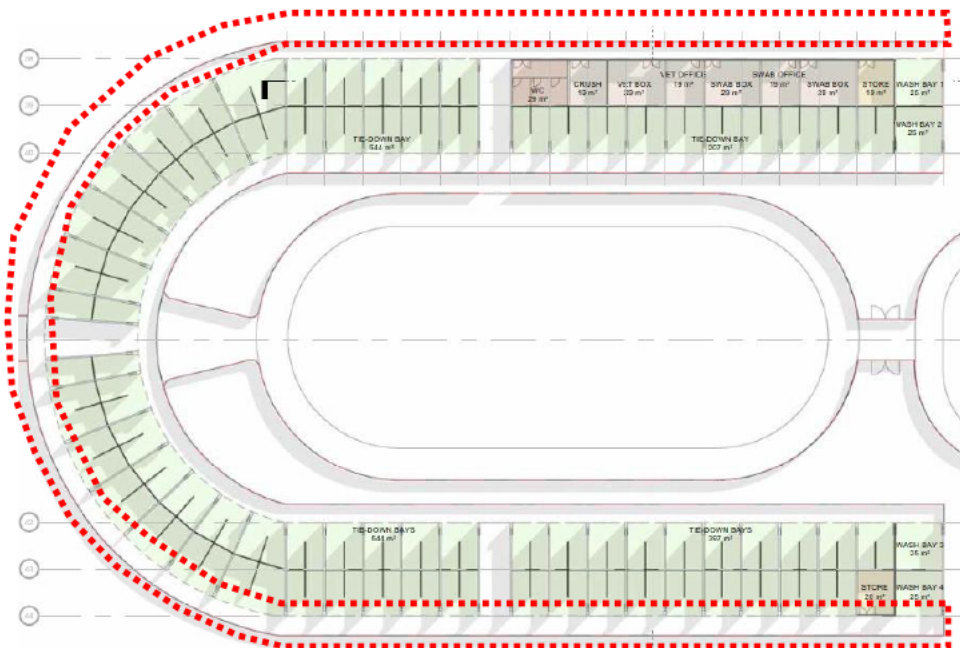
In addition to the above, a typical PA system noise level should be loud enough to provide adequate speech intelligibility above the crowd noise and can vary depending on the event type. A typical level of this type of event may reach levels of 80 – 85 dB  $L_{Aeq(10sec)}$  across audience areas of approx. 10m from the loudspeakers when in operation to achieve adequate speech intelligibility.

For the horse tie-up areas, lower levels of PA noise are expected to provide information only, reaching levels of 70-75dB  $L_{Aeq(10seconds)}$  at up to 5m distance.

In the absence of detailed PA system information, the following areas have been proposed to incorporate PA system coverage for the audience during either Thoroughbred or Harness race areas in addition to quieter PA for the tiedown areas. The noise assessment of the PA is also considered representative of additional noise inclusive of crowd cheering etc.



**Figure 2. Expected PA system coverage (dotted red line) for audience during Thoroughbred (top area) or Harness (bottom area)**



**Figure 3. Expected PA system coverage (dotted red line) for tiedown areas**

The 3D noise model has been input with typical PA loudspeaker directivities as point sources at approximately 5m spacings, 3m above ground level, representative of a typical PA coverage.

In accordance with NZS 6802: 2008, the following noise rating corrections are applicable:

- PA system: +5dBA correction for Special Audible Characteristics due to the tonal and impulsive character
- Adjustment for averaging:
  - Daytime period 0700 – 1900: – 5dBA as the PA will operate for less than 30% of the total daytime period
  - Evening period 1900 – 2200: -1dBA as the PA will operate for ~80% of the total evening period

The expected dB  $L_{AFmax}$  noise levels from the PA and or crowd have been predicted based on the typical level difference of +15dBA of the dB  $L_{Aeq15min}$ .

These have been input with a typical speech spectrum, calibrated to the following reference levels:

**Table 3. PA system calibration setting for 3D noise model**

Area	Continuous PA calibration level, dB $L_{Aeq(10sec)}$	Daytime Period 0700 - 1900 dB $L_{Aeq(15min)}$ / dB $L_{AFmax}$	Night time Period 1900 - 2200 dB $L_{Aeq(15min)}$ / dB $L_{AFmax}$	Calibration distance
Thoroughbred and Harness outdoor audience areas	80	77 / 92	81 / 92	10m
Tiedown area	70	67 / 82	71 / 82	5m

Noise emissions from the WTR have been assessed using CadnaA 3D modelling software based on the latest masterplan drawings (DesignGroup Stapleton Elliott April 2026) and GIS data sourced from the LINZ data portal.

No ground contours have been provided for proposed WTR site and the existing ground contours have been assumed. The site and surrounding areas are generally flat with minimal changes in ground height, generally representative of the proposed WTR site; however, any existing earth bunds to be removed or proposed earth bunds are not taken into account. The final WTR ground contours must be updated into the 3D model during a future Substantive application.

The 3D noise model contours of the PA system noise are presented in Appendix B, with the ratings presented in Appendix C.

### 3.2. Vehicle Noise

Noise from vehicles is expected to comprise vehicles entering and exiting the site and parking.

To provide a detailed assessment of vehicle noise, peak 1hr traffic flows would be required on each vehicle route and car park in addition to the total expected daily (related to the total capacity of the large, medium and small events).

In the absence of detailed traffic information, the following assumptions have been made:

- Vehicles entering and exiting on Pencarrow Road to gain access to either of the car parking spaces, approx. 70% use the 1200 or 350 capacity car parks and 30% continue to use the 480-capacity car park
- Sound power of  $L_w^1$  47dBA per metre for a single movement on the access roads at 10-20km/hr over a 1hr period
- For each of the car parks, approximately 50% of the total capacity used within a peak 1-hour period
- Parking manoeuvres based on a sound power of  $L_w^1$  69dBA for a single parking manoeuvre over a 1-hour period
- During the daytime period of 0700-1900, a -5dBA adjustment for Averaging is applicable to both car parks and access roads
- During the evening period of 1900 - 2200, a -1dBA adjustment for Averaging is applicable to both car parks and access roads
- Car parks modelled as an area source 1m above ground level
- Access roads modelled as a line source 1m above ground level

The reference sound powers for each vehicle noise source are shown in the table below for both day and evening periods. The evening parking noise levels are higher due to the adjustment for averaging across the daytime periods.

**Table 4. Reference vehicle sound power levels within 3D noise model**

Source	Daytime Period	Evening Period
1200 capacity car park at 50% capacity	95 dB $L_w$	98 dB $L_w$
350 capacity car park at 50% capacity	89 dB $L_w$	93 dB $L_w$
480 capacity car park at 50% capacity	90 dB $L_w$	94 dB $L_w$
Main access road off Pencarrow Road	72 dB $L_w$ per meter	66 dB $L_w$ per meter
Connecting access road to southern car park	76 dB $L_w$ per meter	70 dB $L_w$ per meter

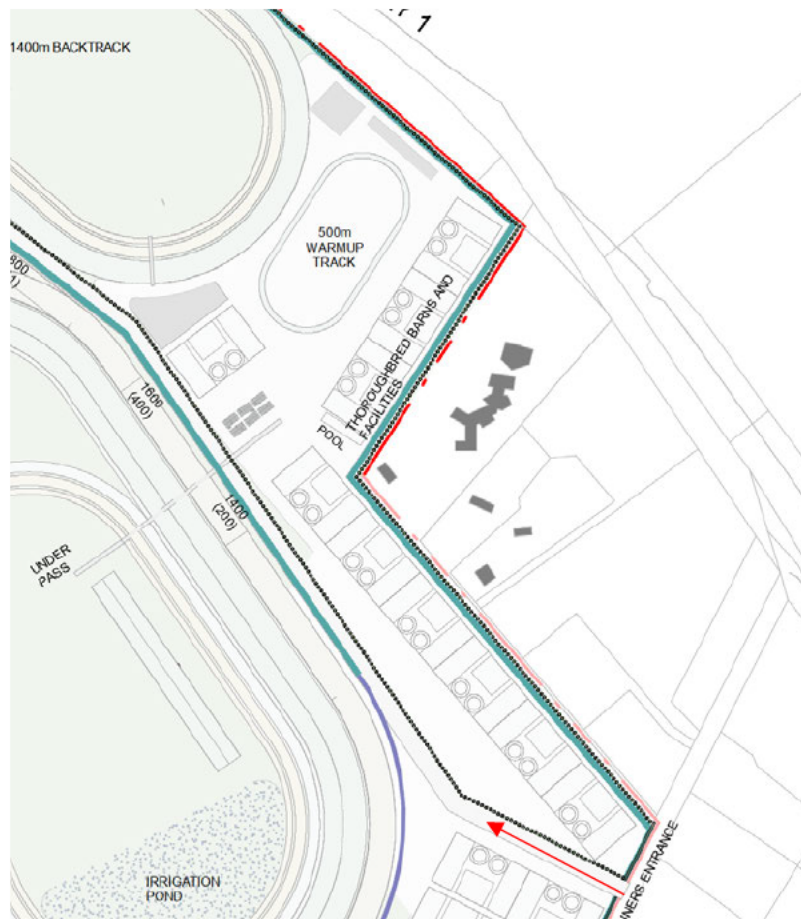
The 3D noise model contours of the vehicles and parking are presented in Appendix B, with the ratings presented in Appendix C.

<sup>1</sup> BayLfU parking noise study – Cars entering/existing car park or parking manoeuvres reference noise levels

### 3.3. Training Activities

#### 3.3.1. Duncan Road Entrance

The proposed training area in the north-east corner of the site include an entrance off Duncan Road, with internal access road and thoroughbred barns and facility buildings as shown below.



**Figure 4. Training area barns and facilities with entrance off Duncan Road (entrance marked as red arrow)**

The training activities are proposed between 4:30am and 11am in which the lower night time noise limits of 40dB  $L_{Aeq}$  are applicable in addition to the daytime limits.

The key noise generation from the training activities are expected to be due to vehicles and trailers / floats arriving on site and loading/unloading. The predicted noise levels from up to 250 vehicles entering the trainers access road comply with the lowest 40dB  $L_{Aeq}$  limit at all receiver sites due to the proposed barn buildings on each side providing screening.

Other noise generating activity related to the training is not expected to be significant, however, vocal commands / whistles during training, or horse desensitisation (training the horses to be desensitised from controlled high noises) could generate appreciable instantaneous noise levels.

In the absence of detailed training activities and noise measurements, an assessment of the other training activity noise cannot be provided. With restriction of high noise activities during training, it is expected that training activities will achieve the permitted night time noise limits of 40dB LAeq at all receiver sites. Consideration of the dB LAfmax noise will be required to ensure potential noise effects are controlled.

Due to the proposed night time training activities, the use of a PA system or amplified sound system should be restricted to minimise potential noise effects.

### 3.3.2. Hooker / Pencarrow Road Entrance

An additional training area for Harness activities is proposed in the south-west corner of the site as shown below., with access from the main entrance on Pencarrow Road or Hooker Road.

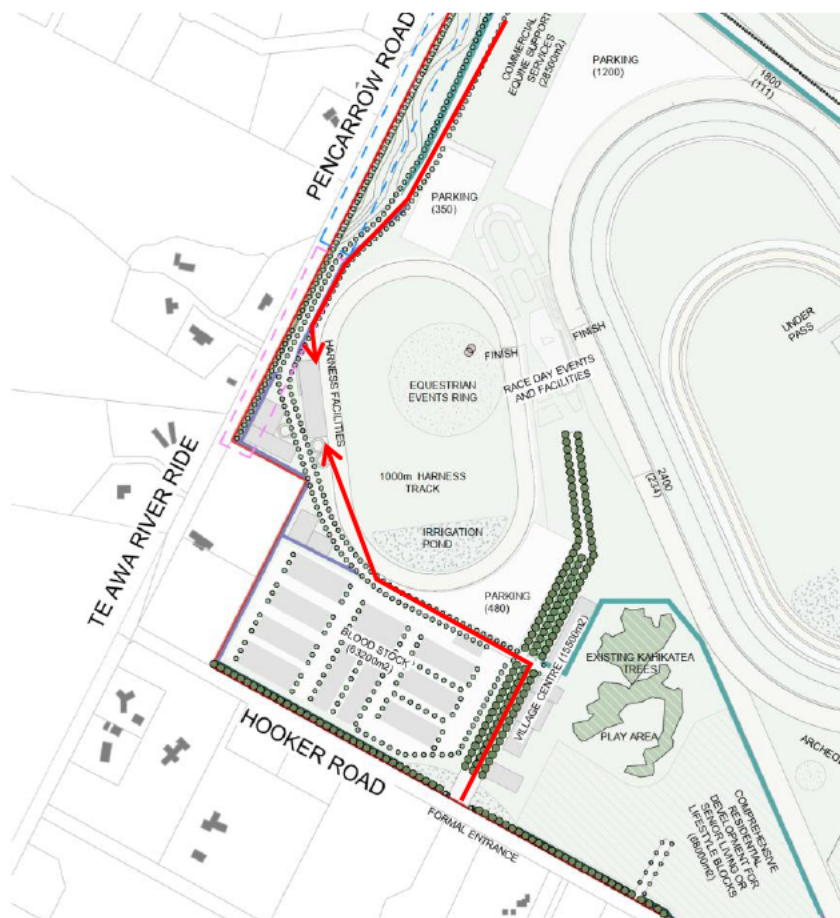


Figure 5. Harness Training Area (access routes shown as red arrow)

These access roads incorporate less screening from existing buildings and are closer to the residential receivers on Pencarrow Road. It is expected that the GRUZ night time noise limit of 40dB  $L_{Aeq}$  may be exceeded for training events with up to 250 attendees, but not during training events with a lower number of attendees. Once detailed traffic information is available, further investigation can be carried out as to option to ensure compliance with the limits (managed access routes etc).

Detailed noise measurement of horse training should be carried out to investigate the instantaneous  $L_{max}$  levels during Harness training to consider the potential effects to nearby residential receivers.

#### 4. Existing Ambient Noise Levels – SH1

The rural environment is expected to incorporate minimal noise activity, with SH1 to the north being the predominant source of background noise across the site and at all receiver sites.

Noise from SH1 has been predicted to all receiver sites using the 3D noise model based on the following NZTA traffic data:

- Road ID: 3943, Cw ID: 10707, App Region: All SH March 2026
- Road Speed: 110 km/hr
- AADT: 17544 (est) 25/1/2026
- 9.4 % heavy goods vehicles
- Porous asphalt grade 10

The predicted SH1 dB  $L_{Aeq(24hr)}$  traffic noise levels are presented in the results table in Appendix C for comparison against the operational noise predictions. The traffic noise levels at receivers surrounding the site are predicted to range from 39 - 65 dB  $L_{Aeq(24hr)}$ .

The typical differences between a whole day dB  $L_{Aeq(24h)}$  highway level compared to a 1 hour daytime or evening period (when the race track will operate) is shown below:

- Daytime or evening dB  $L_{Aeq(1hr)}$  : 1-3 dBA higher than the 24 dB  $L_{Aeq(24hr)}$

Based on the above, traffic noise levels during the day or evening periods when the racecourse is in operation may reach levels of 42 - 68dB  $L_{Aeq(1hr)}$  at receivers surrounding the site.

#### 5. Residential and Commercial Activities

The proposed WTR development will incorporate an area for residential lifestyle blocks to the south-east corner of the site. A residential area for senior living and a commercial area is also proposed in the southern central areas.

These activities are subject to the following acoustic considerations:

### Residential

- Reverse sensitivity to NZTA from SH1 (WDP-OP Rule APP1, 8)
  - The noise contours in Figure 19 of Appendix B show the predicted SH1 traffic noise across the proposed residential areas of the WTR site ranging from 41 – 47 dB  $L_{Aeq(24hr)}$ . With the 3dB safety factor in accordance with Rule 8 of APP1, this results in predicted levels of 44 – 50  $L_{Aeq(24hr)}$ . With an open window being used for ventilation providing 15dBA – the internal noise criterion of 35dB  $L_{Aeq}$  in bedrooms and 40dB  $L_{Aeq}$  in habitable rooms can be achieved.
  - Based on the above, no specific acoustic upgrades are required to ensure the reverse sensitivity noise effects to NZTA are controlled.
- Reverse sensitivity to WTR from racecourse PA noise
  - The noise contours in Figure 15 and Figure 16 of Appendix B show predicted PA noise reaching rating levels of 43dB  $L_{Aeq}$  during the daytime periods, achieving the permitted GRUZ limit of 50 dB  $L_{Aeq}$ . During the evening periods, rating levels up to 52dB  $L_{Aeq}$  are predicted, exceeding the GRUZ limit of 45dB  $L_{Aeq}$  by 7dBA
  - Instantaneous noise levels of up to ~58-63dB  $L_{AFmax}$  are expected from occasional starting alarms or peaks in the PA announcements, 11-16dBA above the background highway noise levels of ~47 dB  $L_{Aeq}$ . This demonstrates that instantaneous noise through the PA system will be clearly audible for outdoor living areas or internal spaces with windows open for ventilation (resulting in regular internal PA noise levels of up to 43-48dB  $L_{AFmax}$ )
  - To mitigate the potential for annoyance during the day or evening periods, a condition of consent may be included for the proposed residential activities (on the WTR site) requiring an alternative method of ventilation / cooling to allow windows to remain closed should the occupants require respite from noise. With standard lightweight building constructions and windows closed, providing ~25dBA reduction of external noise. This would result in internal noise levels of 33-38 dB  $L_{AFmax}$ , below the World Health Organisation recommended guideline of 45dB  $L_{AFmax}$  in bedrooms to avoid sleep disturbance (more sensitive than typical day or evening residential activities)
  - With the inclusion of a consent condition to ensure residential buildings are adequately designed to control effects, a “no complaints covenant” is also recommended to protect WTR from reverse sensitivity noise effects.

- Further investigation into minimising the PA system noise level, frequency of operation or restriction on operational times may also be considered during a substantive application stage, thus reducing the reverse sensitivity requirements.
- Reverse sensitivity to commercial areas on WTR site
  - Noise from the commercial areas (discussed below) will be required to meet the GRUZ limits at existing residential receivers to the south. As this is the same distance to the proposed WTR residential areas, this will control potential commercial noise to the WTR residential sites.
  - If the commercial activities are given the same GRUZ limits at the WTR residential sites, reverse sensitivity noise effects will be controlled.

### **Commercial Activities**

- Noise Emissions
  - No details are currently provided for the expected commercial activities on site. The noise generation or sensitivity of commercial activities can vary i.e. office/healthcare is considerably more sensitive and quieter compared to than hospitality or entertainment.
  - The closest existing receivers to the south are located approximately 150m to the south, which is approximately the same distance to the proposed residential areas on the WTR site.
  - As noise from the commercial activities would be required to meet the GRUZ to the nearest existing the commercial, these limits should also be applied to the new WTR residential areas.
- Reverse sensitivity to WTR from racecourse noise
  - The predicted PA noise levels are expected to reach similar noise levels as the residential areas; however, commercial activities are considerably less sensitive (not including office use).
  - A condition of consent may be considered requiring any noise sensitive commercial activity such as office use to incorporate an alternative method of ventilation / cooling to allow windows to remain closed.

## **6. Construction Noise and Vibration**

The majority of the construction activities for the proposed WTR are expected to be due to the earthwork phases such as removal and replacement of fill to design levels. Other activities include compaction using vibratory rollers, paving works and concrete pouring for the building foundations. As the majority of the buildings related to the racetrack are not more

than 1-2 storeys heavy piling methods are not expected to be required. Similarly, blasting or rock breaking is not expected.

The proposed commercial or residential areas to the south of the project site may incorporate buildings with significant foundations or piles required, however the scale of these building is not yet determined.

Source noise data for representative construction plant has been selected from NZS 6803: 1999, which makes reference to the British noise standard BS 5228-1: 1997. Where appropriate, noise levels have been selected from the updated BS 5228-1: 2009 version of the standard, or based on previous BBA measurement data.

The distances at which compliance with the 70dB  $L_{Aeq}$  / 85dB  $L_{Amax}$  are provided for each activity assuming no noise screening, or, a 2m high temporary noise barrier that provides at least 10dBA reduction of noise where the barrier blocks the line of sight between the construction activity and receiver facade. Compliance distances assume a +3dB façade reflection in accordance with NZS 6803: 1999.

**Table 5. Construction plant / activities, source reference levels and compliance distances**

Construction activity	Noise level ref.	Sound Pressure Level at 10m dB $L_{Aeq}$ / $L_{Amax}$	Compliance Distance, m	
			No Barrier	2m Noise Barrier (10dBA reduction)
21t Excavator	BBA database	71 / 86	16	5
28t Dozer	BS 5228: 2009 C1 11	79 / 94	40	13
25t Wheeled loader	BS 5228: 2009 C2 26	79 / 94	40	13
25t Grader (moving ~10km/hr)	BBA database	81 / 96	50	16
Trucks removing / bringing material to site	BS 5228: 2009 C11 6	63 / 78	6	2
12t Vibratory Roller	BS 5228: 2009 C5 21	80 / 95	45	14
Concrete truck and pump	BS 5228: 2009 C4 24	75 / 90	25	8
21t Excavator mounted rotary bored piling rig for	BBA database	71 / 86	16	5

Construction activity	Noise level ref.	Sound Pressure Level at 10m dB L <sub>Aeq</sub> / L <sub>Amax</sub>	Compliance Distance, m	
			No Barrier	2m Noise Barrier (10dBA reduction)
timber retaining walls				

The table above shows that the majority of construction activities are capable of achieving the permitted limit of 70dB L<sub>Aeq</sub> / 85 dB L<sub>Amax</sub> at distances under 16m if used in conjunction with 2m high noise barriers.

In addition to noise barriers, construction of earth bunds may be considered to provide similar levels of screening for works in close proximity to receiver facades.

As the majority of the construction works will not be occurring in close proximity to receiver sites for long periods of time, the compliance distances are expected to be achieved for the majority of the construction period. Where works are proposed within these compliance distances, prior notice before works start, inclusion of noise barriers will reduce potential noise effects.

A construction noise and vibration management plan (CNVMP) is recommended to ensure the compliance distances are achieved, noise barriers or bunds are installed prior to works commencing. Where the compliance distances cannot be achieved, the CNVMP can detail the mitigation, management and liaison with receivers to minimise potential effects.

## 6.1. Construction Vibration

With the exception of the vibratory roller, all construction activities are not expected to generate significant levels of vibration. Further, these activities will occur at adequate distances from receiver buildings, complying with the recommended human amenity and building damage limits with a large factor of safety.

An 8t vibratory roller is expected to generate vibration levels of PPV 5mm/s at distances of approximately 5m, achieving the recommended building damage limits specified within Line 2 of DIN 4150 for building damage and the upper human amenity limit for works occurring for no longer than 3 days (with prior notice).

The inclusion of a CNVMP will be an effective tool to ensure adequate separation distances are maintained between receivers and the use of the vibratory roller, or notice to occupants is provided for works in close proximity.

## 7. Assessment of Effects and Mitigation Methodology

The acoustic assessment has considered the noise emissions from the proposed WTR to existing residential receivers surrounding the site. This showed compliance with the daytime GRUZ limits of 50  $L_{Aeq}$  for all receivers and up to 9dBA exceedance of the evening criterion of 45dB  $L_{Aeq}$  for receivers to the west and south-west. These ratings include a 5dBA penalty for Special Audible Characteristics to account for the tonal and impulsive nature of PA noise.

The predominant source of noise and potential for noise effects from the WTR site is due to the PA system and crowd, expected to operate from 1230 – 17:30 for Thoroughbred events and 1730 – 2130 for Harness Events, Mondays to Saturdays.

During the daytime periods, PA and crowd noise rating levels up to 49dB  $L_{Aeq}$  are expected to result in instantaneous noise levels of 64 – 69 dB  $L_{AFmax}$  for intermittent periods during announcements, cheers or alarms. These occasional events are expected to be audible above the background noise levels for outdoor living areas and for internal areas with windows open. Whilst these noise levels are occasionally audible, these are adequately low as to not cause significant disturbance to typical daytime residential activities. These instantaneous levels are only marginally under the GRUZ night time limit of 75dB  $L_{AFmax}$ , which is designed to provide protection against sleep disturbance, however this limit is for single, one off events, not regularly occurring instantaneous noise levels such as from a racecourse operating for long periods.

During the evening periods, residential activities such as rest or relaxation are more sensitive to noise. It is expected that PA noise levels over the permitted limit of 45dB  $L_{Aeq}$  and up to 64 – 69 dB  $L_{AFmax}$  is more likely to result in annoyance or disturbance. If these events occurs for a limited number of times per year, the overall effect is significantly reduced compared to regular event numerous times per week.

To ensure noise effects during the evening periods are adequately controlled, the following mitigation measures are recommended for consideration as part of the Substantive application:

- Reduction of the PA system amplification level to meet the GRUZ evening limits at all residential receivers. i.e. lower levels during the evening periods only
- Re-design of the PA system to optimise the directivity of the noise. This would incorporate loudspeaker coverage on the other sides of buildings to provide screening to receivers. Similarly, advanced beam steered column loudspeakers can be incorporated which focus the sound to the audience area whilst reducing the sound energy sent outside of the audience area.

- Consideration of earth bunds surrounding the PA coverage areas where possible, reducing the noise level to the closest receivers
- Limiting the frequency of the PA system during the evening periods i.e. 10 times per year
- All of the above restrictions, calibration and monitoring can be implemented in an Operational Noise Management Plan. This would also include a complaints register should increased noise levels be experienced and detail the corrective actions to ensure noise levels meet the GRUZ limits.

Noise from training activities near the Duncan Road entrance is not expected to cause adverse effects with the restriction of the PA system, horse desensitisation, whistles/ alarms etc. For the training activities via Hooker / Pencarrow Road, potential noise effects are expected when high traffic volumes or if training activities generate increased noise. Further noise measurements are recommended to investigate training noise and alternative access routes can be considered to reduce noise.

Noise from vehicles on the site are expected to be adequately low as to not cause a disturbance to typical residential acoustic amenity due to the existing SH1 noise levels being within 1dB and very similar in character. Where receivers are located near to site vehicle entrances, consideration of noise barriers or earth bunds around access routes is recommended to provide increased reduction of vehicle noise.

With suitable sound insulation measures for the proposed residential activities on the WTR site, reverse sensitivity effects to WTR and the adjacent commercial area will be adequately controlled. No reverse sensitivity noise effects to NZTA are expected as the residential areas are not subject to significant highway noise.

Where commercial activities on site are required to meet the GRUZ limits at existing residential receivers and the new WTR site residential areas, no noise effects are expected.

Construction noise and vibration levels are not expected to result in adverse effects with the implication of noise barriers where necessary and CNVMP.

The following further work is recommended at the Substantive Application stage to consider reduced noise effects and suitable control measures:

- Detailed measurements of a similar, existing racetrack to establish maximum and minimum PA levels, crowd noise and any horse training noise activities.
- On-site measurements of existing SH1 at a range of existing receivers
- Update of 3D noise model to incorporate design level ground contours
- Investigation of earth bunds and screening to provide screening of noise levels

- Consideration of reduced PA system noise level and optimised PA speaker placement directivity (reducing noise to receivers)

## 8. Conclusion

An acoustic assessment has been provided for the proposed Waikato Thoroughbred Racetrack as part of the referral for the Fast Track Resource Consent application. This includes an assessment of PA/crowd noise, vehicle movements, training operations, and construction works in addition to the reverse sensitivity consideration of residential and commercial activities on the site. Based on the information currently available, predicted daytime noise levels comply with the GRUZ limits, while evening PA noise results in exceedances that are limited in extent and duration to the closest receivers.

The PA system and crowd noise is identified as the primary contributor to potential noise effects, particularly during evening periods. To reduce PA noise during the evening periods, consideration should be made to optimising the loudspeaker directivity and utilise buildings/bunds to provide increased screening of noise to receivers. Refinement of system design at the Substantive Application stage is recommended in addition to detailed noise surveys and updated 3D models.

Training activities during the night time periods have the potential to cause annoyance if nearby to residential receivers and further measurements are recommended to investigate typical levels. Similarly, vehicles for training activities could be managed to use alternative routes to reduce noise for event with increased volumes.

Reverse sensitivity effects for the proposed on-site residential and commercial areas can be effectively mitigated through standard construction methods and the provision of mechanical ventilation / cooling to allow windows to remain closed. These measures, combined with recommended covenants, will ensure compatibility between racetrack operations and future sensitive activities.

Construction noise and vibration can be managed through adherence to NZS 6803:1999 and implementation of a Construction Noise and Vibration Management Plan. With the recommended mitigation measures and further refinement at later design stages, the proposed development is capable of achieving acceptable noise outcomes for both existing and future receivers.

Appendix A. Site and Surrounding Area



Figure 6. Site location (dotted red outline) and WDP-OP Zoning



Figure 7. Site location (dotted red outline) and surrounding area (overview)

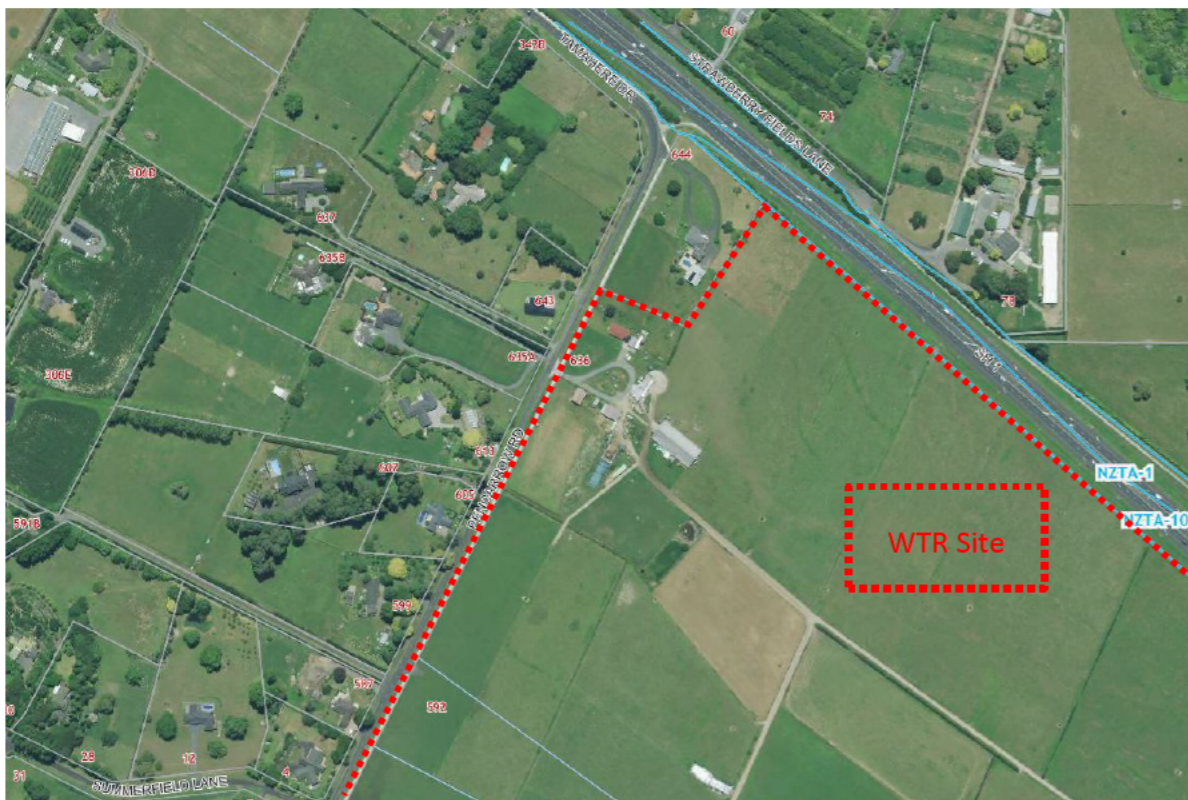


Figure 8. Site (dotted red line) and surrounding receivers 1 of 7)



Figure 9. Site (dotted red line) and surrounding receivers 2 of 7)



Figure 10. Site (dotted red line) and surrounding receivers 3 of 7)



Figure 11. Site (dotted red line) and surrounding receivers 4 of 7)

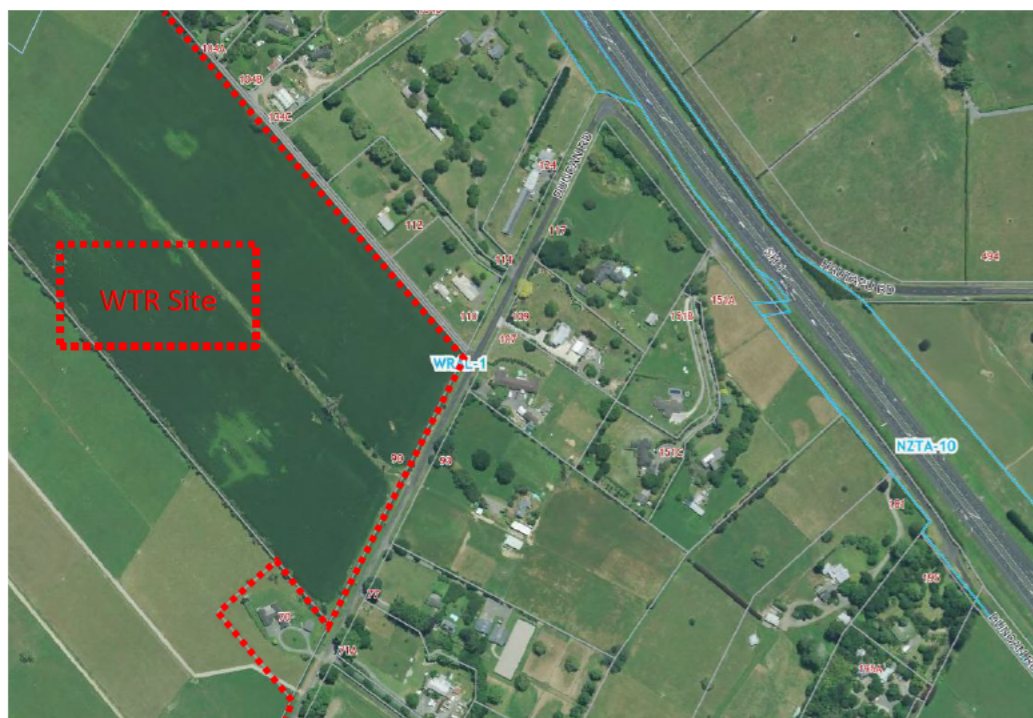


Figure 12. Site (dotted red line) and surrounding receivers 5 of 7

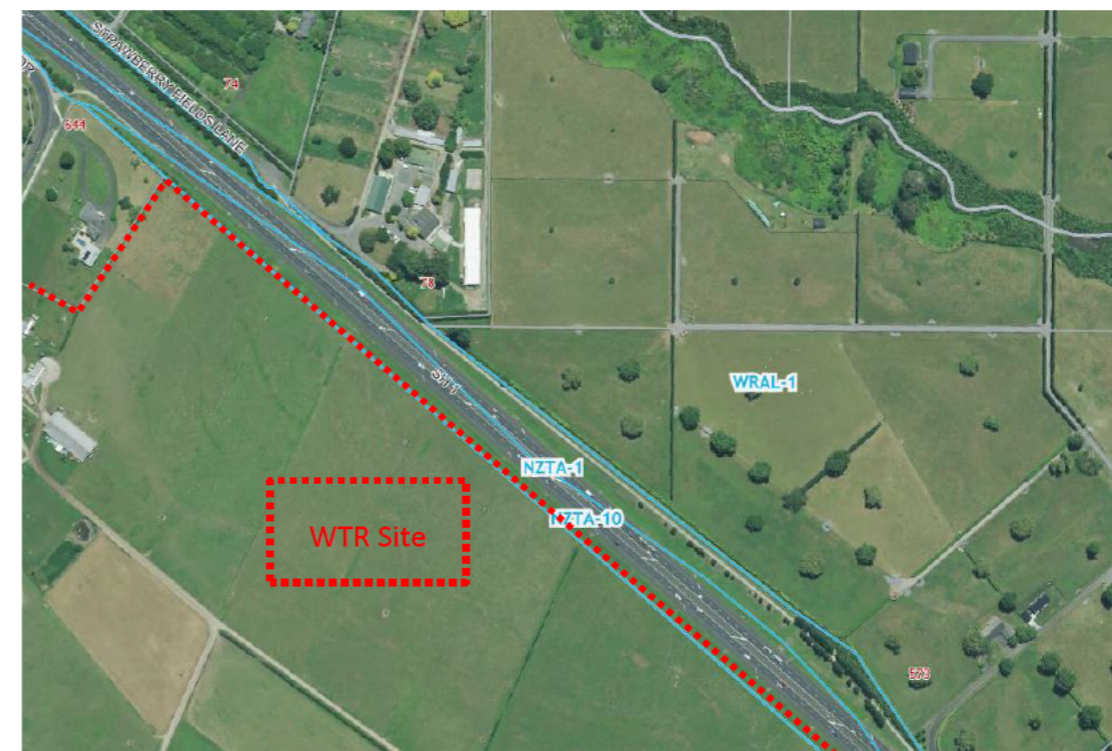


Figure 14. Site (dotted red line) and surrounding receivers 7 of 7



Figure 13. Site (dotted red line) and surrounding receivers 6 of 7

Appendix B: 3D Noise Model Predictions

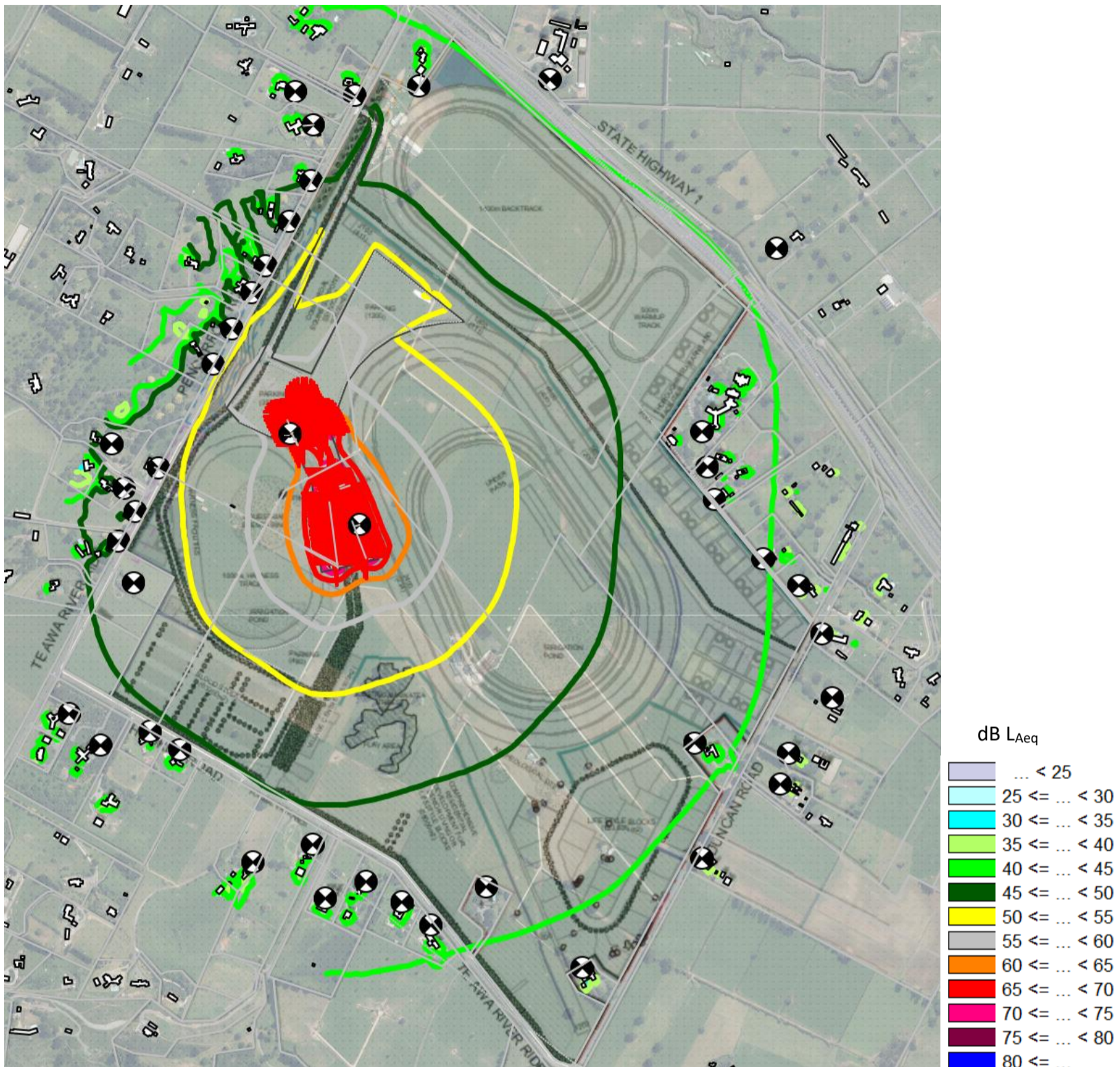


Figure 15. PA / Crowd 3D noise model prediction, Daytime period 0700 – 1900, dB LAeq

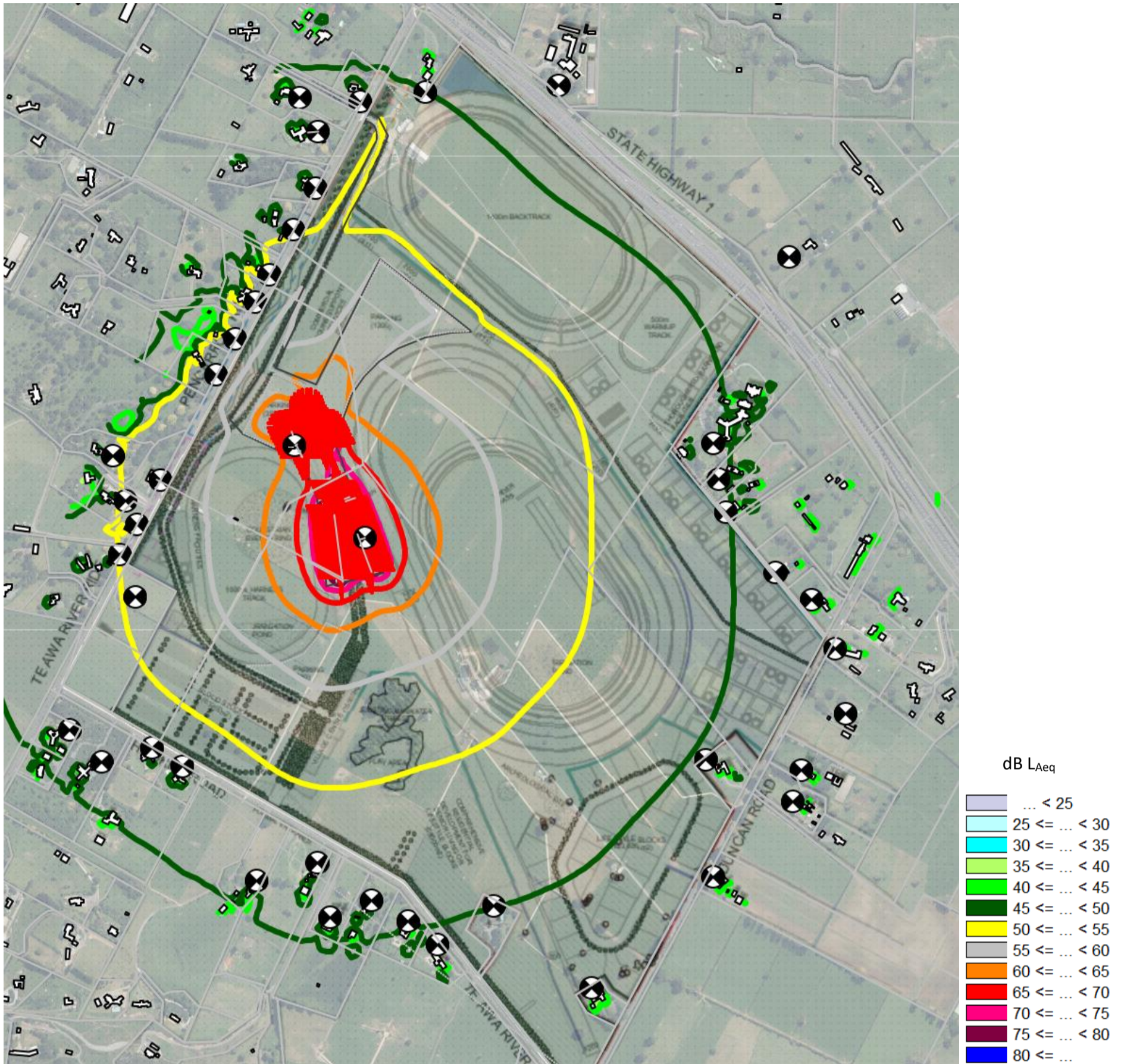


Figure 16. PA / Crowd 3D noise model prediction, Evening Period 1900 - 2200, dB LAeq

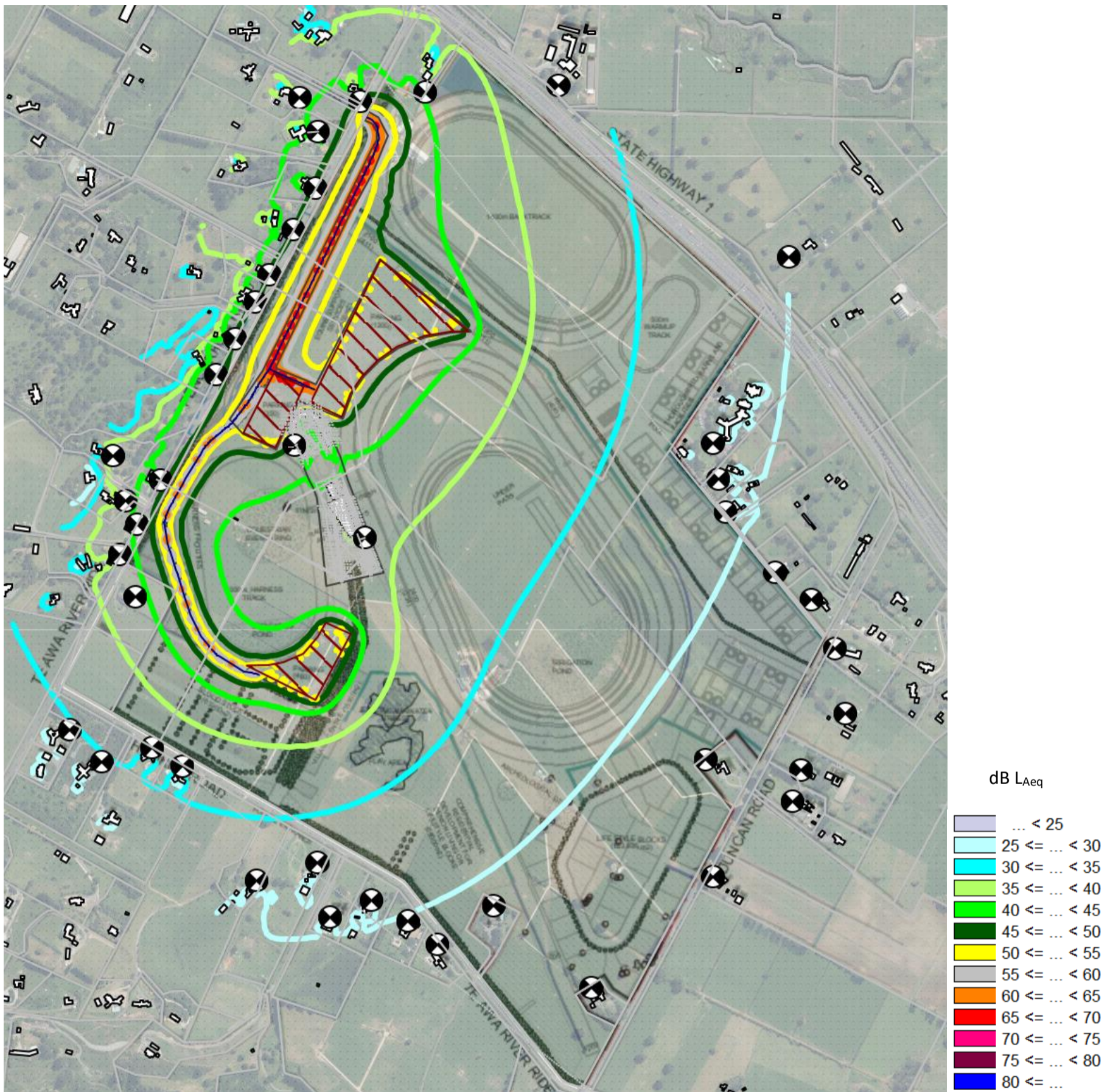


Figure 17. Parking / Vehicle 3D noise model prediction, Daytime period 0700 – 1900, dB LAeq

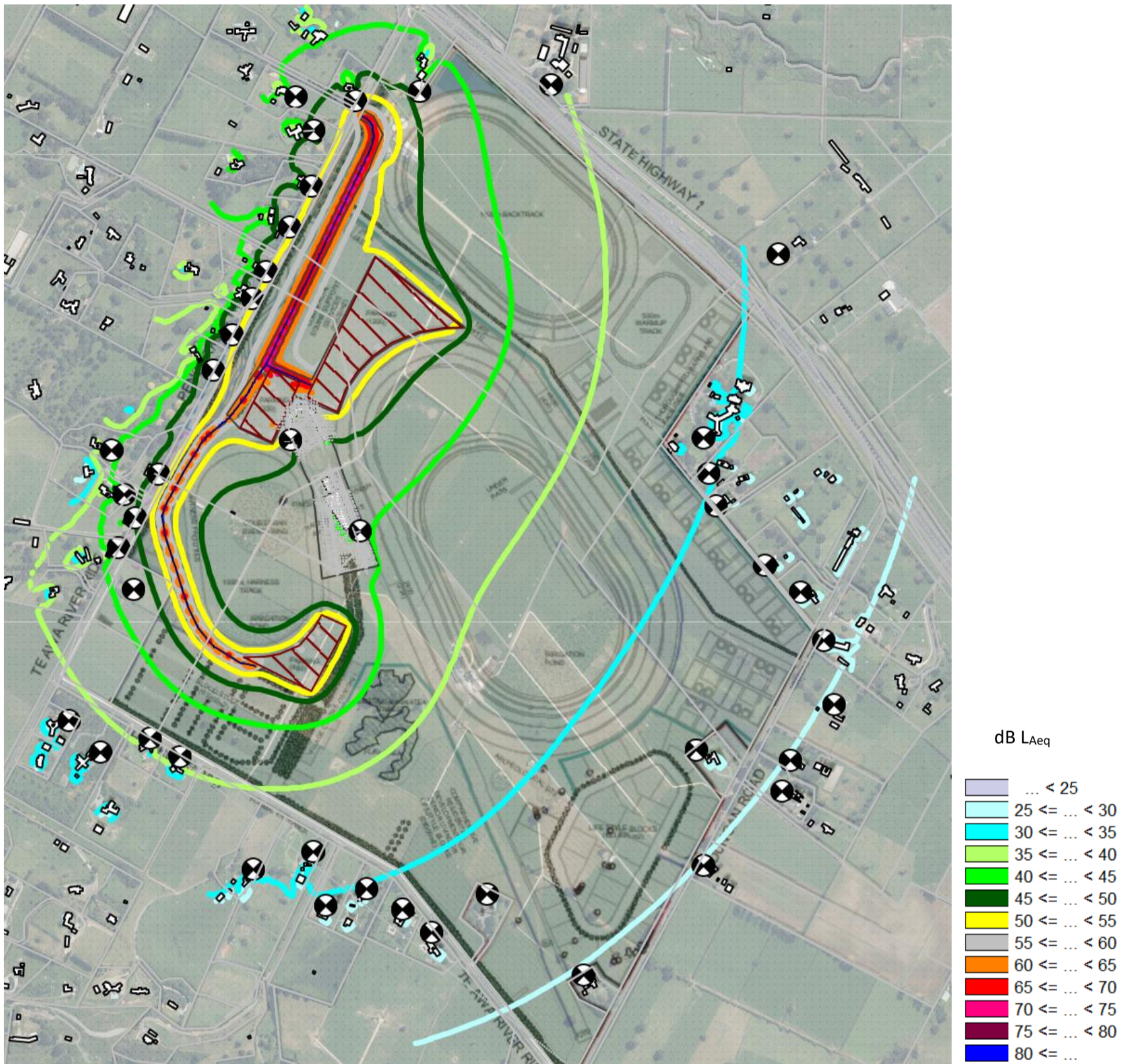


Figure 18. Parking / Vehicle 3D noise model prediction, Evening Period 1900 - 2200, dB LAeq

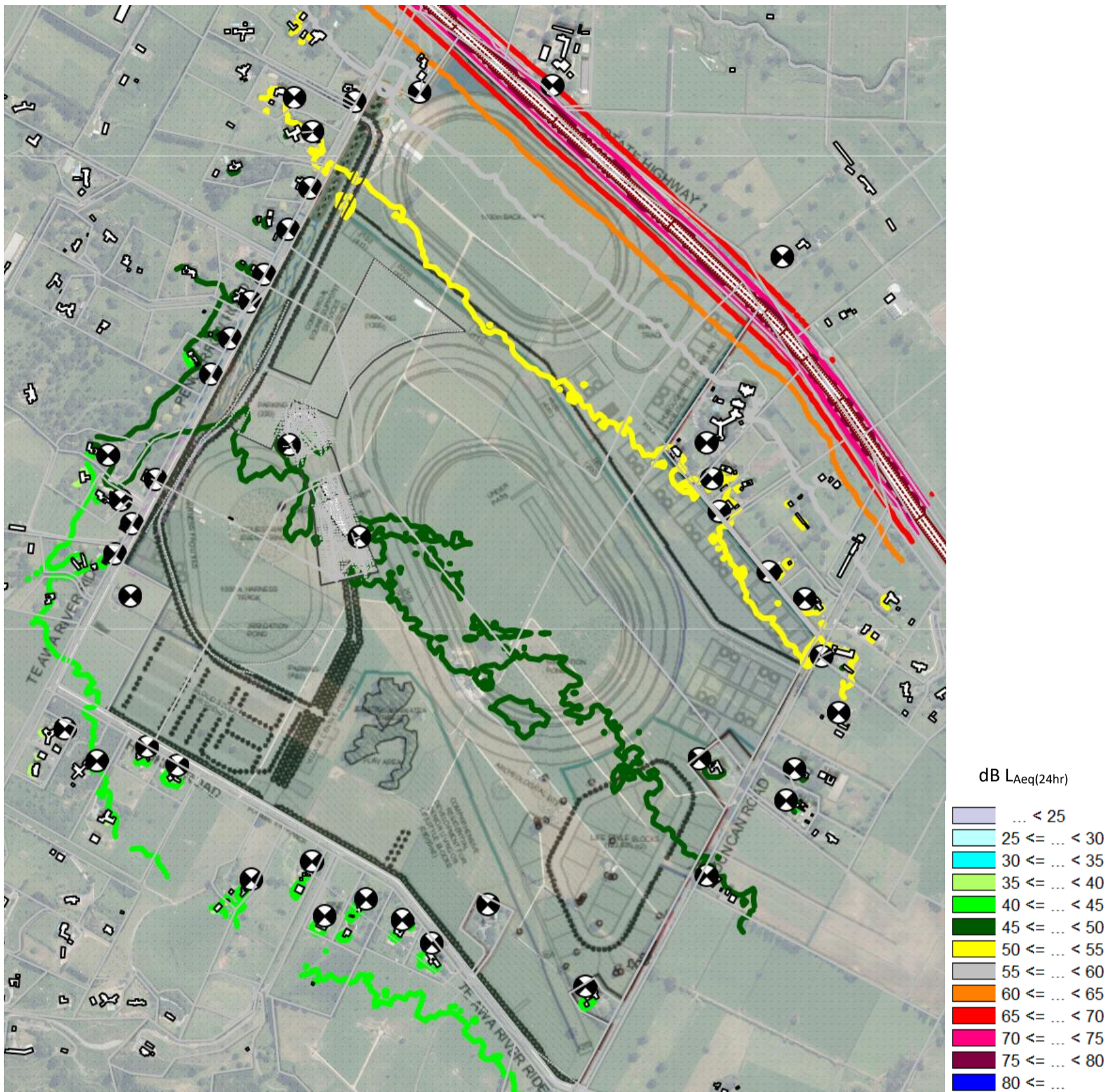


Figure 19. Predicted Existing SH1 Traffic Noise, dB LAeq(24hr)

## Appendix C. Operational Noise Predictions

Table 6. Predicted Operational Noise Level Results and existing SH1 background levels

Receiver	Daytime 0700 – 1900 dB LAeq			Evening 1900 – 2200 dB LAeq			Predicted Existing SH1 Noise dB LAeq(24hr)
	PA / crowd	Vehicles / Parking	Total	PA / Crowd	Vehicles / Parking	Total	
644 Pencarrow	42	39	44	45	43	47	56
643 Pencarrow Road	42	46	48	46	50	52	52
635B Pencarrow Road	42	41	45	46	43	48	51
635A Pencarrow Road	43	46	47	47	45	49	50
605 Pencarrow Road	45	45	48	49	50	52	49
599 Pencarrow Road	46	45	49	50	49	52	49
587 Pencarrow Road	48	45	50	51	49	53	48
4 Summerfield Lane	49	45	50	52	49	54	48
5 Summerfield Lane	49	44	50	53	49	54	47
563 Pencarrow Road	49	43	50	53	48	54	47
535 Pencarrow Road	49	35	49	52	47	53	43
557 Pencarrow Road	46	39	47	50	39	50	45
531 Pencarrow Road	47	41	48	50	43	51	43
525 Pencarrow Road	47	38	48	51	45	52	43
511C Pencarrow Road	47	30	47	50	42	51	41
526 Pencarrow Road	47	30	47	51	42	52	42
480 Pencarrow Road	43	32	43	46	34	46	39
14 Hooker Road	43	32	43	46	34	46	40
20 Hooker Road	44	27	44	48	36	48	41
34 Hooker Road	44	28	44	48	36	48	41
48A Hooker Road	42	26	42	46	31	46	42
62 Hooker Road	44	26	44	47	32	47	42
70 Hooker Road	42	25	42	46	30	46	41
72 Hooker Road	42	24	42	46	30	46	42
82 Hooker Road	42	21	42	45	29	45	42
100 Hooker Road	41	21	41	45	28	45	41
104C Duncan Road	42	21	42	45	30	45	49
101 Hooker Road	41	23	41	45	28	45	43
18 Duncan Road	39	21	39	42	25	42	43



Receiver	Daytime 0700 – 1900 dB LAeq			Evening 1900 – 2200 dB LAeq			Predicted Existing SH1 Noise dB LAeq(24hr)
	PA / crowd	Vehicles / Parking	Total	PA / Crowd	Vehicles / Parking	Total	
47 Duncan Road	39	21	39	43	25	43	45
70 Duncan Road	41	22	41	45	27	45	46
71A Duncan Road	39	23	39	42	25	42	47
77 Duncan Road	39	24	39	43	25	43	46
93 Duncan Road	38	26	38	42	25	42	49
108 Duncan Road	39	26	39	42	26	42	50
110 Duncan Road	39	27	39	43	27	43	51
112 Duncan Road	40	32	41	44	28	44	50
104B Duncan Road	42	39	44	45	30	45	50
104A Duncan Road	42	38	44	46	31	46	52
537 Hautapu Road	39	24	39	42	29	42	58
78 Hautapu Road	39	25	39	43	36	44	65