



Lot 822 Hazelmere Warehouse

Environmental Noise Impact Assessment

c/o Hesperia Property Pty Ltd

L3/338 Barker Road Subiaco WA 6904

Prepared by:

SLR Consulting Australia Pty Ltd

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Basis of Report

This report has been prepared by SLR Consulting Australia Pty Ltd (SLR) with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with c/o Hesperia Property Pty Ltd (the Client). Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid. SLR may have used AI in the preparation of this document.

SLR disclaims any responsibility to the Client and others in respect of any matters outside the agreed scope of the work.



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1.0 Introduction

SLR Consulting Pty Ltd (SLR) was commissioned by Hesperia Property Pty Ltd (the Client) to undertake an Environmental Noise Impact Assessment of a proposed Warehouse development on Lot 822 Stirling Crescent, Hazelmere.

This report details an assessment of predicted noise emissions from the proposed development to the surrounding receptors, and an assessment of compliance against applicable noise limits from the Regulations.

1.1 Site locality

The proposed warehouse development will be located at Lot 822 Stirling Crescent, Hazelmere. **Figure 1** presents an aerial image of the proposed location.

Figure 1 Warehouse locality



The proposed site development is intended to include warehouse building with adjoining office building, being a multi-user warehouse facility. Typical of warehouses, noise sources associated with the site include truck movements, forklifts and warehouse and office mechanical services.

2.0 Criteria

Project noise emissions are addressed by state noise policy in the form of the Western Australia Environmental Protection (Noise) Regulations 1997 ("EPNR", "the Regulations"). To achieve compliance with this policy, noise levels at nearby residential areas are not to exceed defined limits referred to as Assigned Noise Levels.

These limits are determined from consideration of prevailing background noise levels and 'influencing factors' that considers the level of commercial and industrial zoning in the locality. The influencing factor considers zoning and road traffic around the nearest sensitive receiver of interest, within two circles of each 100 m and 450 m radius.



A summary of the applicable noise limits is provided in **Table 1**. The specific assigned levels for each receiver are included in the sections of this report which detail the specific noise assessment for each site.

Table 1 Summary of assigned noise levels

Part of premises receiving noise	Time of day	Assigned level, dB		
		L _{A10}	L _{A1}	L _{Amax}
Noise Sensitive premises at locations within 15 metres of a building directly associated with a noise sensitive use	0700 to 1900 hours Monday to Saturday ('Day')	45 + IF	55 + IF	65 + IF
	0900 to 1900 hours Sunday and public holidays ('Sundays')	40 + IF	50 + IF	65 + IF
	1900 to 2200 hours all days ('Evening')	40 + IF	50 + IF	55 + IF
	2200 hours on any day to 0700 Monday to Saturday and 0900 hours Sunday and public holidays ('Night')	35 + IF	45 + IF	55 + IF
Noise Sensitive premises at locations further than 15 metres from a building directly associated with a noise sensitive use.	All hours	60	75	80
Commercial premises	All hours	60	75	80
Industrial and utility premises	All hours	65	80	90

If noise emitted from any premises when received at any other premises cannot reasonably be free of intrusive characteristics of tonality, modulation and impulsiveness, then a series of adjustments must be added to the emitted levels (measured or calculated) and the adjusted level must comply with the assigned level. The adjustments are detailed in **Table 2** and are further defined in Regulation 9 (1) of the Environmental Protection (Noise) Regulations 1997.

Table 2 Adjustments to the emitted levels

Noise characteristic	Definition	Adjustment if present (Note ¹)
Tones	Where the difference between the A weighted sound pressure level in any one third octave band and the arithmetic average of the A weighted sound pressure levels in the two adjacent one third octave bands is greater than 3 dB in terms of L _{Aeq,T} where the time period T is greater than 10% of the representative assessment period, or greater than 8 dB at any time when the sound pressure levels are determined as L _{ASlow} levels.	+5 dB
Modulation	A variation in the emission of noise that – - Is more than 3 dB L_{AFast} or is more than 3 dB L_{AFast} in any one third octave band; - Is present for at least 10% of the representative assessment period; and, - Is regular, cyclic and audible.	+5 dB
Impulsiveness	Present where the difference between the L _{APeak} and L _{Amax} is more than 15 dB when determined for single representative event.	+10 dB



Note 1 where noise emission is not music, these adjustments are cumulative to a maximum of 15 dB.

3.0 Methodology

Noise emissions from the operation of the proposed site were modelled using ISO 17534¹ compliant software (SoundPLAN v8.2).

3.1 Site specific noise model

A noise model was developed for the site as follows:

- Detailed 3-dimensional representation of the site terrain model and local environment inclusive of key receptor locations.
- Receiver buildings digitised in the model and single point receivers were established at 1.5 m above the ground floor level at representative premises.
- Buildings identified from aerial imagery as non-sensitive, including site buildings such as warehouses, and property fences were retained in the noise model as they could provide screening on noise levels.
- The buildings and representative noise sources for the proposed development were incorporated into the noise model.
- Ground absorption coefficient of 0.6, which is considered reasonably representative of the proportion of soft and hard ground areas in each direction.

Noise screening effects from trees and foliage have not been modelled.

3.2 Calculation of noise levels

The model applied the 'CONCAWE' method for calculating outdoor noise propagation. CONCAWE started with a group of oil refining companies developing methods to assess environmental emissions in 1963, a concatenation of "**CON**servation of **C**lean **A**ir and **W**ater in **E**urope". The group developed an empirical method of modelling noise emissions from refineries to the far field, which has since evolved and continues to be used in 2023.

This method is accepted as being appropriate for modelling of projects of this type in Western Australia. The CONCAWE method permits calculation of noise levels with meteorological conditions favourable for downwind propagation of noise (wind speeds between approximately 1 m/s and 5 m/s) or under a moderate ground-based temperature inversion.

Both the SoundPLAN modelling software and the CONCAWE method are widely applied in Western Australia for the prediction of noise from industrial and commercial premises.

3.3 Noise sensitive receivers (NSR)

Representative residential receptors have been determined for the proposed development. These receptors are shown in **Figure 2**. Compliance at these identified receptors is predicted to result in compliance at all other receptors in the vicinity.

¹ ISO 17534-1:2015 Acoustics — Software for the calculation of sound outdoors — Part 1: Quality requirements and quality assurance



Figure 2 Residential receptor locations.



Under the Regulations, 'highly sensitive areas' are residential buildings or within 15 metres of those buildings within the premises.

The assigned levels include the influencing factor (IF) derived based on the proximity of the receivers to industrial and commercial zoned areas, and major and secondary roads. For the purposes of determining the IF in accordance with Schedule 3 of the Environmental Protection (Noise) Regulations 1997, land use classifications have been derived from the Midland Redevelopment Area planning framework.

The site is located within SUZ 15 zone according to the City of Swan Local Planning Scheme No 17, with some areas north of the site with planning under the Midland Redevelopment Area under Development WA.

The Local Planning Scheme LSP17 has been copied from the City of Swan Intramaps planning layer, with interpreted zoning for the MRA area annotated. **Figure 3** shows Type B (commercial) zoning in yellow, Type A (industrial / infrastructure) in purple and urban in beige, reflecting the classification types used to determine 'influencing factor' in accordance with noise regulations.

For the Midland Private Hospital, Lot 787 is identified within a mixed-use/commercial precinct, and is therefore classified as commercial land use (Type B), notwithstanding that the development comprises a hospital, which is treated as a noise-sensitive premises for the purposes of assigned levels.



The map displays a residential area with various land use zones and infrastructure. Key features include:

- Land Use Zones:**
 - Yellow:** High-density residential (e.g., SUZ 20, SUZ 21, SUZ 22, SUZ 23, SUZ 24, SUZ 25, SUZ 26, SUZ 27, SUZ 28, SUZ 29, SUZ 30, SUZ 31, SUZ 32, SUZ 33, SUZ 34, SUZ 35, SUZ 36, SUZ 37, SUZ 38, SUZ 39, SUZ 40, SUZ 41, SUZ 42, SUZ 43, SUZ 44, SUZ 45, SUZ 46, SUZ 47, SUZ 48, SUZ 49, SUZ 50, SUZ 51, SUZ 52, SUZ 53, SUZ 54, SUZ 55, SUZ 56, SUZ 57, SUZ 58, SUZ 59, SUZ 60, SUZ 61, SUZ 62, SUZ 63, SUZ 64, SUZ 65, SUZ 66, SUZ 67, SUZ 68, SUZ 69, SUZ 70, SUZ 71, SUZ 72, SUZ 73, SUZ 74, SUZ 75, SUZ 76, SUZ 77, SUZ 78, SUZ 79, SUZ 80, SUZ 81, SUZ 82, SUZ 83, SUZ 84, SUZ 85, SUZ 86, SUZ 87, SUZ 88, SUZ 89, SUZ 90, SUZ 91, SUZ 92, SUZ 93, SUZ 94, SUZ 95, SUZ 96, SUZ 97, SUZ 98, SUZ 99, SUZ 100).
 - Pink:** Medium-density residential (e.g., SUZ 11, SUZ 12, SUZ 13, SUZ 14, SUZ 15, SUZ 16, SUZ 17, SUZ 18, SUZ 19, SUZ 20, SUZ 21, SUZ 22, SUZ 23, SUZ 24, SUZ 25, SUZ 26, SUZ 27, SUZ 28, SUZ 29, SUZ 30, SUZ 31, SUZ 32, SUZ 33, SUZ 34, SUZ 35, SUZ 36, SUZ 37, SUZ 38, SUZ 39, SUZ 40, SUZ 41, SUZ 42, SUZ 43, SUZ 44, SUZ 45, SUZ 46, SUZ 47, SUZ 48, SUZ 49, SUZ 50, SUZ 51, SUZ 52, SUZ 53, SUZ 54, SUZ 55, SUZ 56, SUZ 57, SUZ 58, SUZ 59, SUZ 60, SUZ 61, SUZ 62, SUZ 63, SUZ 64, SUZ 65, SUZ 66, SUZ 67, SUZ 68, SUZ 69, SUZ 70, SUZ 71, SUZ 72, SUZ 73, SUZ 74, SUZ 75, SUZ 76, SUZ 77, SUZ 78, SUZ 79, SUZ 80, SUZ 81, SUZ 82, SUZ 83, SUZ 84, SUZ 85, SUZ 86, SUZ 87, SUZ 88, SUZ 89, SUZ 90, SUZ 91, SUZ 92, SUZ 93, SUZ 94, SUZ 95, SUZ 96, SUZ 97, SUZ 98, SUZ 99, SUZ 100).
 - Green:** Parks and recreation (e.g., SUZ 1, SUZ 2, SUZ 3, SUZ 4, SUZ 5, SUZ 6, SUZ 7, SUZ 8, SUZ 9, SUZ 10, SUZ 11, SUZ 12, SUZ 13, SUZ 14, SUZ 15, SUZ 16, SUZ 17, SUZ 18, SUZ 19, SUZ 20, SUZ 21, SUZ 22, SUZ 23, SUZ 24, SUZ 25, SUZ 26, SUZ 27, SUZ 28, SUZ 29, SUZ 30, SUZ 31, SUZ 32, SUZ 33, SUZ 34, SUZ 35, SUZ 36, SUZ 37, SUZ 38, SUZ 39, SUZ 40, SUZ 41, SUZ 42, SUZ 43, SUZ 44, SUZ 45, SUZ 46, SUZ 47, SUZ 48, SUZ 49, SUZ 50, SUZ 51, SUZ 52, SUZ 53, SUZ 54, SUZ 55, SUZ 56, SUZ 57, SUZ 58, SUZ 59, SUZ 60, SUZ 61, SUZ 62, SUZ 63, SUZ 64, SUZ 65, SUZ 66, SUZ 67, SUZ 68, SUZ 69, SUZ 70, SUZ 71, SUZ 72, SUZ 73, SUZ 74, SUZ 75, SUZ 76, SUZ 77, SUZ 78, SUZ 79, SUZ 80, SUZ 81, SUZ 82, SUZ 83, SUZ 84, SUZ 85, SUZ 86, SUZ 87, SUZ 88, SUZ 89, SUZ 90, SUZ 91, SUZ 92, SUZ 93, SUZ 94, SUZ 95, SUZ 96, SUZ 97, SUZ 98, SUZ 99, SUZ 100).
 - Blue:** Water bodies (e.g., SUZ 1, SUZ 2, SUZ 3, SUZ 4, SUZ 5, SUZ 6, SUZ 7, SUZ 8, SUZ 9, SUZ 10, SUZ 11, SUZ 12, SUZ 13, SUZ 14, SUZ 15, SUZ 16, SUZ 17, SUZ 18, SUZ 19, SUZ 20, SUZ 21, SUZ 22, SUZ 23, SUZ 24, SUZ 25, SUZ 26, SUZ 27, SUZ 28, SUZ 29, SUZ 30, SUZ 31, SUZ 32, SUZ 33, SUZ 34, SUZ 35, SUZ 36, SUZ 37, SUZ 38, SUZ 39, SUZ 40, SUZ 41, SUZ 42, SUZ 43, SUZ 44, SUZ 45, SUZ 46, SUZ 47, SUZ 48, SUZ 49, SUZ 50, SUZ 51, SUZ 52, SUZ 53, SUZ 54, SUZ 55, SUZ 56, SUZ 57, SUZ 58, SUZ 59, SUZ 60, SUZ 61, SUZ 62, SUZ 63, SUZ 64, SUZ 65, SUZ 66, SUZ 67, SUZ 68, SUZ 69, SUZ 70, SUZ 71, SUZ 72, SUZ 73, SUZ 74, SUZ 75, SUZ 76, SUZ 77, SUZ 78, SUZ 79, SUZ 80, SUZ 81, SUZ 82, SUZ 83, SUZ 84, SUZ 85, SUZ 86, SUZ 87, SUZ 88, SUZ 89, SUZ 90, SUZ 91, SUZ 92, SUZ 93, SUZ 94, SUZ 95, SUZ 96, SUZ 97, SUZ 98, SUZ 99, SUZ 100).
- Infrastructure:**
 - Roads:** Victoria Road, Beaconsfield Avenue, and other local streets.
 - Railway:** A railway line runs through the area.
 - Waterways:** A waterway is shown on the right side of the map.
- Legend:** A legend in the top right corner identifies the colors and symbols used on the map.

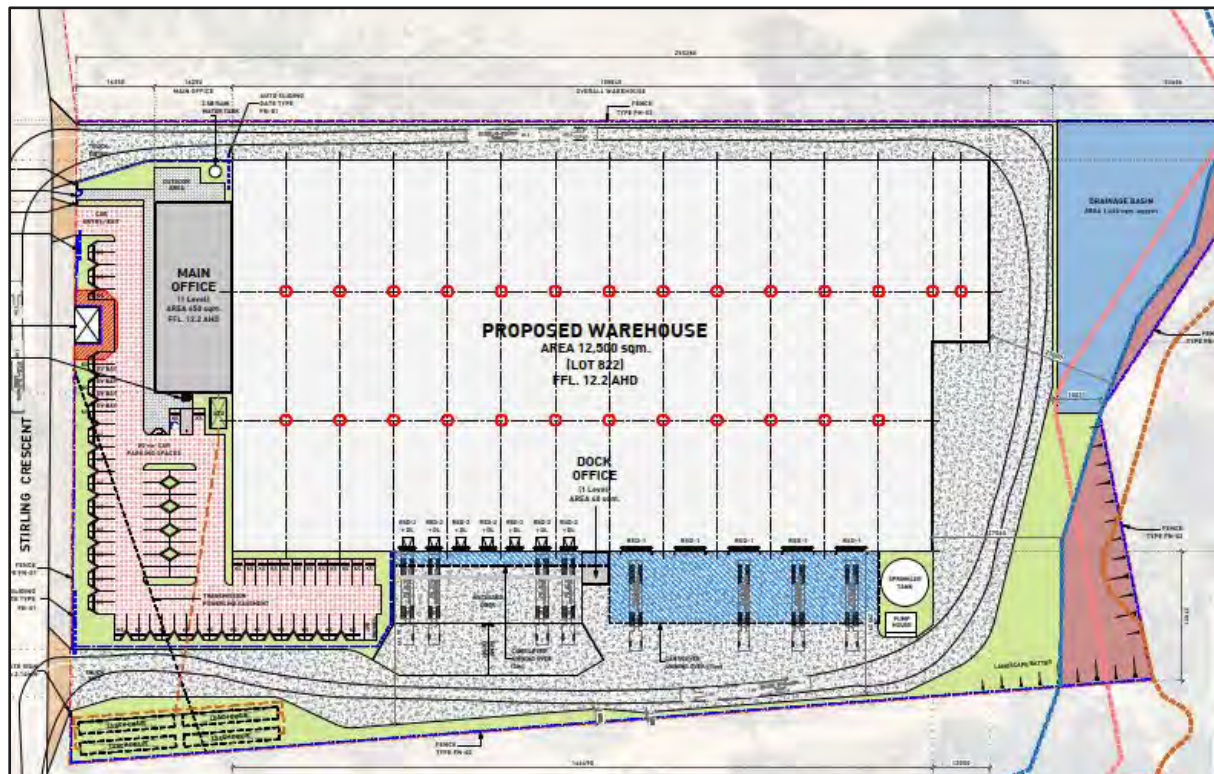
A summary of assigned noise levels applicable to the project area and influencing factors are detailed in **Table 3**.

Sensitive receivers	Influencing Factor	Assigned Levels, L _{A10}		
		Day	Evening	Night
R1	9	54	49	44
R2	8	53	48	43
R3	6	51	46	41
R4	6	51	46	41
R5	3	48	43	38
R6	12	57	52	47

3.4 Assessment scenario

Warehouse operations are expected to be intermittent: typically, a truck will arrive, shut down or idle while being loaded/unloaded, then restart and move off site. Site activity can operate 24 hours at any day, although typically warehouse operations are most active during the day period.

Figure 4 Lot 822 Hazelmere Warehouse site development plan



3.5 Source noise emission levels

Table 4 presents adopted noise emission levels for each source. Associated noise emission characteristics have been determined from measurement of noise levels for the relevant noise source (previously measured for other projects).

Table 4 Modelled Sound Power Levels

Source	A-weighted Sound Power Level, dB
Gas forklift	96
Truck (moving on site, 20 km/hr)	98
Evaporative cooler (each, when used) Day – 10 units Night – 5 units	88
Admin building A/C condensor (1 of 2)	70

There is a site speed limit of 20 km / hour, so truck noise emissions will be controlled by low speed and idling engine and exhaust sources. Most trucks will be unloaded / loaded directly within the warehouse or at pick up area on the eastern side of the warehouse. It is assumed



that noise from one truck is emitted at any one time, noting that short durations of multiple trucks events is likely to fall under the LA1 assessment criteria. There will be multiple trucks on site, however most will be stationary at the loading dock.

The acoustic modelling includes two forklifts operating externally on the eastern side of the warehouse building (loading dock area).

For the day scenario, ten rooftop evaporative coolers are modelled. For the night scenario (assumed cooler temperatures), only five evaporative coolers are modelled. This is the reason for different noise emissions between the scenarios.

4.0 Impact assessment

The predicted noise emissions at the key receptors are shown in **Table 5** below and compared against the applicable criteria for each assessment period.

Table 5 Predicted noise emissions for night-time period, LA10 dB

Receptor	Predicted noise emission		Assigned noise level			Compliance predicted
	Day / Evening	Night	Day	Evening	Night	
R1	36	34	54	49	44	OK
R2	33	31	53	48	43	OK
R3	39	37	51	46	41	OK
R4	36	34	51	46	41	OK
R5	33	32	48	43	38	OK
R6	30	29	57	52	47	OK

It can be seen from this table that the predicted noise levels comply with the project assigned noise levels at all existing receptors.

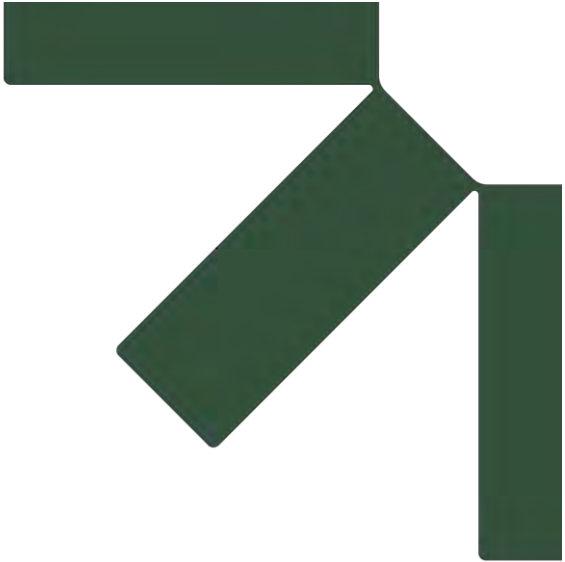
The above results can be regarded as the worst-case scenario with continuous site activity throughout the day and night times. In reality, it is expected the site to be less active during the night-time, therefore the noise emission is expected to be less than that presented in **Table 5**.

Appendix A includes predicted noise contours for the day and night-time operations.

5.0 Conclusion

This assessment of noise emissions for the proposed warehouse development at Lot 822 Stirling Crescent, Hazelmere has determined that the predicted emissions from its operation can meet the project assigned noise levels of the WA Environmental Protection (Noise) Regulations 1997 at all receptors at all times.





Appendix A Noise Contour Maps

Lot 822 Hazelmere Warehouse

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c/o Hesperia Property Pty Ltd

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Figure 5 Predicted noise contour map - Proposed warehouse - L_{A10} Day/Evening

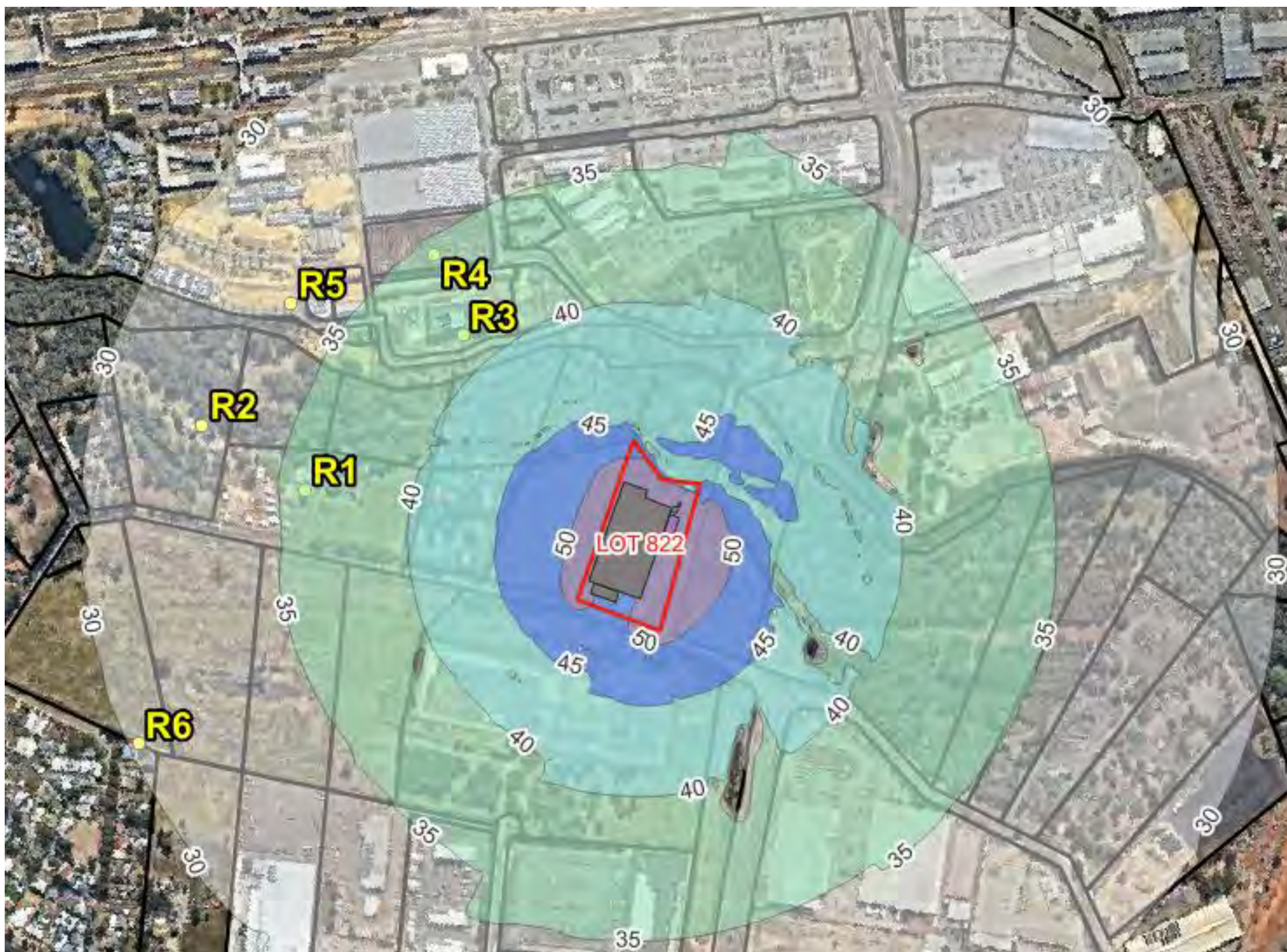
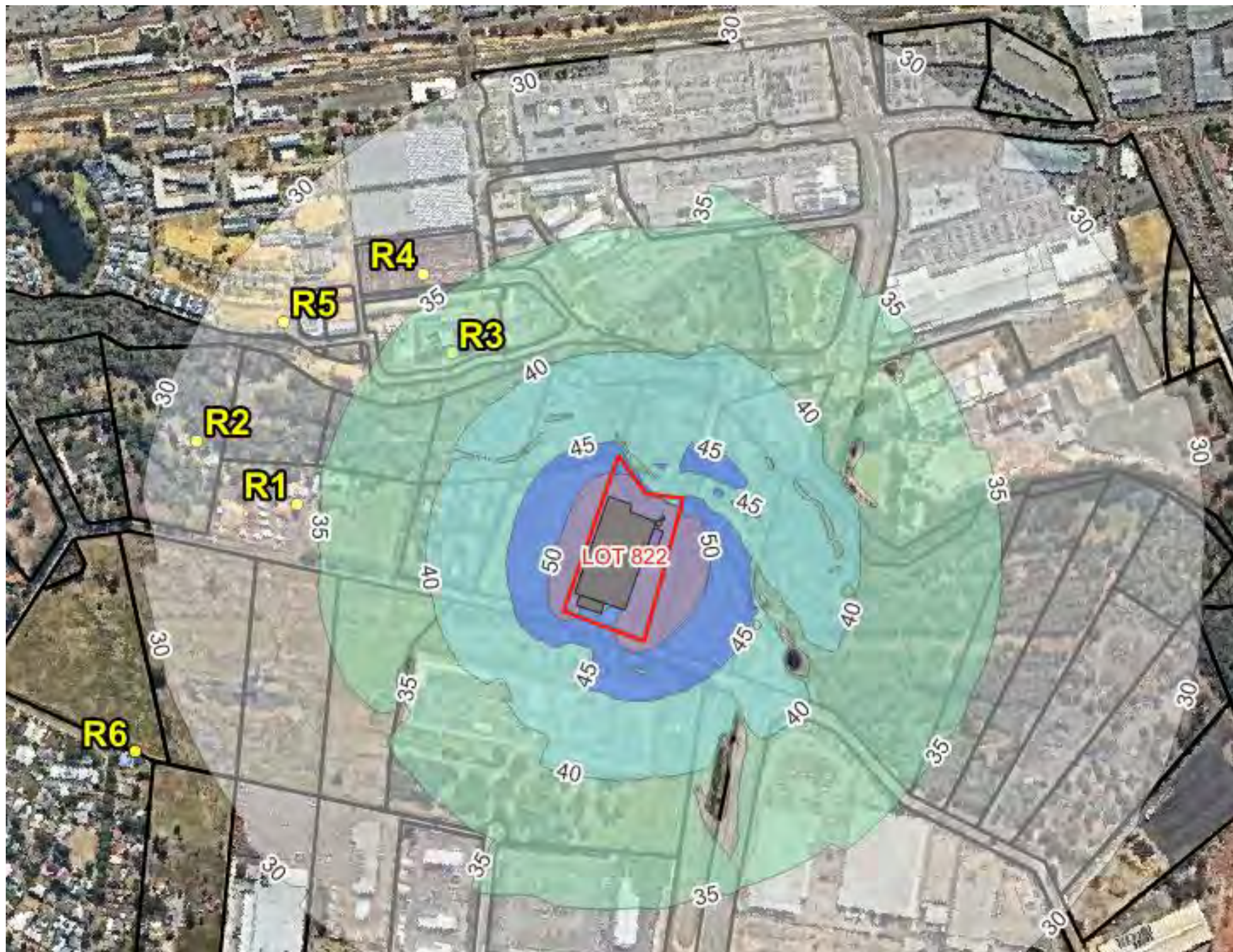
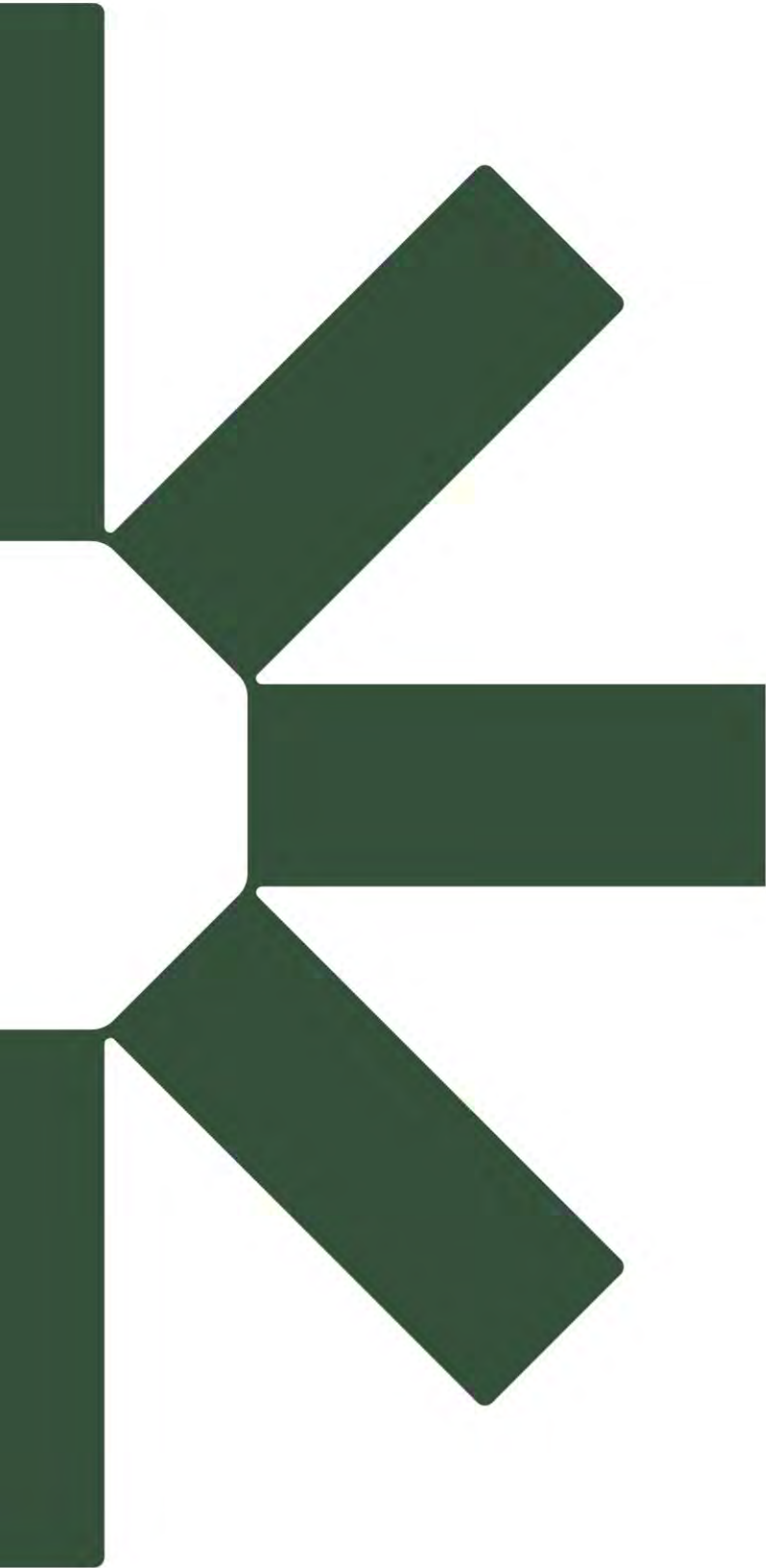


Figure 6 Predicted noise contour map - Proposed warehouse - L_{A10} Night





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