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North Harbour

North Harbour Stages 1 to 5

Road Traffic Noise Impact Assessment

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Executive Summary

Vipac has completed a traffic noise impact assessment for Stages 1 to 5 of the North Harbour Development in Burpengary East, Queensland. Compliance with the Moreton Bay Planning Scheme Policy (Noise) is expected to be achieved with the implementation of a 2.2m noise barrier on the southern boundary of lots 933 – 941 and façade treatments in line with the predicted QDC MP4.4 noise categories.

Details of the acoustic barrier can be found in Section 6.1 of this report. The QDC MP4.4 Noise Categories for ground and first floor for each proposed lot are listed in Appendix B.2.

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1 Introduction

Vipac Engineers & Scientists Ltd (Vipac) was commissioned by North Harbour to provide a traffic noise impact assessment for the North Harbour Stages 1 to 5 in Burpengary East, Queensland. This traffic noise assessment includes the following:

- Description of the development;
- Discussion of the applicable noise criteria;
- Measurement of existing background noise levels;
- Prediction of future traffic noise levels for the lots in the proposed development;
- Assessment of predicted traffic noise levels against applicable noise criteria;
- Discussion of noise barrier requirements, if any; and
- Recommendations and conclusion.

1.1 References

This report refers to the following documents:

- Queensland Department of Transport and Main Roads (DTMR) *Transport Noise Management Code of Practise, Volume 1 – Road Traffic Noise* (referred to as CoP).
- Queensland Department of Transport and Main Roads (DTMR) *Development Affected by Environmental Emissions from Transport Noise Policy*, Version 4.
- Moreton Bay Regional Council (MBRC) Planning Scheme Policy – Noise.
- Queensland Development Code MP 4.4 – Buildings in a Transport Noise Corridor.
- Bitzios Consulting *North Harbour Mixed Industry Business Area and Next Generation Neighbourhood Masterplan Transport and Traffic Impact Assessment* dated 25/09/2023 and sent to Vipac 23/01/2024.

2 Description of the Development

The proposed Stages 1 to 5 of North Harbour will consist of 190 residential lots to be built North-East of North Harbour Boulevard as shown in an aerial photograph of the site in Figure 2-1. Figure 2-2 contains the site layout, with lots included in Stages 1 to 5 shown in colour.

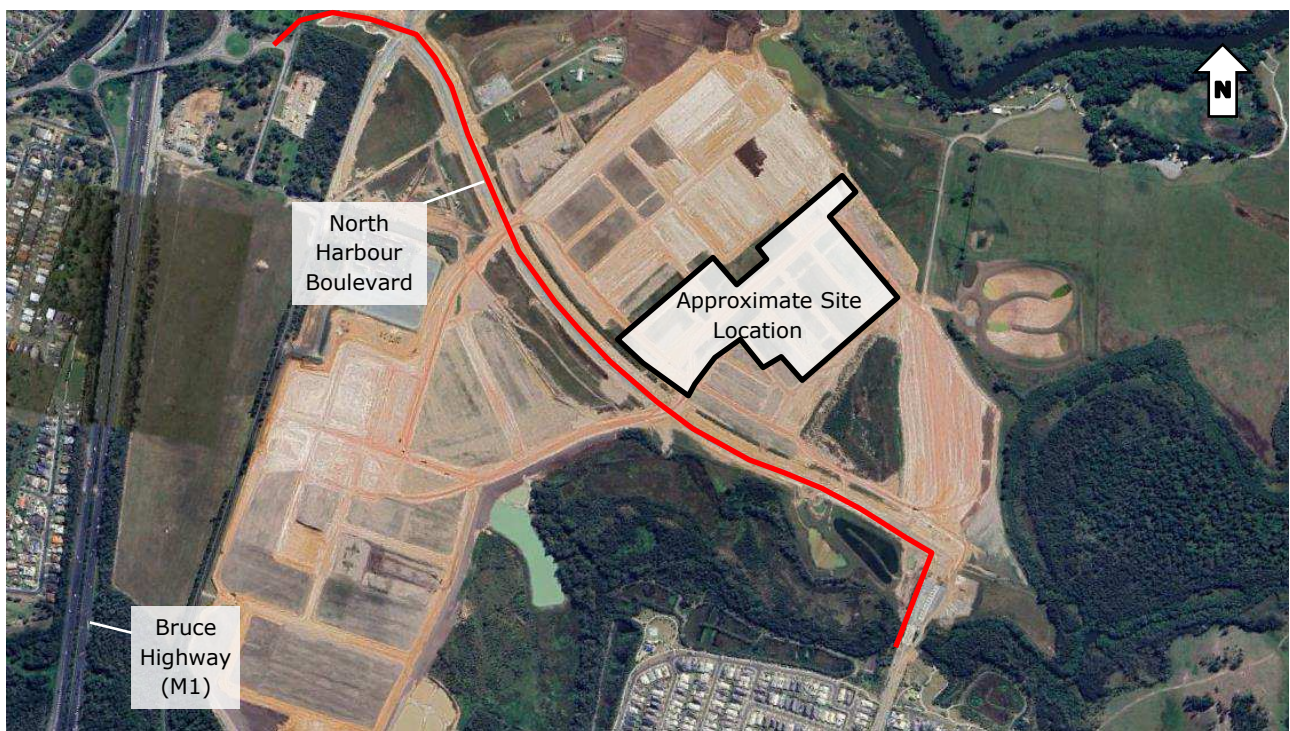


Figure 2-1: Aerial Photograph of Site (Source: Queensland Globe)

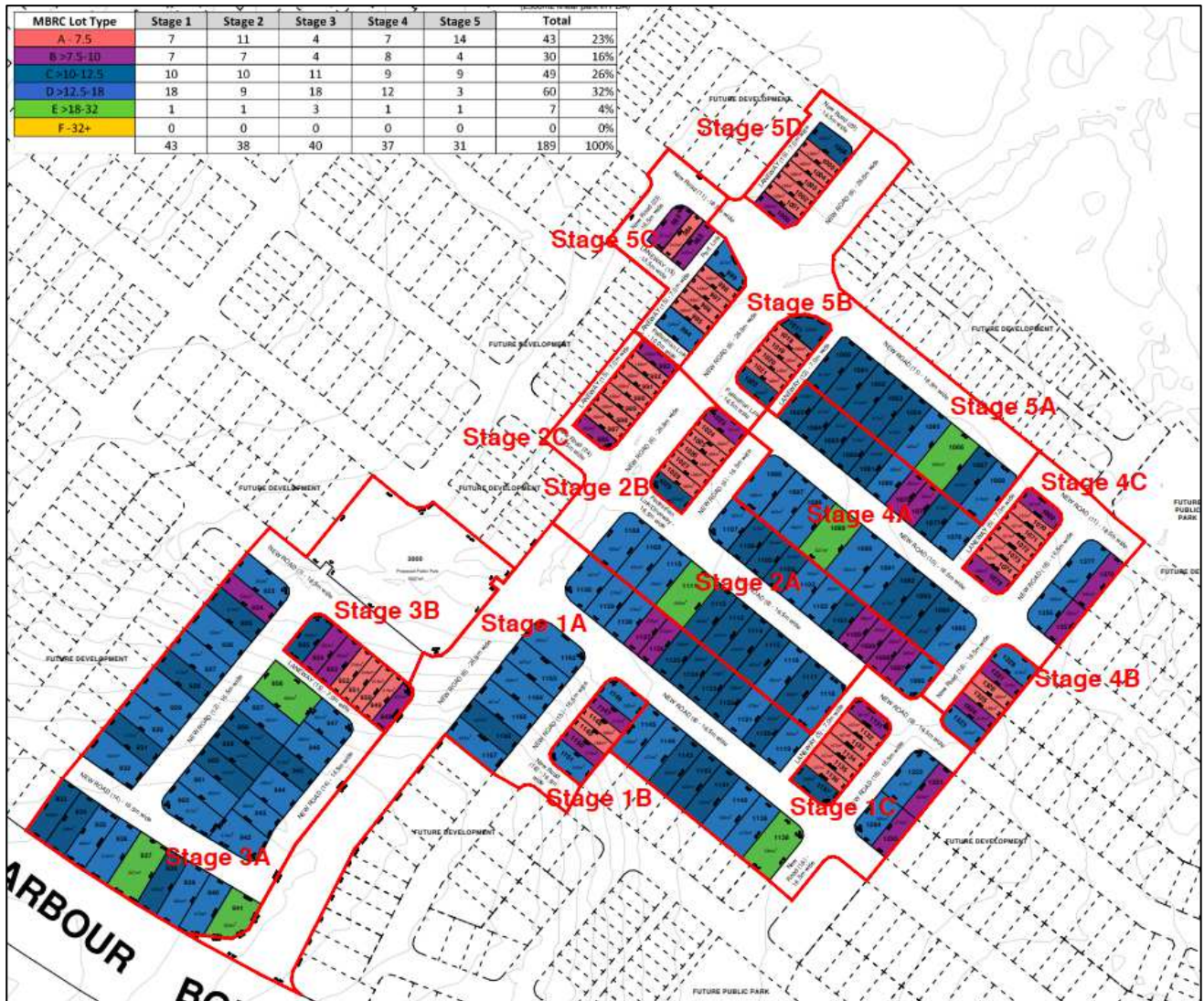


Figure 2-2: North Harbour Stages 1 to 5 (Lots in colour)

3 Noise Criteria

3.1 Moreton Bay Regional Council Planning Scheme Policy – Noise

The 'MBRC Planning Scheme Policy – Noise' outlines the process for establishing acceptable acoustic amenity at locations impacted by road and railway induced noise. Section 8.1 of the Policy states that a transport noise impact assessment report is to be provided where development involves reconfiguring a lot in the general Residential zone where:

- Proposed lots are located within:
 - 50m of a current of future designated sub arterial road; or
 - 100m of a current or future designated arterial road; or
 - 150m of a highway or railway; or
 - Extractive resource transport buffer.
- Where otherwise requested by Council.

The assessment is to be in accordance with QDC MP4.4 and identify the applicable noise category for each lot for both ground and first floor levels.

In addition to the above assessment, residential developments are required to have private open spaces (POS) that meet the external noise criteria as outlined in TMR's Policy for Development Affected by Environmental Emissions from Transport.

3.2 Queensland Development Code MP4.4

The Queensland Development Code (QDC) MP4.4 document specifies external building construction requirements based on the external transport noise levels to achieve acceptable indoor noise levels. The road traffic noise level categories, as specified in Schedule 3 of QDC MP4.4, are provided in Table 3-1. The required acoustic ratings for building components for each noise category are also listed in Table 3-1.

Table 3-1: MP4.4 Road Traffic Noise Category Levels and Required Building Construction Acoustic Ratings

Free-field Noise Category	Level of Traffic Noise L_{A10} (18hr) (façade corrected)	Required Acoustic Ratings (R_w)			
		Glazing and Frames		External Walls	Ceiling and Roofs
		Room Façade Glazing Area $\geq 1.8m^2$	Room Façade Glazing $< 1.8m^2$		
Category 4	≥ 73 dB(A)	R_w 43	R_w 43	R_w 52	R_w 45
Category 3	68-72 dB(A)	R_w 38	R_w 35	R_w 47	R_w 41
Category 2	63-67 dB(A)	R_w 35	R_w 32	R_w 41	R_w 38
Category 1	58-62 dB(A)	R_w 27	R_w 24	R_w 35	R_w 35
Category 0	≤ 57 dB(A)	None	None	None	None

3.3 Private Open Space Criteria

Table 3 of TMR's policy for Development Affected by Environmental Emissions from Transport contains noise limits for private open space in new sensitive developments. These criteria are dependent on the existing ambient noise level and have been reproduced below:

Table 3-2: Private Open Space Criteria (source: Development Affected by Environmental Emissions from Transport)

Development Type	Location within Development	Environmental Criteria
Accommodation Activities	Private and communal open space	≤ 57 dB(A) L_{10} (18hr) free field (measured L_{90} (18hr) free field between 6am and midnight ≤ 45 dB(A))
		≤ 60 dB(A) L_{10} (18hr) free field (measured L_{90} (18hr) free field between 6am and midnight > 45 dB(A))

4 Noise Monitoring

Unattended noise monitoring was conducted to establish the background noise levels for the private open space criteria. Noise measurements were conducted by Vipac between Tuesday 16th January and Monday 22nd January in a free-field location 1.5m above ground. The monitor location was positioned north of Stages 1 to 5 as shown in Figure 4-1. Attended noise measurements confirmed that construction noise during the monitoring period was not audible from the noise monitoring location.



Figure 4-1: Noise Monitoring Location

4.1 Equipment

The following equipment was used to measure background noise levels at North Harbour:

Table 4-1: Equipment List

Instrument	Serial Number	Next Calibration Date
Rion NL-42 Type 2 Environmental Noise Logger	01186132	11/02/2024
Pulsar Model 106 Sound Calibrator	96816	15/11/2024
Brüel & Kjær 2250 Type 1 Sound Level Meter	302997	04/07/2025

The calibrations of the noise monitoring equipment were checked using an acoustic calibrator before and after the measurements with no significant drift from the reference signal observed. Noise monitoring was conducted in accordance with Australian Standard AS1055:2018 – Description and Measurement of Environmental Noise. The noise monitors were set to measure statistical noise levels in 'A' weighting with 'Fast' response over 15 minute intervals.

4.2 Weather observations

Weather during the monitoring period was mostly fine, with some periods of adverse weather (rainfall) observed. Monitoring data during adverse weather conditions has been excluded from the assessment in accordance with the CoP.

Rainfall and temperature data was sourced from the Bureau of Meteorology (BoM) Redcliffe Weather Station (station ID: 040958), approximately 15.8km away. Wind data was sourced from Beerburum BoM Weather Station (station ID: 040284) approximately 16.5km away from the noise monitoring site. Daily weather observations are shown in Table 4-2:

Table 4-2: Weather Observations During the Monitoring Period (Source: Redcliffe & Beerburrum BoM, 2023)

Date	Temp (°C)		Rain (mm)	9:00 AM			3:00 PM		
	Min	Max		Temp (°C)	Wind Direction	Wind Speed (km/h)	Temp (°C)	Wind Direction	Wind Speed (km/h)
Tue 16/01	23.3	29.5	14	28.1	S	6	26.7	SE	4
Wed 17/01	23.3	29.2	14.2	26.6	SE	2	28.5	E	7
Thu 18/01	25.1	32.1	0.2	28.8	NW	6	29.8	ENE	9
Fri 19/01	23.6	31.4	9	27.6	NNE	2	30.8	E	6
Sat 20/01	25.5	30.3	0	27	SSW	4	29.6	SE	7
Sun 21/01	24.6	31.5	0.2	29.2	N	2	30.4	ENE	7
Mon 22/01	24.7	36.0	0	29.8	NNE	9	32.1	ENE	7

4.3 Measured Ambient Noise Levels

Table 4-3 presents the measured background noise levels and the resultant private open space criteria detailed in Section 3.3. Full unattended noise monitoring results can be found in Appendix C.

Table 4-3: Ambient Noise Level Results

Monitoring Period	Free Field L ₉₀ , 18 hour	Private Open Space Criteria
17/01 to 21/01, 6am to midnight	47 dB(A)	L ₁₀ (18 hour) free field ≤ 60 dB(A)

5 Road Traffic Noise Assessment

5.1 Modelling Methodology

Traffic noise calculations were carried out using SoundPLAN v8.2 noise modelling software. The data and assumptions used in traffic noise modelling are presented in Table 5-1.

Table 5-1: Data and Assumptions Used in Traffic Noise Modelling

Parameter	Data
Future Residence Receiver Heights	- Ground Floor: 1.8m above ground level as obtained from terrain data (façade corrected). - Outdoor Spaces for Passive Recreation: 1.5m above ground level as obtained from terrain data (free field) - First Floor: 4.6m above ground level as obtained from terrain data (assuming height of floors as 2.8m, façade corrected)
Terrain Data	0.1m Contour Lines drawing by KN Group (ref: INT CONTS.dwg) sent to Vipac 25/01/2024.
Angle Increment	1°
Grid Spacing (noise contour maps)	2m squares.
Lot Layout	Civil Base drawings by KN Group (ref: x 13 -154 base_RNA.dwg), sent to Vipac 16/01/2024.
Calculation Method	UK's Calculation of Road Traffic Noise (CoRTN)
Road Surface	- Dense graded asphalt (DGA) was modelled for the road surface of North Harbour Boulevard. As per Table 4.3.4.1 of the CoP, no correction is required for DGA. - A correction of -0.7 dB(A) has been applied for free field receptors, and a correction of -1.7dB(A) has been applied for façade corrected receptors for Queensland conditions (Department of Transport and Main Roads, Transport Noise Management Code of Practice 2013).
Existing Noise Barriers	N/A

5.2 Traffic Volumes

Traffic volumes for the North Harbour Boulevard extension are based on Annual Average Daily Traffic (AADT) estimates supplied by Bitzios Consulting which have been reproduced below. Note construction of the road is yet to be completed so verification of any existing traffic noise emissions is not applicable.

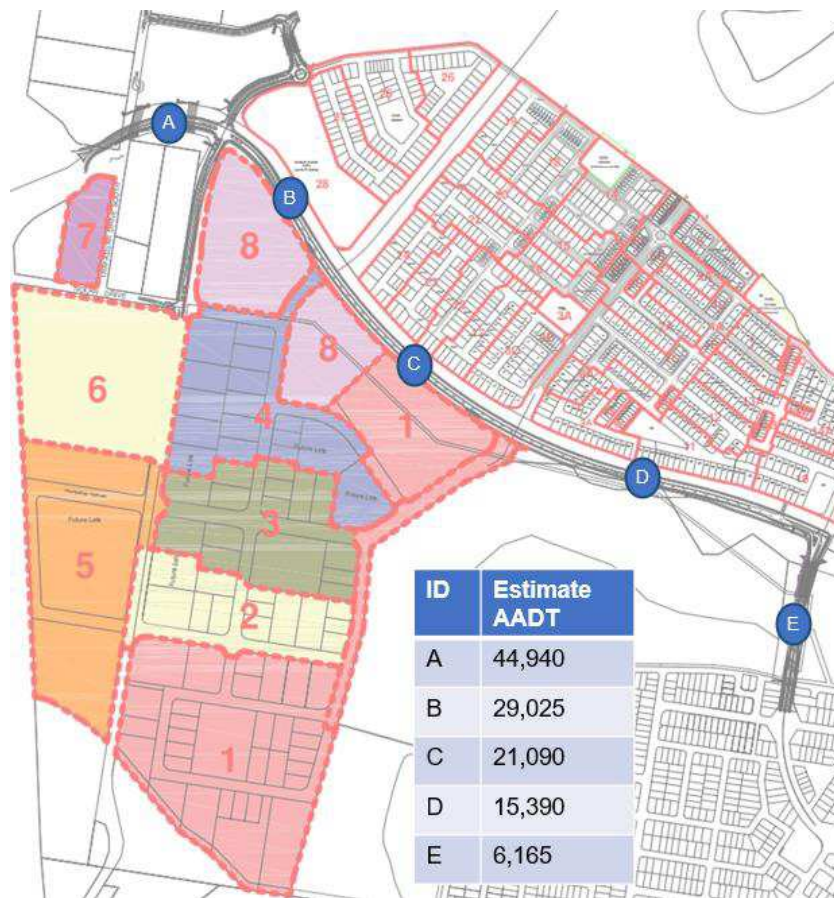


Figure 5-1: North Harbour Boulevard AADT (reproduced from Bitzio Consulting)

Table 5-2 presents the assumptions used for modelling North Harbour Boulevard in the noise prediction model. AADT traffic volumes from Bitzios Consulting in Figure 5-1 are representative of the ultimate traffic volumes in 2041, therefore predictions have been conducted to the ultimate traffic volume to 2041. The 18 hour traffic volume from 6am to midnight to be used in the noise model are taken to be 95% of the AADT as per the CoRTN calculation method.

Table 5-2: Traffic Volumes

North Harbour Boulevard Section	AADT	18hr Traffic Volume	Speed*	Heavy Vehicles*
A	44,940	42,693	70 km/h	5%
B	29,025	27,574		
C	21,090	20,036		
D	15,390	14,621	70 km/h but slowing to 40 km/h approaching intersection	
E	6,165	5,857		

* Speed and heavy vehicle data have been confirmed by North Harbour.

5.3 Noise Modelling Against Private Open Space Criteria

This section contains noise modelling results for comparison against the Private Open Space Criteria. Only the lots most exposed to road traffic noise are presented and the results will be used to determine if noise mitigation measures are required. Predicted road traffic noise levels for the remaining lots exposed to lower road traffic noise levels are presented in Appendix B.1

5.3.1 Predicted Noise Levels without Mitigation

Figure 5-2 presents the predicted road traffic noise levels compared to the private open space criteria for the most exposed lots of North Harbour Stages 1 to 5. Lots not included in the grid noise map are expected to comply with the criteria as North Harbour Boulevard is the only source of road traffic noise modelled in this assessment.

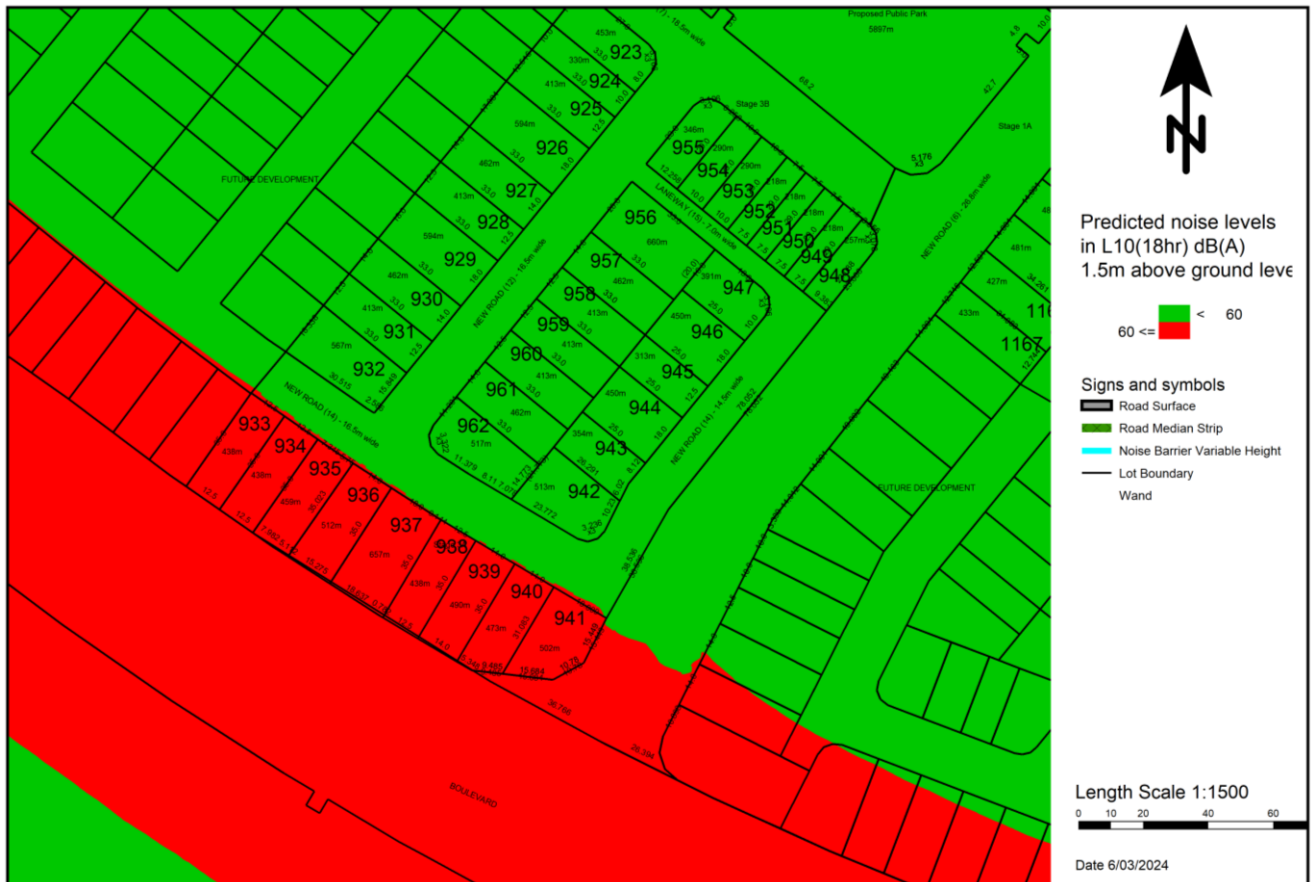


Figure 5-2: Private Open Space Criteria Grid Noise Map without Mitigation

Predicted traffic noise levels for several lots that are nearest to North Harbour Boulevard are predicted to exceed the private open space criteria. Lots predicted to exceed the noise limit are shown in Table 5-3.

Table 5-3 Lots Predicted to Exceed the Private Open Space Limit

Noise Limit	Lots Exceeding Noise Limits	Location
LA10,18hr 60 dB(A) – Free-field	933 - 941	Private Open Space (1.5m above ground)

Refer to Section 6.1 for details of the recommendations for predicted compliance of the exceeding lots.

5.3.2 Predicted Noise Levels with Mitigation Measures

Figure 5-3 contains the predicted road traffic noise from North Harbour with a variable height (1.8 – 2m) acoustic barrier on the boundary between lots 933 – 941. Details of the noise barrier are in Section 6.1.



Figure 5-3: Private Open Space Criteria Grid Noise Map with Mitigation

Predicted traffic noise levels at all lots are predicted to comply with the private open space criteria with the inclusion of the recommended acoustic barrier.

6 Recommendations

6.1 Noise Barrier

A noise barrier is recommended on lots 933-941 to achieve predicted compliance with the private open space criteria as modelled in Section 5.3.2. Details of the height and location of the proposed noise barrier can be found in Table 6-1:

Table 6-1: Details of Recommended Noise Barrier

Lot Numbers	Barrier Location	Height
-	Extends past lot 933 in a north-westerly direction for 50m.	2m
933 - 940	South-West boundary with North Harbour Boulevard.	
941	Entire Southern and Eastern boundary with North Harbour Boulevard & intersection.	1.8m

In addition to the location and height requirements in Table 6-1, the acoustic barrier should also be:

- 1.8 – 2m high (as per Table 6-1) relative to the modelled ground contour levels provided by KN Group (ref: INT CONTS.dwg), sent to Vipac 25/01/2024;
- Of solid construction and have no gaps or holes for the extent shown (inclusive of between the ground and bottom of barrier);
- Any gaps surrounding access gates for landscaping/maintenance are to be overlapped sufficiently so that there are no visible holes above, below or on the sides of the gate;
- Constructed in accordance with:
 - Chapter 7 integrated noise barrier design of the Transport Noise Management Code of Practice: Volume 1 (Road Traffic Noise), Department of Transport and Main Roads, 2013;
 - Technical Specification-MRTS15 Noise Fences, Transport and Main Roads, 2019;
 - Technical Specification-MRTS04 General Earthworks, Transport and Main Roads, 2020;
- The construction may consist of a barrier in combination with an earth mound to achieve the desired height if required.

6.2 Building Façade Requirements

Acoustic treatment is required for some ground and first floor building facades that are impacted by noise equivalent to QDC MP4.4 categories 1 to 2. Details of the construction requirements for each category can be found in Section 3.2.

The QDC MP4.4 noise categories for all lots, including an upper and lower level, are listed in Appendix B.2 .A summary of lots affected by road traffic noise equivalent to category 1 or higher are listed in Table 6-2. Note that these noise categories have been calculated with the inclusion of an acoustic barrier as detailed Section 6.1.

Table 6-2: Summary of QDC MP4.4 Noise Categories

QDC MP4.4 Noise Category*	Floors Affected	Lots Affected
Category 2	First Floor	933 – 941
Category 1	Ground Floor	933 – 941
	First Floor	932, 942 - 943, 961 - 962
Category 0	All remaining floors / lots	

* Includes noise mitigation barrier as detailed in Section 6.1

7 Conclusion

Vipac has completed a traffic noise impact assessment for Stages 1 to 5 of the North Harbour Development. Compliance with the Moreton Bay Planning Scheme Policy (Noise) is expected to be achieved with the implementation of the recommendations in Section 6 of this report.

These recommendations include a noise barrier for compliance with the private open space criteria and façade treatments in line with the predicted QDC MP4.4 noise categories listed in Appendix B.2.



Appendix A QDC MP4.4 Transport Noise Contour Map

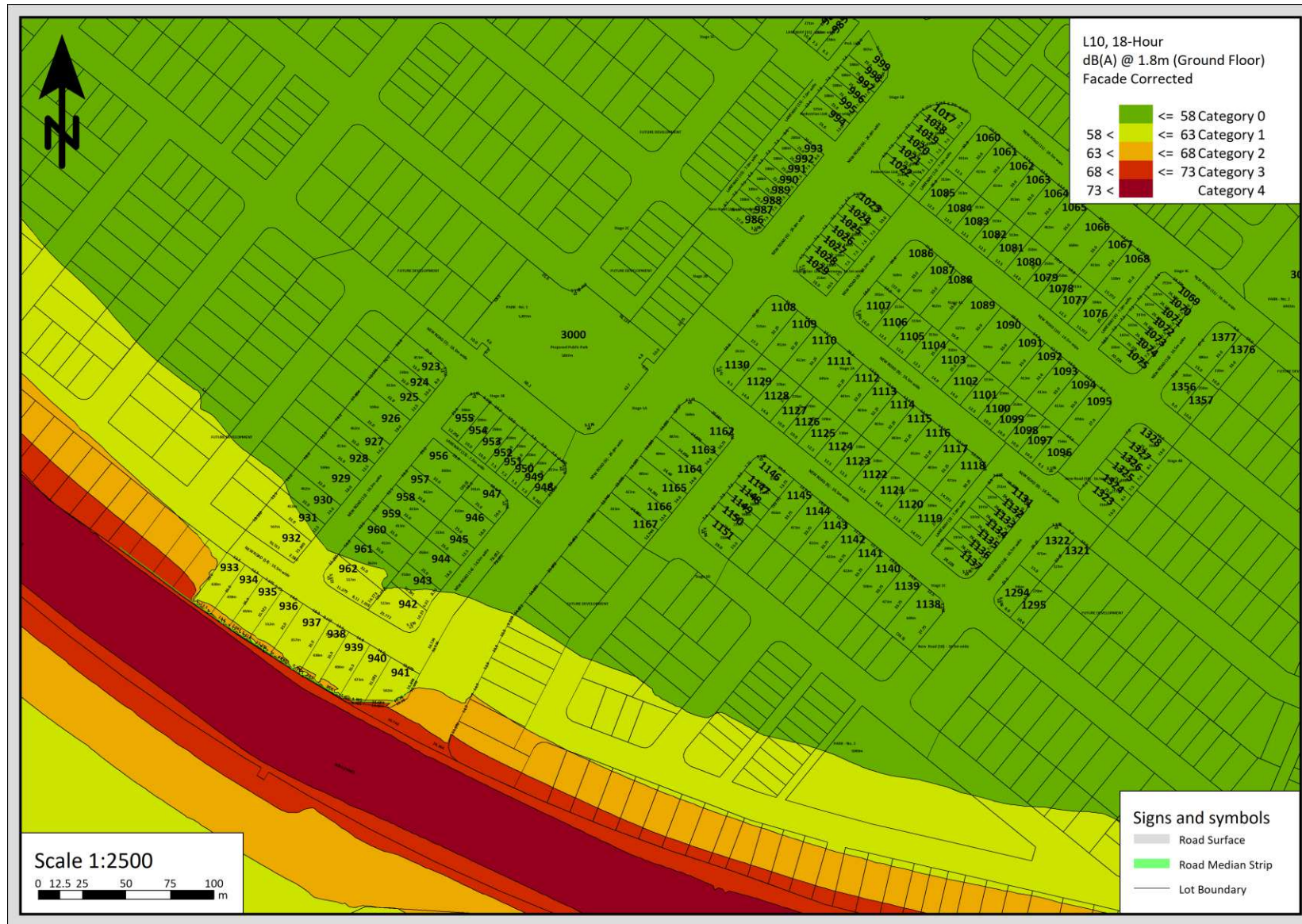
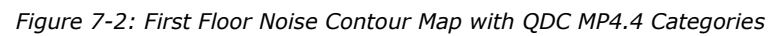


Figure 7-1: Ground Floor Noise Contour Map with QDC MP4.4 Categories



Appendix B Predicted Traffic Noise Levels

B.1 Predicted Free-Field Traffic Noise Levels for Private Open Space Criteria

Table 7-1: Predicted Free-Field Traffic Noise Levels in Private Open Spaces (for all lots)

Lot No.	No Barrier	With Noise Barrier	
	L _{10(18h)} dB(A)	L _{10(18h)} dB(A)	Complies with L _{10(18h)} 60 dB(A) Criteria
923	50.1	49.8	✓
924	51	50.3	✓
925	51.6	51	✓
926	52.4	51.5	✓
927	53	52.1	✓
928	53.7	52.7	✓
929	54.4	53.2	✓
930	55.3	53.9	✓
931	56.2	54.4	✓
932	57.4	55.1	✓
933	66.6	59.5	✓
934	66.4	59.4	✓
935	66.2	59.2	✓
936	66	59.2	✓
937	65.8	59.2	✓
938	65.7	59.3	✓
939	65.5	59.1	✓
940	65.1	59	✓
941	63.8	58.5	✓
942	57.2	55	✓
943	56.3	54.5	✓
944	55.4	54	✓
945	54.4	53.3	✓
946	53.5	52.6	✓
947	52.6	51.9	✓
948	51.7	51.3	✓
949	51.7	51.2	✓
950	51.7	51.1	✓
951	51.7	51.1	✓
952	51.5	50.9	✓
953	51.4	50.8	✓
954	51.4	50.7	✓
955	51.3	50.7	✓
956	52.6	51.8	✓
957	53.4	52.4	✓
958	54.1	53	✓
959	54.8	53.5	✓
960	55.6	54.1	✓
961	56.6	54.6	✓
962	57.9	55.3	✓
983	44.4	44.4	

984	44.4	44.4	
985	44.3	44.3	
986	46	46	✓
987	45.9	45.8	✓
988	45.7	45.7	✓
989	45.6	45.6	✓
990	45.6	45.5	✓
991	45.4	45.3	✓
992	45.3	45.2	✓
993	45.2	45.1	✓
994	44.9	44.8	✓
995	44.7	44.7	✓
996	44.6	44.6	✓
997	44.5	44.5	✓
998	44.4	44.4	✓
999	44.3	44.3	✓
1000	43.6	43.7	✓
1001	43.5	43.6	✓
1002	43.4	43.5	✓
1003	43.4	43.4	✓
1004	43.2	43.3	✓
1005	43.1	43.2	✓
1006	43	43.1	✓
1017	44.2	44.2	✓
1018	44.4	44.3	✓
1019	44.5	44.4	✓
1020	44.5	44.5	✓
1021	44.7	44.7	✓
1022	44.8	44.8	✓
1023	45.1	45.2	✓
1024	45.3	45.3	✓
1025	45.4	45.4	✓
1026	45.5	45.6	✓
1027	45.7	45.7	✓
1028	45.8	45.8	✓
1029	46	45.9	✓
1060	44.4	44.4	✓
1061	44.4	44.4	✓
1062	44.4	44.4	✓
1063	44.4	44.4	✓
1064	44.5	44.4	✓
1065	44.5	44.4	✓
1066	44.5	44.4	✓
1067	44.5	44.4	✓
1068	44.5	44.4	✓
1069	44.8	44.9	✓
1070	45	44.6	✓

1071	45.1	44.9	✓
1072	44.9	44.9	✓
1073	45	45.1	✓
1074	45.1	45.3	✓
1075	45.2	45.4	✓
1076	44.7	44.7	✓
1077	44.7	44.7	✓
1078	44.7	44.6	✓
1079	44.7	44.6	✓
1080	44.7	44.6	✓
1081	44.6	44.6	✓
1082	44.6	44.6	✓
1083	44.6	44.6	✓
1084	44.6	44.7	✓
1085	44.6	44.6	✓
1086	45.6	45.5	✓
1087	45.6	45.6	✓
1088	45.6	45.6	✓
1089	45.7	45.6	✓
1090	45.7	45.7	✓
1091	45.7	45.7	✓
1092	45.8	45.8	✓
1093	45.8	45.8	✓
1094	46.3	46.3	✓
1095	46.5	46.6	✓
1096	46.3	46.2	✓
1097	46.2	46.1	✓
1098	46.2	46.1	✓
1099	46.1	46.1	✓
1100	46.1	46	✓
1101	46	46	✓
1102	46	45.9	✓
1103	45.9	45.9	✓
1104	45.9	45.8	✓
1105	45.9	45.8	✓
1106	45.8	45.8	✓
1107	45.8	45.8	✓
1108	47	46.9	✓
1109	47	46.9	✓
1110	47	46.9	✓
1111	47.1	47	✓
1112	47.1	47	✓
1113	47.2	47.1	✓
1114	47.2	47.1	✓
1115	47.3	47.2	✓
1116	47.3	47.2	✓
1117	47.4	47.3	✓

1118	47.5	47.4	✓
1119	47.8	47.7	✓
1120	47.7	47.6	✓
1121	47.7	47.5	✓
1122	47.6	47.5	✓
1123	47.5	47.4	✓
1124	47.5	47.4	✓
1125	47.5	47.3	✓
1126	47.4	47.3	✓
1127	47.4	47.3	✓
1128	47.3	47.2	✓
1129	47.2	47.1	✓
1130	47.2	47.1	✓
1131	47.1	47	✓
1132	47.3	47.2	✓
1133	47.5	47.4	✓
1134	47.7	47.6	✓
1135	47.9	47.8	✓
1136	48.1	48	✓
1137	48.3	48.3	✓
1138	50.8	50.8	✓
1139	50.5	50.5	✓
1140	50	50	✓
1141	49.8	49.8	✓
1142	49.4	49.4	✓
1143	49.3	49.2	✓
1144	49.2	49.1	✓
1145	49.1	49	✓
1146	48.4	48.3	✓
1147	48.7	48.6	✓
1148	48.9	48.8	✓
1149	49.1	49	✓
1150	49.3	49.2	✓
1151	49.6	49.5	✓
1162	48.2	48.1	✓
1163	48.6	48.5	✓
1164	49	48.9	✓
1165	49.4	49.3	✓
1166	50.3	50.1	✓
1167	50.9	50.7	✓
1294	48.5	48.4	✓
1295	48.8	48.7	✓
1321	48.2	48.1	✓
1322	48.1	48.1	✓
1323	47.5	47.4	✓
1324	47.5	47.4	✓
1325	47.3	47.3	✓

1326	47.2	47.2	✓
1327	47.1	47.2	✓
1328	47	46.9	✓
1356	46.4	45.9	✓
1357	45.4	45.2	✓
1376	45.8	45.6	✓
1377	46.2	46	✓
3000	48.3	48.2	✓
3001	44.9	44.9	✓

B.2 Building Receptor Traffic Noise Levels & QDC MP4.4 Categories

Table 7-2: Façade Corrected Traffic Noise Levels and MP4.4 Categories (for all lots)

Lot No.	Floor	No Barrier	With Noise Barrier	
		L _{10(18h)} dB(A)	L _{10(18h)} dB(A)	QDC MP4.4 Transport Noise Category
923	GF	51.7	51.4	0
	F 1	54.1	53.3	0
924	GF	52.6	51.9	0
	F 1	54.9	53.7	0
925	GF	53.2	52.5	0
	F 1	55.5	54.3	0
926	GF	54	53.1	0
	F 1	56.2	54.8	0
927	GF	54.6	53.7	0
	F 1	56.8	55.3	0
928	GF	55.3	54.3	0
	F 1	57.4	55.9	0
929	GF	56.1	54.8	0
	F 1	58.2	56.4	0
930	GF	57.1	55.5	0
	F 1	59.2	57.2	0
931	GF	58	56.1	0
	F 1	60.1	57.9	0
932	GF	59.3	56.8	0
	F 1	61.2	58.8	1
933	GF	66.1	60.5	1
	F 1	67.6	65.6	2
934	GF	66.1	60.4	1
	F 1	67.6	65.5	2
935	GF	66	60.3	1
	F 1	67.5	65.5	2
936	GF	65.9	60.3	1
	F 1	67.3	65.5	2
937	GF	65.8	60.3	1
	F 1	67.2	65.5	2
938	GF	65.7	60.3	1
	F 1	67.1	65.6	2
939	GF	65.7	60.4	1
	F 1	67.1	65.8	2
940	GF	65.7	60.7	1
	F 1	67.1	66.3	2
941	GF	66.1	61.6	1
	F 1	67.3	67	2
942	GF	59	56.7	0
	F 1	61	58.8	1
943	GF	58	56.2	0
	F 1	59.9	58	1
944	GF	57.2	55.7	0

	F 1	58.9	57.3	0
945	GF	56.2	54.9	0
	F 1	58	56.5	0
946	GF	55.3	54.2	0
	F 1	57.2	55.9	0
947	GF	54.4	53.5	0
	F 1	56.5	55.2	0
948	GF	53.4	52.8	0
	F 1	55.6	54.6	0
949	GF	53.4	52.8	0
	F 1	55.5	54.6	0
950	GF	53.3	52.7	0
	F 1	55.5	54.5	0
951	GF	53.3	52.7	0
	F 1	55.5	54.4	0
952	GF	53.2	52.5	0
	F 1	55.4	54.3	0
953	GF	53.1	52.4	0
	F 1	55.3	54.1	0
954	GF	53	52.3	0
	F 1	55.2	54.1	0
955	GF	52.9	52.3	0
	F 1	55.2	54	0
956	GF	54.3	53.4	0
	F 1	56.4	55.1	0
957	GF	55.1	54.1	0
	F 1	57.2	55.7	0
958	GF	55.9	54.6	0
	F 1	57.8	56.2	0
959	GF	56.6	55.2	0
	F 1	58.6	56.8	0
960	GF	57.4	55.8	0
	F 1	59.3	57.4	0
961	GF	58.4	56.3	0
	F 1	60.2	58.1	1
962	GF	59.7	57.1	0
	F 1	61.4	59.1	1
983	GF	47.6	47.6	0
	F 1	47.7	47.7	0
984	GF	47.6	47.6	0
	F 1	47.7	47.7	0
985	GF	47.6	47.6	0
	F 1	47.7	47.7	0
986	GF	47.6	47.6	0
	F 1	49.9	49.6	0
987	GF	47.4	47.4	0
	F 1	49.8	49.5	0

988	GF	47.3	47.3	0
	F 1	49.6	49.4	0
989	GF	47.1	47.2	0
	F 1	49.5	49.2	0
990	GF	47.1	47.1	0
	F 1	49.4	49.1	0
991	GF	46.9	46.9	0
	F 1	49.2	49	0
992	GF	46.8	46.8	0
	F 1	49.1	48.8	0
993	GF	46.7	46.7	0
	F 1	49	48.7	0
994	GF	46.4	46.3	0
	F 1	48.6	48.4	0
995	GF	46.2	46.2	0
	F 1	48.4	48.2	0
996	GF	46.1	46.1	0
	F 1	48.3	48.1	0
997	GF	45.9	46	0
	F 1	48.1	48	0
998	GF	45.8	45.9	0
	F 1	48	47.8	0
999	GF	45.8	45.8	0
	F 1	47.7	47.6	0
1000	GF	45.2	45.3	0
	F 1	46.9	46.9	0
1001	GF	45.1	45.1	0
	F 1	46.8	46.7	0
1002	GF	44.9	45	0
	F 1	46.7	46.6	0
1003	GF	44.8	44.9	0
	F 1	46.6	46.6	0
1004	GF	44.7	44.9	0
	F 1	46.5	46.5	0
1005	GF	44.7	44.8	0
	F 1	46.4	46.3	0
1006	GF	44.6	44.6	0
	F 1	46.2	46.2	0
1017	GF	45.7	45.7	0
	F 1	47.8	47.6	0
1018	GF	45.8	45.8	0
	F 1	48	47.8	0
1019	GF	46	45.8	0
	F 1	48.1	47.9	0
1020	GF	46	46	0
	F 1	48.3	48.1	0
1021	GF	46.1	46.1	0

	F 1	48.4	48.2	0
1022	GF	46.3	46.3	0
	F 1	48.5	48.4	0
1023	GF	46.7	46.6	0
	F 1	48.8	48.6	0
1024	GF	46.8	46.8	0
	F 1	48.9	48.8	0
1025	GF	47	46.9	0
	F 1	49.1	48.9	0
1026	GF	47.1	47	0
	F 1	49.2	49	0
1027	GF	47.2	47.2	0
	F 1	49.3	49.2	0
1028	GF	47.3	47.3	0
	F 1	49.5	49.3	0
1029	GF	47.5	47.5	0
	F 1	49.7	49.5	0
1060	GF	45.9	45.9	0
	F 1	48.1	47.9	0
1061	GF	45.9	45.9	0
	F 1	48.1	47.9	0
1062	GF	45.9	45.9	0
	F 1	48.1	48	0
1063	GF	45.9	45.9	0
	F 1	48.1	48	0
1064	GF	46	45.9	0
	F 1	48.2	48	0
1065	GF	45.9	45.9	0
	F 1	48.2	48	0
1066	GF	45.9	45.9	0
	F 1	48.2	48	0
1067	GF	46	45.9	0
	F 1	48.2	48	0
1068	GF	46	46	0
	F 1	48.2	48	0
1069	GF	45.7	45.7	0
	F 1	47.8	47.7	0
1070	GF	45.9	45.8	0
	F 1	48	47.9	0
1071	GF	46	46	0
	F 1	48.1	48	0
1072	GF	46.1	46.1	0
	F 1	48.3	48.1	0
1073	GF	46.2	46.2	0
	F 1	48.4	48.3	0
1074	GF	46.4	46.4	0
	F 1	48.6	48.4	0

1075	GF	46.5	46.5	0
	F 1	48.7	48.5	0
1076	GF	46.2	46.2	0
	F 1	48.5	48.3	0
1077	GF	46.2	46.2	0
	F 1	48.5	48.3	0
1078	GF	46.2	46.2	0
	F 1	48.5	48.3	0
1079	GF	46.2	46.2	0
	F 1	48.5	48.3	0
1080	GF	46.2	46.1	0
	F 1	48.4	48.3	0
1081	GF	46.1	46.1	0
	F 1	48.4	48.2	0
1082	GF	46.1	46.1	0
	F 1	48.4	48.2	0
1083	GF	46.1	46.1	0
	F 1	48.4	48.2	0
1084	GF	46.1	46.1	0
	F 1	48.3	48.2	0
1085	GF	46.1	46.1	0
	F 1	48.4	48.2	0
1086	GF	47.1	47.1	0
	F 1	49.3	49.1	0
1087	GF	47.1	47.1	0
	F 1	49.3	49.1	0
1088	GF	47.2	47.1	0
	F 1	49.4	49.2	0
1089	GF	47.2	47.1	0
	F 1	49.4	49.2	0
1090	GF	47.2	47.2	0
	F 1	49.4	49.3	0
1091	GF	47.3	47.2	0
	F 1	49.5	49.3	0
1092	GF	47.3	47.3	0
	F 1	49.5	49.4	0
1093	GF	47.4	47.3	0
	F 1	49.5	49.4	0
1094	GF	47.4	47.4	0
	F 1	49.6	49.4	0
1095	GF	47.5	47.5	0
	F 1	49.6	49.5	0
1096	GF	47.8	47.8	0
	F 1	50.1	50	0
1097	GF	47.7	47.7	0
	F 1	50.1	49.9	0
1098	GF	47.7	47.6	0

	F 1	50	49.9	0
1099	GF	47.6	47.6	0
	F 1	50	49.8	0
1100	GF	47.6	47.6	0
	F 1	50	49.8	0
1101	GF	47.5	47.5	0
	F 1	49.9	49.8	0
1102	GF	47.5	47.5	0
	F 1	49.9	49.7	0
1103	GF	47.4	47.4	0
	F 1	49.8	49.7	0
1104	GF	47.4	47.4	0
	F 1	49.8	49.6	0
1105	GF	47.4	47.3	0
	F 1	49.8	49.6	0
1106	GF	47.4	47.3	0
	F 1	49.8	49.5	0
1107	GF	47.4	47.3	0
	F 1	49.7	49.4	0
1108	GF	48.5	48.4	0
	F 1	50.9	50.7	0
1109	GF	48.5	48.4	0
	F 1	50.9	50.6	0
1110	GF	48.5	48.5	0
	F 1	50.9	50.6	0
1111	GF	48.6	48.5	0
	F 1	50.9	50.7	0
1112	GF	48.7	48.6	0
	F 1	51	50.7	0
1113	GF	48.7	48.6	0
	F 1	51	50.8	0
1114	GF	48.7	48.7	0
	F 1	51.1	50.9	0
1115	GF	48.8	48.7	0
	F 1	51.2	50.9	0
1116	GF	48.8	48.8	0
	F 1	51.2	51	0
1117	GF	48.9	48.8	0
	F 1	51.3	51.1	0
1118	GF	49	48.9	0
	F 1	51.4	51.1	0
1119	GF	49.3	49.2	0
	F 1	51.9	51.6	0
1120	GF	49.3	49.2	0
	F 1	51.8	51.5	0
1121	GF	49.3	49.1	0
	F 1	51.7	51.4	0

1122	GF	49.2	49	0
	F 1	51.7	51.4	0
1123	GF	49.1	49	0
	F 1	51.6	51.3	0
1124	GF	49.1	49	0
	F 1	51.5	51.2	0
1125	GF	49.1	48.9	0
	F 1	51.5	51.2	0
1126	GF	49	48.9	0
	F 1	51.4	51.2	0
1127	GF	49	48.9	0
	F 1	51.3	51.1	0
1128	GF	48.9	48.8	0
	F 1	51.3	51	0
1129	GF	48.8	48.8	0
	F 1	51.3	51	0
1130	GF	48.8	48.7	0
	F 1	51.2	50.9	0
1131	GF	48.6	48.5	0
	F 1	50.8	50.7	0
1132	GF	48.8	48.7	0
	F 1	51.2	50.9	0
1133	GF	49	48.9	0
	F 1	51.4	51.1	0
1134	GF	49.2	49.1	0
	F 1	51.6	51.3	0
1135	GF	49.4	49.3	0
	F 1	51.8	51.6	0
1136	GF	49.6	49.5	0
	F 1	52	51.8	0
1137	GF	49.8	49.8	0
	F 1	52.3	52	0
1138	GF	52.3	52.3	0
	F 1	54.5	54.3	0
1139	GF	52.1	52	0
	F 1	54.2	54.1	0
1140	GF	51.6	51.5	0
	F 1	53.9	53.6	0
1141	GF	51.3	51.3	0
	F 1	53.7	53.4	0
1142	GF	51	50.9	0
	F 1	53.4	53.1	0
1143	GF	50.8	50.7	0
	F 1	53.3	52.9	0
1144	GF	50.7	50.6	0
	F 1	53.2	52.8	0
1145	GF	50.6	50.5	0

	F 1	53.1	52.7	0
1146	GF	50	49.9	0
	F 1	52.5	52.1	0
1147	GF	50.2	50.2	0
	F 1	52.7	52.4	0
1148	GF	50.5	50.4	0
	F 1	52.9	52.6	0
1149	GF	50.7	50.6	0
	F 1	53.2	52.8	0
1150	GF	50.9	50.8	0
	F 1	53.4	53	0
1151	GF	51.2	51.1	0
	F 1	53.7	53.3	0
1162	GF	49.8	49.6	0
	F 1	52.1	51.8	0
1163	GF	50.1	50	0
	F 1	52.5	52.1	0
1164	GF	50.5	50.4	0
	F 1	52.9	52.5	0
1165	GF	51	50.9	0
	F 1	53.4	53	0
1166	GF	51.9	51.7	0
	F 1	54.2	53.7	0
1167	GF	52.5	52.3	0
	F 1	54.8	54.2	0
1294	GF	50	50	0
	F 1	52.4	52.3	0
1295	GF	50.5	50.5	0
	F 1	52.8	52.6	0
1321	GF	49.8	49.7	0
	F 1	52.3	52.1	0
1322	GF	49.5	49.4	0
	F 1	51.8	51.5	0
1323	GF	48.4	48.4	0
	F 1	50.6	50.5	0
1324	GF	48.3	48.3	0
	F 1	50.4	50.3	0
1325	GF	48.1	48.2	0
	F 1	50.2	50.1	0
1326	GF	48.1	48	0
	F 1	50	49.9	0
1327	GF	47.9	47.9	0
	F 1	49.8	49.7	0
1328	GF	47.9	47.7	0
	F 1	49.6	49.5	0
1356	GF	46.7	46.8	0
	F 1	48.6	48.5	0

1357	GF	46.9	46.8	0
	F 1	49	48.9	0
1376	GF	46.8	46.7	0
	F 1	48.4	48.3	0
1377	GF	47.3	46.9	0
	F 1	48.2	48.1	0

Appendix C Unattended Noise Monitoring Results

