Appendix G – Acoustic Assessment Report (Herring Storer)

Rochdale Holdings Pty Ltd A.B.N. 85 009 049 067 trading as:
HERRING STORER ACOUSTICS
Suite 34, 11 Preston Street, Como, W.A. 6152
P.O. Box 219, Como, W.A. 6952
Telephone: (08) 9367 6200
Facsimile: (08) 9474 2579
Email: hsa@hsacoustics.com.au

WASTEROCK PTY LTD

LOT 20 ADELAIDE STREET HAZELMERE

ACOUSTIC ASSESSMENT

SEPTEMBER 2012

OUR REFERENCE: 15172-2-12131

DOCUMENT CONTROL PAGE

ACOUSTIC ASSESSMENT
HAZELMERE

Job No: 12131

Document Reference: 15172-2-12131

FOR
WASTEROCK PTY LTD

DOCUMENT INFORMATION			
Author:	Paul Daly	**Checked By:**	George Watts
Date of Issue :	17 September 2012		

REVISION HISTORY

Revision	Description	Date	Author	Checked
1	Incorporating Client Comments	24/10/2012	HS	PLD

DOCUMENT DISTRIBUTION

Copy No.	Version No.	Destination	Hard Copy	Electronic Copy
1	1	Stratagen, Greg Rowe and Peter Moltoni		✓
1	2	Stratagen, Greg Rowe and Peter Moltoni		✓

CONTENTS

APPENDICIES

EXECUTIVE SUMMARY

Approval is being sought through the City of Swan to remediate an old landfill site at Lot 20 Adelaide Street, Hazelmere.

The existing site is approximately 150,000 square metres of land which previously has been utilised for landfill. To develop the site into habitable land, remediation of the soil is required to enable the removal of contaminants.

As a part of the site excavation works the proposed development will receive and process inert Construction waste (i.e. sand, soils, concrete, bricks and rocks etc) for reuse as clean fill on site. The process of receiving and processing inert excavation and C&D materials for reuse on site requires a Class 62 license for a Waste Transfer Station from the Department of Environment and Conservation. Inert materials recovered from the site will also be processed and reused as clean fill on site. Due to the amount of contaminated soil and landfill requiring remediation, the viability of the remediation works is dependent on the clean fill created by the Waste Transfer Station component particularly for “capping sand” (approx. 350,000 M3 required). Hence the remediation works would not be able to be conducted without the Waste Transfer Station.

Noise level assessment has been conducted for each component of the operations. Assessment of the site excavation works has been considered as construction activities, such as any other land development preparation for the use of residential, or commercial / industrial purposes (Regulation 13). The operation of the Waste Transfer Station component of the site remediation process has been considered as an individual component in regards to the noise emissions, and subsequently has been assessed against Regulation 7 in the *Environmental Protection (Noise) Regulations 1997*.

Noise received at the worst case neighbouring noise sensitive premises for noise emissions from the Waste Transfer Station has been calculated at 45 dB(A) for day time operations. This can be compared to the applicable assigned noise level criteria of 45 dB(A). This noise level allows for all equipment operating at the same time, i.e. crusher, rockbreaker, load, screen, excavator and truck operations. This would be considered unlikely as there would be limited operators available to allow for all the equipment to be operated at the same time.

Noise received at the residence for the site excavation component of the operations has been calculated at between 55 to 76 dB(A) dependent upon the location of equipment and the receivers. The site excavation, whilst operated simultaneously with the proposed Waste Transfer Station is deemed to be assessable as construction activities, therefore will be managed through a Construction Noise Management Plan.

Given these operating parameters, noise levels received at the nearest neighbouring has been calculated to comply with the *Environmental Protection (Noise) Regulations 1997* for the operating times as outlined in this assessment.

1. INTRODUCTION

Herring Storer Acoustics was commissioned by Greg Rowe and Associates, on behalf of Wasterock Pty Ltd to undertake an acoustical assessment of noise emissions from a proposed development site located at Lot 20 Adelaide Street, Hazelmere.

The existing site is approximately 150,000 square metres of land which previously has been utilised for landfill. To develop the site into habitable land, remediation of the soil is required to enable the removal of contaminants.

As a part of the site excavation works the proposed development will receive and process inert Construction waste (i.e. sand, soils, concrete, bricks and rocks etc) for reuse as clean fill on site. The process of receiving and processing inert excavation and C&D materials for reuse on site requires a Class 62 license for a Waste Transfer Station from the Department of Environment and Conservation. Inert materials recovered from the site will also be processed and reused as clean fill on site. Due to the amount of contaminated soil and landfill requiring remediation, the viability of the remediation works is dependent on the clean fill created by the Waste Transfer Station component particularly for “capping sand” (approx. 350,000 M3 required). Hence the remediation works would not be able to be conducted without the Waste Transfer Station.

Generally, site excavation work as detailed in this assessment is considered as construction, hence under the *Environmental Protection (Noise) Regulations 1997*, Regulation 13, noise emitted from the construction activities are exempt from compliance with the daytime noise levels outlined in Regulation 7, given the work is conducted between 07:00 and 19:00 Monday to Saturdays, excluding public holidays. This assessment takes into account the activities that are attributable to the site excavation and noise emissions separately from the proposed Waste Transfer Station.

Operational hours for the site will be Monday to Saturday 07:00 to 17:00 hours.

As part of the study, the following was carried out:

- Noise monitoring of existing noise levels for the surrounding environment, particularly traffic noise associated with Roe Highway and other industry in the area.
- Determination of noise levels associated with the Waste Transfer Station.
- Determination of noise levels associated with machinery required for the construction operations involved with the site excavation.
- Assess the predicted noise levels associated with the Waste Transfer Station at the nearest surrounding noise sensitive premises for compliance with the appropriate criteria.
- If exceedances are predicted, comment on possible noise amelioration options for compliance with the appropriate criteria.
- Advice to Wasterock Pty Ltd on the development of a Construction Noise Management to manage the noise emissions associated with the site excavation works.

For information, a locality plan is attached in Appendix A.

2. CRITERIA

The allowable noise level at the surrounding locales is prescribed by the *Environmental Protection (Noise) Regulations 1997*. Regulations 7 & 8 stipulate maximum allowable external noise levels determined by the calculation of an influencing factor, which is then added to the base levels shown below. The influencing factor is calculated for the usage of land within two circles, having radii of 100m and 450m from the premises of concern.

Table 1 - Baseline Assigned Outdoor Noise Level

Premises Receiving Noise	Time of Day	Assigned Level (dB)		
		$L_{A\ 10}$	$L_{A\ 1}$	$L_{A\ max}$
Noise sensitive premises within 15 metres of a dwelling	0700 - 1900 hours Monday to Saturday (Day)	45 + IF	55 + IF	65 + IF
	0900 - 1900 hours Sunday and Public Holidays (Sunday / Public Holiday Day Period)	40 + IF	50 + IF	65 + IF
	1900 - 2200 hours all days (Evening)	40 + IF	50 + IF	55 + IF
	2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and Public Holidays (Night)	35 + IF	45 + IF	55 + IF

Note: L_{A10} is the noise level exceeded for 10% of the time.
L_{A1} is the noise level exceeded for 1% of the time.
L_{Amax} is the maximum noise level.
IF is the influencing factor.

It is a requirement that received noise be free of annoying characteristics (tonality, modulation and impulsiveness), defined below as per Regulation 9.

"impulsiveness" means a variation in the emission of a noise where the difference between L_{Apeak} and $L_{Amax\ Slow}$ is more than 15 dB when determined for a single representative event;

"modulation" means a variation in the emission of noise that –

(a) is more than 3dB $L_{A\ Fast}$ or is more than 3 dB $L_{A\ Fast}$ in any one-third octave band;
(b) is present for more at least 10% of the representative assessment period; and
(c) is regular, cyclic and audible;

"tonality" means the presence in the noise emission of tonal characteristics where the difference between –

(a) the A-weighted sound pressure level in any one-third octave band; and
(b) the arithmetic average of the A-weighted sound pressure levels in the 2 adjacent one-third octave bands,

is greater than 3dB when the sound pressure levels are determined as $L_{Aeq,T}$ levels 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 $L_{A\ Slow}$ levels.

Where the noise emission is not music, if the above characteristics exist and cannot be practicably removed, then any measured level is adjusted according to Table 2 below.

Table 2 - Adjustments to Measured Levels

Where **tonality** is present	Where **modulation** is present	Where **impulsiveness** is present
+5 dB(A)	+5 dB(A)	+10 dB(A)

Note: These adjustments are cumulative to a maximum of 15 dB.

The nearest potential noise sensitive premises to the proposed development have been identified using the area map in Figure A2 in Appendix A.

The influencing factor at the closest identified premises has been assessed at either 2 or 0 dB, with the calculation based on the following:

Major Roads (Roe Highway) within outer circle
R1 + 2 dB

Hence, Table 3 summarises the Assigned Noise Levels for residences identified in Figure A2.

Table 3- Assigned Outdoor Noise Level

Receiver Type	Influencing Factor	Time of Day	Assigned Level (dB)		
			$L_{A\ 10}$	$L_{A\ 1}$	$L_{A\ max}$
R1	+2	Day	47	57	67
		Sunday / Public Holiday Day Period	42	52	67
		Evening	42	52	57
		Night	37	47	57
R2	0	Day	45	55	65
		Sunday / Public Holiday Day Period	40	50	65
		Evening	40	50	55
		Night	35	45	55
R3	Industrial	All Hours	65	80	90

Note: L_{A10} is the noise level exceeded for 10% of the time.
L_{A1} is the noise level exceeded for 1% of the time.
L_{Amax} is the maximum noise level.

Residences that fall into the type R1 receivers are A, B and C. All other residences highlighted on Figure A2 in Appendix A are type R2 receivers. R3 consist of Additional Use approval under the City of Swan Town Planning Scheme and for the purpose of this assessment has been classified as Industrial Use.

It should be noted that this area is currently transitioning to enable light industrial and composite residential / light industrial land uses. To provide a conservative assessment, the “on ground” usage has not been applied to the influencing factor for other surrounding premises. To clarify this, the site plan shown in Appendix A, details the observed activities for the surrounding properties. Observations conducted while on site indicate the land use is generally transport and other light industrial types. In saying this, until rezoned to allow light industrial and residential / light industrial land uses, the assessment has been based on a zoning of General Rural as per the Town Planning Scheme.

Once this area is rezoned to allow light industrial and composite residential / light industrial land uses, the amended influencing factors then applied would reduce the acoustic impacts relative to the assigned noise levels.

3. NOISE MONITORING

Previously the noise environment at the site and surrounding area was measured using automatic noise data loggers. The purpose of the monitoring was to evaluate daytime noise levels prior to the commencement of any development and establish noise level influence from other sources within the vicinity, such as traffic on the Roe Highway.

Generally, noise levels for the daytime periods were averaged at 59 dB(A). Noise monitoring results are available upon request.

4. CALCULATED NOISE LEVELS

Noise imissions at the nearest neighbouring residential premises, due to noise associated with the proposed waste transfer station, were modelled with the computer programme SoundPlan. Sound power levels used for the calculations are based on measured sound pressure levels of the same type of equipment for use on this site.

The modelling of noise levels has been based on noise sources and sound power levels shown in Table 4.

Table 4 – Sound Power Level –Noise Sources dB(A)

No.	Element Name	Unit	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	Sum
1	Truck Slow or Idle	dB(A) / unit	23	42	54	70	72	78	74	65	56	86
			28	41	58	67	76	76	73	62	54	
			41	49	63	71	80	75	69	59	51	
2	Screening Plant	dB(A) / unit	66	80	84	90	93	95	95	95	87	101
3	Front End Loader	dB(A) / unit	50	76	77	84	90	97	94	91	86	105
			52	64	74	85	93	97	95	90	82	
			62	72	80	89	95	95	93	92	77	
4	Excavator with Rockbreaker	dB(A) / unit	69	88	99	106	113	116	110	106	99	119
5	Excavator	dB(A) / unit	62	83	89	89	92	92	91	87	79	98
6	Terex J1175 Crusher (Max)	dB(A) / unit	57	81	97	94	101	103	103	99	92	113
			65	82	90	96	103	104	101	97	89	
			70	88	95	97	103	103	101	95	85	
7	Large Semi-Tipper	dB(A) / unit	35	54	66	82	84	90	86	77	68	98
			40	53	70	79	88	88	85	74	66	
			53	61	75	83	92	87	81	71	63	
8	Truck Loaded / Tipping "banging"	dB(A) / unit		84	94	101	107	110	111	111	109	117
9	Scraper	dB(A) / unit	68	80	103	110	108	112	117	111	104	120
10	Dozer (D10)	dB(A) / unit	55	72	86	92	99	99	99	97	91	109
			57	72	90	89	97	100	101	95	88	
			64	81	94	95	95	98	97	92	86	

Two operating scenarios have been developed due to assessment being based on noise emission from two different assessable noise activities. These scenarios are as follows:

1. Based on noise emissions from the above equipment, a worst case operating scenario was been developed where material is transported to and from site. This involves truck movement, truck tipping and loading, front end loader operation, excavator (including rockbreaker) and crusher / screening noise. The proposed site for the waste transfer station has been noted on Figure 1. Due to the site being elevated (RL of 36m compared to 28m for surrounding land) the area for the waste transfer station is to be flattened at a RL of 30m. This will provide a bund of 6m towards the southern side, which is the direction of the nearest noise sensitive premises. This topography has been incorporated into the scenario.

   Additionally, truck movements to the waste transfer station will be via the neighbouring property to the north, with access off Talbot Road.

2. The second scenario represents the site excavation works. This operation will be conducted using a dozer and scraper combination. Soil from the site will be removed, taken to the waste transfer station for processing and replaced once contaminants are removed. Due to the scraper / dozer being the dominant noise source they have formed the basis of the worst case scenario. Other equipment may be used for the site excavation, but it is felt this will be considerable less than the large units used in this scenario.

The following input data was used in the calculations:

a) Supplied Drawings, shown in part in Figure 1.

b) Sound Power Levels listed in Table 4.

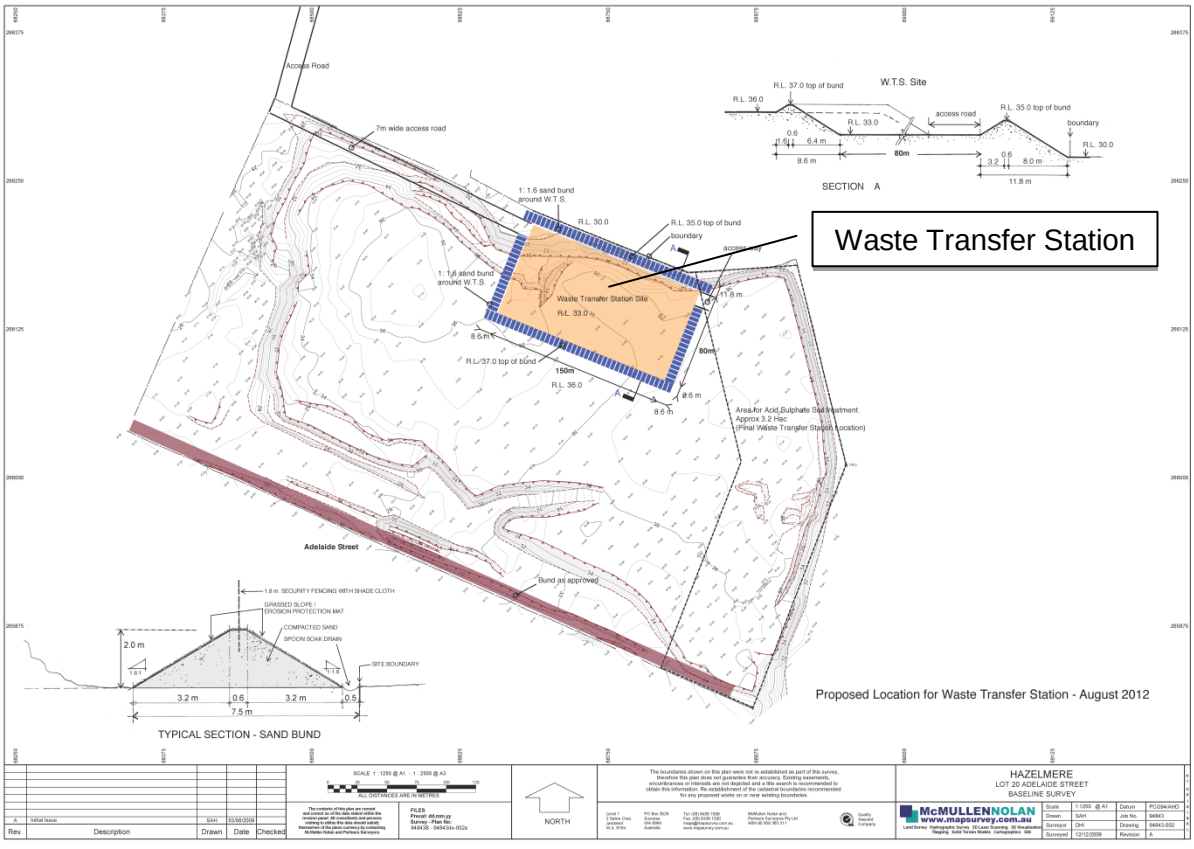

Figure 1 – Site Plan

Weather conditions for modelling were as stipulated in the Environmental Protection Authority's "*Draft Guidance for Assessment of Environmental Factors No. 8 - Environmental Noise"* and for the day periods are as listed in Table 5.

Table 5 – Weather Conditions

Condition	Day
Temperature	20°C
Relative humidity	50%
Pasquill Stability Class	E
Wind speed	4 m/s*

* From sources, towards receivers.

5. RESULTS

Calculated noise levels associated with the noise emissions from the Waste Trasfer Station, are summarised below in Table 6. Calculated noise contour plots for each scenario are contained in Appendix C.

Table 6 – Calculated Noise Levels at Nearest Neighbours

Scenario	Description	Location	Receiver Type	Calculated Noise Level, dB(A)
Scenario 1	Waste Transfer Station – Truck driving, Truck loading, FEL, Excavator, Excavator with Rockbreaker, Crusher and Screen	A	R1	45
		B		39
		C		46
		D	R2	45
		E		45
		F		44
		G		43
		H		42
		I		42
		J		43
		K	R3	54
		L		60
		M		52
		N		49
Scenario 2	Site excavation – Scraper and Dozer (Near to Residence)	A	R1	70
		B		71
		C		69
		D	R2	66
		E		62
		F		60
		G		58
		H		56
		I		55
		J	R3	55
		K		49
		L		53
		M		49
		N		55

6. ASSESSMENT

Based on monitored noise levels at the nearest residence, the noise emissions are considered unlikely to contain tonal characteristics for the Waste Transfer Station operations as the traffic noise influence from Roe Highway would mask tonality at the time of day associated with the proposed operation hours.

Due to the high noise emissions from the site excavation's operations (scraper and dozer) the assessment considers the noise level at the receiver's would be classified as tonal in characteristics. Hence, the applicable adjustments to the calculated noise levels, in accordance with the *Environmental Protection (Noise) Regulations 1997*, are listed in Table 7.

Table 7 – Applicable Adjustments and Assessable Level of Noise Emissions, dB(A)

Receiver	Operation	Calculated Noise Level, dB(A)	Applicable Adjustments To Measured Noise Levels, dB(A)			Assessable Noise Level, dB(A)
			Where Noise Emission Is Not Music			
			Tonality	Modulation	Impulsiveness	
A	**Scenario 1 Waste Transfer Station**	45	-	-	-	42
B		39	-	-	-	40
C		46	-	-	-	40
D		45	-	-	-	42
E		45	-	-	-	43
F		44	-	-	-	40
G		43	-	-	-	42
H		42	-	-	-	42
I		42	-	-	-	41
J		43	-	-	-	42
K		54	-	-	-	52
L		60	-	-	-	57
M		52	-	-	-	47
N		49	-	-	-	49
A	**Scenario 2 Site excavation**	70	+5	-	-	75
B		67	+5	-	-	72
C		69	+5	-	-	74
D		65	+5	-	-	70
E		62	+5	-	-	67
F		60	+5	-	-	65
G		58	+5	-	-	63
H		56	+5	-	-	61
I		55	+5	-	-	60
J		55	+5	-	-	60
K		49	+5	-	-	54
L		53	+5	-	-	58
M		50	+5	-	-	55
N		55	+5	-	-	60

As each scenario varies in the noise emission type and duration, assessment against Regulatory criterion descriptors also varies. Due to scenario 1 being an operation requiring licence / approval for operation from the local government authority, it has been considered under Regulation 7 and needs to comply with the stipulated criteria.

As the site excavation works (scenario 2) are classified under construction activities, compliance is considered against Regulation 13.

Hence, Table 9 summarises the applicable Assigned Noise Levels, and assessable noise level emissions, for the Waste Transfer Station considered.

Noise levels associated with the site excavation works will be managed with a Construction Noise Management Plan, with the noise levels calculated in this assessment forming the basis of the plan.

Table 9 – Assessment of Noise Levels (L_{A10} Criteria)

Scenario	Receiver	Receiver Type	Assessable Noise Level, dB(A)	Applicable Times of Day	Applicable L_{A10} Assigned Noise Level (dB)	Exceedance to Assigned Noise Level (dB)
Scenario 1	A	R1	42	Day	47	complies
	B		40			complies
	C		40			complies
	D	R2	42		45	complies
	E		43			complies
	F		40			complies
	G		42			complies
	H		42			complies
	I		41			complies
	J		42			complies
	K	R3	52		65	complies
	L		57			complies
	M		47			complies
	N		49			complies

7. CONCLUSION

Assessment has been conducted on the proposed Waste Transfer Station at Lot 20 Adelaide Street, Hazelmere.

Noise received at the worst case neighbouring noise sensitive premises has been calculated at 45 dB(A) for day time operations. This can be compared to the applicable assigned noise level criteria of 45 dB(A). This noise level allows for all equipment operating at the same time, i.e. crusher, rockbreaker, load, screen, excavator and truck operations. This would be considered unlikely as there would be limited operators available to allow for all the equipment to be operated at the same time.

Noise received at the residence for the site excavation component of the site remediation works has been calculated at between 55 to 76 dB(A) dependant on the location of equipment and the receivers. The site excavation, whilst operated simultaneously with the proposed waste transfer station is deemed to be assessable as construction activities, therefore will be managed through a Construction Noise Management Plan.

Given these operating parameters, noise levels received at the nearest neighbouring has been calculated to comply with the *Environmental Protection (Noise) Regulations 1997* for the operating times as outlined in this assessment.

APPENDIX A

FIGURE A1 – SITE LAYOUT
FIGURE A2 – NEIGHBOURING PREMISES

FIGURE A1 – SITE LAYOUT

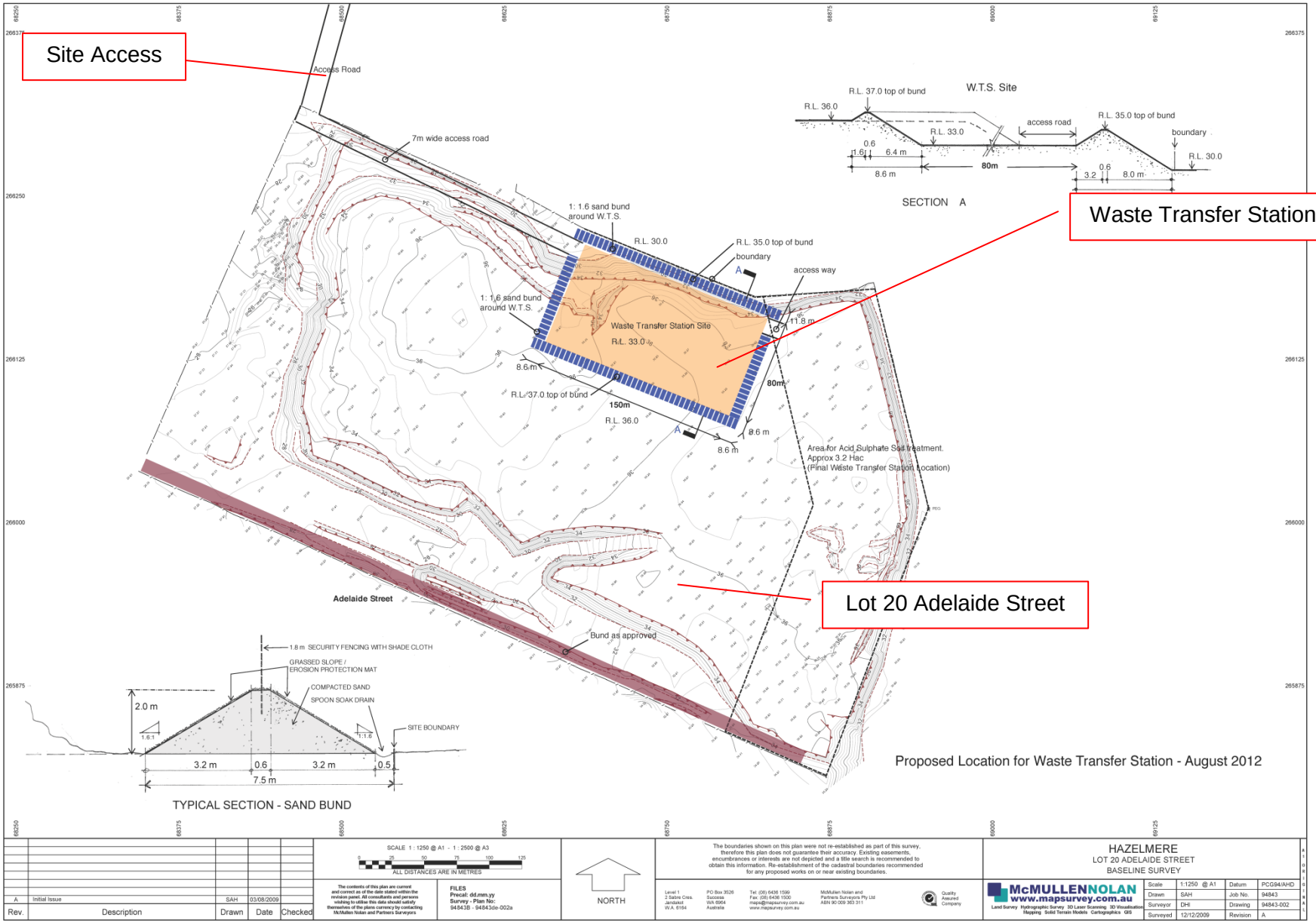

FIGURE A2 – NEIGHBOURING PREMISES

APPENDIX B

NOISE CONTOUR PLOT

Figure 1 – Scenario 1 Waste Transfer Station

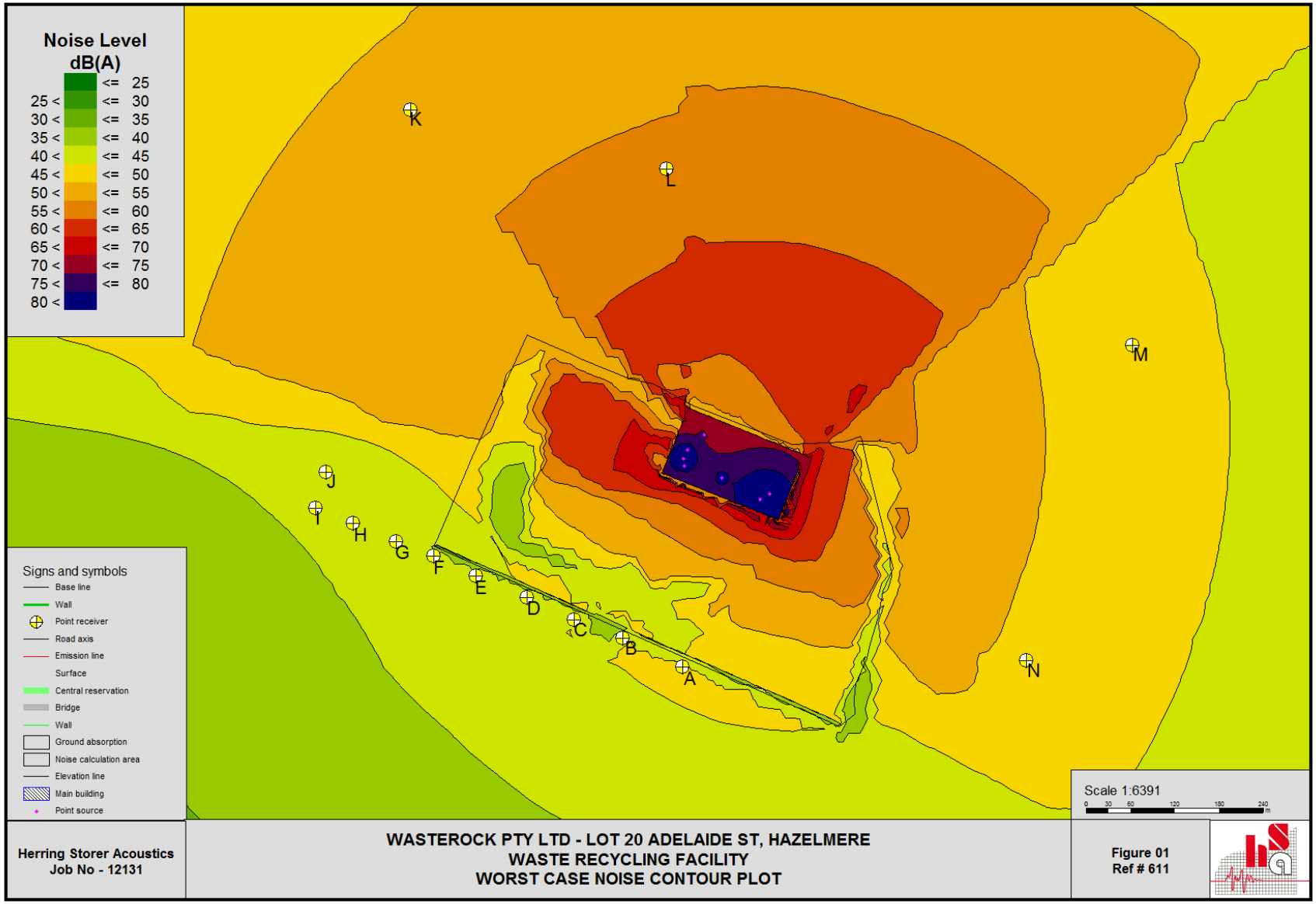

Figure 2 – Scenario 2 – Site Excavation