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MOLD INVESTMENTS LIMITED

PARRY'S QUARRY

NOISE ASSESSMENT REPORT

APRIL 2016

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MOLD INVESTMENTS LIMITED

PARRY'S QUARRY

NOISE ASSESSMENT REPORT

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DRAWINGS

1 INTRODUCTION

1.1.1 By instruction from Mold Investments Limited, Wardell Armstrong LLP were commissioned to undertake a noise assessment at Parry's Quarry, Pinfold Lane, Mold The noise assessment is required to support an application for an environmental permit application.

1.1.2 Parry's Quarry is located to the north-east of Mold. Parry's Quarry is a former mineral quarry, which is undergoing groundworks for a future use as a landfill site. To the north, the site is bound by Hunters Steel Coatings Ltd and Deeside Truck Services. To the east, the site is bound by woodland, and a service area with a hotel and restaurants, with the A55 immediately beyond. To the south the site is bound by woodland, with Parry's Cottages and the A494 Mold Road beyond. To the west the site is bound by Pinfold Lane, with Flintshire County Council Training Centre beyond.

1.1.3 Wardell Armstrong have prepared two previous noise assessment reports in support of the existing and proposed future operations at the site (Report Reference LE12936-003 and LE12936-004 dated April 2016). This report provides the information required by Natural Resource Wales (NRW) in support of a permit application including details of the noise surveys, noise data, assessment of the results in accordance with current guidance, including an assessment in accordance with BS4142:2014, and recommendations for noise mitigation as appropriate.

1.1 Existing Sensitive Receptors

1.1.4 The following existing sensitive receptors have been used in the assessment of noise from Parry's Quarry. They are detailed below in Table 1 and are shown on drawing LE12936-003.

Table 1: Existing Noise Sensitive Receptor Locations

Receptor		Grid Co-ordinates		Bearing from Site	Distance to Site
		Easting	Northing		
ESR1	Holiday Inn, A55 Service Area, Mold.	327905	366609	East	80m
ESR2	The Box, Pinfold Lane, Northop Hall, Mold. CH7 6HE	327604	366917	North	80m
ESR3	Flintshire County Council Refuse Collection and Highways Depot	327437	366231	South-west	32m
ESR4	6 Parry's Cottages, Mold Road, Ewloe, Deeside. CH5 3BQ	327789	366310	South	15m

2 ASSESSMENT METHODOLODGY

2.1 Consultation and Scope of Works

2.1.1 NRW have requested an assessment of the proposed noise sources at the landfill and transfer station and in accordance with the BS4142 methodology, along with clarification of whether the quarry and landfill activities will run in parallel.

2.1.2 NRW also provided a document titled *'Information requirements for permit applications that include computer modelling or spreadsheet calculations'*. The information required to be provided by this document has been included within this report.

2.2 Noise Survey:

2.2.1 As part of this assessment, Wardell Armstrong LLP has carried out an attended noise survey to assess the current ambient and background noise levels at proposed and existing receptor locations. The noise survey is discussed in Section 3 of this report.

2.3 Assessment Methodology Adopted:

2.3.1 Potential noise issues that are addressed as part of this assessment are as follows:

- Noise from the existing quarry operations at existing sensitive receptors; and
- Noise from the proposed landfill operations at existing sensitive receptors.

2.3.2 This noise assessment considers the suitability of the site for the proposed uses, and takes into account current guidance including:

- British Standard 4142: 2014 Methods for Rating and assessing industrial and commercial sound (BS4142);
- The World Health Organisation Guidelines for Community Noise, 1999 (WHO); and,
- British Standard 8233: 2014 Guidance on sound insulation and noise reduction for buildings (BS8233).

British Standard 4142:2014 (BS4142), Method for rating and assessing industrial and commercial sound:

2.3.3 BS4142 is used to rate and assess sound of an industrial and/or commercial nature including:

- sound from industrial and manufacturing processes;
- sound from fixed installations which comprise mechanical and electrical plant and equipment;

- sound from the loading and unloading of goods and materials at industrial and/or commercial premises; and
- sound from mobile plant and vehicles that is an intrinsic part of the overall sound emanating from premises or processes, such as that from forklift trucks, or that from train or ship movements on or around an industrial and/or commercial site.

2.3.4 The standard is applicable to the determination of the following levels at outdoor locations:

- rating levels for sources of sound of an industrial and/or commercial nature; and
- ambient, background and residual sound levels, for the purposes of:

1) Investigating complaints;

2) Assessing sound from proposed, new, modified or additional source(s) of sound of an industrial and/or commercial nature; and

3) Assessing sound at proposed new dwellings or premises used for residential purposes.

2.3.5 The purpose of the BS4142 assessment procedure is to assess the significance of sound of an industrial and/or commercial nature.

2.3.6 BS4142 refers to noise from the commercial source as the 'specific noise' and this is the term used in this report to refer to noise from the Parry's Quarry site. The 'specific noise' levels, of the existing operations have been measured and are detailed in Section 3 of this report.

2.3.7 BS4142 assesses the significance of impacts by comparing the specific noise level to the background noise level (L_{A90}). Section 3 provides details of the background noise survey undertaken.

2.3.8 Certain acoustic features can increase the significance of impacts over that expected from a simple comparison between the specific noise level and the background noise level. In particular BS4142 identifies that the absolute level of sound, the character, and the residual sound and the sensitivity of receptor should all be taken into consideration. BS4142 includes allowances for a rating penalty to be added if it is found that the specific noise source contains a tone, impulse and/or other characteristic, or is expected to be present. The specific noise level along with any applicable correction is referred to as the 'rating level'.

2.3.9 The greater the increase between the rating level over the background noise level, the greater the magnitude of the impact. The assessment criteria given by BS4142 are as follows:

- A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context.
- A difference of around +5dB is likely to be an indication of an adverse impact, depending on the context.
- The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.

2.3.10 During the daytime, BS4142 requires that noise levels are assessed over 1-hour periods. However, during the night-time, noise levels are required to be assessed over 15-minute periods.

2.3.11 Where the initial estimate of the impact needs to be modified due to context, BS4142 states that all pertinent factors should be taken into consideration, including:

- The absolute level of sound;
- The character and level of the residual sound compared to the character and level of the specific sound; and
- The sensitivity of the receptor and whether dwellings or other premises used for residential purposes will already incorporate design measures that secure good internal and/or outdoor acoustic conditions.

The World Health Organisation Guidelines for Community Noise, 1999 (WHO)

2.3.12 The WHO Guidelines for Community Noise 1999 suggest guideline values for internal noise exposure which take into consideration the identified health effects and are set, based on the lowest effect levels for general populations. Guideline values for annoyance which relate to external noise exposure are set at 50 or 55dB(A), representing day time levels below which a majority of the adult population will be protected from becoming moderately or seriously annoyed respectively.

2.3.13 The following guideline values are suggested by WHO:

- 35dB $L_{Aeq\ (16\ hour)}$ during the day time in noise sensitive rooms;
- 30dB $L_{Aeq\ (8\ hour)}$ during the night time in bedrooms;
- 45dB $L_{Af,max}$ during the night time in bedrooms;
- 50dB $L_{Aeq\ (16\ hour)}$ to protect majority of population from becoming moderately annoyed; and
- 55dB $L_{Aeq\ (16\ hour)}$ to protect majority of population from becoming seriously annoyed.

British Standard 8233: 2014 Guidance on sound insulation and noise reduction for buildings (BS8233)

2.3.14 British Standard 8233 bases its advice on the WHO Guidelines. With regards to offices and commercial premises BS 8233 recommends the following guideline values:

- 35-40dB $L_{Aeq,t}$ for Executive Offices;
- 35-40dB $L_{Aeq,t}$ for Staff/meeting rooms, training rooms;
- 45-55dB $L_{Aeq,t}$ for Concourses, Corridors, circulation spaces; and
- 50-55dB $L_{Aeq,t}$ for Department stores, Cafeteria, canteens, kitchens.

2.3.15 In addition, for internal noise levels BS8233 recommends a guideline value of 40dB $L_{Aeq\ (16\ hour)}$ for dining areas and also states;

"Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved."

2.3.16 Furthermore, with regard to external noise, the Standard states;

"For traditional external areas that are used for amenity space such as gardens and patios, it is desirable that the external noise level does not exceed 50 dB $L_{Aeq.\ T}$ with an upper guidance value of 55 dB $L_{Aeq.\ T}$ which would be acceptable in noisier environments. However, it is also recognised that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited.

3 NOISE AND VIBRATION SURVEY

3.1.1 Between the 30th September and the 2nd October 2015, Wardell Armstrong LLP carried out unattended noise surveys to measure the ambient and background noise level at the existing sensitive receptors, identified in Table 1.

3.1.2 Noise monitoring was carried out at each location for a period of 24 hours.

3.1.3 The noise measurements were made using the following Class 1, integrating sound level meters with appropriate calibrators;

- 2x 01dB Fusion sound level meters;
    - Serial Number 10711, and 10717.

3.1.4 The sound level meters were calibrated to a reference level of 94dB at 1kHz both before, and on completion of each noise survey. No drift in calibration was measured during the surveys.

3.1.5 A-weighted[1] L_{90}[2] and L_{eq}[3] noise levels were measured to assess the noise from Parry's Quarry. A-weighted L_{10}[4] noise levels, together with the maximum and minimum sound pressure levels, were also measured to provide additional information.

3.2 Measurement of Noise at Receptors

3.2.1 Noise measurements were taken at four monitoring locations, considered to be representative of the noise sensitive properties described in Table 1. The monitoring locations are as follows, and are shown on Drawing LE12936-003:

- Monitoring Location 1: At the eastern site boundary, and adjacent to the OK Diner at the A55 service area. The monitoring location is considered to be representative of the ambient noise level at ESR1.
- Monitoring Location 2: North of the site boundary on the southern side of Pinfold Lane and west of ESR2. The monitoring location is considered to be representative of the ambient noise level at ESR2.

[1] A' Weighting — An electronic filter in a sound level meter which mimics the human ear's response to sounds at different frequencies under defined conditions

[2] L_{90} — The noise level which is exceeded for 90% of the measurement period.

[3] L_{eqs} — Equivalent continuous noise level; the steady sound pressure which contains an equivalent quantity of sound energy as the time-varying sound pressure levels.

[4] L_{10} — The noise level which is exceeded for 10% of the measurement period.

- Monitoring Location 3: South-west of the site boundary and at the junction of Pinfold Lane, and the A494 Mold Road. The monitoring location is considered to be representative of the ambient noise level at ESR3.
- Monitoring Location 4: South of the site boundary, and north of Parry's Cottages on the A494 Mold Road. The monitoring location is considered to be representative of the ambient noise level at ESR4.

3.2.2 The noise monitoring was unattended, however observations made during the set-up and removal of the equipment identified the noise sources at the monitoring locations to be as follows:

- ***Road Traffic:*** Noise from vehicles on the A55, A494, and Pinfold Lane was dominant at each of the monitoring locations.
- ***Parry's Quarry:*** Noise from the pecker which was in use at Parry's Quarry was occasionally audible at monitoring locations 1, 3, and 4. No other noise from the site was audible at any of the monitoring locations.
- ***Other Noise Sources:*** The noise from aircraft was occasionally audible at each of the monitoring locations.

3.2.3 Road traffic was the dominant source of noise at monitoring locations 1 to 4, which are representative of the existing sensitive receptors.

3.2.4 The measured noise levels are shown in Appendix A.

4 NOISE IMPACT ASSESSMENT

4.1 Introduction

4.1.1 The quarry and landfill operations and transfer station will take place between 0600 and 1800 hours Monday to Friday, and between 0800 and 1300 hours Saturday. The nearest sensitive receptors are the same for both operations.

4.1.2 This assessment report will consider noise from each of the following scenarios at each of the four noise sensitive receptors;

- Scenario 1: Site Preparation
- Scenario 2: Phase 1 – Landfill and Transfer Station
- Scenario 3: Phase 2 – Landfill and Transfer Station
- Scenario 4: Phase 2 – Restoration
- Scenario 5: Phase 3 – Landfill and Transfer Station
- Scenario 6: Phase 3 – Restoration
- Scenario 7: Phase 4 – Landfill and Transfer Station
- Scenario 8: Phase 4 – Restoration
- Scenario 9: Phase 5 – Final Site Restoration

Assessment of Background Noise

4.1.3 Section 8 of BS4142 provides guidance on the selection of the background sound to be used in the assessment. BS4142 states that the background sound levels used for the assessment should be representative of the period being assessed (i.e. daytime or night-time periods), and that there is no "single" background sound level.

4.1.4 BS4142 states that the background sound levels used for the assessment should be representative of the period being assessed (i.e. daytime or night-time periods), and that there is no "single" background sound level. To aid in the identification of appropriate background noise levels during the night-time period, the measured night-time noise levels have been analysed as detailed in Table 2 and shown in Appendix A.

Table 2: Existing Noise Sensitive Receptor Locations				
	Receptor			
	ESR1 Holiday Inn, A55 Service Area, Mold	ESR2 The Box, Pinfold Lane, Northop Hall, Mold. CH7 6HE	ESR3 Flintshire County Council Refuse Collection and Highways Depot	ESR4 6 Parry's Cottages, Mold Road, Ewloe, Deeside. CH5 3BQ
Range of daytime background noise levels between 0700 and 1800 hours ($L_{A90\ 1\ hour}$)	55-60	66-67	58-62	53-56
Mean and median daytime background noise level between 0700 and 1800 hours	58	67	60	54
Range of night-time background noise levels between 0600 and 0700 hours ($L_{A90\ 15\ minutes}$)	56-58	60-65	56-61	48-53
Mean and median night-time background noise level between 0600 and 0700 hours	57	62	58	50
Daytime background noise level used in the BS4142 assessment	**58**	**67**	**60**	**54**
Night-time background noise level used in the BS4142 assessment	**57**	**62**	**58**	**50**

4.1.5 It is noted that the pecker was occasionally audible at each monitoring location. However, the assessment is based upon an L_{A90}, which is unlikely to be affected by short term impulsive noise, such as the noise from the pecker. Therefore, no corrections to the measured background noise level as a result of the noise from the Pecker being occasionally audible are required.

4.2 Assessment of Noise from Scenario 1: Site Preparation Operations

Specific Noise Assessment

4.2.1 The site preparation and landfilling operations include plant equipment and vehicle movements with noise and vibration emissions which may be perceptible at the nearest sensitive receptors. Therefore, an assessment has been carried out which considers the likely operational noise levels at existing sensitive receptors.

4.2.2 To determine the noise likely to be generated by the existing operations noise monitoring at the site has been carried out for the following scenario described below;

- Scenario 1: Site Preparation

4.2.3 Site observations indicated that, during the noise monitoring, all areas of the site were being worked, using large dump trucks, excavators, front loaders, dozer and a pecker.

4.2.4 To determine the levels of noise emitted from the plant which will be operational at the site, noise monitoring was carried out within the site boundary. Where possible, measurements were carried out close to where the main site activities were taking place. Monitoring was carried out in four locations nearest to site workings, described below;

- Monitoring Location 5: In the southern part of the site close to the quarry rim. Site workings in the quarry bottom were clearly visible including the use of an excavator and dump trucks.
- Monitoring Location 6: In the north western part of the site close to tipping of material using dump trucks.
- Monitoring Location 7: In the mid-western part of the site, close to the movement of dump trucks and a dozer.
- Monitoring Location 8: In the south-western part of the site close to the movement of dumpers and two excavators.

4.2.5 It was not possible the measure noise from the pecker whilst on-site. To predict noise from the pecker, noise emission values from British Standard 5228 -1:2009+A1:2014 "Code of Practice for noise and vibration control on construction and open sites have been utilised.

4.2.6 A further noise level measurement was carried out at the site, during a break period, when no activities were taking place. The measurement was required to provide a level for off-site noise sources in the absence of site noise, for use in the calculation procedure. The monitoring location is described below;

- Monitoring Location 9: In the mid-western part of the site close to the quarry rim. No site workings were being carried out during the noise monitoring at this location.

4.2.7 Attended monitoring was carried out throughout the on-site noise survey to allow observations and detailed notes to be made of the significant noise sources which contributed to each of the measured noise levels. The major noise sources identified at the monitoring locations were as follows.

- **Parry's Quarry:** Noise from quarry operations was dominant at locations 5 to 8. Noise included the use of large excavators, large dump trucks, and a dozer. The pecker was not being used during the site noise monitoring.
- **Road Traffic:** Noise from distant road traffic was audible during the noise monitoring at monitoring location 9, during periods when there was no site activity.
- **Other Noise Sources:** Noise from overflying aircraft, and from Hunter Steel Limited to the north of the northern site boundary, was audible at location 9 during periods when there was no site activity.

4.2.8 Calculations based on the measurement of noise levels taken at Parry's Quarry have been used to determine the level of site noise at the receptors.

4.2.9 The noise levels measured at locations 5, 6, 7 and 8, on the Parry's Quarry site have been used in the assessment and are shown in Table 3 below.

Table 3: Noise levels of the Equipment used at the Quarry (Figures in dB)

Monitoring Location		Measurement Time (Hours)	Measured dB L_{Aeq}
5	Excavator & dump trucks	1343-1400	60.6
		1400-1416	60.4
6	Dump trucks tipping	0928-0929	62.8
7	Dump truck movement and dozer	0931-0945	69.7
8	Excavator & dump trucks	0953-1008	66.8

4.2.10 Noise from site working is dominant at all on-site locations, 5, 6, 7 and 8.

4.2.11 However, noise from other sources, such as road traffic, overflying aircraft and Hunters Steel Coatings was also audible on occasions during the measurement of noise at Parry's Quarry. Therefore, the noise from site operations alone has been derived by calculation. The noise level from site working (i.e. in the absence of noise from other sources) has been calculated by the subtraction of the noise level which was measured without any contribution of noise from the site working, from the overall ambient noise level including the contribution of noise from site workings.

4.2.12 The operational noise level is then corrected to allow for attenuation due to the propagation of noise over distance, for the screening provided by the earth mounds and site topography etc, and for the on-time of the equipment in use

4.2.13 Conservative estimates of the barrier attenuation have been made. The actual attenuation provided by earth mounds, site fences, and shielding from other industrial

buildings is likely to be more than that used in the calculation. Therefore, the calculated levels are likely to be overstated.

4.2.14 A calculation has been carried out to show the noise level at receptors without the operation of the pecker for the night-time period (0600 to 0700 hours) and with the operation of the pecker during the daytime (0700-1800 hours). A summary of the calculation is shown in Table 4 and Table 5 below. The full calculation is set-out in Appendix B.

Table 5: Assessment of the Measured Site Noise Levels at Receptors - Daytime (Figures in dB(A))

Receptor	On-site Monitoring Location	Measured L_{eq}	Residual Noise Level from off-site sources	Site Noise Level	Total Distance, Barrier and on-time Attenuation	Calculated Site Noise at Receptors	Combined Site Noise at Receptors
ESR1	5	60.6	58.0	57.1	-17.2	39.9	49.8
	5	60.4	58.0	56.7	-17.2	39.4	
	BS5228 Item 11 Table C.9			93.0	-44.1	48.9	
ESR2	6	62.8	51.1	62.5	-45.6	16.9	48.7
	7	69.7	51.1	69.6	-39.5	30.1	
	BS5228 Item 11 Table C.9			93.0	-44.4	48.6	
ESR3	8	66.8	51.1	66.7	-23.1	43.6	50.2
	BS5228 Item 11 Table C.9			93.0	-43.9	49.1	
ESR4	5	60.6	58.0	57.1	-17.1	40.0	49.8
	5	60.4	58.0	56.7	-17.1	39.6	
	BS5228 Item 11 Table C.9			93.0	-44.1	48.9	

Table 4: Assessment of the Measured Site Noise Levels at Receptors – Night-time (Figures in dB(A))							
Receptor	On-site Monitoring Location	Measured L_{eq}	Residual Noise Level from off-site sources	Site Noise Level	Total Distance, Barrier and on-time Attenuation	Calculated Site Noise at Receptors	Combined Site Noise at Receptors
ESR1	5	60.6	58.0	57.1	-17.2	39.9	42.7
	5	60.4	58.0	56.7	-17.2	39.4	
ESR2	6	62.8	51.1	62.5	-45.6	16.9	30.3
	7	69.7	51.1	69.6	-39.5	30.1	
ESR3	8	66.8	51.1	66.7	-23.1	43.6	43.6
ESR4	5	60.6	58.0	57.1	-17.1	40.0	42.8
	5	60.4	58.0	56.7	-17.1	39.6	

Acoustic Feature and Rating Penalties

4.2.15 Observations made during the noise survey indicated that the specific noise from activities at Parry's Quarry was intermittent during the monitoring. Therefore in accordance with BS4142, it is considered that 3dB should be added to the specific noise level for that period. It is also considered that 3dB should be added as the impulsivity of noise is just perceptible at nearby sensitive receptors. It is considered that that there is no significant tonal component to the specific noise and therefore no correction has been applied for tonality.

Comparison of Background and Specific Noise Levels

4.2.16 In accordance with BS4142, the specific noise levels of the operations in the vicinity of the existing dwellings has been compared with the corresponding measured daytime and night-time background noise levels, as shown in Table 5 and Table 6. It should be noted that ESR3 has been excluded from the night-time assessment as the receptor is an office and therefore is not considered to be a sensitive receptor during the night-time period.

Table 5: Daytime BS4142 Assessment of the quarry operations at Existing Sensitive Receptors– (Figures in dB(A))				
	ESR 1	**ESR 2**	**ESR 3**	**ESR 4**
Specific Noise i.e. noise level of the operational activities	50	49	50	50
Acoustic Feature Correction	+6	+6	+6	+6
Rating Level	56	55	56	56
Daytime Background Noise Level (dB L_{A90})	58	67	60	54
Excess of rating over background level	-2	-12	-4	+2

Table 6: Night-time BS4142 Assessment of the quarry operations at Existing Dwellings– (Figures in dB(A))			
	ESR 1	**ESR 2**	**ESR 4**
Specific Noise i.e. noise level of the operational activities	43	30	43
Acoustic Feature Correction	+6	+6	+6
Rating Level	49	36	49
Night-time Background Noise Level (dB L_{A90})	57	62	50
Excess of rating over background level	-8	-26	-1

4.2.17 The results of the BS4142 assessment in Table 5 and Table 6 indicate that without mitigation measures that the rating level from site preparation works at Parry's Quarry will be below background noise levels background noise levels during both the daytime and night-time period at nearby existing sensitive receptors with the exception of ESR4. This is an indication of the specific sound source having a **low impact** and therefore it is considered that there is no need to modify the estimate of impact due to context.

4.2.18 However, at ESR4, the noise from the site preparation at Parry's Quarry is only slightly above background and mitigation measures are not required. In accordance with BS4142, there is a **moderate adverse** impact of noise from site preparation of Parry's Quarry at ESR4.

4.3 Assessment of Noise from Scenarios 2 to 9; Proposed Landfill Operations and Transfer Station

Specific Noise

4.3.1 The site preparation and landfilling operations and transfer Station include plant equipment and vehicle movements with noise and vibration emissions which may be perceptible at the nearest sensitive receptors. Therefore, an assessment has been carried out which considers the likely operational noise levels at existing sensitive receptors.

4.3.2 To determine the noise likely to be generated by the future operations, noise predictions have been carried out using SoundPLAN (Version 7.4) computer software.

4.3.3 Noise modelling has been carried out for each of the following scenarios described below;

- Scenario 2: Phase 1 - Landfill and Transfer Station
- Scenario 3: Phase 2 – Landfill and Transfer Station
- Scenario 4: Phase 2 – Restoration
- Scenario 5: Phase 3 – Landfill and Transfer Station
- Scenario 6: Phase 3 – Site Restoration
- Scenario 7: Phase 4 – Landfill and Transfer Station
- Scenario 8: Phase 4 – Site Restoration
- Scenario 9: Phase 5 – Final Site Restoration

4.3.4 The equipment used in the noise model is described in Table 7 below.

Table 7: Details of the Equipment used in the Noise Model

Item		Noise Level			On-Time (%)	Speed (kph)
		Data Location Table	Power (kW)	Noise Level (SWL/dB(A))		
1	Hydraulic Excavator	BS5228 - Table C.10	184	108	83	--
2	Articulated Dump truck	BS5228 - Table C.10	239	115	83	15
3	Bulldozer	BS5228 - Table C.10	138	106	83	--
4	Loading Shovel	BS5228 - Table C.10	232	108	83	5
5	Tipper Lorry	BS5228 - Table C.10	--	107	10 loads per hour	10
6	CHP Engine	Manufacturers Data	--	65dB(A) @ 10m	100%	--
7	Gas Flare	Manufacturers Data	--	69dB(A) @ 10m	100%	--

4.3.5 Each item of equipment has been included into the noise model at the approximate location in which it would be when operating normally during each phase.

4.3.6 Haul roads around the site are proposed to be low grade, and used for access and maintenance. The construction of these access roads is likely to only occur for a short time period, but is likely to recur often as the operations move. However, the equipment used for the construction of these roads is likely to be the same as is required for the working of the landfill. the noise from the construction of these haul roads has not been considered as a separate noise source or operation.

4.3.7 Topographical data for each phase of working at the quarry has been provided by the client and includes the finished working height, and any bunds.

4.3.8 The following assumptions have been made when carrying out the noise predictions;

- The front loader and dozer will move at an average speed of 5kph.
- Articulated dump trucks will move at an average speed of 15kph
- The dozer and excavator are assumed to operate for 100% of the time.
- Only one HGV, one dozer and one excavator will be on-site at any one time during normal operations.
- There will be 4 dump trucks working during normal operations.
- There will be no external public announcement systems on the site and no external telephone bells.
- There will be no other externally mounted equipment required.

4.3.9 The calculated noise levels for each of the eight scenarios is detailed in full in Appendix B, and noise contour plots are attached to this report in Figures 1 to 9. To present a 'worst case scenario' only the highest calculated noise level from scenarios 2 to 9 for each receptor has been assessed.

4.3.10 To present a worst-case scenario, the noise from each phase of the quarry has been predicted at the first floor level for each dwelling.

Acoustic Features and Rating Penalties

4.3.11 It is considered that the specific noise from landfill activities and transfer station at Parry's Quarry will be intermittent therefore a 3dB penalty has been added. It is also considered that a further 3dB should be added as the impulsivity of noise will be just perceptible at nearby sensitive receptors, as it is with quarry operations at the site. It is considered that that there will be no significant tonal component to the specific noise and therefore no correction has been applied for tonality.

Comparison of Background and Specific Noise Levels

4.3.12 In accordance with BS4142, the highest predicted specific noise levels of the operations in the vicinity of the existing dwellings has been compared with the corresponding measured daytime and night-time background noise levels, as shown in Table 8 and Table 9. It should be noted that ESR 3 has been excluded from the night-time assessment as the receptor is an office and therefore is not considered to be a sensitive receptor during the night-time period.

Table 8: Daytime BS4142 Assessment of the Highest Predicted Noise Level from Scenarios 2 to 9 Operations at Existing Dwellings – (Figures in dB(A))

	ESR 1	ESR 2	ESR 3	ESR 4
Specific Noise i.e. noise level of the operational activities	44	41	53	42
Acoustic Feature Correction	+6	+6	+6	+6
Rating Level	50	47	59	48
Daytime Background Noise Level (dB L_{A90})	58	67	60	54
Excess of rating over background level	-8	-20	-1	-6

Table 9: Night-time BS4142 Assessment of the Highest Predicted Noise Level from Scenarios 2 to 9 Operations at Existing Dwellings – (Figures in dB(A))

	ESR 1	ESR 2	ESR 4
Specific Noise i.e. noise level of the operational activities	45	42	46
Acoustic Feature Correction	+6	+6	+6
Rating Level	51	48	52
Night-time Background Noise Level (dB L_{A90})	57	62	50
Excess of rating over background level	-6	-14	+2

4.3.13 The results of the BS4142 assessment in Table 5 and Table 6 indicate that without mitigation measures that the rating level from landfilling and transfer station and site restoration at Parry's Quarry will be below background noise levels background noise levels during both the daytime and night-time period at nearby existing sensitive receptors with the exception of ESR4 between 0600 and 0700 hours. This is an indication of the specific sound source having a **low impact** and therefore it is considered that there is no need to modify the estimate of impact due to context with

the exception of ESR4 between 0600 and 0700 hours.

4.3.14 At ESR4, the noise from Parry's Quarry will slightly exceed the background noise level but only between 0600 and 0700 hours, and when considered for a first floor window only. For ground floor windows, the impact is negligible at ESR4 during the daytime and night-time.

4.3.15 For 1st floor windows between 0600 and 0700 hours noise from Parry's Quarry at ESR4 exceeds the background noise level by 2dB. When assessed in accordance with BS4142 the noise impact between 0600 and 0700 hours is **adverse** during Phase 1. During all other phases, between 0600 and 0700 hours the noise at ESR4 is lower.

Uncertainty

4.3.16 To reduce measurement uncertainty, the following steps have been taken:

- The background noise measurement locations were selected to be representative of the background noise level at the closest proposed receptors to the commercial premises. In accordance with guidance the sound level meter was mounted vertically on a tripod 1.5m above the ground. Monitoring locations were also more than 3.5 metres from any other reflecting surfaces;
- The background noise measurements were undertaken during dry and calm weather conditions;
- The background noise measurements were undertaken over a whole night-time period, subdivided into fifteen minute periods in accordance with the reference period required by BS4142;
- The results of each measurement period were reported to the nearest 0.1dB; and
- Noise measurements were made using Class 1, integrating sound level meters.

5 CONCLUSIONS

5.1.1 Wardell Armstrong has carried out a noise assessment of the site preparation the proposed landfill and transfer station, and site restoration at Parry's Quarry, it includes a noise survey carried out in accordance with current guidance.

5.1.2 This noise assessment report has been prepared in support of an environmental permit application.

5.1.3 Noise from the different phases of operation at Parry Quarry, when used for landfill, have been assessed, and comprise site preparation, landfill, transfer station, and site restoration.

5.1.4 On-site noise monitoring and computer modelling have been used to predict the noise from the different phases of the landfill and transfer station at each receptor. Using these predicted specific noise levels, an assessment in accordance with BS4142 has been prepared.

5.1.5 The assessment has demonstrated that noise from the site preparation, landfill and transfer station operations, and restoration phase of the quarry is below the measured background noise level during the daytime and night-time (between 0600 and 0700 hours), with the exception of site preparation at ESR4. At ESR4, noise from the site preparation works during the daytime only, is 2dB(A) above the background noise level.

5.1.6 When assessed in accordance with the criteria in BS4142, this impact is considered to be **low** at existing receptors, with the exception of ESR4, where it is considered to be **moderate adverse**. The noise from Parry's Quarry is only marginally above the background noise level, and therefore mitigation measures are not required.

APPENDICES

Appendix A Noise Monitoring Results

Appendix A

Noise Monitoring Results

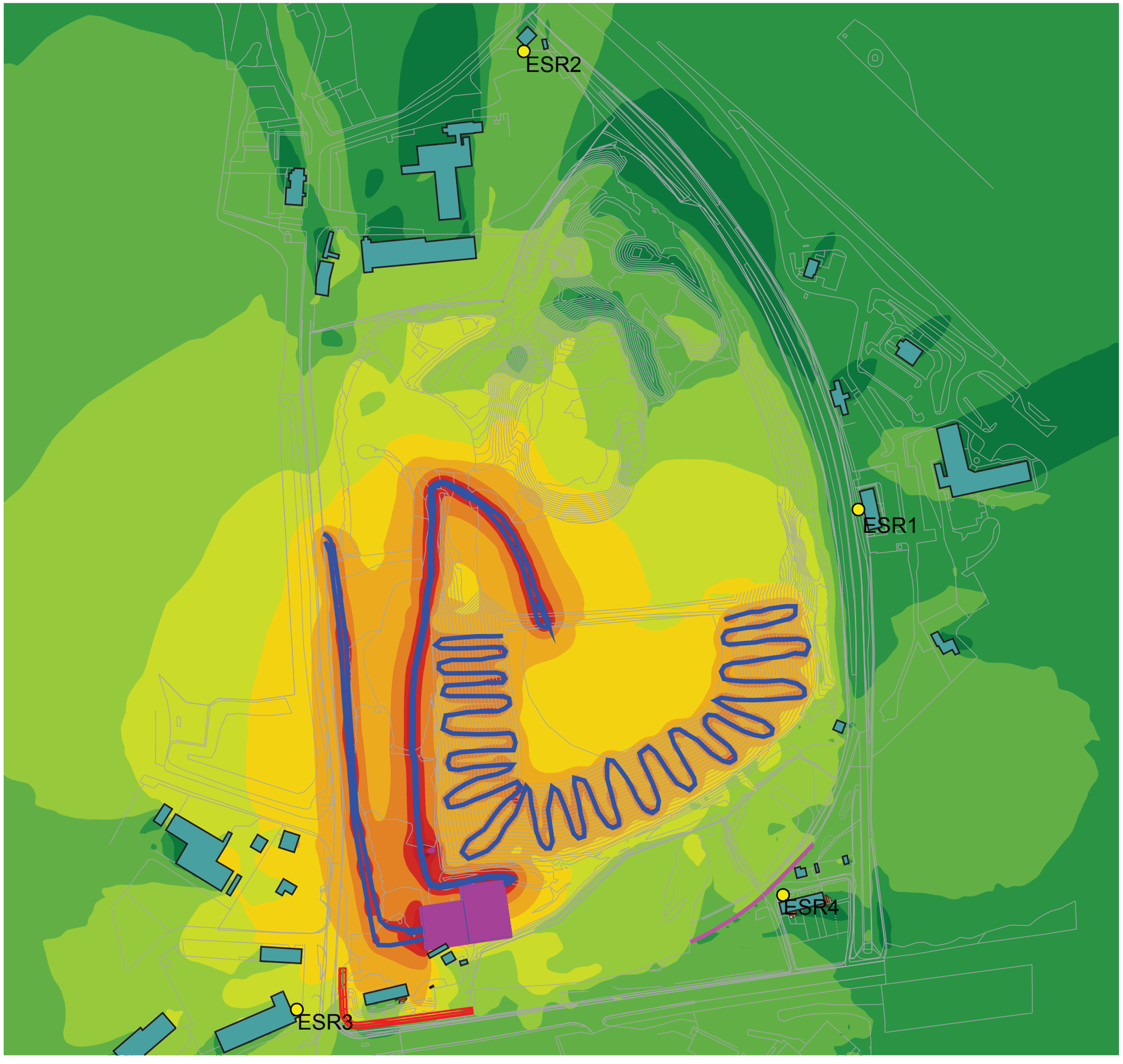
Monitoring Location 1					
Time	**L_{Aeq} (dB)**	**$L_{A\ min}$ (dB)**	**$L_{A\ max}$ (dB)**	**L_{A90} (dB)**	**L_{A10} (dB)**
30/09/2015 – 01/10/2015 - Night Time					
2300-2330	55.5	42.4	63.2	50.4	58.2
2330-0030	53.6	37.5	63.6	47.1	56.6
0030-0130	50.1	34.7	61.0	41.8	53.5
0130-0230	54.4	36.5	71.3	46.7	57.3
0230-0330	51.5	32.9	60.9	41.2	54.9
0330-0430	52.8	33.8	63.1	43.4	56.3
0430-0530	54.2	36.3	62.3	49.0	57.2
0530-0630	58.2	51.3	64.5	55.7	59.7
0630-0700	59.5	55.1	65.1	57.8	60.6
30/09/2015 - Daytime					
1430-1530	60.8	53.8	70.6	58.3	62.5
1530-1630	60.9	55.9	66.7	58.8	62.4
1630-1730	61.3	56.3	68.4	59.6	62.6
1730-1830	61.2	55.6	65.6	59.2	62.7
1830-1930	59.4	55.1	62.8	57.4	60.7
1930-2030	59.6	53.8	65.4	57.2	61.2
2030-2130	57.7	49.6	63.8	54.6	59.5
2130-2230	57.1	46.5	64.8	53.1	59.3
2230-2300	56.1	46.1	62.8	51.6	58.6
01/10/2015 - Daytime					
0700-0730	60.3	56.9	65.3	58.6	61.3
0730-0830	60.2	57.0	66.0	58.5	61.3
0830-0930	58.6	53.8	62.7	57.0	59.8
0930-1030	59.4	54.9	67.9	57.4	60.9
1030-1130	59.1	51.9	70.5	56.0	60.8
1130-1230	57.8	50.0	65.1	55.1	59.5
1230-1330	59.0	52.8	73.0	56.5	60.5
1330-1430	58.3	53.6	64.5	56.3	59.6

Monitoring Location 2					
Time	**L_{Aeq} (dB)**	**$L_{A\ min}$ (dB)**	**$L_{A\ max}$ (dB)**	**L_{A90} (dB)**	**L_{A10} (dB)**
01/10/2015 – 02/10/2015 - Night Time					
2300-2330	63.6	49.3	71.7	54.8	66.9
2330-0030	61.5	38.4	80.9	49.3	65.4
0030-0130	58.6	34.3	71.6	42.4	63.6
0130-0230	62.3	35.5	71.6	47.0	66.3
0230-0330	59.9	35.2	70.9	42.7	64.7
0330-0430	59.8	35.1	70.5	42.5	64.4
0430-0530	61.9	39.0	71.0	49.1	65.8
0530-0630	65.3	51.8	72.6	59.1	68.1
0630-0700	67.8	55.8	73	64.2	69.9
01/10/2015 - Daytime					
1530-1630	69.1	61.1	74.9	66.2	70.7
1630-1730	69.7	60.5	74.7	67.3	71.1
1730-1830	69.6	57.5	74.1	67.0	71.1
1830-1930	68.3	58.9	77.0	64.7	70.2
1930-2030	67.1	56.0	75.8	62.9	69.4
2030-2130	66.0	52.7	72.9	60.3	68.6
2130-2230	64.1	49.7	73.3	56.5	67.4
2230-2300	64.4	50.7	73.0	55.8	67.6
02/10/2015 - Daytime					
0700-0730	69.1	61.0	74.3	66.2	70.8
0730-0830	70.0	63.7	76.9	67.7	71.4
0830-0930	69.7	60.4	79.7	66.5	71.5
0930-1030	69.0	60.2	84.0	65.8	70.7
1030-1130	69.0	58.1	73.7	66.2	70.6
1130-1230	69.2	58.3	75.9	66.6	70.7
1230-1330	69.3	60.4	79.0	66.6	70.7
1330-1430	69.4	57.1	85.3	66.7	70.9
1430-1530	69.5	59.7	74.8	67.0	71.0

Monitoring Location 3					
Time	**L_{Aeq} (dB)**	**$L_{A\ min}$ (dB)**	**$L_{A\ max}$ (dB)**	**L_{A90} (dB)**	**L_{A10} (dB)**
30/09/2015 – 01/10/2015 - Night Time					
2300-0000	62.6	37.3	80.9	43.8	65.5
0000-0100	59.7	29.7	83.5	37.9	60.8
0100-0200	58.1	28.1	79.5	35.6	58.6
0200-0300	57.0	32.8	82.1	39.4	55.1
0300-0400	55.9	31.3	82.2	37.3	55.7
0400-0500	61.4	28.5	82.5	38.3	60.9
0500-0600	68.3	42.4	84.2	48.5	72.3
0600-0700	69.6	49.6	85.2	57.8	73.5
30/09/2015 - Daytime					
1500-1600	68.3	49.5	79.0	59.8	71.7
1600-1700	68.1	54.3	87.8	62.0	70.6
1700-1800	68.1	50.4	87.8	60.3	70.7
1800-1900	67.9	51.7	85.0	58.1	71.1
1900-2000	69.2	52.2	83.4	57.6	73.1
2000-2100	68.4	48.3	85.1	53.9	72.5
2100-2200	66.8	46.9	84.2	51.6	70.7
2200-2300	67.0	42.3	89.4	49.0	70.8
01/10/2015 - Daytime					
0700-0800	72.2	55.7	85.8	63.2	75.4
0800-0900	72.2	53.9	86.8	63.3	75.5
0900-1000	71.4	52.9	83.1	60.1	75.3
1000-1100	70.6	50.9	88.1	59.1	74.6
1100-1200	70.9	50.5	83.3	58.8	75.0
1200-1300	71.0	51.3	93.2	58.4	74.5
1300-1400	71.1	51.9	85.6	59.2	74.8
1400-1500	71.1	49.2	83.6	59.8	75.0

Monitoring Location 4					
Time	**L_{Aeq} (dB)**	**$L_{A\ min}$ (dB)**	**$L_{A\ max}$ (dB)**	**L_{A90} (dB)**	**L_{A10} (dB)**
01/10/2015 – 02/10/2015 - Night Time					
2300-0000	57.6	41.5	76.0	48.1	61.6
0000-0100	53.7	31.6	71.0	41.1	55.3
0100-0200	51.9	32.3	72.1	39.7	50.7
0200-0300	51.0	33.1	72.6	38.2	50.0
0300-0400	50.8	30.6	70.0	37.1	50.2
0400-0500	52.7	29.8	70.3	39.1	53.9
0500-0600	58.2	37.2	71.3	44.5	63.4
0600-0700	61.3	44.7	71.4	49.7	65.2
01/10/2015 - Daytime					
1600-1700	62.8	46.8	74.7	55.6	65.5
1700-1800	62.7	49.1	84.0	54.1	64.9
1800-1900	62.0	51.8	70.4	55.2	65.1
1900-2000	62.0	51.1	74.9	55.2	65.1
2000-2100	61.6	47.2	72.0	53.3	65.5
2100-2200	60.1	47.4	71.8	51.7	64.5
2200-2300	59.0	45.1	70.1	50.9	63.5
02/10/2015 - Daytime					
0700-0800	63.3	50.3	71.6	55.2	66.2
0800-0900	63.0	50.9	74.8	55.1	65.9
0900-1000	62.1	47.9	71.4	53.3	65.3
1000-1100	62.4	47.3	70.8	52.9	65.6
1100-1200	62.6	47.9	76.9	53.1	65.5
1200-1300	62.5	47.5	72.5	53.6	65.5
1300-1400	62.7	47.5	74.8	54.6	65.5
1400-1500	62.3	47.2	77.8	53.5	65.1
1500-1600	62.4	47.1	72.0	54.4	65.3

Appendix B Noise Contour Plots



Parry's Quarry

LE12936

Scenario 2 - Phase 1 Landfill and Transfer Station

Noise Contour Plot

Drawn By: R Calvert

Checked By: R Calvert

Approved By: Mark Dawson

17/06/2016

Signs and symbols

- Existing NSR
- Existing Buildings
- Road axis
- Emission line
- Site Boundary
- Point source
- Wall
- Transfer Station

Noise levels
in $L_{eq\ 16\ hour}$ dB(A)

<	35
35 -	40
40 -	45
45 -	50
50 -	55
55 -	60
60 -	65
65 -	70
70 -	75
75 -	80
80 -	85
>=	85

N

Length scale 1:3000

0 30 60 90 m

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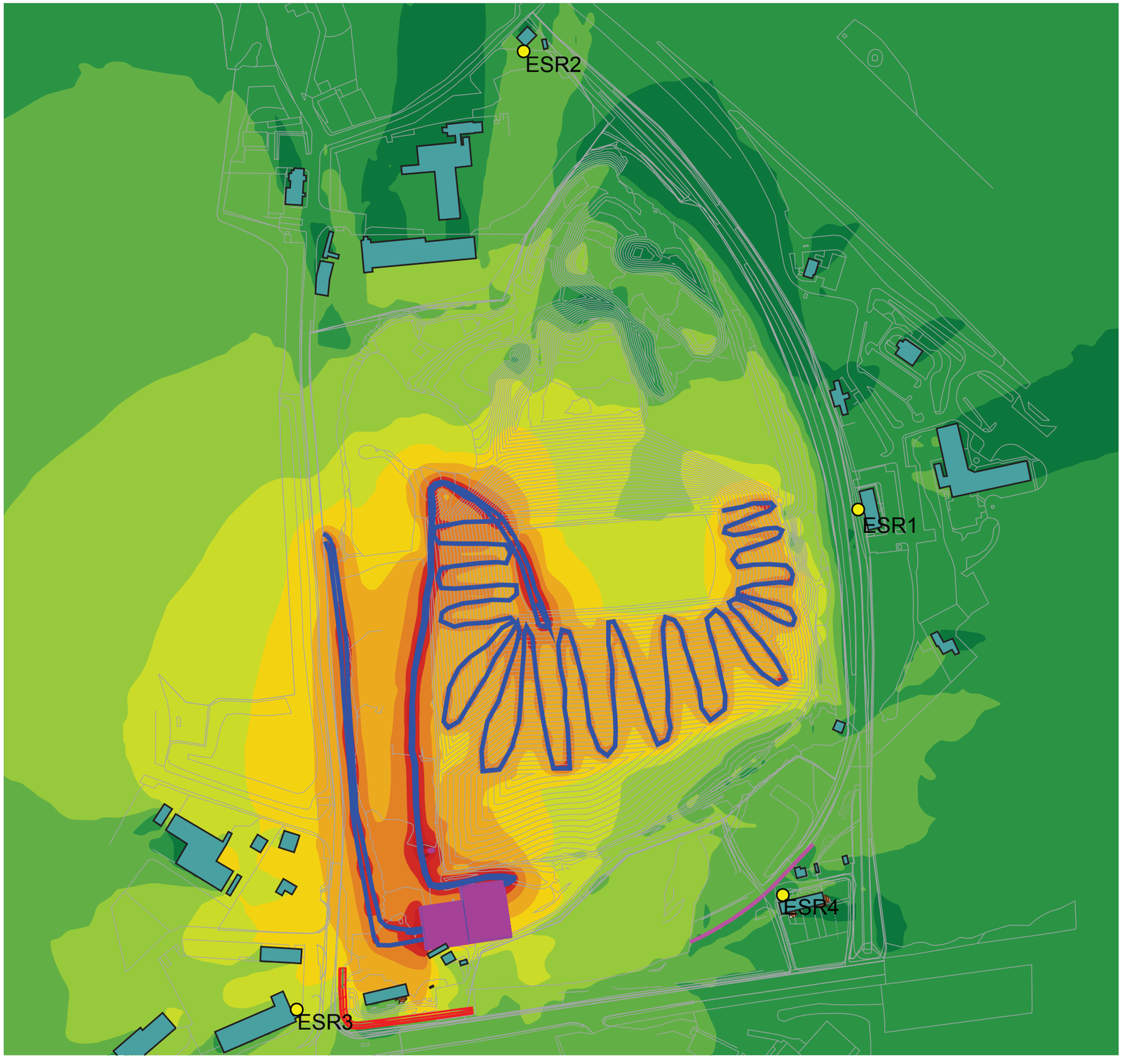

Parry's Quarry

LE12936

Scenario 3 - Phase 2 Landfill and Transfer Station

Noise Contour Plot

Drawn By: R Calvert

Checked By: R Calvert

Approved By: Mark Dawson

17/06/2016

Signs and symbols

- Existing NSR
- Existing Buildings
- Road axis
- Emission line
- Site Boundary
- Point source
- Wall
- Transfer Station

Noise levels
in $L_{eq\ 16\ hour}$ dB(A)

<	35
35 -	40
40 -	45
45 -	50
50 -	55
55 -	60
60 -	65
65 -	70
70 -	75
75 -	80
80 -	85
>=	85

N

Length scale 1:3000

0 30 60 90 m

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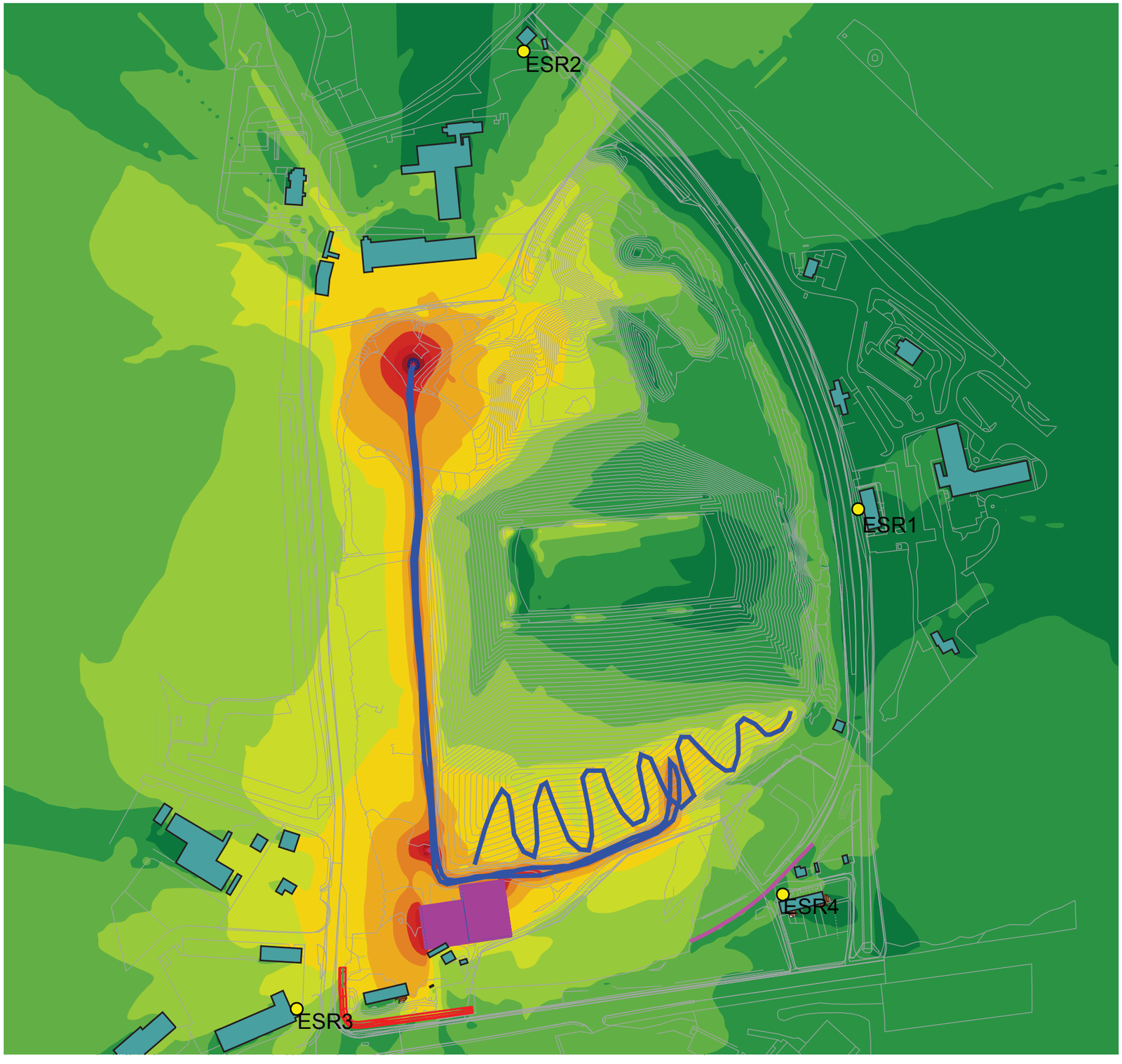

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Scenario 4 - Phase 2 Restoration

Noise Contour Plot

Drawn By: R Calvert

Checked By: R Calvert

Approved By: Mark Dawson

17/06/2016

Signs and symbols

- Existing NSR
- Existing Buildings
- Road axis
- Emission line
- Site Boundary
- Point source
- Wall
- Transfer Station

Noise levels

in $L_{eq\ 16\ hour}$ dB(A)

<	35
35 -	40
40 -	45
45 -	50
50 -	55
55 -	60
60 -	65
65 -	70
70 -	75
75 -	80
80 -	85
>=	85

N

Length scale 1:3000

0 30 60 90 m

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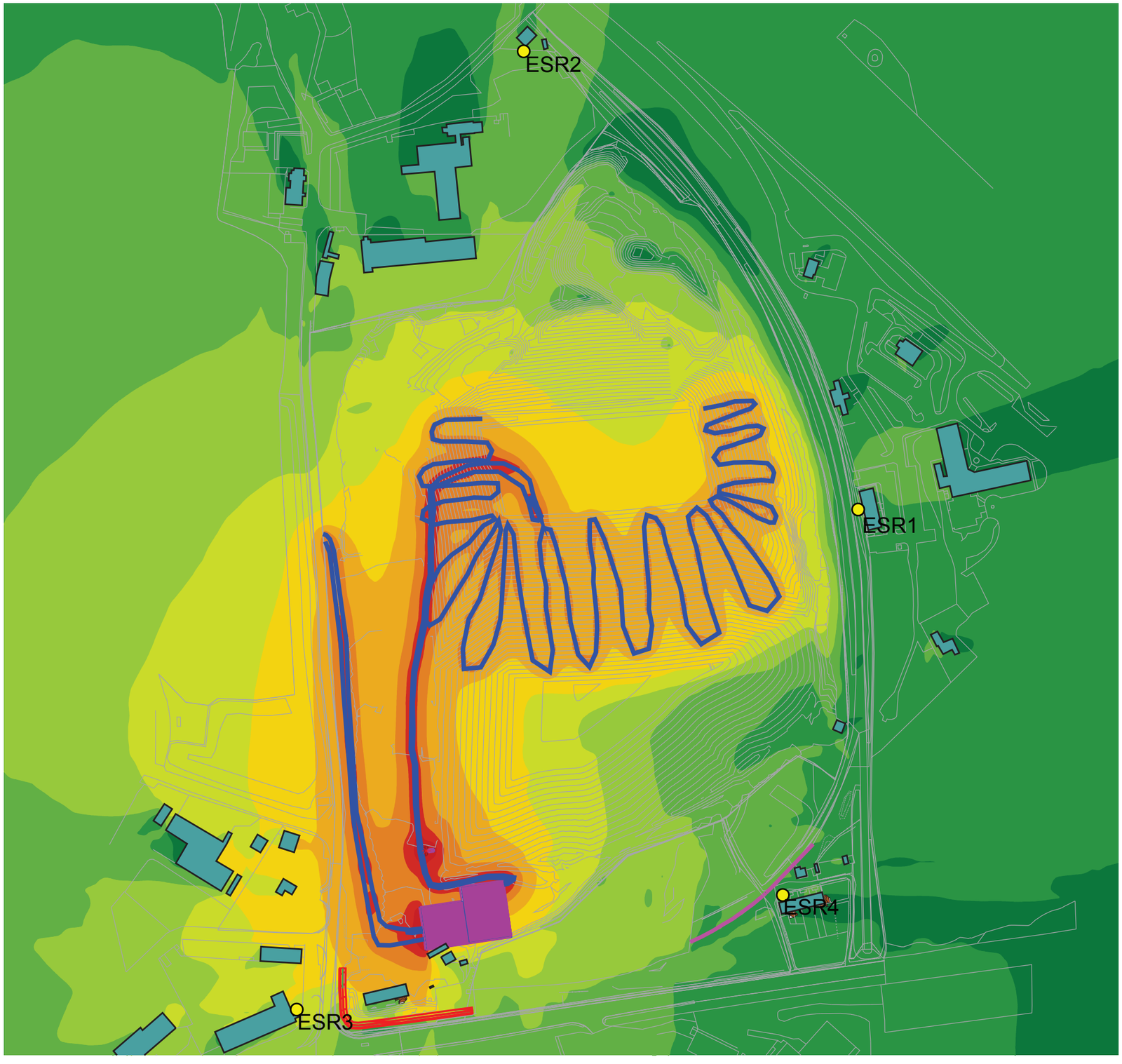

Parry's Quarry

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Scenario 5 - Phase 3 Landfill and Transfer Station

Noise Contour Plot

Drawn By: R Calvert

Checked By: R Calvert

Approved By: Mark Dawson

17/06/2016

Signs and symbols

- Existing NSR
- Existing Buildings
- Road axis
- Emission line
- Site Boundary
- Point source
- Wall
- Transfer Station

Noise levels
in $L_{eq\ 16\ hour}$ dB(A)

<	35
35 -	40
40 -	45
45 -	50
50 -	55
55 -	60
60 -	65
65 -	70
70 -	75
75 -	80
80 -	85
>=	85

N

Length scale 1:3000

0 30 60 90 m

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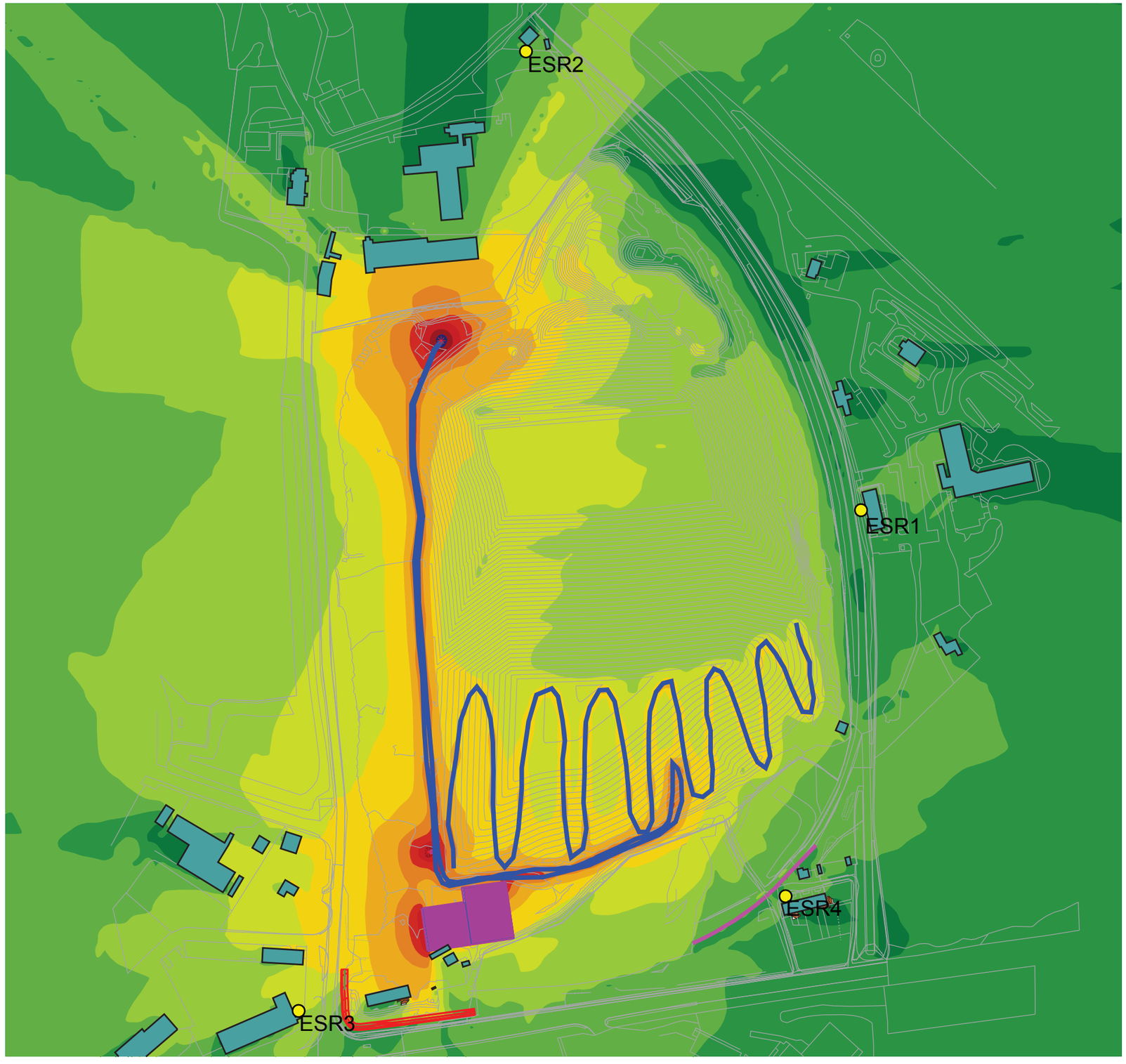

Parry's Quarry

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Scenario 6 - Phase 3 Restoration

Noise Contour Plot

Drawn By: R Calvert

Checked By: R Calvert

Approved By: Mark Dawson

17/06/2016

Signs and symbols

- Existing NSR
- Existing Buildings
- Road axis
- Emission line
- Site Boundary
- Point source
- Wall
- Transfer Station

Noise levels

in $L_{eq\ 16\ hour}$ dB(A)

<	35
35 -	40
40 -	45
45 -	50
50 -	55
55 -	60
60 -	65
65 -	70
70 -	75
75 -	80
80 -	85
>=	85

N

Length scale 1:3000

0 30 60 90 m

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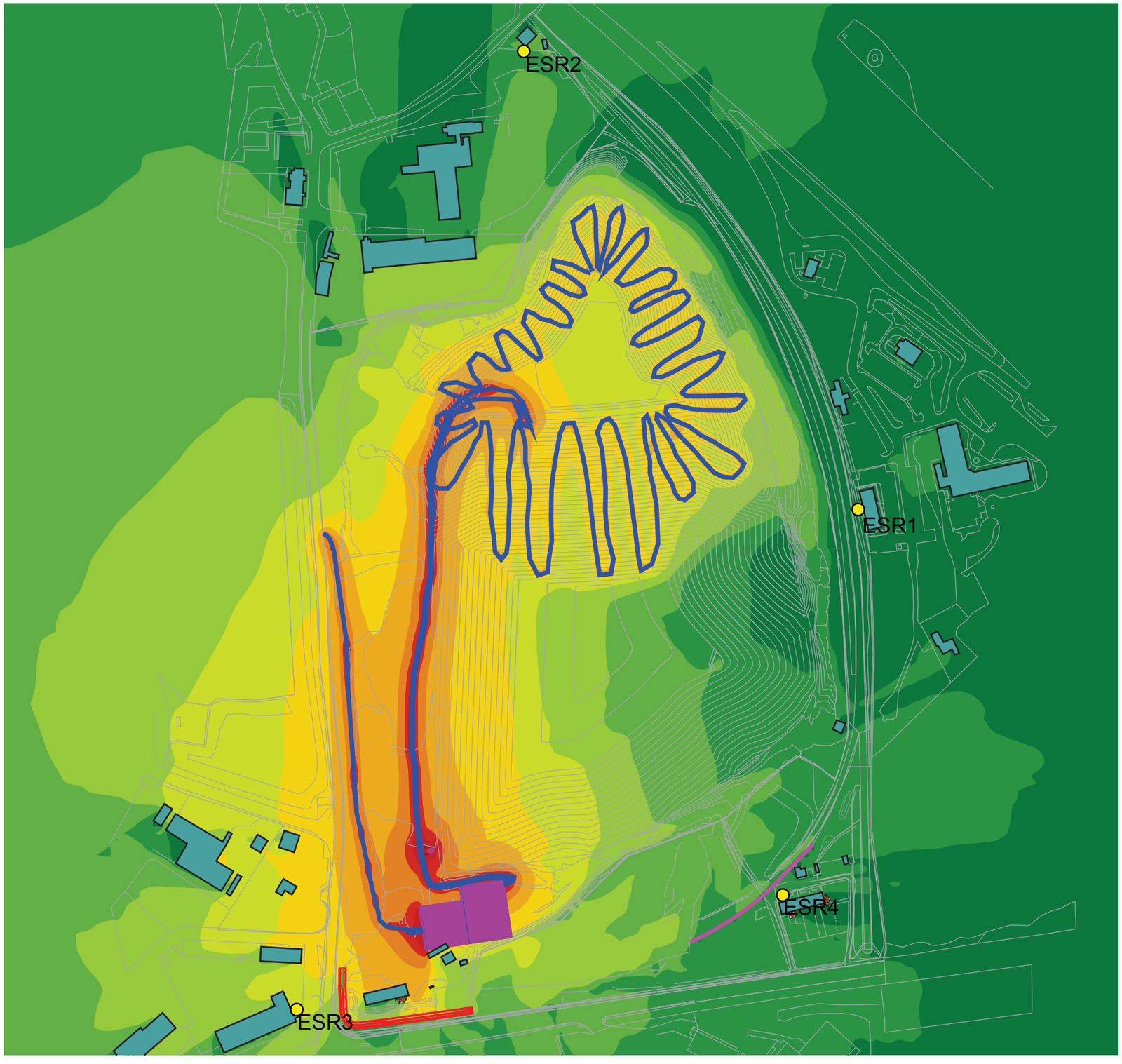

Parry's Quarry

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Scenario 7 - Phase 4 Landfill and Transfer Station

Noise Contour Plot

Drawn By: R Calvert

Checked By: R Calvert

Approved By: Mark Dawson

17/06/2016

Signs and symbols

- Existing NSR
- Existing Buildings
- Road axis
- Emission line
- Site Boundary
- Point source
- Wall
- Transfer Station

Noise levels

in $L_{eq\ 16\ hour}$ dB(A)

<	35
35 -	40
40 -	45
45 -	50
50 -	55
55 -	60
60 -	65
65 -	70
70 -	75
75 -	80
80 -	85
>=	85

N

Length scale 1:3000

0 30 60 90 m

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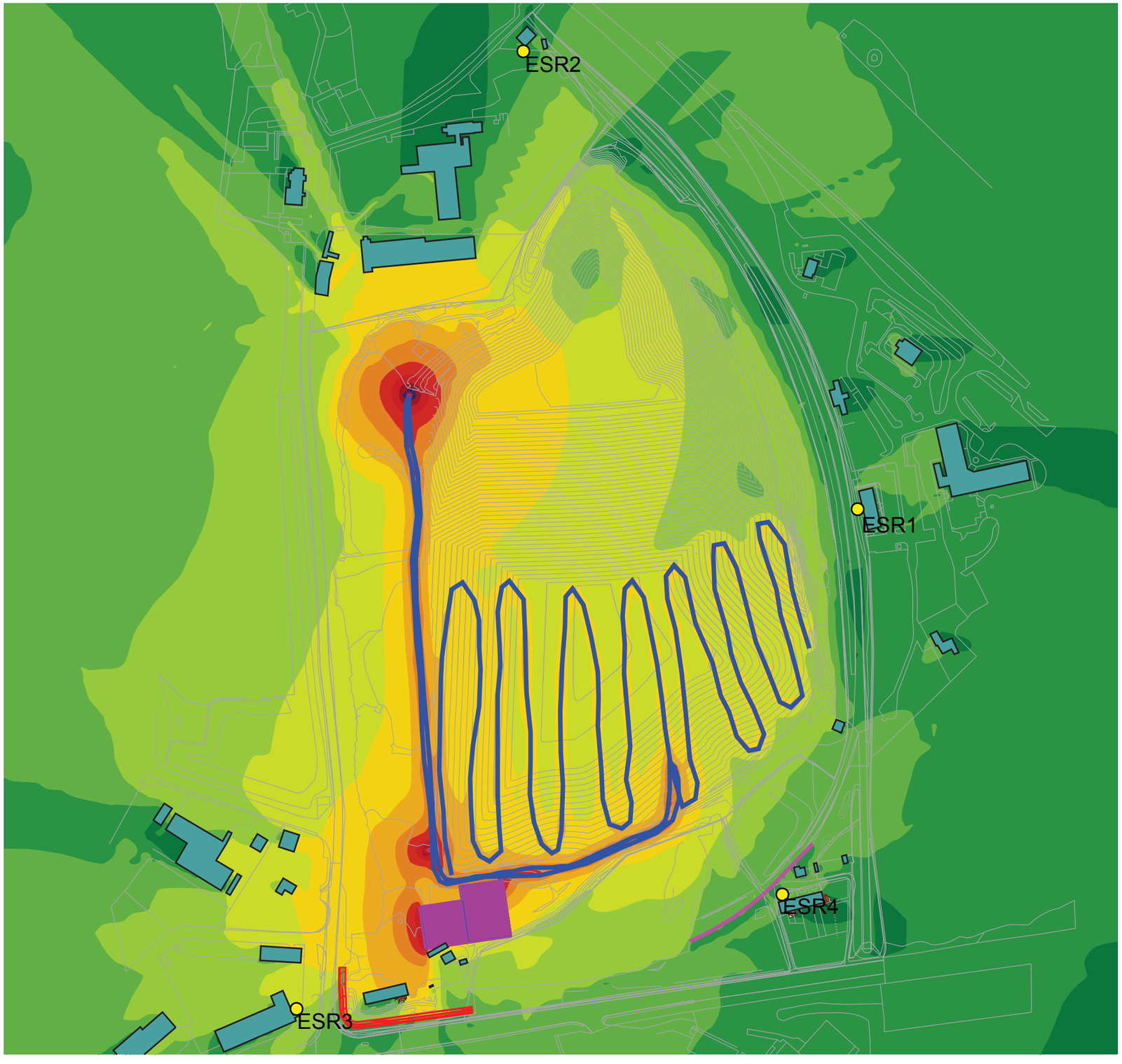

Parry's Quarry

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Scenario 8 - Phase 4 Restoration

Noise Contour Plot

Drawn By: R Calvert

Checked By: R Calvert

Approved By: Mark Dawson

17/06/2016

Signs and symbols

- Existing NSR
- Existing Buildings
- Road axis
- Emission line
- Site Boundary
- Point source
- Wall
- Transfer Station

Noise levels

in $L_{eq\ 16\ hour}$ dB(A)

<	35
35 -	40
40 -	45
45 -	50
50 -	55
55 -	60
60 -	65
65 -	70
70 -	75
75 -	80
80 -	85
>=	85

N

Length scale 1:3000

0 30 60 90 m

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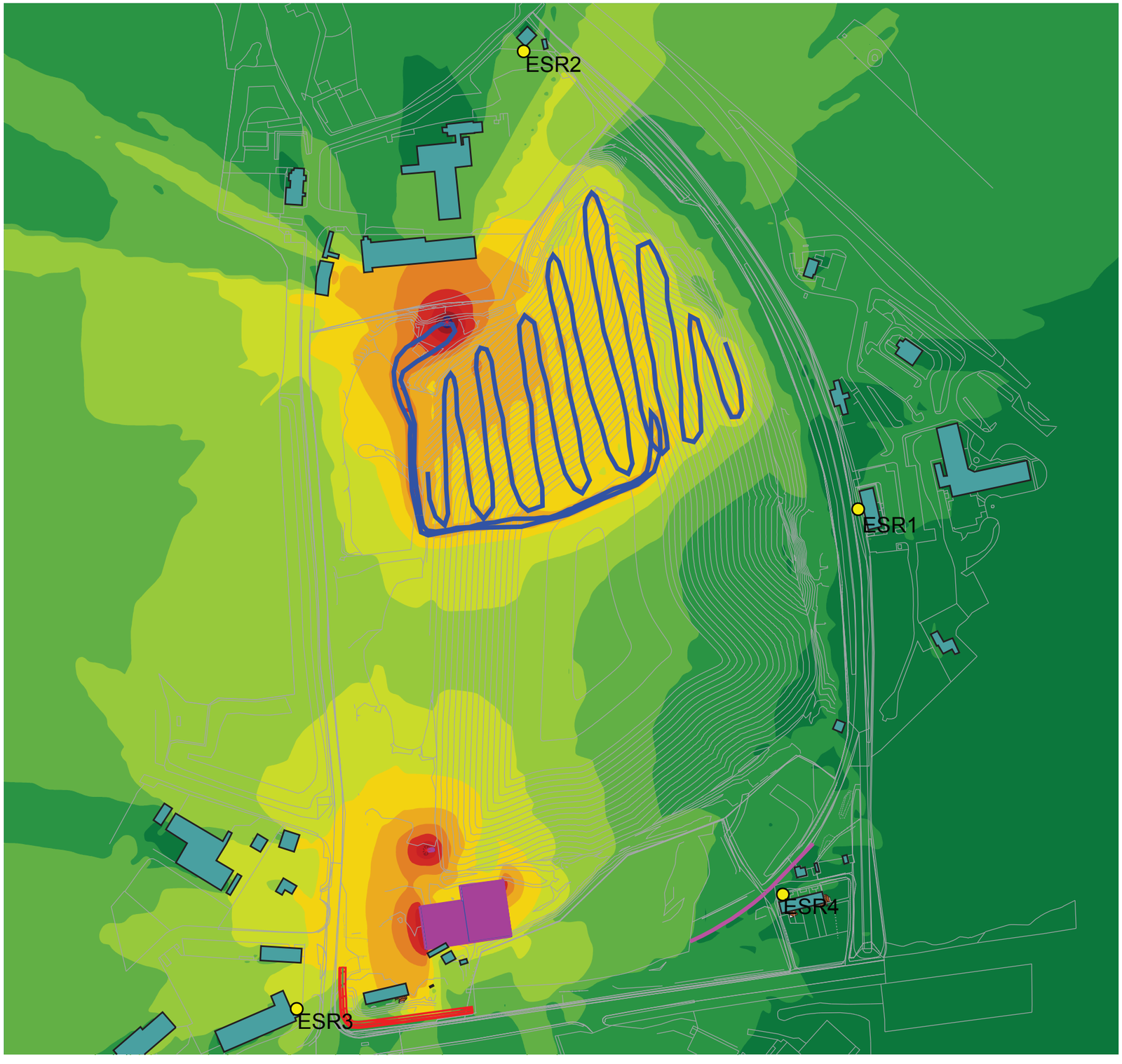

Parry's Quarry

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Scenario 9 - Phase 5 Restoration

Noise Contour Plot

Drawn By: R Calvert

Checked By: R Calvert

Approved By: Mark Dawson

17/06/2016

Signs and symbols

- Existing NSR
- Existing Buildings
- Road axis
- Emission line
- Site Boundary
- Point source
- Wall
- Transfer Station

Noise levels

in $L_{eq\ 16\ hour}$ dB(A)

<	35
35 -	40
40 -	45
45 -	50
50 -	55
55 -	60
60 -	65
65 -	70
70 -	75
75 -	80
80 -	85
>=	85

N

Length scale 1:3000

0 30 60 90 m

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ENERGY AND CLIMATE CHANGE
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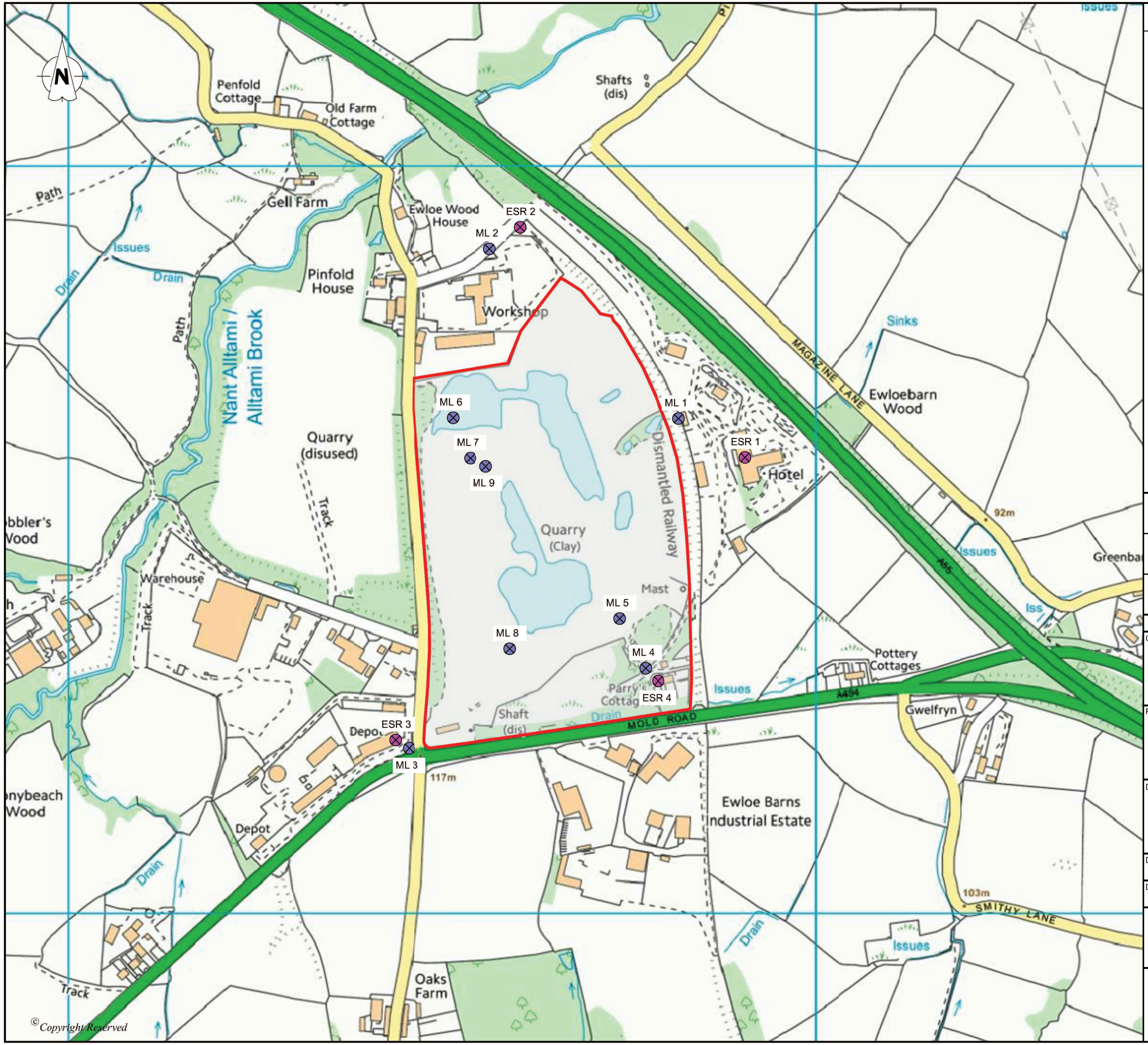
DRAWINGS

LE12936-003 – Noise Monitoring and Sensitive Receptor Plan



DO NOT SCALE FROM THIS DRAWING | A3

REFERENCE

- SITE BOUNDARY
- SENSITIVE RECEPTOR LOCATION
- NOISE MONITORING LOCATION

REVISION	DETAILS	DATE	DRAWN	CHK'D	APP'D
A	First Issue	08/09/15	PG	RC	MD

CLIENT

Mold Investments Limited

PROJECT

Parry's Quarry

DRAWING TITLE

Noise Monitoring and Sensitive Receptor Location Plan

DRG No.	SCALE	DATE
LE12936-003	1:5000@A3	04/09/15

DRAWN BY	CHECKED BY	APPROVED BY
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