

Viking CCS Pipeline

**Environmental
Statement Volume IV –
Appendix 13-4: HRA
Noise Assessment**

Document Reference: EN070008/APP/6.4.13.4

Applicant: Chrysaor Production (U.K.) Limited,
a Harbour Energy Company
PINS Reference: EN070008
Planning Act 2008 (as amended)
The Infrastructure Planning (Applications: Prescribed Forms
and Procedure) Regulations 2009 - Regulation 5(2)(a)
Date: October 2023

PINS Reference	Document Reference	Document Revision	Date
EN070008	EN070008/APP/6.4.13.4	Revision 1	October 2023

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1 HRA Noise Assessment

1.1 Introduction

1.1.1 This appendix presents the methodology used to assess noise to support the Habitats Regulation Assessment (HRA) as part of *ES Volume II Chapter 06: Ecology and Biodiversity*. In order to provide further background information, Figure 1 outlines the European Designated Sites within 10km of the DCO Site Boundary.

1.2 Noise Model Assumptions

1.2.1 In order to determine potential construction noise emissions from the Proposed Development, a noise prediction model has been prepared using the CadnaA® v2022 software package. The following assumptions were applied in the noise models:

- The ground acoustic absorption has been set to 0.8 (i.e. assumed soft ground conditions which is considered appropriate for predominantly open grass field and farmland);
- The maximum order of acoustic reflections was 1;
- Air temperature was assumed to be 10 degrees and humidity 70%;
- Building massing in the surrounding area outside of the DCO Site boundary has been sourced from Ordnance Survey Open Map data and modelled with a standard height of 7m.
- Land topography has been sourced from Ordnance Survey Open Map data;
- No boundary fences/walls have been included in the noise model; and
- Receiver points have been modelled as 0.5m above local ground level (representative of ecological receptors).

1.3 Scenarios Modelled

1.3.1 CadnaA noise mapping software was used to predict construction noise levels at the selected receptors. The construction noise model followed the procedures for prediction of demolition and construction noise set out in BS 5228-1. Sound power levels for each of the following scenarios of construction activities have been calculated:

- The creation of access tracks along the Proposed Development route;
- Maximum sound levels from loudest noise generating construction activity at two locations in Immingham;
- Horizontal Directional Drilling (HDD) at five locations along the Proposed Development route; and

The Creation of Access Tracks Alongside the Proposed Development Route

1.3.2 Noise levels generated from the creation of access tracks have been calculated and are detailed in *Appendix 13.2: Construction Noise Calculations*. As the creation of access tracks was the loudest noise generating activity associated with the pipeline construction, it was used as a worst-case scenario for the ambient noise (L_{Aeq}) that can potentially disturb ecological receptors. Figure 2 presents the ambient noise levels surrounding Immingham and Figure 5 presents the ambient noise levels surrounding the Theddlethorpe area.

Maximum Sound Levels from the Loudest Noise Generating Construction Activity

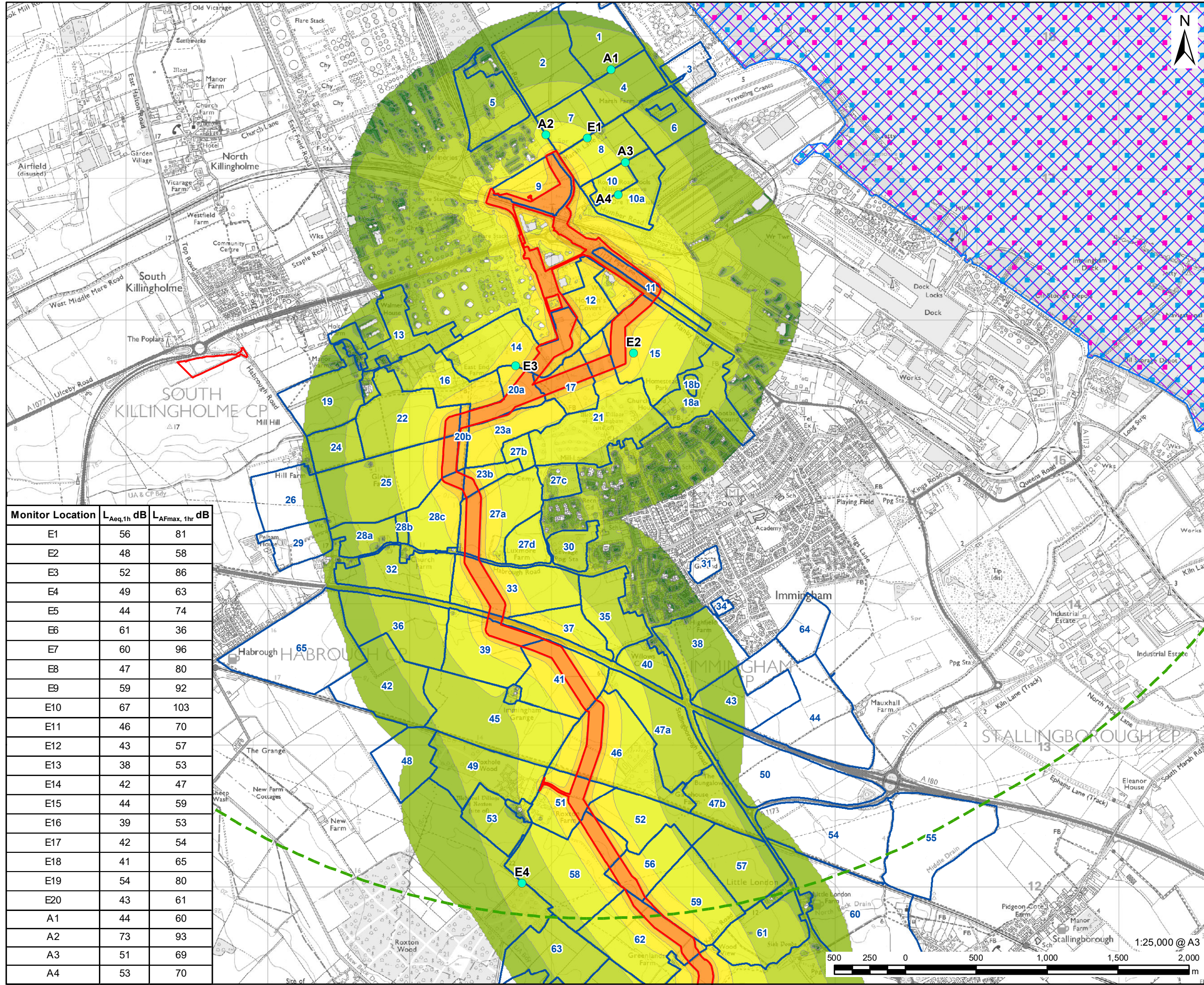
1.3.3 As the areas to the north of the Immingham facility were of concern to ecological receptors, maximum noise levels were calculated at two locations. Figure 3 presents the maximum noise levels emanating from within the DCO Site Boundary closest to Special Protection Areas located north of the DCO Site Boundary (Location 1). Figure 4 presents the maximum noise levels emanating from within the DCO Site Boundary closest to Rosper Pools (Location 2).

Horizontal Directional Drilling (HDD)

1.3.4 Maximum sound levels have been calculated at five proposed HDD locations along the Proposed Development route including:

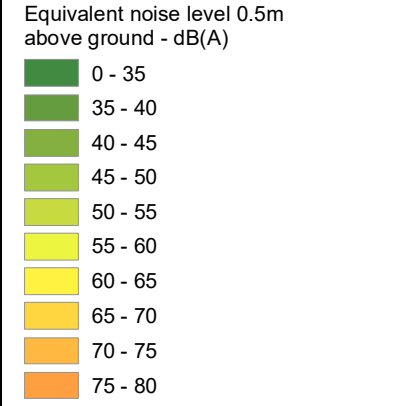
- Figure 6 and Figure 7 presents the maximum noise levels at the Golf Course/Childrens Avenue South of P66 (two options, depending on where the pipeline exits the P66/VPI sites);
- Figure 8 presents the maximum noise levels at North Beck Drain near Newstead Farm;
- Figure 9 presents the maximum noise levels at the River Ludd/Louth Canal to the northeast of Louth; and
- Figure 10 presents the maximum noise levels at the Old Engine Drain and Great Eau west of Theddlethorpe.

1.3.5 For each HDD scenario, two entry points have been modelled as point sources rather than one entry, one exit point. This is because the configuration of the entry / exit point is not established yet and the entry point is the louder sound generating activity of the two. This assumes a worst-case scenario.



Monitor Location	$L_{Aeq,1h}$ dB	$L_{AFmax,1hr}$ dB
E1	56	81
E2	48	58
E3	52	86
E4	49	63
E5	44	74
E6	61	36
E7	60	96
E8	47	80
E9	59	92
E10	67	103
E11	46	70
E12	43	57
E13	38	53
E14	42	47
E15	44	59
E16	39	53
E17	42	54
E18	41	65
E19	54	80
E20	43	61
A1	44	60
A2	73	93
A3	51	69
A4	53	70

- LEGEND**
- DCO Site Boundary
 - Ecology Noise Monitoring Location
 - Ramsar
 - Special Protection Area (SPA)
 - Special Protection Area with Marine Components (SPA)
 - Site of Special Scientific Interest (SSSI)
 - Functionally Linked Land
 - Survey Field Boundary



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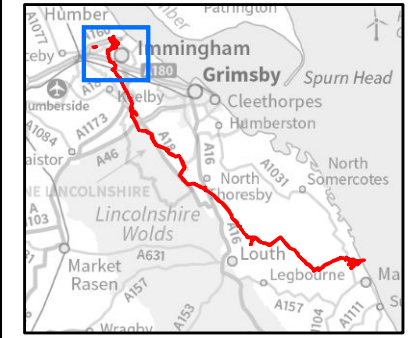
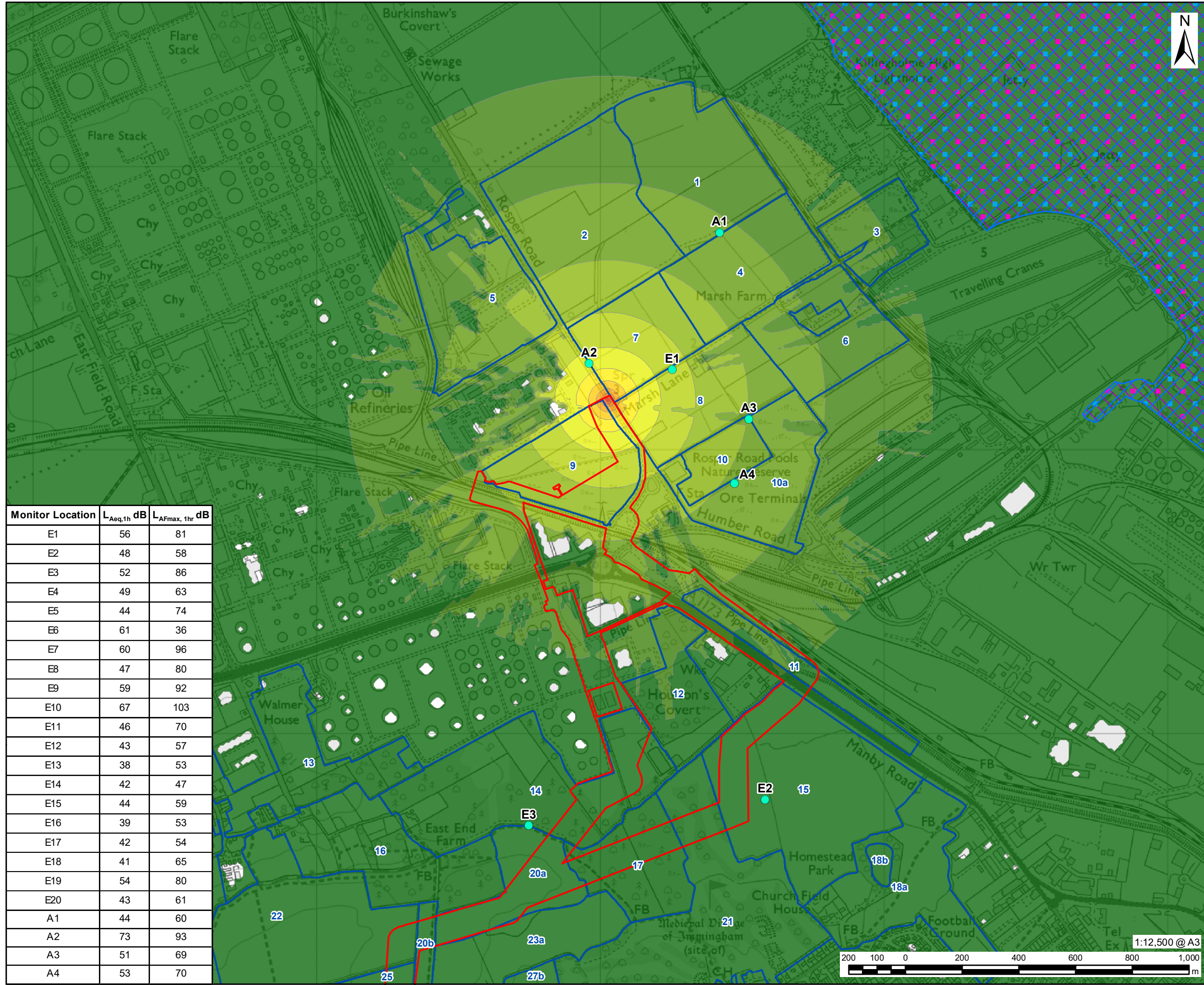


FIGURE TITLE
Figure 2
Immingham Average Sound Levels

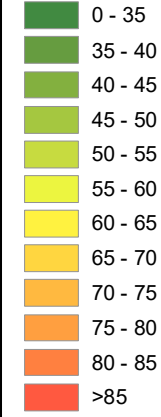
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 - Survey Field Boundary
- Equivalent noise level 0.5m above ground - dB(A)



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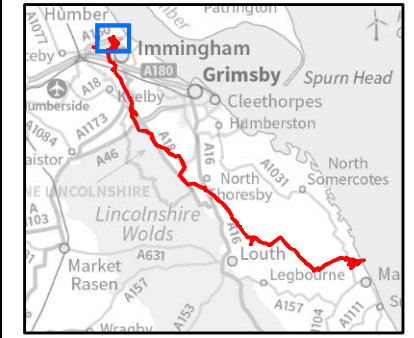
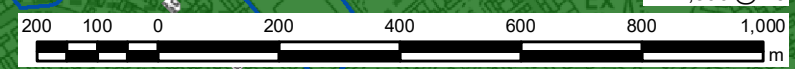


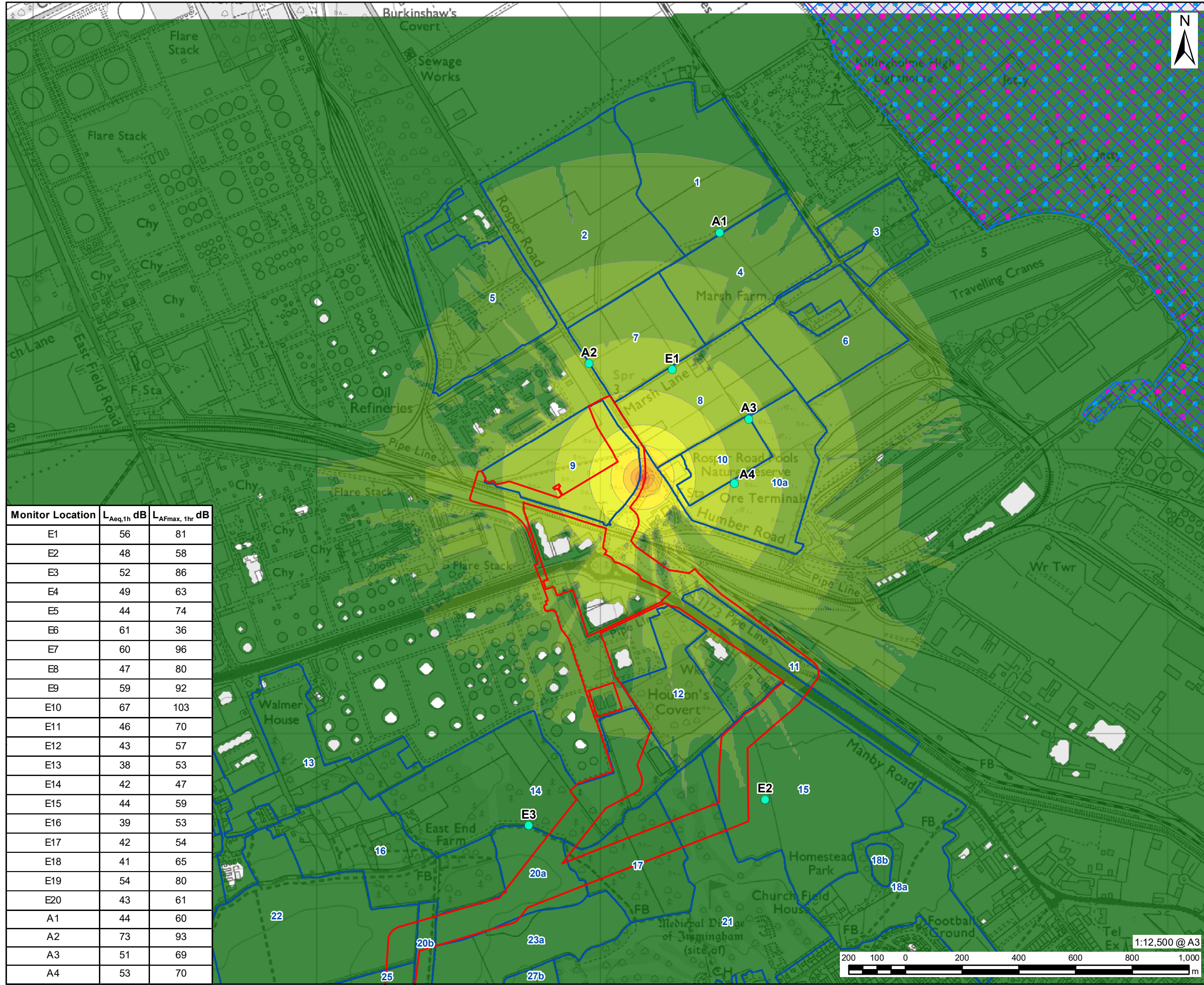
FIGURE TITLE
Figure 3
Immingham Maximum Sound Levels
Location 1

ISSUE PURPOSE
 HRA

PROJECT NUMBER / REFERENCE
 60668955 / VCCS_231004_HRA_3



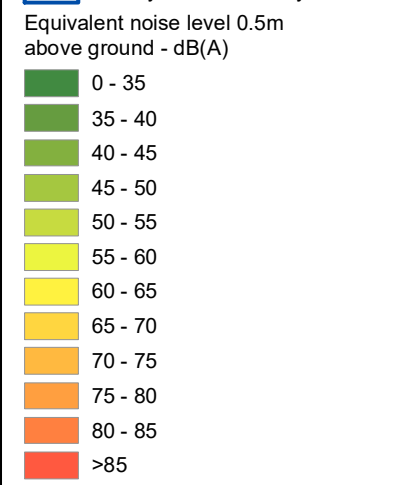
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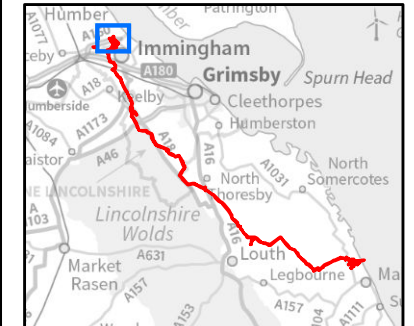
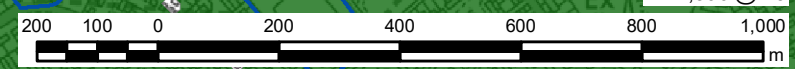
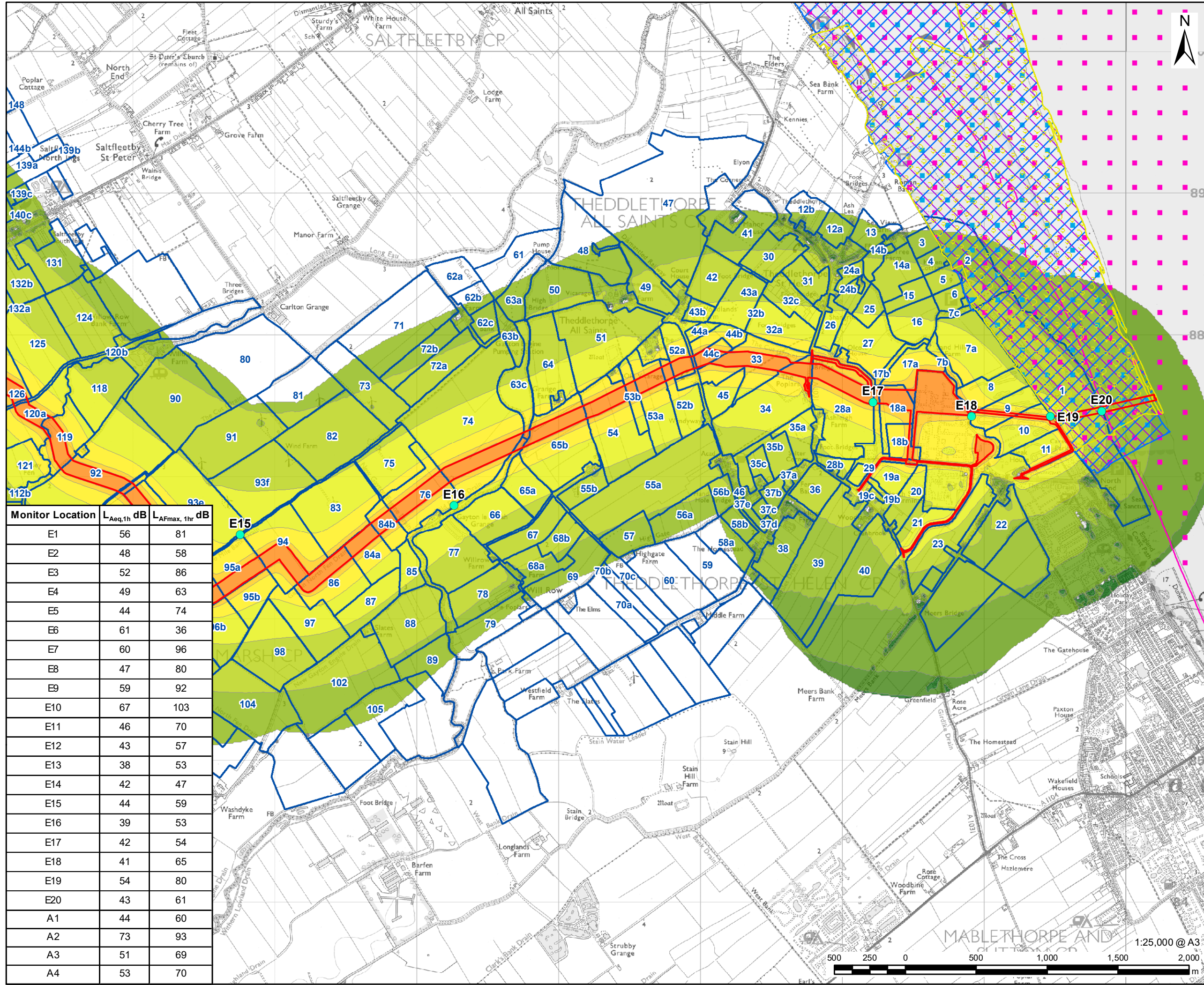


FIGURE TITLE
Figure 4
Immingham Maximum Sound Levels
Location 2



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- Ecology Noise Monitoring Location
- National Nature Reserve (NNR)
- Ramsar
- Special Protection Area (SPA)
- Special Protection Area with Marine Components (SPA)
- Site of Special Scientific Interest (SSSI)
- Survey Field Boundary

Equivalent noise level 0.5m above ground - dB(A)

- 0 - 35
- 35 - 40
- 40 - 45
- 45 - 50
- 50 - 55
- 55 - 60
- 60 - 65
- 65 - 70
- 70 - 75
- 75 - 80

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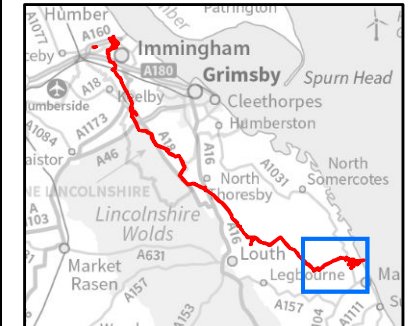
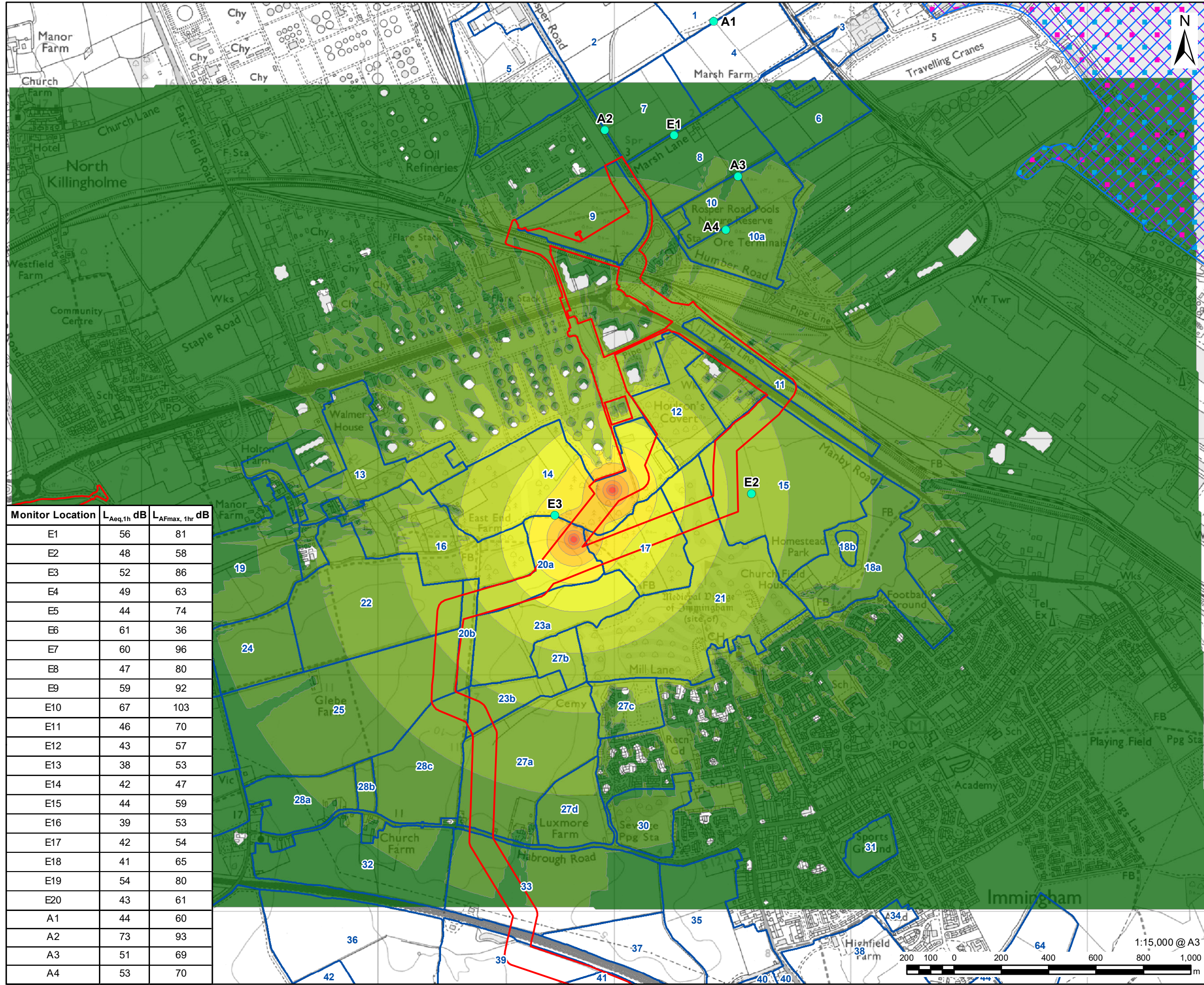
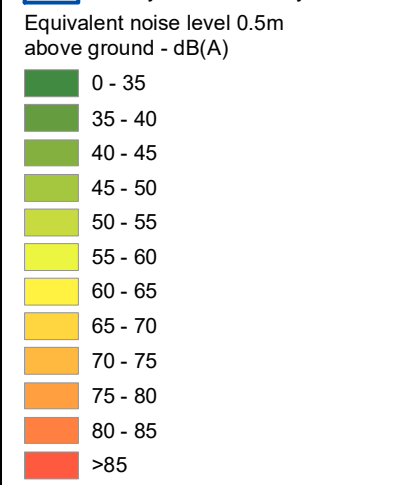


FIGURE TITLE
Figure 5
Theddlethorpe Average Sound Levels

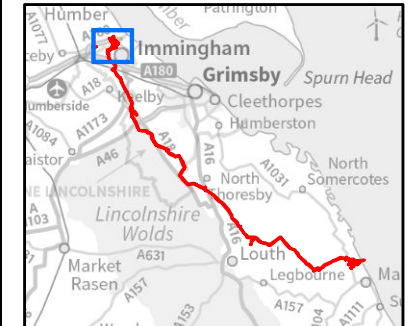


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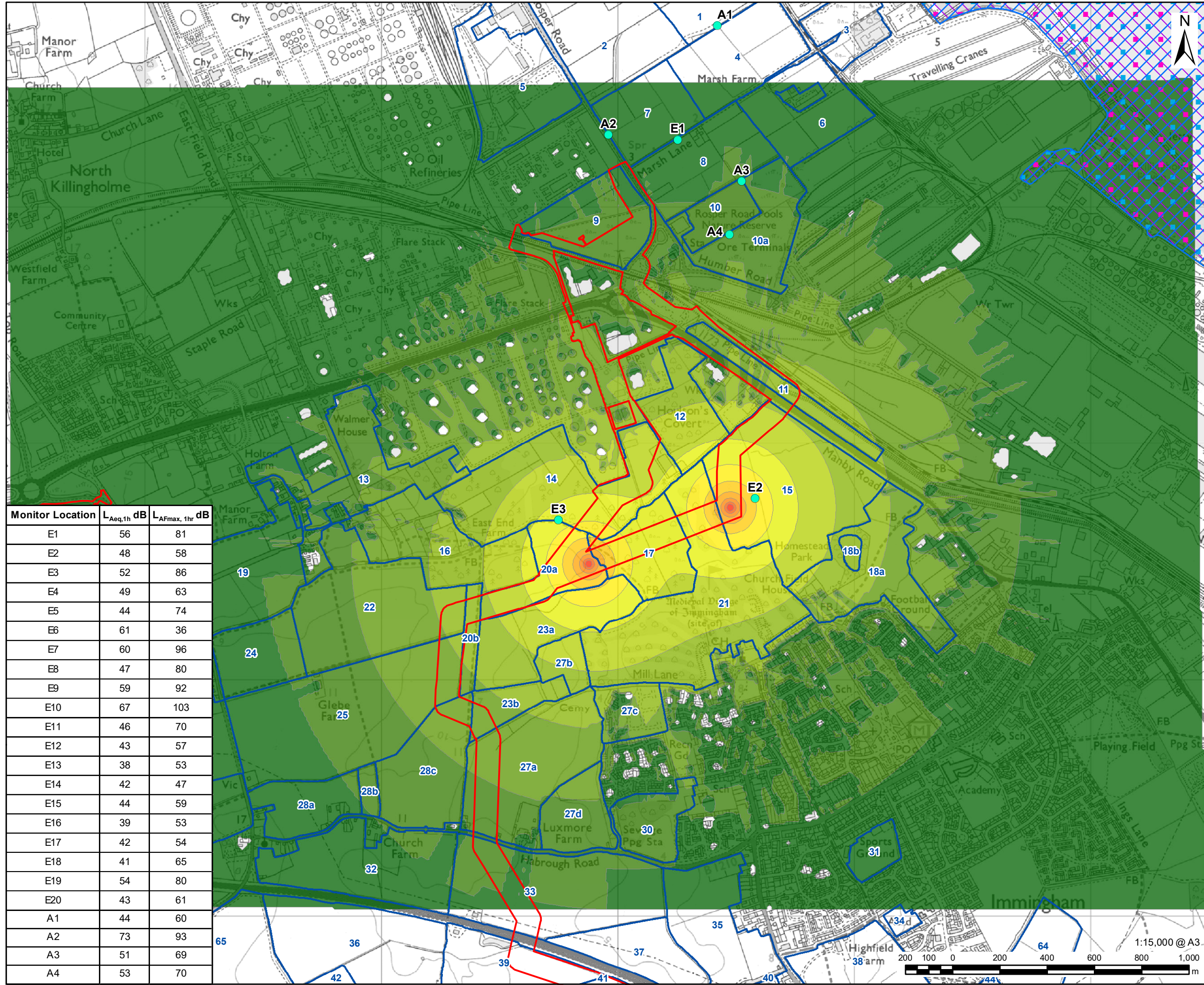


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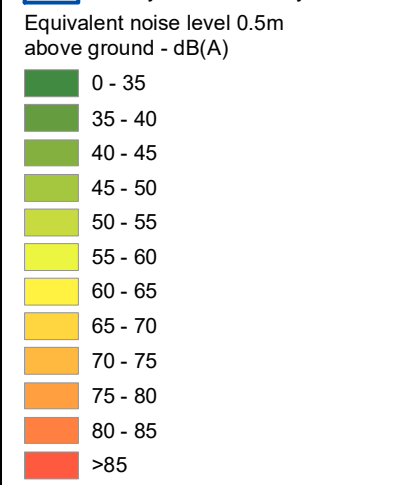
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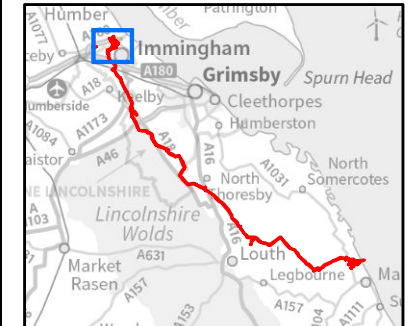
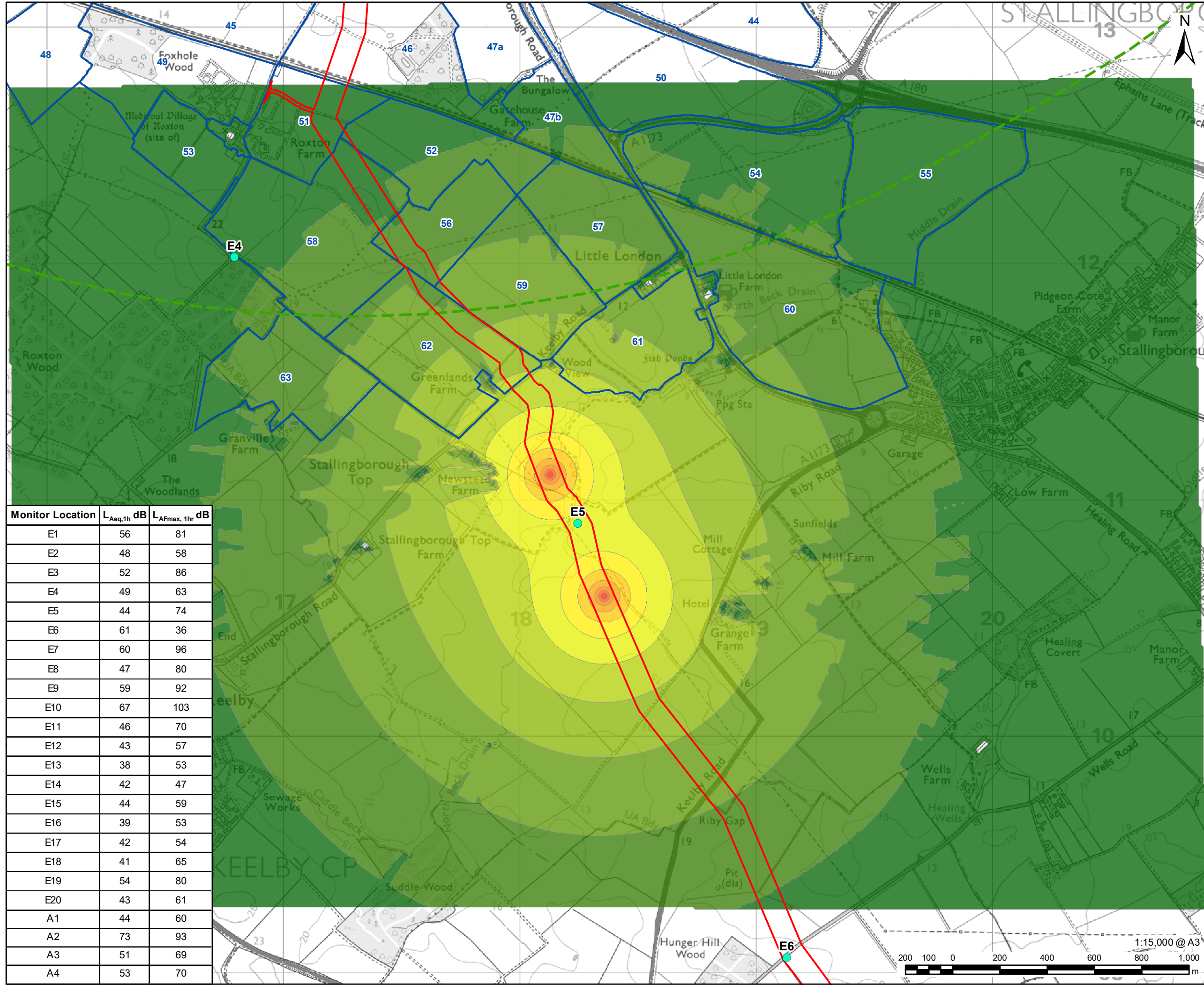


FIGURE TITLE
Figure 7
HDD 1 Option 2 Maximum Sound Levels

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LEGEND

- DCO Site Boundary
- Ecology Noise Monitoring Location
- Functionally Linked Land
- Survey Field Boundary

Equivalent noise level 0.5m above ground - dB(A)

- 0 - 35
- 35 - 40
- 40 - 45
- 45 - 50
- 50 - 55
- 55 - 60
- 60 - 65
- 65 - 70
- 70 - 75
- 75 - 80
- 80 - 85
- >85

Monitor Location	L _{Aeq,1h} dB	L _{AFmax,1hr} dB
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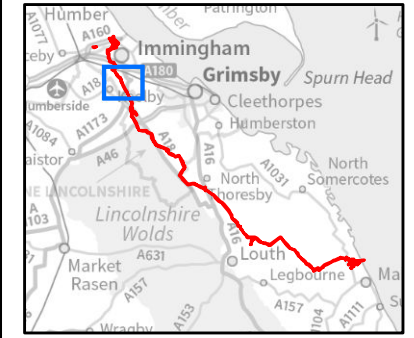
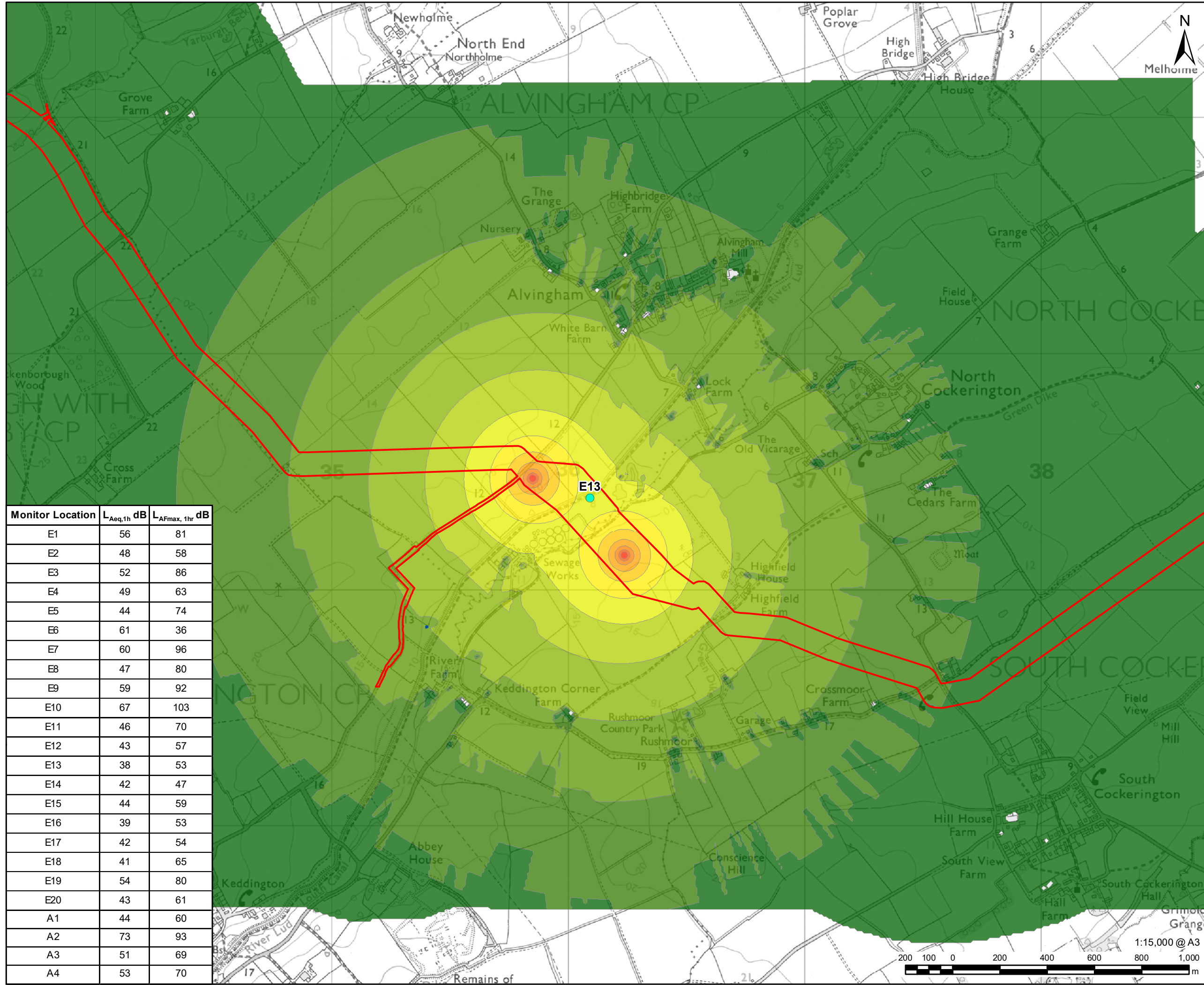


FIGURE TITLE
Figure 8
HDD 2 Maximum Sound Levels

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LEGEND

- DCO Site Boundary
- Ecology Noise Monitoring Location
- Survey Field Boundary

Equivalent noise level 0.5m above ground - dB(A)

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

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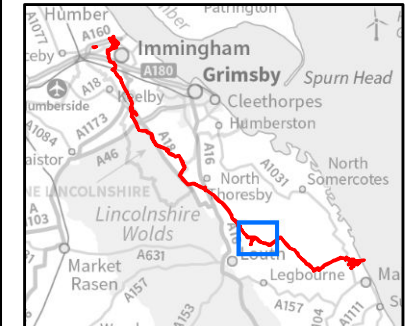
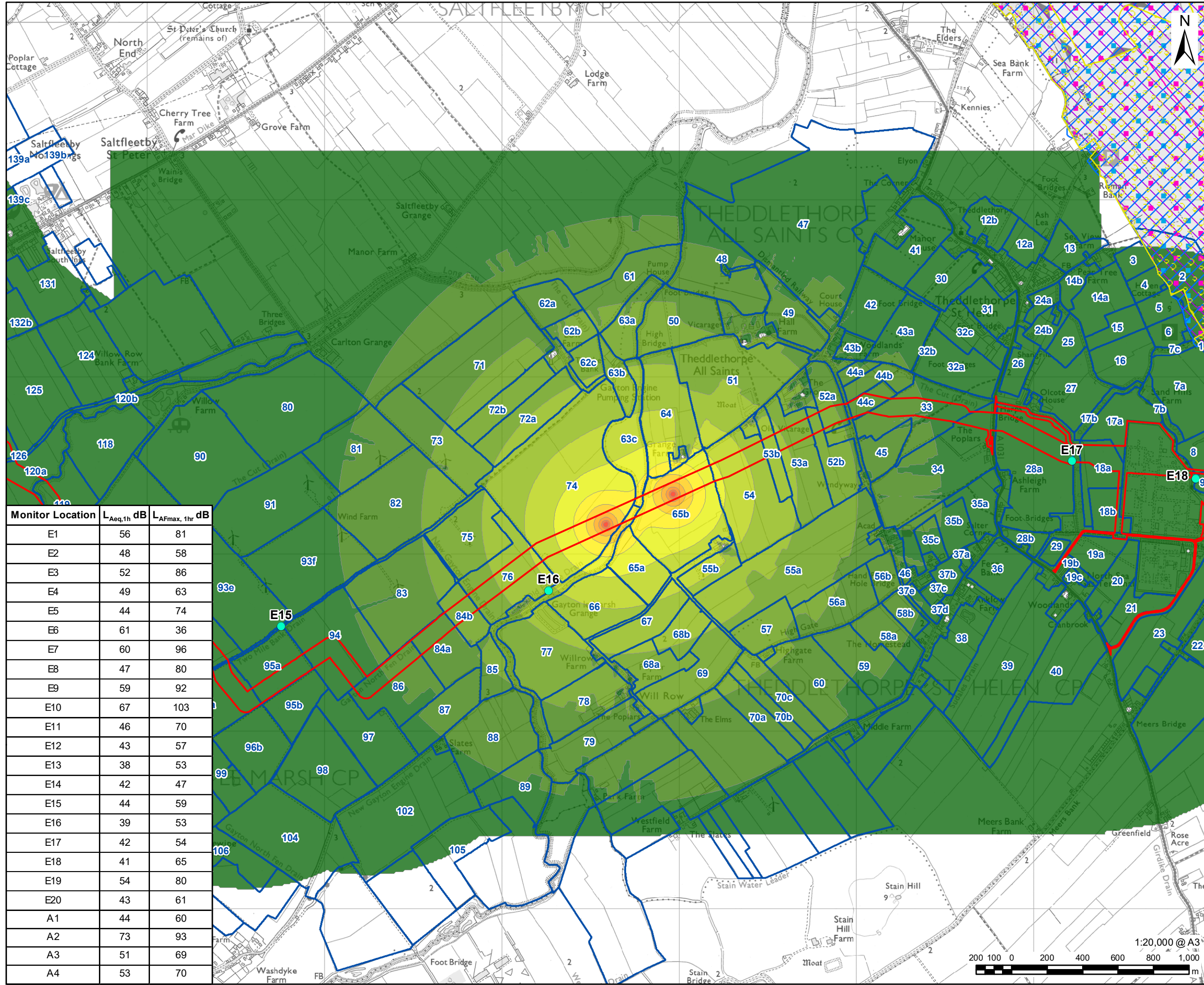


FIGURE TITLE
Figure 9
HDD 3 Maximum Sound Levels



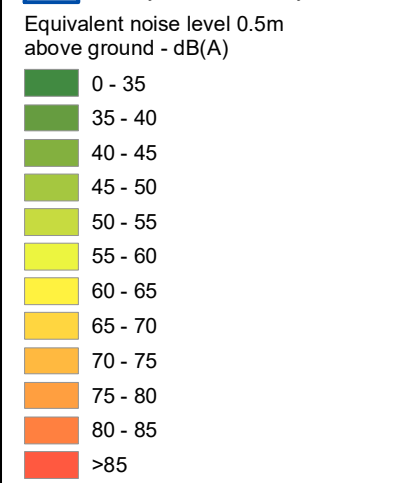
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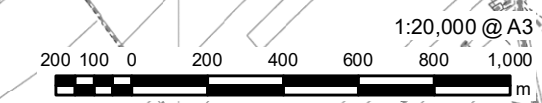
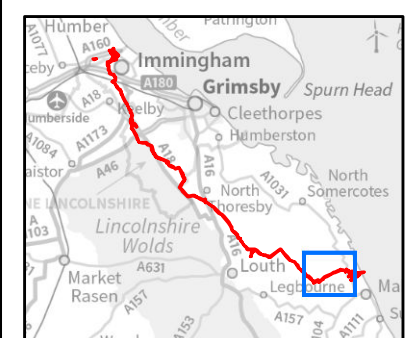
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