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NOISE IMPACT ASSESSMENT FOR PROPOSED NEW TERMINATING JUNCTION TO THE M181 MOTORWAY AND REALIGNMENT OF THE EXISTING B1450 BURRINGHAM ROAD, SCUNTHORPE

NORTH LINCOLNSHIRE COUNCIL PLANNING PERMISSION REFERENCE: PA/2017/1386

1.00 INTRODUCTION

1.01 Environmental Noise Solutions has been commissioned by Maltgrade Ltd. to carry out an operational noise impact assessment for the proposed new terminating junction to the M181 motorway and realignment of the existing B1450 Burringham Road, Scunthorpe (hereafter referred to as the Scheme).

1.02 Planning permission (Reference: PA/2017/1386) for the development was granted by North Lincolnshire Council (NLC) in January 2019, subject to conditions. Conditions 12 and 20 relate to the control of noise as follows:

12. No development shall commence until a noise impact assessment has been submitted to and approved in writing by the local planning authority. The noise impact assessment report shall provide details of existing background noise levels, existing noise sources likely to impact upon the proposed development, new noise source likely to impact upon any sensitive locations, mitigation methods to be employed and the resulting predicted levels of noise at sensitive locations.

20. No development shall take place until a noise impact assessment has been submitted to and approved in writing by the local planning authority. The noise impact assessment shall be carried out with reference to:

- *National Planning Policy Framework (2012)*
- *National Planning Practice Guidance (2014)*
- *ProPG: Planning & Noise, New Residential Development (2017)*
- *BS 4142:2014 Methods for rating and assessing industrial and commercial sound*
- *World Health Organisation Guidelines for Community Noise (1999)*
- *World Health Organisation Night Noise Guidelines for Europe (2009)*
- *BS 8233:2014 Guidance on sound insulation and noise reduction for buildings*
- *BS5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites. Noise*
- *BS5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites. Vibration*
- *BS7445-2:1991, ISO1996-2:1987 Description of environmental noise. Part 2: Guide to acquisition of data pertinent to land use.*

The noise impact assessment report shall provide details of existing background noise levels, likely noise sources which will impact upon the proposed development, mitigation methods to be employed and the resulting predicted level of noise at sensitive locations. Any approved mitigation measures shall be carried out in their entirety before the use of the site commences and shall be retained thereafter.

1.03 The objectives of the noise impact assessment were therefore to:

- Identify the noise-sensitive receptors (NSRs) likely to be affected by the Scheme
- Determine the noise impact of the Scheme with reference to pertinent guidelines

1.04 This report details the methodology and results of the assessment.

1.05 This report has been prepared for Maltgrade Ltd. for the sole purpose described above and no extended duty of care to any third party is implied or offered. Third parties making reference to the report should consult Maltgrade Ltd. and ENS as to the extent to which the findings may be appropriate for their use.

1.06 A glossary of acoustic terms used in the main body of the text is contained in Appendix 1.

2.00 NOISE IMPACT ASSESSMENT CRITERIA

National Planning Policy Framework

2.01 The National Planning Policy Framework (NPPF) was updated in February 2019 and sets out the Government's planning policies for England and how these are expected to be applied.

2.02 Where issues of noise impact are concerned the NPPF provides brief guidance in paragraph 170 where it states that planning policies and decisions should contribute to and enhance the natural and local environment by:

'preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of…..noise pollution'.

2.03 Paragraph 180 advises that:

'Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should…..mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life'.

2.04 The NPPF also refers to the 2010 DEFRA publication, the Noise Policy Statement for England (NPSE) which reinforces and supplements the NPPF.

Noise Policy Statement for England

2.05 The Noise Policy Statement for England (NPSE) sets out the long-term vision of promoting good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development. This long-term vision is supported by the following aims:

- Avoid significant adverse impacts on health and quality of life
- Mitigate and minimise adverse impacts on health and quality of life
- Where possible, contribute to the improvement of health and quality of life

2.06 NPSE describes the following levels at which noise impacts may be identified:

- NOEL – No Observed Effect Level. This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise
- LOAEL – Lowest Observed Adverse Effect Level. This is the level above which adverse effects on health and quality of life can be detected
- SOAEL – Significant Observed Adverse Effect Level. This is the level above which significant adverse effects on health and quality of life occur

Planning Practice Guidance – Noise

2.07 In July 2019, Planning Practice Guidance (PPG) was updated online which provides additional guidance and elaboration on the NPPF. It advises that the Local Planning Authority should consider the acoustic environment in relation to:

- Whether or not a significant adverse effect is occurring or likely to occur
- Whether or not an adverse effect is occurring or likely to occur
- Whether or not a good standard of amenity can be achieved

2.08 In line with the Explanatory Note of the NPSE, the PPG references the LOAEL and SOAEL in relation to noise impact. It also provides examples of outcomes that could be expected for a given perception level of noise, plus actions that may be required to bring about a desired outcome.

2.09 Table 2.1 summarises the noise exposure hierarchy, based on the likely average response.

Table 2.1 – Noise Exposure Hierarchy

Perception	Examples of Outcomes	Increasing Effect Level	Action
No Observed Effect Level (NOEL)			
Not Noticeable	No Effect	No Observed Effect	No specific measures required
No Observed Adverse Effect Level (NOAEL)			
Noticeable and not intrusive	Noise can be heard, but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No Observed Adverse Effect	No specific measures required
Lowest Observed Adverse Effect Level (LOAEL)			
Noticeable and intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level (SOAEL)			
Noticeable and disruptive	The noise causes a material change in behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Noticeable and very disruptive	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory	Unacceptable Adverse Effect	Prevent

2.10 However, in line with the NPSE, no objective noise levels are provided for LOAEL or SOAEL although the PPG acknowledges that:

'…the subjective nature of noise means that there is not a simple relationship between noise levels and the impact on those affected. This will depend on how various factors combine in any particular situation'.

Design Manual for Roads and Bridges LA 111 (DMRB)

2.11 DMRB sets out procedures for undertaking the environmental assessment of new road schemes, including the assessment of noise effects from road traffic, and describes a method for categorising the magnitude of impact due to a new road scheme. In undertaking a DMRB assessment, the calculation of traffic noise levels uses the methodology contained within the Calculation of Road Traffic Noise (CRTN) document as described below.

2.12 DMRB requires comparisons of the following sets of data:

- Do-Minimum scenario (without the Scheme) in the opening year (DMOY) against Do-Something scenario (with the Scheme) in the opening year (DSOY)
- Do-Minimum scenario in the opening year (DMOY) against Do-Something scenario in the future assessment year (DSFY)
- Do-Minimum scenario in the opening year (DMOY) against Do-Minimum scenario in the future year (DMFY)

2.13 The DMRB assessment suggests that the magnitude of noise changes from a project should be classified into levels of impact, and gives detailed consideration to how impact magnitude will be affected by whether a noise level change will occur in the short term (e.g. as a result of a sudden opening of a scheme), or whether the noise level change would occur in the long term (e.g. gradually over time, such as that associated with natural traffic growth).

2.14 The 'magnitude of change' classifications are duplicated in Tables 2.2 and 2.3 below.

Table 2.2 – Classification of Magnitude of Noise Effects in the Short Term

Noise Change, $L_{A10,\ 18h}$, dB	**Magnitude of Change**
Less than 1.0	Negligible
1.0 to 2.9	Minor
3.0 to 4.9	Moderate
5.0+	Major

Table 2.3 – Classification of Magnitude of Noise Effects in the Long Term

Noise Change, $L_{A10,\ 18h}$, dB	**Magnitude of Change**
Less than 3.0	Negligible
3.0 to 4.9	Minor
5.0 to 9.9	Moderate
10.0+	Major

2.15 DMRB confirms that the above scales apply to the impact magnitude, not the impact significance. The impact significance will depend upon both the impact magnitude and the sensitivity of the receiving environment.

2.16 To aid in the determination of significance, DMRB sets out operational noise LOAELs and SOAELs as follows:

Table 2.4 – DMRB Operational Noise LOAELs and SOAELs

Time Period	LOAEL	SOAEL
Day (0600–2400)	55 dB $L_{A10\ (18\ hour)}$ (façade)	68 dB $L_{A10\ (18\ hour)}$ (façade)
Night (0000–0600)	40 dB $L_{night,\ outside}$ (free field)	55 dB $L_{night,\ outside}$ (free field)

Calculation of Road Traffic Noise (CRTN) 1988

2.17 Published by the Department of Transport and the Welsh Office in 1988, this document sets out standard procedures for calculating noise levels from road traffic. The calculation methods use a number of input variables, including traffic flow volume, average vehicle speed, percentage of heavy goods vehicles, type of road surface, site geometry and the presence of noise barriers or acoustically absorbent ground. CRTN predicts the $L_{10\ (18hour)}$ dB(A) or $L_{10\ (1hour)}$ dB(A) noise level for any receptor point at a given distance, up to 300 m, from the road.

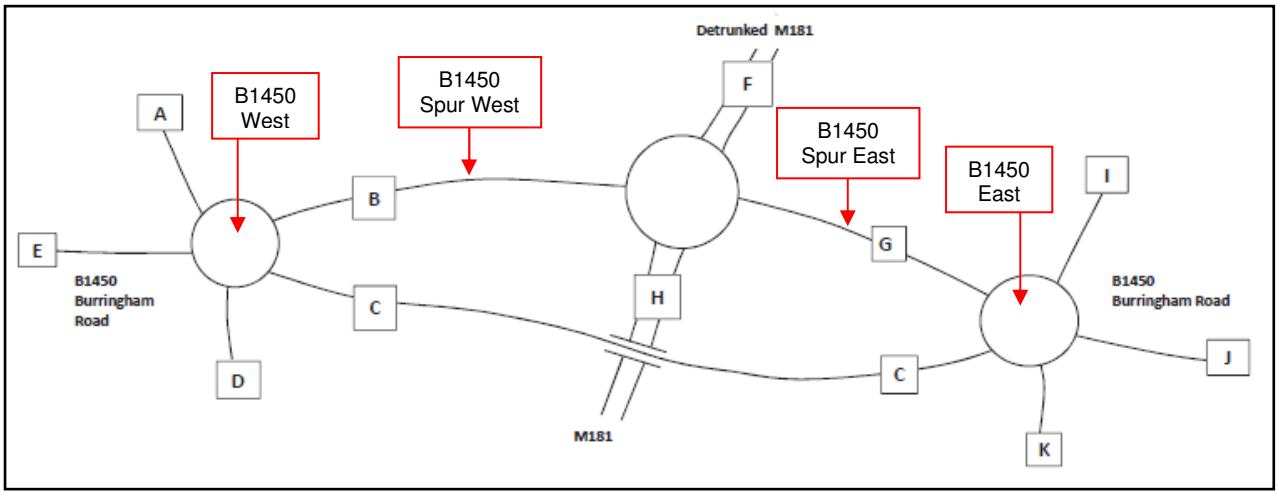
3.00 PROPOSED SCHEME

3.01 The proposed Scheme will provide access to the Lincolnshire Lakes Area Action Plan, 6 no. new village communities (circa 6000 homes) to the west of Scunthorpe, and includes:

- A new four-arm roundabout linking the M181 to the B1450 Burringham Road
- 2 no. additional roundabouts to the east and west of the M181
- 2 no. new spur roads linking the 3 no. roundabouts
- Realignment of the existing B1450 Burringham Road to the east and west of the M181

3.02 A traffic assessment produced by AECOM provides information relating to compositions for the sections of the Scheme as follows (see Figure 3.1 below for annotated layout):

Figure 3.1 – Road Sections



3.03 In accordance with the DMRB, the operational study area is defined as the areas within 600 metres of the Scheme, and encapsulates 33 no. receptors in total.

4.00 NOISE IMPACT ASSESSMENT

4.01 AM peak and PM peak road traffic data has been adopted from the transport assessment produced by Ove Arup & Partners Ltd (report ref: 232952-00 rev A).

4.02 Department for Transport traffic count data for the B1450 Burringham Road indicates that the combined AM and PM peak hour flows account for 23 % of the 12-hour (0700–1900 hours) flows on the road. This equates to a conversion factor of **4.346** for combined peak hours to 12-hour AAWT.

4.03 On the basis of Traffic Flow Data System (TRADS) and WebTRIS data for the area, the conversion factor from 12-hour to 18-hour AAWT is taken as **1.136**.

4.04 Therefore, the conversion factor from combined peak hours to 18-hour AAWT is **4.937** (i.e. 4.346 x 1.136), and this has been used to derive 18-hour AAWT flows for use in the DMRB noise assessment.

4.05 The flows have then been corrected for the Opening Year (2021) and Future Year (2033) using TEMPro growth factors for the Scunthorpe area.

4.06 In accordance with the DMRB, the $L_{A10\ (18\ hour)}$ noise levels are calculated using the procedure contained in the CRTN and the night time L_{night} noise levels have been calculated using 'Method 3' in the TRL document 'Converting the UK traffic noise index $L_{A10,18h}$ to EU noise indices for noise mapping'.

DMOY to DMFY Long Term Assessment

4.07 The DMRB requires a comparison of DMOY against DMFY, in order to demonstrate how noise levels will vary in the long-term, irrespective of the Scheme.

4.08 The long-term changes in $L_{A10\ (18\ hour)}$ and L_{night} levels without the Scheme have been predicted for all NSRs in the study area. The results of the calculations are contained in Appendix 2 and summarised in Table 4.1 below.

Table 4.1 – DMOY to DSFY long-term changes without the Scheme

Change in noise level dB(A)		Daytime		Night Time	
		No. of dwellings	No. of other noise sensitive receptors	No. of dwellings	No. of other noise sensitive receptors
Increase in noise level dB $L_{A10,\ 18h}$ / L_{night}	< 3.0	32	1	32	1
	3.0–4.9	0	0	0	0
	5.0–9.9	0	0	0	0
	> 10.0	0	0	0	0
No Change	0	0	0	0	0
Decrease in noise level dB $L_{A10,\ 18h}$ / L_{night}	< 3.0	0	0	0	0
	3.0–4.9	0	0	0	0
	5.0–9.9	0	0	0	0
	> 10.0	0	0	0	0

4.09 Without the Scheme, the long-term magnitude of change is **negligible** at all NSRs in the study area.

DMOY to DSOY Short Term Assessment

4.10 The short-term changes in $L_{A10\ (18\ hour)}$ and L_{night} levels with the Scheme have been predicted for all NSRs in the study area. The results of the calculations are contained in Appendix 2 and summarised in Table 4.2 below.

Table 4.2 – DMOY to DSOY short term changes with the Scheme

Change in noise level dB(A)		Daytime		Night Time	
		No. of dwellings	No. of other noise sensitive receptors	No. of dwellings	No. of other noise sensitive receptors
Increase in noise level dB $L_{A10,\ 18h}$ / L_{night}	< 1.0	15	0	15	0
	1.0–2.9	12	1	12	1
	3.0–4.9	0	0	0	0
	> 5.0	0	0	0	0
No Change	0	0	0	0	0
Decrease in noise level dB $L_{A10,\ 18h}$ / L_{night}	< 1.0	0	0	0	0
	1.0–2.9	0	0	0	0
	3.0–4.9	0	0	0	0
	> 5.0	5	0	5	0

4.11 The calculations indicate that 12 no. residential dwellings and 1 no. other receptor (Lindsay Lodge Hospice) are set to experience a **minor** increase in noise levels. The initial impact of this is that the effect is **not significant**.

4.12 10 no. of the dwellings in this band will also experience in $L_{A10\ (18\ hour)}$ and L_{night} levels noise levels which are above the SOAEL as defined in the DMRB, specifically *Ferndale*, *Morley*, *Petaling*, *The Poplars*, *Mayfield*, *The Vale*, *The Grove*, *Beckington Villa*, *Evanne* and *Elsinore*; which are in close proximity to and directly front towards the B1450 Burringham Road.

4.13 Although the DMRB advises that **minor** changes in the short-term can constitute a significant effect where the SOAEL is also exceeded, in this instance it is not considered appropriate to modify the initial assessment because the long-term impact on these dwellings will result in effects which are **not significant** (see below for long-term assessment). The DMRB states that *'A lower impact in the long-term and/or future year over the short-term can indicate that it is more appropriate to consider that a larger change is not significant'*. On the basis of the above, it is considered that the overall impact on these dwellings are **not significant**.

4.14 Properties at North Grange Cottages and Warp Farm are to experience a decrease in noise levels (due to the realignment of the existing B1450), whilst remaining properties are set to experience a **negligible** increase in noise levels. In accordance with the DMRB this is an indication that the effects are **not significant**.

DMOY to DSFY Long Term Assessment

4.15 The long-term changes in $L_{A10\ (18\ hour)}$ and L_{night} levels with the Scheme have been predicted for all NSRs in the study area. The results of the calculations are contained in Appendix 2 and summarised in Table 4.3 below.

Table 4.3 – DMOY to DSFY long-term changes with the Scheme

Change in noise level dB(A)		Daytime		Night Time	
		No. of dwellings	No. of other noise sensitive receptors	No. of dwellings	No. of other noise sensitive receptors
Increase in noise level dB $L_{A10,\ 18h}$ / L_{night}	< 3.0	15	0	15	0
	3.0–4.9	12	1	12	1
	5.0–9.9	0	0	0	0
	> 10.0	0	0	0	0
No Change	0	0	0	0	0
Decrease in noise level dB $L_{A10,\ 18h}$ / L_{night}	< 3.0	0	0	0	0
	3.0–4.9	0	0	0	0
	5.0–9.9	5	0	5	0
	> 10.0	0	0	0	0

4.16 The calculations indicate that 12 no. residential dwellings and 1 no. other receptor (Lindsay Lodge Hospice) are set to experience a **minor** increase in noise levels. Remaining properties are set to experience a **negligible** increase in noise levels or a decrease in noise levels.

4.17 In accordance with the DMRB this is an indication that the long-term effects are **not significant**.

5.00 SUMMARY

5.01 A noise impact assessment has been carried out for proposed new terminating junction to the M181 motorway and realignment of the existing B1450 Burringham Road, Scunthorpe.

5.02 The long-term magnitude of change without the Scheme is **negligible** at all receptors within the study area.

5.03 The short-term magnitude of change with the Scheme is **negligible** or **minor** at the nearest receptors. In accordance with the DMRB this is an indication that the short-term effects of the Scheme are **not significant**.

5.04 The long-term magnitude of change with the Scheme is **negligible** or **minor** at the nearest receptors. In accordance with the DMRB this is an indication that the long-term effects of the Scheme are **not significant**.

I trust the foregoing is sufficient for your needs. Should you have any queries regarding the above, please do not hesitate to contact me.

Yours sincerely

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Appendix 1
Glossary of Acoustic Terms

Sound Pressure Level (L_p)

The basic unit of sound measurement is the sound pressure level. As the pressures to which the human ear responds can range from 20 µPa to 200 Pa, a linear measurement of sound levels would involve many orders of magnitude. Consequently, the pressures are converted to a logarithmic scale and expressed in decibels (dB) as follows:

$$L_p = 20 \log_{10}(p/p_0)$$

Where L_p = sound pressure level in dB; p = rms sound pressure in Pa; and p_0 = reference sound pressure (20 µPa).

A-weighting Network

A frequency filtering system in a sound level meter, which approximates under defined conditions the frequency response of the human ear. The A-weighted sound pressure level, expressed in dB(A), has been shown to correlate well with subjective response to noise.

Equivalent continuous A-weighted sound pressure level, $L_{Aeq, T}$

The value of the A-weighted sound pressure level in decibels of continuous steady sound that within a specified time interval, T, has the same mean-square sound pressure as a sound that varies with time. $L_{Aeq, 16h}$ (07:00 to 23:00 hours) and $L_{Aeq, 8h}$ (23:00 to 07:00 hours) are used to qualify daytime and night time noise levels.

$L_{A10, T}$

The A-weighted sound pressure level in decibels exceeded for 10% of the measurement period, T. $L_{A10, 18h}$ is the arithmetic mean of the 18 hourly values from 06:00 to 24:00 hours.

$L_{A90, T}$

The A-weighted sound pressure level of the residual noise in decibels exceeded 90% of a given time interval, T. L_{A90} is typically taken as representative of background noise.

$L_{AF\ max}$

The maximum A-weighted noise level recorded during the measurement period. The subscript 'F' denotes fast time weighting, slow time weighting 'S' is also used.

Sound Exposure Level (SEL or L_{AE})

The energy produced by a discrete noise event averaged over one second, no matter how long the event actually took. This allows for comparison between different noise events which occur over different lengths of time.

Weighted Sound Reduction Index (R_W)

Single number quantity which characterises the airborne sound insulation properties of a material or building element over a defined range of frequencies (R_W is used to characterise the insulation of a material or product that has been measured in a laboratory).

Appendix 2 – Summary of Calculated CRTN Noise Levels

Calculated $L_{A10, 18\ hr}$ noise levels for noise sensitive receptors within the study area

Noise Sensitive Receptor(s)	$L_{A10, 18h}$ (dB)				Change in noise level dB(A)		
	DMOY	DMFY	DSOY	DSFY	DMOY-DMFY	DMOY-DSOY	DMOY-DSFY
Ferndale, Morley, Petaling, The Poplars, Mayfield, The Vale, The Grove, Beckington Villa, Evanne, Elsinore	66.2	66.4	68.6	70.1	+ 0.2	+ 2.4	+ 3.9
The Lodge, Fairways	64.0	64.2	66.4	67.9	+ 0.2	+ 2.4	+ 3.9
Lindsay Lodge Hospice	61.2	61.4	63.6	65.1	+ 0.2	+ 2.4	+ 3.9
Nos. 22–27 New Road, No. 19 Westfield Road, Nos. 21–28 Westfield Road	54.6	54.8	55.0	56.1	+ 0.2	+ 0.4	+ 1.5
Warp Farm	71.5	71.7	62.5	64.0	+ 0.2	- 9.0	- 7.5
North Grange Cottages	71.3	71.6	61.1	62.2	+ 0.3	- 10.2	- 9.1

Calculated L_{Night} noise levels for noise sensitive receptors within the study area

Noise Sensitive Receptor(s)	L_{Night} (dB)				Change in noise level dB(A)		
	DMOY	DMFY	DSOY	DSFY	DMOY-DMFY	DMOY-DSOY	DMOY-DSFY
Ferndale, Morley, Petaling, The Poplars, Mayfield, The Vale, The Grove, Beckington Villa, Evanne, Elsinore	53.3	53.5	55.5	56.8	+ 0.2	+ 2.2	+ 3.5
The Lodge, Fairways	51.1	51.3	53.3	54.6	+ 0.2	+ 2.4	+ 3.9
Lindsay Lodge Hospice	48.3	48.5	50.5	51.8	+ 0.2	+ 2.4	+ 3.9
Nos. 22–27 New Road, No. 19 Westfield Road, Nos. 21–28 Westfield Road	48.9	49.1	49.0	49.9	+ 0.2	+ 0.1	+ 1.0
Warp Farm	58.1	58.3	50.0	51.3	+ 0.2	- 8.1	- 6.8
North Grange Cottages	57.9	58.2	48.7	49.7	+ 0.3	- 9.2	- 8.2