

Land off Sheffield Road, Birdwell, Barnsley

Noise Impact Assessment

21150-RP-NIA-01

13 July 2026

Gates Homes
196 Sheffield Road
Birdwell
Barnsley
S70 5TD

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1.0 Introduction

1.1 Overview

Murray Acoustics Ltd has been commissioned by Gates Homes to undertake a noise impact assessment of the proposed residential development at Land off Sheffield Road, Birdwell, Barnsley (Barnsley Local Plan site allocation HS67).

The assessment considers the suitability of the site for residential use with respect to environmental noise. The principal noise source affecting the site is road traffic, comprising the M1 motorway to the west of the site and Sheffield Road (A61) to the east. The Local Planning Authority has also raised the nearby Academy Theatre in the context of the application; noise associated with the theatre is considered within this report.

A 3D computer noise model of the site and the proposed development has been constructed and calibrated against the measured noise levels to predict noise levels across the site and to inform the design of mitigation measures. This report sets out the assessment methodology, findings, and recommended mitigation measures where relevant.

1.2 Site Description

The site comprises an area of approximately 0.77 ha of undeveloped land on the western side of Sheffield Road (A61), Birdwell.

The M1 motorway runs broadly north to south to the west of the site, with open fields between. Sheffield Road (A61) adjoins the site frontage to the east and carries regular traffic through Birdwell, connecting Barnsley to the north with the M1.

The surrounding area comprises a mix of residential and commercial uses. Existing dwellings on Trafford Grove adjoin the site, with further residential terraces on the eastern side of Sheffield Road. The former Mines Rescue Station, a Grade II listed building, lies immediately south-east of the site. Commercial uses in the vicinity include Rockingham Business Park on the opposite side of Sheffield Road to the north-east, a warehouse building to the north, and the Academy Theatre (within the Take 2 Centre, 311 Sheffield Road) to the north of the site.

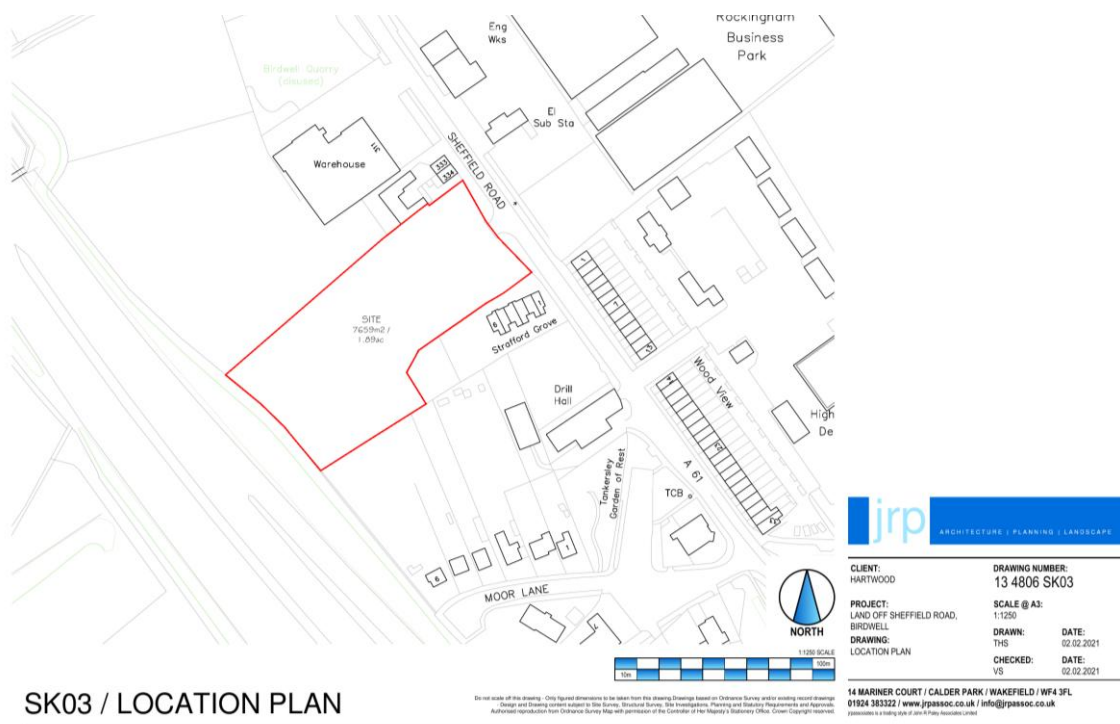


Figure 1.1 Site location plan

1.3 Development Proposals

It is proposed to erect 10 No two-storey dwellings arranged either side of a new access road from Sheffield Road, with private gardens and associated parking, as shown on White Agus Partnership drawing 24-057-01 Rev C. A row of dwellings fronts Sheffield Road, with the remaining plots arranged towards the rear (western part) of the site.



Figure 1.2 Development proposals

1.4 Assessment Scope

This assessment comprises the following elements:

- A baseline environmental noise survey of the site;
- The construction of a 3D computer noise model of the site and proposed development (CadnaA), implementing ISO 9613-2 and calibrated against the measured noise levels, to predict noise levels across the site both with and without mitigation;
- A residential noise break-in assessment in accordance with BS 8233:2014, determining the facade sound insulation and ventilation performance required to achieve the recommended internal ambient noise levels within the proposed dwellings, specified on a facade-by-facade basis informed by the noise model;
- An assessment of external amenity areas against the guideline values of BS 8233:2014, based on the modelled noise levels within the proposed garden areas, both with and without boundary noise mitigation;
- Consideration of the interaction between the noise climate and the overheating/ventilation strategy with reference to Approved Document O;
- Consideration of entertainment noise associated with the Academy Theatre, as raised by the Local Planning Authority.

2.0 Assessment Guidance & Requirements

2.1 Local Authority Guidance

The site falls within the jurisdiction of Barnsley Metropolitan Borough Council (BMBC).

The site is allocated for residential development within the Barnsley Local Plan as site HS67 (Land at Sheffield Road, Birdwell). The allocation states:

Site HS67 Land at Sheffield Road, Birdwell. The development will be expected to: Respect the historic and listed status of the Mine Rescue Station immediately adjacent by the use of appropriate site layout, sympathetic design that reflects the setting, appropriate scaling, massing, details and materials; and Avoid development in the Air Quality Management Area affected by the M1 and satisfy the requirements of Local Plan Policy AQ1 Development in Air Quality Management Areas.

No site-specific noise requirements are set out within the allocation. In the absence of published local noise guidance, the assessment adopts the national standards and guidance set out below.

2.2 BS 8233:2014

BS 8233:2014 'Guidance on sound insulation and noise reduction for buildings' (herein BS 8233) provides guidance on suitable internal ambient noise levels within residential buildings, along with recommended external amenity noise levels. The guidance draws on the World Health Organization (WHO) 'Guidelines for Community Noise' (1999) and 'Night Noise Guidelines for Europe' (2009).

The recommended internal ambient noise levels for dwellings are summarised in Table 2.1.

Table 2.1 Internal ambient noise levels for dwellings (BS 8233:2014)

Activity	Location	07:00 – 23:00	23:00 – 07:00
Resting	Living room	35 dB LAeq,16h	-
Dining	Dining room/area	40 dB LAeq,16h	-
Sleeping / resting	Bedroom	35 dB LAeq,16h	30 dB LAeq,8h

In addition, with reference to the WHO guidelines, individual noise events in bedrooms at night should not regularly exceed 45 dB LAFmax (i.e. more than 10–15 times per night).

For external amenity areas such as gardens, BS 8233 recommends that noise levels do not exceed 50 dB LAeq,T, with 55 dB LAeq,T as an upper guideline value. BS 8233 acknowledges that these guideline values are not achievable in all circumstances, and that in higher-noise areas a compromise between elevated noise levels and other factors such as the convenience of living in the location may be warranted, with development not prohibited on noise grounds alone.

2.3 Approved Document O

Approved Document O 'Overheating' (herein ADO) of the Building Regulations came into force in June 2022 and applies to new residential buildings in England. It sets out requirements to limit unwanted solar gains and provide an adequate means of removing heat from indoor environments. Where the overheating strategy relies on openable windows at night, ADO requires consideration of whether external noise would make that unreasonable; indicative internal criteria of 40 dB LAeq,8h and 55 dB LAFmax (occurring more than 10 times per night) in bedrooms are given.

2.4 National Planning Policy

The relevant national planning framework for noise is set out in the National Planning Policy Framework (NPPF) and the Noise Policy Statement for England (NPSE). The NPPF requires planning decisions to avoid, mitigate or reduce to a minimum the adverse impacts of noise on health and quality of life. The NPSE introduces the concepts of NOEL, LOAEL and SOAEL (No Observed Effect Level, Lowest Observed Adverse Effect Level and Significant Observed Adverse Effect Level), with the policy aim of avoiding significant adverse impacts and mitigating and minimising adverse impacts, taking account of the economic and social benefits of development.

3.0 Environmental Noise Survey

3.1 Procedure

Continuous automated noise measurements were undertaken at measurement position MP1 from 11:45 hours on Thursday 25 June 2026 until 13:00 hours on Monday 29 June 2026. A supplementary attended sample measurement was undertaken at measurement position MP2 between 11:00 and 13:00 hours on Monday 29 June 2026. Audio recordings were captured throughout the unattended measurement period to support source attribution.

Weather conditions were generally dry with light winds and therefore suitable for the measurement of environmental noise.

The measurement procedure complied with ISO 1996-2:2017 Acoustics 'Description, measurement and assessment of environmental noise - Part 2: Determination of environmental noise levels'.

3.2 Noise Climate

The noise climate across the site is dominated by road traffic. At the front of the site the noise climate comprises local road traffic on Sheffield Road together with the continuous contribution of the M1 motorway to the west; towards the rear of the site the M1 becomes the dominant source, and during the attended measurement at MP2 noise from the motorway was noted to be the dominant source. The M1 operates continuously throughout the night, and night-time noise levels across the site are governed by motorway traffic, with a steady character reflected in the measured background sound levels.

Measured evening noise levels (19:00-23:00 hours) were consistent from day to day across the survey, including the Friday and Saturday evenings, at 59-61 dB $L_{Aeq,4h}$ at MP1, and retained a road traffic character throughout; no distinct entertainment noise events were evident within the measured data or audio recordings.

3.3 Measurement Positions

The chosen measurement positions (MP1 & MP2) are highlighted on Figure 3.1 below. Both positions were free-field, with microphones at a height of approximately 1.5 m above local ground level.

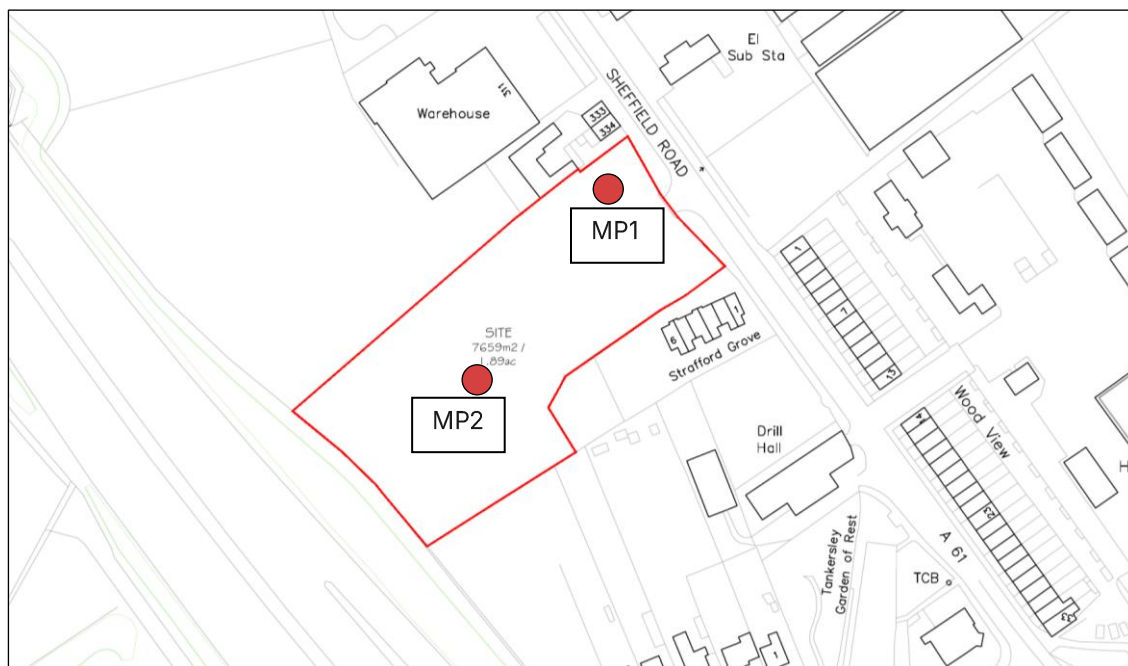


Figure 3.1 Survey measurement positions

3.4 Equipment

The equipment calibration was verified before and after use and no abnormalities were observed. The equipment used is described within Table 3.1.

Table 3.1 Survey equipment information

Equipment	Serial No.	Calibration Date	Certificate No.
Class 1 Sound Level Meter SvanteK Type 971A (MP1)	173141	19 Jan 2026	1516680-2
Preamplifier SvanteK SV18A	163626		
Free-field Microphone ACO 7152	96756		
Class 1 Sound Level Meter SvanteK Type 971A (MP2)	173136	19 Jan 2026	1516680-1
Preamplifier SvanteK SV18A	163637		
Free-field Microphone ACO 7152	96767		
Class 1 Acoustic Calibrator SvanteK SV33B	182123	30 Jan 2026	C182123-1

3.5 Results

The full measured sound levels throughout the survey duration are presented as a time history graph in Appendix A - Environmental Noise Survey Results. A summary of the measured sound levels is presented below.

Note that these are free-field sound levels, with background sound levels derived based on the guidance of BS 4142.

Table 3.2 Summary of noise survey results (free-field)

Position	Daytime $L_{Aeq,16h}$	Night-time $L_{Aeq,8h}$	Night-time 10th Highest $L_{AFmax,15min}$
MP1	62 dB	56 dB	70 dB
MP2*	67 dB	61 dB	-

* MP2 values are derived from the difference between the attended sample measurement and the measured levels at MP1.

Daytime noise levels at MP1 varied over a narrow range across the survey (60-62 dB $L_{Aeq,16h}$), with the busiest measured day (Sunday 28 June 2026) adopted as the design basis together with its measured octave band spectrum. Night-time levels similarly varied over a narrow range (55-56 dB $L_{Aeq,8h}$), with the most onerous night adopted. The 10th highest nightly L_{AFmax} was consistent across all four nights at 69-70 dB.

4.0 Noise Modelling

4.1 Model Construction

A 3D computer noise model of the site and its surroundings has been constructed in CadnaA (DataKustik GmbH), implementing the calculation methodology of ISO 9613-2 'Acoustics — Attenuation of sound during propagation outdoors'. Site topography has been incorporated from the Environment Agency 1 m LiDAR composite Digital Terrain Model (2022), with the proposed dwellings and site layout modelled in accordance with White Agus Partnership drawing 24-057-01 Rev C. Surrounding buildings, including the existing dwellings on Strafford Grove and Sheffield Road and the commercial buildings to the north, are included within the model.

The proposed dwellings have been modelled as two-storey buildings. Noise levels have been predicted across the site as a horizontal grid at a height of 1.5 m above local ground level, representative of external amenity areas, together with facade receptors at each floor of each proposed dwelling.

4.2 Source Data & Calibration

The M1 motorway and Sheffield Road have been modelled as road traffic line sources. The source emission levels have been calibrated such that the predicted noise levels at the survey measurement positions reproduce the measured design levels set out in Section 3.0 (the busiest measured day and the most onerous night), providing a model that is representative of the reasonable worst-case noise climate across the site.

4.3 Modelled Scenarios

The following scenarios have been modelled for the standard daytime (07:00 – 23:00 hours) and night-time (23:00 – 07:00 hours) periods:

- The proposed development without mitigation; and
- The proposed development with a 2.4 m high acoustic barrier along the south-western and north-eastern site boundaries.

The model outputs are presented in Appendix B – Noise Model Results, comprising noise contour plots at 1.5 m grid height for each scenario and period, together with the predicted facade noise levels at each dwelling. The modelled facade noise levels have been used to inform the glazing and ventilation specification set out in Section 5.0, and the modelled garden noise levels inform the assessment of external amenity areas in Section 6.0.

5.0 Residential Noise Break-in Assessment

5.1 Criteria

Based on the guidance set out within BS 8233 and the WHO guidelines, the following criteria have been adopted for the proposed dwellings.

Table 5.1 Noise intrusion criteria - proposed dwellings

Area	Daytime (07:00 – 23:00)	Night-time (23:00 – 07:00)
Living rooms	35 dB LAeq,16h	-
Bedrooms	35 dB LAeq,16h	30 dB LAeq,8h 45 dB LAFmax

5.2 Assessment Parameters & Assumptions

The assessment is undertaken on a reasonable worst-case basis. The calibrated noise model has been used to predict free-field noise levels at each facade of each proposed dwelling (Appendix B). The highest predicted facade noise levels across the development are approximately 69 dB LAeq,16h (daytime) and 63 dB LAeq,8h (night-time), occurring at the upper-floor facades most exposed to the M1. The predicted facade noise levels have been used to zone the facades for the purposes of the glazing and ventilation specification, as set out below.

Internal noise levels have been predicted using the composite facade method of BS EN 12354-3, based on a typical bedroom of 3.5 m x 4.0 m x 2.5 m with a facade area of 8.75 m², glazed area of 3.5 m², a reverberation time of 0.5 s, and 2No trickle ventilators. This room represents a reasonable worst case.

5.3 Non-Glazed Elements

The external walls are assumed to be a masonry cavity construction, which would be expected to provide at least the minimum sound insulation performance shown in the table below. Non-glazed elements of this performance do not limit the internal noise levels; the facade performance is governed by the glazed elements and ventilators.

Table 5.2 Assumed sound reduction performance for non-glazed elements

Element	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	Rw + Ctr (dB)
Masonry external wall	35	42	45	50	50	55	44

5.4 Glazed Elements

The required glazing performance has been specified on a facade-by-facade basis, informed by the modelled facade noise levels, such that the internal ambient noise level criteria are achieved in all habitable rooms. Three specification zones are adopted, as shown on the glazing zone mark-up at Figure 5.1 below and summarised in Table 5.3.

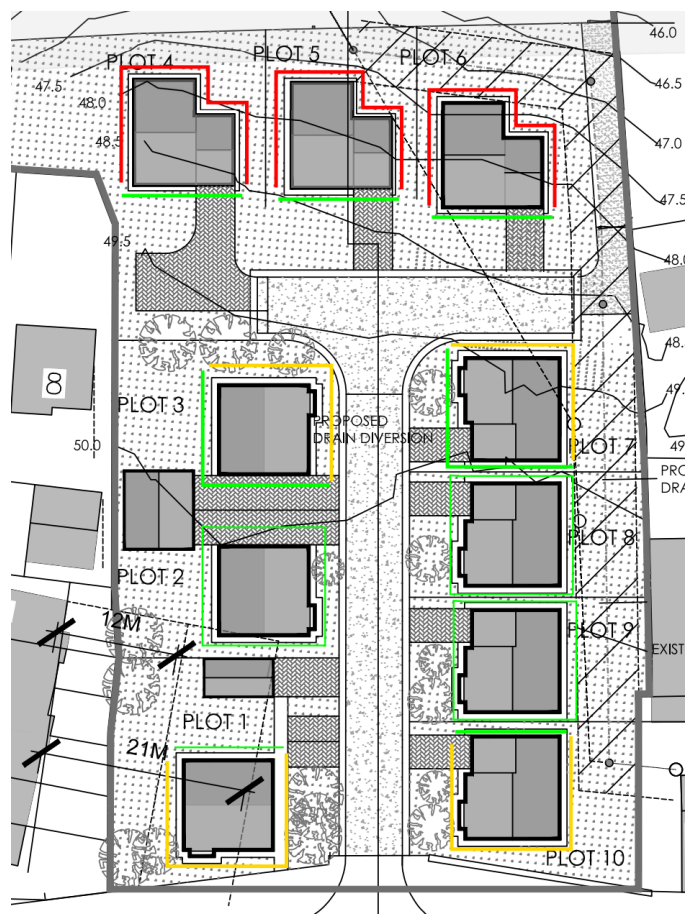


Figure 5.1 Glazing specification zones (base drawing: White Agus Partnership 24-057-01 Rev C)

Table 5.3 Minimum glazing performance requirements by facade zone

Zone	Minimum whole-window performance (Rw + Ctr)	Indicative glazing construction
Zone A (green)	29 dB	Standard thermal double glazing (e.g. 4/16/4)
Zone B (orange)	34 dB	Upated acoustic double glazed unit incorporating an acoustic laminated pane
Zone C (red)	36 dB	Laminated acoustic double glazed unit with panes of differing thickness (e.g. 10/16/6.4 acoustic laminate)

The performance is specified for the whole window unit, including the frame, seals, etc. as appropriate. Sole glass performance data would not demonstrate compliance with this

specification. The nominated glazing supplier should provide test data demonstrating that each proposed window system achieves the specified $R_w + C_{tr}$ rating for the complete window assembly.

With the corresponding ventilator performance specified below, the internal noise level criteria, including the night-time L_{AFmax} criterion, are predicted to be met in all habitable rooms.

5.5 Ventilation

5.5.1 Normal Ventilation

Based on the measured and modelled noise levels, appropriate ventilation systems (ref. ADF) are outlined below for each glazing zone, in order that the internal noise criteria are not compromised. In each zone the ventilator performance is specified at not less than 6 dB above the corresponding glazing performance, such that the ventilators do not limit the composite facade performance.

Table 5.4 Ventilation strategy

Zone	Background ventilators	Minimum performance ($D_{n,e,w} + C_{tr}$)
Zone A (green)	Trickle ventilators / MVHR	35 dB
Zone B (orange)	Acoustic trickle ventilators / MVHR	40 dB
Zone C (red)	Acoustic trickle ventilators / MVHR	42 dB

Alternatively, mechanical supply ventilation may be provided. Increasing the number of vents will reduce the composite performance of the facade; if more vents are required, the required insulation should be increased by $+10 \cdot \log(N)$ where N is the number of vents proposed.

In the case of mechanical ventilation, systems should be designed to meet the internal noise levels as defined in CIBSE Guide A (2015), as shown below.

Table 5.5 Mechanical building services noise level requirements

Room Type	L_{Aeq} , dB	NR
Bedrooms	30	25
Living Rooms	35	30
Kitchen	45-50	40-45

In all cases, purge ventilation may be provided by openable windows. The internal noise level requirement would not be applicable during purge conditions as this would only occur occasionally.

5.5.2 Overheating (Approved Document O)

Where the ADO overheating strategy relies on openable windows at night, the measured night-time noise climate has been assessed against the ADO indicative internal criteria (40 dB LAeq,8h and 55 dB LAFmax more than 10 times per night), assuming a partially open window provides approximately 13 dB of attenuation.

On this basis, the predicted internal levels with bedroom windows open at night are approximately 43 dB LAeq,8h for the Sheffield Road zone and approximately 47 dB LAeq,8h for the rear (M1) zone, with the 55 dB LAFmax threshold also predicted to be exceeded more than 10 times per night in both zones. The ADO noise criteria are therefore not met with open windows, and the overheating strategy should not rely on open bedroom windows at night. The overheating strategy, including any dynamic thermal modelling and the selection of alternative means of removing heat (e.g. mechanical ventilation with adequate free area, or active cooling where justified), is to be developed by an overheating specialist. Windows remain openable at the occupants' discretion.

6.0 External Amenity Areas

The measured free-field daytime noise levels across the undeveloped site (approximately 62 dB LAeq,16h at the Sheffield Road frontage and 67 dB LAeq,16h at the rear of the site) exceed the BS 8233 guideline values of 50 – 55 dB LAeq,T for external amenity areas. The calibrated noise model has therefore been used to predict noise levels within the proposed garden areas at a height of 1.5 m, both with and without boundary mitigation, as presented in Appendix B.

Without mitigation, daytime noise levels within the proposed gardens are predicted to be in the range of approximately 55 to 65 dB LAeq,16h, with the highest levels within the gardens closest to the M1.

BS 8233 advises that, in higher-noise areas such as those adjoining the strategic transport network, a compromise between elevated noise levels and other factors such as the convenience of living in the location may be warranted, and that in such circumstances development should aim to achieve the lowest practicable noise levels within external amenity areas. Mitigation has therefore been developed to reduce garden noise levels as far as reasonably possible.

It is recommended that a 2.4 m high acoustic barrier is provided along the south-western and north-eastern site boundaries, in the locations modelled (Appendix B). The barrier should be imperforate over its full height with no gaps at or beneath the base, and should provide a minimum superficial mass of 10 kg/m² – e.g. close-boarded timber fencing with battened joints, a proprietary acoustic fence, or masonry.

With the recommended barrier in place, daytime noise levels within the majority of the proposed garden areas are predicted to reduce to approximately 55 dB LAeq,16h or below – a reduction of typically 5 dB relative to the unmitigated case within the most exposed gardens – with the most screened garden areas below approximately 52 dB LAeq,16h.

The noise environment is common to the Birdwell area as a whole, which lies between the M1 corridor and the A61, and is commensurate with that of the established residential properties surrounding the site, including the adjacent dwellings on Trafford Grove and Sheffield Road. BS 8233 acknowledges that development in such locations should not be prohibited on noise grounds alone.

On this basis, with the recommended boundary barrier in place, noise levels within the external amenity areas will have been reduced as far as reasonably possible in line with the guidance of BS 8233, and are considered acceptable in the context of the site. Noise within external amenity areas should not be regarded as a limiting factor for the proposed development.

7.0 Entertainment Noise - The Academy Theatre

7.1 Local Authority Request

The Local Planning Authority has raised the presence of a nearby theatre in the context of the application. This section considers the potential for entertainment noise associated with the Academy Theatre to affect the proposed dwellings, and the associated 'agent of change' considerations.

7.2 The Venue

The Academy Theatre is located within the Take 2 Centre at 311 Sheffield Road, to the north of the site. The venue is a fully enclosed, professional working theatre converted from a former retail unit, with an intimate auditorium seating approximately 172 people in tiered seating, together with ancillary studio, bar and restaurant space. The programme comprises seated performances (touring shows, pantomime and similar), principally during evening hours with weekend matinees; the venue also operates a performing arts academy with classes within the building.

7.3 Assessment

The venue is a seated, enclosed theatre rather than an amplified music venue; noise breakout from the enclosed auditorium at the separation distance to the proposed dwellings is expected to be negligible. The principal potential sources of noise associated with the venue are patron arrivals and departures and associated car park activity, which are intermittent, short in duration, and screened from the majority of the site by intervening buildings.

The environmental noise survey provides direct empirical support for this position. The unattended measurement position (MP1) operated continuously across four evenings, including a Friday and a Saturday. Measured evening levels (19:00-23:00 hours) were consistent from day to day at 59-61 dB LAeq,4h with a steady road traffic character, and the measured levels show no evidence of distinct entertainment noise events at the site. Night-time noise levels at the site are governed by continuous M1 traffic.

The internal noise criteria adopted in Section 5.0, and the facade sound insulation and ventilation specifications derived from the measured road traffic noise levels, are governed by the road traffic noise climate; any residual contribution from the theatre is negligible against this envelope. On that basis, noise from the Academy Theatre is not anticipated to result in an adverse impact on the amenity of future occupiers of the proposed dwellings, nor to give rise to reasonable grounds for complaint that could prejudice the continued operation of the venue, and no specific mitigation is considered necessary.

8.0 Conclusion

Murray Acoustics Ltd has been commissioned by Gates Homes to undertake a noise impact assessment of the proposed residential development of 10 No dwellings at Land off Sheffield Road, Birdwell, Barnsley (Local Plan allocation HS67). The principal noise source affecting the site is road traffic, comprising the M1 motorway to the west and Sheffield Road (A61) to the east.

A baseline environmental noise survey was undertaken between 25 and 29 June 2026, comprising a continuous unattended measurement at the Sheffield Road frontage and an attended measurement at the rear of the site, where the M1 is the dominant source. The assessment has been undertaken on a reasonable worst-case basis, adopting the busiest measured day and most onerous night.

A 3D computer noise model of the site (CadnaA, ISO 9613-2), calibrated against the measured noise levels, has been used to predict noise levels across the proposed development, at each facade of each dwelling and within the proposed garden areas.

The assessment demonstrates that the recommended internal ambient noise levels of BS 8233, together with the WHO night-time LAFmax guideline, can be achieved within all proposed dwellings with practicable facade specifications. The glazing and ventilation requirements are specified on a facade-by-facade basis across three zones, informed by the modelled facade noise levels: standard thermal double glazing (29 dB Rw + Ctr) to the majority of facades, uprated acoustic glazing (34 dB Rw + Ctr) to the exposed facades of Plots 1, 3, 7 and 10, and laminated acoustic glazing (36 dB Rw + Ctr) to the facades of Plots 4 – 6 facing the M1, in each case with background ventilators achieving a minimum $D_{n,e,w} + C_{tr}$ commensurate with the glazing performance. Mechanical ventilation may be adopted as an alternative, designed to CIBSE Guide A internal noise levels.

Where the Approved Document O overheating strategy would rely on open bedroom windows at night, the ADO indicative internal noise criteria would not be met; the overheating strategy should therefore not rely on open bedroom windows at night, and alternative means of removing heat should be developed by an overheating specialist.

Daytime noise levels within the external amenity areas would exceed the BS 8233 guideline values in the absence of mitigation. In line with the guidance of BS 8233, garden noise levels have been reduced as far as reasonably possible: a 2.4 m high imperforate acoustic barrier is recommended along the south-western and north-eastern site boundaries, with which daytime noise levels within the majority of the proposed gardens are predicted to be approximately 55 dB LAeq,16h or below. Having regard to the screening provided by the dwellings themselves and the context of the site within the established noise environment of the Birdwell area, noise levels within the external

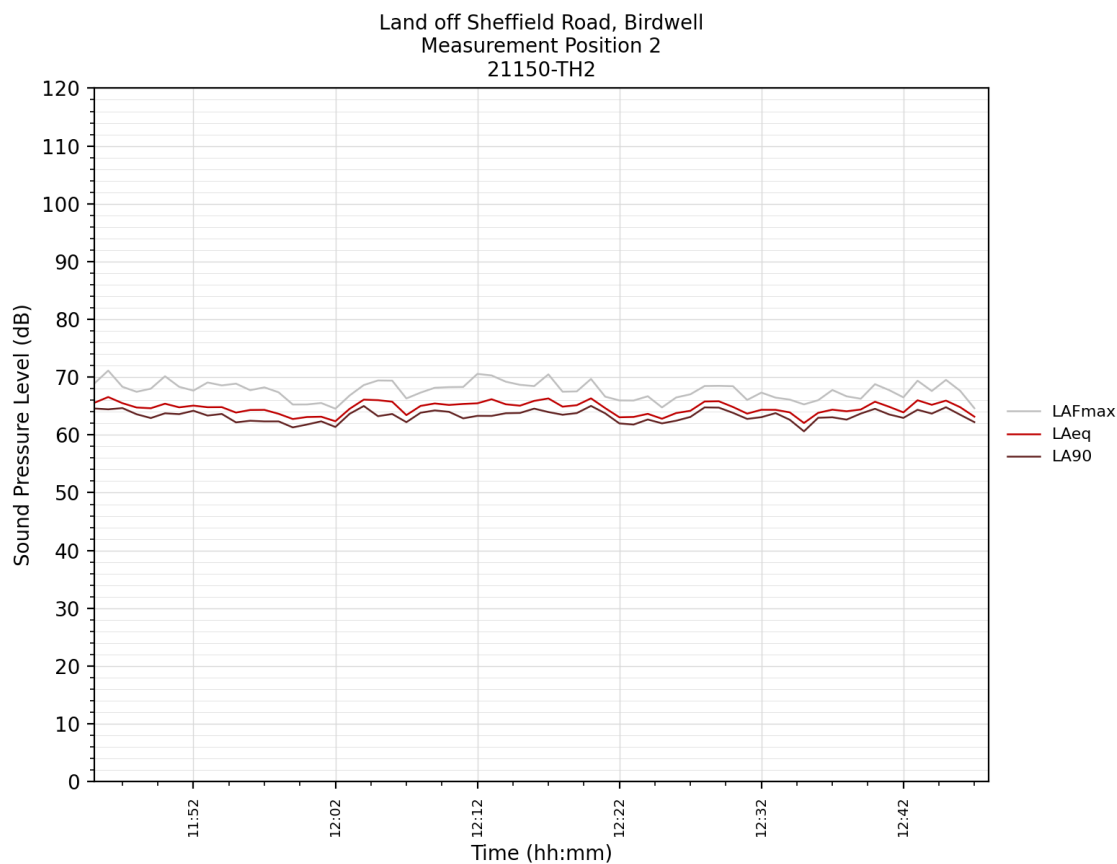
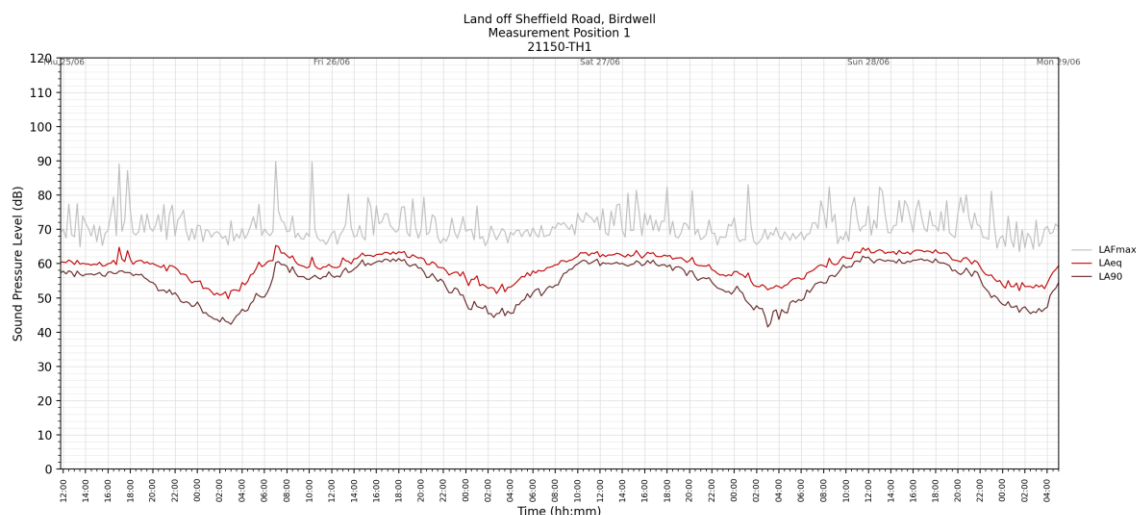
amenity areas are considered acceptable and should not be regarded as a limiting factor for the proposed development.

Noise from the nearby Academy Theatre has been considered; the venue is an enclosed seated theatre, the measured evening noise levels at the site show no evidence of entertainment noise events, and the facade specifications are governed by road traffic noise. No adverse impact is anticipated and no specific mitigation is considered necessary.

It is therefore considered that a suitable acoustic environment can be achieved for future occupiers of the proposed development, and that the development can be delivered without unacceptable noise impact, subject to the measures identified within this report.

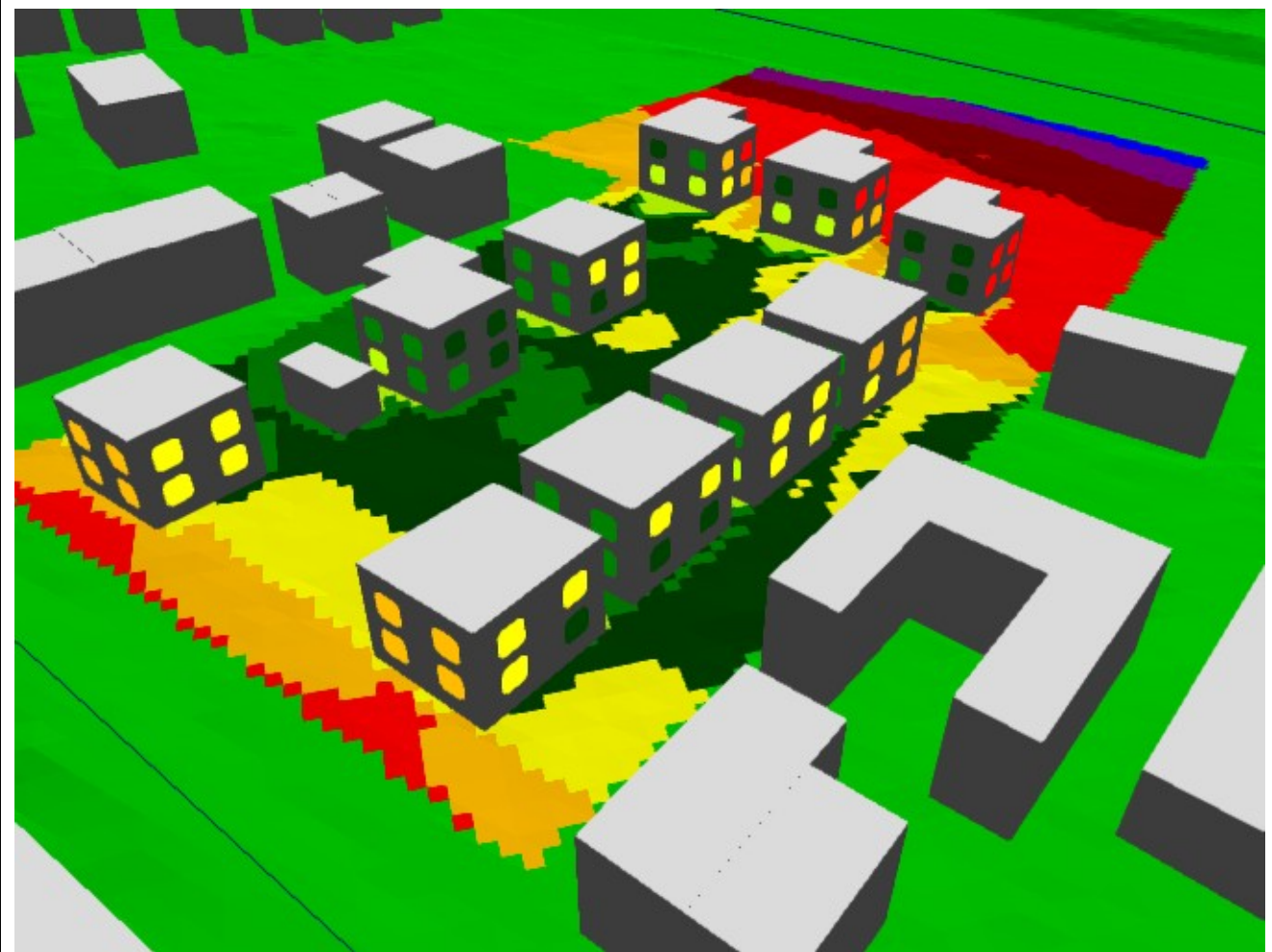
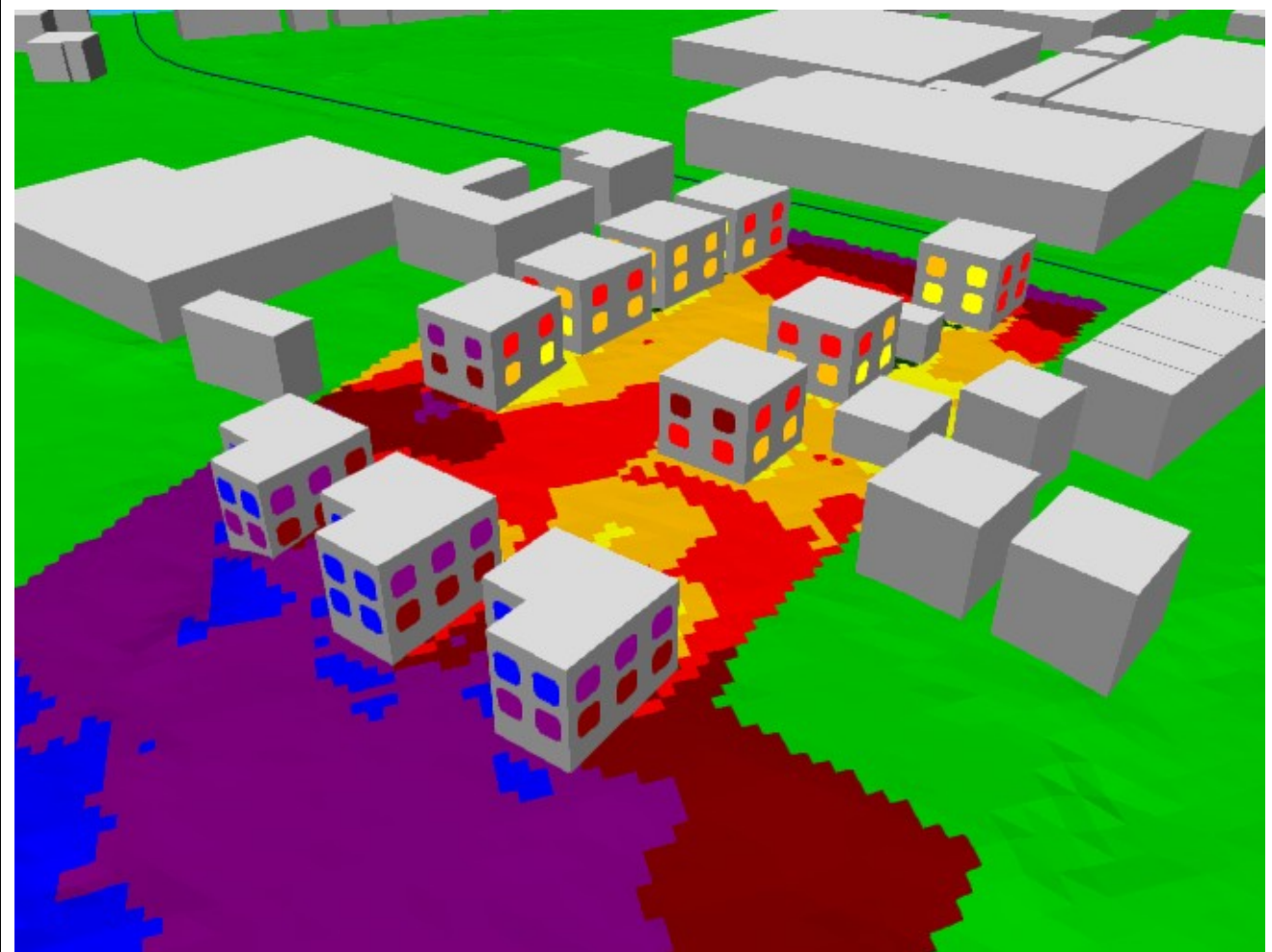
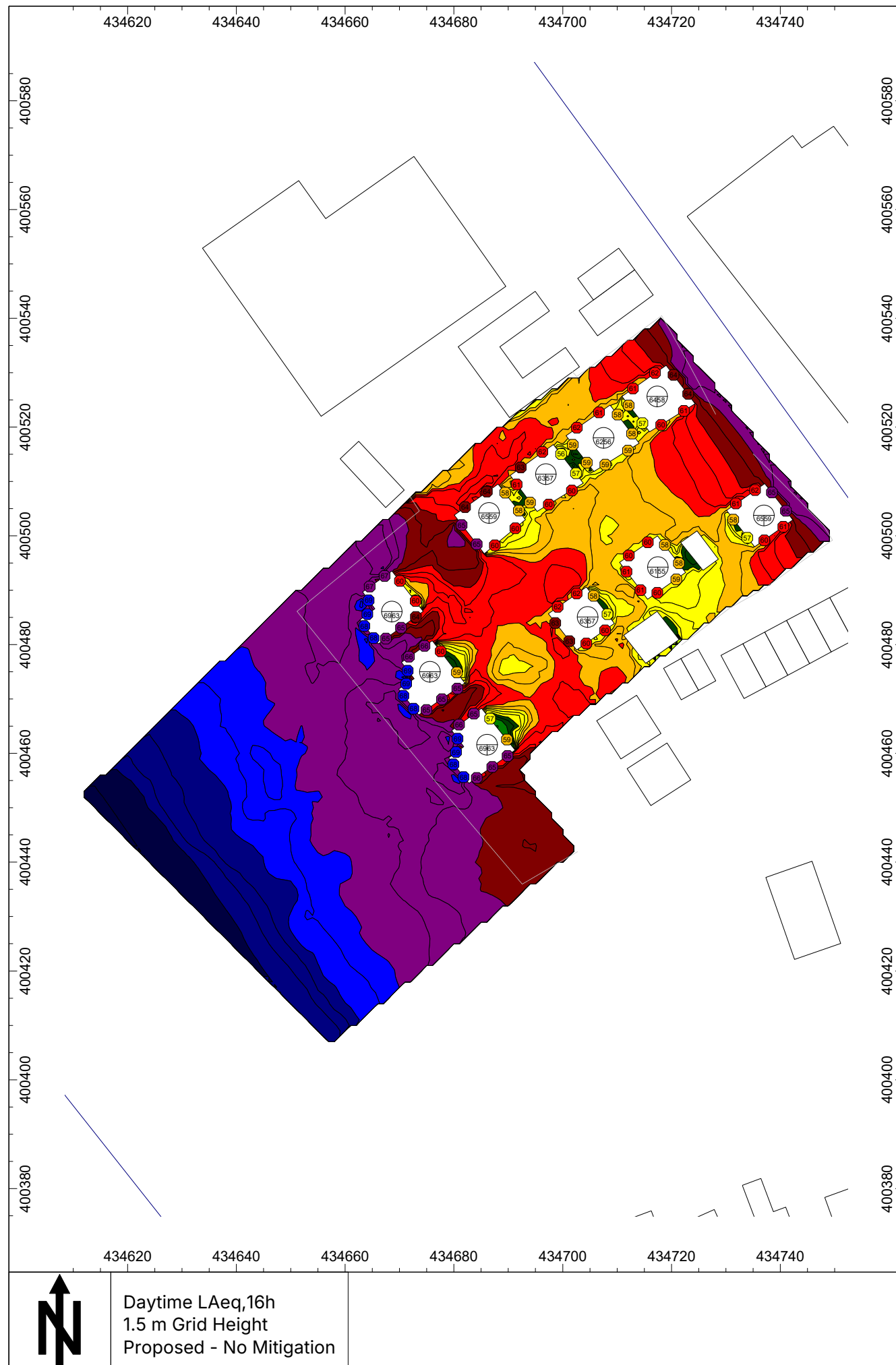
Appendix A – Environmental Noise Survey Results

Time history graphs of the measured sound levels are presented below. Measurement position MP1 (unattended, 15-minute intervals) is followed by measurement position MP2 (attended, 1-minute intervals).



Appendix B – Noise Model Results

Noise contour plots at a grid height of 1.5 m above local ground level are presented below for the daytime (07:00 – 23:00 hours) and night-time (23:00 – 07:00 hours) periods, for the proposed development without mitigation and with the recommended 2.4 m high boundary barrier. Predicted free-field facade noise levels are shown at each dwelling.

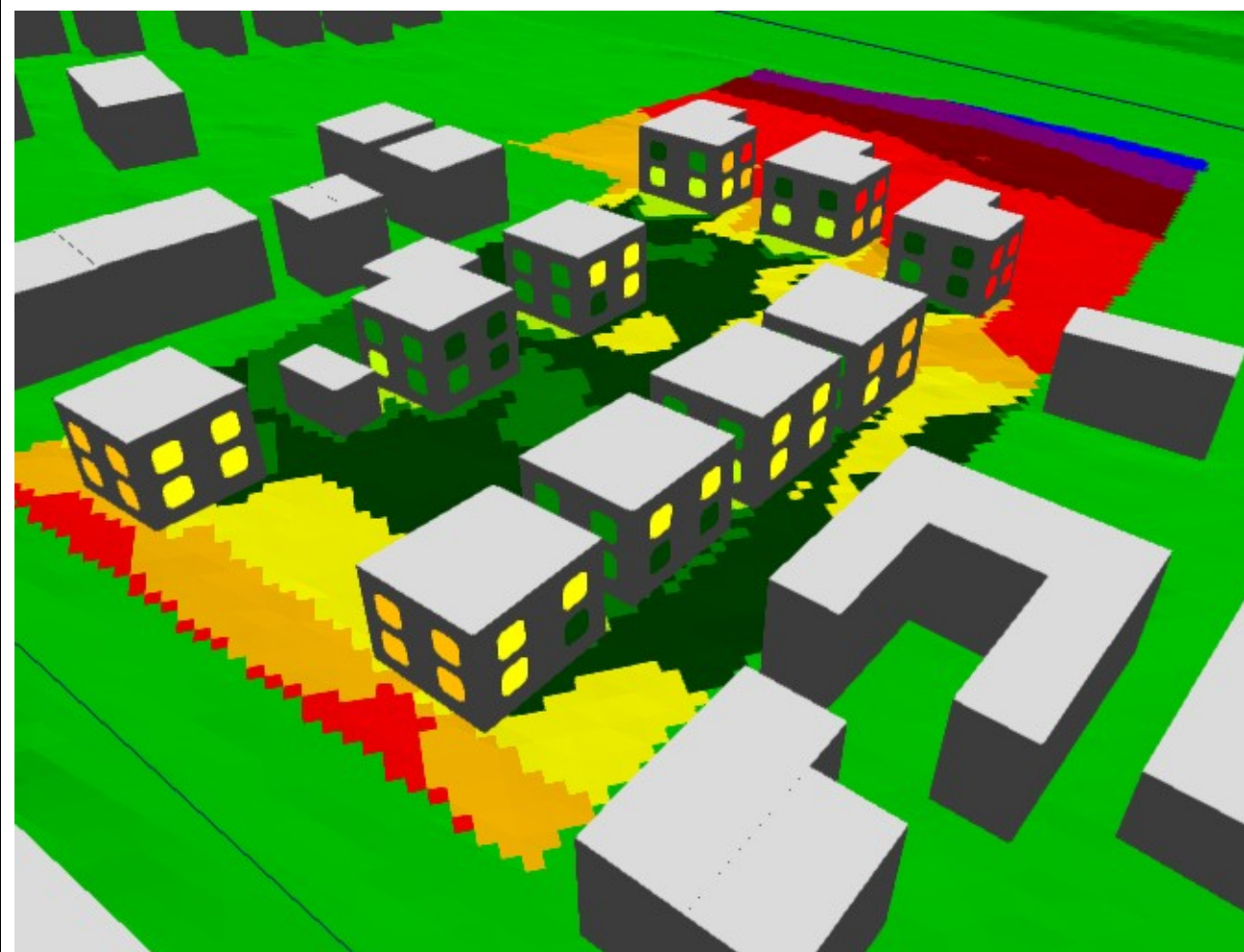
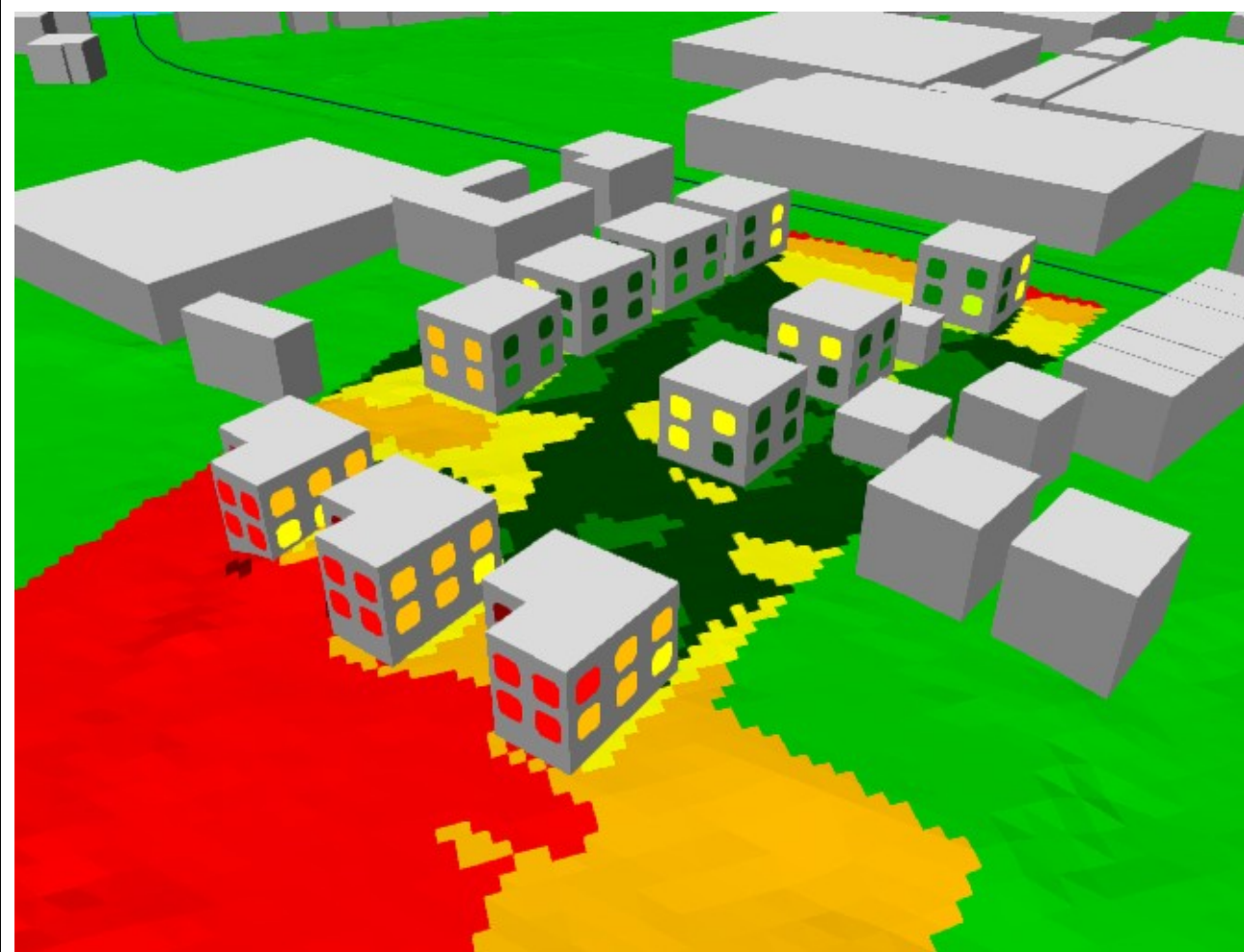
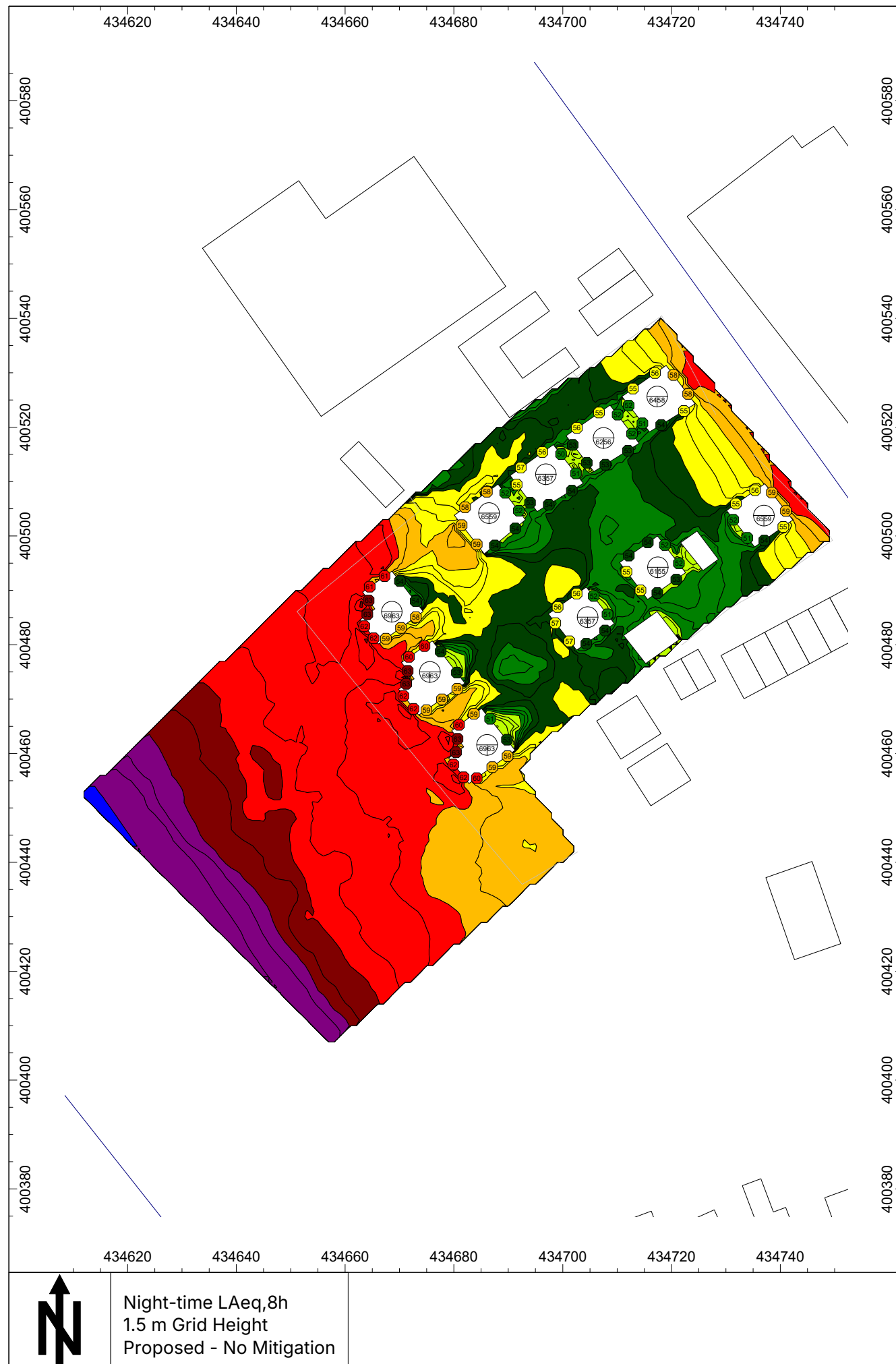


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70.0 <= ... < 72.5
72.5 <= ...

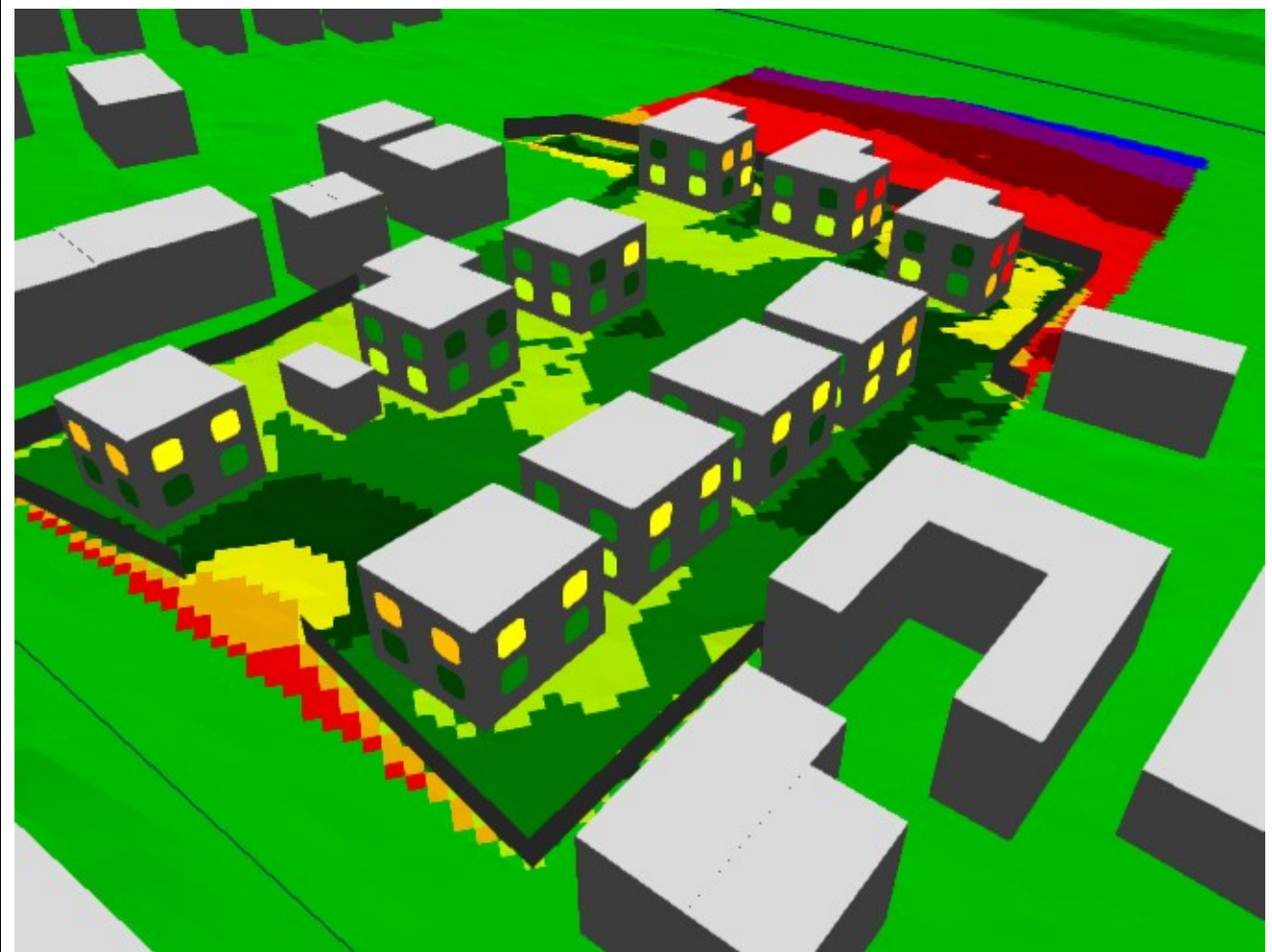
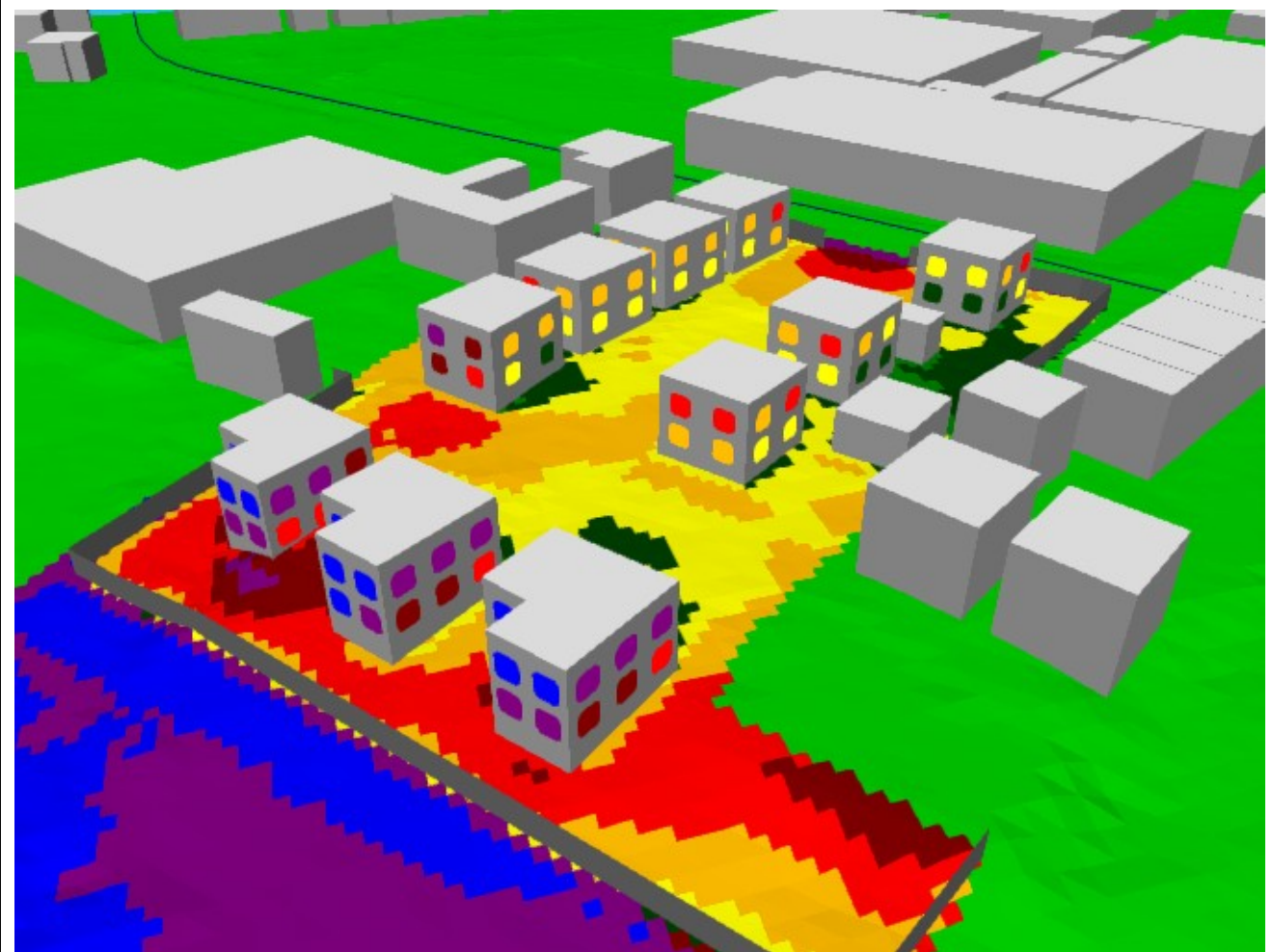
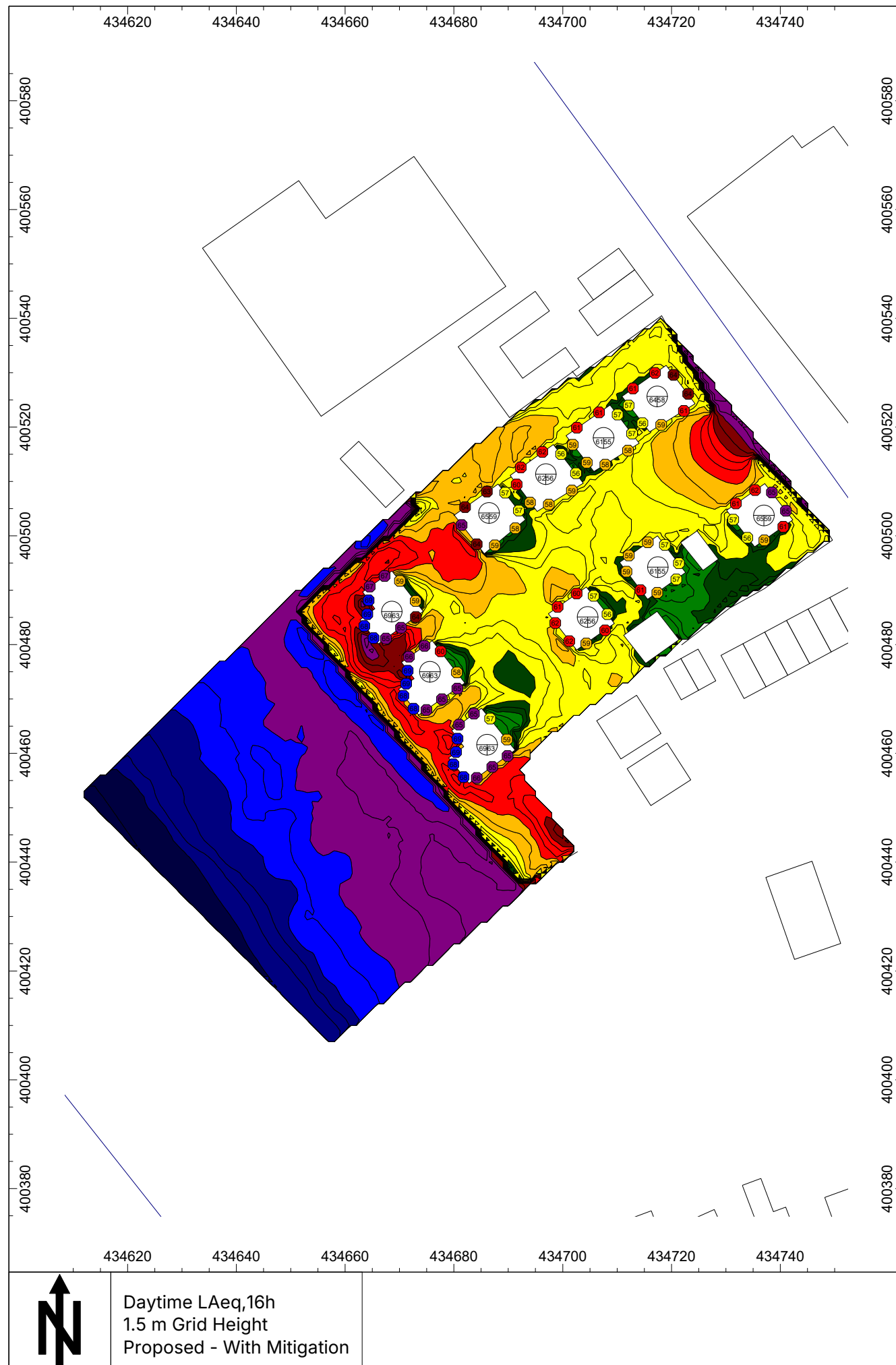


MURRAY
ACOUSTICS

ISO 9613-2:2014

Project: 21150
Created By: JM

50.0 <= ... < 52.5
52.5 <= ... < 55.0
55.0 <= ... < 57.5
57.5 <= ... < 60.0
60.0 <= ... < 62.5
62.5 <= ... < 65.0
65.0 <= ... < 67.5
67.5 <= ... < 70.0
70.0 <= ... < 72.5
72.5 <= ...

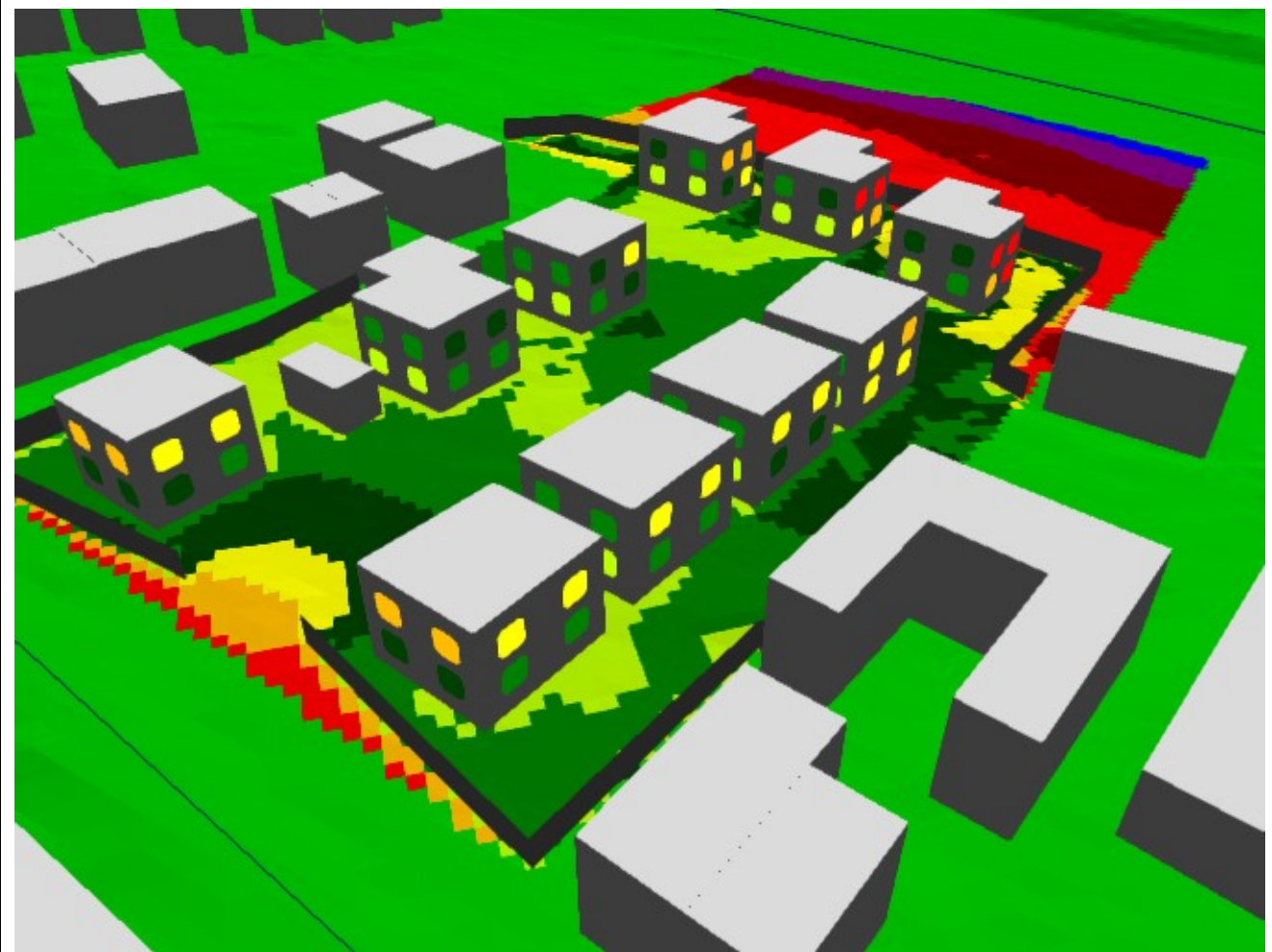
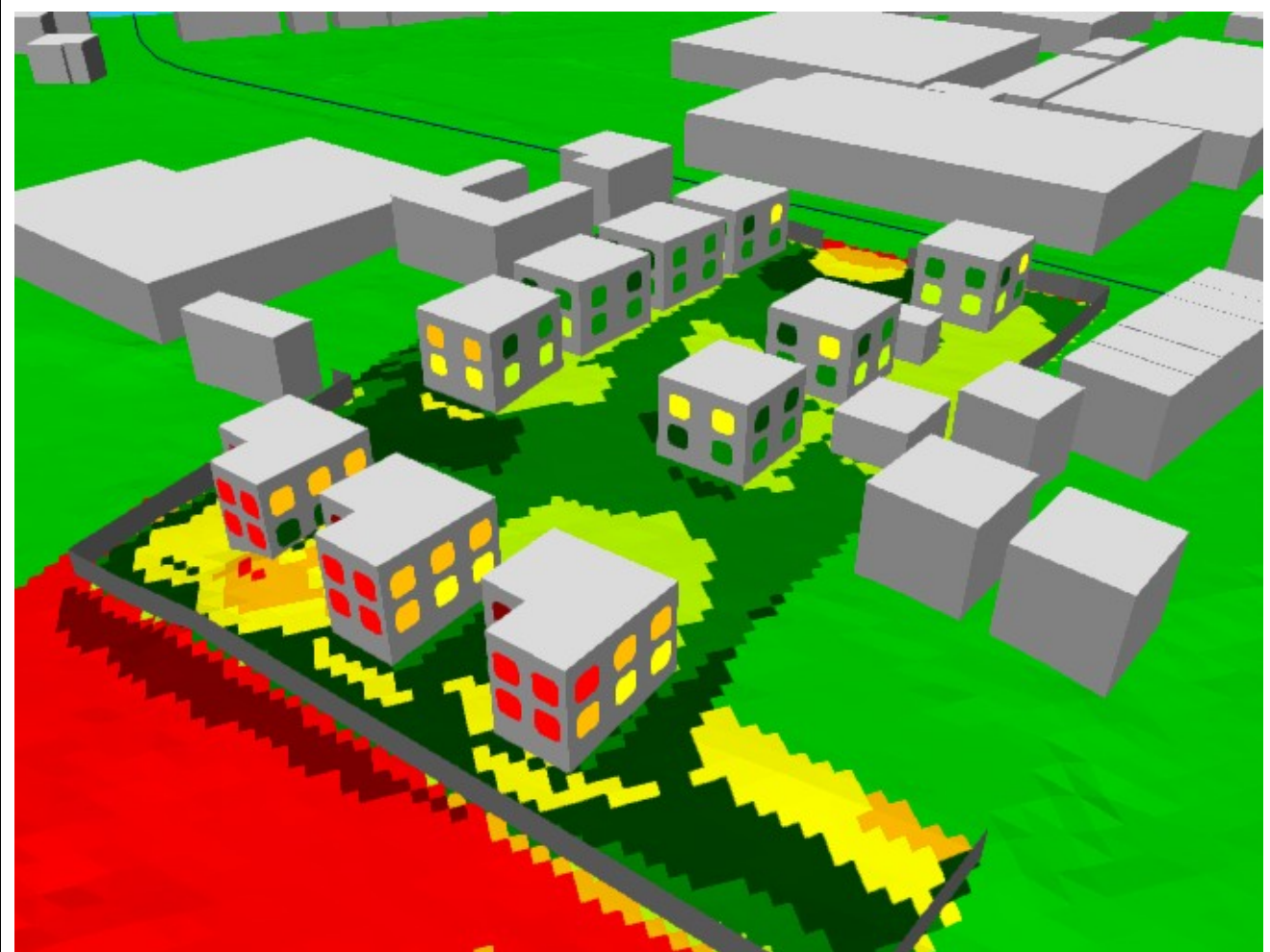
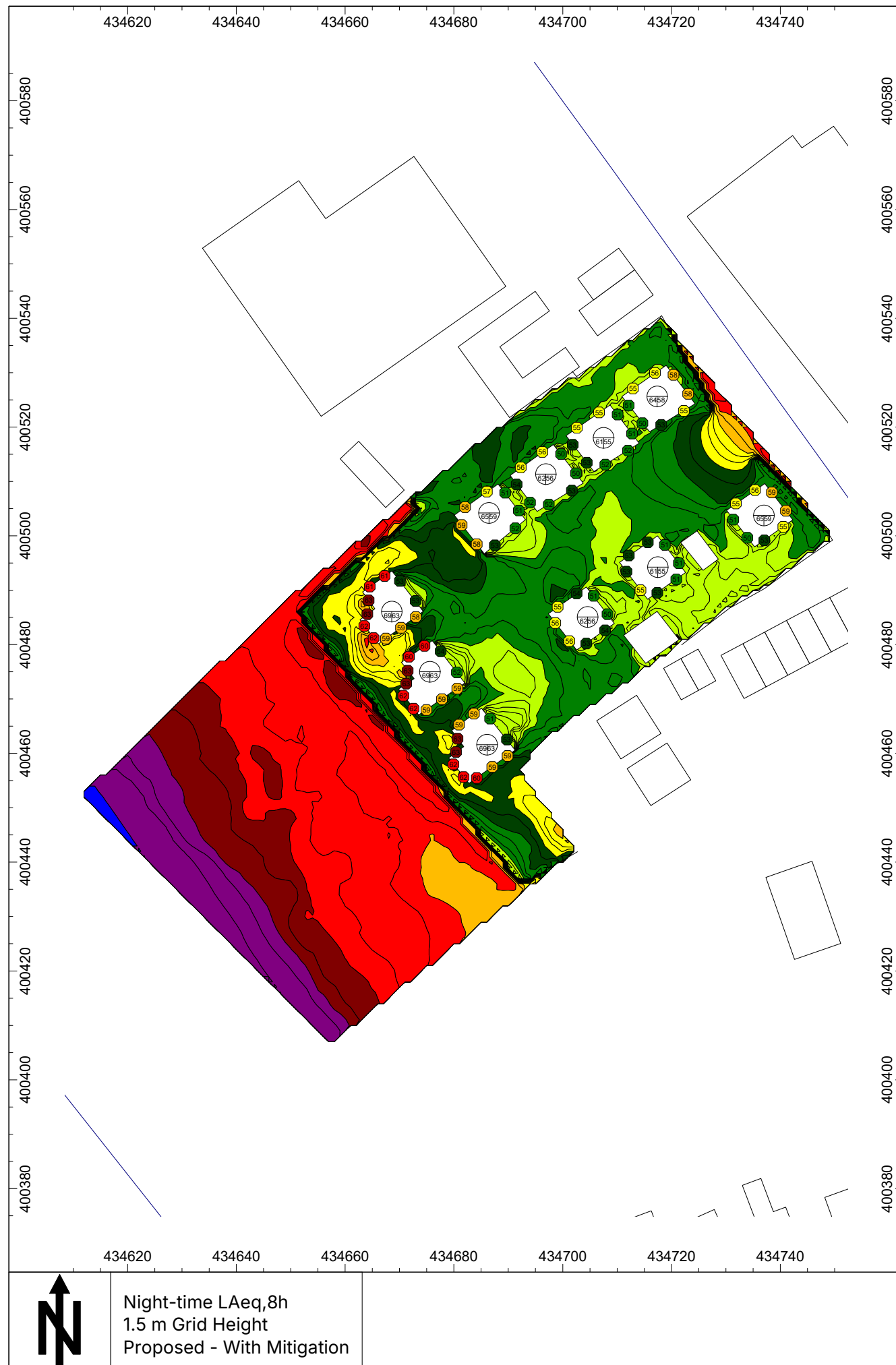


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