
Noise Impact Assessment

Proposed Residential Development – Land South of Cowm Top Lane, Castleton

Client: GLP Trows LLP & BDW Trading Ltd

Reference: 21.105.1.R4

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EXECUTIVE SUMMARY

This Assessment has been undertaken to identify the key sources of noise surrounding the Site which may adversely impact upon the proposed residential amenity. Accordingly, this Assessment has been completed with due regard to the National Planning Policy Framework and its associated National Planning Policy Guidance in addition to appropriate British Standards and guidance documents relevant to the assessment of noise impacts.

Since the original report comments have been received from the EHO at Rochdale Borough Council stating that the garden areas should not be exposed to noise levels of greater than 58dB $L_{Aeq\ 16hr}$. As such, the layout has been re designed in order to ensure that good acoustic design has been implemented across the scheme specifically for the eastern and south eastern areas of the Site which were previously exposed to noise levels above 58dB $L_{Aeq\ 16hr}$.

With regards to garden areas of proposed dwellings, this Assessment has shown that following noise mitigation, resultant noise levels will achieve the 58dB $L_{Aeq\ 16hr}$ criteria, this is due to the good acoustic design implemented for the scheme.

During the various visits to the Site, there was no audible commercial noise associated with the commercial use to the north of the Site and these uses were observed to be operational at the time of the noise surveys.

With regards to internal noise levels, this Assessment has shown that noise levels in living rooms can meet the internal noise criteria limits provided in BS8233:2014 provided that the appropriate noise mitigation measures for upgraded glazing and alternative ventilation as detailed in this Assessment are adhered to. With regards to noise levels in bedrooms during the night-time period, this Assessment has shown that various Plots will require upgraded glazing and alternative ventilation.

Should the recommended noise mitigation measures be implemented in order to control external noise levels for gardens and internal noise levels in habitable rooms, then the sound climate which future occupiers of the Development will be exposed to will accord with the 'No Observed Adverse Effect Level' as detailed in the PPG and as such, noise should not be deemed to be a determining factor in the granting of planning permission for this Site.

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1 INTRODUCTION

1.1 Appointment

- 1.1.1 Professional Consult Limited was instructed by GLP Trows LLP and BDW Trading Ltd ('the Applicant'), to prepare a Noise Impact Assessment ('the Assessment') for a proposed residential development ('the Development') on a parcel of land located at land south of Cowm Top Lane in Castleton, Rochdale OL11 to be referred to hereafter as 'the Site'.

1.2 The Development

- 1.2.1 It is understood that proposals include for the development of up to 495 residential dwellings and associated works.

1.3 Site & Locality

- 1.3.1 The Site will form an extension of the existing residential development located to the west off Leander Drive. To the north of the Site lies a number of commercial uses and to the east and south lies the A627(M) and M62 motorways.

1.4 Purpose of Assessment

- 1.4.1 This Assessment has been undertaken to identify the key sources of noise surrounding the Site which may adversely impact upon the proposed residential amenity. Accordingly, this Assessment has been completed with due regard to the National Planning Policy Framework and its associated National Planning Policy Guidance in addition to appropriate British Standards and guidance documents relevant to the assessment of noise impacts.

1.5 Limitations

- 1.5.1 The limitations of this report are presented in Appendix 1.
- 1.5.2 All acronyms used within this report are defined in the Glossary presented in Appendix 2.

1.6 Confidentiality

- 1.6.1 Professional Consult has prepared this report solely for the use of the Client. Should any third party wish to use or rely upon the contents of the report, written approval must be sought from Professional Consult; a charge may be levied against such approval.

2 POLICY & GUIDANCE

2.1 National Planning Policy Framework & National Planning Practice Guidance

- 2.1.1 The Government updated the National Planning Policy Framework (NPPF) on 20th July 2021 and its associated National Planning Practice Guidance (NPPG) on 22nd July 2019. Together, the NPPF and NPPG set out what the Government expects of local authorities. The overall aim is to ensure the planning system allows land to be used for new homes and jobs, while protecting valuable natural and historic environments.
- 2.1.2 The NPPG adds further context to the NPPF and it is intended that the two documents should be read together.
- 2.1.3 Noise needs to be considered when new developments may create additional noise and when new developments would be sensitive to the prevailing acoustic environment. When preparing local or neighbourhood plans, or taking decisions about new development, there may also be opportunities to consider improvements to the acoustic environment.
- 2.1.4 Local planning authorities' plan-making and decision making should take account of the acoustic environment and in doing so consider:
- ② Whether or not a significant adverse effect is occurring or likely to occur;
 - ② Whether or not an adverse effect is occurring or likely to occur; and
 - ② Whether or not a good standard of amenity can be achieved.
- 2.1.5 In line with the Explanatory Note of the Noise Policy Statement for England, this would include identifying whether the overall effect of the noise exposure (including the impact during the construction phase wherever applicable) is, or would be, above or below the significant observed adverse effect level and the lowest observed adverse effect level for the given situation.
- 2.1.6 The Observed Effect Levels are as follows:
- ② Significant observed adverse effect level: This is the level of noise exposure above which significant adverse effects on health and quality of life occur;
 - ② Lowest observed adverse effect level: this is the level of noise exposure above which adverse effects on health and quality of life can be detected; and
 - ② No observed effect level: this is the level of noise exposure below which no effect at all on health or quality of life can be detected.
- 2.1.7 Table 1 summarises the noise exposure hierarchy, based on the likely average response.

Table 1. Noise Exposure Hierarchy

Perception	Examples of Outcomes	Increasing Effect Level	Action
Not Noticeable	No Effect	No Observed Effect	No specific measures required
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
<i>Lowest Observed Adverse Effect Level</i>			
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
<i>Significant Observed Adverse Effect Level</i>			
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 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

2.1.8 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.

2.1.9 These factors include:

- ② The source and absolute level of the noise together with the time of day it occurs. Some types and level of noise will cause a greater adverse effect at night than if they occurred during the day - this is because people tend to be more sensitive to noise at night as they are trying to sleep. The adverse effect can also be greater simply because there is less background noise at night;
- ② For non-continuous sources of noise, the number of noise events, and the frequency and pattern of occurrence of the noise;
- ② the spectral content of the noise and the general character of the noise. The local topology and topography should also be taken into account along with the existing and, where appropriate, the planned character of the area.

2.1.10 More specific factors to consider when relevant:

- ② where applicable, the cumulative impacts of more than one source should be taken into account along with the extent to which the source of noise is intermittent and of limited duration;
- ② Consideration should also be given to whether adverse internal effects can be completely removed by closing windows and, in the case of new residential development, if the proposed mitigation relies on

windows being kept closed most of the time. In both cases a suitable alternative means of ventilation is likely to be necessary. Further information on ventilation can be found in the Building Regulations; and

- ② If external amenity spaces are an intrinsic part of the overall design, the acoustic environment of those spaces should be considered so that they can be enjoyed as intended.

2.2 BS8233:2014 'Guidance on sound insulation and noise reduction for buildings'

Noise Criteria Limits

- 2.2.1 The scope of this standard is the provision of recommendations for the control of noise in and around buildings. It suggests appropriate criteria and limits for different situations, which are primarily intended to guide the design of new buildings or refurbished buildings undergoing a change of use, rather than to assess the effect of changes in the external noise climate.
- 2.2.2 The standard suggests suitable internal noise levels within different types of buildings, including dwellings, as shown in Table 2.

Table 2. BS8233:2014 Internal Target Noise Levels

Criterion	Typical Situation	Design $L_{Aeq,T}$ (dB)
Suitable resting / sleeping conditions	Living Room	35
	Bedroom*	30
*For a Reasonable standard in bedrooms at night, individual noise events (measured with fast time weighting) should not exceed 45dB L_{max}		

- 2.2.3 BS8233 goes on to recommend noise levels for gardens as follows:

"It is desirable that the external noise level does not exceed 50dB $L_{Aeq,T}$, with an upper guideline value of 55dB $L_{Aeq,T}$ 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 might be warranted".

- 2.2.4 BS8233 goes on to say:

"In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces but should not be prohibited".

- 2.2.5 With regards to external noise within balcony areas, BS8233: 2014 provides the following advice:

"Other locations, such as balconies, roof gardens and terraces, are also important in residential buildings where normal external amenity space might be limited or not available, i.e. in flats, apartment blocks, etc. In these locations, specification of noise limits is not necessarily appropriate. Small balconies may be included for uses such as drying washing or growing pot plants, and noise limits should not be necessary for these uses. However, the general guidance on noise in amenity space is still appropriate for larger balconies, roof gardens and terraces, which might be intended to be used for relaxation. In high-noise areas, consideration should be given to protecting these areas by screening or building design to achieve the lowest practicable levels"

Ventilation Requirements

- 2.2.6 Where a partially open window cannot be relied upon to provide an adequate level of facade sound insulation performance, it is necessary to consider alternative ventilation for habitable rooms. Section 8.4.5.4 within BS8233 states:

“The Building Regulations’ supporting documents on ventilation [48, 49, 50] recommend that habitable rooms in dwellings have background ventilation. Where openable windows cannot be relied upon for this ventilation, trickle ventilators can be used and sound attenuating types are available. However, windows may remain openable for rapid or purge ventilation, or at the occupant’s choice.

Alternatively, acoustic ventilation units (see 7.7.2 below) are available for insertion in external walls. These can provide sound reduction comparable with double glazed windows. However, ducted systems with intakes on the quiet side of the building might be required in very noisy situations, or where appearance rules out through-the-wall fans.”

Section 7.7.2 states:

“NOTE 5 If relying on closed windows to meet the guide values, there needs to be an appropriate alternative ventilation that does not compromise the façade insulation or the resulting noise level.”

2.3 Rochdale Metropolitan Borough Council’s Environmental Health Department

- 2.3.1 Professional Consult issued the following consultation to Rochdale Metropolitan Borough Council on 13th July 2021:

‘We have been appointed by a client to complete a Noise Impact Assessment for a proposed residential development on a parcel of land at Trows Fram in Castleton, Rochdale. The Site is bound by the M62 to the south and the A627(M) to the east with commercial uses to the north.

The Site has recently been subject to a Noise Constraints Assessment by a third party which advised the client of good acoustic design for the residential dwellings in order to ensure that noise levels in gardens are as low as practically possible and this has been borne in mind with the indicative draft layout for the scheme.

We are currently completing noise surveys across the Site for the M62, A627(M) and the commercial uses.

We will complete a Noise Impact Assessment for the Site using Cadna-A noise modelling software and the Assessment will adhere to the following noise criteria limits:

Noise Levels in Habitable Rooms: We will ensure that noise levels in living rooms and bedrooms do not exceed 35dB LAeq,16hr and 30dB LAeq,8hr/45dB LMax,f respectively; and

Noise Levels in Garden Area: We will aim to achieve the lowest practicable noise levels in garden areas which accords with the design advice provided in BS8233:2014 which states:

‘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.’

Please note that this design principle accords with that adopted for the nearby residential development adjacent to the M62 which was granted planning approval by Rochdale MBC some years ago:

15/00826/FUL | Residential development - 259 dwellings

Wherever possible we will look to specify acoustic fences for certain garden areas where required in order to ensure that lowest practicable noise levels are met.'

- 2.3.2 Since issuing the original report the following correspondence has been received from the EHO at Rochdale Borough Council:

'I note the comment raised surrounding the wording of BS8233:2014 'Guidance on sound insulation and noise reduction for buildings' provides recommendations and guidance for noise levels in garden areas, and have been aware of such since its publication. As a department we considered the wording and context and in developments that met such criteria adopted an maximum upper limit of 58 dB(A) in garden areas, this was done to give flexibility to the development whilst maintaining an appropriate acoustic environment for the end user. This has been set for all residential developments post 2014, and to maintain a consistency of approach we have continued and will continue to require this level to be met to allow us to support such development.

I understand that the residential development at the former Hill Top Primary School site (ref: 15/00826/FUL), which is a site also bounding the M62 did not meet such requirements in some garden areas, as such we did not support the application. I accepted at the time that the lowest practicable levels have been achieved, however it has to be noted that lowest achievable does not always represent acceptable and I am of the opinion that this is not in line with the context/essence of the standard.'

- 2.3.3 As a result of the above the aim to to achieve an upper limit of 58dB $L_{Aeq\ 16hr}$ in the garden areas during the daytime period.

3 NOISE SURVEYS

3.1 Survey Information

3.1.1 A series of road traffic noise surveys have been completed over a full 24-hr weekday period in order to accurately quantify the level of noise from vehicles using the adjacent motorways.

3.1.2 A noise survey has also been completed for the commercial uses to the north of the Site however there was no discernible noise associated with these uses at the Site boundary and the uses were observed to be operational at the time of the noise surveys.

3.2 Road Traffic Noise Survey – M62

3.2.1 Professional Consult has completed a noise measurement as follows:

 Noise Measurement Position 1: Located 26m from the centre of the M62 in free-field conditions. Noise sources at the measurement position comprised of road traffic movements along the motorway.

3.2.2 Table 3 summarises the measured road traffic noise levels at the microphone location.

Table 3. Summary of Measured Road Traffic Noise Levels

Table 3: Summary of Measured Road Traffic Noise Levels				
Measurement Position	Period	Measured Sound Pressure Level, dB		Measurement Distance to Centre of Road (m)
		L _{Aeq,T}	L _{Amax,fast}	
1	Daytime	78.6		26
	Night-time	74.1	86.4	
*10 th highest L _{Amax,fast}				

3.2.3 Appendix 9 details the measured road traffic noise levels for the M62.

3.3 Road Traffic Noise Survey – A627(M)

3.3.1 Professional Consult has completed a noise measurement as follows:

 Noise Measurement Position 2: Located 29m from the centre of the A627(M) in free-field conditions. Noise sources at the measurement position comprised of road traffic movements along the motorway.

3.3.2 Table 4 summarises the measured road traffic noise levels at the microphone location.

Table 4. Summary of Measured Road Traffic Noise Levels

Measurement Position	Period	Measured Sound Pressure Level, dB		Measurement Distance to Centre of Road (m)
		L _{Aeq,T}	L _{Amax,fast}	
1	Daytime	74.7		29
	Night-time	68.6	84.2	

*10th highest L_{Amax,fast}

3.3.3 Appendix 10 details the measured road traffic noise levels for the M627(M)

3.4 Noise Survey Equipment

3.4.1 The following equipment was used for the noise surveys.

Table 5. Noise Measurement Equipment

Measurement Position	Equipment Description	Manufacturer & Type No	Serial No.	Calibration Due Date
NMP1	Sound Level Meter	01dB Fusion	11755	03 July 2022
	Pre-amplifier	01dB PRE22	1707173	
	Microphone	GRAS 40CE	291693	
	Calibrator	01dB CAL-31	84086	30 June 2022
NMP2	Sound Level Meter	01dB Fusion	12586	24 June 2022
	Pre-amplifier	01dB PRE22	367351	
	Microphone	GRAS 40CD	2004163	
	Calibrator	01dB CAL-31	92222	30 June 2022

3.4.2 The sound level meters were field calibrated prior to and following the noise surveys and there was no drift beyond the allowable limit of 1dB.

3.4.3 Table 6 indicates a summary of the measured weather conditions.

Table 6. Range of Measured Wind Speeds

Period	Range of Measured Wind Speeds (m/s)	Rainfall Recorded?
All periods	0 – 0.8	No

4 NOISE IMPACT ASSESSMENT

4.1 Assessment Information & Approach

4.1.1 Since the original report comments have been received from the EHO at Rochdale Borough Council stating that the garden areas should not be exposed to noise levels of greater than 58dB $L_{Aeq, 16hr}$. As such, the layout has been re designed in order to ensure that good acoustic design has been implemented across the scheme specifically for the eastern and south eastern areas of the Site which were previously exposed to noise levels above 58dB $L_{Aeq, 16hr}$.

4.2 Road Traffic Noise

4.2.1 For the purposes of this assessment, Professional Consult has used noise modelling software CadnaA to determine the impact of noise from the measured noise levels for the M62 and the A627(M) for the proposed residential dwelling blocks. Accordingly, a noise model has therefore been constructed in order to calculate façade noise levels and external noise levels in amenity areas.

4.2.2 The following inputs have been included in the model:

- ② Site elevations have been taken as existing using 1m contours;
- ② Noise Measurement Positions 1 and 2 has been used in order to calibrate the noise model;
- ② A floor height of 2.5m has been assumed for all proposed dwellings which is a standard separation distance between ground and first floors in a typical dwelling;
- ② A reflection order of 2 has been used in all calculations;
- ② Noise levels generated using ISO 9613-1 and ISO 9613-2 “Acoustics – Attenuation of sound during propagation outdoors” as incorporated into CadnaA software.

External Noise Impact in Garden Areas of Proposed Dwellings

4.2.3 In order to assess noise levels in external amenity areas across the Site, a grid noise map was calculated in the noise model. The grid noise map (Figure 1 of Appendix 4) shows that of the garden areas facing the M62, the highest noise levels are in the noise contour band 61dB – 63dB $L_{Aeq, 16hr}$, however if most garden areas face away from the M62, noise levels are between 50dB – 58dB $L_{Aeq, 16hr}$. Nevertheless, the following section considers noise mitigation in order to reduce noise levels as low as practically possible.

4.2.4 For the garden areas which lie closest to the A627(M), noise levels lie in the noise contour band 61dB – 63dB $L_{Aeq, 16hr}$ and so the following section considers noise mitigation measures to reduce these noise levels to the lowest practicable.

Internal Noise Impact for Proposed Dwellings

4.2.5 With regards internal noise levels, BS8233:2014 suggests that standard thermal double glazing will afford 33dB R_w of sound reduction, however this is for the pink noise spectrum and the same configuration will afford 30dB $R_w + C_{tr}$ for average noise levels from road traffic noise and so this value has been used to calculate internal noise levels. With regard to the maximum noise level ($L_{Amax, fast}$), the value of 33dB R_w has been used. BS8233:2014 also goes on to recommend that a partially open window provides approximately 15dB of attenuation.

4.2.6 Professional Consult uses a library database of glazing configurations issued by Saint Gobain and the glazing configuration 6mm glass / 12mm air space / 6mm glass affords 30dB $R_w + C_{tr}$ and 33dB R_w respectively.

- 4.2.7 Figure 1 of Appendix 7 shows the requirements for the proposed building facades based the average daytime noise levels at the various facades of the plots and determines the requirement for upgraded glazing or alternative ventilation for living rooms. The façades highlighted blue require alternative ventilation and the facades highlighted orange require upgraded glazing and alternative ventilation. Appendix 7 that standard thermal double glazing will be adequate in controlling external noise to meet the internal noise criteria limit for the majority of bedrooms. However, the eastern façade of the plots facing the A627(M) requires a glazing unit that provides and attenuation of $33\text{dB}_{\text{RW}+\text{Ctr.}}$. In addition with a partially open window, the internal noise criteria limit for living rooms will be exceeded in various Plots and so the following section considers appropriate noise mitigation.
- 4.2.8 Figure 1 Appendix 8 shows the requirements for the proposed building facades based on the average night-time noise levels at the various facades of the plots and determines the requirement for upgraded glazing or alternative ventilation for bedrooms. The façades highlighted blue require alternative ventilation and the facades highlighted orange require upgraded glazing and alternative ventilation. Appendix 8 indicates that standard thermal double glazing will be adequate in controlling external noise to meet the internal noise criteria limit for the majority of bedrooms. However, the eastern façade of plots facing the A627(M) requires a glazing unit that provides and attenuation of $38\text{dB}_{\text{RW}+\text{Ctr.}}$. In addition with a partially open window, the internal noise criteria limit for Bedrooms will be exceeded in various Plots and so the following section considers appropriate noise mitigation.
- 4.2.9 In addition to the average noise levels, it is also necessary to consider maximum noise levels in bedrooms for the night-time period in addition to the average noise levels. With regards to road traffic movements along the M62, the measured 10th highest maximum noise level was 86.4dB at 26m and calculation indicates that any dwellings located within 62m of the M62 will require upgraded glazing. For proposed dwellings beyond this distance there is no need to upgrade glazing based on the maximum noise levels. Allowing 15dB for a partially open window indicates that any bedroom window within a dwelling, with full or partial line of sight to the M62, which lies within 545m of the centre of the M62 will require alternative ventilation and so the following section considers this.
- 4.2.10 With regards to road traffic movements along the A627(M), the measured 10th highest maximum noise level was 84.2dB at 29m . On the basis of the closest dwelling being 20m from the centre of the A627 and, allowing 3dB for 90-degree angle of view correction, gives an external maximum noise level of 84.4dB $L_{\text{Amax,fast}}$. With standard thermal double glazing the internal maximum noise level in a bedroom would be 51.4dB and thus necessitating glazing which affords 39dB R_w and a typical glazing configuration would be 4mm acoustic laminate glass, 20mm air space and 6.4mm acoustic laminate glass. Any dwelling located further back than these dwellings will require a lower sound insulation performance for the glazing.
- 4.2.11 With a partially open window, internal noise levels would significantly exceed the noise criteria and so the following section considers appropriate noise mitigation.

5 MITIGATION

5.1 Road Traffic Noise

External Noise Impact in Garden Areas of Proposed Dwellings

- 5.1.1 The previous section has shown that noise levels in the garden areas closest to the M62 and A627 have noise levels up to 63dB $L_{Aeq,16hr}$ with no noise mitigation in place and so this section will consider the effectiveness of an acoustic barrier for the affected gardens. Appendix 6 details the daytime grid noise map with noise barriers located along the boundary of gardens ranging from 1.8m to 2.5m and parts of the southern boundary and the resulting noise levels are no higher than 58dB $L_{Aeq,16hr}$ for the majority of the Site. The only exceedance is at plot 17 located in the south western area of the Site which exceeds the criteria by +0.8dB. Given that all other plots will achieve the criteria due to the good acoustic design of the Site the slight exceedance is considered acceptable.
- 5.1.2 Where noise barriers have been recommended and these comprise of a timber fence, the fence should have a minimum mass of 15kg/m² and be free from holes.
- 5.1.3 It should be noted that the majority of garden areas associated with residential dwellings, particularly in the centre of the Site, have noise levels below the 58dB $L_{Aeq,16hr}$.

Internal Noise Impact for Habitable Rooms

- 5.1.4 For the daytime period, Appendix 7 has determined that standard thermal double glazing is adequate in order to control external to internal noise break-in. However, the eastern façade of the plots facing the A627(M) requires a glazing unit that provides an attenuation of 33dB $R_{w+C_{tr}}$.
- 5.1.5 In addition, various Plots will experience exceedances of the average internal noise levels with an open window and Appendix 7 has highlighted the facades of Plots. In order to control these exceedances, alternative ventilation will be required in the form of an acoustic trickle ventilator incorporated into the window frame of the habitable room and one such ventilator is as follows:
- ② Greenwoods EAR42W (affords up to 42dB $D_{n,e,w} + C_{tr}$).
- 5.1.6 The above trickle ventilator should be applied to any living room window which has full or partial line of sight to the M62 or A627(M).
- 5.1.7 For the night-time period, Appendix 8 indicates that standard thermal double glazing will be adequate in controlling external noise to meet the internal noise criteria limit for the majority of bedrooms. However, the eastern façade of plots facing the A627(M) requires a glazing unit that provides an attenuation of 38dB $R_{w+C_{tr}}$.
- 5.1.8 In addition, various Plots will experience exceedances of the average internal noise levels with an open window and Appendix 8 has detailed the affected Plots. In order to control these exceedances, alternative ventilation will be required in the form of an acoustic trickle ventilator incorporated into the window frame of the habitable room and one such ventilator is as follows:
- ② Greenwoods EAR42W (affords up to 42dB $D_{n,e,w} + C_{tr}$).
- 5.1.9 The above trickle ventilator should be applied to any bedroom window which has full or partial line of sight to the M62 or A627(M) in all parcels except the South East, North East and East parcels. For these parcels, an acoustic wall ventilator will be required as follows:

② Greenwoods EAR42W (affords up to 42dB $D_{n,e,w} + C_{tr}$).

5.1.10 With regards to maximum noise levels generated by vehicles using the A627(M), the previous section has indicated that certain bedrooms during the night-time period with a partially open window will exceed the internal noise criteria limit of 45dB $L_{Amax,fast}$ and thus necessitating glazing which affords 39dB R_w and a typical glazing configuration would be 4mm acoustic laminate glass, 20mm air space and 6.4mm acoustic laminate glass. It is recommended that any bedroom window located within the south east, north east and east parcels use the following acoustic wall ventilator:

 Greenwoods EAR42W (affords up to 42dB $D_{n,e,w}$).

6 CONCLUSION

- 6.1.1 Professional Consult Limited was instructed by GLP Trows LLP and BDW Trading Ltd to prepare a Noise Impact Assessment for a proposed residential development on a parcel of land located at land south of Cowm Top Lane in Castleton, Rochdale OL11 to be referred to hereafter as 'the Site'.
- 6.1.2 It is understood that proposals include for the development of up to 495 residential dwellings and associated works.
- 6.1.3 The Site will form an extension of the existing residential development located to the west off Leander Drive. To the north of the Site lies a number of commercial uses and to the east and south lies the A627(M) and M62 motorways.
- 6.1.4 This Assessment has been undertaken to identify the key sources of noise surrounding the Site which may adversely impact upon the proposed residential amenity. Accordingly, this Assessment has been completed with due regard to the National Planning Policy Framework and its associated National Planning Policy Guidance in addition to appropriate British Standards and guidance documents relevant to the assessment of noise impacts.
- 6.1.5 Since the original report comments have been received from the EHO at Rochdale Borough Council stating that the garden areas should not be exposed to noise levels of greater than 58dB $L_{Aeq\ 16hr}$. As such, the layout has been re designed in order to ensure that good acoustic design has been implemented across the scheme specifically for the eastern and south eastern areas of the Site which were previously exposed to noise levels above 58dB $L_{Aeq\ 16hr}$.
- 6.1.6 With regards to garden areas of proposed dwellings, this Assessment has shown that following noise mitigation, resultant noise levels will achieve the 58dB $L_{Aeq\ 16hr}$ criteria, this is due to the good acoustic design implemented for the scheme.
- 6.1.7 During the various visits to the Site, there was no audible commercial noise associated with the commercial use to the north of the Site and these uses were observed to be operational at the time of the noise surveys.
- 6.1.8 With regards to internal noise levels, this Assessment has shown that noise levels in living rooms can meet the internal noise criteria limits provided in BS8233:2014 provided that the appropriate noise mitigation measures for upgraded glazing and alternative ventilation as detailed in this Assessment are adhered to. With regards to noise levels in bedrooms during the night-time period, this Assessment has shown that various Plots will require upgraded glazing and alternative ventilation.
- 6.1.9 Should the recommended noise mitigation measures be implemented in order to control external noise levels for gardens and internal noise levels in habitable rooms, then the sound climate which future occupiers of the Development will be exposed to will accord with the 'No Observed Adverse Effect Level' as detailed in the PPG and as such, noise should not be deemed to be a determining factor in the granting of planning permission for this Site.

APPENDIX 1: LIMITATIONS

This report and its findings should be considered in relation to the terms of reference and objectives agreed between Professional Consult Limited and the Client.

The executive summary, conclusions and recommendations sections of the report provide an overview and guidance only and should not be specifically relied upon without considering the context of the report in full.

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APPENDIX 2: GLOSSARY OF ACOUSTIC TERMINOLOGY

Noise is defined as unwanted sound. Human ears are able to respond to sound in the frequency range 20 Hz (deep bass) to 20,000 Hz (high treble) and over the audible range of 0 dB (the threshold of perception) to 140 dB (the threshold of pain). The ear does not respond equally to different frequencies of the same magnitude, but is more responsive to mid-frequencies than to lower or higher frequencies. To quantify noise in a manner that approximates the response of the human ear, a weighting mechanism is used. This reduces the importance of lower and higher frequencies, in a similar manner to the human ear.

Furthermore, the perception of noise may be determined by a number of other factors, which may not necessarily be acoustic. In general, the impact of noise depends upon its level, the margin by which it exceeds the background level, its character and its variation over a given period of time. In some cases, the time of day and other acoustic features such as tonality or impulsiveness may be important, as may the disposition of the affected individual. Any assessment of noise should give due consideration to all of these factors when assessing the significance of a noise source.

The most widely used weighting mechanism that best corresponds to the response of the human ear is the 'A'-weighting scale. This is widely used for environmental noise measurement, and the levels are denoted as dB(A) or L_{Aeq} , L_{A90} etc., according to the parameter being measured.

The decibel scale is logarithmic rather than linear, and hence a 3 dB increase in sound level represents a doubling of the sound energy present. Judgement of sound is subjective, but as a general guide a 10 dB(A) increase can be taken to represent a doubling of loudness, whilst an increase in the order of 3 dB(A) is generally regarded as the minimum difference needed to perceive a change under normal listening conditions.

An indication of the range of sound levels commonly found in the environment is given in the following table.

Table 1: Typical Sound Pressure Levels

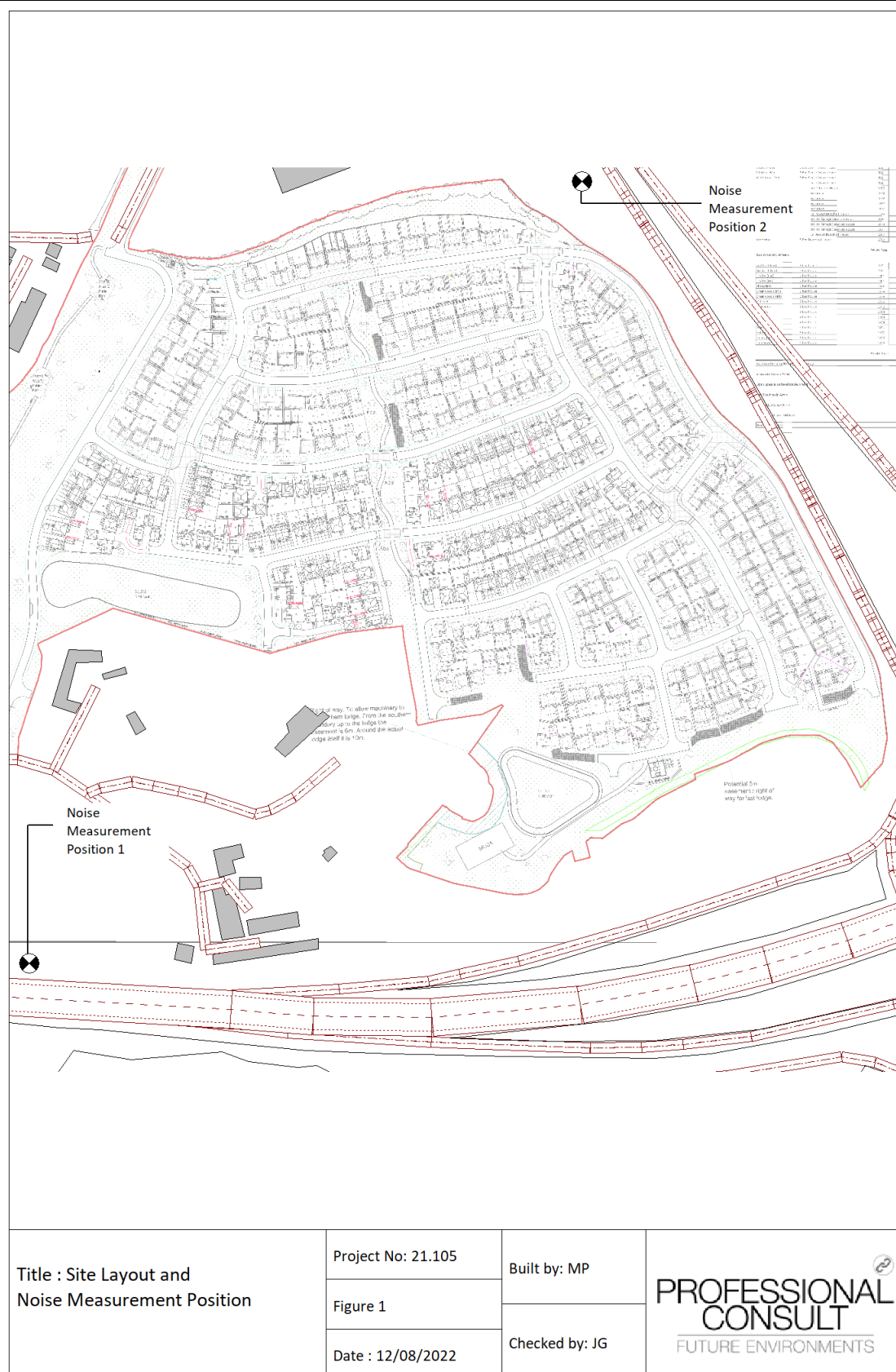
Sound Pressure Level (dB)	Location/Example
0	Threshold of hearing
20 - 30	Quiet bedroom at night
30 - 40	Living room during the day
40 - 50	Typical office
50 - 60	Inside a car
60 - 70	Typical high street
70 - 90	Inside factory
100 - 110	Burglar alarm at 1m away
110 - 130	Jet aircraft on take off
140	Threshold of pain

Table 2: Terminology

Descriptor	Explanation
dB (decibel)	The scale on which sound pressure level is expressed. It is defined as 20 times the logarithm of the ratio between the root-mean-square pressure of the sound field and a reference pressure (2x10 ⁻⁵ Pa).
dB(A)	A-weighted decibel. This is a measure of the overall level of sound across the audible spectrum with a frequency weighting (i.e. 'A' weighting) to compensate for the varying sensitivity of the human ear to sound at different frequencies.
L _{Aeq, T}	L _{Aeq} is defined as the notional steady sound level which, over a stated period of time (T), would contain the same amount of acoustical energy as the A - weighted fluctuating sound measured over that period.
L _{Amax}	L _{Amax} is the maximum A - weighted sound pressure level recorded over the period stated. L _{Amax} is sometimes used in assessing environmental noise where occasional loud noises occur, which may have little effect on the overall Leq noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response.
L ₁₀ & L ₉₀	If a non-steady noise is to be described it is necessary to know both its level and the degree of fluctuation. The Ln indices are used for this purpose, and the term refers to the level exceeded for n% of the time. Hence L ₁₀ is the level exceeded for 10% of the time and as such can be regarded as the 'average maximum level'. Similarly, L ₉₀ is the 'average minimum level' and is often used to describe the background noise. It is common practice to use the L ₁₀ index to describe traffic noise.
Free-field Level	2A sound field determined at a point away from reflective surfaces other than the ground with no significant contributions due to sound from other reflective surfaces. Generally as measured outside and away from buildings.
Fast	A time weighting used in the root mean square section of a sound level meter with a 125millisecond time constant.
Slow	A time weighting used in the root mean square section of a sound level meter with a 1000millisecond time constant.

APPENDIX 3: NOISE MEASUREMENT POSITIONS

Figure 1 Noise Measurement Positions



Title : Site Layout and
Noise Measurement Position

Project No: 21.105

Figure 1

Date : 12/08/2022

Built by: MP

Checked by: JG

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APPENDIX 4: DAYTIME GRID NOISE MAP



APPENDIX 5: NIGHT-TIME GRID NOISE MAP

Figure 1

Night-time Grid Noise Map



Noise Map Objects	Level LAeq 8 hour in dB(A)	Title :	Built by: MP
- Road - Railway - Building - Barrier - Receiver - Building Evaluation - Calculation Area	< 43.0 43.0 <= ... < 46.0 46.0 <= ... < 49.0 49.0 <= ... < 52.0 52.0 <= ... < 55.0 55.0 <= ... < 58.5 58.5 <= ... < 61.0 61.0 <= ... < 63.0 63.0 <= ... < 66.0 66.0 <= ... < 70.0 70.0 <= ... < 75.0 75.0 <= ...	Night-Time Grid Noise Map at 4.5m above ground level	Checked by: JG
		Date : 12/08/2022	PROFESSIONAL CONSULT FUTURE ENVIRONMENTS
		Figure 1	
		Project No: 21.105	

APPENDIX 6: DAYTIME GRID NOISE MAP – WITH NOISE MITIGATION

Figure 1

Daytime With Noise Mitigation



Noise Map Objects - Road - Railway - Building - Barrier - Receiver - Building Evaluation - Calculation Area	Level LAeq 16hr in dB(A) ... < 43.0 43.0 <= ... < 46.0 46.0 <= ... < 49.0 49.0 <= ... < 52.0 52.0 <= ... < 55.0 55.0 <= ... < 58.5 58.5 <= ... < 61.0 61.0 <= ... < 63.0 63.0 <= ... < 66.0 66.0 <= ... < 70.0 70.0 <= ... < 75.0 75.0 <= ...	Title: Daytime Grid Noise Map 1.5m above ground level with Proposed Barriers Date : 12/08/2022 Figure 1 Project No: 21.105	Built by: MP Checked by: JG PROFESSIONAL CONSULT FUTURE ENVIRONMENTS
Barrier Height (m) 1.8m 2.5m			

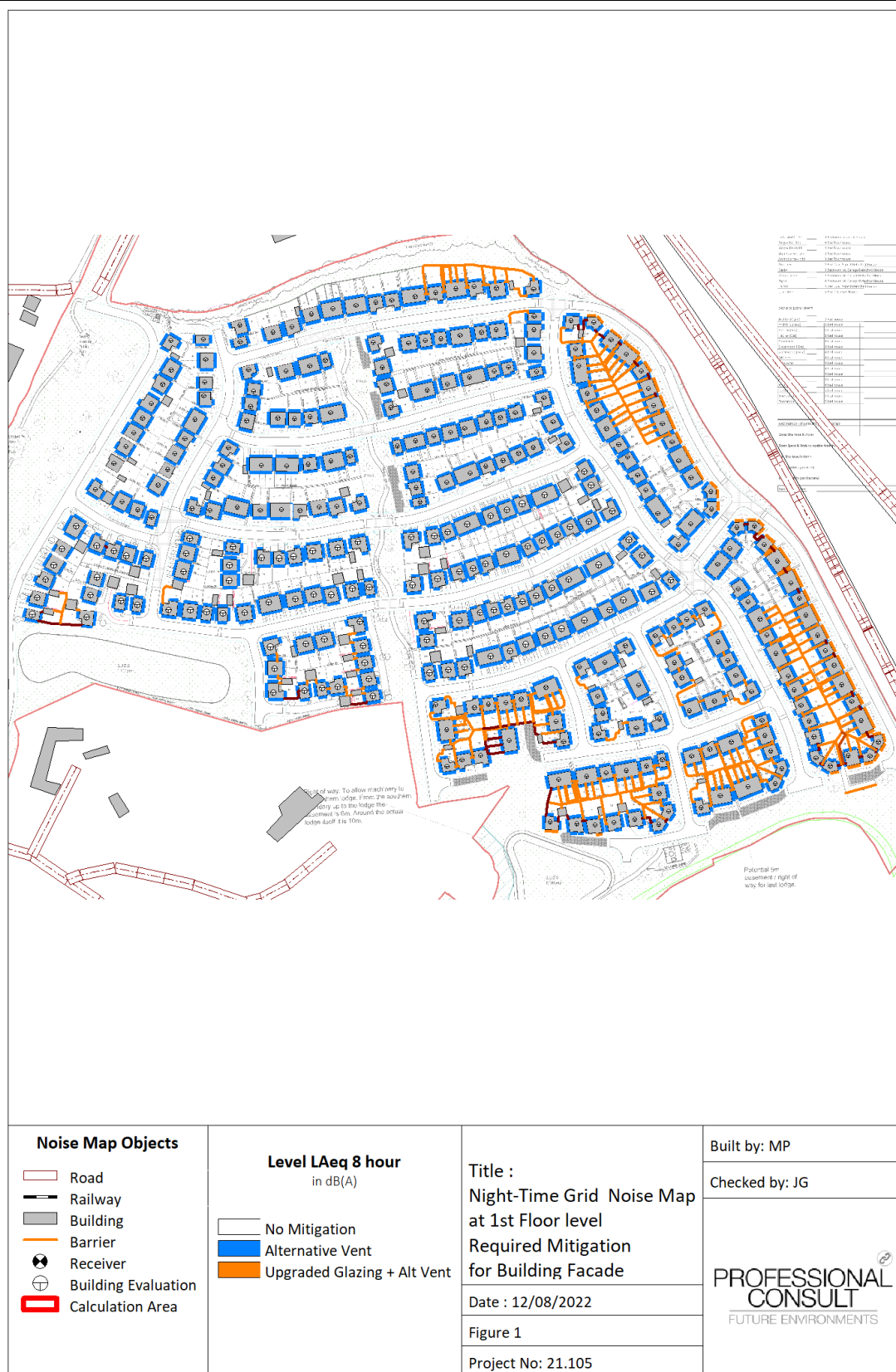
APPENDIX 7: DAYTIME GRID NOISE MAP – REQUIRED MITIGATION FOR BUILDING FAÇADE

Figure 1 Daytime Grid Noise Map – Require Mitigation for Building Façade – Ground Floor



APPENDIX 8: DAYTIME GRID NOISE MAP – REQUIRED MITIGATION FOR BUILDING FAÇADE

Figure 1 Daytime Grid Noise Map – Require Mitigation for Building Façade – Ground Floor



APPENDIX 9: MEASURED ROAD TRAFFIC LEVELS – NMP1

Start Date & Time	Measured Sound pressure Level, $L_{Aeq,T}$ (dB)
14/07/2021 12:00	74.5
14/07/2021 13:00	79.1
14/07/2021 14:00	79.1
14/07/2021 15:00	79.1
14/07/2021 16:00	79.4
14/07/2021 17:00	79.1
14/07/2021 18:00	78.4
14/07/2021 19:00	77.6
14/07/2021 20:00	76.4
14/07/2021 21:00	74.9
14/07/2021 22:00	73.9
14/07/2021 23:00	72.6
15/07/2021 00:00	71.4
15/07/2021 01:00	70.4
15/07/2021 02:00	70.2
15/07/2021 03:00	70.4
15/07/2021 04:00	72.5
15/07/2021 05:00	75.9
15/07/2021 06:00	79.2
15/07/2021 07:00	79.7
15/07/2021 08:00	79.7
15/07/2021 09:00	79.5
15/07/2021 10:00	79.3
15/07/2021 11:00	79.2
15/07/2021 12:00	78.9

APPENDIX 10: MEASURED ROAD TRAFFIC LEVELS – NMP2

Start Date & Time	Measured Sound pressure Level, $L_{Aeq,T}$ (dB)
14/07/2021 12:00	74.5
14/07/2021 13:00	74.5
14/07/2021 14:00	74.9
14/07/2021 15:00	75.2
14/07/2021 16:00	75.4
14/07/2021 17:00	75.7
14/07/2021 18:00	75.1
14/07/2021 19:00	74.2
14/07/2021 20:00	73.3
14/07/2021 21:00	72.4
14/07/2021 22:00	71.5
14/07/2021 23:00	70
15/07/2021 00:00	68.5
15/07/2021 01:00	65.9
15/07/2021 02:00	63.7
15/07/2021 03:00	63.9
15/07/2021 04:00	64.9
15/07/2021 05:00	69.8
15/07/2021 06:00	73
15/07/2021 07:00	75.9
15/07/2021 08:00	76.1
15/07/2021 09:00	75.1
15/07/2021 10:00	74.7
15/07/2021 11:00	74.6
14/07/2021 12:00	74.5