Vale of Glamorgan Resource Recovery Facility, Barry, Vale of Glamorgan

Permit Number: PAN-015651

Noise Impact Assessment

On behalf of **Eunomia Research & Consulting Ltd**

Project Ref: 332510113/3011| Rev: 2 | Date: September 2022

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Document Control Sheet

Project Name: **Vale of Glamorgan Resource Recovery Facility, Barry**

Project Ref: **332510113**

Report Title: **Noise Impact Assessment**

Doc Ref: **NIA**

Date: **September 2022**

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Revision	Date	Description	Prepared	Reviewed	Approved
1	July 2022	Rev 1	MM	MB	MB
2	September 2022	Rev 2	MM	MB	MB

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Non-technical Summary

This noise assessment has been prepared by Stantec UK Ltd. on behalf of Eunomia to accompany an environmental permit application for the proposed Waste Transfer Station (WTS) at the Atlantic Trading Estate, Barry, Vale of Glamorgan (VoG).

A baseline sound survey has been undertaken to establish the prevailing sound climate at the closest existing noise sensitive receptor. The results of the survey have formed the basis of the assessment to determine the impact from the proposed operations.

An assessment in general accordance with BS4142:2014+A1:2019 has been undertaken to determine the likely impact associated with the proposed facility at the nearest noise sensitive receptor. The assessments cover both a full operational daytime period of 07:00 – 21:00 and an evening time period of 18:00 – 21:00.

The numerical assessment indicates that the operation from the development is likely to have a low impact during the daytime periods at the nearest noise sensitive receptors.

Therefore, the assessment demonstrates that the proposed development is likely to be acceptable in relation to the potential noise impacts identified herein.

1 Introduction

1.1 Background

1.1.1 Stantec UK Ltd. previously provided a noise impact assessment to support the planning application for the Vale of Glamorgan Resource Recovery Facility at Atlantic Trading Estate, Barry, Vale of Glamorgan. The site is located within the administrative boundary of Vale of Glamorgan Council (VoGC).

1.1.2 The site currently requires an environmental permit, therefore Stantec UK Ltd. (Stantec) has been commissioned by Eunomia to update the noise impact assessment to account for the permitting requirements set by Natural Resources Wales (NRW). The environmental permit application number is PAN-015651.

1.1.3 The results of the environmental sound survey and acoustic model created for the original noise impact assessment have been used to inform the assessment of the potential noise impact at the nearest noise sensitive receptors and support the permit application. The assessments cover a full operational daytime period of 07:00 – 21:00 and on specific request of NRW an evening time period of 18:00 – 21:00.

1.1.4 The report author and reviewers are fully accredited members with the Institute of Acoustics. Stantec are also sponsor members of the Institute of Acoustics and active members of the Association of Noise Consultants.

1.1.5 A glossary of acoustic terminology used within this report is contained within **Appendix A** .

1.2 Site Description and Location

1.2.1 The proposed development site is currently unoccupied and located on the Atlantic Trading Estate, Barry, Vale of Glamorgan, CF63 3RF.

1.2.2 The site is bounded by existing industrial units to the west, a household waste recycling centre (HWRC) to the east, and industrial estate access roads to the south and north.

1.2.3 The location of the site is presented in **Figure 1**.

Figure 1: Site Location Plan

1.3 Project Proposals

1.3.1 The proposed development comprises the construction of a Waste Transfer Station (WTS). The maximum capacity of the WTS is up to 75,000 tonnes per annum of material. However, the WTS is expected to process approximately 45,000 tonnes per annum which will be collected from households and commercial uses within the Vale of Glamorgan.

1.3.2 The opening hours will be 06:00 hours to 21:00 hours, Monday to Friday and weekends and bank holidays as necessary. Following discussions with the operators, it is understood that no noise generating activities will occur between 06:00 and 07:00 hours on any day. This is provisional time for staff to arrive, have a daily debrief and prepare for the day.

1.3.3 The facility will receive, store, process and bulk a range of primarily pre-sorted materials to include mixed recyclables, materials (including glass, plastic and cans), residual and AHP waste and organic material (including garden waste, household food waste, wood, paper and card).

1.3.4 The principal elements of the proposals include a new main storage building which will house the main elements of the WTS including two balers and mechanical and manual sort lines.

1.3.5 A second storage building will hold materials prior to them being moved off site. No machinery is to be stored in the storage building.

1.4 Scope of Report

1.4.1 It has been requested by National Resource Wales (NRW) that the noise impact assessment report submitted for planning is updated for it to be issued to support the permit application.

1.4.2 The scope of the updates are as follows:

- The main body of report to cover headings as listed within Environment Agency guidance which NRW follow.
- Include details on ground type/cover between site and receptors.
- Include details on field calibration checks.
- Include justification for sound monitoring location.
- Include statistical analysis to justify background sound level.
- Include sound levels, heights and operating times used within the noise model for the fixed and mobile plant and noise emitting buildings.
- Include construction details of acoustic barriers/screening on site.
- Include noise control section to consider BAT as appropriate.

2 Standards and Guidance

2.1 NRW Permitting Requirement – Noise

2.1.1 NRW requires that operators must consider the potential noise impact of their site. NRW states that operators may need to carry out noise impact assessments:

- at the permit application stage.
- when applying to vary a permit.
- to comply with specific permit conditions.

2.1.2 Where noise is possibly causing an impact, the operator must carry out an assessment to determine:

- the level of impact.
- how much work needs to be done to prevent or minimise noise pollution.

2.1.3 Operators must prevent significant pollution and also comply with the requirements to use 'appropriate measures' (Waste Framework Directive 2018/851) or 'best available techniques' (BAT) to prevent or minimise noise pollution.

2.1.4 Guidance on the noise assessment process for permit applications is detailed in Noise and vibration management: environmental permits.[1]

2.2 BS4142:2014+A1:2019 Methods for Rating and Assessing Industrial and Commercial Sound

2.2.1 BS 4142:2014+A1:2019 describes methods for rating and assessing sound of an industrial and/or commercial nature. The methods described in the standard use outdoor sound levels to assess the likely effects of sound on people who might be inside or outside a dwelling or premises used for residential purposes upon which sound is incident.

2.2.2 The standard is used to determine the rating levels for sources of sound of an industrial and/or commercial nature and the ambient, background and residual sound levels at outdoor locations. These levels could be used for the purposes of investigating complaints; assessing sound from proposed, new, modified or additional source(s) of sound of an industrial and/or commercial nature; and assessing sound at proposed new dwellings or premises used for residential purposes. However, the determination of noise amounting to a nuisance is beyond the scope of the standard.

2.2.3 The procedure contained in BS 4142 assesses the significance of sound which depends upon the margin by which the rating level of the specific sound sources exceeds the background sound level and the context in which the sound occurs/will occur.

2.2.4 An initial estimate of the impact of the specific sound is obtained by subtracting the measured background sound level from the rating level and considering the following:

- Typically, the greater this difference, the greater the magnitude of the impact.
- A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.

[1] https://www.gov.uk/government/publications/noise-and-vibration-management-environmental-permits/noise-and-vibration-management-environmental-permits

- A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.

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

2.2.5 Where the initial estimate of the impact needs to be modified due to the context, the following factors should be considered:

- The absolute level of sound;

- The character and level of the residual sound compared to the character and level of the specific sound; and

- The sensitivity of the receptor and whether dwellings or other premises used for residential purposes will already incorporate design measures that secure good internal and/or outdoor acoustic conditions such as:

  - Façade insulation treatment;

  - Ventilation and/or cooling that will reduce the need to have windows open to provide rapid or purge ventilation; and

  - Acoustic screening.

3 Baseline Sound Survey

3.1.1 An unattended environmental sound survey was undertaken between Thursday 25 March 2021 and Tuesday 30 March 2021 to establish the current sound climate at a single location representative of the nearest noise sensitive receptors. Measurements were logged in 15-minute periods of the L_{A90} sound levels.

3.1.2 The sound level meter was located in an environmental case. The microphone was connected to the meter via an extension cable and fitted with the manufacturer's windshield. Field calibrations were performed before and after the measurements with no significant fluctuations recorded (< 0.5 dB). Calibration certificates are available upon request.

3.2 Measurement Locations

3.2.1 Sound measurements were undertaken at a single position representative of dwellings along Bendrick Road. Within **Figure 2** the measurement position (LT1) is detailed together with the nearest noise sensitive receptor. The measurement position is also described in **Table 1.**

3.2.2 This measurement location is deemed appropriate due to its close proximity to the noise sensitive receptor and that the acoustic climate is not dissimilar to that of the noise sensitive receptor. This position also allowed longer term monitoring due to it being in a safe and secure location.

Figure 2: Site Plan Indicating Site Boundary and Measurement Position

Contains Data from OS, Esri, HERE, Garmin, Geotechnologies, Inc, NGA, USGS

Table 1: Description of Measurement Locations

Position	Description
LT1	The microphone was located approximately 1.5 m above ground level, in a free-field location, approximately 20 m from the nearest noise sensitive receptors along Bendrick Road. This measurement location is deemed appropriate due to its close proximity to the noise sensitive receptor and that the acoustic climate is not dissimilar to that of the noise sensitive receptor.

3.2.3 Details of the noise sensitive receptor are shown in **Table 2**.

Table 2: Noise Sensitive Receptor Details

Noise Sensitive Receptor	Address	No. Storeys	Grid Reference	
			Front Facade	Rear Facade
A	2 Bendrick Road, Barry, CF63 3RE	2	ST 13407 67480	ST 13423 67473

3.3 Assumptions/Limitations

3.3.1 The engineer noticed nothing unusual in terms of the sound climate at the time of the survey. This report refers, within the limitations stated, to the environment of the site in the context of the surrounding area at the time of the inspections. Environmental conditions can vary. No warranty is given as to the possibility of changes in the environment of the site and surrounding area at differing times.

3.4 Environmental Sound Climate

3.4.1 Due to the nature of the survey (i.e., unattended), it is not possible to accurately comment on the dominant noise sources or specific noise events during the entire survey period. However, at the beginning and end of the survey period, it was noted that on-site sound levels were dominated by distant vehicular movements on the surrounding road network and industrial noise from the Atlantic Trading Estate.

4 Equipment and Meteorology

4.1 Equipment

4.1.1 The instrumentation used in the survey is listed in **Table 3**.

Table 3: Instrumentation

Description	Manufacturer	Type	Serial Number	Laboratory Calibration Date	Field Calibration Results
Sound Level Meter	RION	NL-62	930517	07/01/2020	Before Survey: 94 dB After Survey: 94 dB
½" Pre-polarised microphone		UC-59	00598		
Pre-amplifier		NH-26	00559		
Sound Calibrator	Rion	NC-74	34746691	21/09/2020	-

4.2 Meteorological Conditions

4.2.1 Due to the nature of the survey (i.e., unattended), it is not possible to accurately comment on the meteorological conditions throughout the entire survey period. However, based on a review of publicly available weather forecasts and observations at the beginning and end of the survey period, the weather conditions are detailed in **Table 4**.

Table 4: Meteorological Conditions

Date	Temperature (°C)	Precipitation (mm)	Wind Speed (m/s)	Wind Direction
Thursday 25 March	9	0	<5	WSW
Friday 26 March	8	0	<5	WSW
Saturday 27 March	8	0	<5	WSW
Sunday 28 March	11	0	<5	SW
Monday 29 March	12	0	<5	WSW
Tuesday 30 March	13	0	<5	E

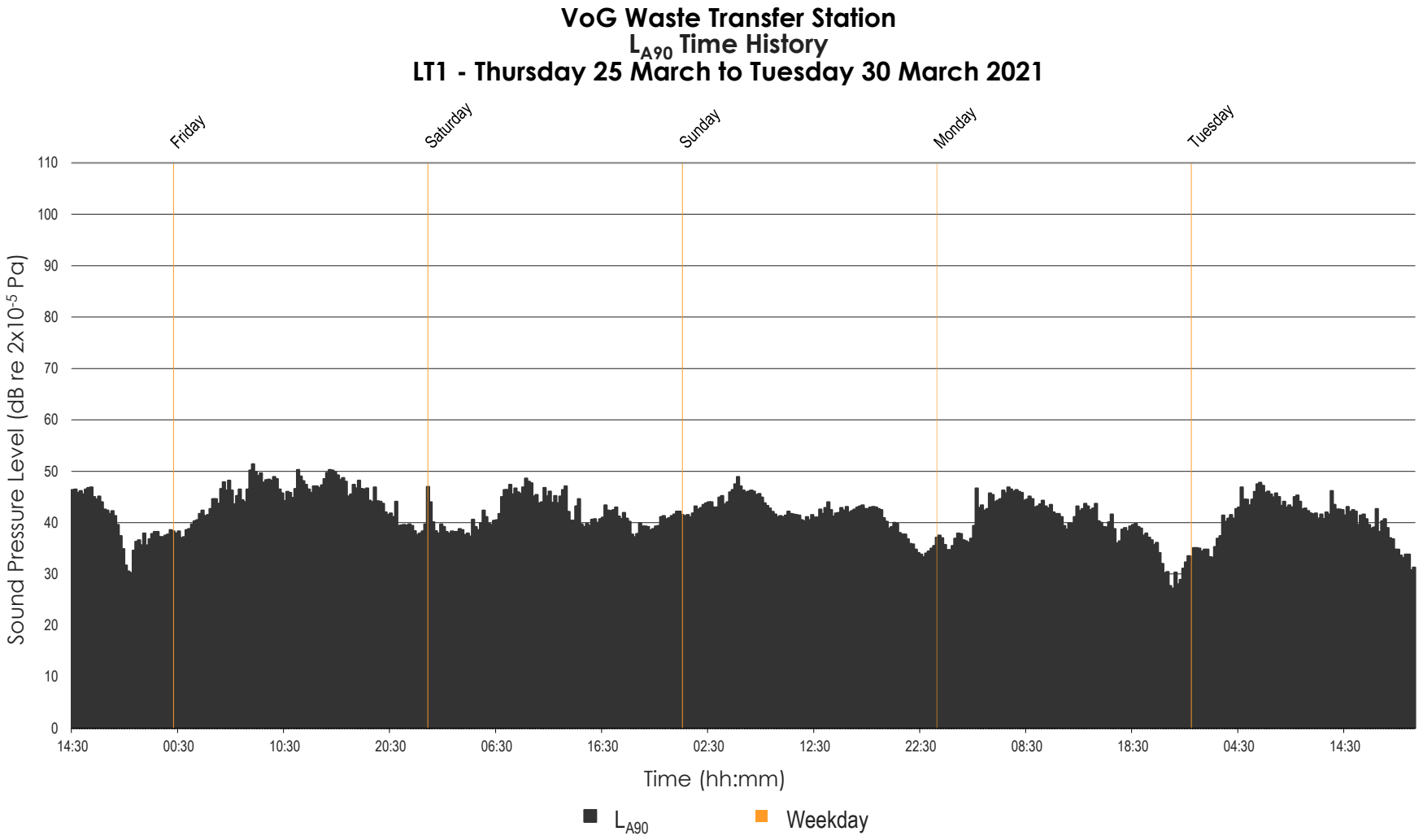
4.2.2 It is understood that no rainfall occurred during the survey period. Therefore, based on this and the presented weather conditions above, these conditions are considered suitable for obtaining representative sound level measurements.

5 Environmental Sound Data

5.1 Time-history Graph

5.1.1 The results of the environmental sound survey are shown in the time-history graph shown in **Figure 3**.

Figure 3: Time History Graph (L_{A90}) - LT1



5.2 Results Summary

5.2.1 A daily summary of the survey results during the daytime operational period (07:00 – 21:00 hours) is detailed in **Table 5**.

Table 5: Summary of Measured Environmental Sound Survey Results

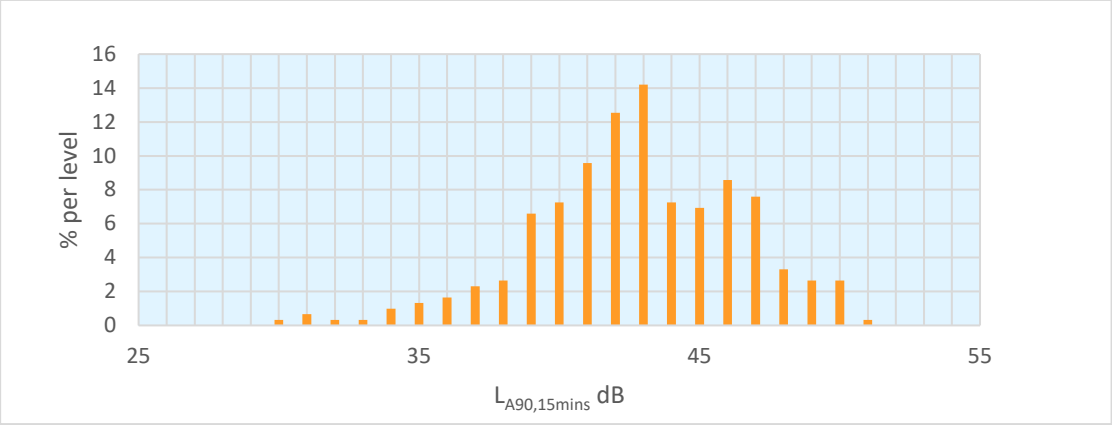
Date	Measured Sound Level (dB) Operational Period (07:00 – 21:00 hours)	
	$L_{Aeq,14hours}$	Typical* $L_{A90,T}$
Thursday 25 March 2021	50	46
Friday 26 March 2021	53	47
Saturday 27 March 2021	49	40
Sunday 28 March 2021	46	43
Monday 29 March 2021	50	39
Tuesday 30 March 2021	50	43

* Calculated based on the statistical distribution of background sound levels during the measurement period in general accordance with guidance in BS 4142:2014+A1:2019

5.3 Background Sound Levels

5.3.1 Based on the results of the environmental sound survey, a statistical analysis of the background sound levels has been undertaken across the entire survey period for time periods 07:00 – 21:00 and 18:00 – 21:00. The histogram of measured $L_{A90,15minute}$ sound levels between 07:00 and 21:00 hours can be seen in **Figure 4**.

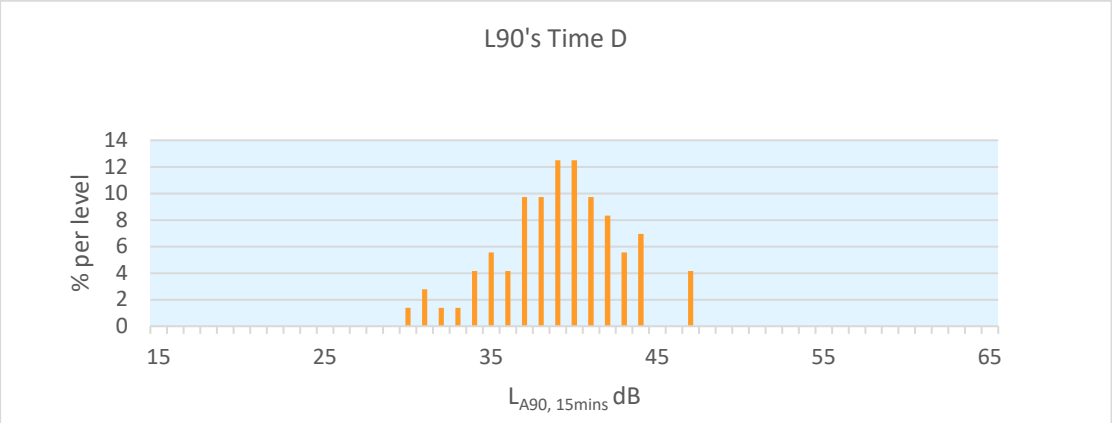
Figure 4: Histogram - L90 - LT1



5.3.2 The analysis indicates that a representative typical background sound level between 07:00 and 21:00 hours is 43 dB $L_{A90,15minutes}$.

5.3.3 The histogram of measured $L_{A90,15minute}$ sound levels between 18:00 and 21:00 hours can be seen in **Figure 5**.

Figure 5: Histogram - L90 - LT1 (18:00 – 21:00)



5.3.4 The analysis indicates that a representative typical background sound level between 18:00 and 21:00 hours is 39 dB $L_{A90,15minutes}$.

6 Noise Impact Assessment

6.1.1 An assessment has been undertaken in general accordance with BS 4142:2014 to determine the likely noise impacts associated with the operation of the development at nearby dwellings.

6.1.2 The assessment considers 2 scenarios. This includes the full operational time period of 07:00 – 21:00 and an evening period of 18:00 – 21:00.

6.2 Proposed Operations

6.2.1 The assessment has been based on the masterplan 'Internal Arrangement for Storage Building', Drawing No. HP/01/322, dated January 2020 and includes consideration of:

- Sound associated with operational processes.
- Sound associated with deliveries to and from the site.

6.2.2 Based on discussions with the proposed operator, the assessment has been based on the following operational parameters:

- The hours of operation when noisy works could occur will be between 07:00 hours to 21:00 hours.
- There will be a maximum of three Resource Recovery Vehicles (RRVs) per hour to the main building and two RRVs per hour to the storage building.
- Operational activities within the main building will comprise use of the balers, sort line and loaders. The assessment assumes that these operations occur continuously for the entire 1-hour assessment period.
- The main building includes roller shutter doors which will remain mainly closed but will open when vehicles are entering in and out. The assessment assumes that each roller door is open for one minute every hour. The model assumes a typical sound insulation performance R_w of 15 dB for the roller shutter doors.
- Glass being deposited to site could occur 40 times per day. The assessment includes three glass deposits in the assessed hour.
- A JCB will process glass three times a day. The assessment includes this operation in the assessed hour.
- A JCB loading glass into an RRV will occur approximately 2-3 times a week. The assessment includes this operation in the assessed hour.
- No glass operations will occur after 17:00 as per planning restrictions.

6.2.3 Grid references and heights of site buildings are shown in **Appendix** C

6.3 Noise Sensitive Receptors

6.3.1 The nearest noise sensitive receptor to the proposed development is 2 Bendrick Road and is identified in **Figure 2**. The receptor is approximately 100 m from the northern site boundary.

6.4 Calculation Procedure

6.4.1 The assessment has been undertaken over a 1-hour period in line with BS 4142:2014+A1:2019 methodology and includes the following activities:

- RRVs arriving, reversing into the main building and departing.
- RRVs arriving, reversing into the storage building and departing.
- Internal processes including use of baler, sort line and loaders within the main building.
- Glass being deposited, processed and loaded onto a RRV by a JCB. No operations after 17:00.

6.4.2 An acoustic model of the site and the surrounding area has been prepared using computer software SoundPLAN version 8.2. The acoustic model has been used to evaluate the likely noise impact from the site at the noise receptor.

6.4.3 The model includes topography from a topographical survey carried out by a subcontractor and the following topographical elements which are part of the proposals:

- 4 m high wall surrounding the glass bay.
- 3 m high bays.
- retaining wall opposite the weighbridge with a height of between 0.7 m and 1.7 m.
- retaining wall located near the main barn with a height between 0.7 m and 1 m.

6.4.4 Source levels ($L_{Aeq,T}$) have been provided by the operator based on measurements at a similar existing facility. Details of the source levels used in the assessment are provided in **Table 6.**

Table 6: Summary of Measured Source Sound Levels

Activity	Distance (m)	Measured Sound Pressure Level (L_{Aeq} dB) at Octave Band Centre Frequency (Hz)								dBA
		63	125	250	500	1k	2k	4k	8k	
RRV moving forward	5	81	70	66	59	59	58	54	53	70
RRV reversing	3	76	70	64	65	64	64	64	56	72
Truck depositing glass	2	74	72	76	77	78	87	88	80	91
JCB processing glass	12	86	90	87	86	85	81	78	72	92
JCB tipping glass into truck empty	10	81	82	84	87	88	89	87	81	96
JCB tipping glass into truck - becoming full	10	80	80	76	74	74	72	72	71	81
General activity noise from main building (based on open doors)	1	75	78	82	82	81	81	78	73	88

6.4.5 The location of site noise sources used in the acoustic model are shown in **Figure 6**.

Figure 6: Location of Site Noise Sources

Contains data from: Maxar, Microsoft, OS, Esri, HERE, Garmin, GeoTechnologies, Inc

6.4.6 Descriptions, sound power levels and grid references of line (moving) and static (point) sources used within the acoustic model are shown in **Table 7.** The table also includes on-time percentages for the sources 7-10. These on time corrections have been applied to the noise source. The table also includes the height of the source

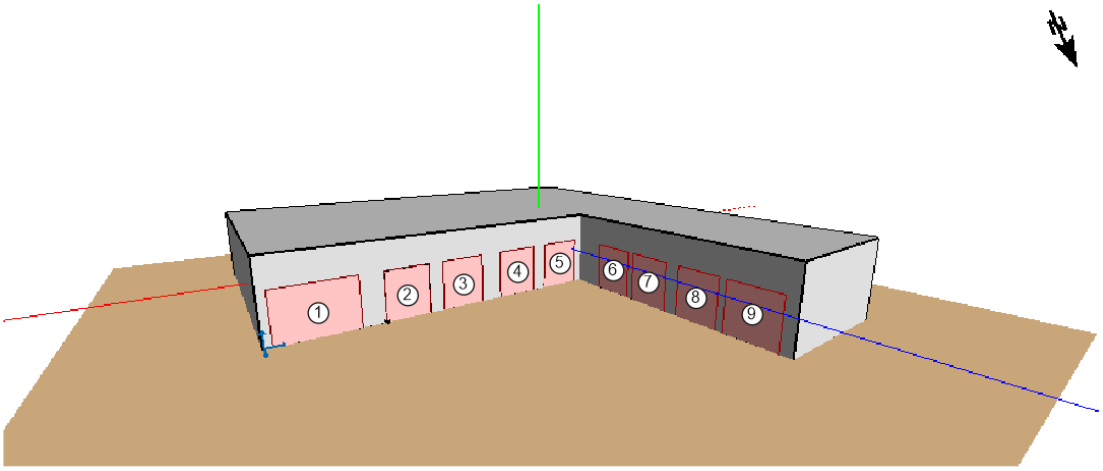
Table 7: Descriptions, Sound Power Levels and Grid References of Site Noise Sources

Source	Description	Sound Power Level (L_W/unit, dB)	Height of Source (m)	Assumed speed (km/h)/On time percentage	Grid References
1	Truck reversing from storage yard	95	0.5	8	ST 13389 67332
2	Truck leaving from / arriving at storage yard	91	0.5		ST 13403 67302
3	Truck leaving from / arriving at storage yard	92	0.5		ST 13407 67299

4	Truck leaving / entering main building	92	0.5		ST 13390 67256
5	Truck leaving / entering main building	92	0.5		ST 13395 67246
6	Truck reversing from main building	97	0.5		ST 13381 67241
7	JCB processing glass	98	1	On time percentage 1%	ST 13413 67247
8	Romaquip depositing glass	98	1	On time percentage 5%	
9	JCB tipping glass into empty truck	112	2	On time percentage 8%	
10	JCB tipping becoming full	102	2	On time percentage 25%	

6.4.7 The doors associated with general activity noise from the main building are shown in **Figure 7**.

Figure 7: Main Building Doors



6.4.8 Sound power level and grid references of general activity noise at the doors of the main building are shown in **Table 8**.

Table 8: Main Building Sound Power Levels and Grid References

Door	Sound Power Level (L_w/unit, dB)		Grid Reference
	Open	Closed	
1 – 5	100	86	ST 13396 67225
6 – 9			ST 13368 67241

6.4.9 BS 4142 advises that certain acoustic features can increase the significance of impact over that expected from a basic comparison between the specific sound levels and the background

sound level. To account for the readily distinctive noise from the main building against the residual acoustic environment, a penalty of +3 dB penalty has been applied.

6.4.10 Operations are unlikely to be deemed intermittent or impulsive at the receptor based on the specific sound level and due to distance between the source and receptor. The operations associated with glass tipping without any time corrections applied to source are likely to be below the residual acoustic environment. However, to cover a worst case a +3dB penalty has been applied for impulsivity. Tonal corrections are not considered to be required based on our understanding of operations.

6.5 Indicative Assessment

6.5.1 The rating level of the WTS operations at the nearest receptor has been calculated using the acoustic model and the results summarised in **Table 9** for the time period 07:00 – 21:00 and in Table 10 for the evening period 18:00 – 21:00.

Table 9: BS4142 Assessment – 07:00 – 21:00

Description	**Sound Level (dB)**			
	Front Façade GF	**Front Façade F1**	**Rear Façade GF**	**Rear Façade F1**
Specific Sound Level $L_{Aeq,T}$	30	31	34	36
Noise Rating Corrections	+6			
Calculated Rating Level at Receptor ($L_{Ar,Tr}$)	36	37	40	42
Background Sound Level ($L_{A90,T}$)	43			
Difference between Rating Level and Background Sound Level	-7	-6	-3	-1
Assessment of Impact	Indication of a low impact, depending on the context			

Table 10: BS4142 Assessment – 18:00 – 21:00

Description	**Sound Level (dB)**			
	Front Façade GF	**Front Façade F1**	**Rear Façade GF**	**Rear Façade F1**
Specific Sound Level $L_{Aeq,T}$	24	26	27	29
Noise Rating Corrections	+3			
Calculated Rating Level at Receptor ($L_{Ar,Tr}$)	27	29	30	32
Background Sound Level ($L_{A90,T}$)	39			
Difference between Rating Level and Background Sound Level	-12	-10	-9	-7
Assessment of Impact	Indication of a low impact, depending on the context			

6.6 Context and Mitigating Factors

6.6.1 The above assessment details the results of the numerical assessment of sound levels at the nearest noise sensitive receptor. It is important to note that the numerical assessment of impact is influenced by the context of the proposals including the surrounding environment and the operating characteristics.

6.6.2 The above represents a worst-case assessment and therefore in many instances operational activities may take less time than assumed and may occur less frequently within the assessment period. These factors would reduce the likely impact of the operations.

6.6.3 It should also be noted that the land uses in the area are of an industrial nature with a household waste recycling centre already operating in the immediate vicinity. Therefore, this development would not be a new type of noise source for the surrounding area as a whole.

6.7 Uncertainty

6.7.1 Care has been taken to reduce uncertainty as far as reasonably possible. However, it should be recognised that in any environmental sound survey and assessment process uncertainty exists.

6.7.2 Uncertainty in measured background sound levels can occur due to variation in temporary/non representative meteorological conditions. In this instance all possible steps were taken to minimise the risk of meteorological conditions affecting the survey results. However, it should be recognised that there is a degree of uncertainty inherent in the baseline environmental sound data.

6.7.3 The level of uncertainty in source sound levels has been reduced by referring to measured sound levels of the same activities taking place at another existing site.

6.8 Summary

6.8.1 The noise impacts at the nearest sensitive receptors have been calculated by comparing the existing background sound levels, with the relevant calculated future rating level.

6.8.2 Acoustic feature corrections have been applied where sound sources are judged to be discernible from the background sound climate at the noise sensitive receptors.

6.8.3 Considering the preliminary results of the assessment and the context detailed above, the proposed use of the site as a WTS should be considered acceptable, in relation to noise without any further acoustic mitigation for both the assessment time periods considered.

7 Noise Control

7.1 Embedded Mitigation

7.1.1 Embedded mitigation, in the form of acoustic barriers, is included within the design proposals is shown in **Figure 8** and described in **Table 1**.

Figure 8: Embedded Mitigation - Acoustic Barriers

Contains data from: Maxar, Microsoft, OS, Esri, HERE, Garmin, GeoTechnologies, Inc

Table 11: Embedded Mitigation - Acoustic Barriers - Descriptions

Acoustic Barrier	Construction details	Mass per square metre (kg/m^2)	Height (m)	National Grid Reference
1	Concrete Wall	More than 10	1	ST 13373 67331
2			3	ST 13383 67294
3			1	ST 13380 67266
4			4	ST 13410 67265

7.2 Operating Techniques Document

7.2.1 Operational procedures to minimise noise emissions are included in the Document: VoG.007 Operating Techniques Document v1.0 – Project Code: COL020-220 – Date: July 2021.

7.2.2 Measures from this document are provided below.

> *"The site is a fully functioning waste transfer station and as such there is potential for frequent noise. However, the facility is located on an already established commercial trading estate. Any significant noise event is entered into the site diary and also on a noise monitoring spreadsheet.*
>
> *Waste sorting operations will only be carried out during operational hours and only within the waste buildings. All equipment will be maintained and operated in accordance with manufacturer's guidance and will be maintained in good working order.*

The site will be operated so as to minimise noise emissions from the site. Measures that will be taken at the site include:

- *all waste operation activities will occur within the confines of the waste operations buildings/containers or bays;*
- *where possible plant will be located away from noise-sensitive receptors;*
- *avoidance of dropping materials from height;*
- *all plant will be switched off when not in use;*
- *the imposition of a speed limit for vehicles delivering waste to the site. This will reduce noise associated with high engine speeds;*
- *all site personnel will be trained in the need to minimise site noise, and will be responsible for monitoring and reporting excessive noise when carrying out their everyday roles;*
- *all plant and equipment in use at the site will be regularly maintained to minimise noise resulting from inefficient operation of pumps, generators and engines;*
- *in the event that reversing alarms are found to give rise to complaints, alternative alarms or technology will be investigated;*
- *the regular maintenance of roads to prevent the development of potholes will significantly reduce the noise generated particularly by empty vehicles exiting the site;*
- *consideration will be given to the fitting of noise suppression kits on items of plant and equipment; and*
- *all plant will be maintained in accordance with manufacturer's recommendations to minimise noise emissions.*

Any complaint received will be logged in the site diary. The Site Manager will investigate the complaint and will take action to identify the source of the noise and implement remedial measures where appropriate."

8 Conclusions

8.1.1 To support the permit application for the proposed Waste Transfer Station (WTS) at the Atlantic Trading Estate, Barry, Vale of Glamorgan (VoG) the previously submitted planning noise impact assessment has been updated to reflect permitting requirements set by Natural Resources Wales (NRW).

8.1.2 A baseline sound survey has been undertaken to establish the prevailing sound climate at the closest existing receptor. The results of the survey have formed the basis of the assessment to determine the impact from the proposed operations.

8.1.3 An assessment in general accordance with BS4142:2014 has been undertaken to determine the likely impact associated with the proposed facility at the nearest noise sensitive receptor.

8.1.4 The numerical assessment indicates that the operation from the development is likely to have a low impact during the daytime periods at the nearest noise sensitive receptors.

8.1.5 Therefore, the assessment has demonstrated that the proposed development is likely to be acceptable in relation to the potential noise impacts identified herein.

Appendix A Acoustic Terminology

Parameter	Description
Acoustic Environment	Sound at the receiver from all sound sources as modified by the environment.
Ambient Sound	Totally encompassing sound in a given situation at a given time, usually composed of sound from many sources near and far. Comprises of the residual sound and the specific sound when present.
Ambient Sound Level ($L_a = L_{Aeq,T}$)	Equivalent continuous A-weighted sound pressure level of the totally encompassing sound in a given situation at a given time, usually from many sources near and far, at the assessment location over a given time interval, T.
A-Weighted Decibel (dBA)	A decibel level that has been corrected for the A-Weighting curve.
A-Weighting	Octave band and 1/3 octave band filters that correlate to the response of the human hearing system to sound pressure levels at different frequencies.
Background Sound	The level of sound measured in the absence of extraneous noise sources.
Background Sound Level ($L_{A90,T}$)	A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, T, measured using a fast time-weighting and quoted to the nearest whole number of decibels.
Decibel (dB)	A logarithmic unit used to describe the ratio between the measured level and a reference level of 0 dB. The ratio can be sound pressure, intensity or power. The reference value for sound pressure is 20 µPa and for sound power is 1 ρW.
Equivalent Continuous A-Weighted Sound Pressure Level (LAeq,T)	Value of the time-averaged A-weighted sound pressure level, in decibels (dB), of a continuous steady sound for the duration of the specified time interval, T.
Façade Level	The sound pressure level at a distance of 1 metre from the façade
Fast Time Weighted	The speed at which the instrument responds to changes in amplitude of the measured signal. The response time of a fats time-weighted instrument is 0.125 seconds.
Free-Field Level	The sound pressure level measured away from any reflective surfaces.
Frequency (f)	The number of cycles of pressure fluctuations within a given period of time. Measured in Hertz.
Hertz (Hz)	The unit of frequency or pitch of a sound. One hertz is equal to one cycle per second.
$L_{10,T}$	The noise level exceeded for 10 % for a given time interval, T. Generally used to describe traffic noise.
L_{Amax}	The maximum A-weighted level measured during a given time period.
Octave Band	Band of frequencies where the upper limit of the band is twice the frequency of the lower limit. E.g., the 1000 Hz band contains noise energy at all frequencies from 707 to 1414 Hz.
Percentile Level ($L_{AN,T}$)	The A-Weighted Sound Pressure Level which is exceeded for N% of the specified time interval. E.g., the LA90,1hour is the A-weighted sound level exceeded for 90% of 1 hour/
Rating Level ($L_{Ar,Tr}$)	Specific sound level plus any adjustment for the characteristic features of the sound.
Reference Time Interval (T)	Specified interval over which the specific sound level is determined.

Sound Pressure	The difference between the pressure caused by a sound wave and the ambient pressure of the medium the sound wave is passing through. Measured in Pascals.
Sound Pressure Level (L_p)	The logarithm of the ratio of a given sound pressure (p) to the reference sound pressure (p0). The reference value for sound pressure is 20 µPa. Defined as: $L_p = 20log\left(\frac{p}{p_0}\right)$
Sound Sources	Sounds generated by nature or human activity.
Specific Sound Level ($L_s = L_{Aeq,Tr}$)	Equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given reference time interval, T_r.

Appendix B Calibration Certificates

Sound Level Meter

ANV MEASUREMENT SYSTEMS

CERTIFICATE OF CALIBRATION

ilac-MRA UKAS CALIBRATION 0653

Date of Issue: 08 January 2020 **Certificate Number: UCRT20/1026**

Issued by:
ANV Measurement Systems
Beaufort Court
17 Roebuck Way
Milton Keynes MK5 8HL
Telephone 01908 642846 Fax 01908 642814
E-Mail: info@noise-and-vibration.co.uk
Web: www.noise-and-vibration.co.uk
Acoustics Noise and Vibration Ltd trading as ANV Measurement Systems

Page 1 of 2 Pages

Approved Signatory

K. Mistry

Customer	Stantec UK Limited 10 Queen Square Bristol BS1 4NT

Order No.	18583			
Description	Sound Level Meter / Pre-amp / Microphone / Associated Calibrator			
Identification	*Manufacturer*	*Instrument*	*Type*	*Serial No. / Version*
	Rion	Sound Level Meter	NL-62	00930517
	Rion	Firmware		2.1
	Rion	Pre Amplifier	NH-26	00559
	Rion	Microphone	UC-59L	00701
	Rion	Calibrator	NC-74	34536109
		Calibrator adaptor type if applicable		NC-74-002
Performance Class	1			
Test Procedure	TP 2.SLM 61672-3 TPS-49			
	Procedures from IEC 61672-3:2006 were used to perform the periodic tests.			
Type Approved to IEC 61672-1:2002	NO	Approval Number	N/A	
	If YES above there is public evidence that the SLM has successfully completed the applicable pattern evaluation tests of IEC 61672-2:2003			
Date Received	07 January 2020	ANV Job No.	UKAS20/01009	
Date Calibrated	08 January 2020			

The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3:2006, for the environmental conditions under which the tests were performed. However, no general statement or conclusion can be made about conformance of the sound level meter to the full requirements of IEC 61672-1:2002 because evidence was not publicly available, from an independent testing organisation responsible for pattern approvals, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2002 and because the periodic tests of IEC 61672-3:2006 cover only a limited subset of the specifications in IEC 61672-1:2002.

Previous Certificate	*Dated*	*Certificate No.*	*Laboratory*
	31 January 2018	UCRT18/1105	0653

CERTIFICATE OF CALIBRATION	Certificate Number UCRT20/1026
UKAS Accredited Calibration Laboratory No. 0653	Page 2 of 2 Pages

Sound Level Meter Instruction manual and data used to adjust the sound levels indicated.

SLM instruction manual title	Sound Level Meter NL-62		
SLM instruction manual ref / issue	12-05		
SLM instruction manual source	Manufacturer		
Internet download date if applicable	N/A		
Case corrections available	Yes		
Uncertainties of case corrections	Yes		
Source of case data	Manufacturer		
Wind screen corrections available	Yes		
Uncertainties of wind screen corrections	Yes		
Source of wind screen data	Manufacturer		
Mic pressure to free field corrections	Yes		
Uncertainties of Mic to F.F. corrections	Yes		
Source of Mic to F.F. corrections	Manufacturer		
Total expanded uncertainties within the requirements of IEC 61672-1:2002	Yes		
Specified or equivalent Calibrator	Specified		
Customer or Lab Calibrator	Lab Calibrator		
Calibrator adaptor type if applicable	NC-74-002		
Calibrator cal. date	16 December 2019		
Calibrator cert. number	UCRT19/2361		
Calibrator cal cert issued by	0653		
Calibrator SPL @ STP	93.98	dB	Calibration reference sound pressure level
Calibrator frequency	1002.05	Hz	Calibration check frequency
Reference level range	25 - 138	dB	

Accessories used or corrected for during calibration - Extension Cable & Wind Shield WS-15
Note - if a pre-amp extension cable is listed then it was used between the SLM and the pre-amp.

Environmental conditions during tests	Start	End	
Temperature	23.12	23.01	± 0.30 °C
Humidity	41.7	41.5	± 3.00 %RH
Ambient Pressure	101.13	101.17	± 0.03 kPa

Response to associated Calibrator at the environmental conditions above.

Initial indicated level	94.0	dB	Adjusted indicated level	94.0	dB
The uncertainty of the associated calibrator supplied with the sound level meter ±				0.10	dB

Self Generated Noise — This test is currently not performed by this Lab.

Microphone installed (if requested by customer) = Less Than	N/A	dB	A Weighting
Uncertainty of the microphone installed self generated noise ±	N/A	dB	

Microphone replaced with electrical input device - UR = Under Range indicated

Weighting	A			C			Z		
	11.8	dB	UR	15.8	dB	UR	24.5	dB	UR
Uncertainty of the electrical self generated noise ±							0.12	dB	

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor $k=2$, providing a coverage probability of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

For the test of the frequency weightings as per paragraph 12. of IEC 61672-3:2006 the actual microphone free field response was used.

The acoustical frequency tests of a frequency weighting as per paragraph 11 of IEC 61672-3:2006 were carried out using an electrostatic actuator.

..... END .....

Calibrated by: B. Giles R 1

Additional Comments The results on this certificate only relate to the items calibrated as identified above.
None

Calibrator

CERTIFICATE OF CALIBRATION

0653

Date of Issue: 22 September 2020

Certificate Number: UCRT20/1898

Calibrated at & Certificate issued by:
ANV Measurement Systems
Beaufort Court
17 Roebuck Way
Milton Keynes MK5 8HL
Telephone 01908 642846 Fax 01908 642814
E-Mail: info@noise-and-vibration.co.uk
Web: www.noise-and-vibration.co.uk
Acoustics Noise and Vibration Ltd trading as ANV Measurement Systems

Page 1 of 2 Pages

Approved Signatory

B. Bogdan

Customer	Stantec Caversham Bridge House Waterman Place Reading RG1 8DN			
Order No.	18583			
Test Procedure	Procedure TP 1 Calibration of Sound Calibrators			
Description	Acoustic Calibrator			
Identification	*Manufacturer* Rion	*Instrument* Calibrator	*Model* NC-74	*Serial No.* 34746691

The calibrator has been tested as specified in Annex B of IEC 60942:2003. As public evidence was available from a testing organisation (PTB) responsible for approving the results of pattern evaluation tests, to demonstrate that the model of sound calibrator fully conformed to the requirements for pattern evaluation described in Annex A of IEC 60942:2003, the sound calibrator tested is considered to conform to all the class 1 requirements of IEC 60942:2003.

ANV Job No.	UKAS20/09512	
Date Received	21 September 2020	
Date Calibrated	22 September 2020	
Previous Certificate	*Dated*	02 September 2019
	Certificate No.	UCRT19/1952
	Laboratory	0653

CERTIFICATE OF CALIBRATION	Certificate Number UCRT20/1898
UKAS Accredited Calibration Laboratory No. 0653	Page 2 of 2 Pages

Measurements

The sound pressure level generated by the calibrator in its WS2 configuration was measured five times by the Insert Voltage Method using a microphone as detailed below. The mean of the results obtained is shown below. It is corrected to the standard atmospheric pressure of 101.3 kPa (1013 mBar) using original manufacturers information.

Test Microphone	*Manufacturer*	*Type*
	Brüel & Kjær	4134

Results

The level of the calibrator output under the conditions outlined above was

93.98 ± 0.10 dB rel 20 µPa

Functional Tests and Observations

The frequency of the sound produced was	1002.74 Hz	±	0.13 Hz
The total distortion was	1.01 %	±	6.9 % of Reading

During the measurements environmental conditions were

Temperature	24	to	24	°C
Relative Humidity	58	to	64	%
Barometric Pressure	100.0	to	100.1	kPa

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a coverage probability of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

The uncertainties refer to the measured values only with no account being taken of the ability of the instrument to maintain its calibration.

A small correction factor may need to be applied to the sound pressure level quoted above if the device is used to calibrate a sound level meter which is fitted with a free-field response microphone. See manufacturers handbook for details.

…… END ……

Note:

Calibrator adjusted prior to calibration?	NO	
Initial Level	N/A	dB
Initial Frequency	N/A	Hz

Additional Comments The results on this certificate only relate to the items calibrated as identified above.

None

Calibrated by: B. Giles R 1

Appendix C Site Buildings

C.1.1 Site buildings are shown in **Figure C.1**

Figure C.1: Site Buildings Locations

Contains data from: Maxar, Microsoft, OS, Esri, HERE, Garmin, GeoTechnologies, Inc

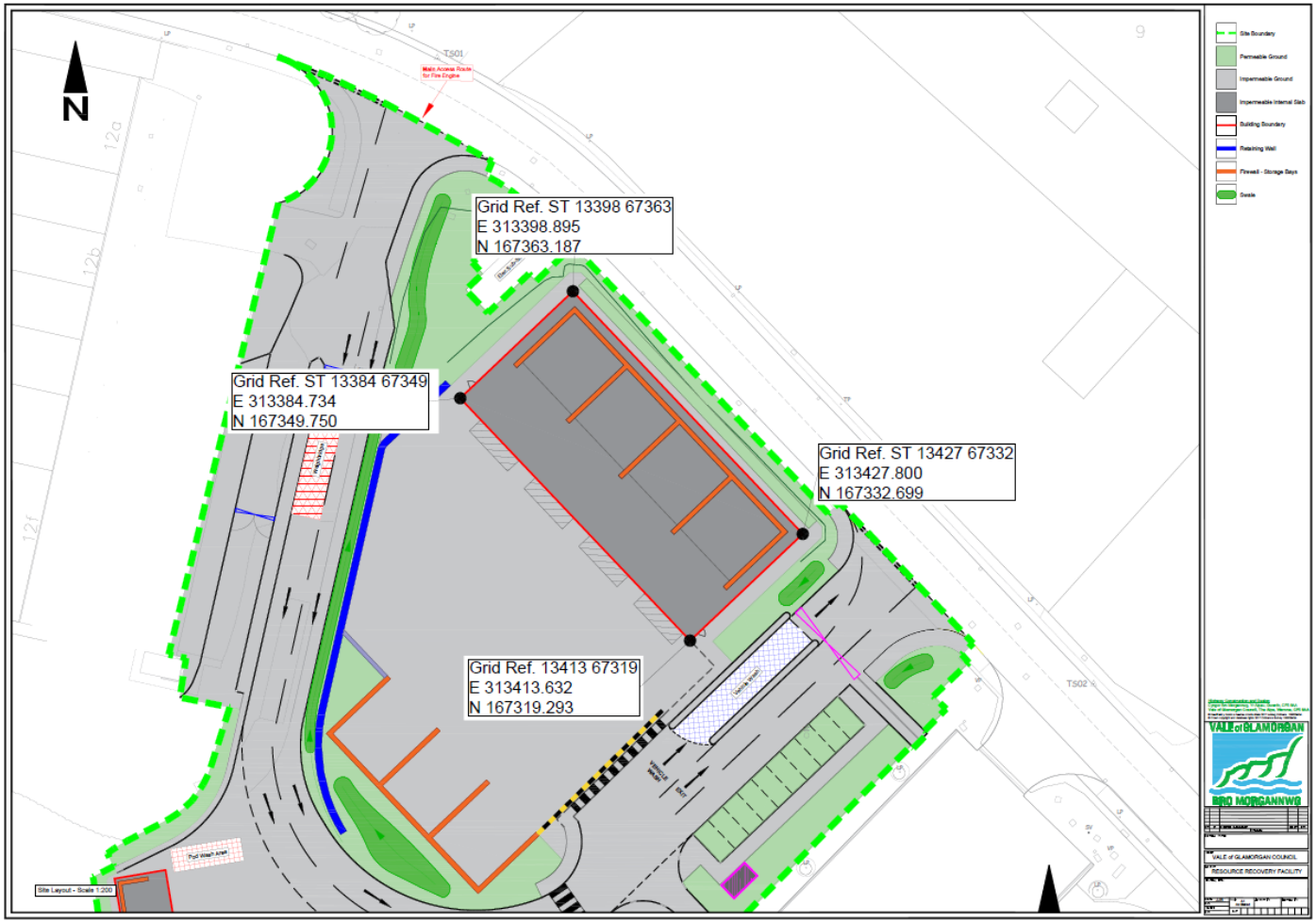
C.1.2 Site building heights and general grid references are shown in **Table C.1**.

Table C.1: Site Buildings Heights and Grid References

Site Building	Height (m)	National Grid Reference
1	10	ST 13407 67346
2	7.4	ST 13408 67278
3	6	ST 13348 67273
4	11	ST 13382 67211

C.1.3 Grid references of site building quoins are shown in the **Figure C.2** and **Figure C.3** below.

Figure C.2: Site Building Quoins Grid References – Northern Buildings



Drawing: Resource Recovery Facility – JJB for Vale of Glamorgan Council

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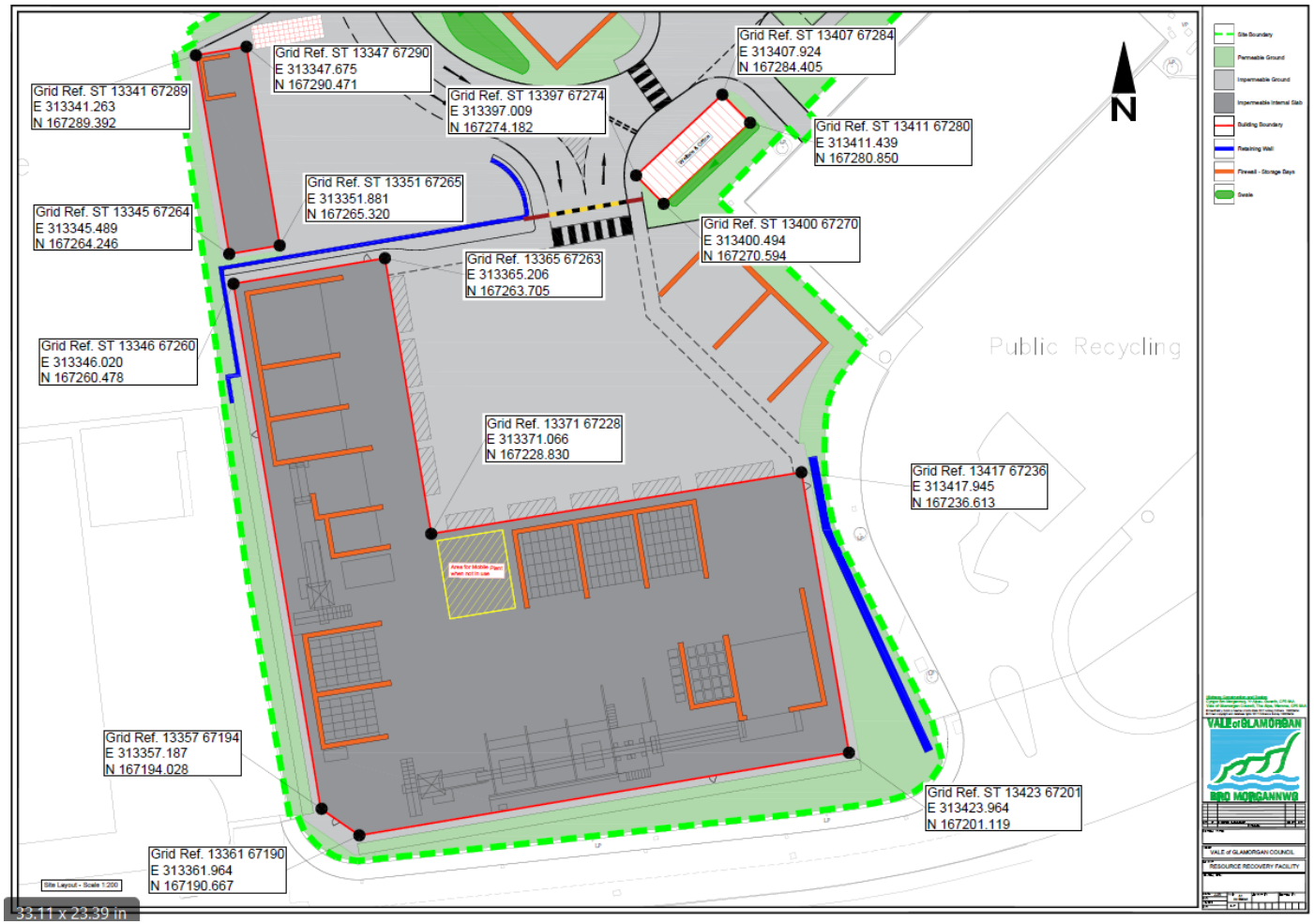
Figure C.3: Site Building Quoins Grid References – Southern Buildings



Drawing: Resource Recovery Facility – JJB for Vale of Glamorgan Council