



## **CONSOLIDATION OF A NOISE MONITORING STUDY AT THE SANT' ANTNIN WASTE TREATMENT PLANT, MARSASKALA**

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### **REPORT OF NOISE MONITORING STUDY**



**Version I (October 2014)**



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## Quality Assurance

### **Consolidation of a Noise Monitoring Study at the Sant' Antnin Waste Treatment Plant, Marsaskala** **Report of Noise Monitoring Study** October 2014

Report for: **WasteServ Malta Ltd**

### Revision Schedule

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# **SANT' ANTIN WASTE TREATMENT PLANT, MARSASKALA**

## **CONSOLIDATED NOISE MONITORING STUDY – REPORT OF NOISE MONITORING STUDY**

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### **INTRODUCTION**

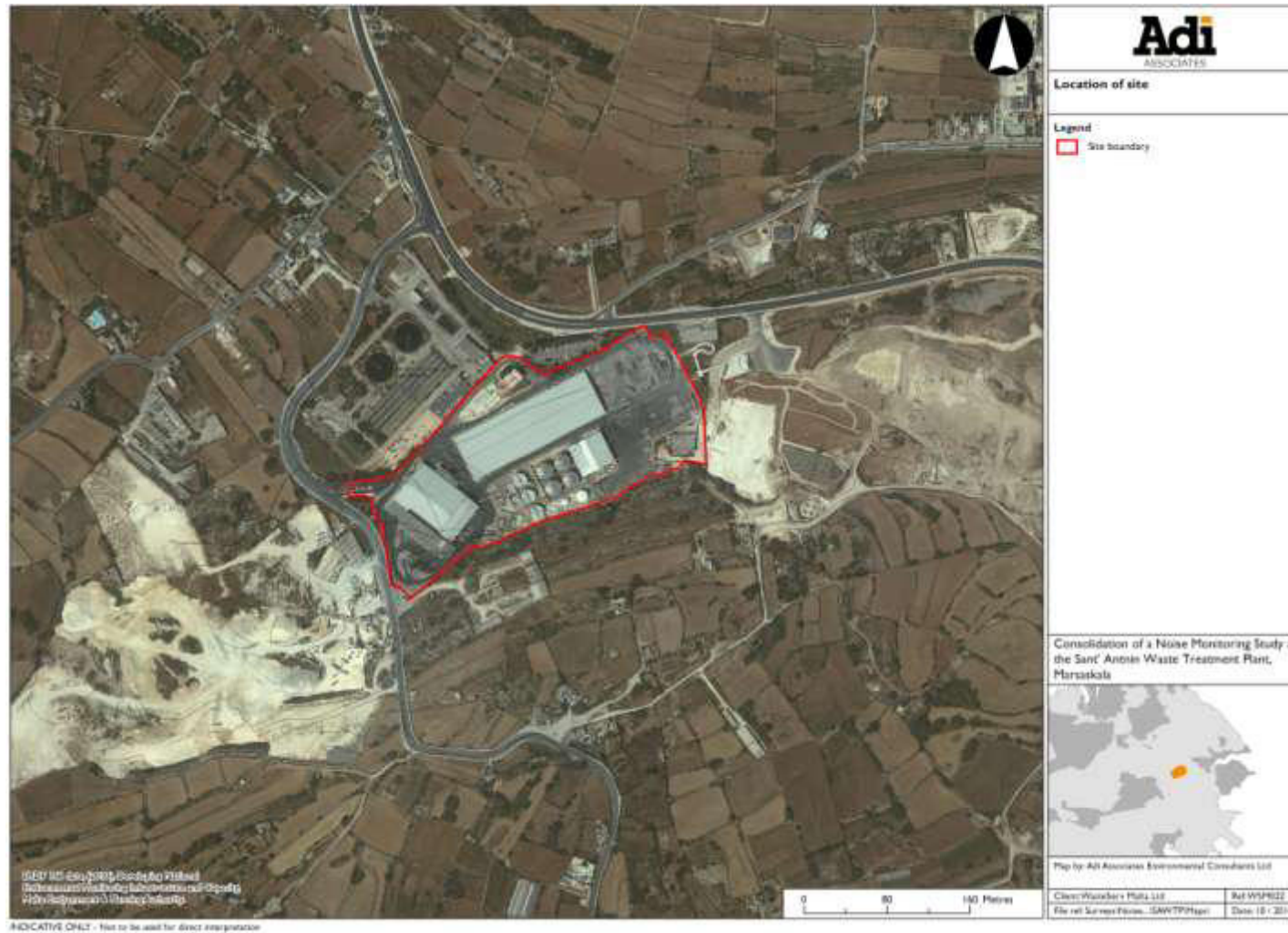
1. Adi Associates Environmental Consultants Ltd was commissioned by WasteServ Malta Ltd to carry out a Consolidated Noise Monitoring Study at the Sant' Antnin Waste Treatment Plant (SAWTP) in Marsaskala, as requested by the Malta Environment and Planning Authority (MEPA), in relation to Environmental Permit EP 0021/09/C. **Figure 1** shows the location of the SAWTP.
2. In accordance with the Terms of Reference for the Study, this Report describes the results of a noise survey undertaken to determine the noise climate at the identified sensitive receptors in the vicinity of the SAWTP during the day time, when the treatment plant was in operation, as well as at night time when the treatment plant was not operating. The Report also describes the assessment of the noise impact on the sensitive receptors, informed by the noise survey, as well as a programme for the monitoring of noise impacts arising from the operations of the SAWTP, informed by the outcome of the noise impact assessment.

### **SCOPE OF THE SURVEY**

#### **Terms of Reference**

3. The requirements for the Consolidated Noise Monitoring Study were provided by WasteServ Malta Ltd; these are reproduced below:
  - 1.4 ...is required to propose a monitoring procedure for measuring noise levels within and around the installation.*
  - 1.5 The monitoring study should address the following issues:*
    - a) Description of the facility; this shall include a description of all processes carried out onsite, related equipment, infrastructures and hours of operation.*
    - b) Description of surrounding areas; this shall include identification of the types of activities (both residential and commercial), roads and other amenities. These shall be location specific taking into account their location with respect to the site.*
    - c) Identification of the main sources of noise and vibration; this shall include all processes on site such as transport noise on site, landfill equipment, mechanical operations etc...*

**Figure 1: Location of the Sant' Antnin Waste Treatment Plant**





- d) *Identification of the closest noise sensitive receptors shall be established after assessing the noise levels in the landfills' perimeter and in the other locations identified in point b. above, under normal operating conditions (including grit blasting operations). The various monitoring points shall be identified with a unique code and an analysis of the ambient noise to which each monitoring point is subjected. The consultant, in collaboration with MEPA, shall first seek advice from the Local Council during the selection of these sensitive receptors.*
  - e) *Environmental Noise Survey – this shall include details of the standards used for measurements, equipment used including calibration details, resultant measurement data, assessment methods and complaints significance scale. The survey is to be carried out according to the latest revisions of ISO 1996 and the rating of industrial noise affecting residential areas shall be according to BS4142:1997. The survey should include perimeter noise levels, baseline noise survey of sensitive receptor sites, noise impact on sensitive receptor sites including day and night background levels.*
  - f) *The monitoring shall be performed exclusively using type one (1) sound level meter. The use of type two (2) sound level meters or less is not considered acceptable and will not be considered.*
  - g) *Impact assessment of noise events on noise sensitive receptor sites – this shall include an assessment according to the guidelines BS4142:1997, ISO 1996 and ISO 9613 or any other standard and any other standard methodology stipulated by the Contracting Authority. A summary of the data obtained after the survey has been carried out in relation to the noise sensitive receptors identified above shall also be submitted.*
  - h) *Conclusions and Mitigation measures – this shall include a summary report of findings from the noise monitoring survey and any remedial action and/or mitigation measures to be implemented by the operator in order to reduce impacts resulting from the site of operation.*
- 1.6 Results for the monitoring sessions have to be submitted within one (1) month or less from the sampling sessions. They shall be made available to the Company in both paper and electronic format.*
- 1.7 The final Noise Monitoring Survey Report shall include the following information:*
- *Details of the standards/methods used for noise measurements including duration and time of monitoring and prevailing weather conditions*
  - *Equipment used throughout the survey including calibration details and certificates*
  - *Perimeter noise levels*
  - *Results obtained from baseline noise monitoring of sensitive receptor sites*
  - *An assessment of noise impact on site sensitive receptors including day and night background levels in accordance with BS 4142:1997, ISO 1996, ISO 9613 or the equivalent*
  - *Assessment methods used*

- *Rating of industrial noise affecting residential areas according to BS 4142:1997 and complaints significance scale*
- *Summary of the data obtained from the survey in relation to the noise sensitive receptors identified*
- *Any remedial actions and/or mitigation measures to be implemented by the Contracting Authority to reduce impacts resulting from the operation site.*

*1.8 Based on the results obtained from the survey, the consultant shall provide the Contracting Authority with a detailed monitoring procedure for effectively measuring noise levels within and around the Sant' Antnin Waste Treatment Plant.*

4. Having regard to the Terms of Reference, the methodology agreed by the Malta Environment and Planning Authority (MEPA) and the Sant' Antnin Noise Monitoring Committee outlined three specific tasks:

- Carrying out of a noise survey in order to identify the noise impacts of the operations of the SAWTP:
- Carrying out of a noise impact assessment, informed by the noise survey, in order to identify the noise impacts of the operations of the SAWTP on the closest noise sensitive receptors; and
- Preparation of a programme for the monitoring of noise impacts of the operations of the SAWTP, informed by the outcome of the noise impact assessment.

## **DESCRIPTION OF SANT' ANTNNIN WASTE TREATMENT PLANT**

### **Operations**

5. The first stage of the Noise Study involved an examination of the operations of the SAWTP and the identification of the noise generating activities and predominant noise sources. The treatment plant comprises the following installations / activities:

- Materials Recovery Facility (MRF), where the sorting of recyclables takes place;
- Mechanical Treatment Plant (MTP), where the organic fraction in the waste consignment is separated and extracted;
- Anaerobic Digestion Plant (AD), which is fed by the organic-rich substrate directly from the MTP, and which produces a methane-rich biogas ( $\text{CH}_4/\text{CO}_2$  mixture);
- Combined Heat and Power (CHP) engines (two in number), into which the biogas is fed; and

- Composting plant for the production and storage of compost (the final stage in the process after the organic substrate has been dried following anaerobic digestion).
6. The SAWTP operates six days a week – on Monday to Friday, between the hours of 06:30 and 22:30, and on Saturday, between the hours of 07:00 and 19:00<sup>1</sup>. Night time cleaning operations take place after operation during the week, between 22:30 to 02:30. Different activities within the plant operate at varying times, as follows:
- 06:30 to 22:30 – activity in relation to the Materials Recovery Facility; during the week, this activity is operated in two consecutive shifts running from 06:30 to 14:00 and from 14:00 to 22:30; on Saturday, the MRF activity operates between 07:00 and 19:00;
  - 07:00 to 22:30 – activity in relation to the Mechanical Treatment Plant; again, during the week, this activity is operated in two consecutive shifts, from 07:00 to 15:30 and from 15:30 to 22:30; on Saturday, the MTP activity operates between 07:00 and 19:00; and
  - 07:00 to 17:00 - administration and general maintenance.

### **Predominant Noise Sources**

7. A number of noise-generating activities were observed at the SAWTP. These activities, and the predominant noise sources in relation to the activities, are:
- Operation of the MRF, where the predominant noise sources are conveyor belts, extractor fans and ventilation / AC units, a medium-sized front loader, and fork lifters. The MRF takes the form of a large, high shed with large, high-level doors (usually open during operation);
  - Operation of the MTP, where the predominant noise sources are conveyor belts, and extractor fans and ventilation / AC units. The MTP also takes the form of a large, high shed with large, high-level doors (usually open during operation);
  - Operation of the AD, where the predominant sources are circulation pumps and motors, and ventilators; and
  - Operation of the CHP engines, where the predominant noise sources are the internal combustion engines and extractor fans and ventilation / AC units; and
  - Movement of vehicles into / out of and around the site (including refuse trucks) and the tipping, baling and relocation of waste within the site.

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<sup>1</sup> The recently renewed Environmental Permit (EP 0021/09/D – issued 10<sup>th</sup> October 2014) has revised the permitted operating arrangements, whereby the MTP and AD operations can continue Monday to Sunday, 24 hours, and the night time maintenance and cleaning operations can take place Monday to Sunday all through the night, from 22:30 to 06:30.

## **DESCRIPTION OF THE AREA IN THE VICINITY OF SANT' ANTININ WASTE TREATMENT PLANT**

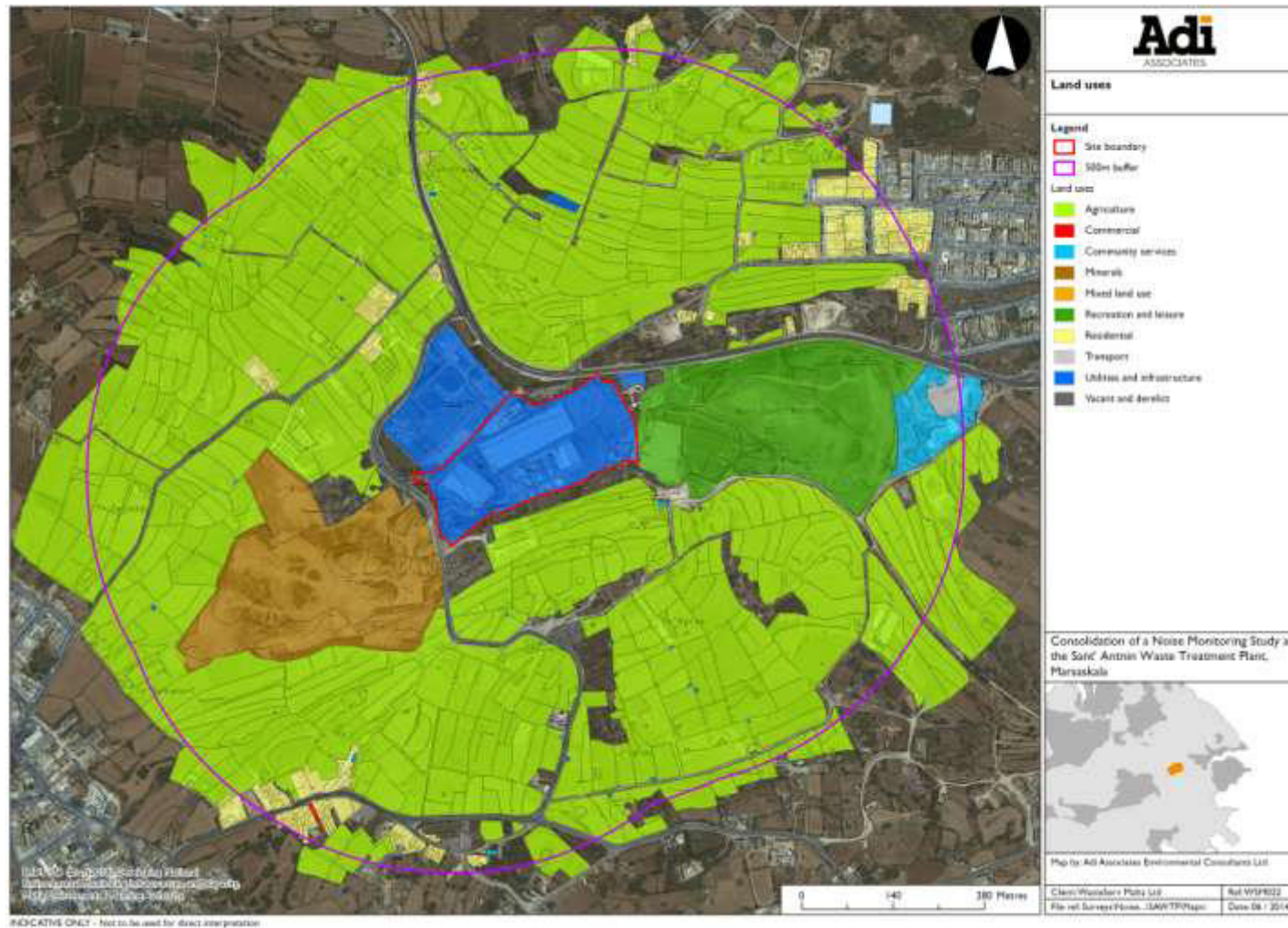
### **Surrounding Land Uses**

8. The SAWTP is located on the edge of the settlement of Marsascala, in the southeast of Malta (see **Figure 1** above). A detailed land use survey of the area surrounding the treatment plant was conducted on 30<sup>th</sup> June 2014. A land use map of the area is illustrated in **Figure 2**.
9. The Marsascala Development Boundary is located approximately 377 m northeast of the SAWTP at its closest point. The Bellavista residential area marks the edge of the settlement at this location; this is an area of relatively dense terraced housing, which overlooks the treatment plant from the east and the north. There are a number of individual residential properties located between the SAWTP and Bellavista, on Triq iż-Żafran; the closest residential property to the SAWTP is located along this road, approximately 137 m from the boundary of the SAWTP.
10. The Dar Frate Jacoba residential respite centre is located to the west of the SAWTP, approximately 209 m from the boundary of the treatment plant. The Sant' Antnin Family Park immediately adjoins the SAWTP along its eastern perimeter; the Parks' Visitor's Centre is located approximately 32m from the site boundary.
11. There is a Water Services Corporation Wastewater Treatment Plant immediately adjoining the SAWTP on its western perimeter, and an Electricity Distribution Centre located approximately 10m away on the northeast corner of the site. A large quarry, together with a batching plant, occupies a large area immediately to the southeast of the SAWTP.
12. Elsewhere, to the north, west and south, the SAWTP is surrounded by agricultural land.

### **Potential Noise Sources in the Vicinity of the Sant' Antnin Waste Treatment Plant**

13. A number of other noise-generating activities are operating in the area surrounding the SAWTP. These activities, having the potential to contribute to the noise climate at the sensitive receptors, include:
  - Waste Water Treatment Plant, adjoining the SAWTP on its western perimeter;
  - Quarry operations, arising from quarries located to the southeast of the SAWTP;
  - Electricity Distribution Centre, located on the northeast corner of the SAWTP;
  - Vehicular traffic, from the surrounding road network, particularly along Triq Sant' Antnin, a Distributor Road (and the main route to / from Marsascala), which runs along the northern perimeter of the SAWTP;

**Figure 2: Surrounding Land Uses**





- Activity connected with the Sant' Antnin Family Park (including chatter, children playing, and from plant equipment on the roof of the visitors centre);
- Activity connected with nearby private residences (including chatter, children playing and dogs barking); and
- Activity connected with nearby farms (including animal noises).

## **NOISE SURVEY**

### **Standards and Guidance**

14. There is to date no specific guidance in Malta on noise in the context of land use planning<sup>2</sup>. In situations where standards are not available, MEPA generally makes reference to equivalent guidance from the UK and ISO standards. In respect of this study therefore, it was considered appropriate to refer to the British Standard BS 4142: 2007<sup>3</sup> and to the UK Government's Planning Policy Guidance Notes which clarify the applicability of these Standards to land use planning issues (PPG 24: Planning and Noise<sup>4</sup>). Reference was also made to ISO 1996<sup>5</sup>, in accordance with Annex II of the Environmental Noise Directive (2002/49/EC).

### **Noise Sensitive Receptors and Monitoring Locations**

15. Through the land use evaluation, and subsequent discussions with WasteServ Malta Ltd, four Noise Sensitive Receptors (NSRs) were identified for the survey; these were identified as being the closest sensitive receptors to the SAWTP. They included a group of private residential properties on the edge of the Marsascala Development Boundary (Bellavista housing area); two private residential properties located along Triq iż-Żafran; Dar Frate Jacoba residential respite centre; and the Visitor's Centre of the Sant' Antnin Family Park. Four Monitoring Points (MPs) were identified to measure the noise climate at these four sensitive receptors. The NSRs and the corresponding MPs were agreed by MEPA and the Sant' Antnin Noise Monitoring Committee.
16. In discussions with WasteServ Malta Ltd, two additional MPs had been identified, on the eastern and western perimeter of the SAWTP, respectively. During the noise survey however, the close proximity of the monitoring point that had been identified on the eastern perimeter of the site to that identified at the Sant' Antnin Family Park

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<sup>2</sup> Malta transposed the Environmental Noise Directive (Directive 2002/49/EC) into national legislation through Legal Notice 426 of 2007. The Regulations designate MEPA as the competent authority for the generation of strategic noise maps, the publication of information on environmental noise, and the drawing up of action plans.

<sup>3</sup> BS 4142:1997, *Method for rating industrial noise affecting mixed residential and industrial areas*, British Standards Institution

<sup>4</sup> Department of Communities and Local Government (UK), Planning Policy Guidance PPG 24, *Planning and Noise*, September 1994.

<sup>5</sup> ISO 1996, *Acoustics - Description, measurement and assessment of environmental noise*, International Organisation for Standardization.

Visitor's Centre, and the need to adhere to the relevant standard BS 4142: 1997 in relation to minimizing the influence of reflection, resulted in the decision to record at only one monitoring position in this area. Furthermore, and again in order to minimize the influence of reflection, the monitoring location that had been identified on the western perimeter of the site was relocated during the survey (to a point further south along the boundary).

17. **Figure 3** illustrates the five MPs relevant to the survey, as well as the four NSRs. Details of the precise location of the MPs are provided in **Table 1**.

**Table 1: Location of Noise Monitoring Points**

MP	Location	Eastings	Northings	Distance from SAWTP boundary (m)
A	Private residences, Bellavista	459528.085	3968885.993	112
B	Private residences, Triq iż-Żafran	459687.385	3968959.901	290
C	Dar Frate Jacoba residential centre	459113.514	3968826.804	163
D	Family Park Visitor's Centre	459512.477	3968715.022	18
E	SAWTP – southeastern boundary	459204.059	3968535.153	4

### Sound Level Survey Protocols

18. The sound level surveys were undertaken in accordance with BS 4142:1997; paragraphs 5.1 to 5.5 of the Standard give guidelines on measurement practice.
19. In accordance with the Standard, the measurements taken at all monitoring points were taken at a distance of at least 3.5m from the façade of the nearest buildings / face of the nearest wall, in order to minimize the influence of reflection. In all cases, the sound level meter was mounted on the tripod at a height of 1.2m – 1.5m above ground level. Details of the measurement position (distance from reflecting surface and height above ground level) were recorded for each measurement.
20. An effective windshield was used to minimize the effects of turbulence at the microphone. The weather conditions prevailing during all measurements were also recorded. All measurements were undertaken when wind speeds were less than 5m / s (Force 3), in accordance with BS 4142.

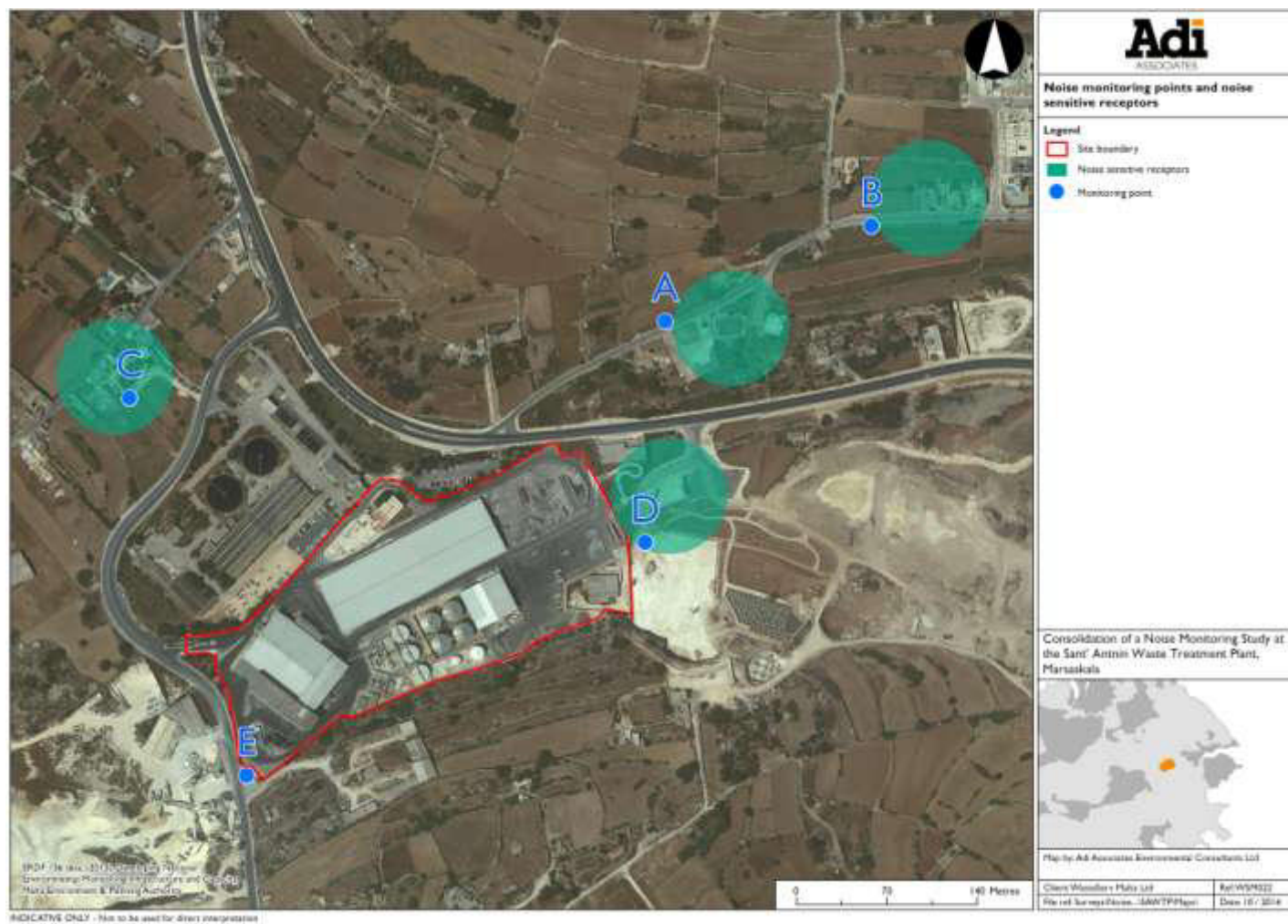
### Sound Level Equipment

21. A Class I Norsonic 140 Noise Nuisance Recorder, calibrated according to BS 4142, was used to take the measurements. Calibration certificates are provided in **Appendix I**.

### Sound Level Indices

22. The surveys measured and recorded the following sound level indices:
- $L_{Aeq(T)}$  (the equivalent continuous noise level, or energy average, recorded over the time period of interest);

**Figure 3: Location of Noise Monitoring Points and Noise Sensitive Receptors**





- $L_{AFmax}$  (the maximum noise level recorded over the time period of interest);
  - $L_{AF10}$  (the noise level exceeded for 10% of the time period of interest); and
  - $L_{AF90}$  (the noise level exceeded for 90% of the time period of interest).
23. During the surveys, observations were recorded by the noise assessors and attempts were made to identify the source of any significant impulsive or tonal noise. In addition, efforts were made to identify and describe acoustic events and phenomena attributable to sources other than the Scheme.

### Sound Level Measurements

24. A total of eight sound level surveys (four day time and four night time) were undertaken in order to establish the noise climate at the NSRs (MPs A – D). An additional two sound level surveys (one day time and one night time) were undertaken on the southwestern perimeter of the SAWTP (MP E).
25. In accordance with BS 4142, the day time surveys were conducted over a one hour sampling time and the night time surveys were conducted over a five minute sampling time. The day time surveys were undertaken in the period between 07:30 and 18:30. The night time surveys were undertaken between 02:00 and 04:00; this time period was specified by WasteServ Ltd having regard to the noise complaints received from residents in the area, and with regard to the Terms of Reference. Specifically, the sound level surveys were conducted as described in **Table 2**.
26. The measured sound levels recorded at the NSRs (MPs A – D) are shown in **Table 3**. The measured sound levels recorded at the perimeter of the SAWTP (MP E) are shown in **Table 4**.

**Table 2: Sound Level Surveys**

MP	Date	Time
<b>Day time surveys</b>		
A	Monday 22 <sup>nd</sup> September 2014	07:33 - 08:33
B	Monday 22 <sup>nd</sup> September 2014	08:57 - 09:57
D	Monday 22 <sup>nd</sup> September 2014	10:12 - 11:12
C	Tuesday 23 <sup>rd</sup> September 2014	08:50 - 09:50
E	Tuesday 23 <sup>rd</sup> September 2014	07:31 - 08:31
<b>Night time surveys</b>		
A	Tuesday 23 <sup>rd</sup> September 2014	02:37 - 02:42
B	Tuesday 23 <sup>rd</sup> September 2014	02:56 - 03:01
C	Tuesday 23 <sup>rd</sup> September 2014	02:19 - 02:24
D	Tuesday 23 <sup>rd</sup> September 2014	03:12 - 03:17
E	Tuesday 23 <sup>rd</sup> September 2014	02:01 - 02:06

**Table 3: Recorded Sound Levels at the Noise Sensitive Receptors**

MP	$L_{Aeq}$	$L_{Amax}$	$L_{A10}$	$L_{A90}$	SAWTP noise sources	Other Predominant Noise Sources	Climatic Conditions
<b>Day time sound levels</b>							
<b>A</b>	58	82	56	46	<ul style="list-style-type: none"> <li>• Front loading dropping material into open container (intermittent and not significant)</li> <li>• Vehicle reversing alarms (intermittent and not significant)</li> <li>• HGV movements within the site (intermittent and not significant)</li> </ul>	<ul style="list-style-type: none"> <li>• Road traffic (fairly regular and significant)</li> </ul>	Wind Direction: SW Wind Speed: 6 km/h Air Temperature: 26 °C Relative Humidity: 65% Precipitation: 0 mm
<b>B</b>	52	71	51	42	<ul style="list-style-type: none"> <li>• Vehicle reversing alarms (intermittent and not significant)</li> </ul>	<ul style="list-style-type: none"> <li>• Road traffic (occasional and significant)</li> <li>• Aircraft traffic (infrequent but significant at that time)</li> <li>• Chatter from nearby residential properties (intermittent and relatively significant)</li> <li>• Dogs barking (intermittent and relatively significant)</li> <li>• Construction noise (crane) in the distance (frequent but not significant)</li> <li>• Birds chirping (constant but not significant)</li> </ul>	Wind Direction: NW Wind Speed: 9 km/h Air Temperature: 31 °C Relative Humidity: 51% Precipitation: 0 mm
<b>C</b>	50	73	51	43	<ul style="list-style-type: none"> <li>• Vehicle reversing alarms (intermittent and not significant)</li> <li>• Bangs from unidentified source (infrequent and not significant)</li> </ul>	<ul style="list-style-type: none"> <li>• Road traffic (regular and significant)</li> <li>• Birds chirping (constant but not significant)</li> <li>• Farm animals (occasional but not significant)</li> </ul>	Wind Direction: NE Wind Speed: 9 km/h Air Temperature: 28 °C Relative Humidity: 84% Precipitation: 0 mm
<b>D</b>	49	67	52	40	<ul style="list-style-type: none"> <li>• Bangs from unidentified source (infrequent and not significant)</li> </ul>	<ul style="list-style-type: none"> <li>• AC unit, on roof of the Visitors Centre (continuous and significant)</li> <li>• HGV revving nearby (constant for 5 mins and significant at that time)</li> <li>• Birds chirping (constant but not significant)</li> <li>• Dog barking (intermittent and not significant)</li> </ul>	Wind Direction: NW-S-SW Wind Speed: 11 km/h Air Temperature: 33 °C Relative Humidity: 26% Precipitation: 0 mm

MP	$L_{Aeq}$	$L_{Amax}$	$L_{A10}$	$L_{A90}$	SAWTP noise sources	Other Predominant Noise Sources	Climatic Conditions
<b>Night time sound levels</b>							
<b>A</b>	35	44	36	33	• Chatter (continuous but not significant)	• Road traffic (intermittent but significant)	Wind Direction: W Wind Speed: 0 km/h Air Temperature: 28 °C Relative Humidity: 55% Precipitation: 0 mm
<b>B</b>	38	45	40	36	No noise audible from the SAWTP	<ul style="list-style-type: none"> <li>• Road traffic (frequent / almost constant and significant)</li> <li>• Dogs barking (intermittent but not significant)</li> <li>• Farm animals (frequent but not significant)</li> <li>• Crickets (constant but not significant)</li> </ul>	Wind Direction: W Wind Speed: 5 km/h Air Temperature: 27 °C Relative Humidity: 55% Precipitation: 0 mm
<b>C</b>	44	49	44	42	No noise audible from the SAWTP	• Whirring sound (possibly circulation pump) from Wastewater Treatment Plant (continuous and fairly significant)	Wind Direction: W Wind Speed: 0 km/h Air Temperature: 28 °C Relative Humidity: 55% Precipitation: 0 mm
<b>D</b>	31	37	32	29	No noise audible from the SAWTP	• Hum from Electricity Distribution Centre (very faint and not significant)	Wind Direction: W Wind Speed: 0 km/h Air Temperature: 27 °C Relative Humidity: 55% Precipitation: 0 mm

**Table 4: Recorded Sound Levels at the Perimeter of the SAWTP**

MP	$L_{Aeq}$	$L_{Amax}$	$L_{A10}$	$L_{A90}$	SAWTP noise sources	Other Predominant Noise Sources	Climatic Conditions
<b>Day time sound levels</b>							
E	67	89	68	49	<ul style="list-style-type: none"> <li>• Vehicle reversing alarms (intermittent and not significant)</li> <li>• HGV movements within the site (intermittent and not significant)</li> </ul>	<ul style="list-style-type: none"> <li>• Plant noises, from quarry / batching plant to the southeast (frequent and significant)</li> <li>• Road traffic (regular to constant and significant)</li> <li>• Birds chirping (constant but not significant)</li> </ul>	Wind Direction: N Wind Speed: 11 km/h Air Temperature: 27 °C Relative Humidity: 79% Precipitation: 0 mm
<b>Night time sound levels</b>							
E	40	49	41	39	<ul style="list-style-type: none"> <li>• Whirring sound from unidentifiable source – possibly the circulation pump from the Wastewater Treatment Plant but possibly emanating from the SAWTP (noise was continuous and fairly significant)</li> </ul>		Wind Direction: SW Wind Speed: 0 km/h Air Temperature: 28 °C Relative Humidity: 55% Precipitation: 0 mm

## NOISE IMPACT ASSESSMENT

### Day Time Noise Levels

27. The noise survey revealed the day time ambient noise levels at the majority of the sensitive receptors to be relatively low by local standards. At the residential properties on Triq iż-Żafran (MP B -  $L_{Aeq}$  of 52 dB(A), with  $L_{AFmax}$  of 71 dB(A) but  $L_{AF90}$  of 42 dB(A)); Dar Frate Jacoba (MP C -  $L_{Aeq}$  of 50 dB(A), with  $L_{AFmax}$  of 73 dB(A) but  $L_{AF90}$  of 43 dB(A)); and the Family Park Visitor's Centre (MP D -  $L_{Aeq}$  of 49 dB(A), with  $L_{AFmax}$  of 67 dB(A) and  $L_{AF90}$  of 40 dB(A)), the continuous sound level ( $L_{Aeq}$ ) recorded over the sampling period was below the World Health Organisation (WHO) day time outdoor guideline value of 55 dB(A)<sup>6</sup>.
28. The SAWTP was in operation during all of the day time surveys; however, the SAWTP was not audible at MPs C and D (Dar Frate Jacoba and the Family Park - see **Table 3** above). The assessors observed that the predominant noises audible during the survey at these locations arose from other noise-generating activities in the area, primarily road traffic (in the case of MP C) and an AC unit located on the roof of the Visitor's Centre (in the case of MP D).
29. Vehicle reversing alarms emanating from the SAWTP were audible at MP B (Bellavista residential area); however, the assessors did not consider these noises to be significantly contributing to the overall noise level recorded at this location.
30. Noise from the SAWTP was also audible at MP A (residential properties on Triq iż-Żafran), specifically vehicle reversing alarms, HGV movements within the site, and the dropping of material into an open container. Again however, the assessors did not consider these noises to be significantly contributing to the overall noise level recorded at this location.
31. The day time survey at MP A revealed the continuous sound level ( $L_{Aeq}$ ) over the sampling period to be 58 dB(A), therefore exceeding the WHO day time outdoor guideline value. The assessors attributed the high  $L_{Aeq}$  level to traffic noise, and particularly from vehicles revving on leaving a sleeping policeman located close to the monitoring location. The recorded indices support this observation, with the high  $L_{AFmax}$  recorded (82 dB(A) and the relatively low noise level recorded over 90% of the sampling time ( $L_{AF90}$  of 46 dB(A)).
32. Despite being located only 4m from the SAWTP boundary, the predominant noise sources during the day time survey at MP E were observed to be road traffic and noise from the nearby quarry / batching plant ( $L_{Aeq}$  of 67 dB(A), with  $L_{AFmax}$  of 89 dB(A) but  $L_{AF90}$  of 49 dB(A)).

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<sup>6</sup> Berglund B, Lindvall T, and Schwela D, (Eds) *Guidelines for Community Noise*, World Health Organisation, London March 1999, Published 2<sup>nd</sup> March 2000

### Night Time Noise Levels

33. Again, the noise survey revealed the night time ambient noise levels at the majority of the NSRs to be relatively low. At the residences on Triq iż-Żafran (MP A -  $L_{Aeq}$  of 35 dB(A), with  $L_{AFmax}$  of 44 dB(A) and  $L_{AF90}$  of 33 dB(A)); Bellavista (MP B -  $L_{Aeq}$  of 38 dB(A), with  $L_{AFmax}$  of 45 dB(A) and  $L_{AF90}$  of 36 dB(A)); and the Family Park Visitor's Centre (MP D ( $L_{Aeq}$  of 31 dB(A), with  $L_{AFmax}$  of 37 dB(A) and  $L_{AF90}$  of 29 dB(A)), the continuous sound level ( $L_{Aeq}$ ) recorded over the sampling period was well below the WHO night time outdoor guideline value of 45 dB(A)<sup>7</sup>.
34. The SAWTP was not operating during the night time surveys, and the observations of the assessors at MPs B and D (see **Table 3** above) were that the predominant noises audible during the survey at these locations arose from other noise-generating actives in the area, primarily road traffic (in the case of MP B) and the Electricity Distribution Centre (in the case of MP D). Faint chatter from the SAWTP was audible to the assessors at MP A (from employees going off shift); however, this was considered by the assessors not to be a significant contributor to the overall noise level recorded during the survey.
35. The night time survey at Dar Frate Jacoba (MP C) revealed the equivalent continuous sound level ( $L_{Aeq}$ ) over the sampling period to be 44 dB(A), just within the WHO night time outdoor guideline value. However, the assessors observed there to be no audible noise arising from the SAWTP at this location. The predominant noise observed by the assessors was a continuous whirring sound (possibly from a circulation pump), but which was clearly emanating from the Wastewater Treatment Plant located immediately opposite the monitoring point, and between the SAWTP and Dar Frate Jacoba.
36. The predominant noise source during the night time survey at MP E (SAWTP boundary) was a whirring sound which was continuous throughout the survey. The assessors could not discern if the noise was emanating from the SAWTP or the adjoining Wastewater Treatment Plant (circulation pump heard at MP C – see **Table 4** above). However, the noise level recorded at the monitoring location ( $L_{Aeq}$  of 40 dB(A), with  $L_{AFmax}$  of 49 dB(A) and  $L_{AF90}$  of 39 dB(A)) was low, as to be expected given that the SAWTP does not operate at night.

### Conclusions of the Noise Assessment

37. The results of the noise survey point to there being no discernible impact from the SAWTP on the ambient noise levels at all of the identified NSRs during the day time, when the treatment plant is in operation. In the case of the residential properties on

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<sup>7</sup> Night time noise guidelines issued by the WHO (World Health Organisation (2009) *Night Noise Guidelines for Europe*. WHO Regional Office for Europe) identify a night time guideline value of 40 dB(A) outside, although this has not been universally adopted. The Interim Guidelines, published in 2000, and which advocate a night time outdoor guideline value of 45dB(A) are more generally accepted, and this guideline value is considered to be more appropriate in the local context

Triq iż-Żafran, Dar Frate Jacoba and the Family Park Visitor's Centre, the day time noise levels recorded during the survey were below the WHO day time outdoor guideline value. The night time noise levels recorded at all of the NSRs were below the WHO night time outdoor guideline value. The SAWTP does not operate at night, and the assessors did not observe other noises to be significantly loud during the night time surveys.

38. Overall, from the results of the noise survey, it would appear that noise from the SAWTP is not excessive, and that it most likely is not the source of the problematic noise which has given rise to complaints in the past.
39. The relatively low noise levels recorded both during the day and at night suggest that a full BS 4142 assessment to rate noise from the SAWTP against the  $L_{A90}$  background levels at the sensitive receptors is unnecessary. However, importantly, where noise complaints persist (and possibly outside of the scope of this study since it would appear that noise from the SAWTP is not problematic), these should be further investigated in order precisely establish the source of the problematic noise and the scale of the impact on the sensitive receptors.

## **NOISE MONITORING PROGRAMME**

40. The results of the noise survey suggest that there isn't a need for frequent monitoring of the noise emanating from the SAWTP, either during the day time or at night. Notwithstanding this, a monitoring programme which records day time and night time noise levels at the identified sensitive receptors periodically would allow for the noise output from the SAWTP to be tracked, for any changes in the noise output to be assessed, and, ultimately, for timely remedial action to be taken to control noise output should this be deemed necessary.
41. Where the results of the noise survey undertaken would suggest that a programme of annual noise surveys is sufficient, this assumes that the nature of activities at the treatment plant does not significantly change. As mentioned earlier however, the recently renewed Environmental Permit for the treatment plant (EP 0021/09/D) has revised the permitted operating arrangements, whereby the MTP and AD can operate continually (Monday to Sunday, 24 hours), and the night time maintenance and cleaning operations can take place all through the night (Monday to Sunday), from 22:30 to 06:30. This change has particular implications for night time noise. It is therefore recommended, that noise monitoring is undertaken following the implementation of this change in operating times, particularly at night, in order to determine the change in the noise climate at the sensitive receptors as a result.

## **CONCLUSION**

42. The noise survey was undertaken with the objective of determining the noise climate at the closest sensitive receptors to the SAWTP during the day time, when the treatment plant is in operation, and at night, when the plant is not in operation. The purpose of the survey was to inform a programme for the monitoring of noise from the SAWTP.

43. As mentioned, the results of the noise survey point to there being no discernible impact from the SAWTP on the ambient noise levels at all of the identified NSRs both during the day time and at night. The assessors observed there to be no audible noise from the SAWTP during the day at Dar Frate Jacoba and the Sant Antnin Family Park. At the Bellavista residential area and the residences on Triq iż-Żafran, noise from the SAWTP was audible, however, these noises were not predominant, and they did not contribute significantly to the overall noise levels recorded.
44. The assessors observed there to be no audible noise from the SAWTP during the night at Bellavista, Dar Frate Jacoba and the Family Park. At the residences on Triq iż-Żafran, noise from the SAWTP was audible. Again however, this noise was not predominant, and it did not contribute significantly to the overall noise level recorded.
45. The results of the noise survey suggest that a programme of annual noise monitoring would be sufficient to monitor the noise levels at the identified sensitive receptors, assuming that the nature of activities at the treatment plant does not significantly change. Where the operating arrangements of the treatment plant are likely to change however, in relation to EP 0021/09/D, this will have the potential to influence the noise time noise levels at the sensitive receptors. It is therefore recommended that night time noise monitoring in particular is undertaken following the implementation of this change in operating times.



**Appendix I**  
**Calibration Certificates**

**Campbell Associates Ltd**  
5b Chelmsford Road Industrial Estate  
GREAT DUNMOW, Essex, GB-CM6 1HD  
[www.campbell-associates.co.uk](http://www.campbell-associates.co.uk)  
Phone 01371 871030 Facsimile 01371879106



**CALIBRATION**



**UKAS Laboratory 0789**

## Certificate of Calibration

**Certificate number: U16097**

**Test object:** Sound Level Meter, Type 1 (Precision)  
**Manufacturer:** Norsonic  
**Type:** 140  
**Serial no:** 1405007

**Customer:** En-Sure Ltd  
**Address:** Kappara Business Centre,  
113, Triq Birkirkara, San Gwann,  
SGN 4197. Malta.  
**Contact Person:** Adrian Mallia - Managing Director

**Method :**

Calibration has been performed as set out in CA Technical Procedures TP01 & 02 as appropriate. The following items have been calibrated as set out in BS 7580 Part 1:1997

	Producer:	Type:	Serial No:	Certificate number
Microphone	Norsonic	1225	149544	16095
Calibrator*	Norsonic	1251	33407	U16096
Preamplifier	Norsonic	1209	14564	Included

Additional items that also have been submitted for verification


Wind shield	Norsonic	Nor1451
Attenuator	None	
Extension cable	None	

These items have been taken into account wherever appropriate.

Environmental conditions:	Pressure:	Temperature:	Relative humidity:
Reference conditions:	101.325 kPa	23.0 °C	50 %RH
Measurement conditions:	100.637 kPa	21.7 °C	47.1 %RH

**Date received :** 14/04/2014  
**Date of calibration:** 24/04/2014  
**Date of issue:** 25/04/2014

**Engineer**

  
Palanivel Marappan B Eng (Hons), M.Sc

**Supervisor**

  
Darren Batten Tech IOA

This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service. It provides traceability of measurement to recognized national standards, and to the units of measurement realized at the National Physical Laboratory or other recognized national standards laboratories. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

\* The calibrator was complete with any required coupler for the microphone specified

# Calibration Certificate

## UKAS Laboratory Number 0789

Certificate Number:- U16097

### Method

From markings on the sound level meter or by reference to the manufacturer's published literature it has been determined that the instrument submitted for verification was originally manufactured to BS EN 60651 and or BS EN 60804. The reference range, reference sound pressure level, primary indicator range, secondary indicator range, pulse range, linearity range and display range as specified by the manufacturer were used for the verification. The sound level meter was set to A weighting and adjusted to read correctly in response to the associated sound calibrator the reading was derived from the calibrator calibration certificate and manufacturer's instruction manuals. A measurement of the self noise of the sound level meter was then made using a dummy microphone having a capacitance of  $\pm 20\%$  of the associated microphones self capacitance. The sound level meter was then tested, and its overall sensitivity adjusted, in accordance with Section 5 of BS 7580:Part 1:1997. The acoustic calibration at 1 kHz specified in sub-clause 5.6.1 of the standard was performed by application of a reference sound calibrator, whilst the tests at 125 Hz and 8k Hz (sub-clause 5.6.2) were performed by the electrostatic actuator method. At the end of the test, the associated sound calibrator was reapplied to the sound level meter and the meter reading was recorded and is noted below in the statements section.

### Traceability :

The following measured values are traceable to the National Physical Laboratory, United Kingdom.  
Sound Pressure Level, Voltage, Frequency, Barometric Pressure, Temperature & Relative Humidity

### Measurement Results:

Indication at the calibration check frequency - BS7580 #5.4	Passed
Noise test - BS 7580 #5.5.2	Passed
Level Linearity Test - BS 7580, #5.5.3	Passed
Frequency weightings: A Network - BS 7580 #5.5.4	Passed
Frequency weightings: C Network - BS 7580 #5.5.4	Passed
Frequency weightings: Z Network - BS 7580 #5.5.4	Passed
Time weightings F and S - BS7580 #5.5.5	Passed
Peak response - BS7580 #5.5.6	Passed
RMS accuracy - BS7580 #5.5.7	Passed
Time weighting I - BS7580 #5.5.8	Passed
Integrating Test : Time averaging - BS7580 #5.5.9	Passed
Integrating Test : Pulse range - BS7580 #5.5.10	Passed
Integrating Test : Sound exposure level - BS7580 #5.5.11	Passed
Overload SPL Test - BS 7580 #5.5.12	Passed
Overload Leq Test - BS 7580 #5.5.12	Passed
Acoustic tests - BS 7580 #5.4 and 5.6	Passed
Summation of acoustic tests - BS 7580 #5.5.4	Passed

### Statements

The sound level meter in the configuration tested conforms to the requirements of BS 7580 Part 1.

The self-generated noise recorded in the test specified in § 5.5.2 was: (Below MSD) 9.0dB(A), (Below MSD) 10.8dB(C) and (Below MSD) 18.7dB(Z).

**The final response obtained using the associated calibrator was (§5.6.3): 113.8dB(A)**

**This reading should be used henceforth to set up the sound level meter for field use.**

A stricter test than that specified in paragraphs 5.5.6 of BS7580:1997 has been used by verifying that the 10 ms reference pulse is also correct. The level uncertainty of the Laboratory's 1 kHz sound calibrator used during this verification is  $\pm 0.1$  dB.

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

**The sound level meter in the configuration tested was found to comply with BS 7580:1997 part 1 for a type 1 device. The associated calibrator has been corrected for barometric pressure at the time of calibration in accordance with the relevant manufacturer's instructions**

**Campbell Associates Ltd**  
 5b Chelmsford Road Industrial Estate  
 GREAT DUNMOW, CM6 1HD, England  
[www.campbell-associates.co.uk](http://www.campbell-associates.co.uk)  
[info@campbell-associates.co.uk](mailto:info@campbell-associates.co.uk)  
 Phone 01371 871030 Facsimile 01371879106



**CALIBRATION**

**UKAS Laboratory 0789**

**Certificate number: U16096**

## Certificate of Calibration and Conformance

<b>Test object:</b>	<b>Sound Calibrator</b>
<b>Manufacturer:</b>	<b>Norsonic</b>
<b>Type:</b>	<b>1251</b>
<b>Serial no:</b>	<b>33407</b>
<b>Customer:</b>	<b>En-Sure Ltd</b>
<b>Address:</b>	<b>Kappara Business Centre, 113, Triq Birkirkara, San Gwann, SGN 4197, Malta.</b>
<b>Contact Person:</b>	<b>Adrian Mallia - Managing Director</b>

Measurement Results:	Level	Level Stability	Frequency	Frequency Stability	Distortion
1:	113.99 dB	0.06 dB	1000.29 Hz	0.00 %	<0.3 %
2:	113.99 dB	0.06 dB	1000.29 Hz	0.00 %	<0.3 %
3:	113.98 dB	0.06 dB	1000.28 Hz	0.00 %	<0.3 %
<b>Result (Average):</b>	<b>113.99 dB</b>	<b>0.06 dB</b>	<b>1000.29 Hz</b>	<b>0.00 %</b>	<b>&lt;0.3 %</b>
Expanded Uncertainty:	0.10 dB	0.02 dB	1.00 Hz	0.01 %	0.10 %
Degree of Freedom:	>100	>100	>100	>100	>100
Coverage Factor:	2.00	2.00	2.00	2.00	2.00

The stated level is relative to 20µPa. The level is traceable to National Standards.

The stated level is valid at reference conditions. The following correction factors have been applied during the measurement: Pressure: 0.0005 dB/kPa Temperature: 0.003 dB/°C Relative humidity: 0.000 dB/%RH Load volume : 0.0003 dB/mm<sup>3</sup>


The reported expanded uncertainty of measurements is based on a standard uncertainty multiplied by the coverage factor of k=2, providing a level of confidence of approximately 95%. Where the degrees of freedom are insufficient to maintain this confidence level, the coverage factor is increased to maintain this confidence level. The uncertainty has been determined in accordance with UKAS requirements.

Records: K:\C A\Calibration\Nor-1504\Nor-1018 CalCal\2014\NOR1251\_33407\_M1.nmf

Environmental conditions:	Pressure:	Temperature:	Relative humidity:
Reference conditions:	101.325 kPa	23.0 °C	50 %RH
Measurement conditions:	101.139 ± 0.044 kPa	22.0 ± 0.3 °C	49.8 ± 2.3 %RH

Date received for calibration: 14/04/2014  
 Date of calibration: 24/04/2014  
 Date of issue: 24/04/2014  
 Engineer

Supervisor

  
 Palanivel Marappan B.Eng(Hons), M.Sc

  
 Darren Batten TechIOA

This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service. It provides traceability of measurement to recognised national standards, and to the units of measurement realised at the National Physical Laboratory or other recognised national standards laboratories. This certificate may not be reproduced other than in full without the prior written approval of the issuing laboratory.



Certificate number: U16096

#### Preconditioning

The equipment was preconditioned for more than 4 hours in the specified calibration environment.

#### Measurements

The calibrator has been tested as described in the following annexes to BS EN IEC60942:2003 Sound Calibrators; B3.4 for sound pressure level, B3.5 for frequency, B3.6 for total distortion and A4.4 for short term stability of the pressure level.

#### Method

Calibration has been performed as set out in the current version of CA Technical procedure TP01

#### Instruments and program

A complete list of equipment, hardware and software that has been used in this calibration is available from the calibration laboratory on request.

#### Traceability

The measured values are traceable to the following laboratories:

Sound Pressure Level: National Physical Laboratory, United Kingdom

Voltage: National Physical Laboratory, United Kingdom

Frequency: National Physical Laboratory, United Kingdom

Ambient Pressure: National Physical Laboratory, United Kingdom

Temperature & Relative Humidity: National Physical Laboratory, United Kingdom

#### Comment

Level adjusted from 114.22dB.

#### Statement of conformance

**As public evidence was available<sup>1</sup>, from a testing organisation 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 BS EN IEC 60942:2003, the sound calibrator tested is considered to conform to all the class 1 requirements of that BS EN IEC 60942:2003.**

<sup>1</sup> This evidence is held on file at the calibration laboratory.

#### Notes:

The sound pressure level generated by the calibrator in its ½ inch configuration was measured five times and averaged by a WS2P working standard microphone for class 1 or 2 devices or a LS2P reference microphone for class 0 or LS devices as specified in the International Standard BS EN 61094-4. The results of three replications and the mean of the measurements obtained are given in the measurement results table of this certificate. The frequency and distortion were measured in a similar manner. The figures in **BOLD** are the final results; a small correction factor may need to be added to the sound pressure level quoted here if the device is used to calibrate a sound level meter that is fitted with a free field response microphone. See manufacturer's handbooks for full details of this and other corrections that may be applicable.

Measurements performed by



Sonitus House, 5b Chelmsford Road Industrial Estate, Great Dunmow, GB-CM6 1HD

Tel ( +44) 01371 871030 Fax (+44) 01371 879106

email calibration@campbell-associates.co.uk

Page 2 of 2

## 1.0 CLIENT

Ms. Daniela Grech  
Wasteserv Malta Ltd.  
Phoenix Building  
Old Railway Track  
Sta. Venera SVR 9022

## 2.0 SCOPE OF REPORT

To monitor the diurnal (07:00 to 22:00) environmental noise breakout at various locations outside the Sant' Antnin Waste Treatment Plant in Marsascala.

Another report has been prepared by the undersigned with respect to the nocturnal environmental noise monitoring at the same location.

## 3.0 DATES OF SURVEY VISITS

The site noise monitoring was carried out on the following dates:

30 November 2010,  
3 December 2010  
4 December 2010  
5 December 2010

The following persons were present for the inspection visits:

Ing. Christopher Sammut B.Eng.(Hons.), M.Sc.(Brunel), MASHRAE	in the capacity of	Building Services Consulting Engineer
Mr. John Fenech	in the capacity of	Noise monitoring technician

## 4.0 BACKGROUND INFORMATION

Wind speed	On all dates of surveys did not exceed a Gentle breeze (Beaufort force 3)
Instrument Used	Make: Tecpel Model: 331 datalogger Serial No: 100407027 (Certified by manufacturer to meet IEC651 Type 2 standards)  Latest verification test: 30-November 2010 Reference level of calibrator: 94.0 dB Meter reading before measurement with calibrator: 94.2 dB Meter reading after measurement with calibrator: 94.0 dB

This report is carried out in accordance to BS 4142:1997 *“Method for rating industrial noise affecting mixed residential and industrial areas”* for the purpose of assessing whether complaints due to noise annoyance are justified.

Extracts from BS 4142:1997:

*“Response to noise is subjective and affected by many factors (acoustic and non-acoustic). In general, the likelihood of complaint in response to a noise depends on factors including the margin by which it exceeds the background noise level, its absolute level, time of day, change in the noise environment etc., as well as local attitudes to the premises and the nature of the neighbourhood”. BS 4142:1997 “is only concerned with the rating of a noise of an industrial nature, based on the margin by which it exceeds the background noise level with an appropriate allowance for the acoustic features present in the noise. As this margin increases, so does the likelihood of complaint.”*

BS 4142:1997 acknowledges that the *“likelihood that an individual will complain depends on individual attitudes and perceptions in addition to the noise levels and acoustic features present”*, yet the standard itself *“makes no recommendations in respect of the extent to which individual attitudes and perceptions should be taken into account in any particular case.”*

## 5.0 METHODOLOGY AND COMMENTS

The exercise was carried out in accordance to BS 4142:1997, whereby the noise level was monitored for during day time (07:00 to 22:00) in the absence of any specific disturbing noise source from the plant (SAWTP) being investigated, and subsequently repeated with the noise source under investigation to measure its effect on the external environment.







## 6.0 OBSERVATIONS

The following are a summary of the measured noise levels during the 5 minute periods at each location shown in the plan layout above:

Location	Background noise level (Plant not in operation) dB	Specific Noise level (Plant in operation) dB	Difference dB	Surveyor's subjective comments
A	62.5	62.1	- 0.4	Background noise level is due to traffic noise. Specific noise level is also due to traffic noise, the noise from the SAWTP is not identifiable at these locations.
B	63.2	63.8	+ 0.6	Background noise level is due to traffic noise. Specific noise level is also due to traffic noise, the noise from the SAWTP is not identifiable at these locations.
C	51.4	54.8	+ 3.4	Background noise level is due to traffic noise. Specific noise level is also due to traffic noise, the noise from the SAWTP is not identifiable at these locations. Difference of 3.4 dB may be due to the fact that the background noise level at the time of measurement with the plant in operation at this location increased over when the plant was off
D	51.6	51.9	+ 0.2	Background noise level is due to traffic noise. Specific noise level is also due to traffic noise, the noise from the SAWTP is not identifiable at these locations.

### Notes:

1. The background noise levels is based on  $L_{A90,T}$  figures i.e. the A-Weighted noise level that has been exceeded for 90% of the time during the interval of measurement.
2. The specific noise level i.e. the noise level measured with the plant in operation is also based on  $L_{A90,T}$  figures instead of the conventionally applied  $L_{Aeq,T}$  values, the reason for this is the fact that the noise from the SAWTP was not perceptible by the surveyor as such usage of the  $L_{Aeq,T}$  values would have misrepresented the actual noise level from the plant and would have in actual fact represented  $L_{Aeq,T}$  values from the background traffic.

## 7.0 ASSESSMENT OF ANNOYANCE IN ACCORDANCE TO BS 4142:1997

The standard defines the likelihood of complaints by the excess of the rating level above the background noise level as follows:

- A difference of + 5dB is of marginal significance
- A difference of +10 dB or more indicates that complaints are likely.

In this case it is evident that the noise from the plant does not differ significantly from the background noise levels as such we comfortably confirm that with the present configuration of the Sant Antnin waste separation plant and its surroundings, complaints due to annoyance from noise generated inside the plant are not likely.

END OF REPORT  
PREPARED IN 20 DECEMBER 2010



**Ing. Christopher Sammut**  
B.Eng.(Hons.), M.Sc.(Brunel), MASHRAE  
Building Services Consulting Engineer

## 1.0 CLIENT

Ms. Daniela Grech  
Wasteserv Malta Ltd.  
Phoenix Building  
Old Railway Track  
Sta. Venera SVR 9022

## 2.0 SCOPE OF REPORT

To monitor the nocturnal (22:00 to 07:00) environmental noise breakout at various locations outside the Sant' Antnin Waste Treatment Plant in Marsascale.

Another report has been prepared by the undersigned with respect to the diurnal environmental noise monitoring at the same location.

## 3.0 DATES OF SURVEY VISITS

The site noise monitoring was carried out on the following dates:

30 November 2010,  
3 December 2010  
4 December 2010  
5 December 2010

The following persons were present for the inspection visits:

Ing. Christopher Sammut B.Eng.(Hons.), M.Sc.(Brunel), MASHRAE	in the capacity of	Building Services Consulting Engineer
Mr. John Fenech	in the capacity of	Noise monitoring technician

## 4.0 BACKGROUND INFORMATION

Wind speed	On all dates of surveys did not exceed a Gentle breeze (Beaufort force 3)
Instrument Used	Make: Tecpel Model: 331 datalogger Serial No: 100407027 (Certified by manufacturer to meet IEC651 Type 2 standards)
	Latest verification test: 30-November 2010 Reference level of calibrator: 94.0 dB Meter reading before measurement with calibrator: 94.2 dB Meter reading after measurement with calibrator: 94.0 dB

This report is carried out in accordance to BS 4142:1997 *“Method for rating industrial noise affecting mixed residential and industrial areas”* for the purpose of assessing whether complaints due to noise annoyance are justified.

Extracts from BS 4142:1997:

*“Response to noise is subjective and affected by many factors (acoustic and non-acoustic). In general, the likelihood of complaint in response to a noise depends on factors including the margin by which it exceeds the background noise level, its absolute level, time of day, change in the noise environment etc., as well as local attitudes to the premises and the nature of the neighbourhood”. BS 4142:1997 “is only concerned with the rating of a noise of an industrial nature, based on the margin by which it exceeds the background noise level with an appropriate allowance for the acoustic features present in the noise. As this margin increases, so does the likelihood of complaint.”*

BS 4142:1997 acknowledges that the *“likelihood that an individual will complain depends on individual attitudes and perceptions in addition to the noise levels and acoustic features present”*, yet the standard itself *“makes no recommendations in respect of the extent to which individual attitudes and perceptions should be taken into account in any particular case.”*

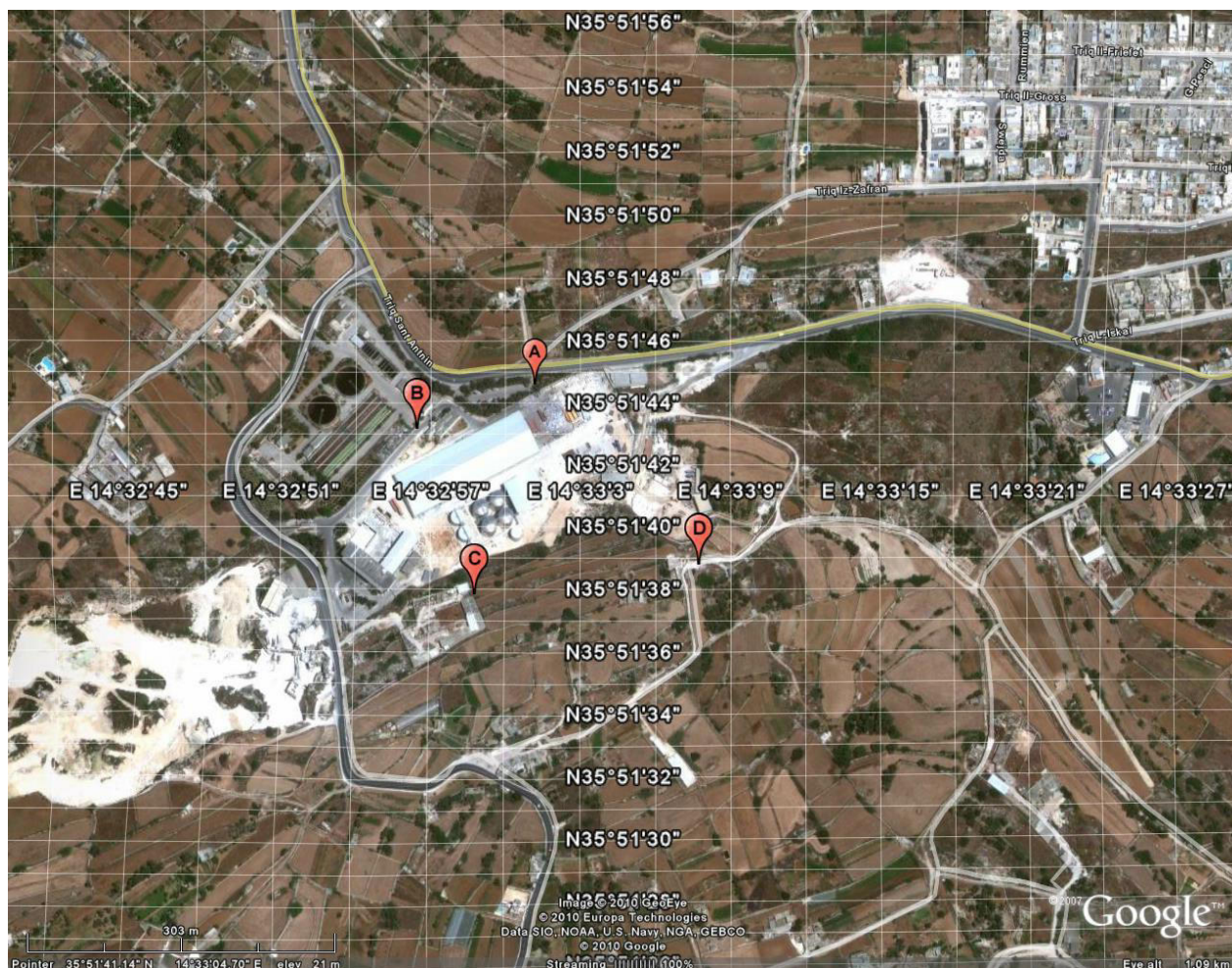
## 5.0 METHODOLOGY AND COMMENTS

The exercise was carried out in accordance to BS 4142:1997, whereby the noise level was monitored for during night time (22:00 to 07:00) in the absence of any specific disturbing noise source from the plant (SAWTP) being investigated.

Due to the fact that currently the plant does not operate during night time hours (see annexed documentation from operations), this report can be used as a baseline information of the external noise character at night time to provide future assessments should the plant commence operating during night time hours.

### Location of measurement

Both the background noise level and the specific noise levels were measured at four distinct locations as per attached plan layout labelled A, B, C and D. The locations were chosen to study the noise breakout surrounding the



The background noise level was attributable mainly to noise generated from the following sources:

### Continuous noise sources

- Traffic noise (continuous throughout) – valid for all locations (A, B, C and D),
- Noise from adjacent batching plant – valid for locations C and D

## 6.0 OBSERVATIONS

The following are a summary of the measured noise levels during the 5 minute periods at each location shown in the plan layout above:

Location	Background noise level (Plant not in operation) dB	Specific Noise level (Plant in operation) dB	Difference dB	Surveyor's subjective comments
A	45.3	Not applicable	<b>Not applicable</b>	Background noise level is due to traffic noise.
B	44.7	Not applicable	<b>Not applicable</b>	Background noise level is due to traffic noise.
C	46.1	Not applicable	<b>Not applicable</b>	Background noise level is due to traffic noise.
D	40.4	Not applicable	<b>Not applicable</b>	

Notes:

1. The background noise levels is based on  $L_{A90,T}$  figures i.e. the A-Weighted noise level that has been exceeded for 90% of the time during the interval of measurement.

Furthermore in order to better explain the noise character of these locations, we are enclosing Appendix 1, which reproduces in graphical form the sound pressure levels measured at each site, (the peaks indicating the passing traffic observed during the measuring period).

## 7.0 ASSESSMENT OF ANNOYANCE IN ACCORDANCE TO BS 4142:1997

The standard defines the likelihood of complaints by the excess of the rating level above the background noise level as follows:

- A difference of + 5dB is of marginal significance
- A difference of +10 dB or more indicates that complaints are likely.

END OF REPORT

PREPARED IN 20 DECEMBER 2010



**Ing. Christopher Sammut**

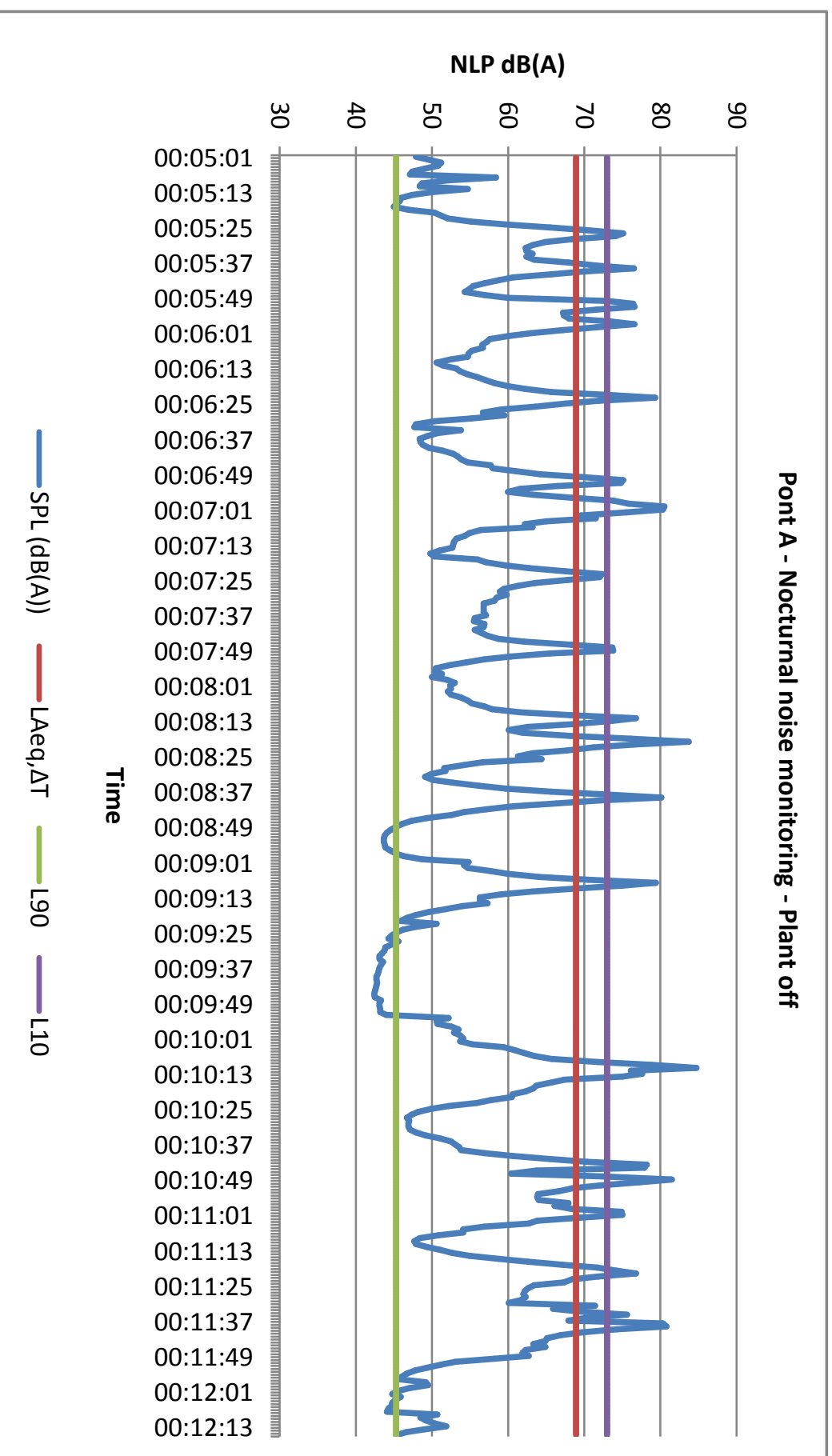
B.Eng.(Hons.), M.Sc.(Brunel), MASHRAE

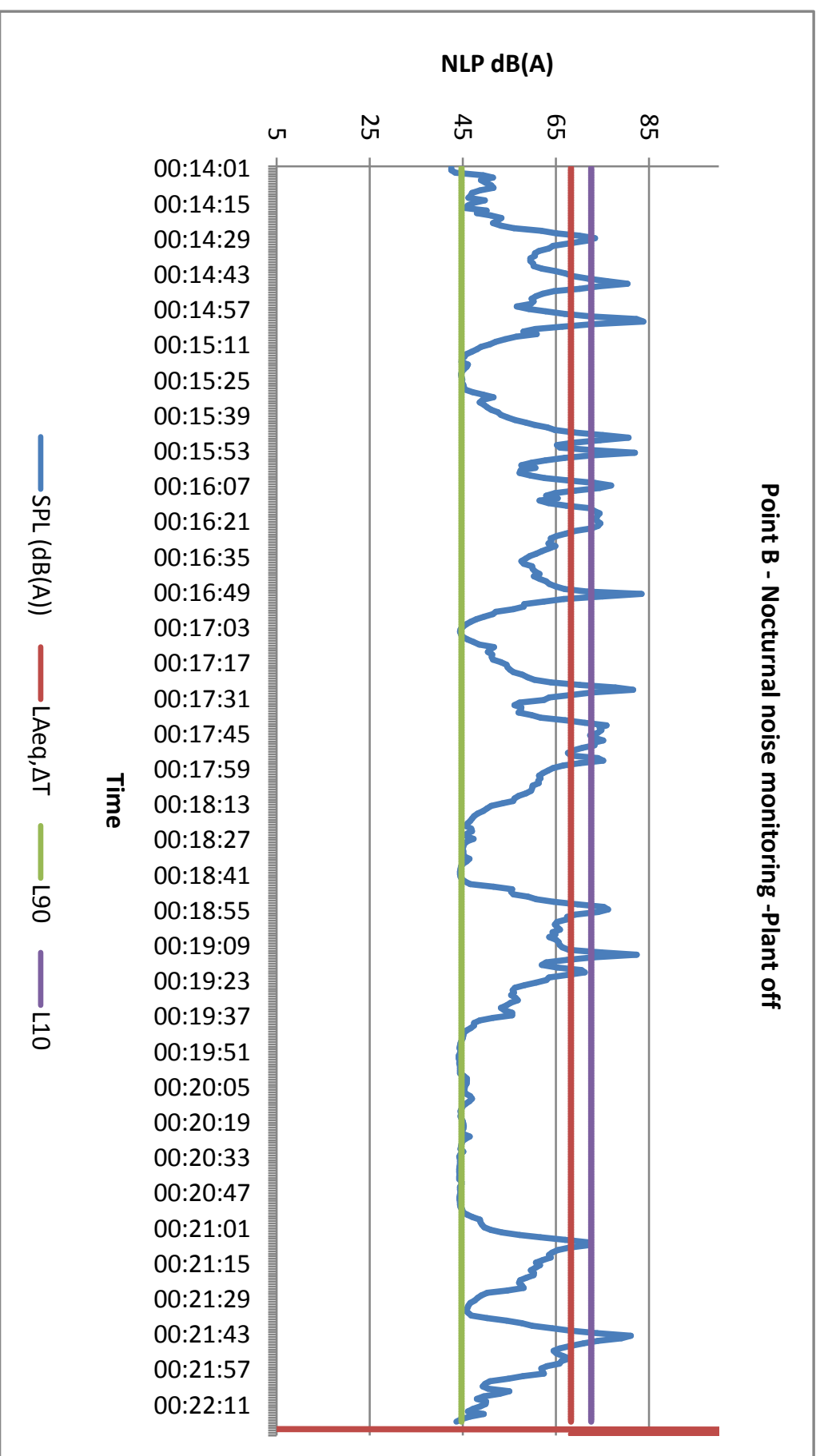
Building Services Consulting Engineer

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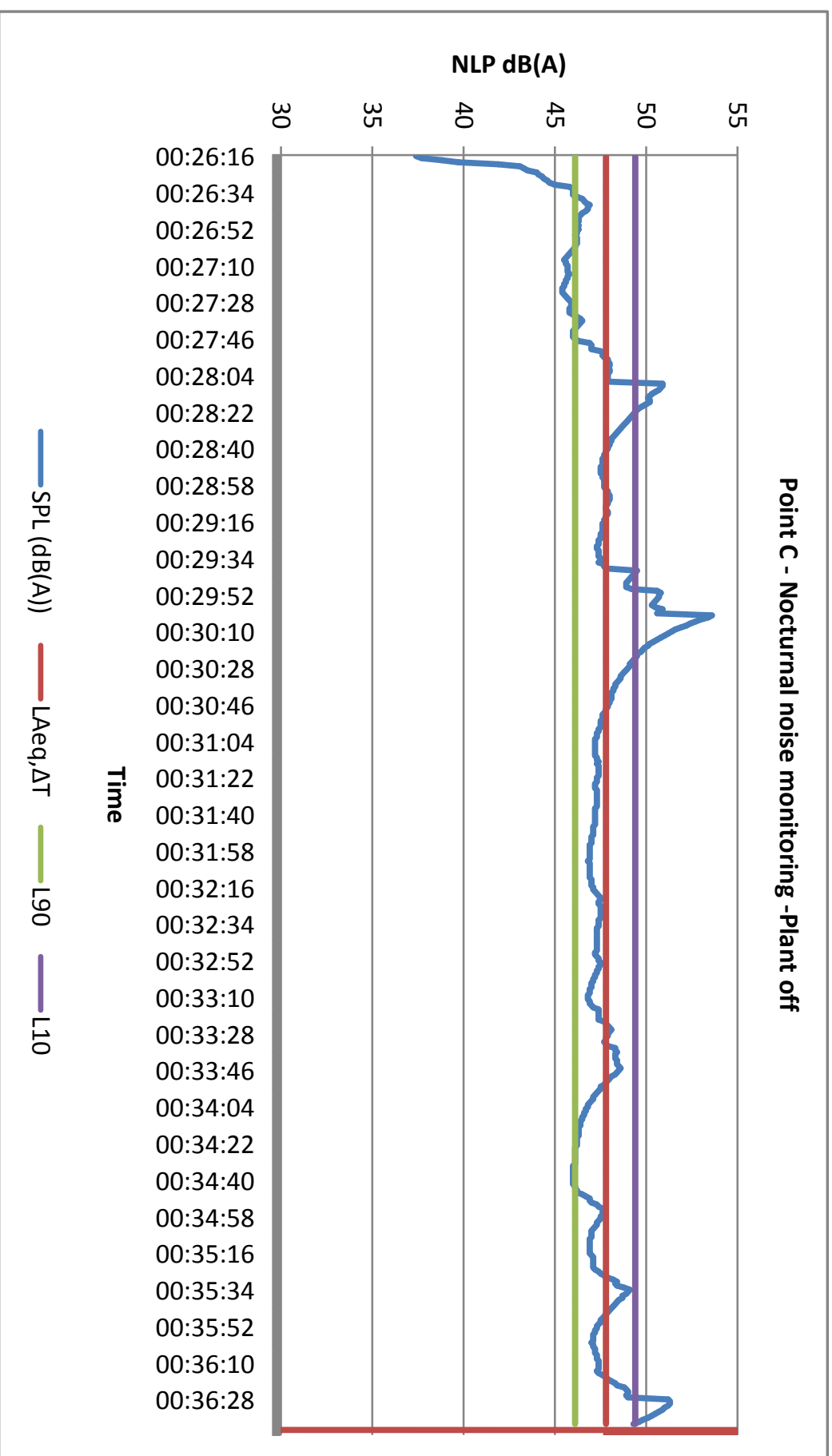
- Appendix 1 – Graphical representation of noise character of each locations
- Declaration of plant operating hours of the Sant Antnin Waste Treatment Plant, by Wasteserv Malta

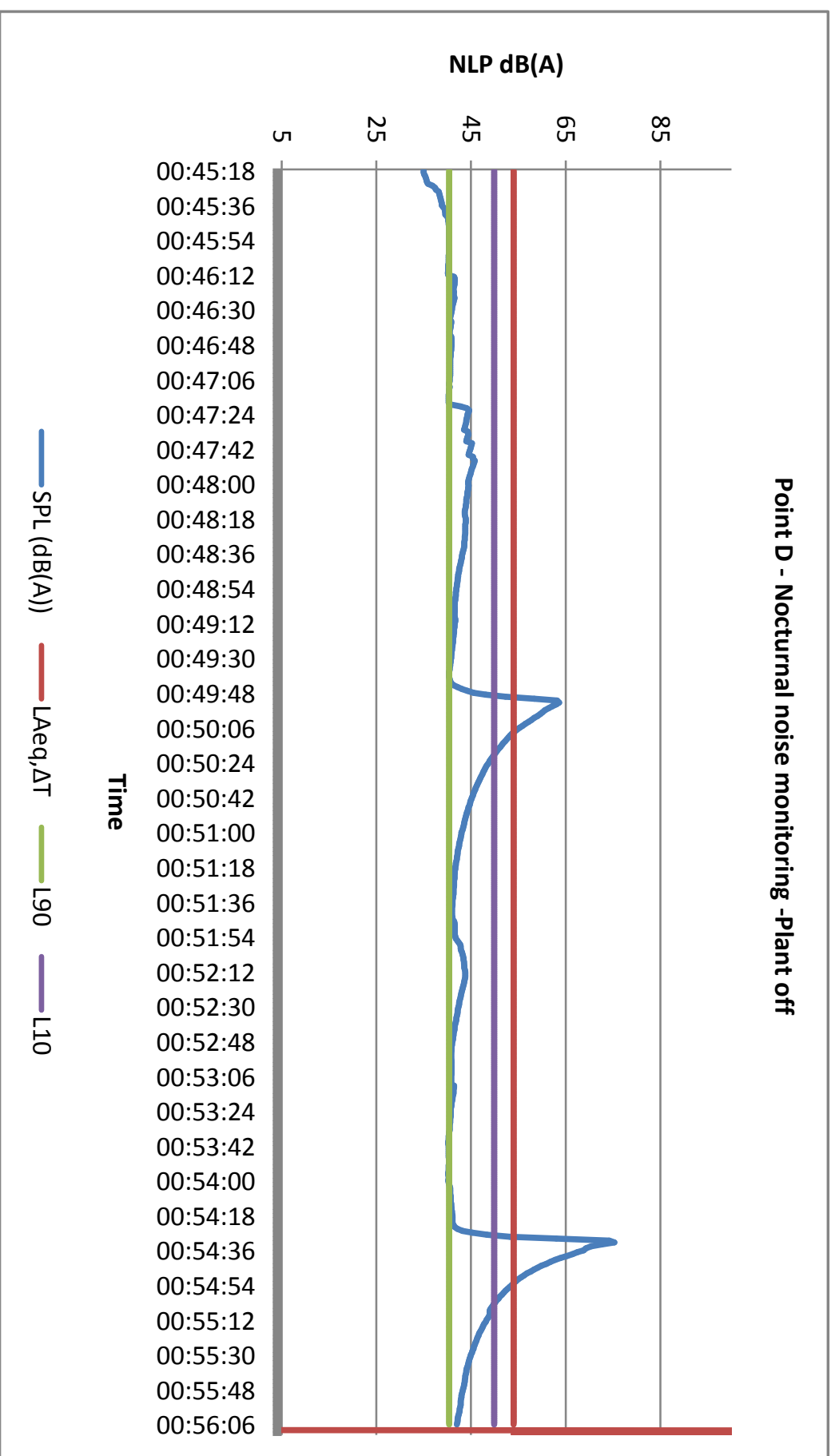












## Appendix 2 - Wasteserve Malta, declaration of operating hours.

### 4.4 Hours of operation

The following specified waste management operations authorised by this Permit shall only be carried out within the times specified in Table 5 below

Table 5 Permitted operating hours	
Specified waste management operations	Permitted hours
Mondays to Fridays	06:30 hrs - 22:00 hrs
Saturdays	07:00 hrs - 19:00hrs
Sundays and Public Holidays	08:00 hrs - 18:00hrs in case of emergency only

### 4.5 Staffing and Understanding of Requirements of Permit Conditions

#### *Minimum Staffing and Supervision*

4.5.1 Whenever the Site is open to receive or dispatch waste, or is carrying out any of the specified waste management operations, it shall be supervised by at least one member of staff who is suitably trained and fully conversant with the requirements of the Permit regarding:

- (i) Waste acceptance and control procedures;
- (ii) Operational controls and environmental monitoring;
- (iii) Maintenance;
- (iv) Record-keeping;
- (v) Emergency action plans;
- (vi) Notifications to the Authority.

#### *Availability of Permit*

4.5.2 A copy of the approved plans (Development Permit Plans) and documents related to the Site, a copy of the Development Permit and a copy of the Permit shall be kept available on the Site for reference when required by all Site staff carrying out work under the requirements of the Permit.

