



# **Forth Replacement Crossing**

**Employer's Delivery Team  
Construction Noise Monitoring Report**

**Principal Contract and M9J1a Contract  
(December 2012)**



An agency of  The Scottish Government



**FORTH REPLACEMENT CROSSING**

**EMPLOYER'S DELIVERY TEAM  
CONSTRUCTION NOISE MONITORING REPORT  
PRINCIPAL CONTRACT AND M9J1A CONTRACT  
(December 2012)**

**Revision Status**

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**FORTH REPLACEMENT CROSSING**

**EMPLOYER'S DELIVERY TEAM  
CONSTRUCTION NOISE MONITORING REPORT**

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## **1. INTRODUCTION**

1.1 This report sets out the results of the construction noise monitoring undertaken on the Forth Replacement Crossing project.

1.2 The noise monitoring periods covered in this report are as follows:

- Principal Contract: December 2012 – refer to Section 2 of this report.
- M9 Junction 1a Contract: December 2012 – refer to Section 3 of this report.

1.3 Noise monitoring from the Fife ITS Contract is reported separately.

## 2. PRINCIPAL CONTRACT NOISE MONITORING

### NOISE MONITORING LOCATIONS

2.1 Continuous noise monitoring was carried out at the fixed monitor locations in Table 2.1 below. The main construction activities carried out adjacent to the monitor locations are also listed.

Monitoring Location	Monitoring Period	Main Construction Activities
Whinny Hill (M1)	December 2012	<ul style="list-style-type: none"> <li>• Breaking rock</li> <li>• Loading of rock</li> </ul>
Tigh-Na-Grian (M3)	December 2012	<ul style="list-style-type: none"> <li>• On-going works at CT</li> <li>• NT caisson excavation</li> <li>• Installation of N1 platform</li> </ul>
Port Edgar (M6)	December 2012	<ul style="list-style-type: none"> <li>• On-going works at CT</li> <li>• ST jet grouting</li> <li>• S1 caisson excavation</li> <li>• S4 excavation</li> <li>• Earth bund at S6</li> </ul>
Butlaw Fisheries (M7)	December 2012	<ul style="list-style-type: none"> <li>• On-going works at CT</li> <li>• ST jet grouting</li> <li>• S1 caisson excavation</li> <li>• S4 excavation</li> <li>• Earth bund at S6</li> <li>• Grit blasting at S7 and S8</li> <li>• Backfilling of S7</li> <li>• Site clearance</li> </ul>
Inchgarvie Lodge (M10)	December 2012	<ul style="list-style-type: none"> <li>• On-going works at CT</li> <li>• ST jet grouting</li> <li>• S1 caisson excavation</li> <li>• S4 excavation</li> <li>• Earth bund at S6</li> <li>• Grit blasting at S7 and S8</li> <li>• Backfilling of S7</li> <li>• Break out rock from launch</li> <li>• Works at South Abutment including concrete pour</li> </ul>
Linn Mill (M11)	December 2012	<ul style="list-style-type: none"> <li>• Break out rock from launch</li> <li>• Works at South Abutment including concrete pour</li> </ul>
Clufflat Brae (M13)	December 2012	<ul style="list-style-type: none"> <li>• Break out rock from launch</li> <li>• Works at South Abutment including concrete pour</li> </ul>
Springfield (M14)	December 2012	<ul style="list-style-type: none"> <li>• Break out rock from launch</li> </ul>

Echline Field (M15)	December 2012	<ul style="list-style-type: none"> <li>Excavate rock at Queensferry gyratory</li> </ul>
Scotstoun (M16)	December 2012	<ul style="list-style-type: none"> <li>Site clearance</li> <li>Utility works</li> </ul>
Dundas Home Farm (M17)	December 2012	<ul style="list-style-type: none"> <li>Utilities works</li> </ul>
Newton (M18)	December 2012	<ul style="list-style-type: none"> <li>No works</li> </ul>

**Table 2.1 Principal Contract – Long Term Monitoring Locations**

## **NOISE MONITORING RESULTS**

- 2.2 Monitoring results from the Principal contract are contained in Appendix A of this report. The results are presented in a report containing noise charts using the template contained in the Construction Noise Monitoring Information Note which is available on the project website at [http://www.transportscotland.gov.uk/files/documents/projects/forth-replacement/FRC\\_Construction\\_Noise\\_Monitoring\\_Information\\_Note\\_2\\_.pdf](http://www.transportscotland.gov.uk/files/documents/projects/forth-replacement/FRC_Construction_Noise_Monitoring_Information_Note_2_.pdf).
- 2.3 Some exceedances of the maximum noise level thresholds occurred in December, however the majority of these are not considered to be due to construction works being carried out. Exceedances of the maximum noise level threshold at Butlaw Fisheries, Linn Mill and Tigh-Na-Grian were attributed to construction works.
- 2.4 Exceedances of the monthly average threshold were recorded at Scotstoun and Butlaw Fisheries, however the exceedances were not attributed to construction works.
- 2.5 All exceedances were investigated in accordance with the project Code of Construction Practice.
- 2.6 All exceedance reports are available on request from the FRC Team, contactable via email at [enquiries@forthreplacementcrossing.info](mailto:enquiries@forthreplacementcrossing.info). A summary of the information included in the exceedance reports is provided in Table 2.2 overleaf.

Monitoring Location	Exceedance
Butlaw Fisheries (M7)	During December the maximum noise threshold was exceeded on 30 occasions (daytime, 12; evening, 5; night time, 13). Seven daytime exceedances were found to be due to works at the S6 earth bund. However, a large number of exceedances were attributed to a range of non-construction factors, including waves on the shore, wind and birds (particularly during the early hours of the morning).
Clufflat Brae (M13)	During December the maximum noise threshold was exceeded on 18 occasions (daytime, 6; evening, 3; night time, 9). No exceedances were attributable to construction works. Exceedances were found to be due to birds and adverse weather conditions.
Inchgarvie Lodge (M10)	During December the maximum noise threshold was exceeded on 12 occasions (daytime, 9; evening, 2; night time, 1). No exceedances were found to be due to construction works. However, investigations found movements at the property to be the main contributing factors to the exceedances at this location.
Linn Mill (M11)	During December the maximum noise threshold was exceeded on 14 occasions (daytime, 6; evening, 2; night time, 6). Four exceedances (3 daytime and 1 night time) were due to construction works. However, the majority of exceedances were caused by a number of non-construction factors, notably adverse weather conditions, fireworks and birds.
Tigh-Na-Grian (M3)	During December the maximum noise threshold was exceeded on 11 occasions (daytime, 3; evening, 0; night time, 8). A single night time exceedance was found to be due to construction works at the North Tower caisson. However, other exceedances were also due to non-construction factors including birds, wind and vehicles.
Dundas Home Farm (M17)	During December the maximum noise threshold was exceeded on 4 occasions. Exceedances were not attributable to construction works. Exceedances were due to birds, local noises from nearby properties and an alarm sounding.
Echline Field (M15)	During December the maximum noise threshold was exceeded on 16 occasions. No exceedances at this location were due to construction activities. Exceedances were largely attributed to vehicles passing by on the adjacent roads.
Springfield (M14)	During December the maximum noise threshold was exceeded on 12 occasions. No exceedances at this location for which there is audio were due to construction activities. The majority of non-construction related exceedances were due to monitor maintenance. Due to an error with the device, there are some missing audio recordings for exceedances.

Monitoring Location	Exceedance
Scotstoun (M16)	During December the maximum noise threshold was exceeded on 17 occasions. Exceedances were attributed to vehicles passing by on the adjacent road.
Whinny Hill (M1)	During December the maximum noise threshold was exceeded on 4 occasions. Exceedances were not due to construction activities. A range of factors were found to cause exceedances at this location, including birds, dogs and monitor maintenance.

**Table 2.2 Principal Contract – Summary of Noise Threshold Exceedances**

### 3. M9 J1A CONTRACT NOISE MONITORING

#### NOISE MONITORING LOCATIONS

3.1 Continuous noise monitoring was carried out at the fixed monitor locations in Table 3.1 below. The main construction activities carried out adjacent to the monitor locations are also listed.

Monitoring Location	Monitoring Period	Main Construction Activities
93/95 King Edwards Way (CNV02)	December 2012	<ul style="list-style-type: none"><li>• Pavement works complete</li><li>• ITS hardstanding and footpath at G03J</li><li>• Niddry Burn mammal ledge installed</li><li>• Fencing works</li></ul>
15-17 Buie Rigg (CNV07)	December 2012	<ul style="list-style-type: none"><li>• Pavement works complete</li><li>• Newmains Bridge verge &amp; expansion joints</li><li>• Snagging works at Newmains Bridge</li><li>• Snagging works at M9 Overbridge</li><li>• Landscaping works</li></ul>
8 Kirklands Park Grove (CNV16)	December 2012	<ul style="list-style-type: none"><li>• Pavement works complete</li><li>• Snagging works at Newmains Bridge</li><li>• Snagging works at M9 Overbridge</li></ul>

**Table 3.1 M9 J1a Contract – Long Term Monitoring Locations**

#### NOISE MONITORING RESULTS

3.2 Monitoring results from the M9 Junction 1a contract are contained in Appendix B of this report. The results are presented in charts using the template contained in the Construction Noise Monitoring Information Note which is available on the project website at [http://www.transportscotland.gov.uk/files/documents/projects/forth-replacement/FRC\\_Construction\\_Noise\\_Monitoring\\_Information\\_Note\\_2\\_.pdf](http://www.transportscotland.gov.uk/files/documents/projects/forth-replacement/FRC_Construction_Noise_Monitoring_Information_Note_2_.pdf).

3.3 Some exceedances of the maximum noise level thresholds occurred in December during the evening and night time periods, however none of the exceedances are attributed to construction works as no activities were being carried out in the vicinity of the receptors at the time of the exceedances.

3.4 Summary information regarding the exceedances of the maximum noise level thresholds is provided In Table 3.2 below.

<b>Monitoring Location</b>	<b>Contractor's Exceedance Report Reference</b>	<b>Exceedance</b>
93/95 King Edwards Way (CNV02)	N/A	During December the maximum noise threshold was exceeded on 24 occasions (evening, 6; night, 18). None of the exceedances are attributed to construction works as no activities were being carried out in the vicinity of the receptors at the time of the exceedances.
15-17 Buie Rigg (CNV07)	N/A	During December the maximum noise threshold was exceeded on 18 occasions (evening, 1; night, 17). None of the exceedances are attributed to construction works as no activities were being carried out in the vicinity of the receptors at the time of the exceedances.
8 Kirklands Park Grove (CNV16)	N/A	During December the maximum noise threshold was exceeded on 11 occasions during the night time period. None of the exceedances are attributed to construction works as no activities were being carried out in the vicinity of the receptors at the time of the exceedances.

**Table 3.2 M9 J1a Contract – Summary of Noise Threshold Exceedance**

**APPENDIX A -**

**PRINCIPAL CONTRACT - CONSTRUCTION  
NOISE MONITORING REPORTS**



Contractor



**Forth Crossing** Bridge Constructors

HOCHTIEF Solutions  
 American Bridge International  
 DRAGADOS  
 Morrison Construction

Project

**FORTH REPLACEMENT CROSSING**

Document title

**CONSTRUCTION NOISE MONITORING  
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- 3. Noise Monitoring Results**

## **1 Introduction**

- 1.1** Monitoring of construction noise is being undertaken by FCBC during the construction of the new Forth Crossing and the associated road network. This report covers the month of December 2012. The objective of this report is to detail the monitoring that has been undertaken across the site during this period and to present the construction noise monitoring results acquired for December 2012.
- 1.2** Monitoring of construction noise has been undertaken in accordance with the Code of Construction Practice (CoCP) and the Noise and Vibration Management Plan (NVMP).

## **2 Noise Monitoring Locations**

- 2.1** During December 2012, construction noise was monitored using permanent, continuous noise monitoring devices at the locations listed in Table 1. The majority of the monitors were installed throughout November and December 2011, with additional monitors installed at Scotstoun Park (Arup's Office) and Newton during February and a further sound level meter installed at Whinny Hill during March.
- 2.2** At some monitoring locations, the noise monitoring devices are accompanied by associated weather stations. Weather stations are present at Echline Field, Tigh-Na-Grian, Clufflat Brae, Dundas Home Farm, Butlaw Fisheries, Linn Mill and Whinny Hill.
- 2.3** Various construction works were undertaken across the site during December 2012. The main construction activities undertaken in the locality of each of the noise meters during the period have been listed in Table 1.

**Table 1: Monitoring Locations**

Ref.	Monitoring Location	Crossing or Network	Main Construction Activities During December 2012
M1	Whinny Hill	Network	Breaking rock Loading of rock  N.B. No evening, night time or Sunday daytime construction in vicinity.
M3	Tigh-Na-Grian	Crossing	On-going works at CT NT caisson excavation Installation of N1 platform
M6	Port Edgar	Crossing	On-going works at CT ST jet grouting S1 caisson excavation S4 excavation Earth bund at S6
M7	Butlaw Fisheries	Crossing	On-going works at CT ST jet grouting S1 caisson excavation S4 excavation Earth bund at S6 Grit blasting at S7 and S8 Backfilling of S7 Site clearance
M10	Inchgarvie Lodge	Crossing	On-going works at CT ST jet grouting S1 caisson excavation S4 excavation Earth bund at S6 Grit blasting at S7 and S8 Backfilling of S7 Break out rock from launch Works at South Abutment including concrete pour
M11	Linn Mill	Network (close proximity to Crossing)	Break out rock from launch Works at South Abutment including concrete pour
M13	Clufflat Brae	Network (close proximity to Crossing)	Break out rock from launch Works at South Abutment including concrete pour
M14	Springfield	Network	Break out rock from launch  N.B. No evening, night time or Sunday daytime construction in vicinity.
M15	Echline Field	Network	Generate rock from Queensferry gyratory Works on A904

			N.B. No evening, night time or Sunday daytime construction in vicinity.
M16	Scotstoun	Network	Site clearance Utility works  N.B. No evening, night time or Sunday daytime construction in vicinity.
M17	Dundas Home Farm	Network	Utilities works  N.B. No evening, night time or Sunday daytime construction in vicinity.
M18	Newton	Network	No works

### 3 Noise Monitoring Results

**3.1** All noise monitoring results for construction days have been presented in charts using the template provided in the Construction Noise Monitoring Information Note, as available on the project website ([http://www.transportscotland.gov.uk/files/documents/projects/forth-replacement/FRC\\_Construction\\_Noise\\_Monitoring\\_Information\\_Note\\_2\\_.pdf](http://www.transportscotland.gov.uk/files/documents/projects/forth-replacement/FRC_Construction_Noise_Monitoring_Information_Note_2_.pdf)). All charts can be found in the appendices of this report.

**3.2** With regard to the noise monitoring results charts, the following should be noted:

- All locations are considered as either 'Main Crossing' or 'Network Connections', as set out in Table 1. Main Crossing works are undertaken during the day, evening and night time periods. Network connection works, however, are undertaken during the daytime only. The inclusion of data in the graphs reflects this. Although Linn Mill and Clufflat Brae are considered as network locations, the potential for marine works near the south shore to be heard has been recognised. As a result, evening and night time data has been included for these locations although no network connection construction activities have been undertaken during these periods.

- Noise data for days, evening and nights on which no construction works were conducted have been excluded from the monthly average results presented in the graph. Additionally, no investigations into the  $L_{AFmax}$  exceedances during these periods have been made as they would have been caused by non-construction related factors. However, noise results ( $L_{Aeq}$  and  $L_{AFmax}$ ) for any days, evenings and nights on which no construction works have been conducted have been presented in the graphs in greyed out areas. During December there was an extended period over which no works were undertaken due to the Christmas break; this period began from daytime of 21 December for land-based works and evening of 21 December for marine-based works.
  - An average for Sunday construction noise data has been included on the graphs where applicable; in locations where no Sunday works have been undertaken no average is shown.
  - As set out in the CoCP, the assessment time for evening, nights and Sunday daytime is 1 hour periods. To present the construction noise results for these periods, therefore, the maximum  $L_{AFmax}$  (fast time response) and maximum  $L_{Aeq}$  within the overall evening/night time period has been taken. It should be noted, therefore, that the average shown for these periods is an average of only the highest  $L_{Aeq}$  results.
  - Where noise data is missing for days, evening or nights during which construction works were conducted, this has been indicated. Some device errors were encountered in December, resulting in loss of data for short periods (1-2 days) at the following locations: Butlaw Fisheries, Clufflat Brae, Echline and Linn Mill. There is also a longer period (7 days) of missing data due to an error with the Tigh-Na-Grian device over the Christmas period.
- 3.3** Results demonstrate that the monthly average total construction noise results for daytime were within the threshold limits for all monitoring locations for December 2012, with the exception of Scotstoun. For the evening period, the monthly average total construction noise results were within the threshold for all locations throughout December 2012. For night-time, results show exceedances of the threshold at Butlaw Fisheries, with all other monitoring locations within the threshold.
- 3.4** With regard to the Sunday averages (for applicable monitoring locations), all locations were found to be within the threshold, with the exception of the night time Sunday average at Butlaw Fisheries.

- 3.5** The night time exceedances of both the monthly average and the Sunday average thresholds at Butlaw Fisheries can be attributed to increased noise levels due to waves on the shore; these night time averages are based only on the highest  $L_{Aeq}$  levels for 1 hour periods which can adversely affect the averages.
- 3.6** The exceedance of the daytime average at Scotstoun is due to increased background noise levels due to the location of the meter directly adjacent to the road. Traffic noise at this location is further increased during periods of wet weather.
- 3.7** During December 2012, some exceedances of the maximum noise thresholds also occurred. Each exceedance of the threshold was investigated using triggered audio recordings, records of construction works (i.e. site programmes and diaries, daily marine reports and dredging reports) and analysis of weather station data, where required. A Noise and Vibration Investigative Report (NVIR) spread sheet has been produced detailing the results of the investigation for each exceedance. Where the exceedances are due to construction works, a detailed NVIR has been completed which details the results of the investigation in addition to any additional mitigation measures required.
- 3.8** Investigations of the exceedances of the maximum noise level thresholds show the majority to have occurred as a result of non-construction related noise. Spells of adverse weather conditions during December were found to result in a number of exceedances, with increased exceedances at Butlaw Fisheries during such conditions due to the noise associated with waves on the shore. Additionally, birds and other animals, fireworks, local noises at nearby properties and monitor maintenance were also found to be contributing factors to maximum noise level exceedances. At some locations, notably Scotstoun and Echline, existing traffic noise had an effect on maximum noise levels during the period covered in this report.
- 3.9** Where an exceedance due to construction works was identified, the works were investigated as soon as practicably reasonable and a detailed NVIR was completed, within which any additional mitigation measures were recognised.
- 3.10** The daytime  $L_{AFmax}$  threshold was exceeded as a result of land-based construction works on a total of four occasions at Linn Mill. These were caused by plant movements in Echline field, in close proximity to the meter.
- 3.11** The daytime  $L_{AFmax}$  threshold was also exceeded on seven occasions due to works related with the viaducts. The exceedances were found to be attributable to works associated with the Pier S6 earthbund at Port Edgar Barracks.

**3.12** A single exceedance in December was found to be due to marine works. This exceedance was recorded at Tigh-Na-Grian and was found to be caused by works at the North Tower caisson. This exceedance, in addition to those associated with land-based and viaducts works have been investigated and mitigation measures have been implemented where possible; the relevant NVIRs provide more detail with regard to these exceedances.

**3.13** A summary of the findings for exceedances occurring at each of the locations can be found in Table 2. All construction related exceedances are detailed in Table 3; further information on related remedial actions is detailed in the relevant NVIR.

**Table 2: Summary of Exceedances at Monitoring Locations**

Monitoring Location	Summary of Exceedance Details
Butlaw Fisheries	During December the maximum noise threshold was exceeded on 30 occasions (daytime, 12; evening, 5; night time, 13). Seven daytime exceedances were found to be due to works at the S6 earth bund. However, a large number of exceedances were attributed to a range of non-construction factors, including waves on the shore, wind and birds (particularly during the early hours of the morning).
Clufflat Brae	During December the maximum noise threshold was exceeded on 18 occasions (daytime, 6; evening, 3; night time, 9). No exceedances were attributable to construction works. Exceedances were found to be due to birds and adverse weather conditions.
Inchgarvie Lodge	During December the maximum noise threshold was exceeded on 12 occasions (daytime, 9; evening, 2; night time, 1). No exceedances were found to be due to construction works. However, investigations found movements at the property to be the main contributing factors to the exceedances at this location.
Linn Mill	During December the maximum noise threshold was exceeded on 14 occasions (daytime, 6; evening, 2; night time, 6). Four exceedances (3 daytime and 1 night time) were due to construction works. However, the majority of exceedances were caused by a number of non-construction factors, notably adverse weather conditions, fireworks and birds.
Tigh-Na-Grian	During December the maximum noise threshold was exceeded on 11 occasions (daytime, 3; evening, 0; night time, 8). A single night time exceedance was found to be due to construction works at the North Tower caisson. However, other exceedances were also due to non-construction factors including birds, wind and vehicles.
Dundas Home Farm	During December the maximum noise threshold was exceeded on 4 occasions. Exceedances were not attributable to construction works. Exceedances were due to birds, local noises from nearby properties and an alarm sounding.

Echline	During December the maximum noise threshold was exceeded on 16 occasions. No exceedances at this location were due to construction activities. Exceedances were largely attributed to vehicles passing by on the adjacent roads.
Springfield	During December the maximum noise threshold was exceeded on 12 occasions. No exceedances at this location for which there is audio were due to construction activities. The majority of non-construction related exceedances were due to monitor maintenance. Due to an error with the device, there are some missing audio recordings for exceedances.
Scotstoun	During December the maximum noise threshold was exceeded on 17 occasions. Exceedances were attributed to vehicles passing by on the adjacent road.
Whinny Hill	During December the maximum noise threshold was exceeded on 4 occasions. Exceedances were not due to construction activities. A range of factors were found to cause exceedances at this location, including birds, dogs and monitor maintenance.

**Table 3: Summary of Construction Exceedances at Monitoring Locations**

Monitor	Date	Period	Description	NVIR No.
Butlaw Fisheries	03/12/12	Day	Works associated with Pier S6 earthbund	B.D.031212
	04/12/12			B.D.041212
	06/12/12			B.D.061212
	10/12/12			B.D.101212
	14/12/12			B.D.141212
	19/12/12			B.D.191212
	20/12/12			B.D.201212
Linn Mill	01/12/12	Day	Plant movements in Echline Field	L.D.011212
	10/12/12			L.D.101212
	11/12/12			L.D.111212
	17/12/12	Night		L.N.171212
Tigh-Na-Grian	03/12/12	Night	Works at North Caisson	T.N.031212



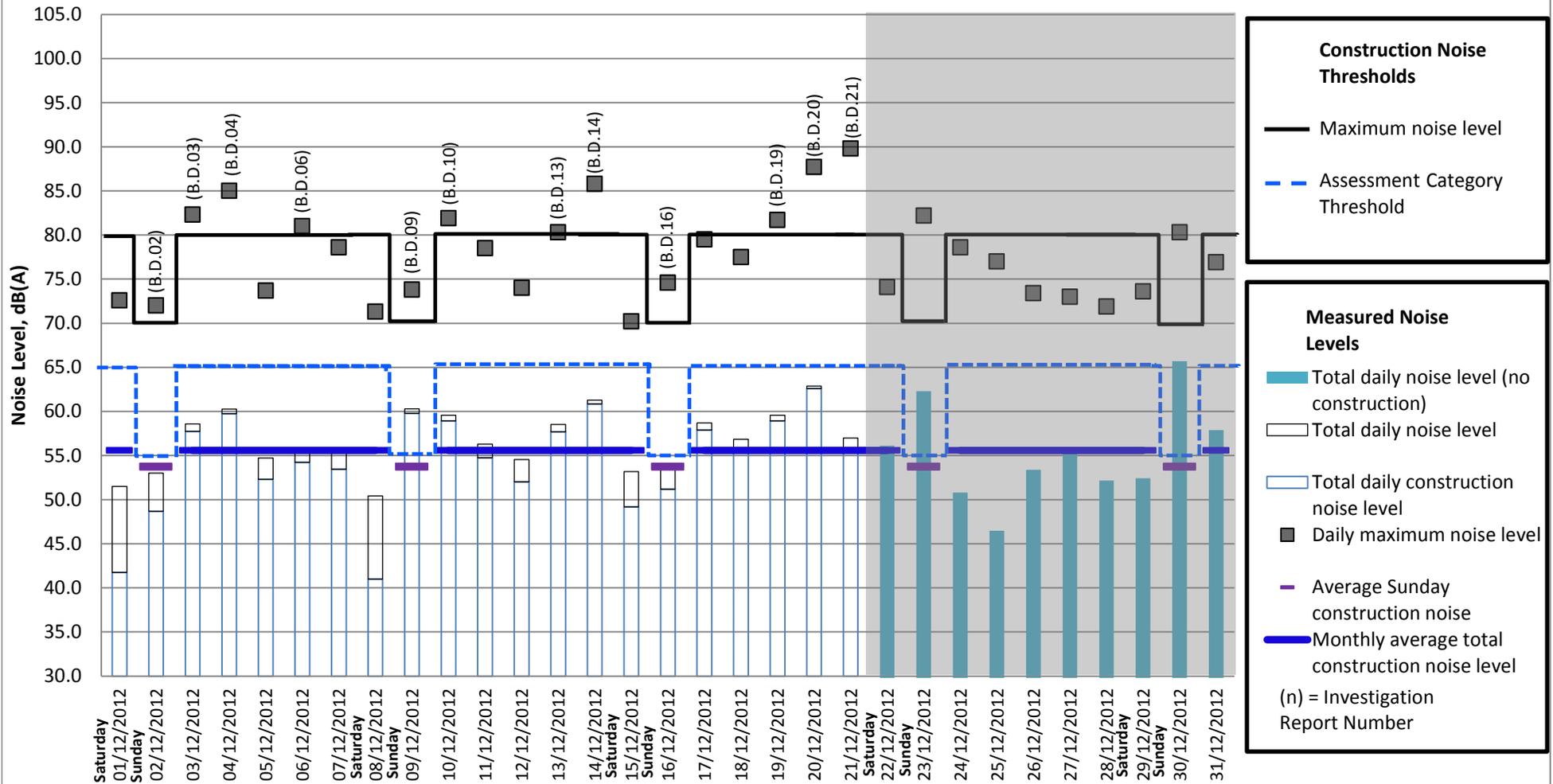
**Forth Crossing** Bridge Constructors

HOCHTIEF Solutions  
American Bridge International  
DRAGADOS  
Morrison Construction

## **APPENDIX A**

## Measured Daytime Noise Levels at Butlaw Fisheries

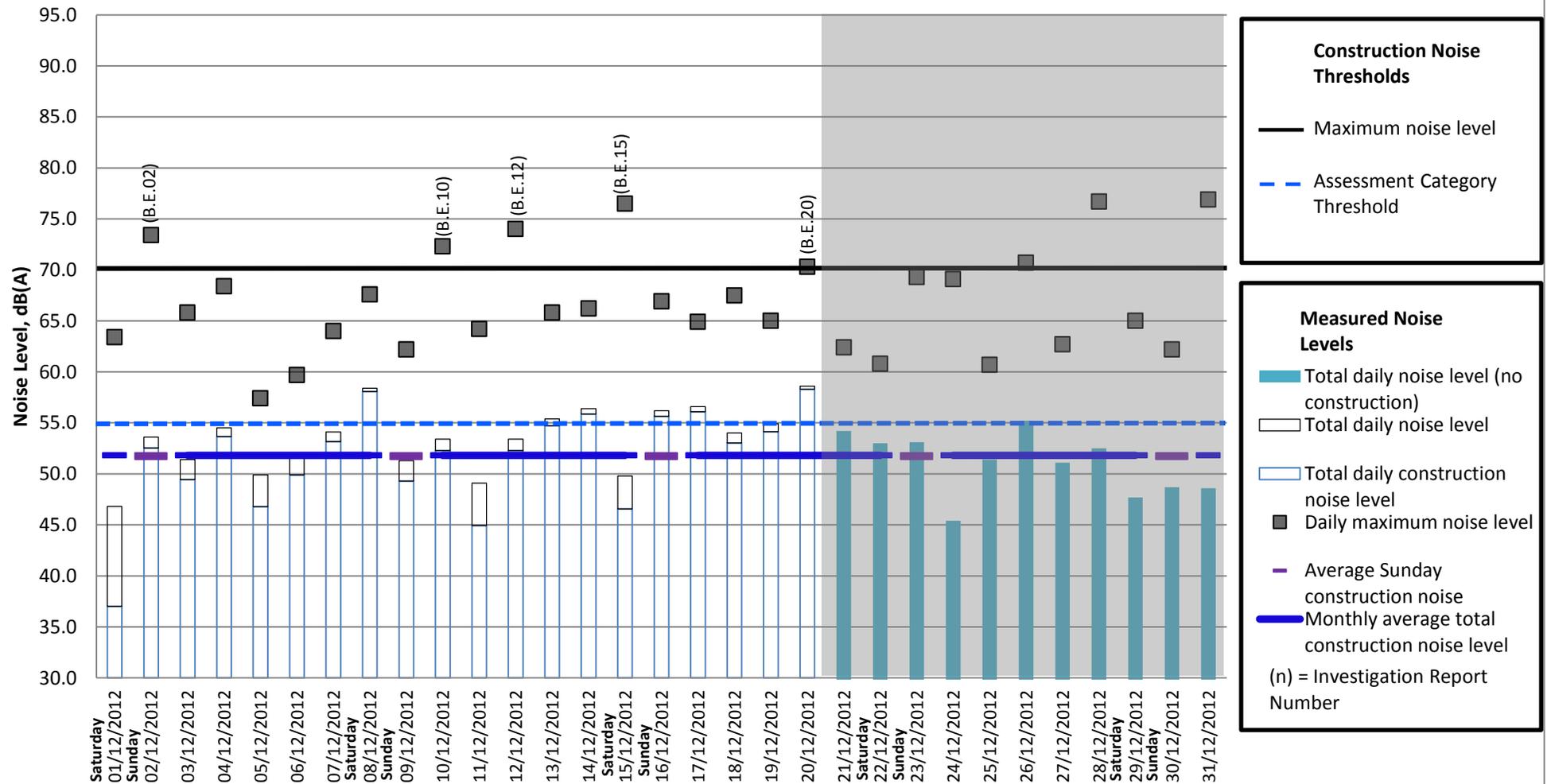
### Measurement period: December 2012



**Note:** The grey areas of the chart represent days on which there were no construction works; no construction works were undertaken over the festive period (21/12/12 to 07/01/13 - networks and 21/12/12 to 03/01/13 - marine).

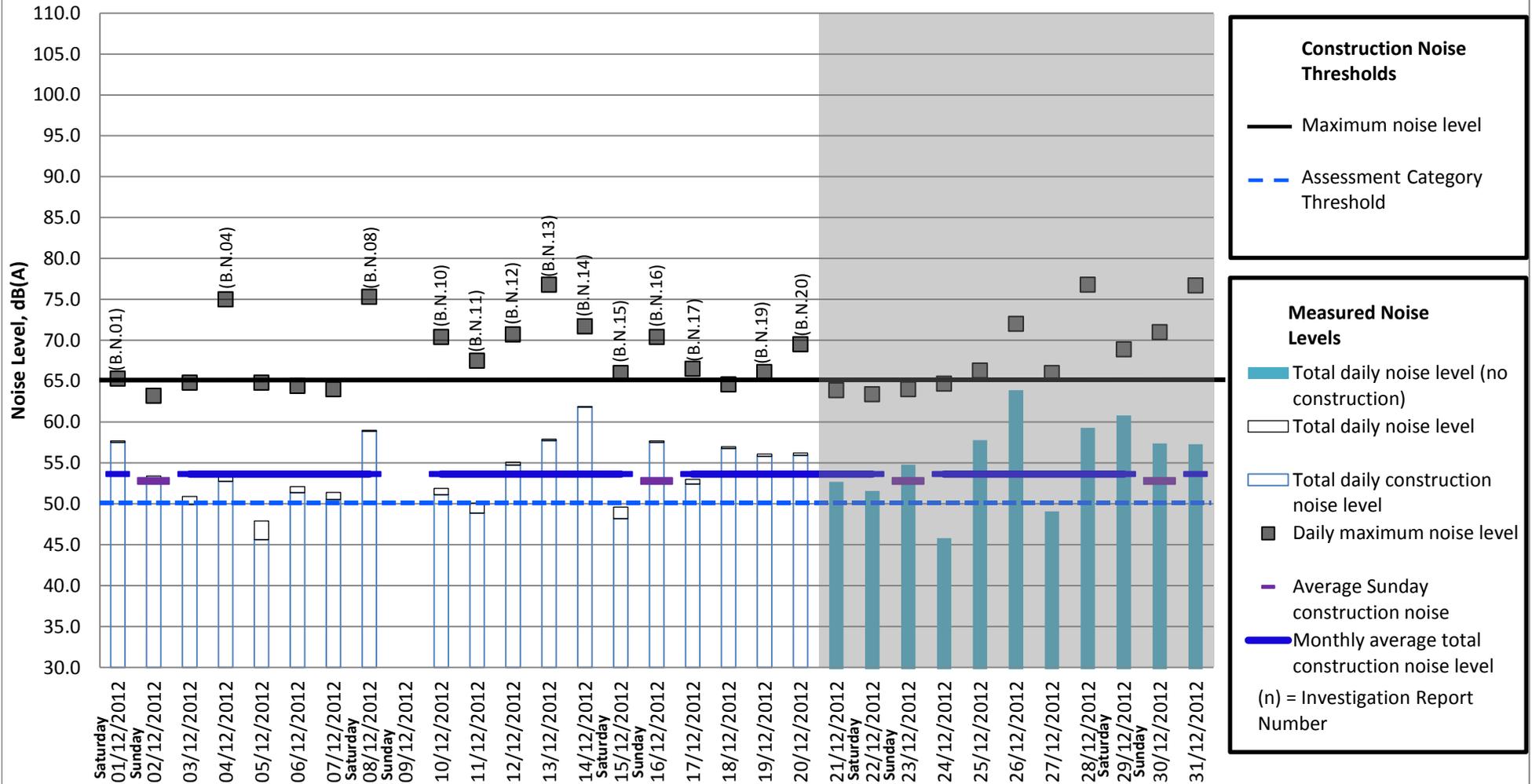
## Measured Evening Noise Levels at Butlaw Fisheries

### Measurement period: December 2012



**Note:** The grey areas of the chart represent days on which there were no construction works; no construction works were undertaken over the festive period (21/12/12 to 07/01/13 - networks and 21/12/12 to 03/01/13 - marine).

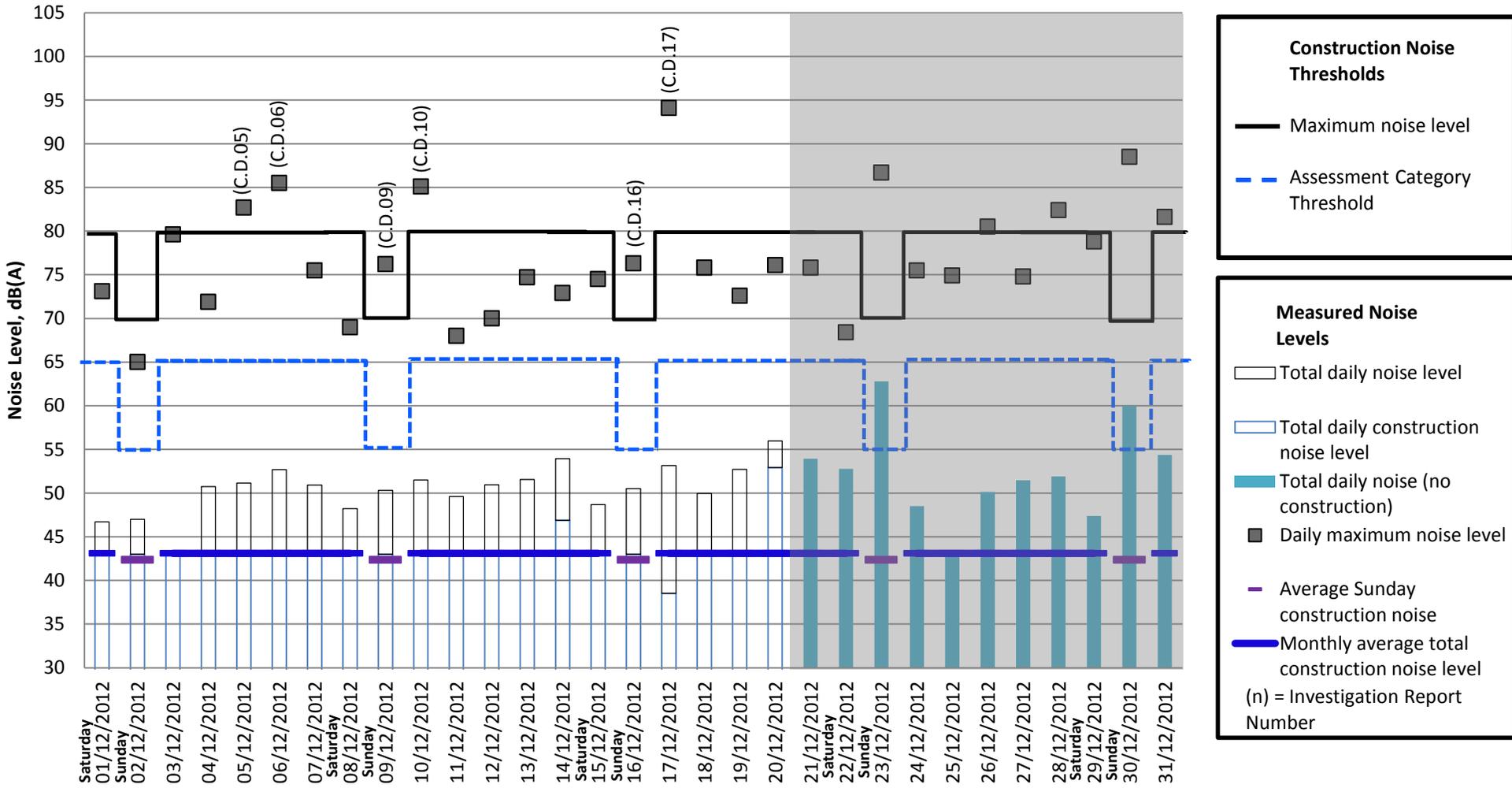
## Measured Night time Noise Levels at Butlaw Fisheries Measurement period: December 2012



**Note:** The grey areas of the chart represent days on which there were no construction works; no construction works were undertaken over the festive period (21/12/2012 to 07/01/2013 - networks and 21/12/2012 to 03/01/2013 - marine). Due to device error, data is missing for 09/12/12.

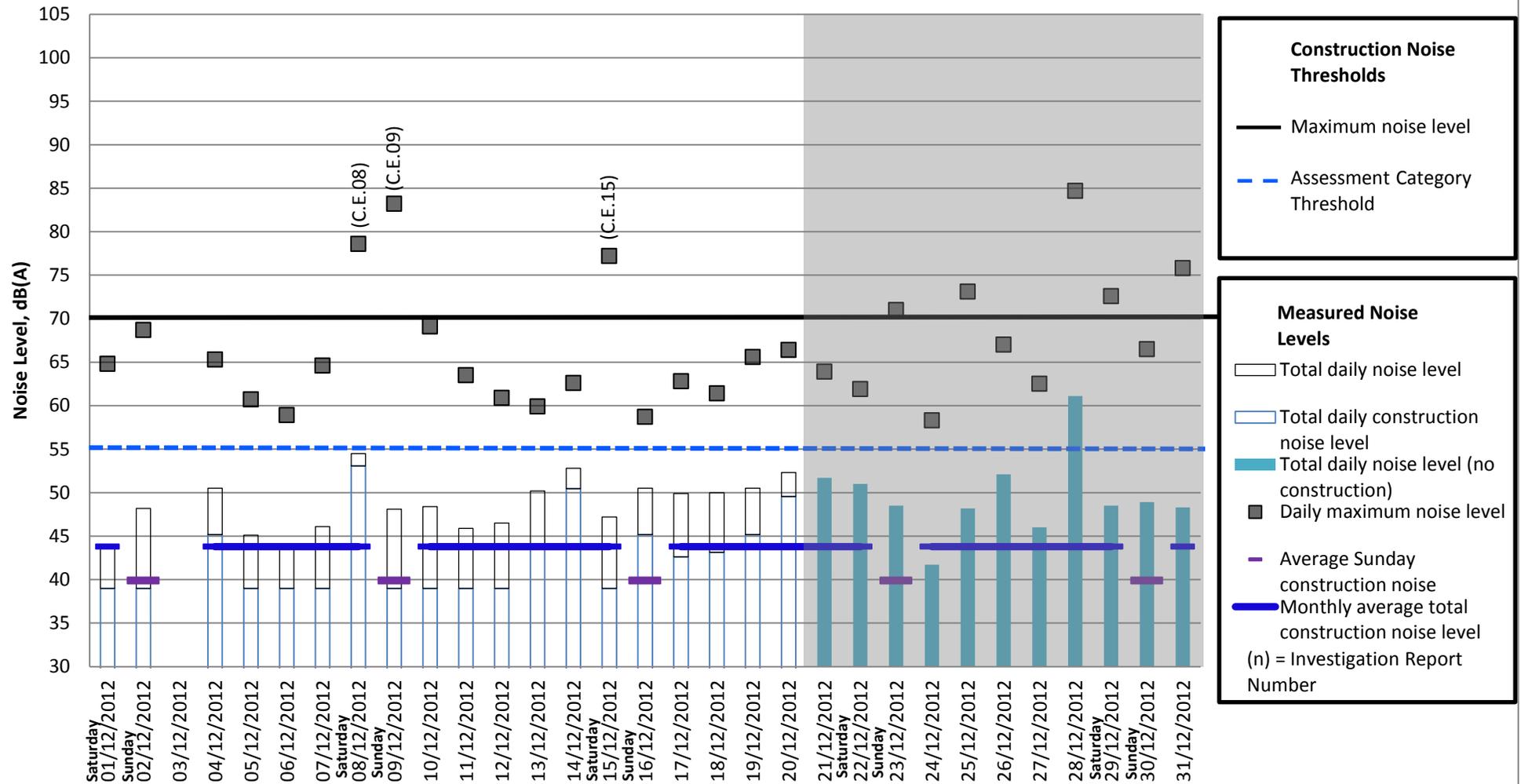
# Measured Daytime Noise Levels at Clufflat Brae

## Measurement period: December 2012



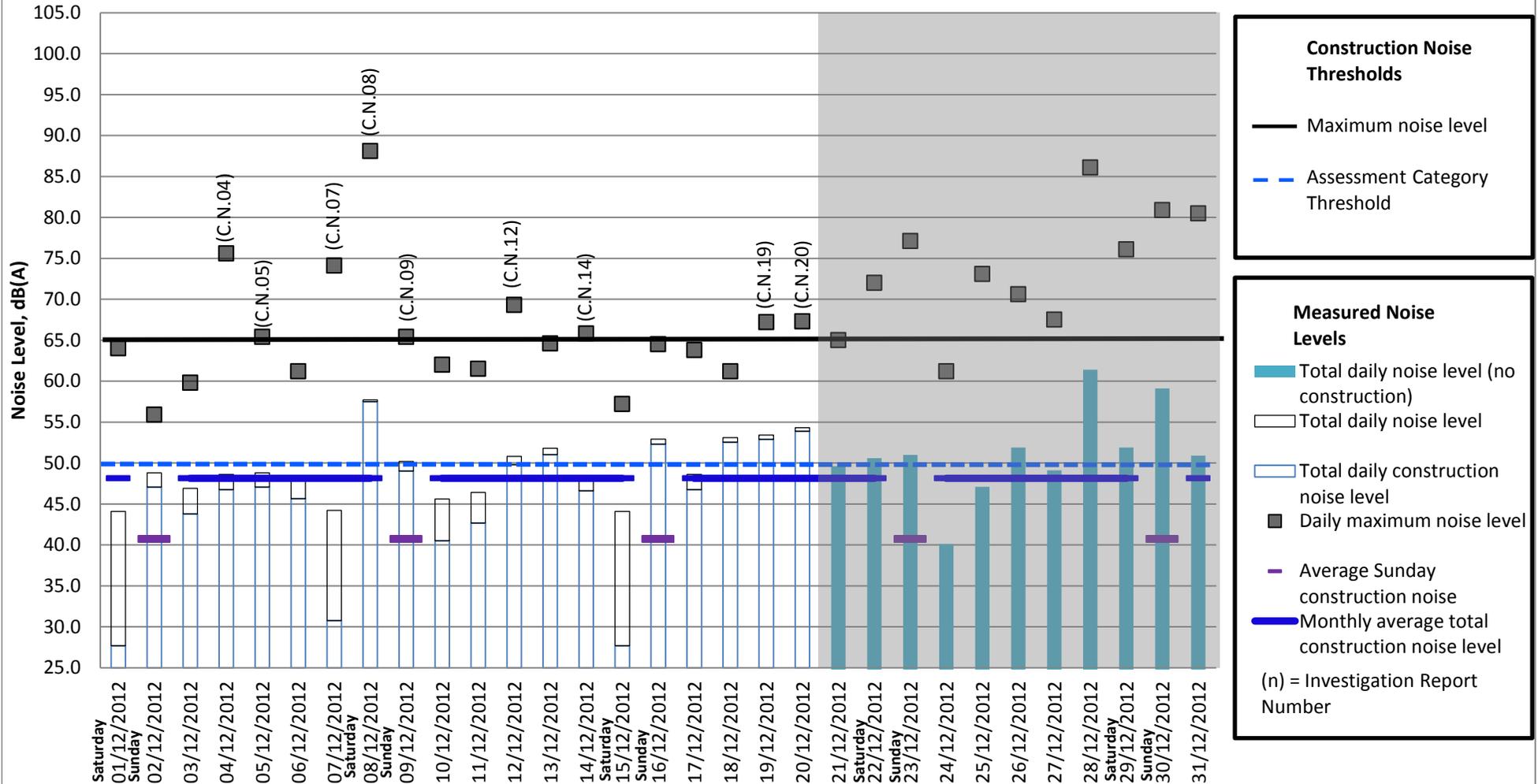
**Note:** The grey areas of the chart represent days on which there were no construction works; no construction works were undertaken over the festive period (21/12/12 to 07/01/13 - networks and 21/12/12 to 03/01/13 - marine).

## Measured Evening Noise Levels at Clufflat Brae Measurement period: December 2012



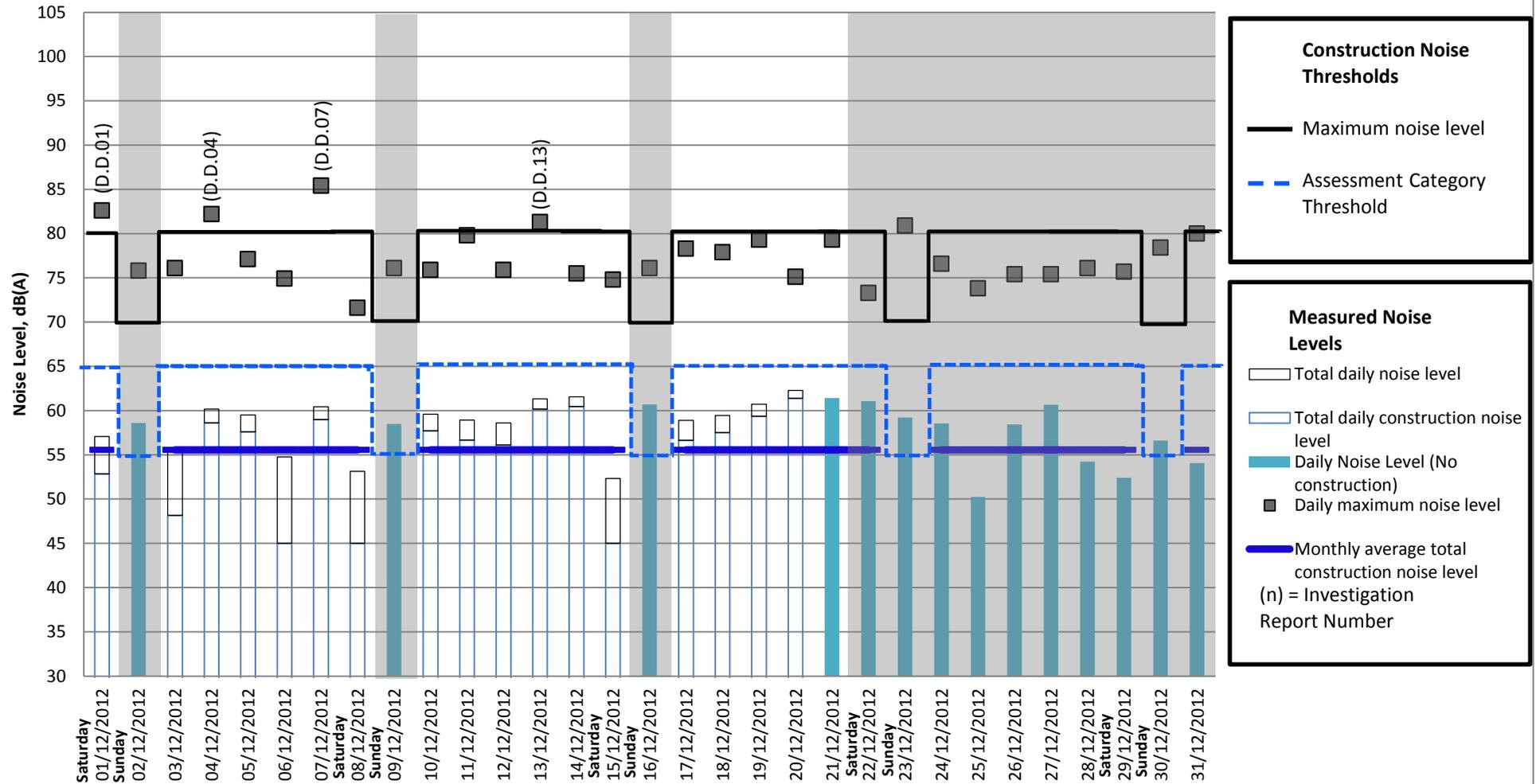
**Note:** The grey areas of the chart represent days on which there were no construction works; no construction works were undertaken over the festive period (21/12/12 to 07/01/13 - networks and 21/12/12 to 03/01/13 - marine). Data is missing for 03/12/12 due to device error.

## Measured Night-time Noise Levels at Clufflat Brae Measurement period: December 2012



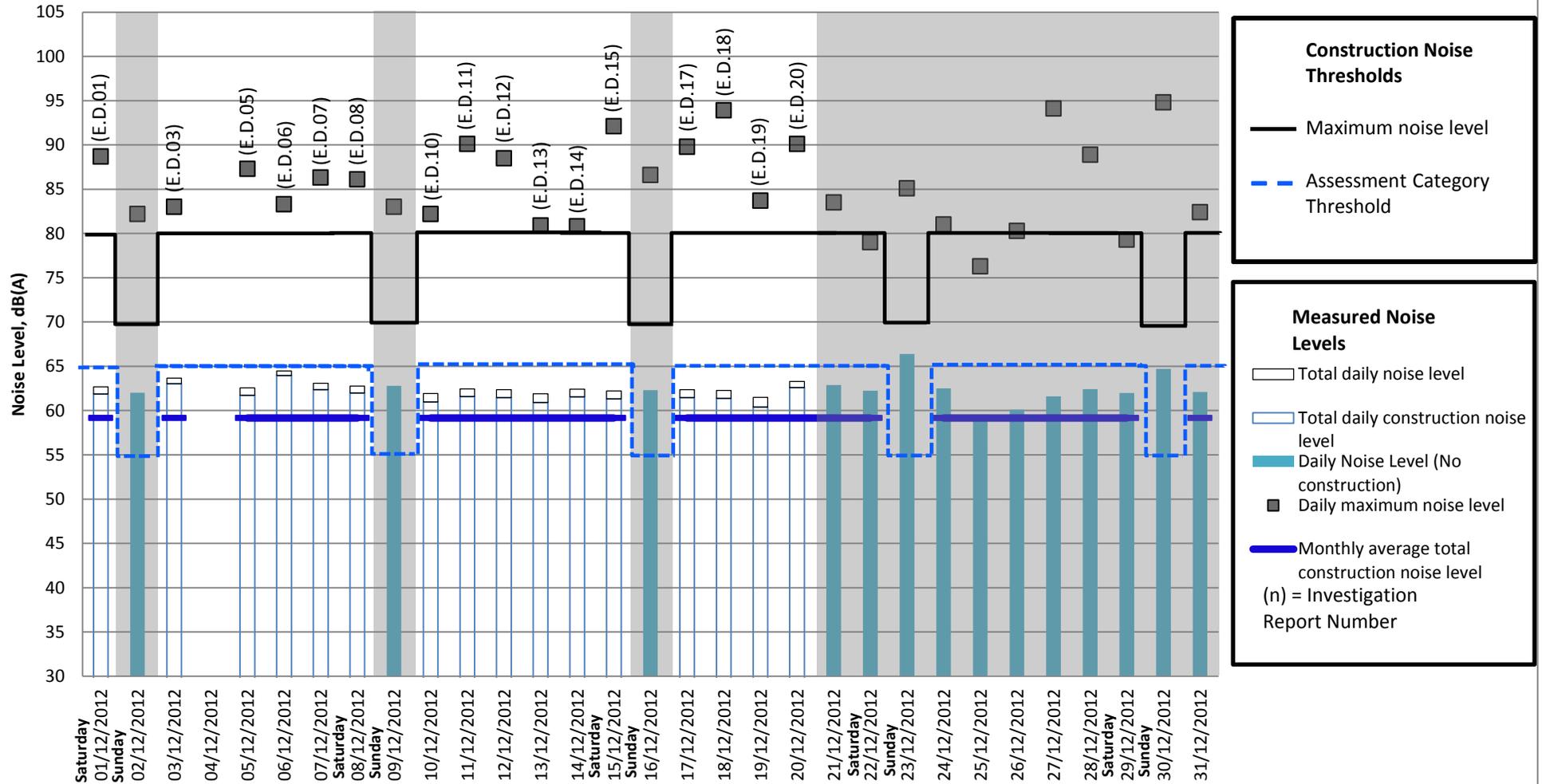
**Note:** The grey areas of the chart represent days on which there were no construction works; no construction works were undertaken over the festive period (21/12/12 to 07/01/13 - networks and 21/12/12 to 03/01/13 - marine).

## Measured Daytime Noise Levels at Dundas Home Farm Measurement period: December 2012



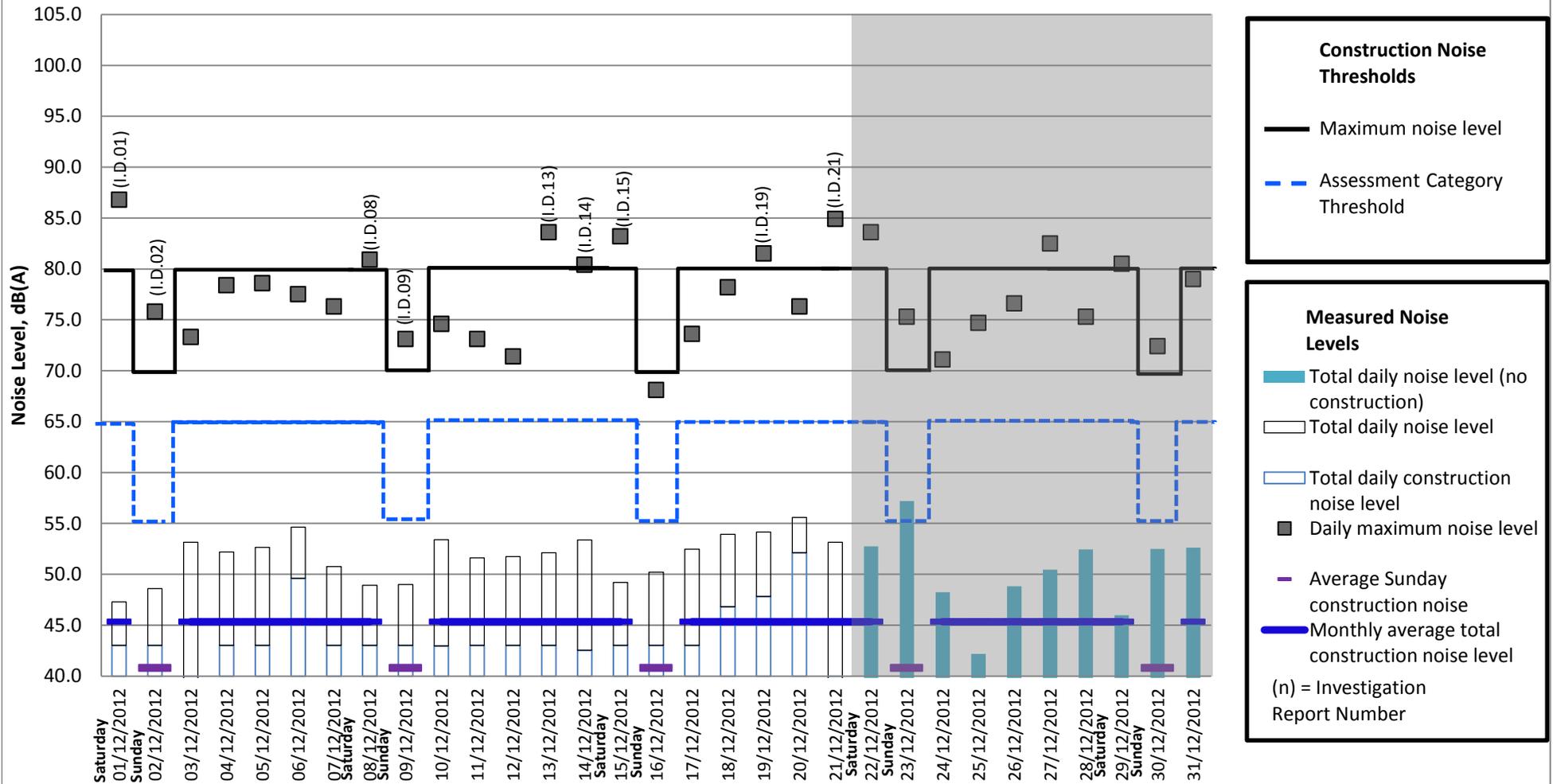
**Note:** The grey areas of the chart represent days on which no construction works have been conducted; no Sunday works have been conducted at this location and no works were undertaken over the festive period (21/12/12 to 07/01/13). The Sunday average has not been included as no Sunday works have been conducted at this location.

## Measured Daytime Noise Levels at Echline Measurement period: December 2012



**Note:** The grey areas of the chart represent days on which no construction works have been conducted; no Sunday works have been undertaken at this location and no works were undertaken over the festive period (21/12/12 to 07/01/13). The Sunday average has not been included as no Sunday works have been conducted at this location. Data is missing for 04/12/12 due to device error.

## Measured Daytime Noise Levels at Inchgarvie Measurement period: December 2012



**Construction Noise Thresholds**

- Maximum noise level
- Assessment Category Threshold

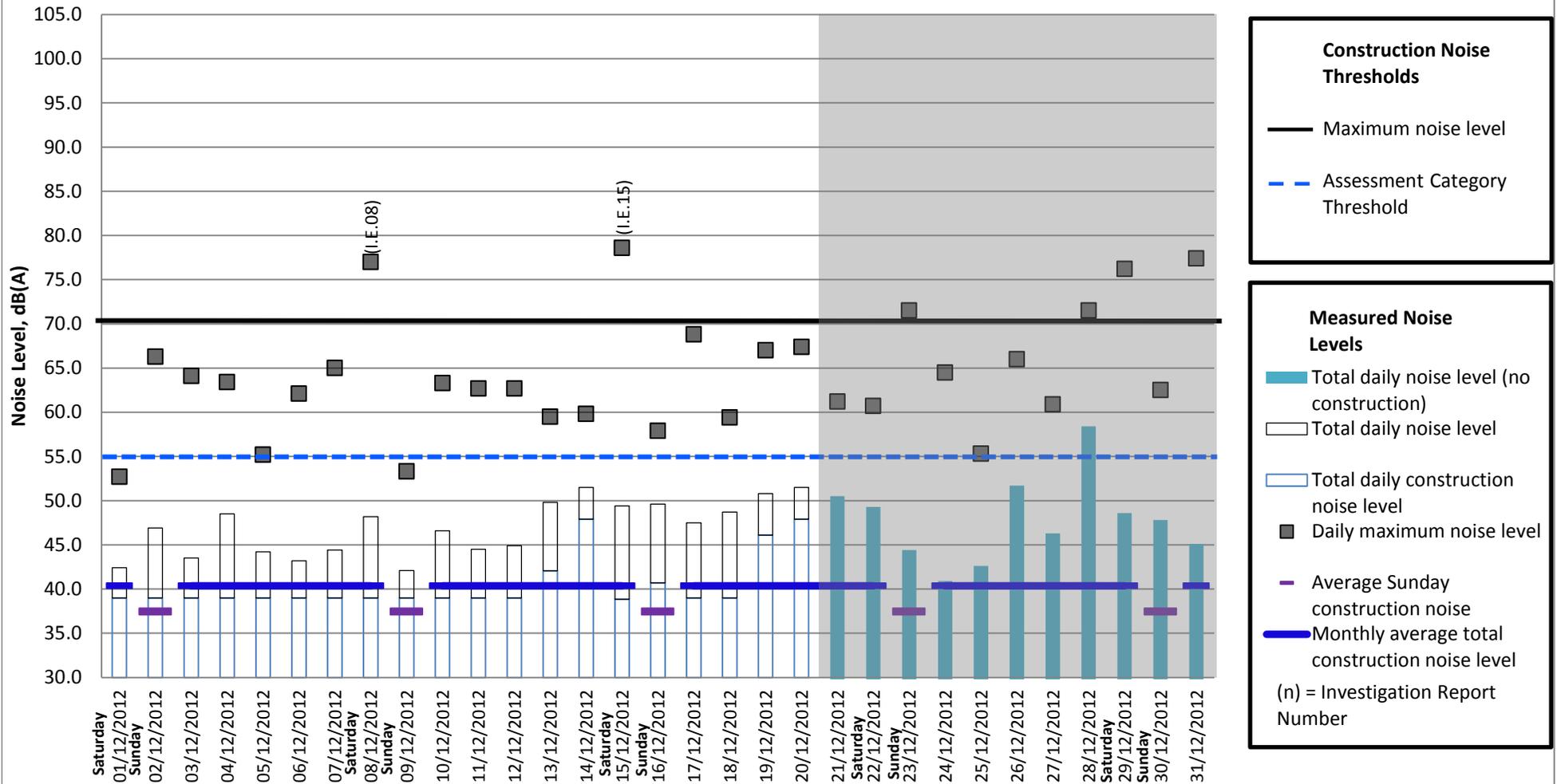
**Measured Noise Levels**

- Total daily noise level (no construction)
- Total daily noise level
- Total daily construction noise level
- Daily maximum noise level
- Average Sunday construction noise
- Monthly average total construction noise level

(n) = Investigation Report Number

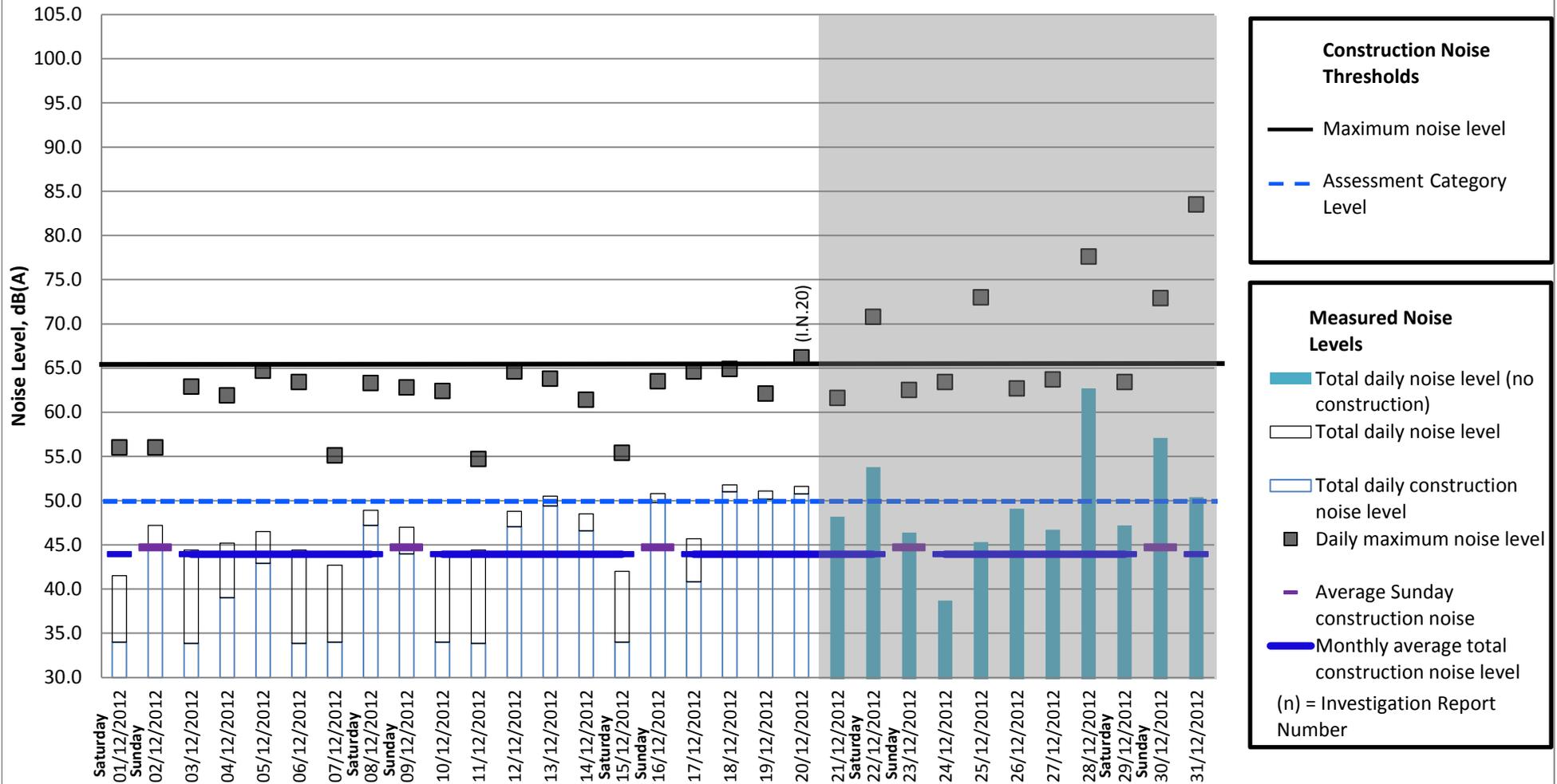
**Note:** The grey areas of the chart represent days on which there were no construction works; no construction works were undertaken over the festive period (21/12/12 to 07/01/13 - networks and 21/12/12 to 03/01/13 - marine).

## Measured Evening Noise Levels at Inchgarvie Measurement period: December 2012



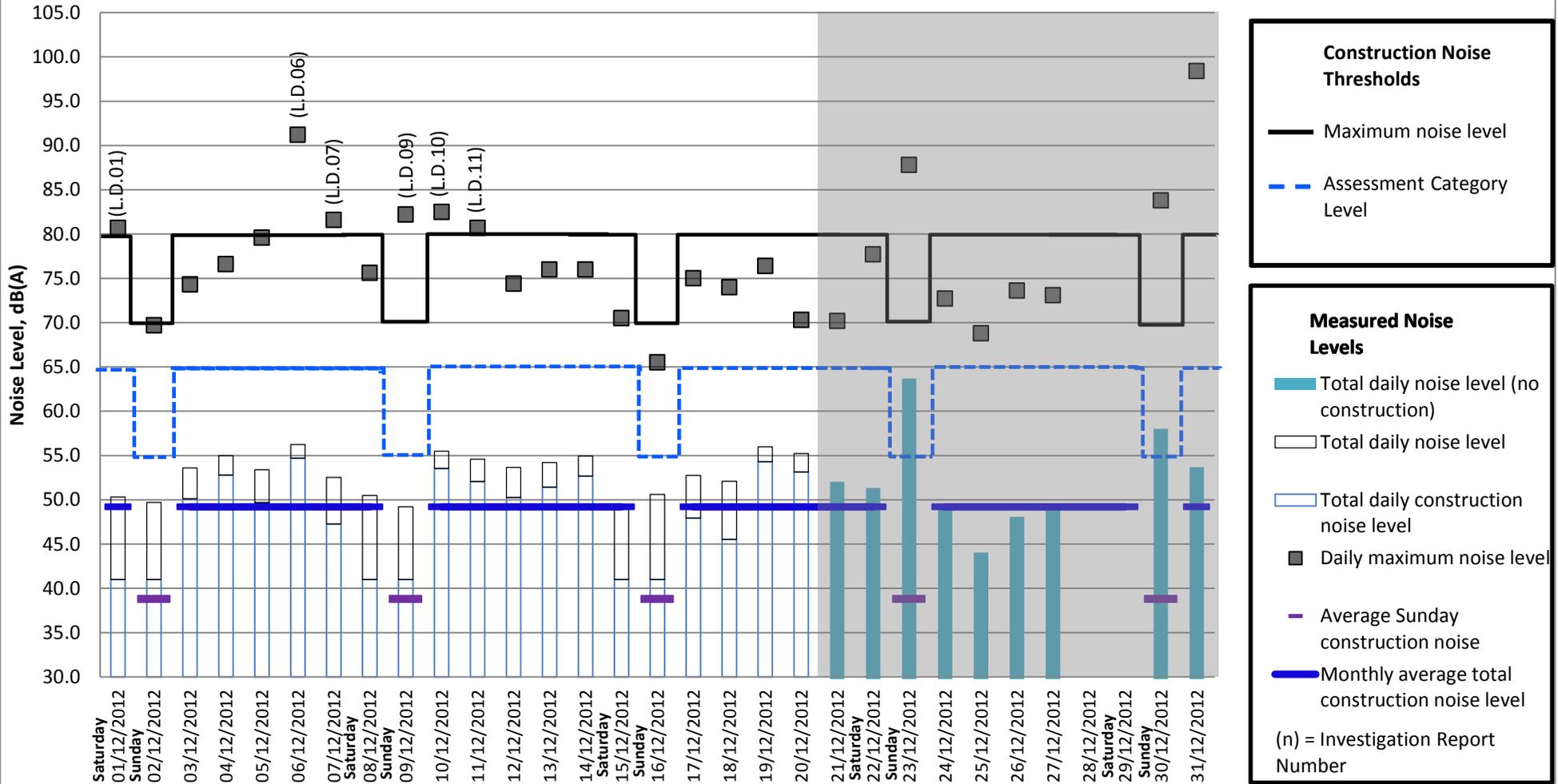
**Note:** The grey areas of the chart represent days on which there were no construction works; no construction works were undertaken over the festive period (21/12/12 to 07/01/13 - networks and 21/12/12 to 03/01/13 - marine).

## Measured Night-time Noise Levels at Inchgarvie Measurement period: December 2012



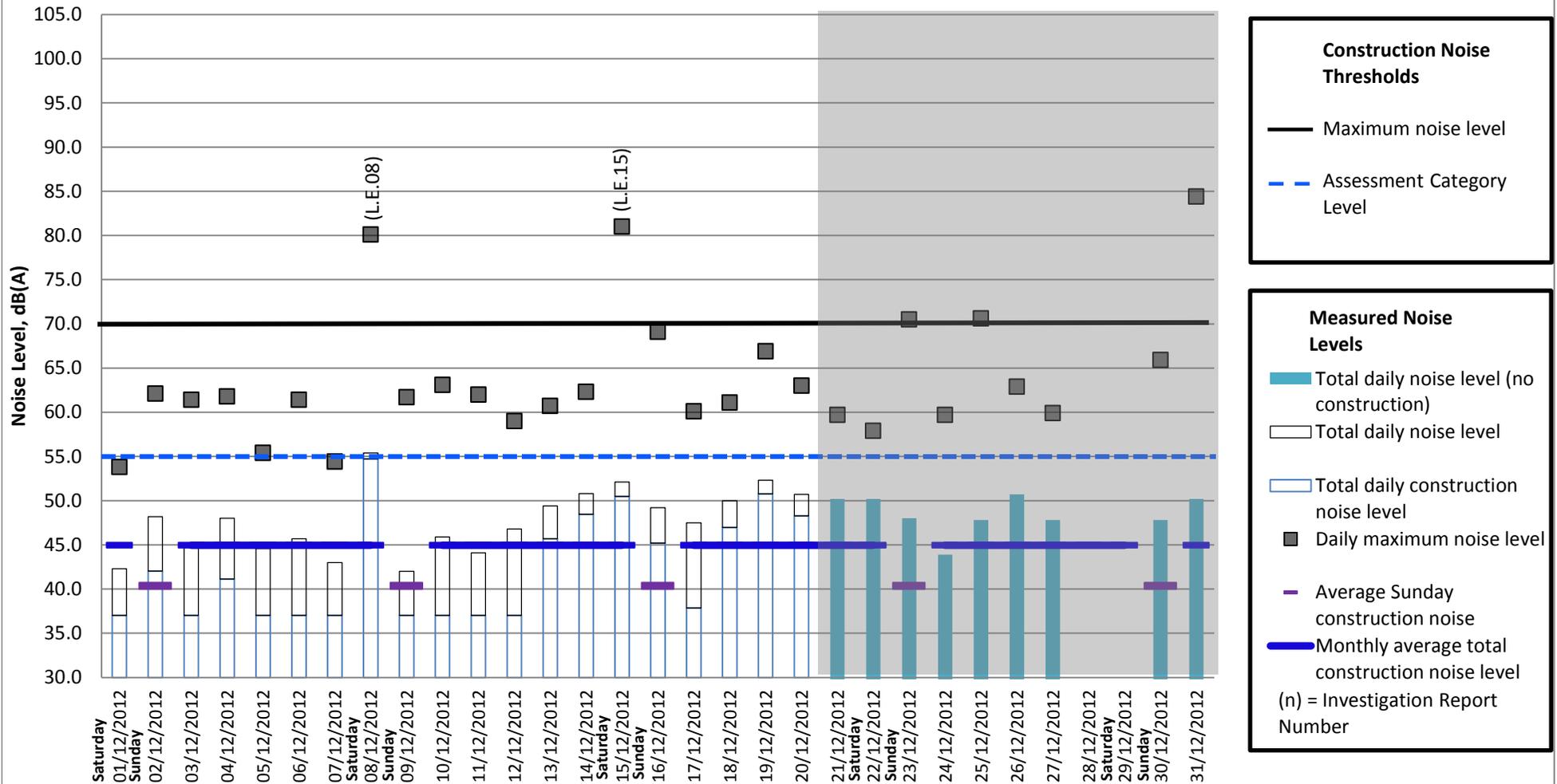
**Note:** The grey areas of the chart represent days on which there were no construction works; no construction works were undertaken over the festive period (21/12/12 to 07/01/13 - networks and 21/12/12 to 03/01/13 - marine).

## Measured Daytime Noise levels at Linn Mill Measurement period: December 2012



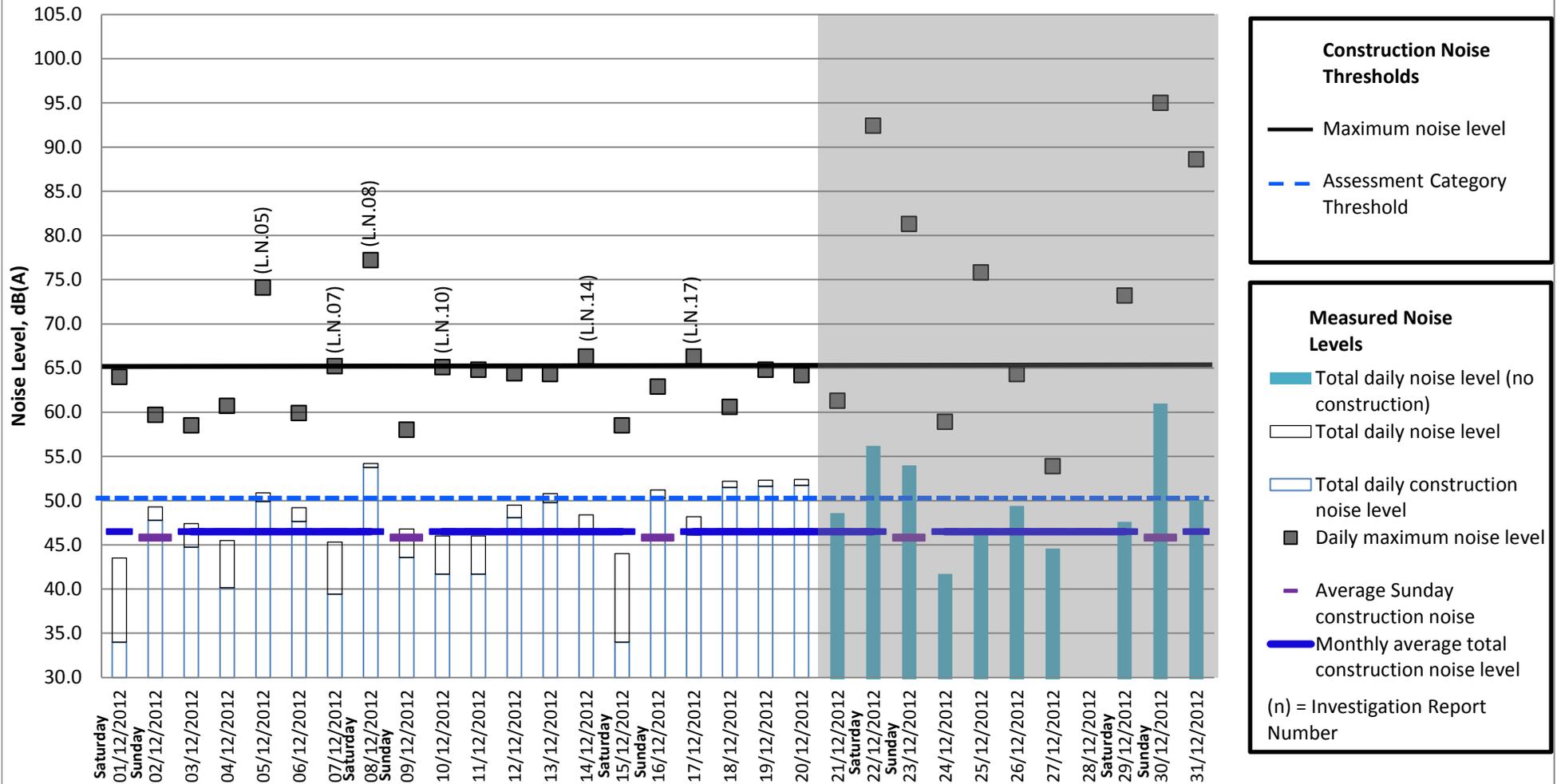
**Note:** The grey areas of the chart represent days on which there were no construction works; no construction works were undertaken over the festive period (21/12/12 to 07/01/13 - networks and 21/12/12 to 03/01/13 - marine). Due to device error, daytime data is missing for 28/12/12 and 29/12/12.

## Measured Evening Noise Levels at Linn Mill Measurement period: December 2012



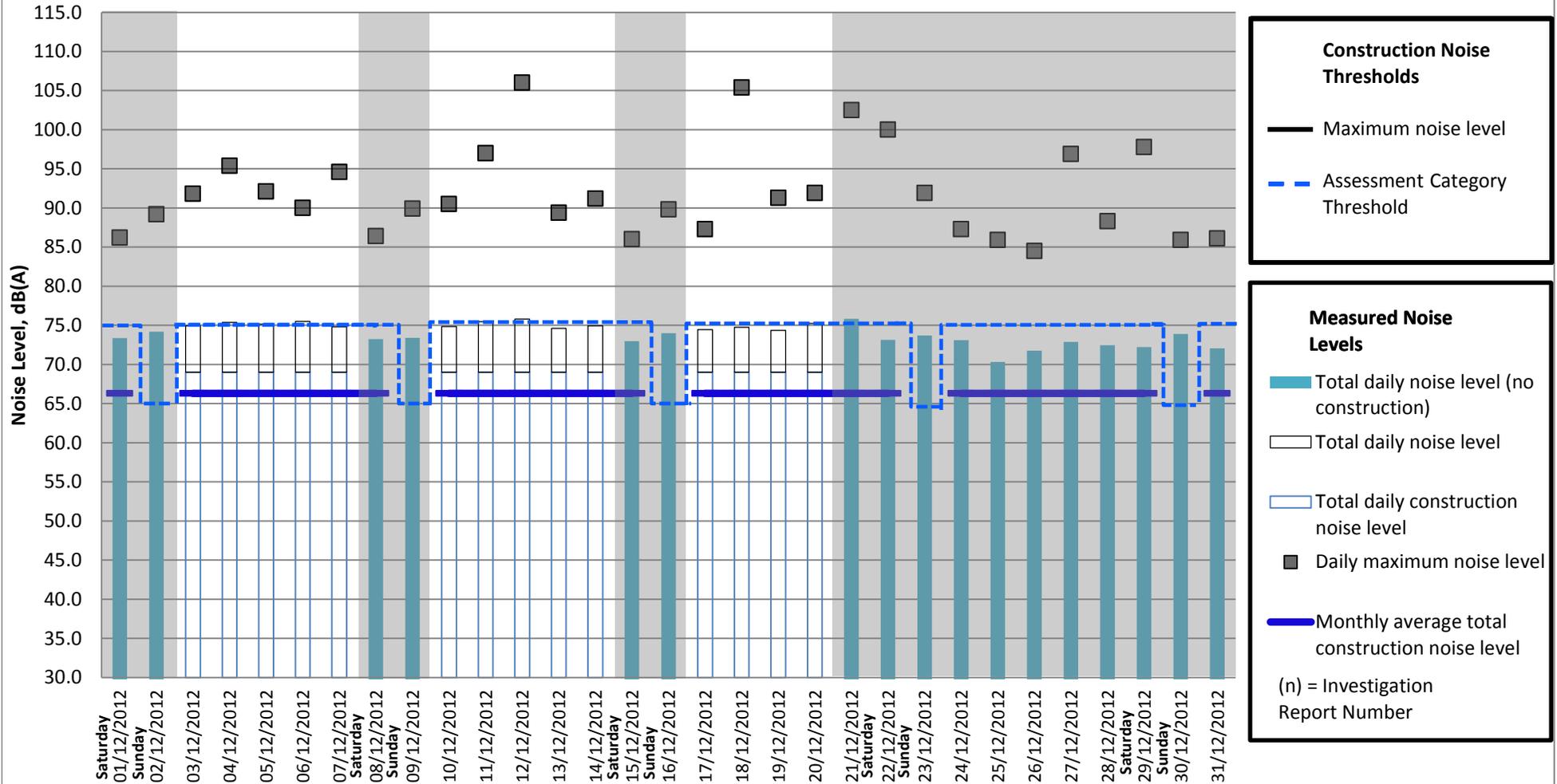
**Note:** The grey areas of the chart represent days on which there were no construction works; no construction works were undertaken over the festive period (21/12/12 to 07/01/13 - networks and 21/12/12 to 03/01/13 - marine). Due to device error, evening data is missing for 28/12/12 and 29/12/12.

## Measured Night-time Noise Levels at Linn Mill Measurement period: December 2012



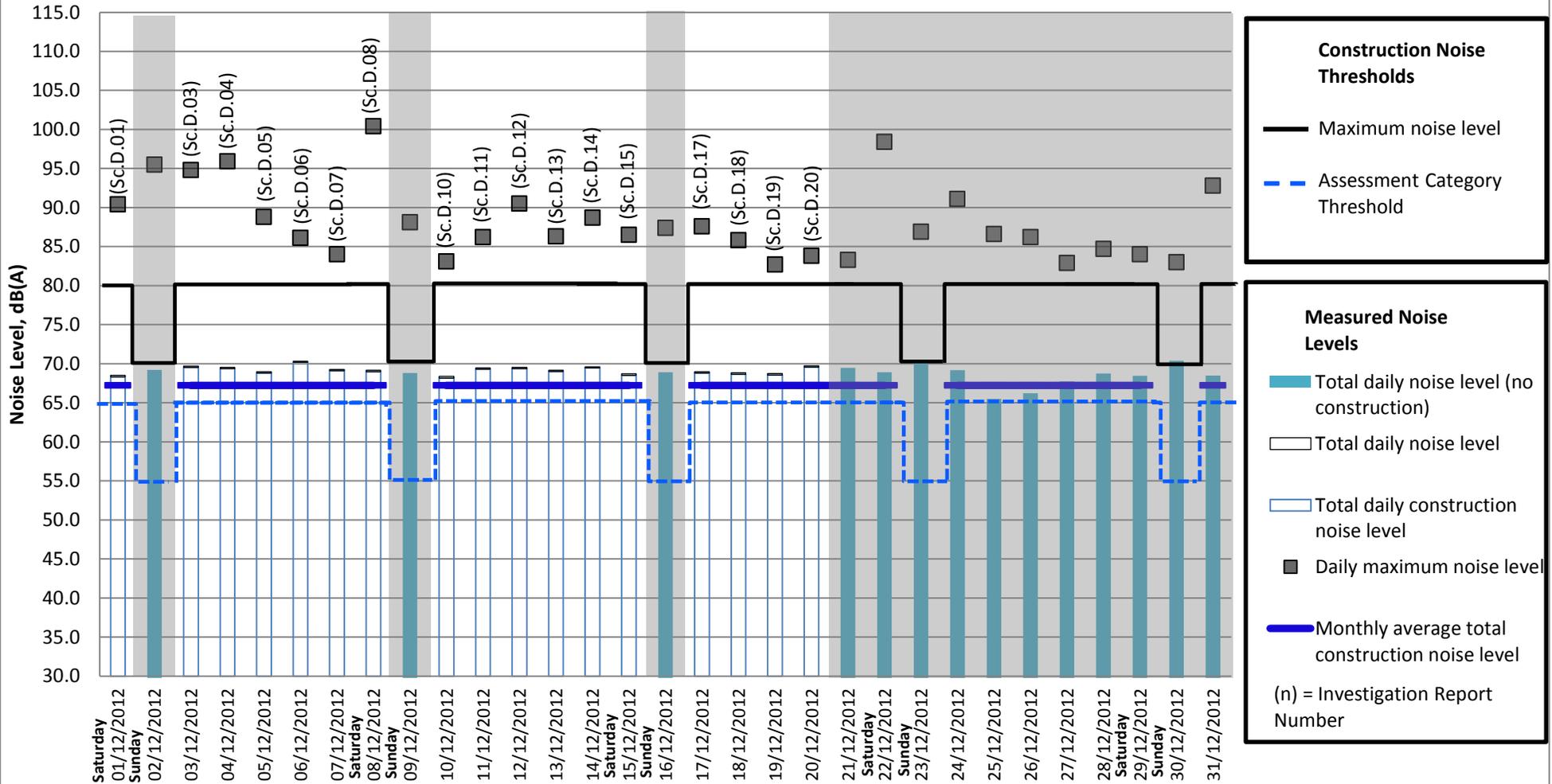
**Note:** The grey areas of the chart represent days on which there were no construction works; no construction works were undertaken over the festive period (21/12/12 to 07/01/13 - networks and 21/12/12 to 03/01/13 - marine). Due to device error, night data is missing for 28/12/12.

## Measured Daytime Noise Levels at Newton Measurement period: December 2012



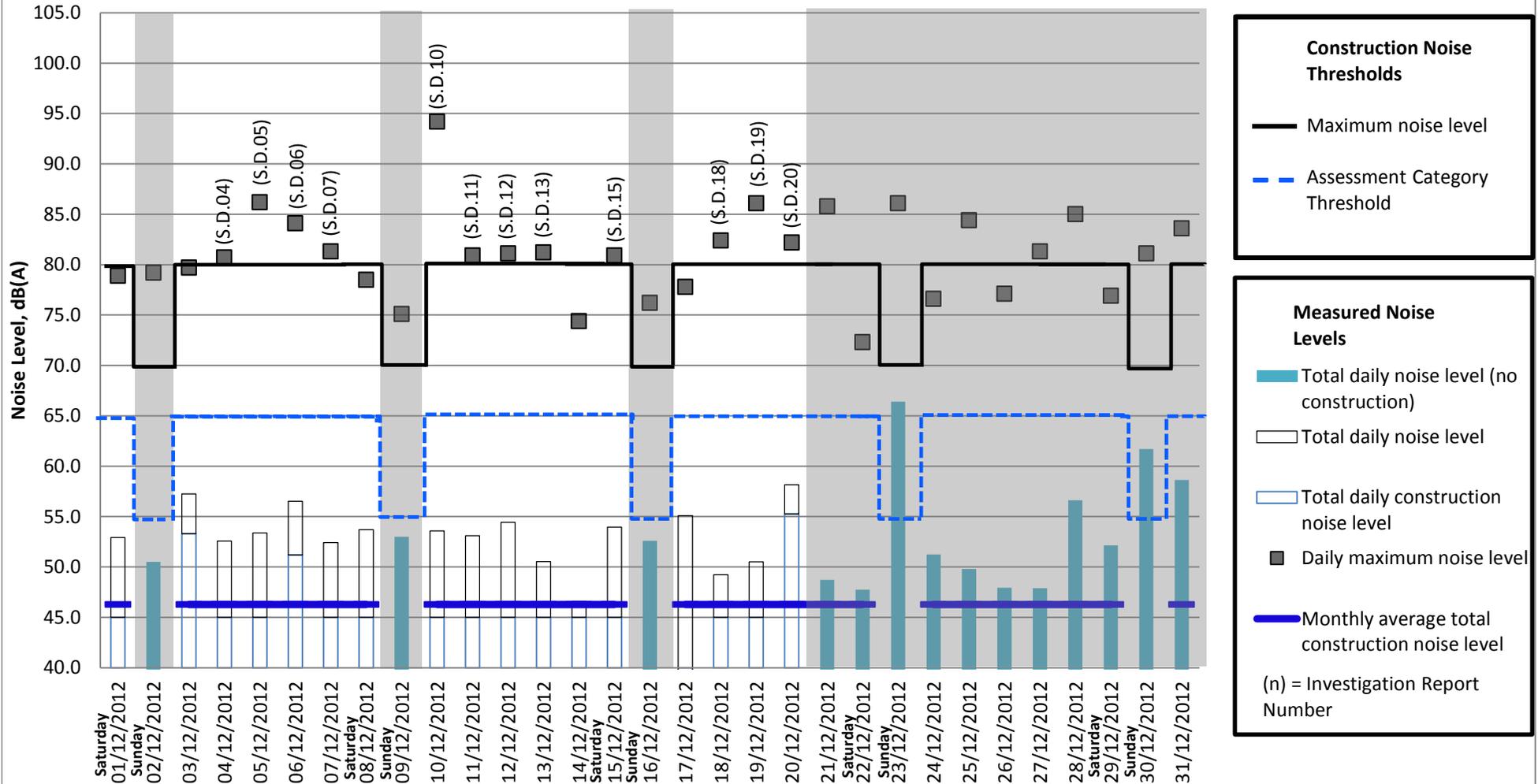
**Note:** The grey areas of the chart represent days on which no construction works have been conducted; no construction works were undertaken over the festive period (21/12/12 to 07/01/13 - networks). It should be noted that the measured noise levels Mon - Fri can not be attributed to construction works due to the considerable distance (1.75 kilometers) between this monitoring location and the closest construction works.

## Measured Daytime Noise Levels at Scotstoun Measurement period: December 2012



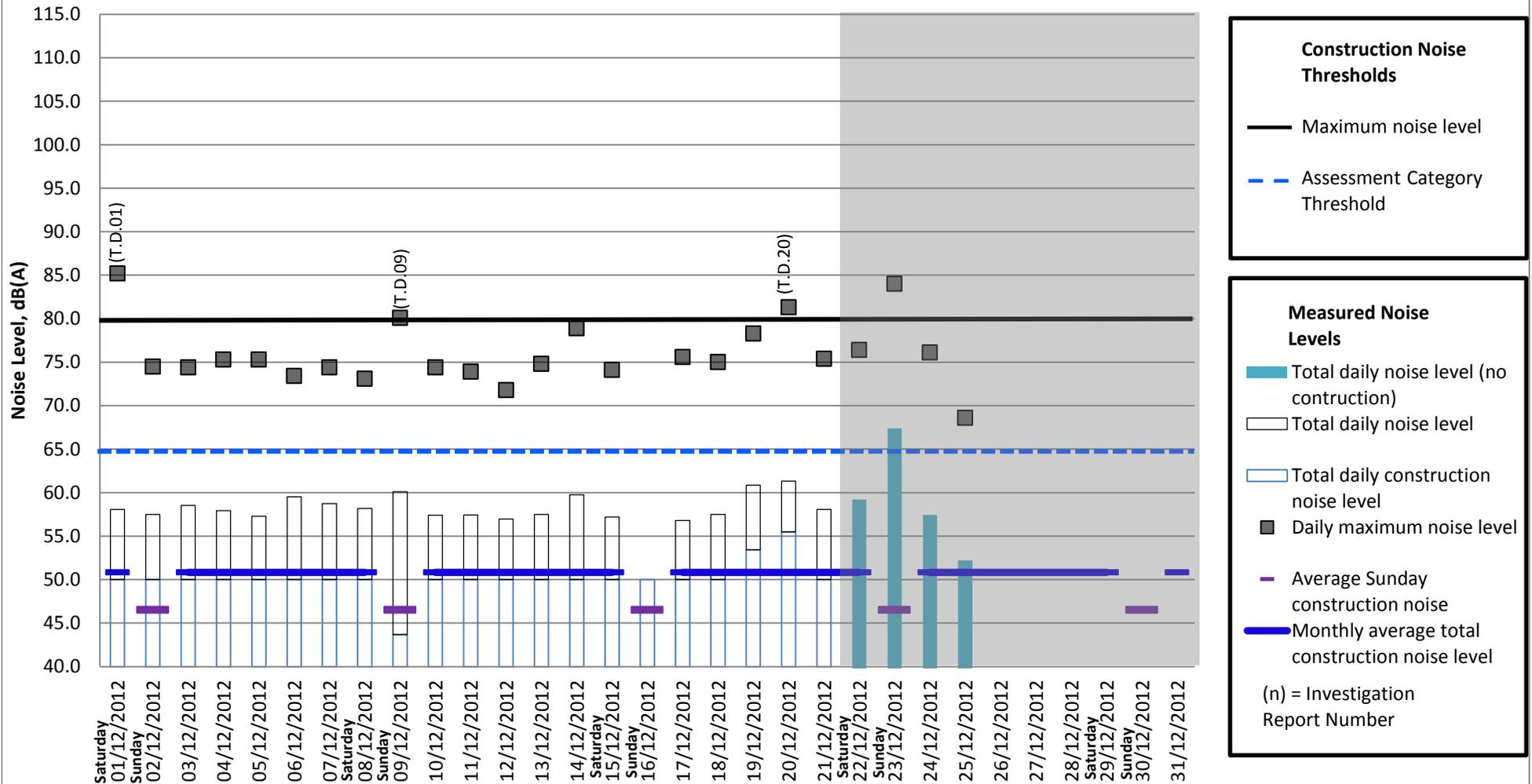
**Note:** The grey areas of the chart represent days on which no construction works have been conducted; no construction works were undertaken over the festive period (21/12/12 to 07/01/13 - networks). The monthly average construction noise for Sunday has not been included as no Sunday works have been conducted at this location .

## Measured Daytime Noise Levels at Springfield Measurement period: December 2012



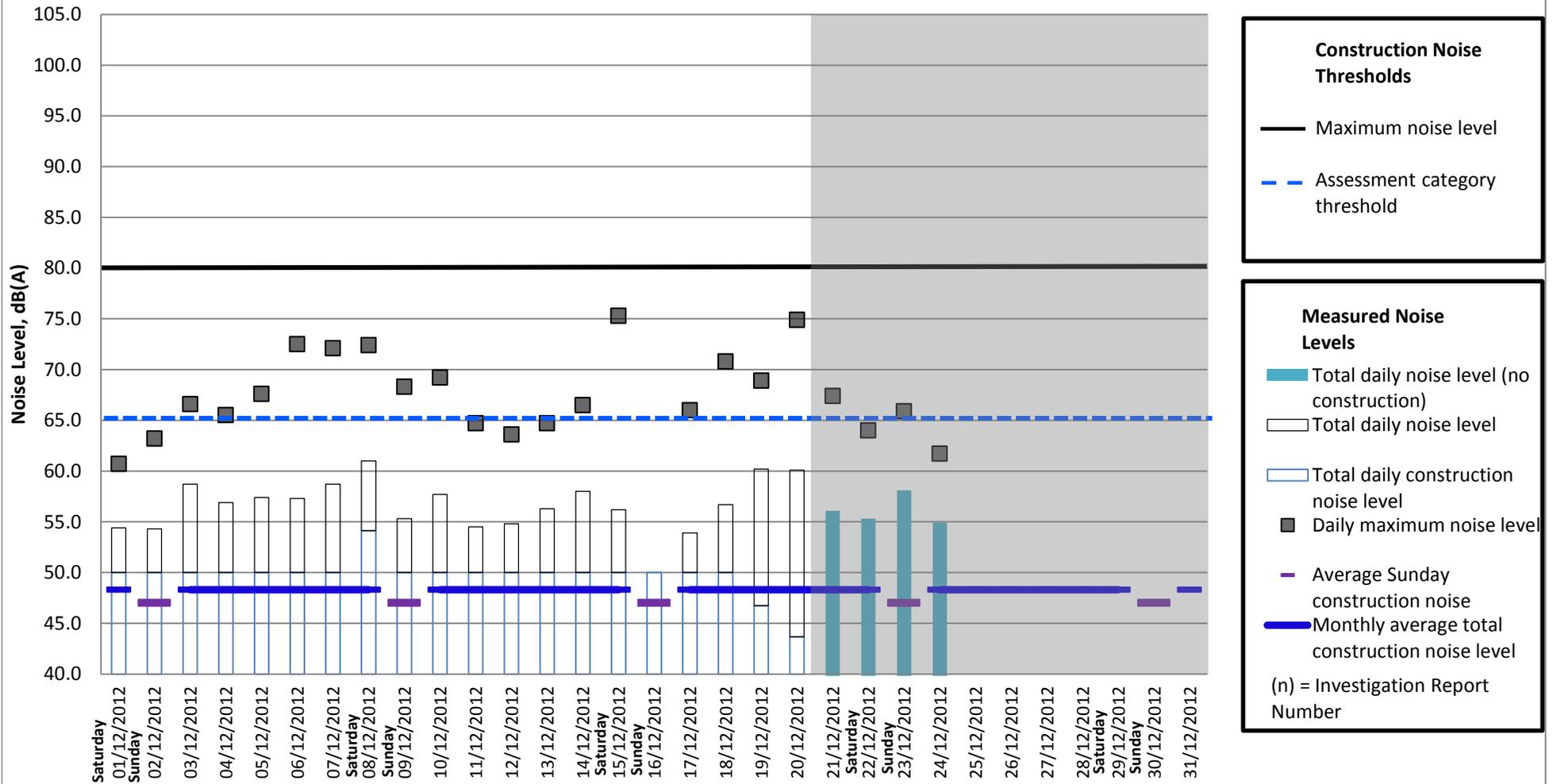
**Note:** The grey areas of the chart represent days on which no construction works have been conducted; no construction works were undertaken over the festive period (21/12/12 to 07/01/13 - networks). The monthly average construction noise for Sunday has not been included as no Sunday works have been conducted at this location.

## Measured Daytime Noise Levels at Tigh-Na-Grian Measurement period: December 2012



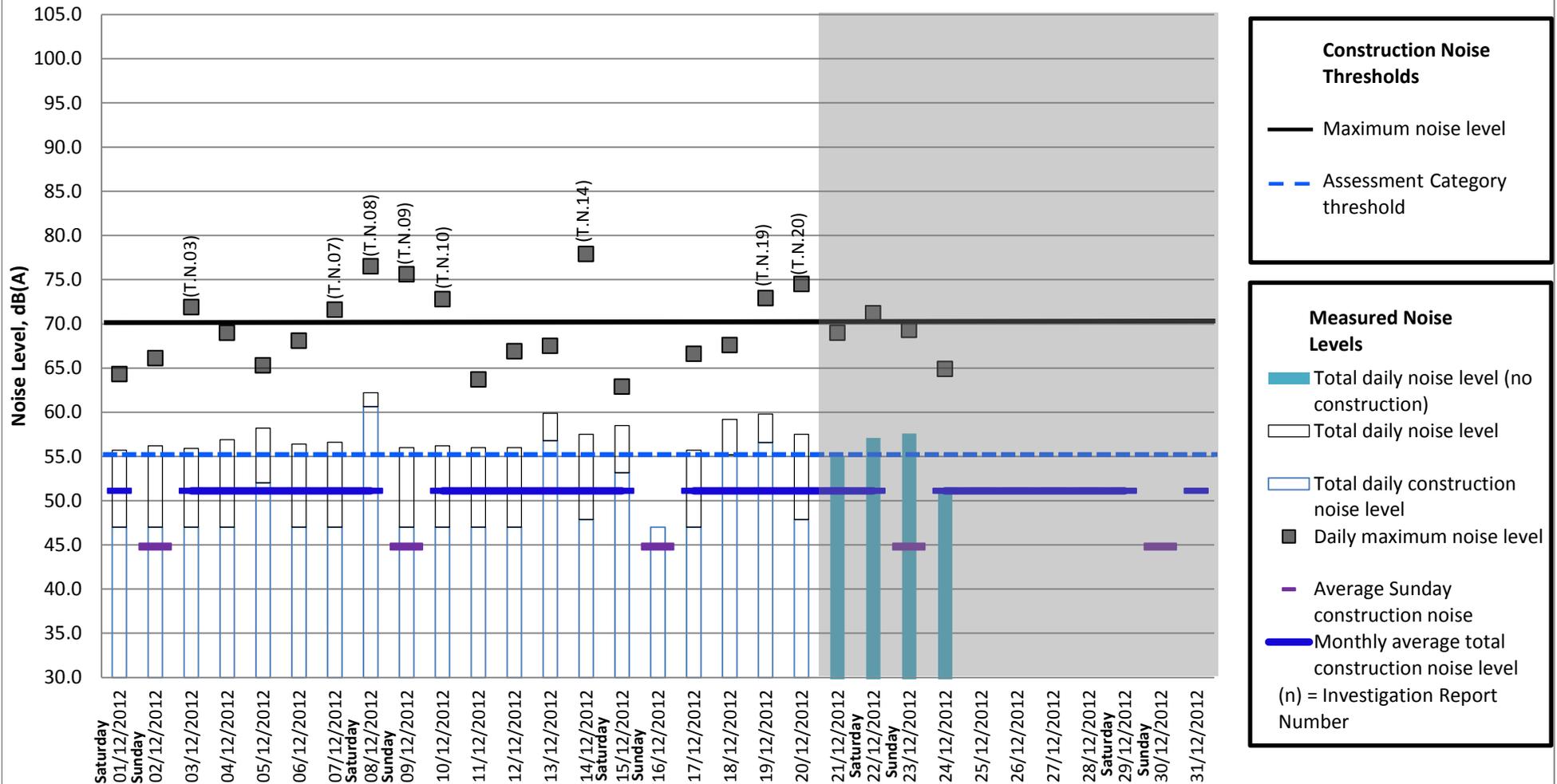
**Note:** The grey areas of the chart represent days on which there were no construction works; no construction works were undertaken over the festive period (21/12/12 to 07/01/13 - networks and 21/12/12 to 03/01/13 - marine). Due to device error, data is missing for 26/12/12 to 31/12/12 due to a device error which occurred over the Christmas period.

## Measured Evening Noise Levels at Tigh-Na-Grian Measurement period: December 2012



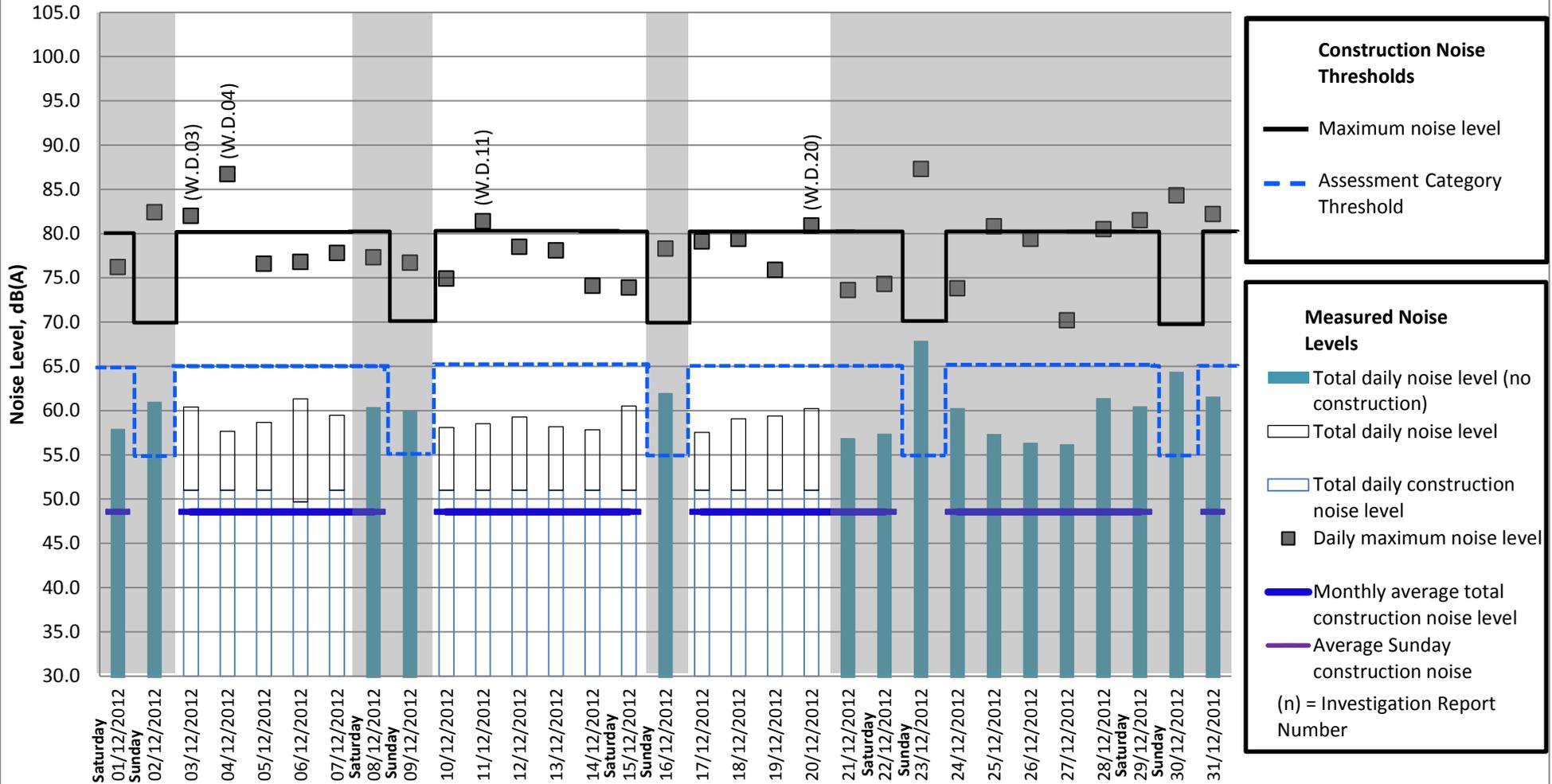
**Note:** The grey areas of the chart represent days on which there were no construction works; no construction works were undertaken over the festive period (21/12/12 to 07/01/13 - networks and 21/12/12 to 03/01/13 - marine). Due to device error, data is missing for 25/12/12 to 31/12/12 due to a device error which occurred over the Christmas period.

## Measured Night-time Noise Levels at Tigh-Na-Grian Measurement period: December 2012



**Note:** The grey areas of the chart represent days on which there were no construction works; no construction works were undertaken over the festive period (21/12/12 to 07/01/13 - networks and 21/12/12 to 03/01/13 - marine). Due to device error, data is missing for 25/12/12 to 31/12/12 due to a device error which occurred over the Christmas period.

## Measured Daytime Noise Levels at Whinny Hill Measurement period: December 2012

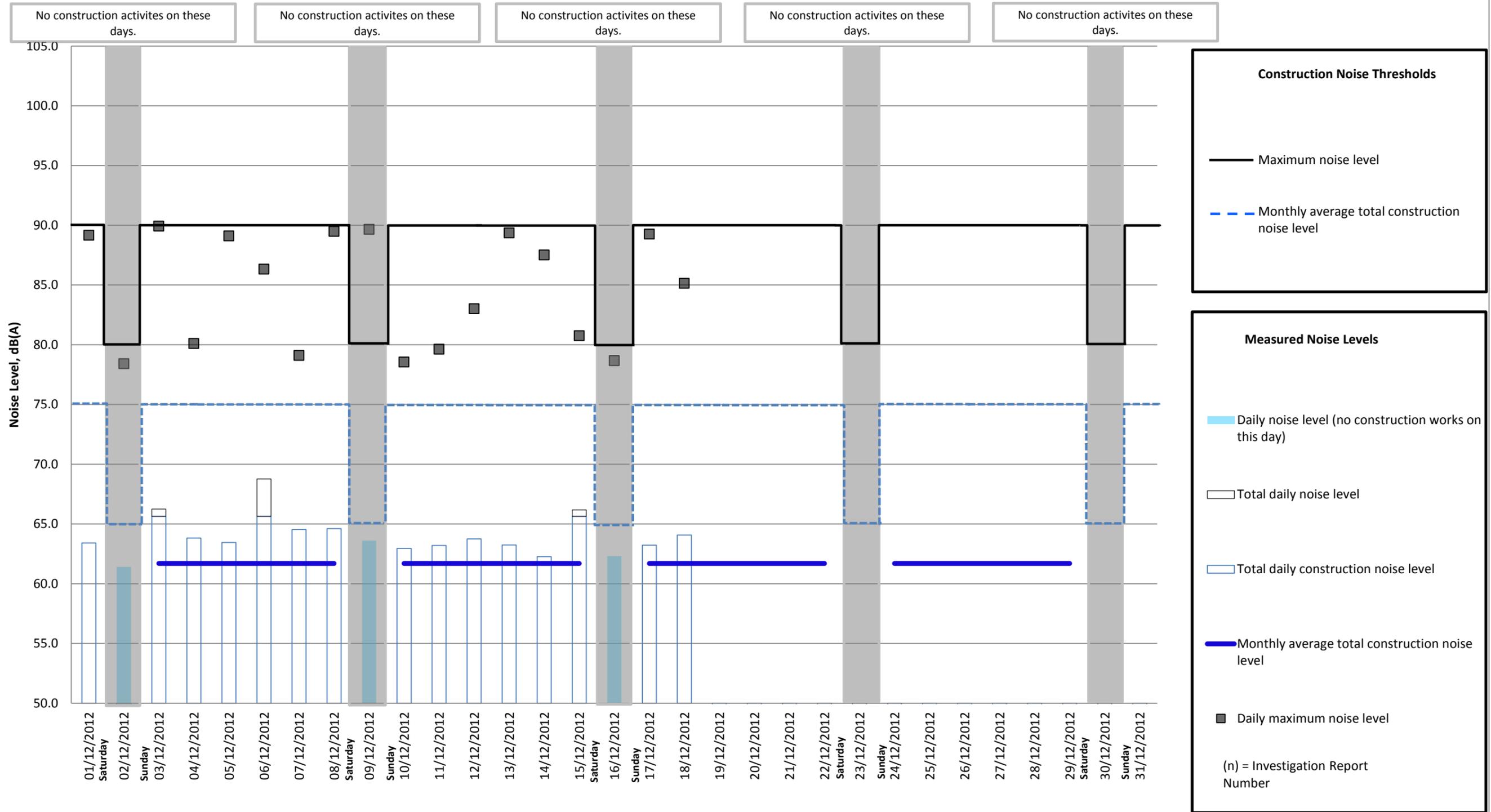


**Note:** The grey areas of the chart represent days on which no construction works have been conducted; no weekend works were conducted during December and no road works were conducted over the festive period (21/12/12 to 07/01/13)

**APPENDIX B -**

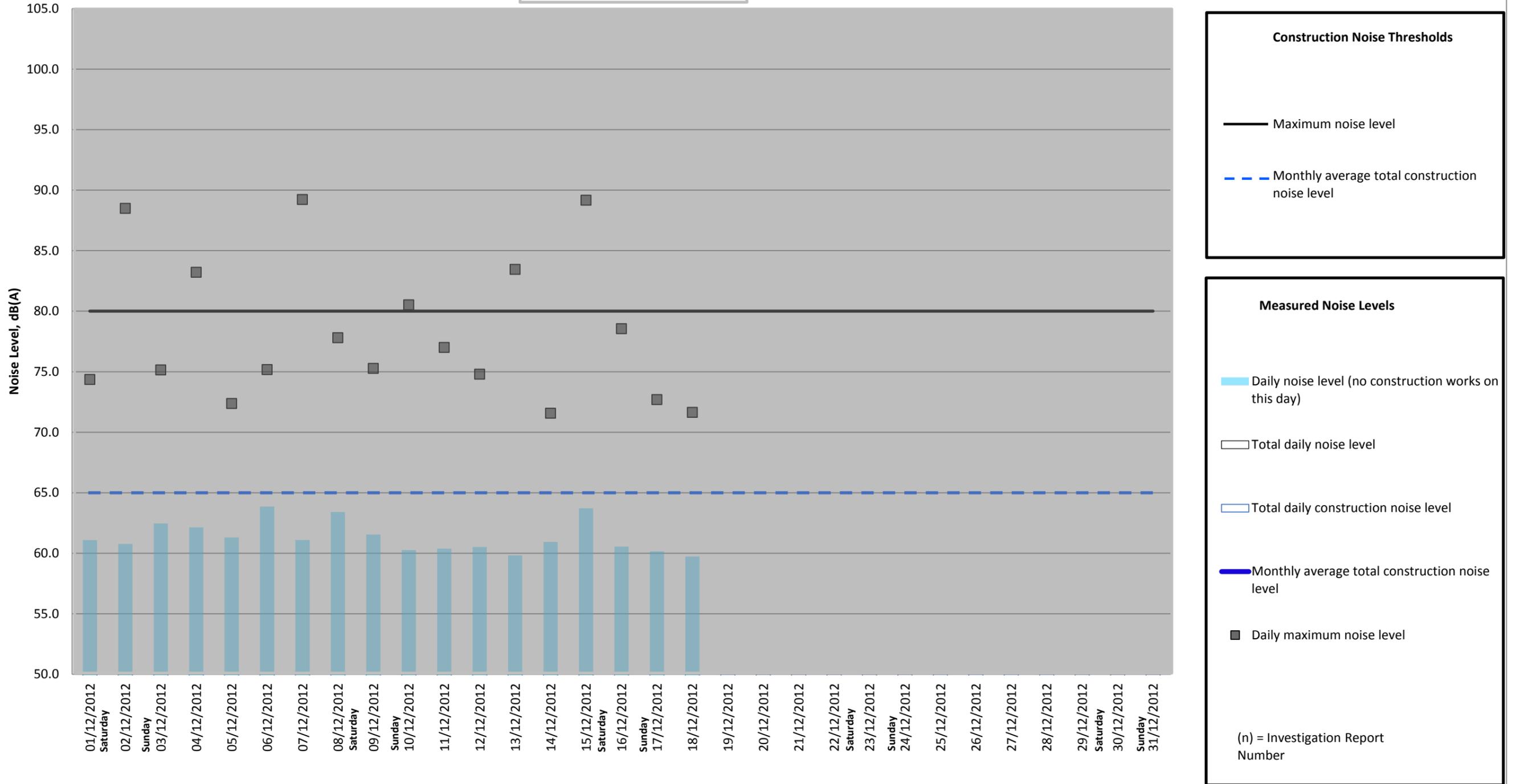
**M9 J1A CONTRACT - CONSTRUCTION  
NOISE MONITORING REPORTS**

## Measured daytime noise levels, 93/95 King Edwards Way (CNV02) Measurement period 1st December to 31st December 2012



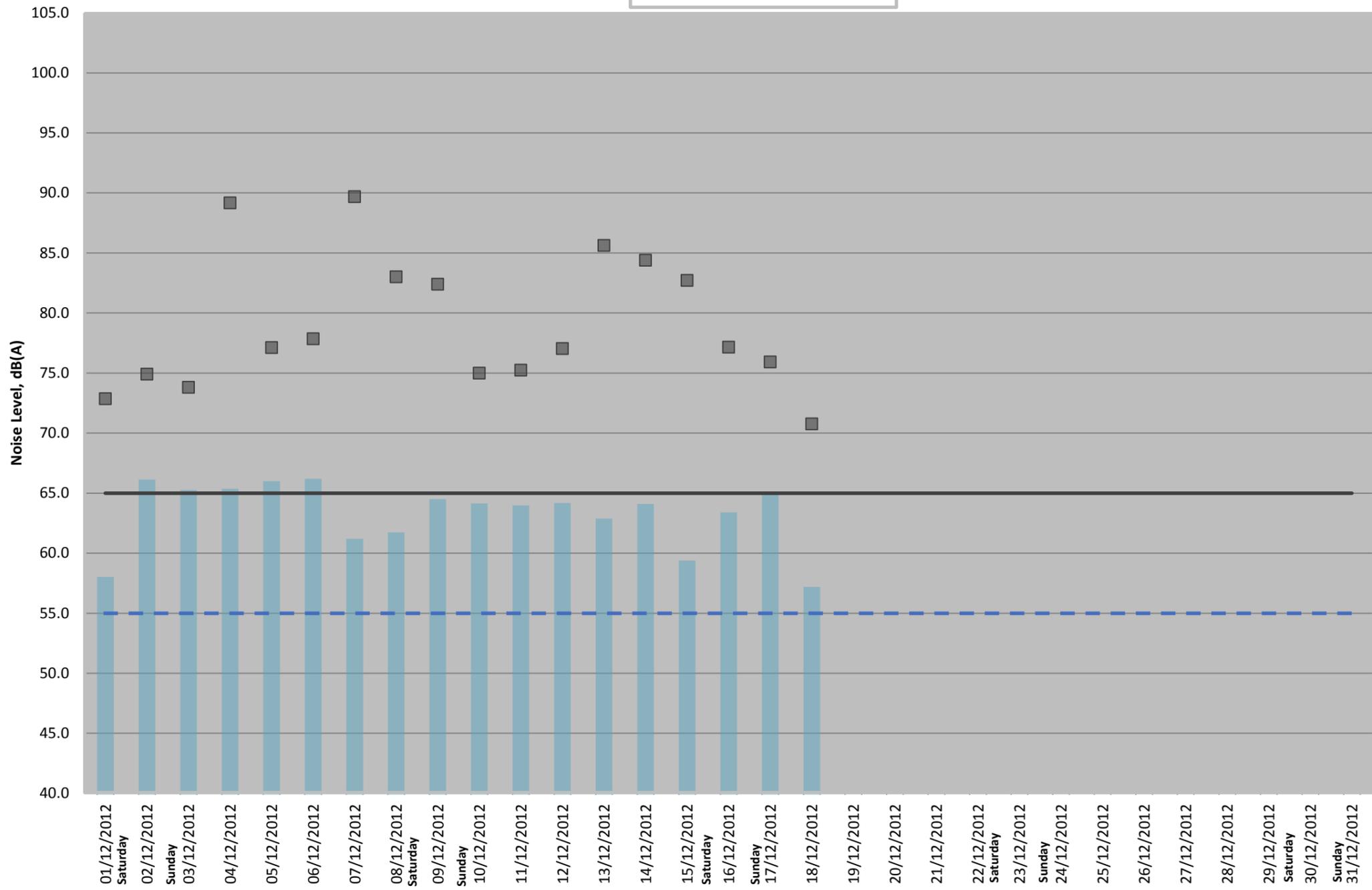
## Measured evening noise levels, 93/95 King Edwards Way (CNV02) Measurement period 1st December to 31st December 2012

No construction activities on these days.



## Measured night-time noise levels, 93/95 King Edwards Way (CNV02) Measurement period 1st December to 31st December 2012

No construction activities on these days.



**Construction Noise Thresholds**

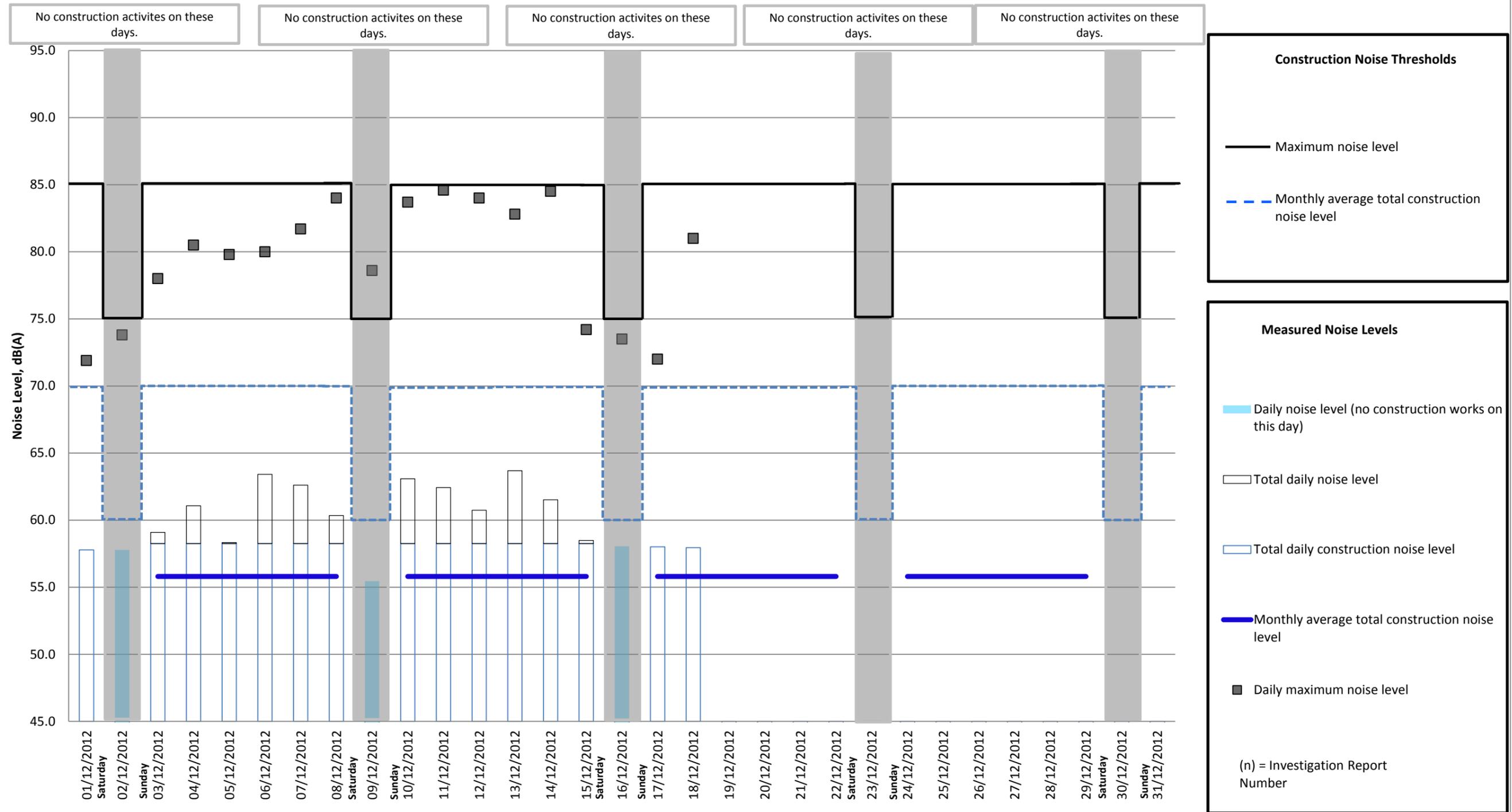
- Maximum noise level
- Monthly average total construction noise level

**Measured Noise Levels**

- Daily noise level (no construction works on this day)
- Total daily noise level
- Total daily construction noise level
- Monthly average total construction noise level
- Daily maximum noise level

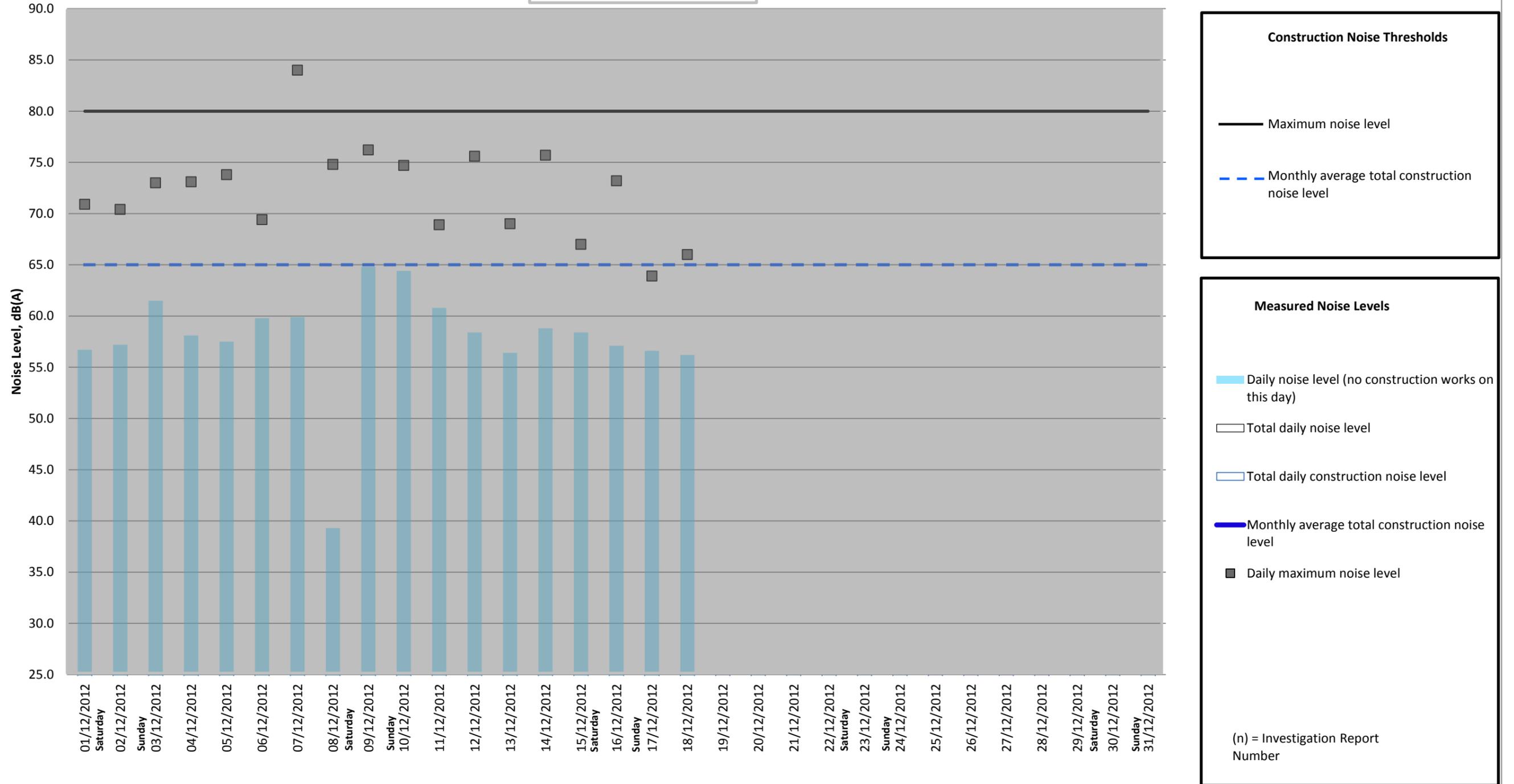
(n) = Investigation Report Number

## Measured daytime noise levels, Buie Rigg (CNV07) Measurement period 1st December to 31st December 2012



## Measured evening noise levels, Buie Rigg (CNV07) Measurement period 1st December to 31st December 2012

No construction activities on these days.



**Construction Noise Thresholds**

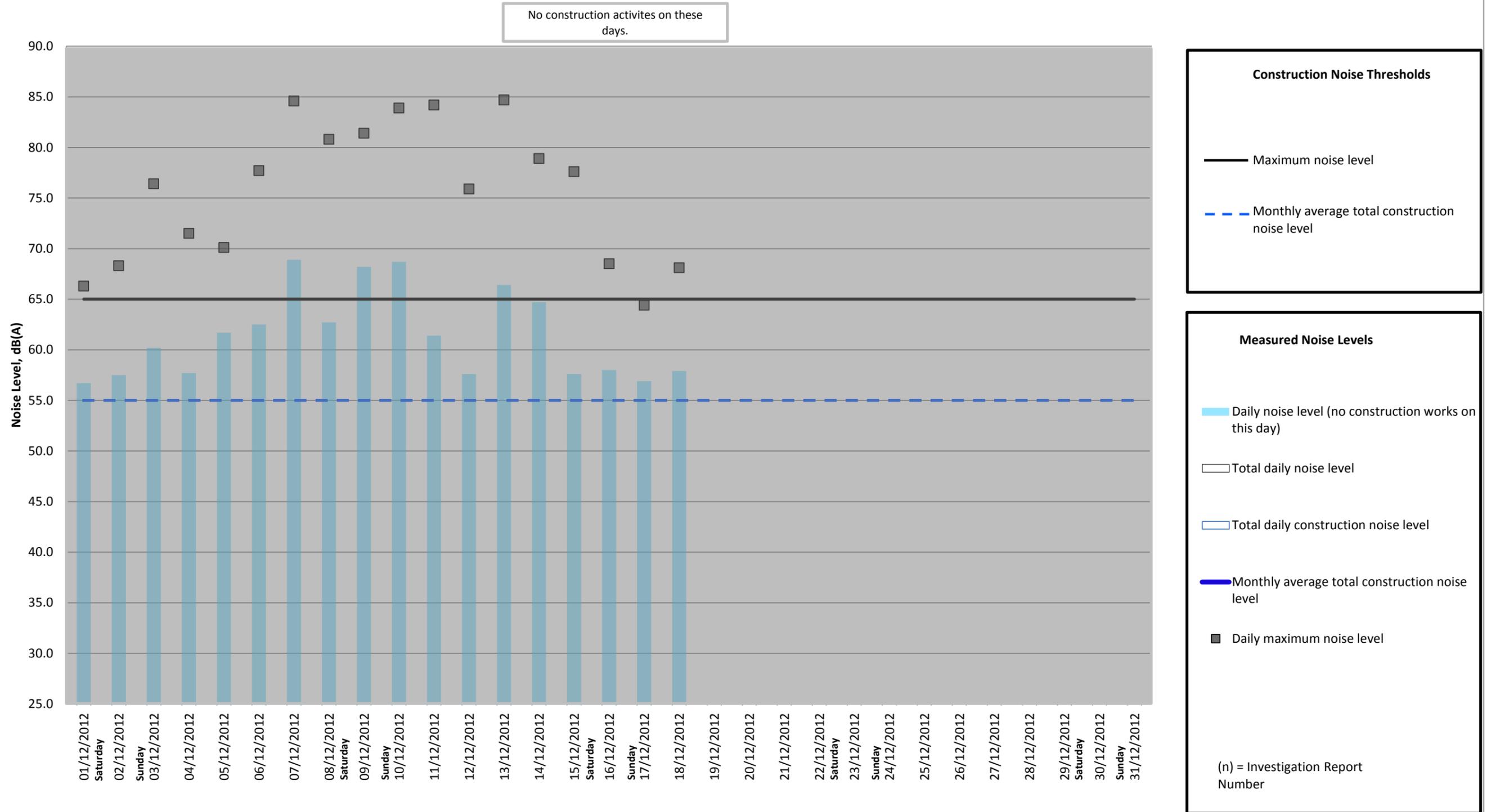
- Maximum noise level
- Monthly average total construction noise level

**Measured Noise Levels**

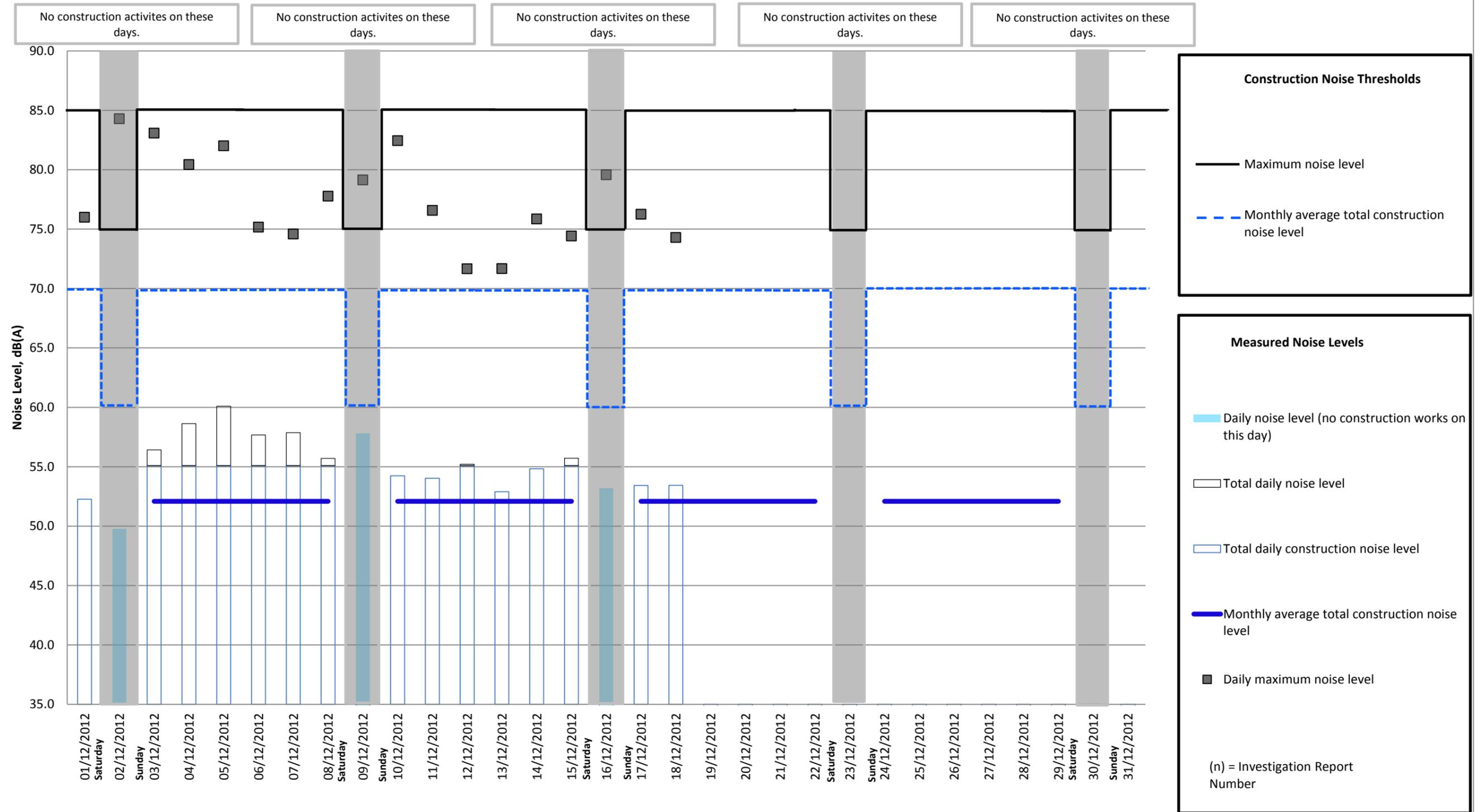
- Daily noise level (no construction works on this day)
- Total daily noise level
- Total daily construction noise level
- Monthly average total construction noise level
- Daily maximum noise level

(n) = Investigation Report Number

## Measured night-time noise levels, Buie Rigg (CNV07) Measurement period 1st December to 31st December 2012

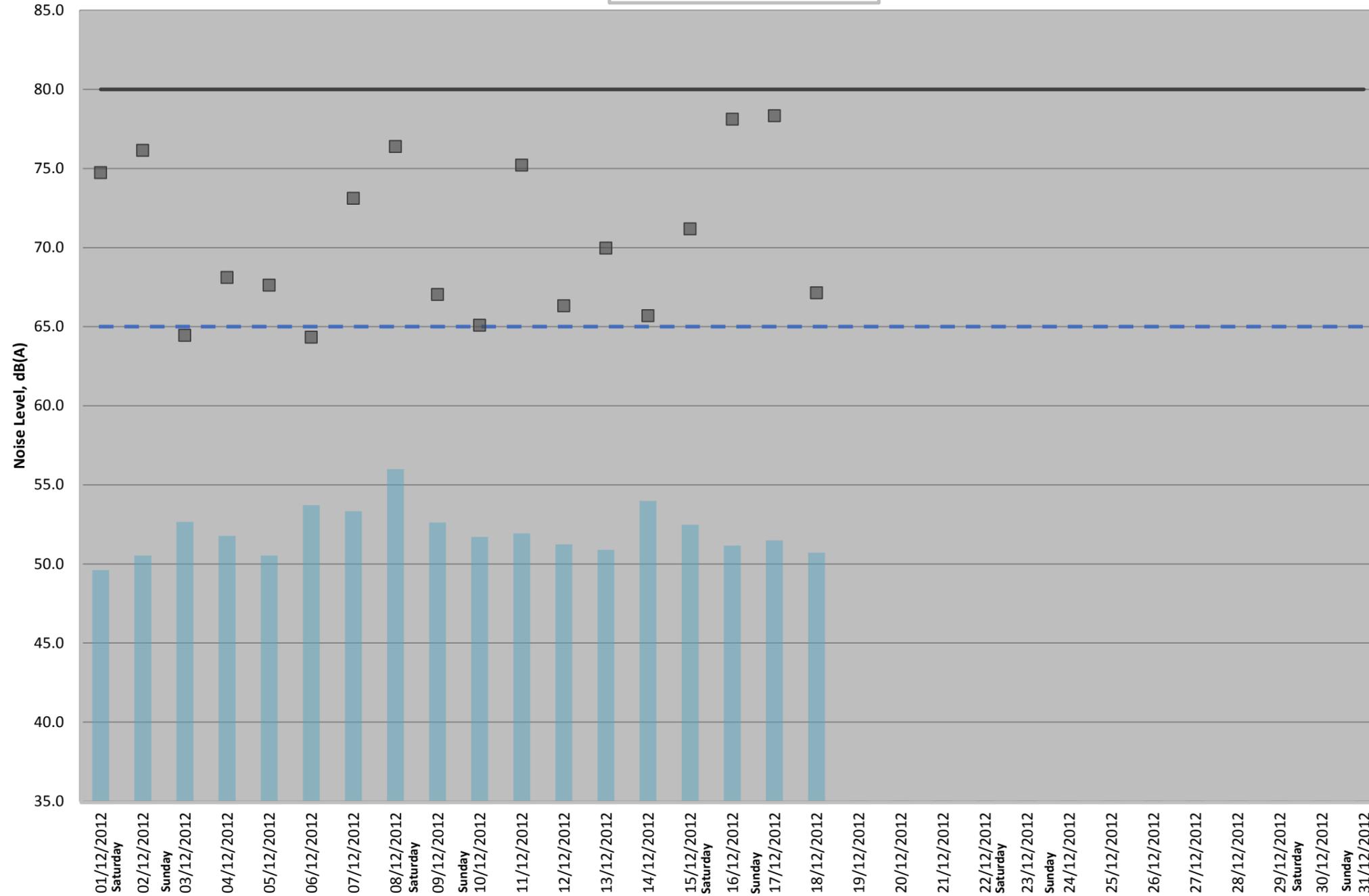


## Measured daytime noise levels, 8 Kirklands Park Grove (CNV16) Measurement period 1st December to 31st December 2012



## Measured evening noise levels, 8 Kirklands Park Grove (CNV16) Measurement period 1st December to 31st December 2012

No construction activities on these days.



**Construction Noise Thresholds**

- Maximum noise level
- Monthly average total construction noise level

**Measured Noise Levels**

- Daily noise level (no construction works on this day)
- Total daily noise level
- Total daily construction noise level
- Monthly average total construction noise level
- Daily maximum noise level

(n) = Investigation Report Number

## Measured night-time noise levels, 8 Kirklands Park Grove (CNV16) Measurement period 1st December to 31st December 2012

