



Contractor



Forth Crossing Bridge Constructors

HOCHTIEF Solutions
American Bridge International
DRAGADOS
Morrison Construction

Project **FORTH REPLACEMENT CROSSING**

Document title

CONSTRUCTION NOISE MONITORING REPORT: JULY 2015

Rev	Rev. Date	Purpose of revision	Made	Checked	Approved
00	07/08/2015	First Revision	SWR	MRN	LSN

Document status

FOR REVIEW

Made by: Steven Westwater
Initials: SWR

Checked By: Michael Richardson
Initials: MRN

Document number

REP-00240

Rev
00

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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 July 2015. The objective of this report is to detail the monitoring that was undertaken across the site during this reporting period and to present the construction noise monitoring results.
- 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 July 2015, construction noise was monitored using permanent, continuous noise monitoring devices (01db DUOs) at locations listed in **Table 1**. These monitors were installed during November and December 2011, with additional monitors installed at Scotstoun Park (Arup's Office) and Newton during March 2012, a further sound level meter was installed at Whinny Hill during April 2012.
- 2.2 Weather stations accompany the noise monitors 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 July 2015. **Table 1** outlines the main construction activities in the location of each monitor.

Table 1: Monitoring Locations

Ref.	Monitoring Location	Crossing or Network	Main Construction Activities During July 2015
M1	Whinny Hill	Network	<ul style="list-style-type: none"> • Earth Works/Fill Placement • New Ferrytoll Road • FT03 & FT04 Bridge Works • FT09 Works • FT19 Works • Roadworks
M3	Tigh-Na-Grian	Crossing	<ul style="list-style-type: none"> • Central Tower rebar, formwork, concreting works deck table installation works • North Tower rebar, formwork, concreting works deck table installation works • Pier N1 rebar formwork & concrete works • AVN works
M4	North Leg	Crossing	<ul style="list-style-type: none"> • Central Tower rebar, formwork, concreting works deck table installation works • North Tower rebar, formwork, concreting works deck table installation works • Pier N1 rebar formwork & concrete works
M6	Port Edgar	• Crossing	<ul style="list-style-type: none"> • Central Tower rebar, formwork, concreting works deck table installation works • South Tower rebar, formwork, concreting works deck table installation works • Pier S2 foundation work • Pier S1 rebar, formwork & concrete works
M7	Butlaw Fisheries	Crossing	<ul style="list-style-type: none"> • Pier S1, rebar, formwork & concrete works • Pier S2 foundation work • Central Tower rebar, formwork, concreting works deck table installation works • South Tower rebar, formwork, concreting works deck table installation works
M10	Inchgarvie Lodge	Crossing	<ul style="list-style-type: none"> • Launch – snagging and bearing installation • Pier S1, rebar, formwork & concrete works • Central Tower rebar, formwork, concreting works deck table installation works • South Tower rebar, formwork, concreting works deck table installation works. • Main carriageway earthworks

M11	Linn Mill	Network (close proximity to Crossing)	<ul style="list-style-type: none"> • Launch – snagging and bearing installation • No night time or Sunday construction in the vicinity • Main carriageway earthworks
M13	Clufflat Brae	Crossing / Network	<ul style="list-style-type: none"> • Launch – snagging and bearing installation • No night time or Sunday construction in the vicinity • Main carriageway earthworks
M14	Springfield	Network	<ul style="list-style-type: none"> • Launch – snagging and bearing installation • No night time or Sunday construction in the vicinity • Main carriageway earthworks
M15	Echline	Network	<ul style="list-style-type: none"> • Launch – snagging and bearing installation • No night time or Sunday construction in the vicinity • Main carriageway earthworks
M16	Scotstoun	Network	<ul style="list-style-type: none"> • Arup Access works • Footpath works • Utility works • Concrete finishing works at ESQ04 • B800 North road works including bridge works (these works are directly in the location of the meter which now sits within the construction boundary).
M17	Dundas Home Farm	Network	<ul style="list-style-type: none"> • Utility works • Concrete finishing works at ESQ04 • B800 South road works including bridge works etc... • Main carriageway works
M18	Newton	Network	<ul style="list-style-type: none"> • No works

3 Noise Monitoring Results

Overview

3.1 Noise monitoring results are presented in graphs (**Appendix A**) using the template provided in the *Construction Noise Monitoring Information Note* (www.transportscotland.gov.uk).

3.2 With regard to the noise monitoring graphs, 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 are undertaken during the daytime only.
- Linn Mill is considered as a network location which has the potential to receive noise from the marine works near the south shore. As a result, evening and night time data has been included for this location.
- Noise data for day, evening and night on which no construction works were conducted have been excluded from the monthly average results presented in the graph. L_{AFmax} exceedances during these periods would have been caused by non-construction related factors and do not require investigation. Noise results (L_{Aeq} and L_{AFmax}) for any day, evening and night on which no construction works have been conducted have been presented in the graphs in greyed out areas.
- An average for Sunday construction noise data has been included where applicable; in locations where no Sunday works were conducted no average is shown.
- As set out in the CoCP, the assessment time for evening, nights and Sunday daytime is in one 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.
- It has been indicated on the graphs where noise data is missing for day, evening or night during which construction works were conducted. Results for the North leg are unavailable due to inaccessibility of the monitor location in July 2015. Wireless connection to the monitor is to be repaired in August 2015.

Results

- 3.3** Results demonstrate that the monthly average total of construction noise results for daytime are within the threshold levels for all monitoring locations during July 2015. For the night time periods, there were exceedances of monthly average construction noise at Butlaw and Tigh-Na Grian. There are no exceedances of Sunday averages, with the exception of Butlaw Fisheries however these occurred on Sunday night only.
- 3.4** The rises in daytime exceedances at Scotstoun are likely to be due to the very close proximity of construction to the monitoring location. The works are very similar to previous works in the vicinity and construction noise levels at residential receptors were unlikely to be higher than before. No residential complaints were received from any of the residents in the location of the works during this period.
- 3.5** The exceedances noted are not thought to have been caused by increased noise levels due to construction. Each exceedance was found to be affected by increased noise levels due to periods of weather, traffic, residential noise or bird noise. Audio demonstrates that the increased levels were caused by waves and birds at Butlaw Fisheries, birds and resident activity at Inchgarvie and birds at Tigh-na-Grian (With regard to the averages reported for evening and night time periods, it should be noted that these averages are based only on the highest L_{Aeq} levels for 1 hour periods which can affect the averages).
- 3.6** During July 2015, some exceedances of the maximum noise thresholds occurred. Each exceedance of the threshold was investigated using triggered audio recordings, records of construction works (i.e. site programmes and diaries and daily marine reports) and analysis of weather station data, where required for these investigations. A Noise and Vibration Investigative Report (NVIR) spread sheet has been produced detailing the results of the investigation for each exceedance. There were some exceedances this month that were due to construction work (See 3.7).

- 3.7** During the month of July it was noted that there was construction related noise at Linn Mill and Tigh-na-Grian. The exceedances at Linn Mill occurred during the day on the 4th, 10th, 14th and 21st and seem to be coming from the Scaffold/Timber storage area which is near the noise monitor. The Environmental team have contacted the relevant site agent and asked that staff be reminded to keep noise to a minimum, the environmental team will continue to monitor the situation closely. An exceedance occurred at Tigh-na-grian on the night of 7th July and is believed to be from works at the Forth Road Bridge, The exceedances at night on the 15th, 23rd and 24th are construction related, The 15th resulted from anchor buoy banging against the barge. The exceedances on the 23rd are caused by hammering and the barge hitting against the cofferdam. The environmental team contacted the site agent and these issues were resolved straight away. There were also construction related exceedances at Scotstoun (see 3.4).
- 3.8** The majority of exceedances at all locations were caused by factors including periods of localised noises at nearby properties such as traffic, residential noise and birds. At some locations, notably Scotstoun and Echline, existing traffic noise had an effect on maximum noise levels during the period covered in this report. Butlaw Fisheries also records a high number of waves against the shore during times of bad weather and high tides.
- 3.9** A summary of the findings for exceedances occurring at each of the locations can be found in Table 2.

Table 2: Summary of Exceedances at Monitoring Locations

Monitoring Location	Summary of Exceedance Details
Butlaw Fisheries	During July the maximum noise threshold was exceeded on 53 occasions (15 day time, 8 evening and 30 night time). No exceedances were related to construction works. Exceedances were attributed to non-construction factors notably birds, traffic, waves and fireworks.
Clufflat Brae	During July the maximum noise threshold was exceeded on 37 occasions (11 daytime, 4 evening and 22 night time). No exceedances were found to be due to construction works. Exceedances were found to be largely due to birds and residential activity.
Inchgarvie Lodge	During July the maximum noise threshold was exceeded on 68 occasions (19 day time, 20 evening and 29 night time). No exceedances were attributed to construction works. Investigations found residents having work done to his property and the resident's car the main contributing factors to the exceedances in this location. Other factors included birds and monitor maintenance.
Linn Mill	During July the maximum noise threshold was exceeded on 55 occasions (14 daytime, 14 evening and 27 night time). The majority of exceedances at this location were due to birds. There were 4 instances of construction noise exceeding the threshold (see 3.7)
Tigh-Na-Grian	During July the maximum noise threshold was exceeded on 23 occasions (7 daytime, 0 evening and 16 night time). There were 4 instances of construction noise exceeding the threshold (see 3.7) Other exceedances were due to birds and weather.
Dundas Home Farm	During July the maximum noise threshold was exceeded on 16 occasions. These exceedances were not caused by construction works. The exceedances were due to residents and birds.
Echline	During July the maximum noise threshold was exceeded on 25 occasions. No exceedances at this location were due to construction activities. All exceedances were attributed to vehicles passing by on the adjacent roads.
Springfield	During July the maximum noise threshold was exceeded on 18 occasions. These exceedances were due to, local residents and their pet (dog). The monitor is situated within a garden with a dog next door.
Scotstoun	During July the maximum noise threshold was exceeded on 27 occasions. The majority of these exceedances were due to construction; this is due to the location of the current meter being in the immediate vicinity of on-going works on the B800. However a number of exceedances were attributed to vehicles passing (including Sundays) on the adjacent road
Whinny Hill	During July the maximum noise threshold was exceeded on 13 occasions. Exceedances were not due to construction activities. Mostly, exceedances were due to monitor maintenance and weather.
North Leg	No data is reported in this report due to limited accessibility to this device. Wireless operation is unavailable and awaiting repair which is scheduled for August 2015.
Port Edgar	Recordings taken for data purposes
Newton	Recordings taken for data purposes



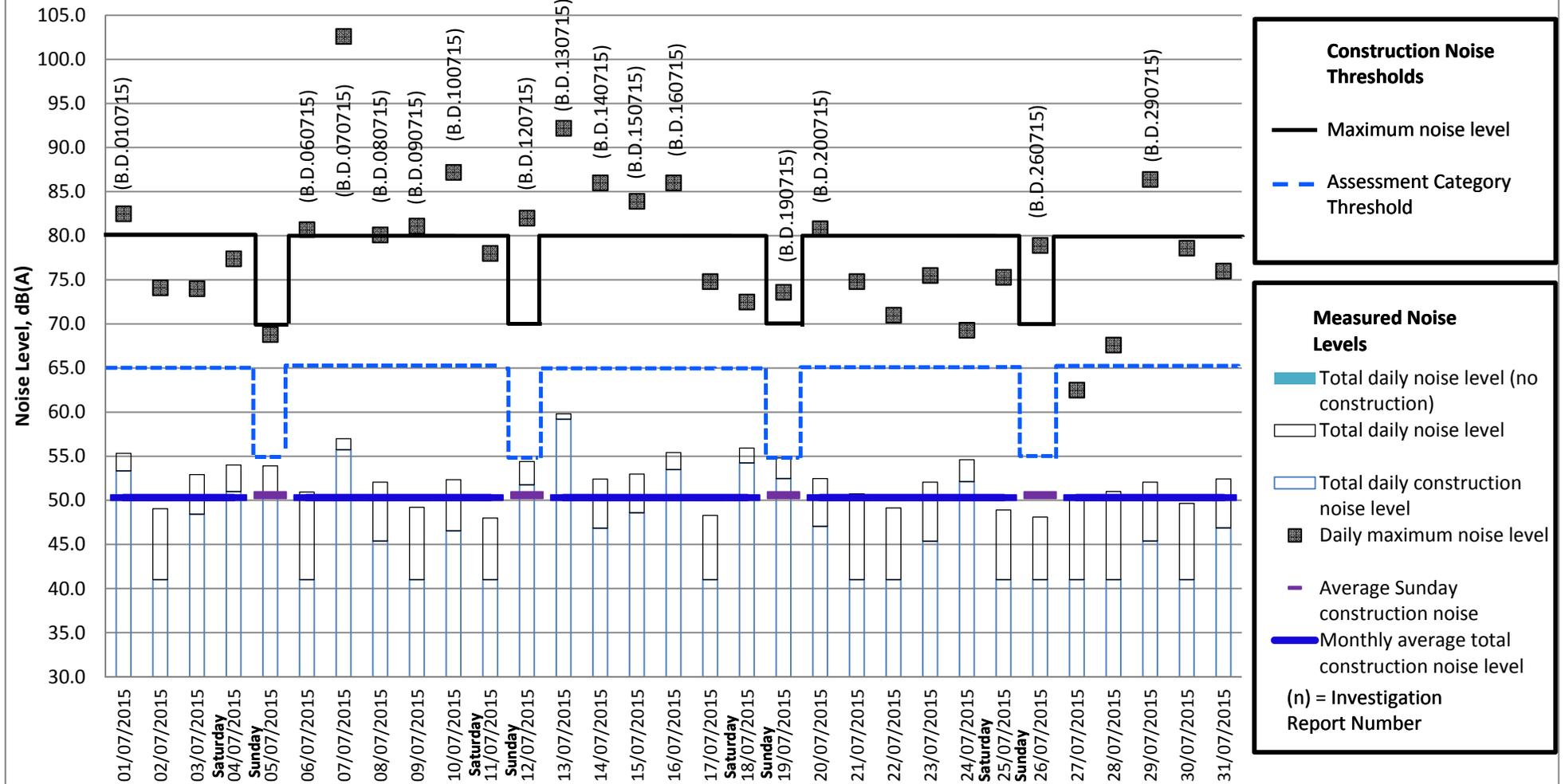
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APPENDIX A

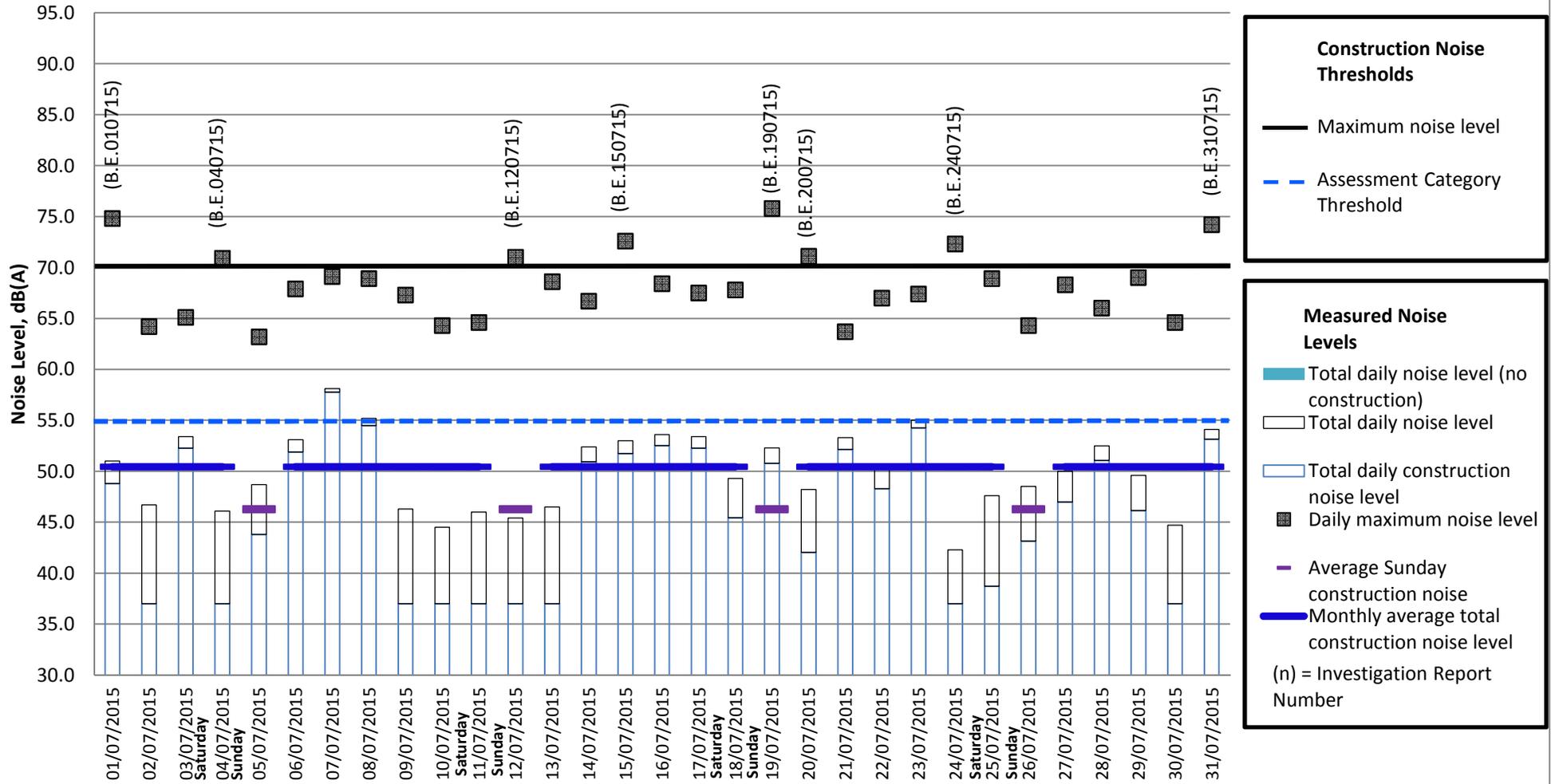
Measured Daytime Noise Levels at Butlaw Fisheries

Measurement period: July 2015



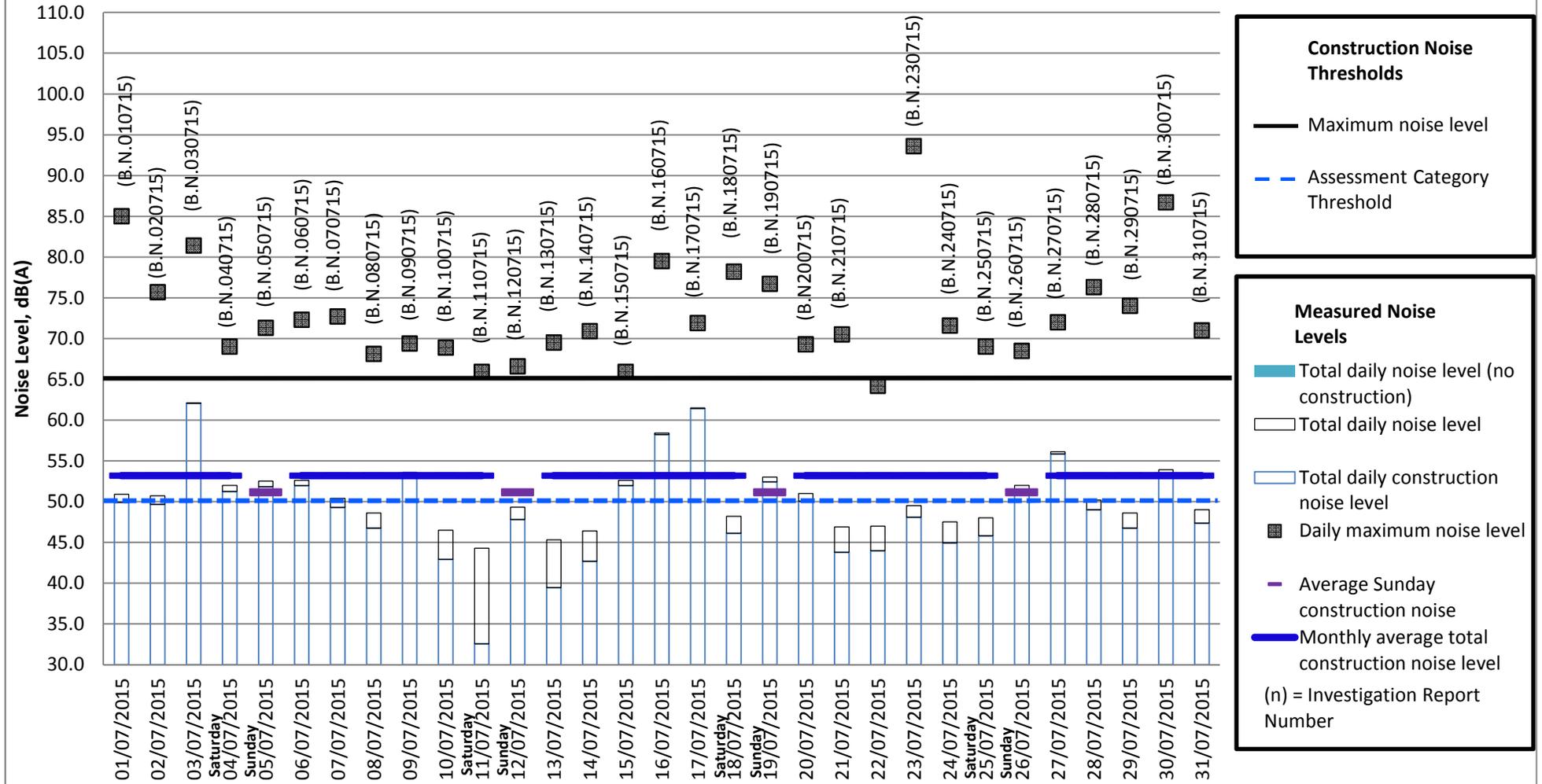
Measured Evening Noise Levels at Butlaw Fisheries

Measurement period: July 2015



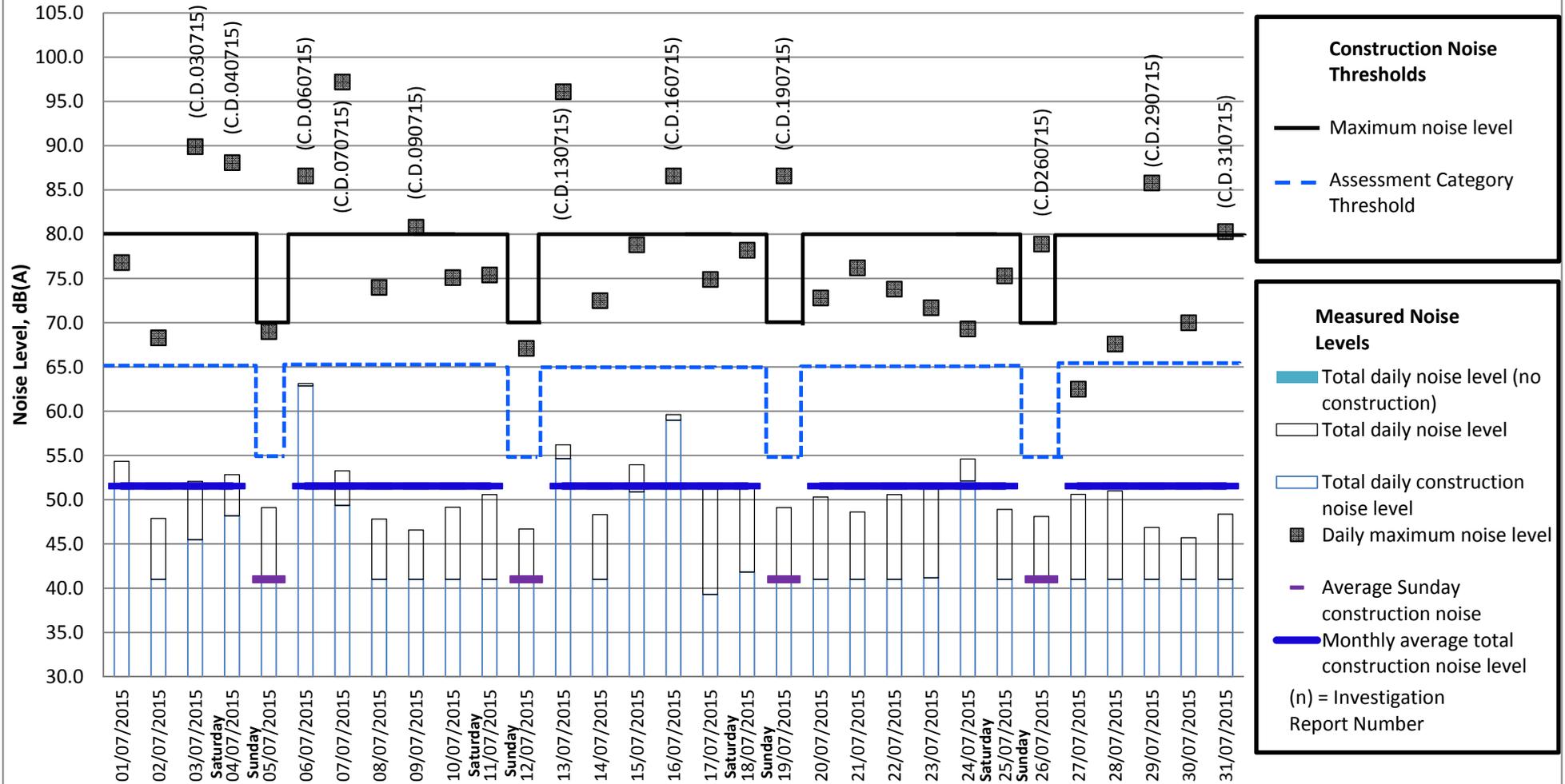
Measured Night time Noise Levels at Butlaw Fisheries

Measurement period: July 2015



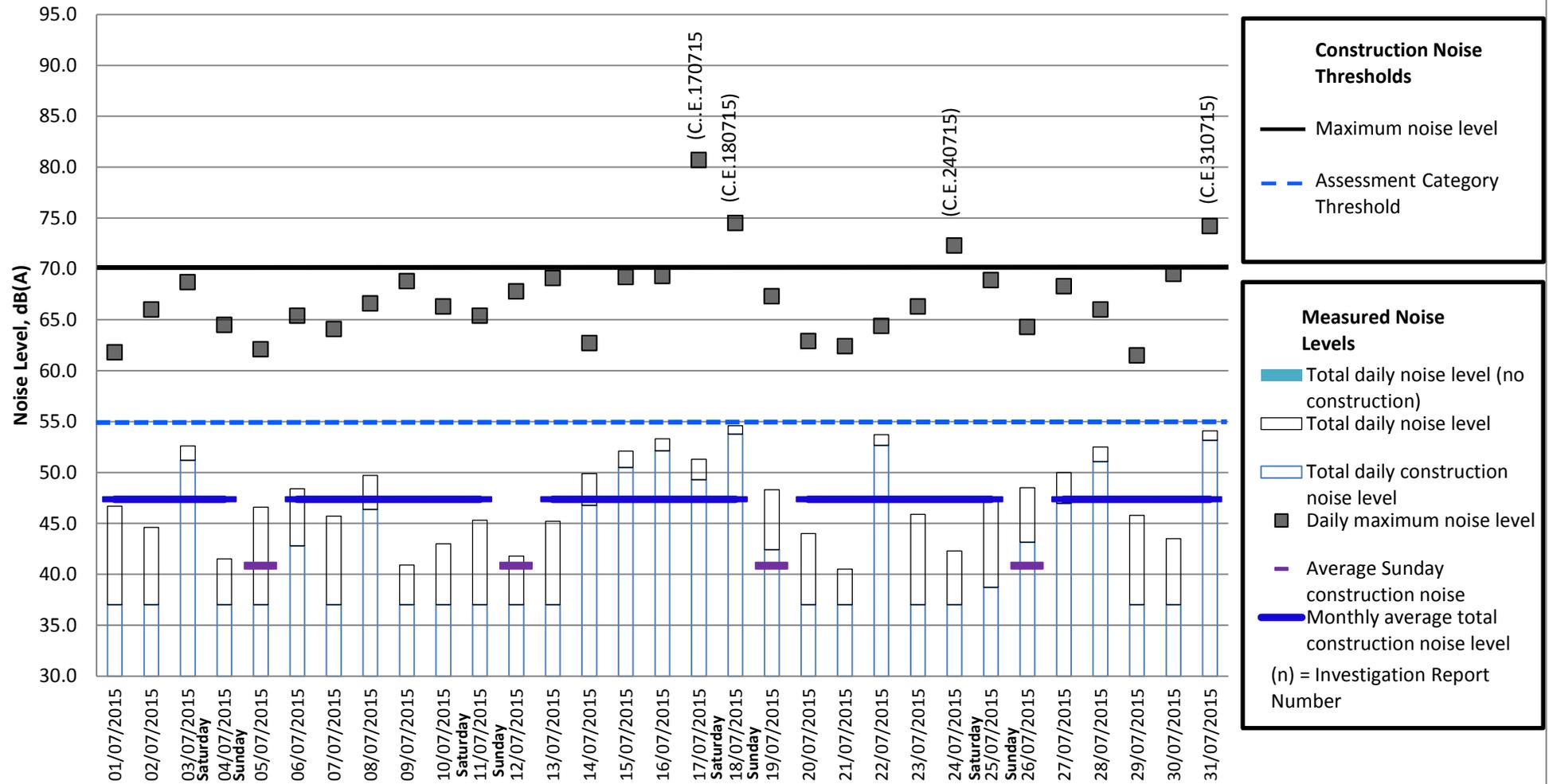
Measured Daytime Noise Levels at Clufflat Brae

Measurement period: July 2015



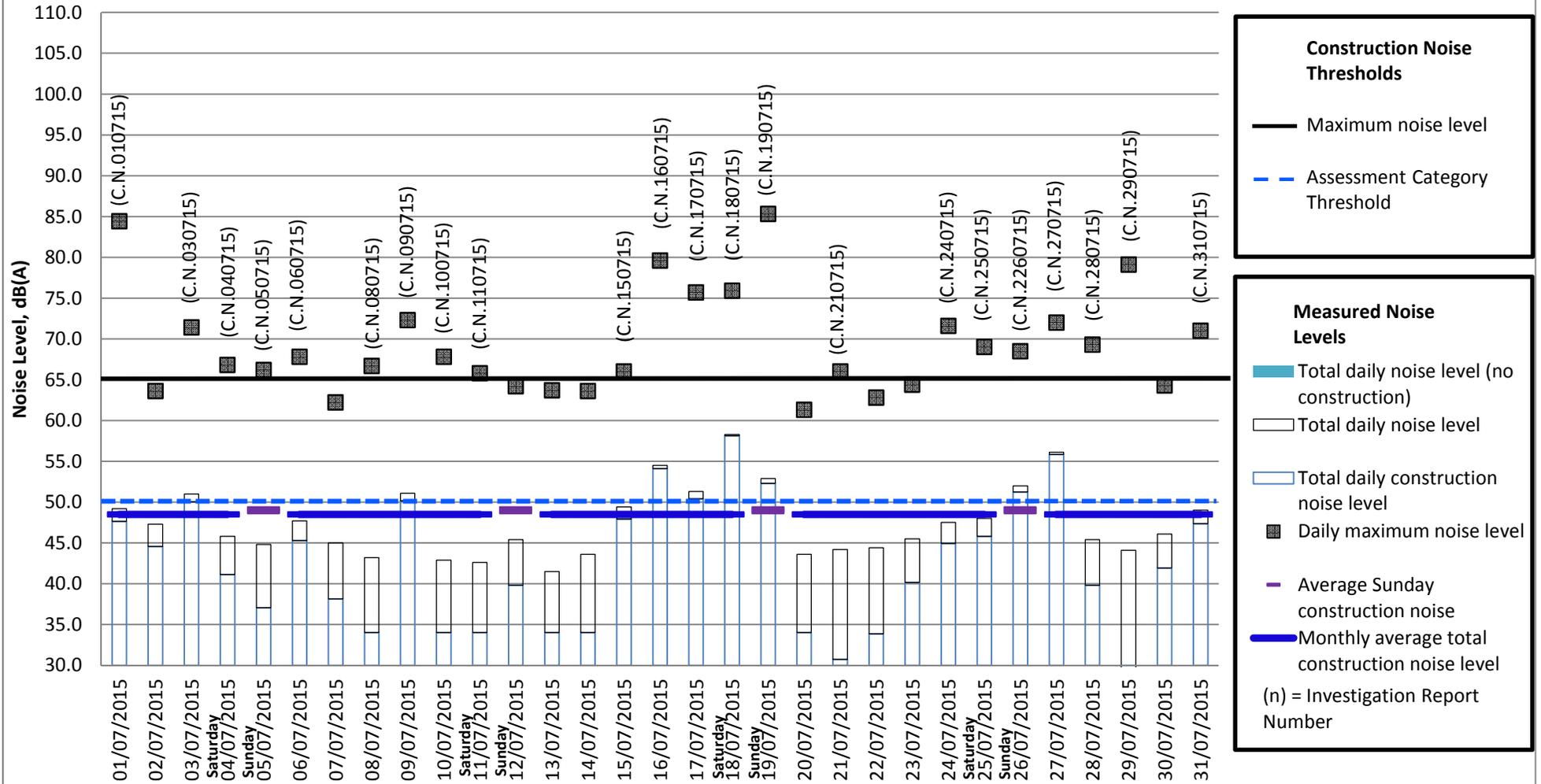
Measured Evening Noise Levels at Clufflat Brae

Measurement period: July 2015



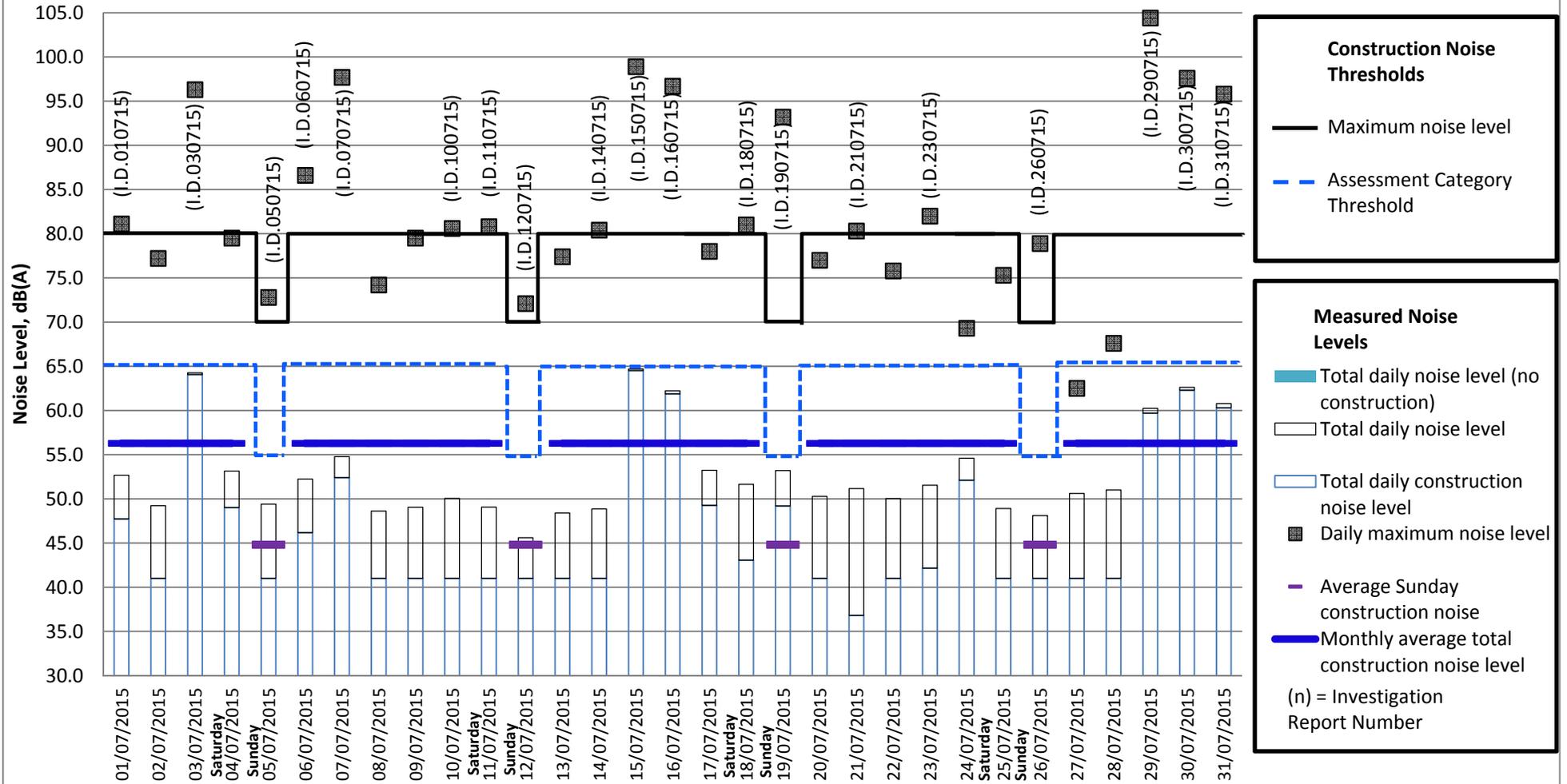
Measured Night time Noise Levels at Clufflat Brae

Measurement period: July 2015



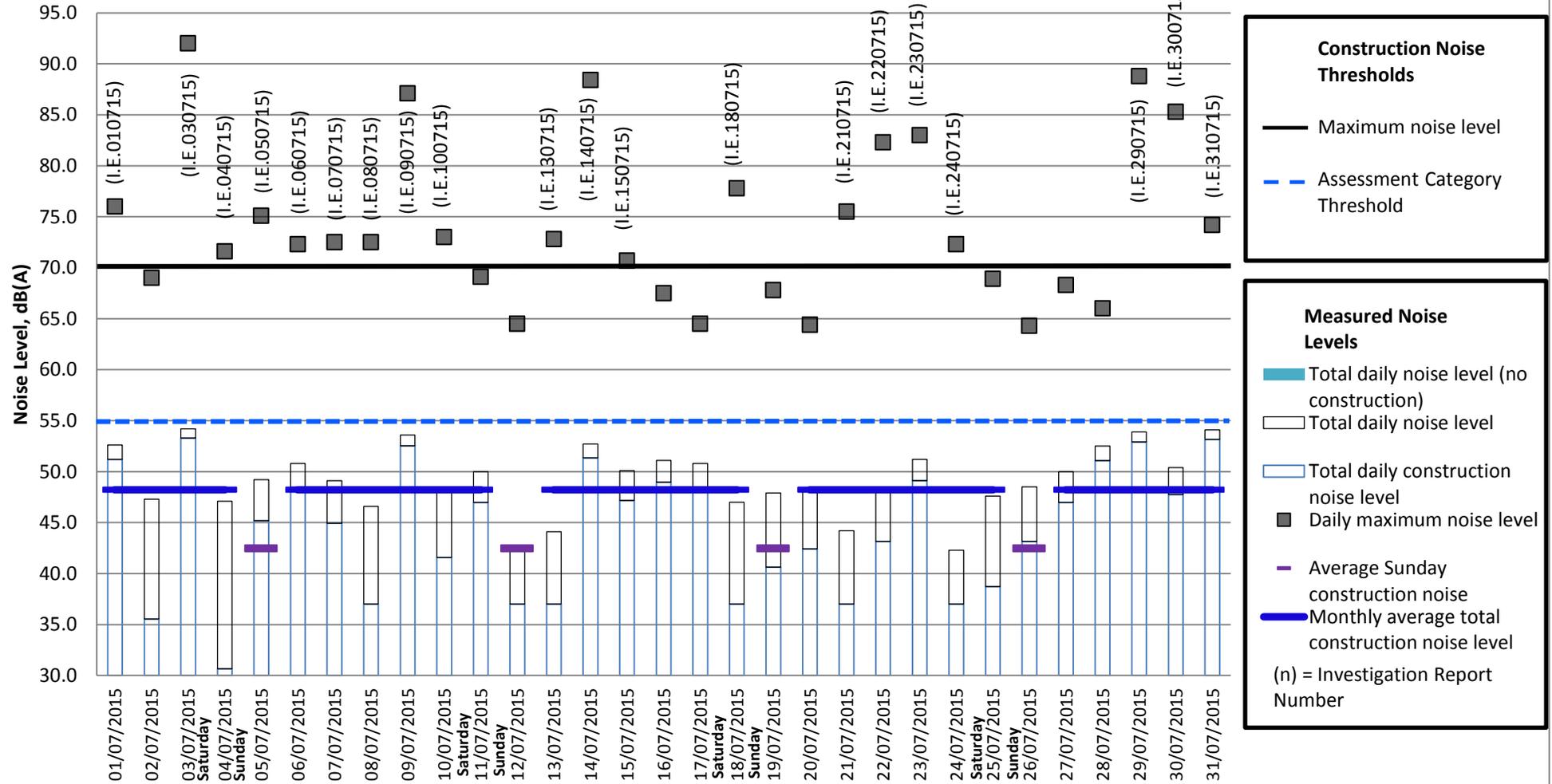
Measured Daytime Noise Levels at Inchgarvie

Measurement period: July 2015



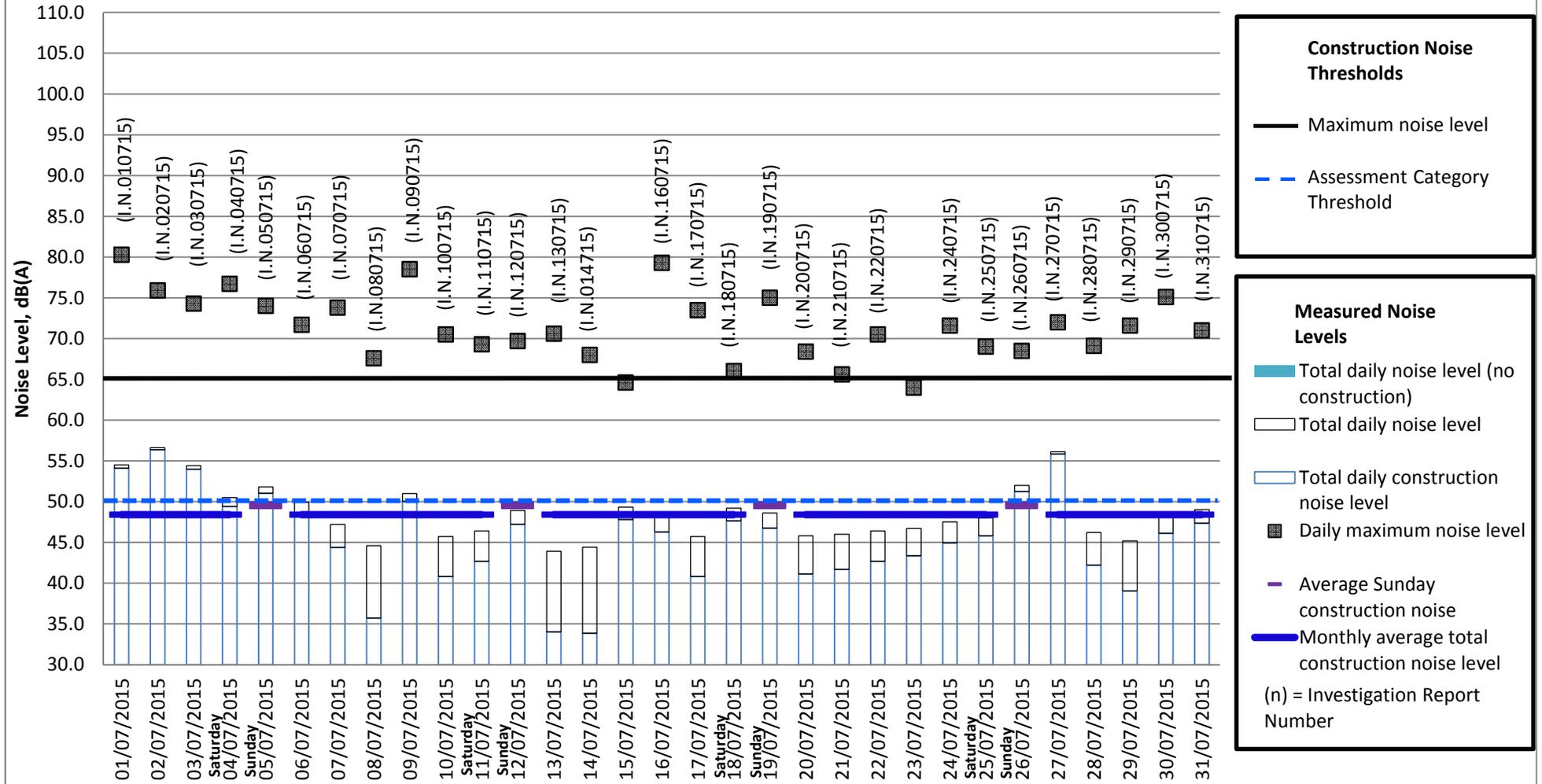
Measured Evening Noise Levels at Inchgarvie

Measurement period: July 2015



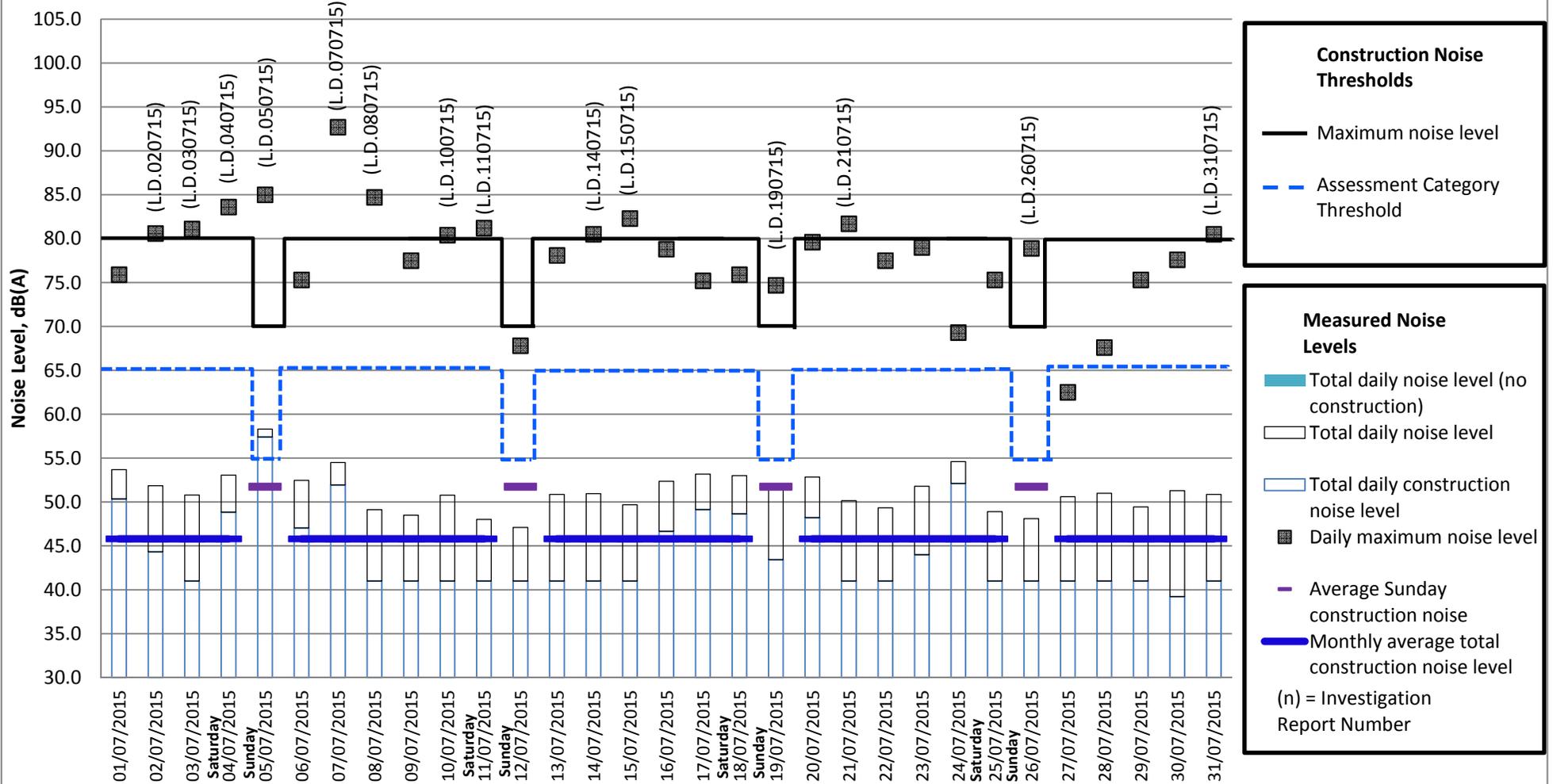
Measured Night time Noise Levels at Inchgarvie

Measurement period: July 2015



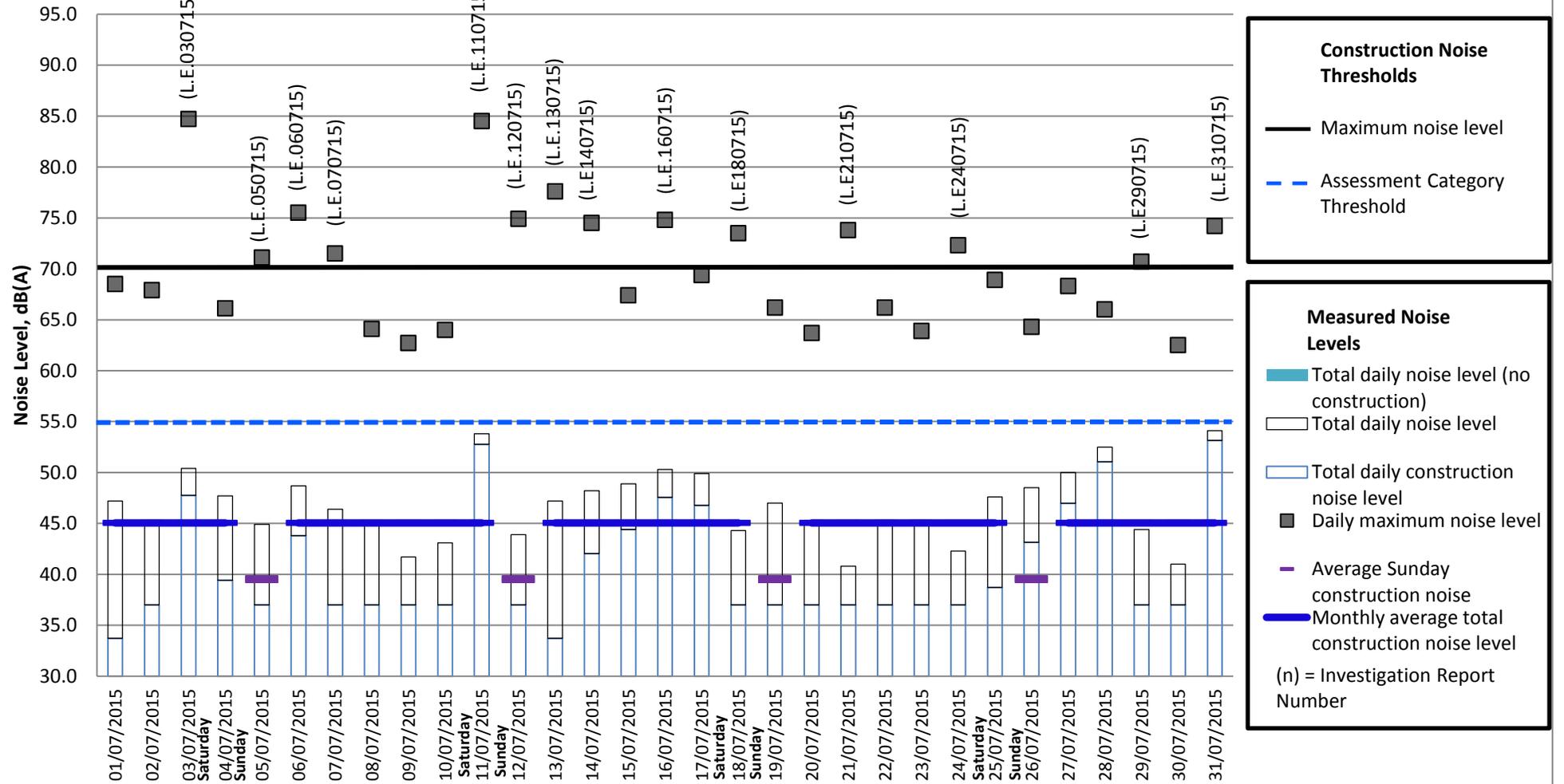
Measured Daytime Noise Levels at Linn Mill

Measurement period: July 2015



Measured Evening Noise Levels at Linn Mill

Measurement period: July 2015



Construction Noise Thresholds

- Maximum noise level
- Assessment Category Threshold

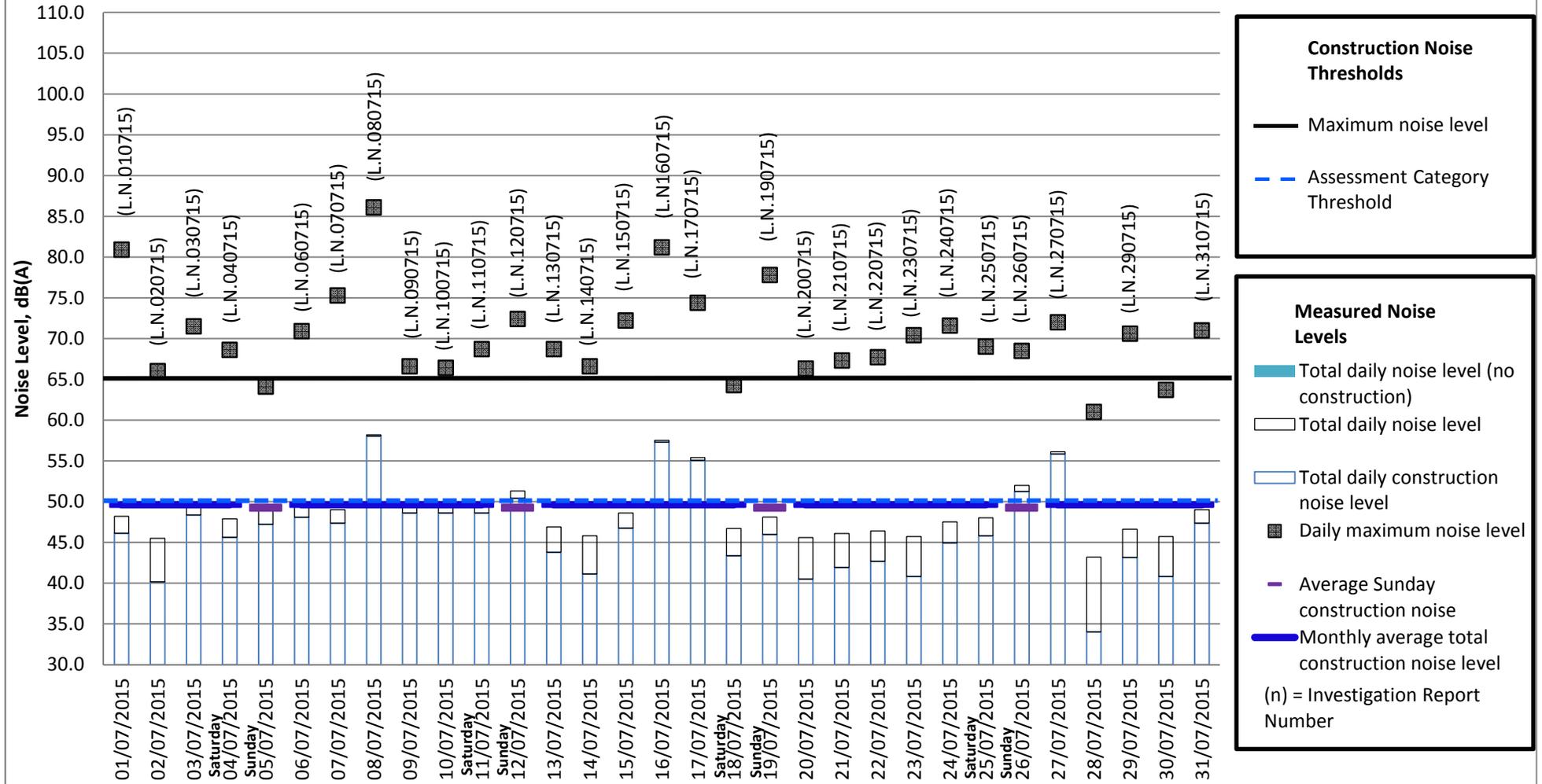
Measured Noise Levels

- 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

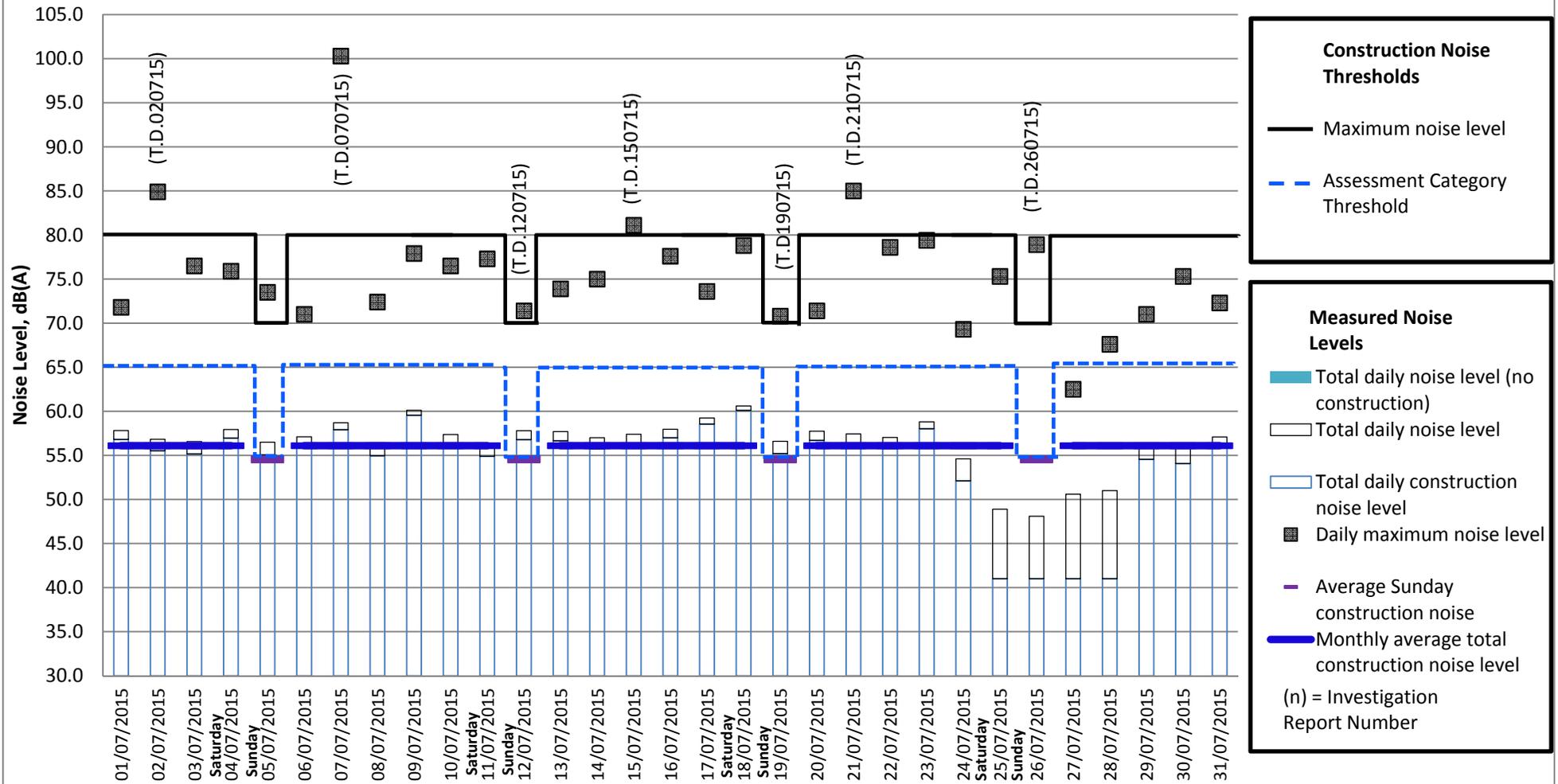
Measured Night time Noise Levels at Linn Mill

Measurement period: July 2015



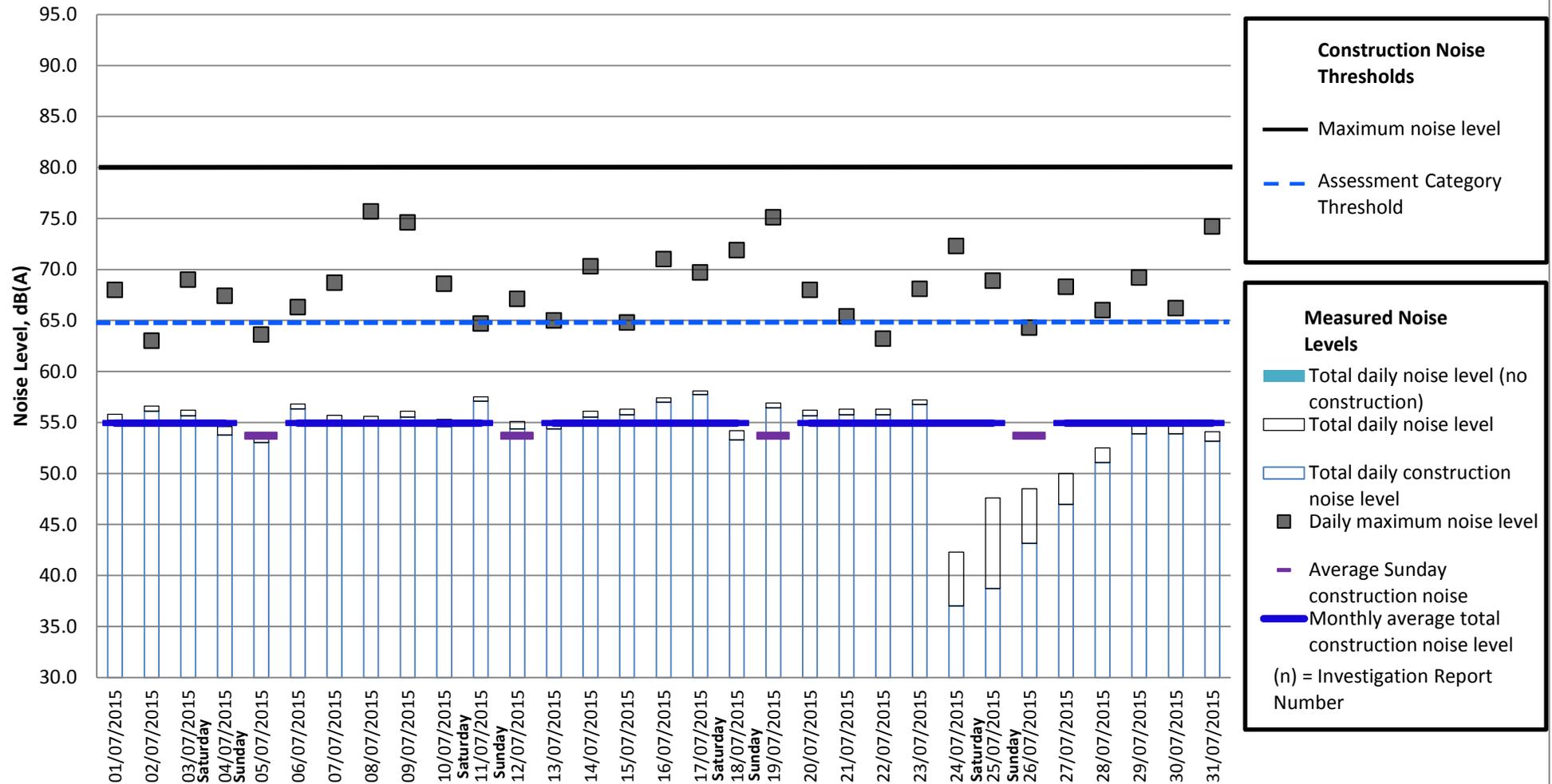
Measured Daytime Noise Levels at Tigh-Na Grian

Measurement period: July 2015

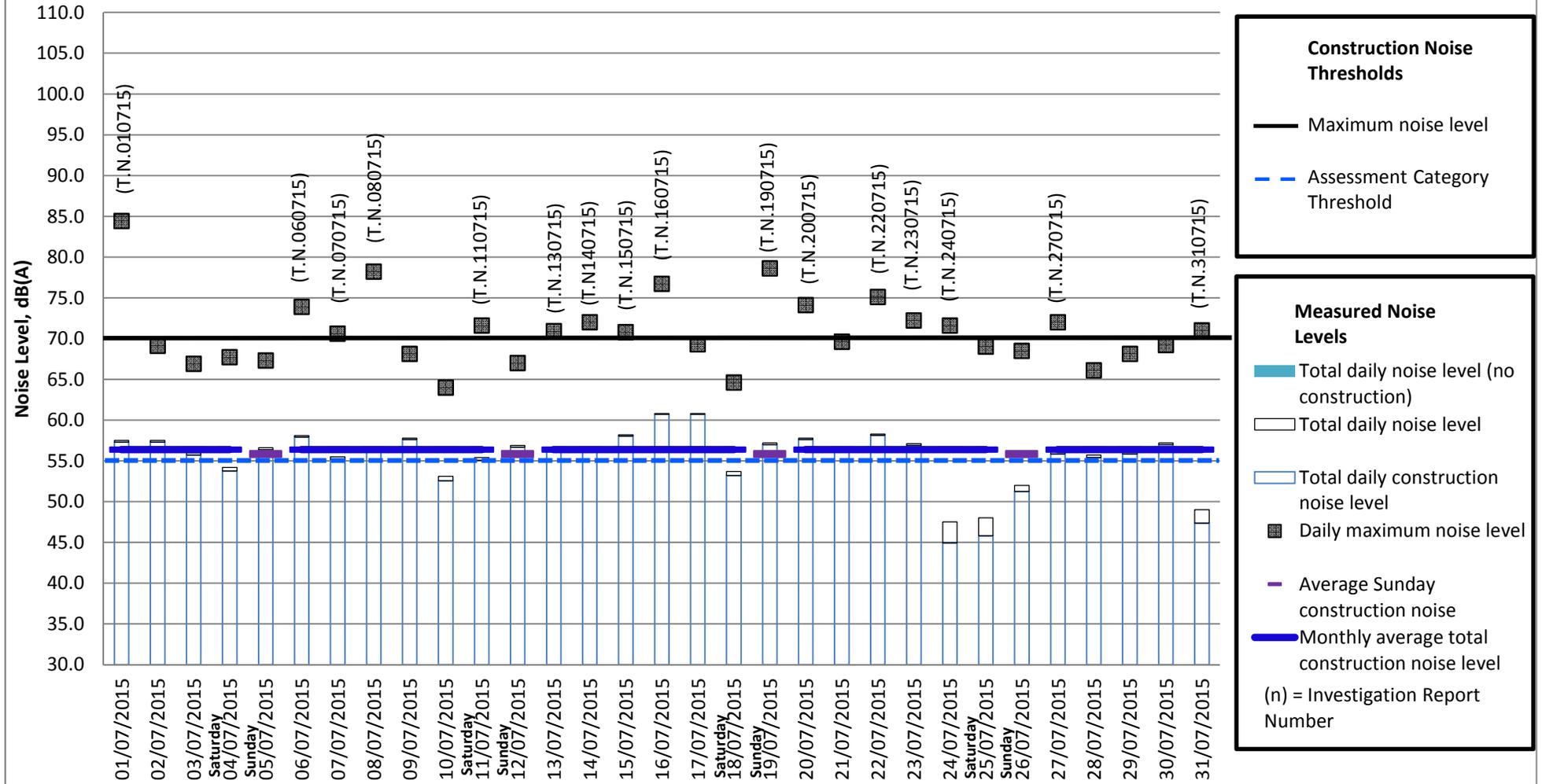


Measured Evening Noise Levels at Tigh-Na Grian

Measurement period: July 2015

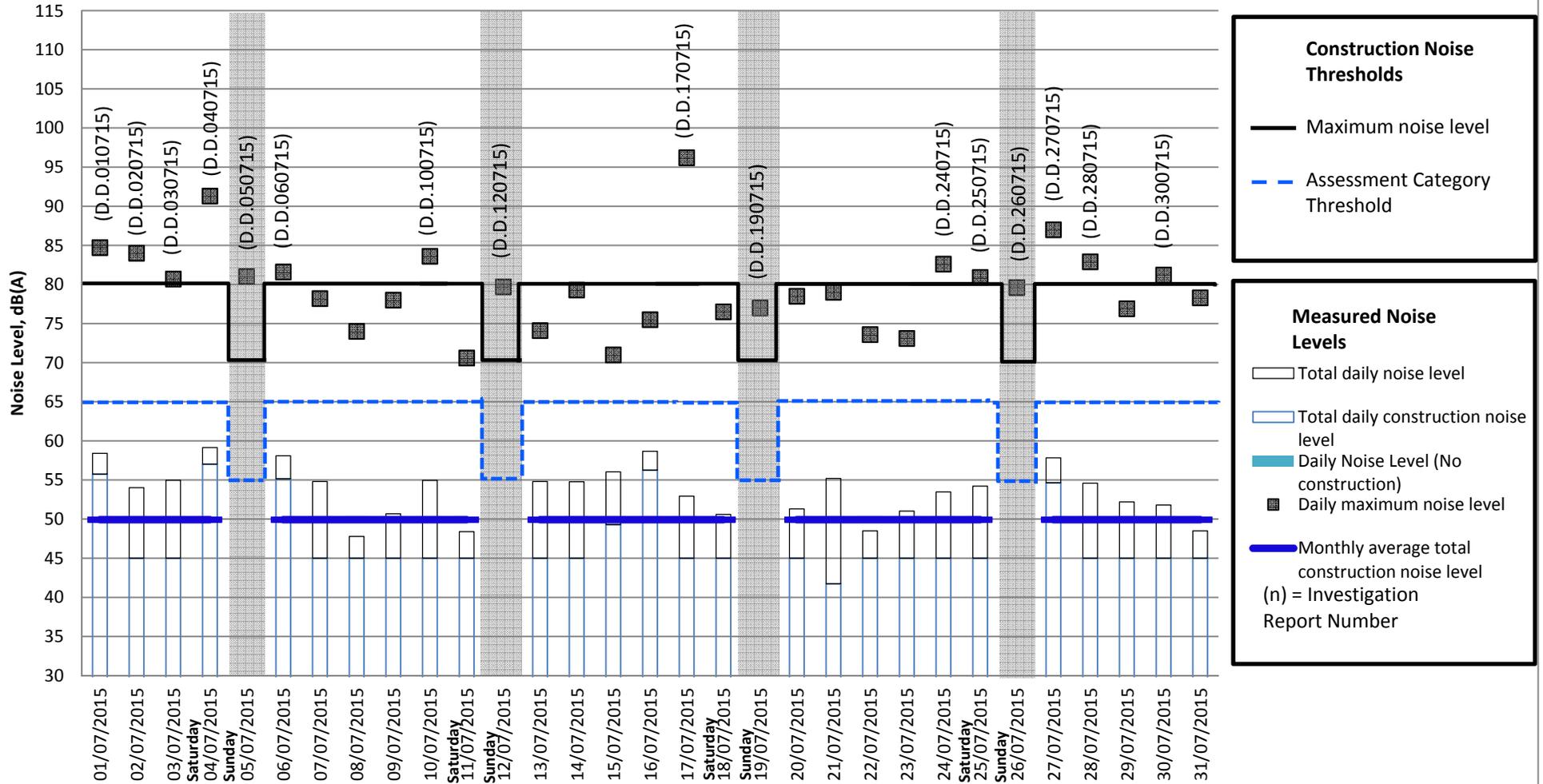


Measured Night time Noise Levels at Tigh-Na Grian Measurement period: July 2015



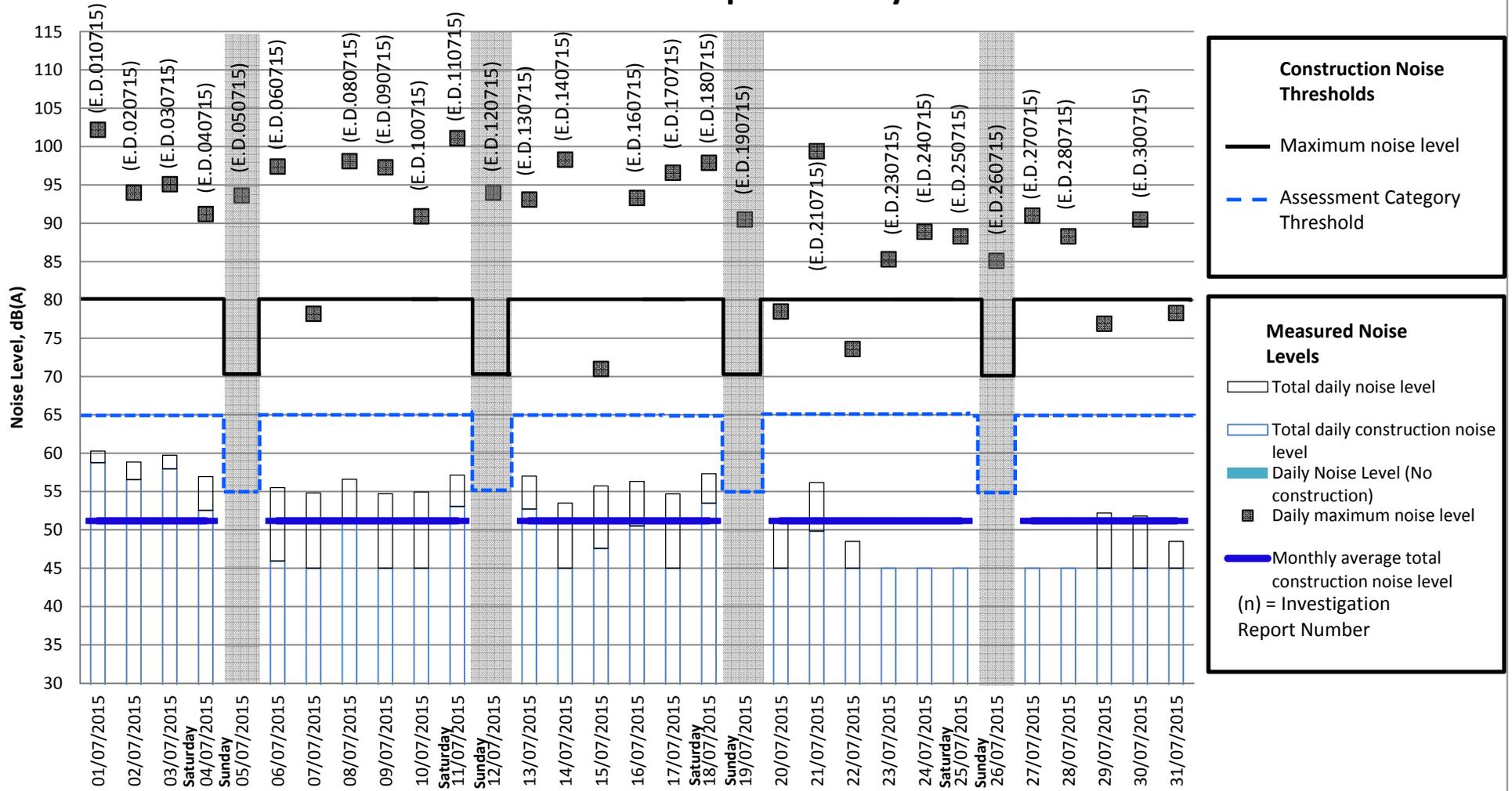
Measured Daytime Noise Levels at Dundas Home Farm

Measurement period: July 2015



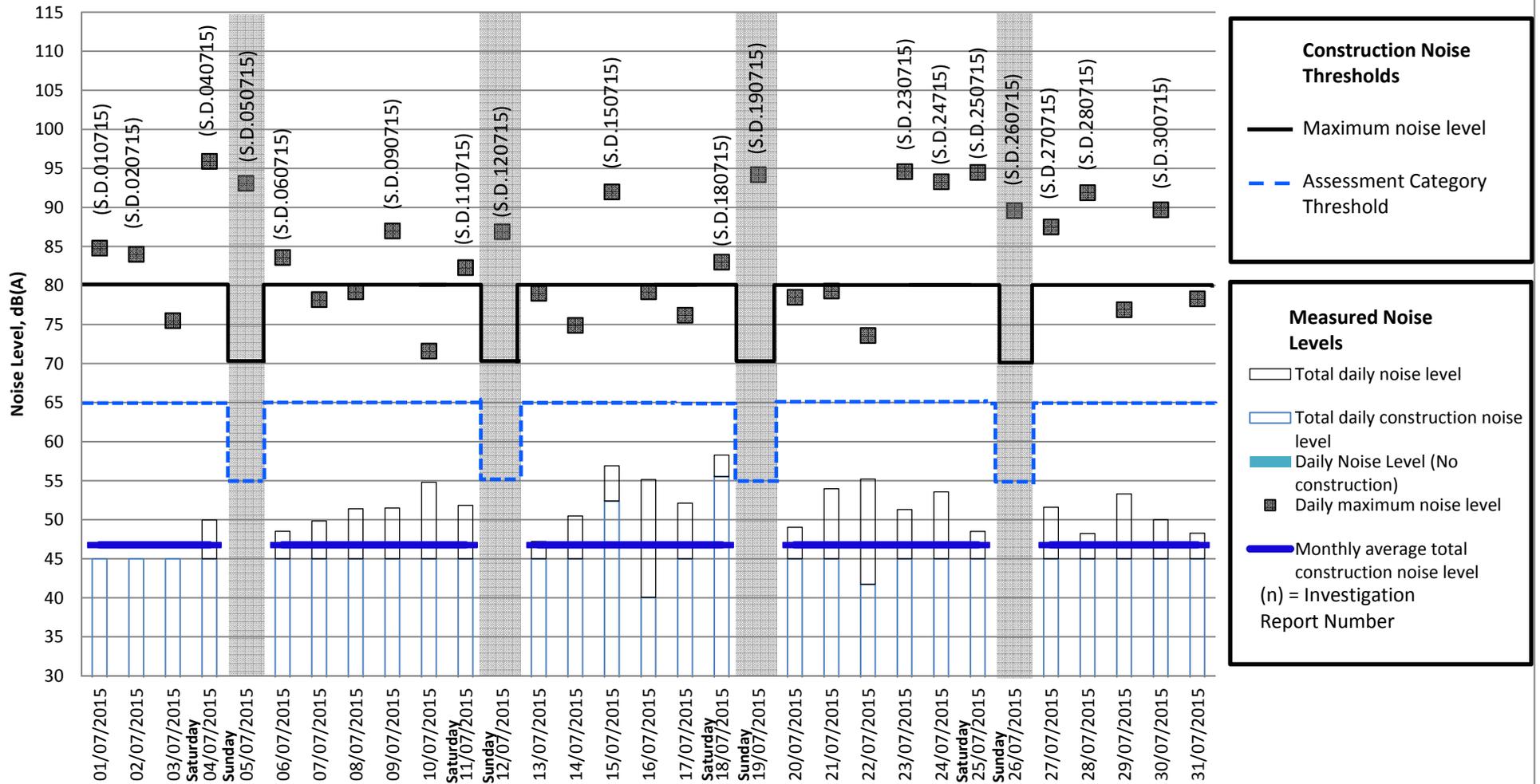
Note: The grey areas of the chart represent days on which no construction works have been conducted.

Measured Daytime Noise Levels at Echline Measurement period: July 2015



Note: The grey areas of the chart represent days on which no construction works have been conducted.

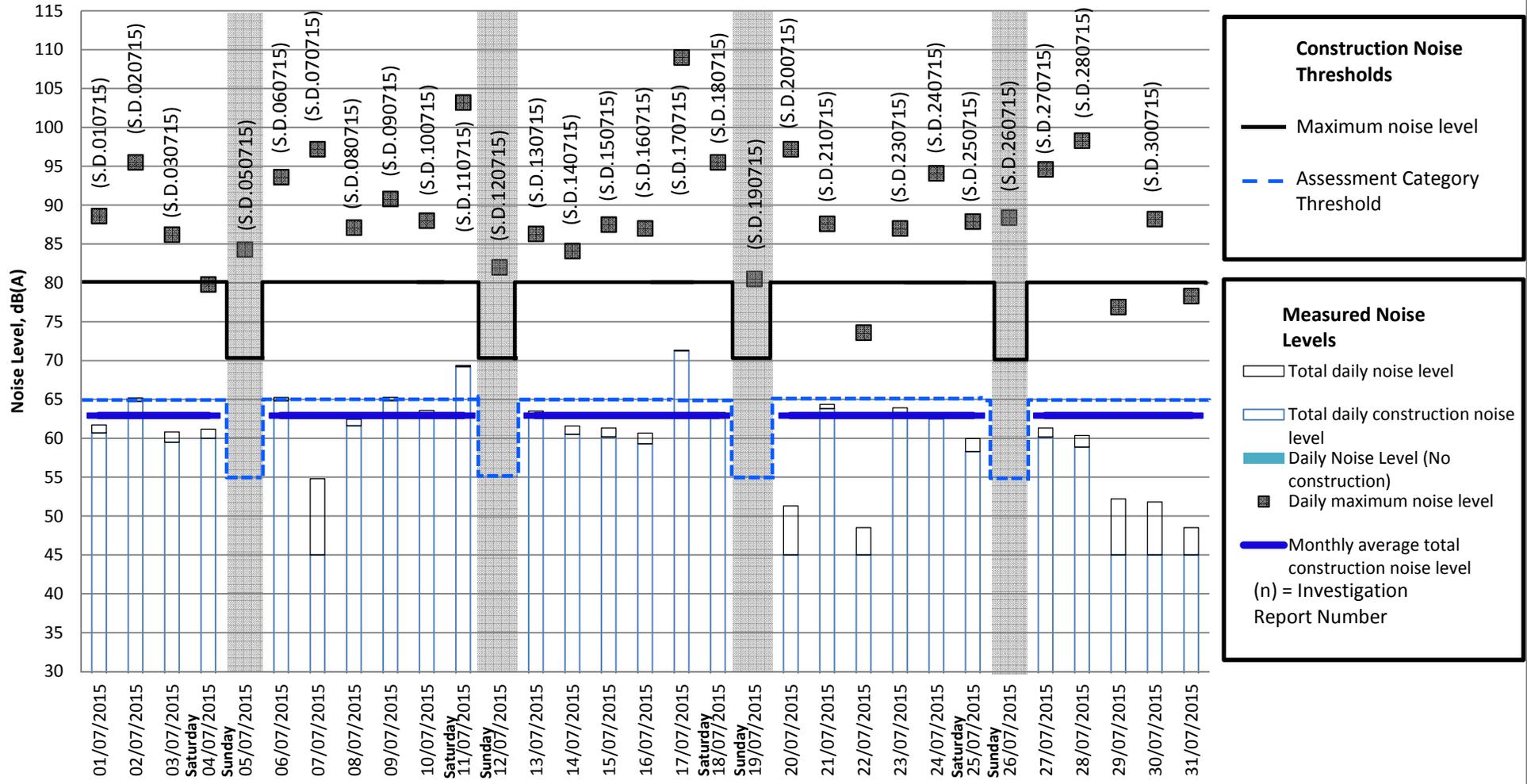
Measured Daytime Noise Levels at Springfield Measurement period: July 2015



Note: The grey areas of the chart represent days on which no construction works have been conducted.

Measured Daytime Noise Levels at Scotstoun

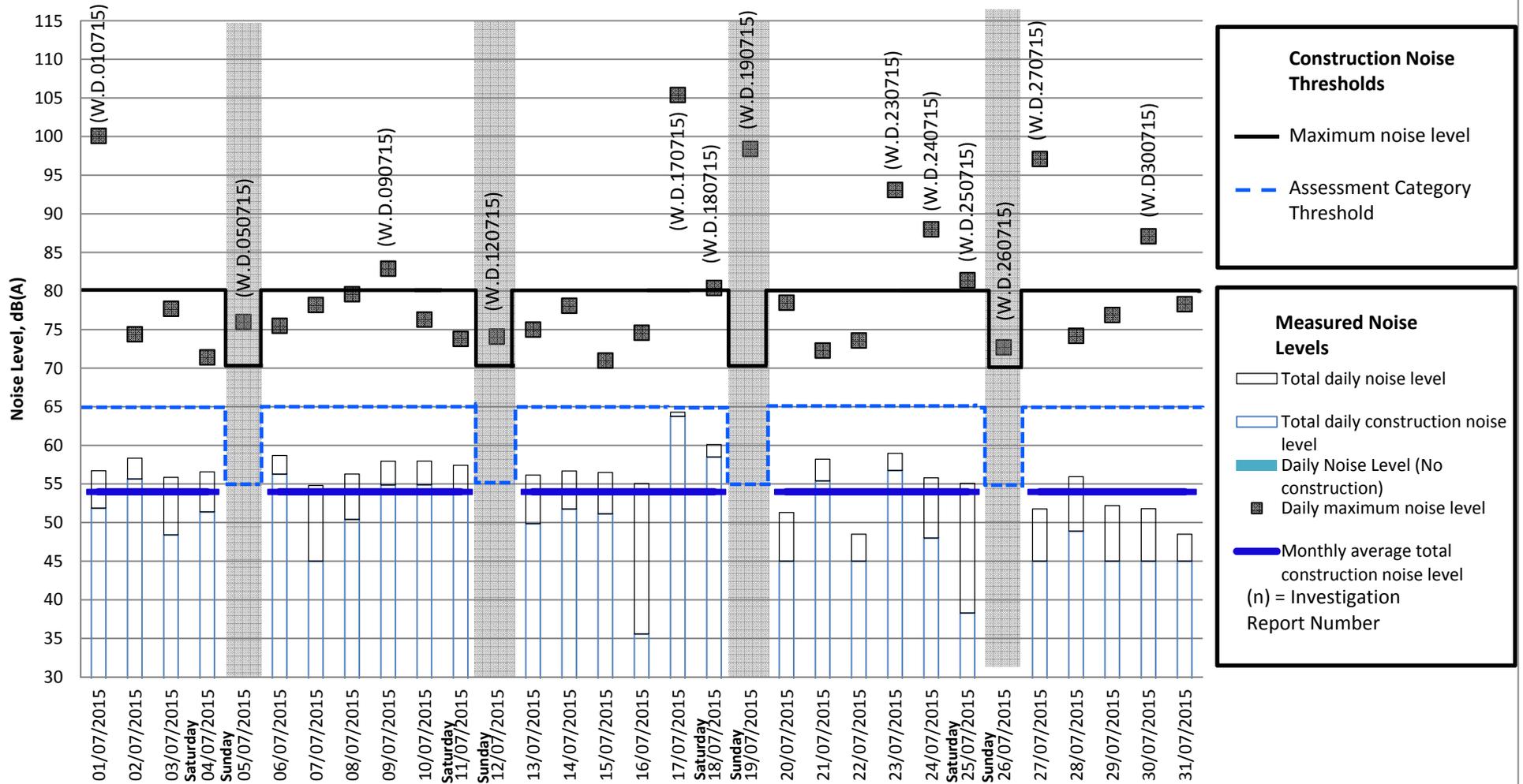
Measurement period: July 2015



Note: The grey areas of the chart represent days on which no construction works have been conducted.

Measured Daytime Noise Levels at Whinny Hill

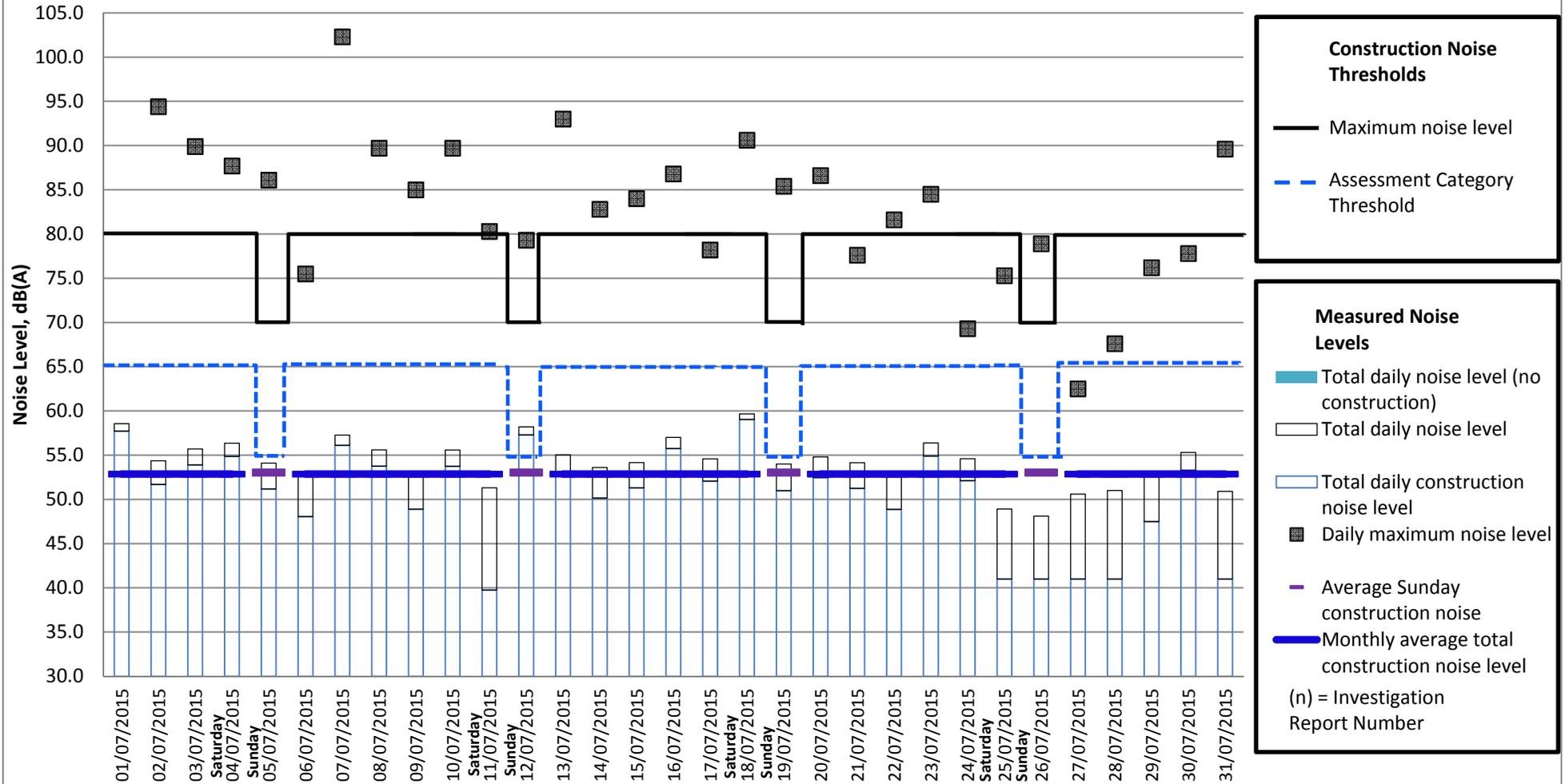
Measurement period: July 2015



Note: The grey areas of the chart represent days on which no construction works have been conducted.

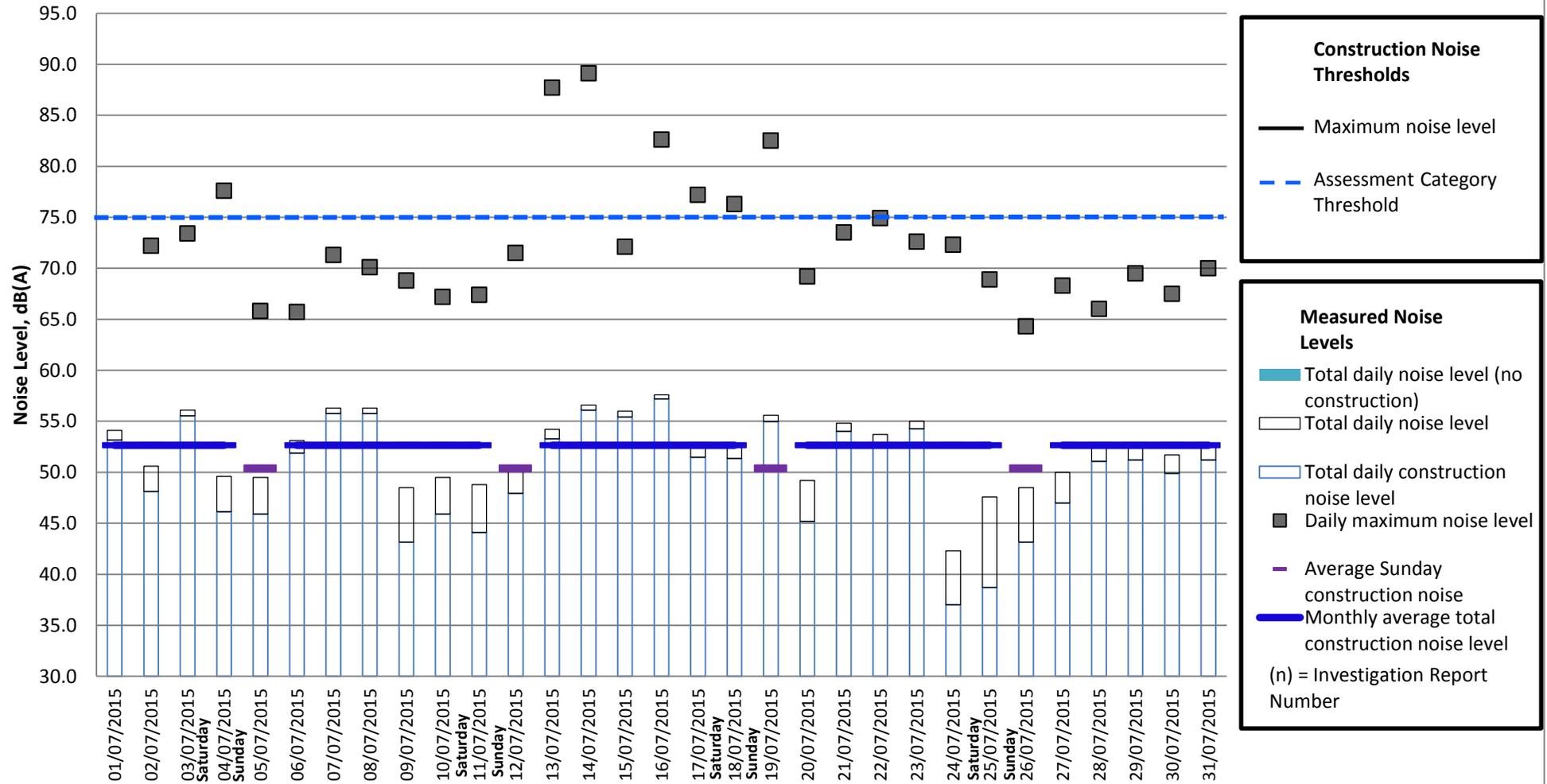
Measured Daytime Noise Levels at Port Edgar

Measurement period: July 2015



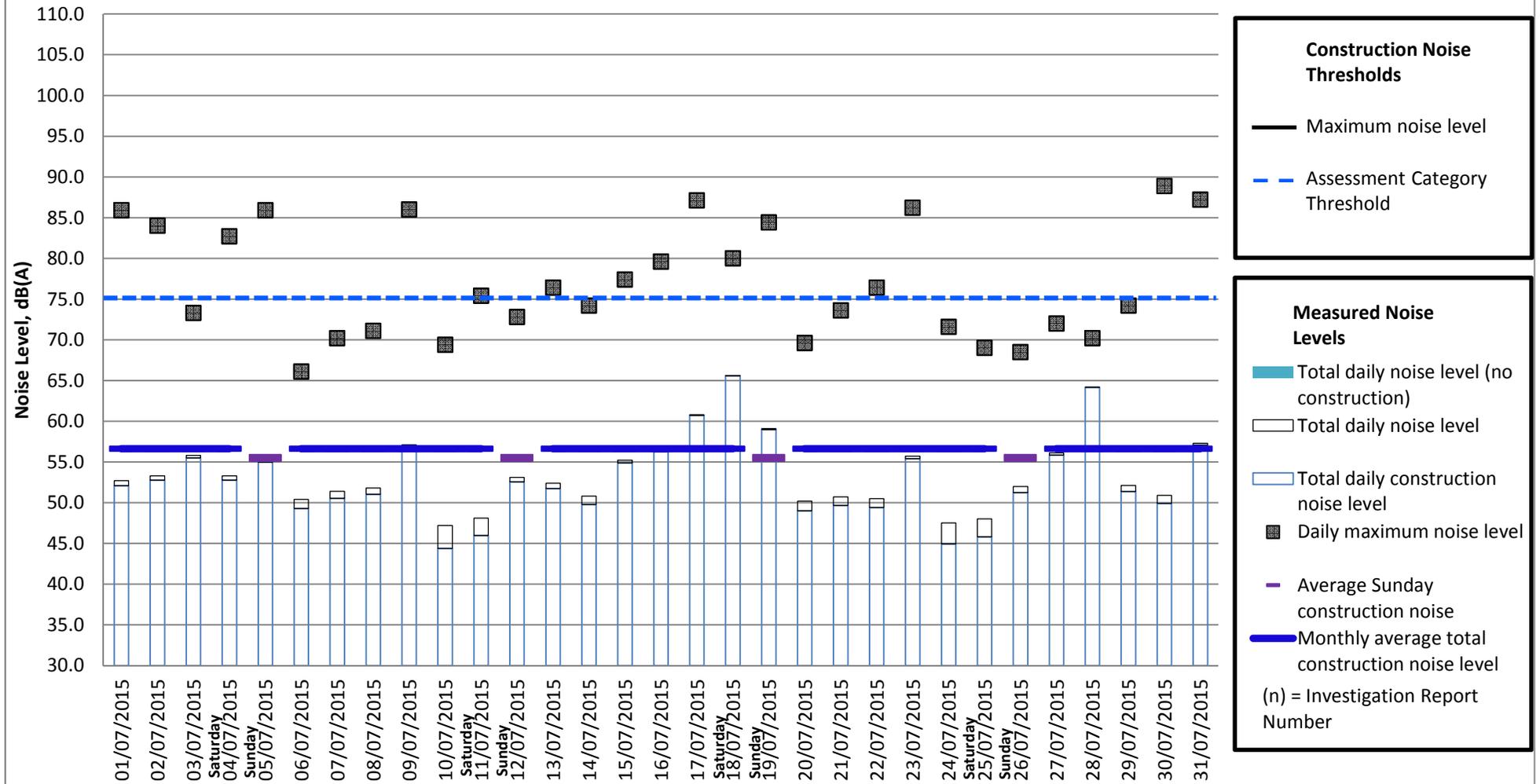
Measured Evening Noise Levels at Port Edgar

Measurement period: July 2015

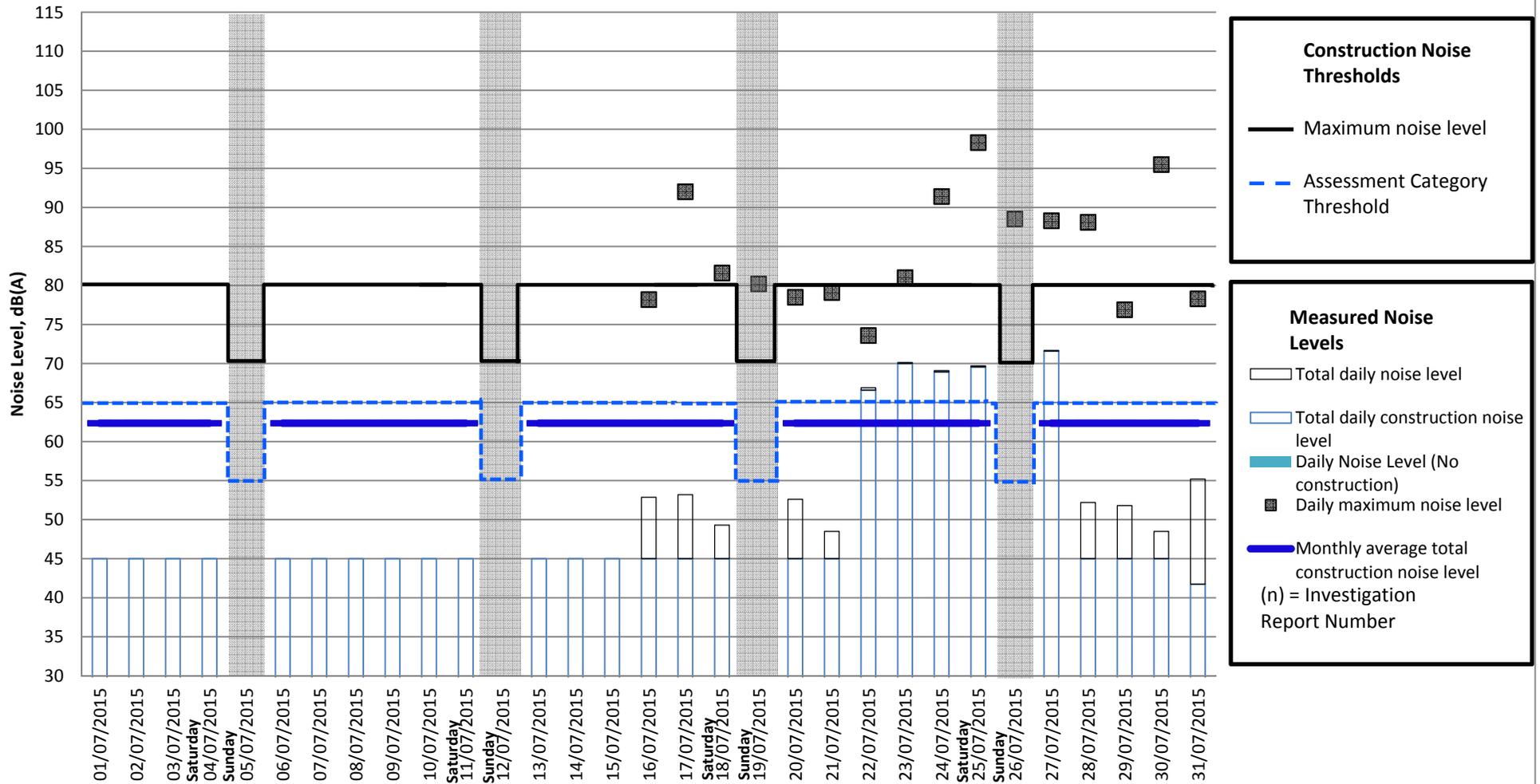


Measured Night time Noise Levels at Port Edgar

Measurement period: July 2015



Measured Daytime Noise Levels at Newton Measurement period: July 2015



Note: The grey areas of the chart represent days on which no construction works have been conducted. 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. There is no data from 01/07/2015 to 15/07/2015 due to an error with the monitor