8 and 10 Stukeley Street London

Environmental Noise Survey and Plant Noise Assessment Report

23068/PNA1 Rev4

19 May 2016

For:
Benprop Drury Limited
10 Orange Street
London
WC2H 7DQ

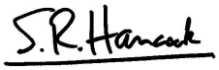
Hann Tucker Associates
Consultants in Acoustics Noise & Vibration

Head Office: Duke House, 1-2 Duke Street, Woking, Surrey, GU21 5BA (t) +44 (0) 1483 770 595
Manchester Office: First Floor, 346 Deansgate, Manchester, M3 4LY (t) +44 (0) 161 832 7041
(w) hanntucker.co.uk (e) enquiries@hanntucker.co.uk

Hann Tucker Associates

Environmental Noise Survey and Plant Noise Assessment Report 23068/PNA1 Rev4

Document Control

Rev	Date	Comment	Prepared by	Authorised by
0	14/03/2016	-	Giovanni De Rienzo Assistant Consultant BSc(Hons), AMIOA	Simon Hancock Director BEng(Hons), CEng, MIMechE, MCIBSE, FIOA
1	29/03/2016	Changes to Assessment wording	Giovanni De Rienzo Assistant Consultant BSc(Hons), AMIOA	John Gibbs Director MIOA, MSEE, CEnv
2	26/04/2016	Updated wording following comments from DP9	Giovanni De Rienzo Assistant Consultant BSc(Hons), AMIOA	John Gibbs Director MIOA, MSEE, CEnv
3	13/05/2016	Manned measurements of existing plant included	Giovanni De Rienzo Assistant Consultant BSc(Hons), AMIOA	Simon Hancock Director BEng(Hons), CEng, MIMechE, MCIBSE, FIOA
4	19/05/2016	Revised following comments from DP9		
			Giovanni De Rienzo Assistant Consultant BSc(Hons), AMIOA	Simon Hancock Director BEng(Hons), CEng, MIMechE, MCIBSE, FIOA

Hann Tucker Associates

Environmental Noise Survey and Plant Noise Assessment Report 23068/PNA1 Rev4

Contents

Attachments

1.0 Introduction

It has been proposed that the existing building at 8 and 10 Stukeley Street, London shall undergo development to extend the existing commercial office (B1) with the introduction of a new single storey basement level, and re-configure the two existing residential units (C3). It is our understanding that the existing commercial office space is to be increased by approximately double the sq/ft area. With this being the case, we have been made aware that additional plant may be necessary.

Hann Tucker Associates have therefore been commissioned to undertake a 24 hour noise survey to assess the potential impact of replacement, additional, and existing plant items on the roof of 8 and 10 Stukeley Road, London on nearby noise sensitive windows.

This report presents the survey methodology and findings. The survey data may be used as the basis for various acoustic assessment purposes.

2.0 Objectives

To establish the existing noise levels by means of fully automated noise monitoring over a period of approximately 24 hours at a secure and accessible position.

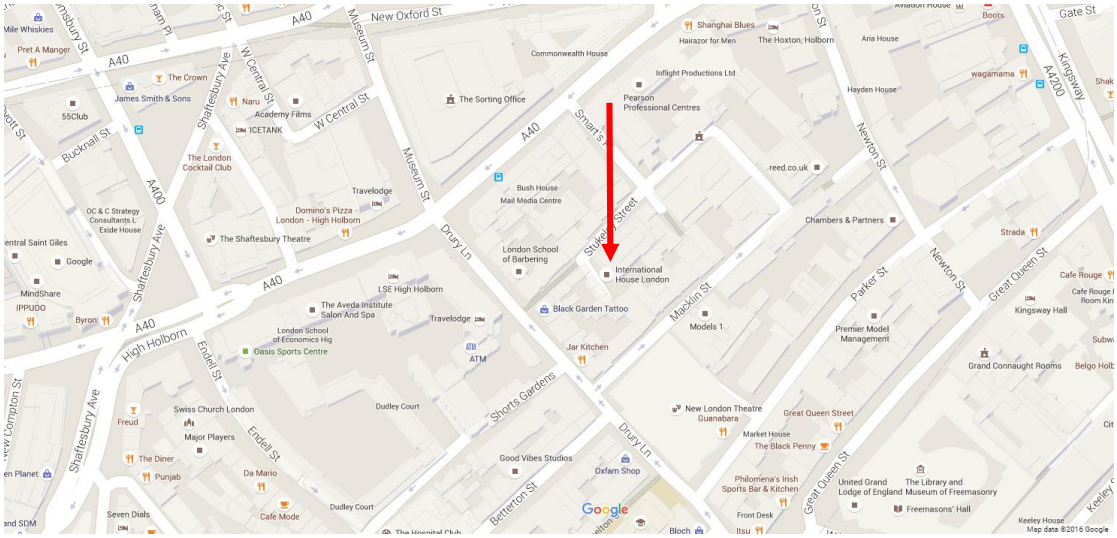
To assess the noise emissions from the replacement, or additional plant, based upon data with which we are provided, and comment upon the acceptability.

To advise on noise control measures if required with reference to the requirements of the Local Authority.

3.0 Site Description

3.1 Location

The site is located at 8 and 10 Stukeley Street, London and falls within the London Borough of Camden's jurisdiction. See Location Map below.



Location Map (maps.google.co.uk)

3.2 Description

8 and 10 Stukeley Street is a ground plus 2 storey building consisting of office space at ground level with residential dwellings on upper floors.

See Site Plan below.

Site Plan (Google Earth)

4.0 Acoustic Terminology

For an explanation of the acoustic terminology used in this report please refer to Appendix A enclosed.

5.0 Unmanned Survey

The survey was undertaken by Giovanni De Rienzo BSc(Hons) AMIOA.

5.1 Methodology

5.1.1 Procedure

Fully automated environmental noise monitoring was undertaken from approximately 12:30 hours on Wednesday 09 March 2016 until 12:30 hours on Thursday 10 March 2016.

Due to the nature of the survey, i.e. unmanned, it is not possible to accurately comment on the weather conditions throughout the entire survey period. However at the beginning and end of the survey period the wind conditions were calm. The sky was generally clear. We understand that generally throughout the survey period the weather conditions were similar to this. These conditions are considered suitable for obtaining representative measurement results.

Measurements were taken continuously of the A-weighted (dBA) L_{90}, L_{eq} and L_{max} sound pressure levels over 15 minute periods.

5.1.2 Measurement Position

The noise level measurements were undertaken at a position located on the roof of 8 and 10 Stukeley Street, accessed via 182 Drury Lane, London. The position was located 1 metre from the nearest residential window located at 182 Drury Lane, London.

The position was selected in order to assess the lowest noise levels at the development site for subsequent use in setting plant noise emission criteria and is shown on the plan below.

Plan Showing Manned Measurement Positions (Google Earth)

5.1.3 Instrumentation

The instrumentation used during the survey is presented in the Table below:

Description	Manufacturer	Type	Serial Number	Calibration
Type 1 Data Logging Sound Level Meter	Larson Davis	824	3804	LD calibration on 13/05/2014
Type 1 ½" Condenser Microphone	PCB	377B02	107417	LD calibration on 13/05/2014

The sound level meter, including the extension cable, was calibrated prior to and on completion of the survey. No significant change was found to have occurred (no more than 0.1 dB).

The sound level meter was located in an environmental case with the microphone connected to the sound level meter via an extension cable.

The microphone was fitted with a Larson Davis windshield.

5.2 Results of Unmanned Survey

The results have been plotted on Time History Graph 23068/TH1 enclosed, presenting the 15 minute A-weighted (dBA) L_{90}, L_{eq} and L_{max} levels at each measurement position throughout the duration of the survey.

The following table presents the lowest measured L_{A90} background noise levels during the survey:

Lowest Measured L_{A90} Background Noise Level (dB re 2 x 10^{-5} Pa)		
Daytime (07:00 – 23:00) Hours	**Night-Time (23:00 – 07:00) Hours**	**24 Hours**
44 dBA	40 dBA	40 BA

6.0 Manned Survey

The survey was undertaken by Giovanni De Rienzo BSc(Hons) AMIOA.

6.1 Methodology

6.1.1 Procedure

Fully manned environmental noise monitoring was undertaken from approximately 10:30 hours and 11:00 hours on 13 May 2016 to establish the noise levels of the existing plant items on the roof of 8 and 10 Stukeley Street, London. Noise measurements were taken at approximately 1 metre from the existing plant noise enclosure.

During the survey period the wind conditions were calm. The sky was generally clear. There was no rain during the survey.

Measurements were taken of the A-weighted (dBA) L_{90}, L_{eq} and L_{max} sound pressure levels over periods of not less than 1 minute. Atypical noises were excluded as far as reasonably possible. Plant noise is typically consistent and therefore longer measurements intervals are not necessary to gain an accurate representation of the plant noise levels.

In addition, typical L_{90}, L_{eq} and L_{max} octave band spectra (from 63Hz to 8kHz) were taken in order to gain a more detailed description of the plant noise emissions.

6.1.2 Measurement Position

The noise level measurements were undertaken on the roof of 8 and 10 Stukeley Street to assess the noise levels of the existing plant and is shown on the plan below.

Plan Showing Manned Measurement Positions (Google Earth)

6.1.3 Instrumentation

The instrumentation used during the manned survey is presented in the table below:

Description	Manufacturer	Type	Serial Number	Calibration
Precision Sound Analyser Meter	Brüel & Kjær Type 2260 with building acoustics module BZ 7204	2274840	University of Salford calibration on 19/02/2015	02171/2, 02171/3 & 02171/4
½ " Microphone	Brüel & Kjær Type 4189	2275232	University of Salford calibration on 19/02/2015	02171/2
Sound Level Calibrator	Brüel & Kjær Type 4231	2308993	University of Salford calibration on 04/03/2016	02622/1

The sound level meter was handheld throughout the measurements and was fitted with a Brüel and Kjær microphone windshield.

The sound level meter, was calibrated prior to and on completion of the survey. No significant change was found to have occurred (no more than 0.1 dB).

6.2 Results of Manned Survey

The L_{eq} sound pressure levels for 3 separate measurements, 1 metre from the plant enclosure are shown below.

Measurement	L_{eq} Sound Pressure Level (dB) @ Octave Band Centre Frequency (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
1	63	67	59	49	45	41	33	21	55
2	61	65	59	49	45	41	33	22	54
3	65	63	56	49	43	39	31	20	53
Arithmetic Average	63	65	58	49	44	40	33	21	54

7.0 Discussion Of Noise Climate

7.1 Unmanned Survey

Due to the nature of the survey, i.e. unmanned, it is not possible to accurately describe the dominant noise sources, or specific noise events throughout the entire survey period. However at the beginning and end of the survey period the dominant noise source was noted to be road traffic from the surrounding road network.

7.2 Manned Survey

Plant noise was dominant where measurements were undertaken. There was distant road traffic, and construction noise which was not deemed to have affected the survey. Impulsive noises such as construction bangs and car horns were not recorded during the survey.

8.0 Plant Noise Emission Criteria

8 and 10 Stukeley Street, London falls within the London Borough of Camden. Following an email dated 27th March 2015 we understand the London Borough of Camden's advice relating to noise emissions from air conditioning plant is as follows:

"Noise levels at a point 1 metre external to sensitive facades shall be at least 5dB(A) less than the existing background measurement (L_{A90}), expressed in dB(A) when all plant/equipment are in operation. Where it is anticipated that any plant/equipment will have a noise that has a distinguishable, discrete continuous note (whine, hiss, screech, hum) and/or if there are distinct impulses (bangs, clicks, clatters, thumps) special attention should be given to reducing the noise levels from that piece of plant/equipment at any sensitive façade to at least 10dB(A) below the L_{A90}, expressed in dB(A)".

In order to meet the above advice, noise emissions from the proposed plant should not exceed a level of 5dB below the lowest measured $L_{A90(15min)}$. Therefore, based on the results of the noise survey and the advice above, we recommend the following plant noise emission levels to be achieved with all plant running simultaneously at 1m external to the nearest noise sensitive façade.

Plant Noise Emission Criteria (dBA re:$2x10^{-5}$Pa)		
Daytime (07:00 – 23:00 hours)	**Night Time (23:00 – 07:00 hours)**	**24 Hours**
39 dBA	35 dBA	35 dBA

It should be noted that the above criteria are subject to final approval by the London Borough of Camden.

9.0 Plant Noise Emission Limits

No details are currently available regarding any additional plant. In the absence of plant details and plant noise data, we have calculated Cumulative Atmospheric Plant Noise Emission Limits to be achieved at 1 metre from the plant / plant enclosure in any direction.

Cumulative Atmospheric Plant Noise Emission Limits Sound Pressure Level (SPL dB re $2x10^{-5}$ Pa)	
Daytime (07:00 – 23:00 hours)	**Night-time (23:00 – 07:00 hours)**
39 dBA @ 1m	35 dBA @ 1m

The above Cumulative Plant Noise Emission Limits apply when all new items of plant are operating simultaneously. If more than one item of plant is running then appropriate corrections need to be applied for the cumulative effects.

10.0 Mitigation Measures

The existing plant enclosure is constructed mainly of wood and tiling with obvious gaps and spaces for noise to escape, and does not therefore offer any noticeable acoustic mitigation to the existing plant. Recorded noise levels outside the existing enclosure could therefore be considered representative of the plant alone.

10.1 Maintaining Existing Plant

The results outlined in section 6.2 would indicate that the existing plant currently exceeds the requirements of the Local Authority by approximately 15 dB, and should therefore require further mitigation to comply with the Local Authority criteria. If no additional plant is proposed then we would recommend that the existing plant enclosure be removed and replaced with an acoustic enclosure offering a minimum of 15 dB sound reduction. See attached our list of suitable suppliers.

10.2 Other Scenarios

We understand that the office space the plant is serving is to be increased by approximately double the sq/ft area. With this being the case, we have been made aware that additional plant may be necessary. We understand that any additional plant would be positioned in the same area as the existing plant, however should this not be the case we would require drawings clearly outlining plant locations once plant selection is made.

Upon receiving details of new plant, we can review and advise on mitigation measures to bring the plant into compliance with the Local Authority guidelines.

11.0 Conclusions

A detailed 24 hour daytime and night-time fully automated environmental noise survey has been undertaken in order to establish the currently prevailing roof level environmental noise climate around the site.

Plant noise emission criteria have been recommended based on the results of the noise survey and in conjunction with the Local Authority.

An assessment has been carried out to determine the approximate cumulative atmospheric plant noise emission limits to be achieved at 1 metre from the plant / plant enclosure in any direction.

An assessment of the existing plant has been undertaken and mitigation measures have been recommended based on the noise levels recorded on site and the Local Authority guidelines.

If additional plant items are necessary, we can review upon receiving plant details, and advise on potential mitigation measures to bring the plant into compliance with the Local Authority guidelines.

Appendix A

The acoustic terms used in this report are defined as follows:

dB — Decibel - Used as a measurement of sound level. Decibels are not an absolute unit of measurement but an expression of ratio between two quantities expressed in logarithmic form. The relationships between Decibel levels do not work in the same way that non-logarithmic (linear) numbers work (e.g. 30dB + 30dB = 33dB, not 60dB).

dBA — The human ear is more susceptible to mid-frequency noise than the high and low frequencies. The 'A'-weighting scale approximates this response and allows sound levels to be expressed as an overall single figure value in dBA. The $_A$ subscript is applied to an acoustical parameter to indicate the stated noise level is A-weighted

It should be noted that levels in dBA do not have a linear relationship to each other; for similar noises, a change in noise level of 10dBA represents a doubling or halving of subjective loudness. A change of 3dBA is just perceptible.

$L_{90,T}$ — L_{90} is the noise level exceeded for 90% of the period *T* (i.e. the quietest 10% of the measurement) and is often used to describe the background noise level.

$L_{eq,T}$ — $L_{eq,T}$ is the equivalent continuous sound pressure level. It is an average of the total sound energy measured over a specified time period, *T*.

L_{max} — L_{max} is the maximum sound pressure level recorded over the period stated. L_{max} is sometimes used in assessing environmental noise where occasional loud noises occur, which may have little effect on the L_{eq} noise level.

Sound Pressure Level (L_p) is the sound pressure relative to a standard reference pressure of 2×10^{-5} Pa. This level varies for a given source according to a number of factors (including but not limited to: distance from the source; positioning; screening and meteorological effects).

Sound Power Level (SWL or L_w) is the total amount of sound energy inherent in a particular sound source, independent of its environment. It is a logarithmic measure of the sound power in comparison to a specified reference level (usually 10^{-12} W).

SUITABLE SUPPLIERS

Of

ACOUSTIC ENCLOSURES FOR SMALL AIR CONDITIONING UNITS

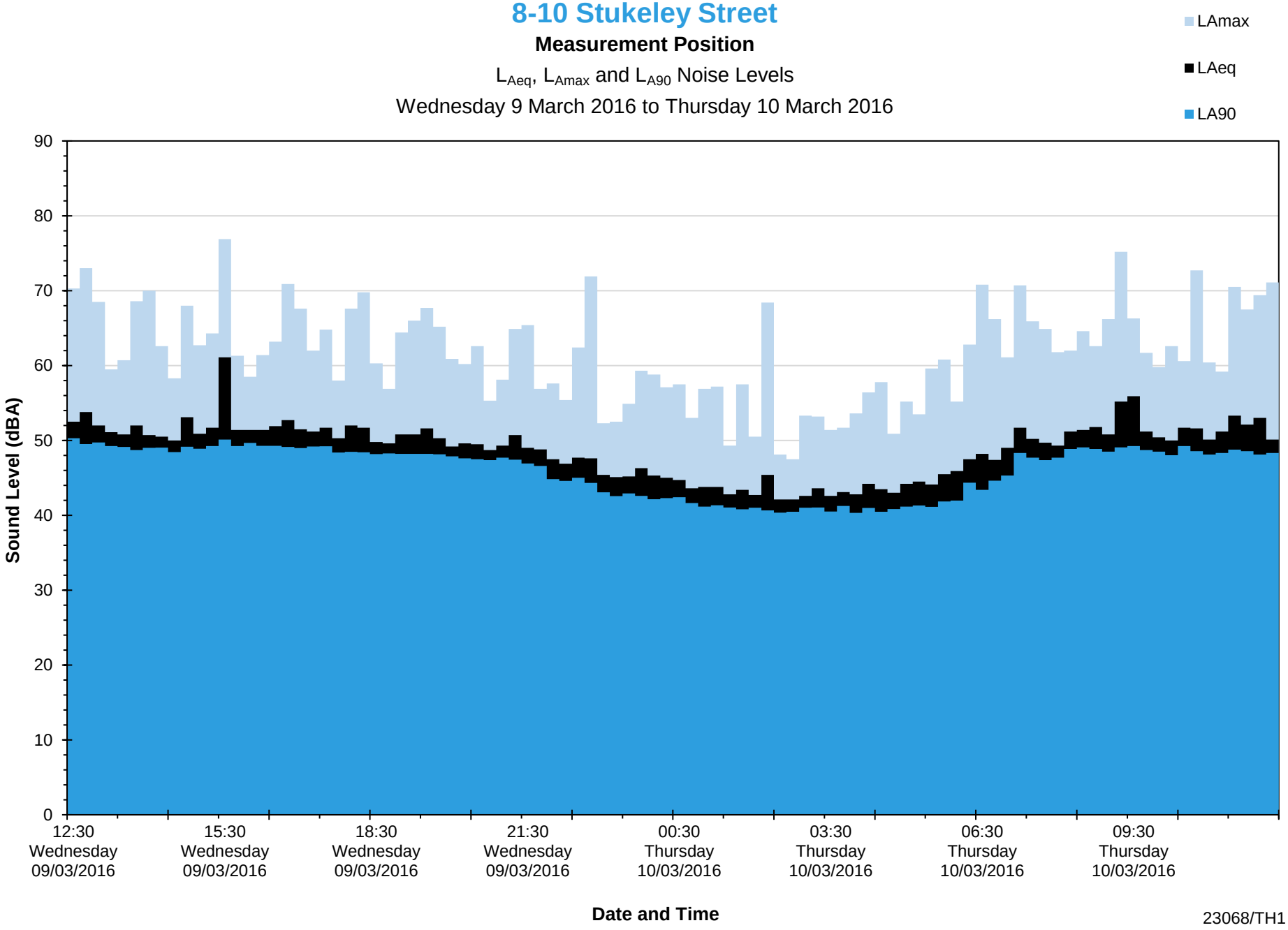
Name & Address	Telephone Number	Contact
Environ Technologies Ltd Regus House 1010 Cambourne Business Park Cambourne CB3 6DP	0870 383 3344	Steve Cox
Acoustic Engineering Services Ltd 78 High Road Byfleet Surrey KT14 7QW	01932 352733	Barry Austin Mark Stagg

8-10 Stukeley Street

Measurement Position

L_{Aeq}, L_{Amax} and L_{A90} Noise Levels

Wednesday 9 March 2016 to Thursday 10 March 2016



23068/TH1