Assessment of Mechanical Plant Noise

18 Chenies Street, London WC1

for NET Coverage Solutions Ltd

01 April 2016

ARM 186-01

Title: Assessment of Mechanical Plant Noise
Project: 18 Chenies Street, London WC1
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1. INTRODUCTION

It is understood that telecommunications equipment, including 1no. external air conditioning unit for cooling purposes, is to be installed at premises on Chenies Street. The new plant will be located at roof level the outdoor air conditioning unit may potentially operate continuously over any given24 hour period.

In order to ensure that the amenity of adjacent premises is not unduly affected as a result of noise emissions from the mechanical plant, it is necessary to demonstrate to the local planning authority, the London Borough of Camden, that noise will be controlled in line with the requirements of their Local Development Framework, specifically *DP28 Noise and vibration*.

To satisfy the requirements of the local authority, an ambient noise survey was undertaken over a period considered representative of the lowest prevailing background noise level corresponding to the operation of the plant. This information and noise emission data obtained from the equipment supplier has subsequently been used to assess the impact of the scheme upon local amenity. The survey and assessment methods were based upon the guidance, principles and recommendations contained in the following documents:

- BS 4142:2014 *Methods for rating and assessing industrial and commercial sound*;
- BS 7445: Part 2: 1991: *Description and measurement of environmental noise. Part 2. Guide to the acquisition of data pertinent to land use*; and
- BS 8233: 2014: *Guidance on sound insulation and noise reduction for buildings*.

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2. SITE DESCRIPTION

The premises of 18 Chenies Street comprise five storeys and provide rehearsal rooms and offices facilities for the Royal Academy of Dramatic Art (RADA). The proposed telecommunications equipment and the associated outdoor air conditioning unit (which is to provide cooling), are to be located at the eastern corner fifth floor flat roof, set back from road at a distance of approximately 12 metres from the roof parapet.

Adjoining the premises to the east is a recently constructed 5 storey building providing commercial office usage at ground and first floor levels, with the upper storeys given over to residential apartments having double glazed openable windows. Adjoining the premises to the west is a further three storeys building also occupied by RADA, whilst beyond this lies the eight storey Whittington House which provides office accommodation and has a sealed double glazed facade.

Situated on the opposite side of the road at a distance of approximately 16 metres from the facade of the building lie the six storey residential premises of #9 Chenies Street and 1-12 Ridgmount Gardens, both of which have single glazed sash windows.

The soundscape at roof level of the building comprises continuous low level road traffic noise from more distant roads and higher transient noise from individual road traffic events passing along Chenies Street. In addition, underlying continuous noise arising from mechanical plant serving adjacent buildings was in evidence.

A site plan is presented in **Appendix 1.**

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3. BASIS OF ASSESSMENT

In assessing the impact of the proposed development upon local amenity, it is necessary to consider the effects upon sensitive premises. Evaluation of the effects upon residential accommodation will be based upon the level of the specific plant noise emissions relative to the underlying ambient noise climate and undertaken in accordance the method set out within BS 4142: 2014 - *Methods for rating and assessing industrial and commercial sound*. It will also be necessary to consider any requirements the local authority may impose in the application of their noise policy.

3.1. Planning Policy

In order to ensure that the amenity of adjacent premises is not unduly affected as a result of noise emission from the mechanical plant, it is necessary to demonstrate to the local planning authority, the London Borough of Camder, that noise will be controlled in line with Development Policy DP28 as set out within their Local Development Framework. This policy advises that:

"The Council will seek to ensure that noise and vibration is controlled and managed and will not grant planning permission for:

a) development likely to generate noise pollution; or

b) development sensitive to noise in locations with noise pollution, unless appropriate attenuation measures are provided.

Development that exceeds Camden's Noise and Vibration Thresholds will not be permitted.

The Council will only grant permission for plant or machinery if it can be operated without cause harm to amenity and does not exceed our noise thresholds."

The noise thresholds applicable to noise from mechanical plant and machinery are set out in Table E, as reproduced below:

Table E: Noise levels from plant and machinery at which planning permission will not be granted

Noise description and location of measurement	Period	Time	Noise level
Noise at 1 metre external to a sensitive façade	Day, evening and night	0000-2400	5dB(A) <LA90
Noise that has a distinguishable discrete continuous note (whine, hiss, screech, hum) at 1 metre external to a sensitive façade	Day, evening and night	0000-2400	10dB(A) <LA90
Noise that has distinct impulses (bangs, clicks, clatters, thumps) at 1 metre external to a sensitive façade.	Day, evening and night	0000-2400	10dB(A) <LA90
Noise at 1 metre external to sensitive façade where LA90>60dB	Day, evening and night	0000-2400	55dB$L_{Aeq'}$

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4. MEASUREMENTS

4.1. Background noise measurements

An unattended ambient noise survey was undertaken between approximately 10:00 hrs on Wednesday 16th March and 11:00 hrs on Monday 21st March 2016. The measurement period was considered sufficient to establish the typical lowest background noise levels corresponding to the operational period of the plant. The measurement location was chosen so as to minimise the influence of mechanical plant noise, whilst remaining representative of the residual noise level otherwise existing at adjacent sensitive premises.

The site plan contained in **Appendix 1** identifies the measurement position.

Position 1: Free-field measurement at roof level (5th floor) of 18 Chenies Street at 1.5m above the ground plane.

The weather conditions during the survey were generally clear and cool with average temperatures4-9°C and highs of 12°C, with no precipitation and a very light westerly breeze.

4.2. Measuring Equipment

Sound pressure level measurements were obtained using the instrumentation detailed in Table 1 below. The equipment complies with the class 1 specification of IEC 61672 and is certified to that standard:

Table 1: Instrumentation Details

Instrument	Serial Number
ACOEM 01dB Cube noise monitor	10532
ACOEM 01dB - PRE22 preamplifier	10535
GRAS 40CD microphone	207181

Calibration checks were made prior to and after completion of measurements using the calibrator complying with class 1 of IEC 60942, calibration level 94.0 dB, ± 0.1 dB, @ 1.0 kHz. No drift in calibration was noted. All acoustic instrumentation carried current manufacturer's certificates of conformance.

Various statistical broad-band and spectral (1/1 octave band) level measurements were derived from the survey data.

The data are defined as follows:

$L_{Aeq,T}$	The A-weighted equivalent continuous noise level for the duration of the measurement time interval, T
$L_{A90,T}$	The A-weighted sound pressure level exceeded for 90% of the measurement time interval, T.
$L_{A10,T}$	The A-weighted sound pressure level exceeded for 10% of the measurement time interval, T.
$L_{eq,T}/L_{n,T}$	The linear 1/3 octave band sound pressure levels.

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5. RESULTS

5.1. Background noise levels

During the survey period, continuous measurement of the ambient sound was obtained. In order to characterise the background sound level a measurement time interval of 15 minutes has been adopted, in accordance with the minimum period suggested in BS4142 (8.1.3). The lowest $L_{A90,15min}$ measured during the survey period is considered to represent the background noise level in the absence of specific noise. Data across the survey period and a graph of such are presented in Appendix 2, whilst a summary of the data to be used in the assessment are presented in Table 2,below.

Table 2: Measured background noise levels

Location	Period	Residual $L_{Aeq,T}$	Background L_{A90}
Position 1	00:00 - 24:00hrs	53.4 dB	52.8 dB

5.2. Source noise levels

The specific noise level attributable to the mechanical plant at the receptor location shall be determined through calculation, as endorsed by Section 7.3.6 of BS 4142. The outdoor unit of the split system air conditioning system will comprise:

- 1 x Toshiba RAS-24SA-ES

Noise data pertaining to the outdoor unit under cooling are presented within **Table 3** are manufacturers data and are stated as sound pressure levels at 1m in front of the unit over a reflective plane.

Table 3: Mechanical plant acoustic data, dB

Plant	1/1 octave band centre frequency, Hz								
Toshiba RAS-24SA-ES	**63**	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**	**A**
L_p dB re 2 x10-5 Pa @ 1m	66	56	57	54	52	47	42	34	57

5.3. Resultant noise levels

The acoustic data set out in **Table 3**,foregoing, have been used as the basis of calculations carried out in accordance with BS4142: 2014 *Methods for rating and assessing industrial and commercial sound* to determine the resultant noise level experienced at a distance of 1m external to windows of the nearest noise sensitive premises – the results of which are set out in **Table 4**, below.

Table 4: Predicted resultant noise levels external to receiver

Receptor	Specific noise level $L_{Aeq,T}$	Background noise level $L_{A90,T}$
9 Chenies Street	20 dB	53 dB
20-22 Chenies Street	31 dB	53 dB

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As set out within LB Camden Development Policy 28, planning permission will only be granted for plant and machinery where the specific noise level at sensitive facades does not exceed the threshold of $L_{90,T}$ - 5dB, or $L_{90,T}$ -10dB in cases where noise has a distinguishable discrete continuous note (whine, hiss, screech, hum).

From the predicted specific noise level for the plant identified in Table 4, it can be seen that the resultant noise arising from the proposed new plant is some 22 dBA below the lowest measured background noise level at the most affected noise sensitive premises and as such will be compliant with the requirements of LB Camden Development Policy 28 relating to noise emissions from plant and machinery.

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6. CONCLUSION

New telecommunications equipment, including 1no. external air conditioning unit is to be installed at premises on Chenies Street. The new plant will be located at roof level the outdoor air conditioning unit may potentially operate continuously over any given24 hour period in order to provide cooling.

In order to ensure that the amenity of adjacent premises is not unduly affected as a result of noise emission from the mechanical plant, it is necessary to demonstrate to the local planning authority, the London Borough of Camden, that noise will be controlled in line with the requirements of their Local Development Framework, specifically *DP28 Noise and vibration*.

An ambient noise survey was undertaken over a period considered representative of the lowest prevailing background noise level corresponding to the operation of the plant. This information and noise emission data obtained from the equipment supplier was subsequently used to assess the impact of the scheme upon local amenity.

The predicted resultant specific noise level ($L_{Aeq,T}$ 31 dB) of the proposed plant at the nearest sensitive premises was found to be significantly below the lowest measured background noise level ($L_{90,T}$ 53 dB), by some 22 dB. Consequently, it is considered that noise emissions from the proposed installation will not affect the amenity of adjacent sensitive premises and will comply with the requirements of the London Borough of Camden *Development Policy 28 - Noise and Vibration*.

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APPENDIX 1
Site Plan

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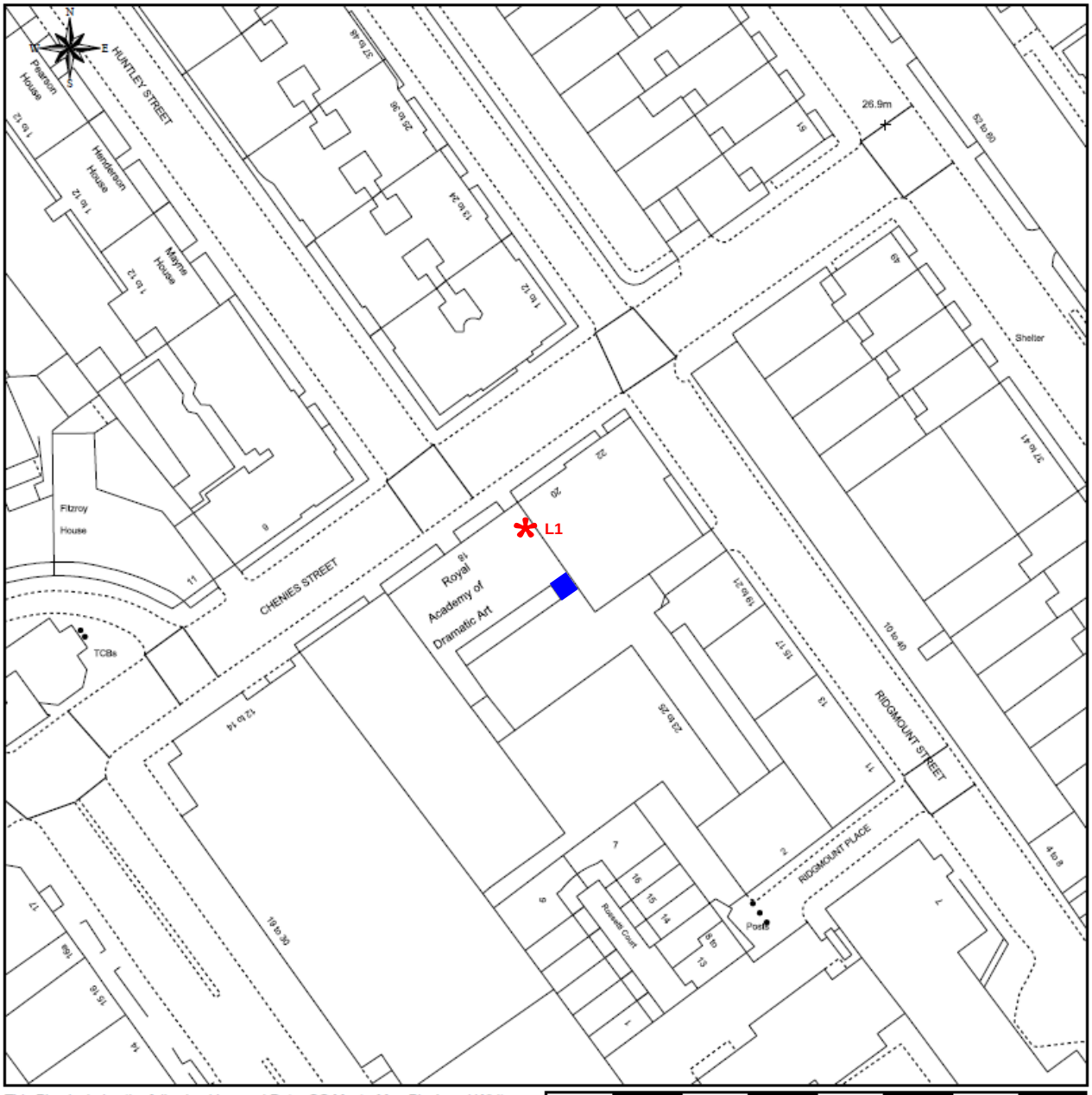

Scale: 1:1000, paper size: A4

Measurement Location

Indicative plant location

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APPENDIX 2
Ambient noise survey data

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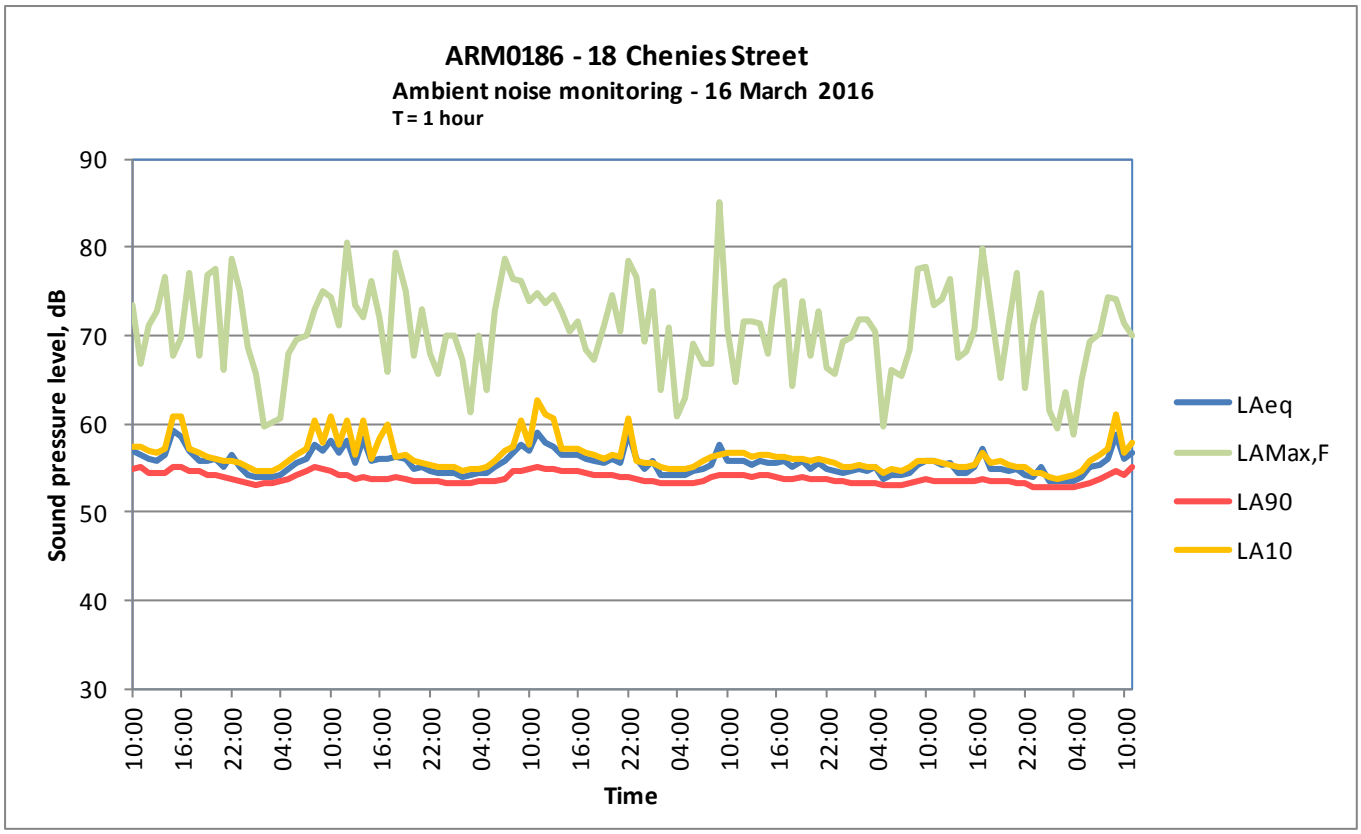

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Periods		1h			
Start		16/03/2016 10:00			
End		21/03/2016 13:00			
Location		CUBE_10532			
Weighting		A			
Unit		dB			
Period start		L_{Aeq}	$L_{AMax,F}$	L_{A90}	L_{A10}
16-Mar-16	10:00	56.9	73.5	54.8	57.5
	11:00	56.4	66.8	55	57.4
	12:00	56.1	71.2	54.5	56.9
	13:00	55.9	72.7	54.4	56.7
	14:00	56.5	76.7	54.4	57.1
	15:00	59.3	67.7	55.2	60.8
	16:00	58.5	69.7	55.1	60.8
	17:00	56.9	77	54.6	57.2
	18:00	55.9	67.6	54.6	56.7
	19:00	55.7	76.8	54.2	56.3
	20:00	56	77.6	54.1	56.1
	21:00	55.1	66	54	55.9
	22:00	56.5	78.6	53.7	55.9
	23:00	55	75	53.6	55.5
17-Mar-16	00:00	54.3	68.6	53.3	55.1
	01:00	54	65.6	53.1	54.6

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	02:00	54	59.7	53.2	54.6
	03:00	54	60.1	53.3	54.7
	04:00	54.3	60.7	53.5	55
	05:00	54.8	67.9	53.7	55.7
	06:00	55.5	69.5	54.1	56.5
	07:00	56.1	69.9	54.6	57.1
	08:00	57.7	72.9	55.1	60.3
	09:00	56.9	75	54.8	57.9
	10:00	58.1	74.4	54.6	60.9
	11:00	56.7	71.2	54.1	57.6
	12:00	58.1	80.6	54.1	60.3
	13:00	55.5	73.4	53.7	56.4
	14:00	58.4	72	53.9	60.3
	15:00	55.7	76.3	53.8	56.1
	16:00	56	72	53.8	58.3
	17:00	56.1	65.9	53.8	60
	18:00	56.2	79.5	53.9	56.3
	19:00	56	75	53.8	56.4
	20:00	54.9	67.8	53.6	55.7
	21:00	55	73	53.6	55.6
	22:00	54.6	67.9	53.5	55.4
	23:00	54.5	65.7	53.6	55.1
18-Mar-16	00:00	54.5	69.9	53.3	55
	01:00	54.4	69.9	53.3	55
	02:00	54	67.2	53.2	54.6
	03:00	54.2	61.2	53.3	54.9
	04:00	54.5	70.1	53.4	54.8
	05:00	54.5	63.9	53.5	55.2
	06:00	55	72.8	53.6	55.9
	07:00	55.8	78.6	53.8	56.9
	08:00	56.8	76.4	54.6	57.4
	09:00	57.6	76.3	54.7	60.4
	10:00	56.9	73.9	54.9	57.6
	11:00	59	74.9	55.1	62.6
	12:00	57.9	73.6	54.8	61
	13:00	57.4	74.5	54.8	60.6
	14:00	56.4	72.8	54.7	57.1
	15:00	56.5	70.4	54.7	57.1
	16:00	56.5	71.6	54.7	57.1
	17:00	56	68.4	54.5	56.7
	18:00	55.7	67.2	54.3	56.5
	19:00	55.5	71.2	54.2	56.1
	20:00	56	74.7	54.2	56.4
	21:00	55.5	70.4	54	56.3
	22:00	58.9	78.4	54	60.5
	23:00	56	76.6	53.7	55.8
19-Mar-16	00:00	54.8	69.3	53.6	55.5
	01:00	55.8	75.1	53.5	55.6

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	03:00	54.3	70.9	53.3	54.9
	04:00	54.1	60.9	53.2	54.8
	05:00	54.1	62.9	53.2	54.9
	06:00	54.7	69.1	53.2	55.1
	07:00	54.8	66.7	53.5	55.9
	08:00	55.3	66.9	53.9	56.3
	09:00	57.6	85.2	54.3	56.5
	10:00	55.8	70.7	54.2	56.6
	11:00	55.7	64.7	54.3	56.7
	12:00	55.9	71.7	54.1	56.6
	13:00	55.3	71.6	53.9	56.3
	14:00	55.8	71.3	54.2	56.5
	15:00	55.6	67.9	54.1	56.5
	16:00	55.5	75.4	54	56.3
	17:00	55.7	76.2	53.8	56.2
	18:00	55	64.2	53.8	56
	19:00	55.7	74	53.9	56.1
	20:00	54.9	67.8	53.7	55.8
	21:00	55.5	72.7	53.7	56.1
	22:00	54.9	66.3	53.7	55.8
	23:00	54.6	65.6	53.4	55.6
20-Mar-16	00:00	54.5	69.3	53.4	55.2
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	13:00	55.5	76.4	53.5	55.4
	14:00	54.5	67.5	53.5	55.2
	15:00	54.5	68.2	53.5	55.1
	16:00	55	70.6	53.6	55.4
	17:00	57.2	79.8	53.7	56.6
	18:00	54.9	73.1	53.6	55.6
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	20:00	54.7	71.3	53.6	55.4
	21:00	54.9	77	53.3	55
	22:00	54.3	64.1	53.2	55
	23:00	53.9	71.1	52.9	54.5
21-Mar-16	00:00	55	74.8	52.9	54.5
	01:00	53.5	61.5	52.8	54

02:00	53.4	59.4	52.8	53.8
03:00	53.5	63.5	52.8	53.9
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05:00	53.9	64.9	53	54.6
06:00	55.1	69.3	53.3	55.8
07:00	55.4	70.2	53.8	56.5
08:00	56	74.3	54.2	57.1
09:00	58.8	74.1	54.6	61.1
10:00	56	71.4	54.3	56.8
11:00	56.6	69.9	55	57.9

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