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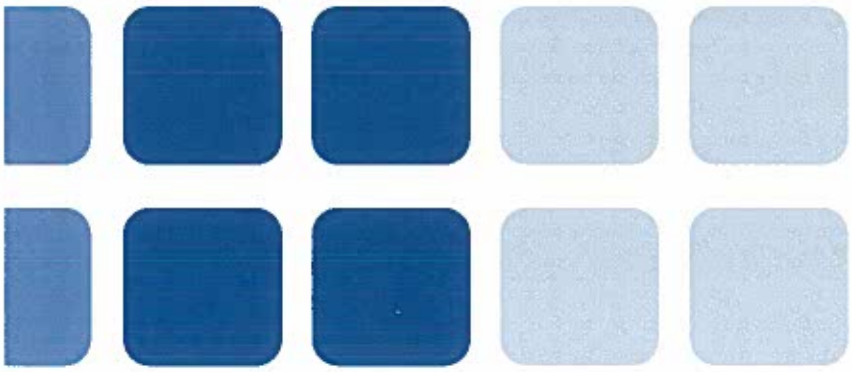

SOMERS TOWN ENERGY CENTRE LONDON NW1

Plant Noise Assessment

REPORT 6571/PNA
Prepared: 27 January 2015

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Plant Noise Assessment

SOMERS TOWN ENERGY CENTRE
LONDON NW1

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Revision	Comment	Date	Prepared By	Approved By
Zero	First issue of report	27 January 2015	Guillermo Alfaro	Andrew Heath

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1.0 INTRODUCTION

In order to provide evidence for the discharge of Planning Condition 2 for the Somers Town Energy Centre an assessment of atmospheric noise emissions from the proposed equipment to the nearest noise sensitive properties is required.

RBA Acoustics have been commissioned by Vital Energi to undertake measurements of the prevailing noise conditions at the site and to determine the atmospheric noise emissions in accordance with London Borough of Camden's requirements. The following report summarises the results of our assessment and provides recommendations for suitable mitigation measures in order to achieve the Local Authority's target criterion.

2.0 ENVIRONMENTAL NOISE SURVEY

2.1 General

In accordance with the requirements of the Local Authority, attended noise monitoring of the prevailing background noise was undertaken between 01:00 and 04:00 hrs on Thursday 7 January 2015. This monitoring period was agreed with Edward Davis of the London Borough of Camden as it is considered to be the quietest time period during which the future plant is required to operate.

2.2 Instrumentation

The following equipment was used for the measurements.

Table 6571/T1 – Equipment Details

Manufacturer	Model Type	Serial No.	Calibration	
			Certificate No.	Expiry Date
01dB A&V Type 1 Sound Level Meter	Black Solo 01	65678	01651/2	27 January 2016
01dB A&V Pre Amplifier	PRE 21 S	16316		
01dB A&V ½" Microphone	MCE 212	153459		
01dB-Stell Calibrator	Cal 21	35242481	01651/1	27 January 2016

The sound level meter was calibrated both prior to and on completion of the survey with no calibration drift observed.

2.3 Measurement Locations

Position 1 – Purchese Street

A microphone was positioned on a tripod on Purchese Street approximately 1 metre away from the facade of the proposed energy centre at approximately 1.2 metres above ground level. This position is considered as being representative of the noise climate as experienced at the most affected residential windows overlooking Purchese Street.

The measurement location is also shown in the attached Site Plan 6571/SP1 and Photograph 6571/P2.

Position 2 – Brill Place

A microphone was positioned on a tripod on Brill Place approximately 1 metre away from the facade of the proposed energy centre at approximately 1.2 metres above ground level. This position is considered as being representative of the noise climate as experienced at the most affected residential windows overlooking Brill Place.

The measurement location is also shown on the attached Site Plan 6571/SP1 Photograph 6571/P1.

2.4 Site Description

The site is located in Camden, between Brill Place and Purchese Street. During our time on site there were no vehicular movements on either road. The major source of noise in the area was due to ambient traffic noise from Midland Road and Ossulston Street.

3.0 RESULTS

The lowest measured background $L_{A90,\ 15\ minute}$ levels are shown in Table 6571/T2 below.

Table 6571/T2 – Measured L_{90} Levels

Measurement Period	Position 1- Purchese Street	Position 2- Brill Place
	L_{90} (dBA)	L_{90} (dBA)
1:00 to 2:00 hours	46	47
2:00 to 3:00 hours	43	46
3:00 to 4:00 hours	46	46

4.0 PLANT NOISE CRITERIA

The requirements of the Local Authority with regards to plant noise emissions are stated in Planning Condition 2 which states:

> *"Noise levels at a point 1 metre external to sensitive facades shall be at least 5dB(A) less than the existing background measurement (LA90), expressed in dB(A) when all plant/equipment (or any part of it) is in operation unless the plant/equipment hereby permitted will have a noise that has a distinguishable, discrete continuous note (white, hiss, screech, hum) and/or if there are distinct impulses (bangs, clicks, clatters, thumps), then the noise levels from that piece of plant/equipment at any sensitive façade shall be at least 10dB(A) below the LA90, expressed in dB(A)."*

In line with the above the relevant plant noise limits are as follows:

Position 1 – Purchese Street – 38 dBA
Position 2 – Brill Place – 41 dBA

5.0 ASSESSMENT ASSUMPTIONS

At this stage our assessment has been based upon the following information.

5.1 Proposed Mechanical Services

Phase 1 of the Energy Centre installation will comprise the following items of noise generating plant:

3No. Gas Boilers Hoval Ultragas 1440D
2No. District Heating Pumps
6No. Boiler Shunt Pumps

5.2 Operating Hours

We understand that the proposed mechanical services plant may be required to operate during both daytime and night-time periods, i.e. 24 hours a day.

5.3 Noise Levels

Information regarding the noise levels of the proposed plant has been forwarded to us by Vital Energi and are presented in Table 6571/T3.

Table 6571/T3 – Plant Noise Levels (Phase 1)

Item	Model	Sound Level (dBA)	Parameter
3No. Gas Boilers	Hoval Ultragas 1440D	70 dBA	Lp at 1m (each unit)
2No. District Heating Pumps	-	74 dBA	Lp at 1m (each unit)
6No. Boiler Shunt Pumps	-	68 dBA	Lp at 1m (each unit)

All recommendations have been based on this noise data and will not hold should plant be reselected and any of the noise levels increase.

5.4 Energy Centre Layout

The layout of the plant room is as detailed on the following Vital Energy drawing:

- D-377-C-07-A

This drawing indicates that the energy centre is ventilated with louvres that connect at high level in the plant room to low level at the street. The louvres that are considered as relevant for the noise impact assessment on nearby residential properties have been divided in four groups as shown on the attached Site Plan 6571/SP2.

The Boilers are to have flues that discharge at high level on Purchese Street as indicated on Vital Energi drawing:

- D-377-C-102-0

The energy centre is to be located at basement level with existing offices directly above and to the side. An assessment of noise levels to these areas will also be considered as part of this assessment.

6.0 NOISE EMISSIONS TO RESIDENTIAL PROPERTIES

6.1 Location of Nearest Residential Windows

The nearest noise sensitive receptors to Louvres 1 and 2 are the flats within the same building overlooking Purchese Street approximately 10m from the louvres and significantly screened.

The nearest noise sensitive receptors to Louvre 3 are located on the ground floor of Brill place, approximately 3m to the west of the louvre discharge location. This receptor can be seen on Photo 6571/P1 included in the Appendix.

The nearest noise sensitive receptors to the boiler flues are the flats within the same building overlooking Purchese Street.

6.2 Calculation of Noise Levels at Nearest Residential Window

Our calculation method for predicting noise levels from the proposed Energy Centre at the nearest residential windows, based on the information stated above, is summarised below.

- Source Term SPL
- Reflections within plant room
- Louvre Losses
- Directivity
- Screening
- 20LogR Distance Attenuation

Example calculations are provided in Appendix B. The results of the calculations indicate the following noise levels at the nearest affected residential windows from each louvre grouping:

Table 6571/T4 – Predicted Noise Levels

Noise source	Predicted Noise level at receptor [dBA]	
	Prediction	Criterion
Louvre 1	34	38
Louvre 2	36	38
Louvre 3	38	41
Boiler Flues	52*	38

*The levels highlighted above exceed the required criteria, therefore further mitigation measures are recommended.

6.3 Mitigation Measures (Phase 1 Plant)

Boiler Flues

It is recommended that noise from the atmospheric discharge of the boiler flues do not exceed 55 dBA (each) when measured at 1m above the discharge location (in line with the direction of flow).

7.0 NOISE TRANSFER TO ADJACENT OFFICES

7.1 Energy Centre Constructions

Floor to above – Beam and Block

It is understood the floor above the proposed Energy Centre comprises a beam and block construction with screed and carpet. We have predicted the following sound reduction indices based on test data RBA have obtained from similar constructions.

Table 6571/T6 –Sound Reduction Index – Beam and Block Floor with Screed

Sound Reduction Index (dB) at Octave Band Centre Frequency (Hz)							
63	125	250	500	1k	2k	4k	8k
26	30	38	42	50	55	60	62

Before installation of plant items it may be prudent for the floor to be tested to establish the actual on-site sound insulation of the floor.

Walls– Masonry Wall

It is understood that the walls to adjacent offices comprises blockwork, concrete and render with approximate thickness of 500mm. We have predicted the following sound reduction indices based on our experience of similar constructions.

Table 6571/T7 –Sound Reduction Index – Wall

Sound Reduction Index (dB) at Octave Band Centre Frequency (Hz)							
63	125	250	500	1k	2k	4k	8k
36	40	45	52	59	63	67	70

7.2 Predicted Noise Transfer

Phase 1 Plant

The worst case noise transfer to the offices above (directly above the DH pumps) due to the operation of Phase 1 plant is predicted to be approximately 30 dBA. This would typically be around 10 dB quieter than a normal office environment and therefore considered appropriate.

Noise transfer horizontally through the wall is predicted to be approximately 15 dBA and therefore considered appropriate without further measures.

8.0 VIBRATION CONTROL

Each item of mechanical services plant will require appropriate treatment in order to ensure vibration transfer to the building structure (which may then cause a re-radiated noise issue) is controlled to acceptable levels. The attached Anti-Vibration Measures Schedule 6571/AVM details our recommended vibration control measures for each item of building services plant serving the development. We also present the following general advice:

8.1 Pipework Isolation

The use of flexible connectors as an interface between plant and associated pipework cannot be considered as adequate vibration isolation. Their use as thermal and shock compensators is well known, but even under nominal line pressures the connectors become acoustically rigid. It is, therefore, recommended that all active pipework should be isolated on resilient mountings/hangers up to the plant room structural penetration. Thereafter oversized brackets having neoprene inserts would be advisable, generally for larger "live" pipework, but also for smaller "live" pipework where friction losses exceed 280Pa/m.

If flexible connectors are also required, they should be located in the horizontal plane and be of the double arched type.

8.2 Ductwork Flexible Connections

All ductwork connections to fans should be flexible and at least 75mm long. These should be constructed from sound barrier mat having a minimum superficial density of at least 5kg/m^2. These connections should be straight but not rigid, with no offset, in order to prevent turbulence.

8.3 Electrical Connections

It is important that isolated equipment is not mechanically shorted by the installation of conduit or cable trays, etc., which are rigidly connected to the structure. Electrical connections to plant should, therefore, be made via a looped flexible conduit. The loop should form a diameter of 300 mm or more.

9.0 SUMMARY

A detailed assessment of noise emissions from Phase 1 of the proposed Somers Town Energy Centre has been undertaken.

The results of the assessment indicate that, providing certain acoustic performance requirements and attenuation measures are included as outlined herein, levels of noise transfer from items of mechanical services plant associated with the scheme achieve compliance with the requirements detailed within Planning Condition 2.

Recommended mitigation measures.

- Additional attenuation to boiler flues to meet the noise limits presented herein

Appendix A - Acoustic Terminology

dB	Decibel - Used as a measurement of sound pressure level. It is the logarithmic ratio of the noise being assessed to a standard reference level.
dB(A)	The human ear is more susceptible to mid-frequency noise than the high and low frequencies. To take account of this when measuring noise, the 'A' weighting scale is used so that the measured noise corresponds roughly to the overall level of noise that is discerned by the average human. It is also possible to calculate the 'A' weighted noise level by applying certain corrections to an un-weighted spectrum. The measured or calculated 'A' weighted noise level is known as the dB(A) level. Because of being a logarithmic scale noise levels in dB(A) do not have a linear relationship to each other. For similar noises, a change in noise level of 10dB(A) represents a doubling or halving of subjective loudness. A change of 3dB(A) is just perceptible.
L_{eq}	L_{eq} is defined as a notional steady sound level which, over a stated period of time, would contain the same amount of acoustical energy as the actual, fluctuating sound measured over that period (1 hour).
L_{Aeq}	The level of notional steady sound which, over a stated period of time, would have the same A-weighted acoustic energy as the A-weighted fluctuating noise measured over that period.
L_{An} (e.g L_{A10}, L_{A90})	If a non-steady noise is to be described it is necessary to know both its level and the degree of fluctuation. The L_n indices are used for this purpose, and the term refers to the level exceeded for n% of the time, hence L_{10} is the level exceeded for 10% of the time and as such can be regarded as the 'average maximum level'. Similarly, L_{90} is the average minimum level and is often used to describe the background noise.
$L_{max,T}$	The instantaneous maximum sound pressure level which occurred during the measurement period, T. It is commonly used to measure the effect of very short duration bursts of noise, such as for example sudden bangs, shouts, car horns, emergency sirens etc. which audibly stand out from the general level of, say, traffic noise, but because of their very short duration, maybe only a very small fraction of a second, may not have any effect on the L_{eq} value.

Appendix B – Example plant calculations

Louvre 1 noise emission to nearest residential window

Detail	dBA
Sound Pressure Level 1m Inside Louvre	70
Breakout loss	-7
Distance (9m)	-19
Barrier attenuation	-10
Total at Receptor	**34**

Louvre 2 noise emission to nearest residential window

Detail	dBA
Sound Pressure Level 1m Inside Louvre	72
Breakout loss	-7
Distance (9m)	-19
Barrier attenuation	-10
Total at Receptor	**36**

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SOMERS TOWN ENERGY CENTRE
ANTI-VIBRATION MEASURES SCHEDULE
(PHASE 1) 6571/AVM – 1 OF 2

System Description	Location	Duty / Flowrates	Base	Isolator	Static Deflection (mm)
Gas Boiler	Plant room	-	-	NP	4
District Heating Pumps	Plant room	-	CIB	OSS	20
Boiler Shunt Pumps	Plant room	-	-	HSS/R	20

Base Code and Description
Rails : A V Rails
SFB : Steel frame base
CIB : Concrete inertia base
Plinth : Concrete split plinth

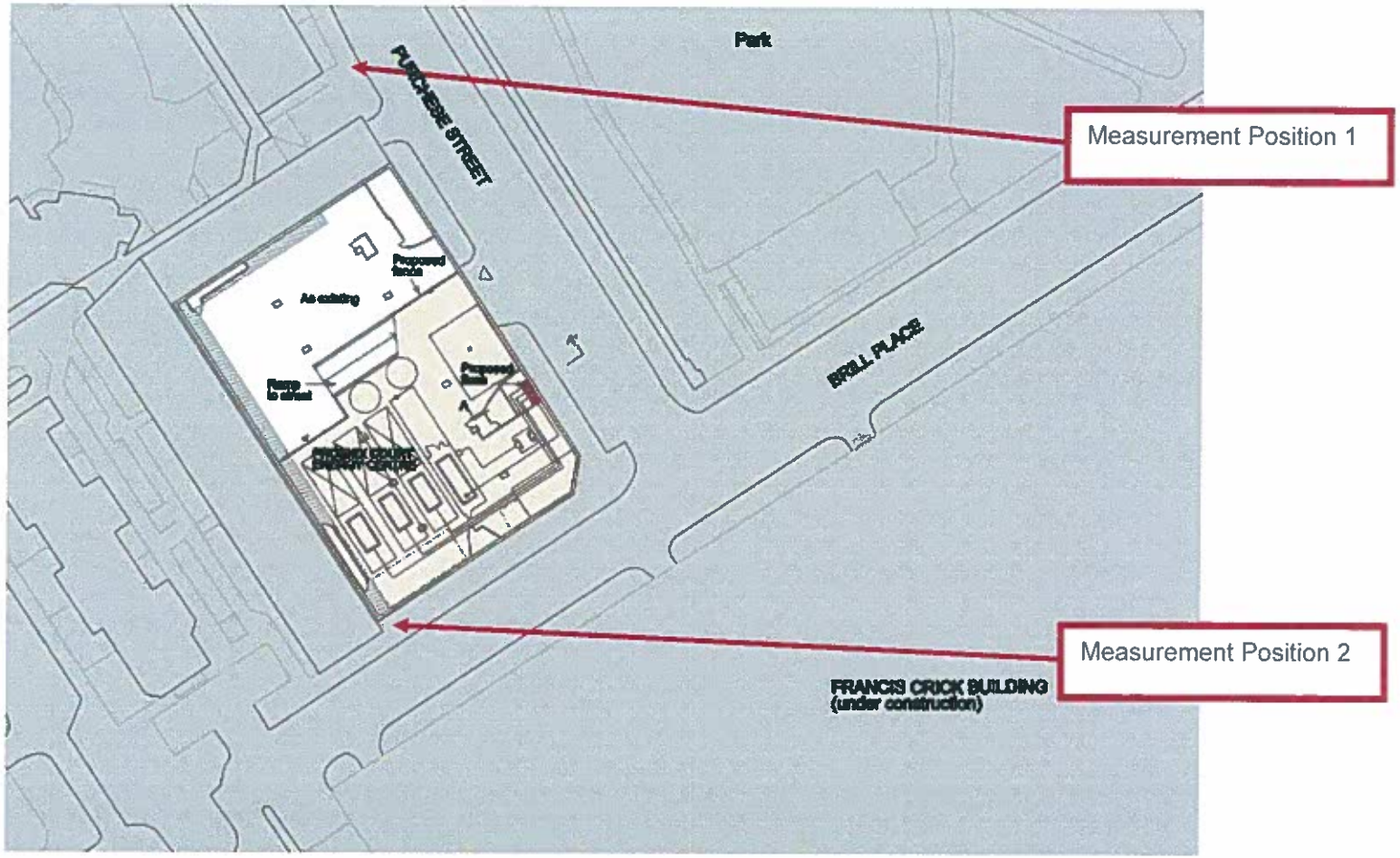
Isolator Code & Description
Pads : Neoprene Pads
CS : Caged steel spring
OS : Open steel spring
NIS : Neoprene-in-shear

Isolator Code & Description
SH : Spring Hangers
TH : Hangers with neoprene turrets
_/R : Restraining or positioning device

Note 1 : All cased fans shall have the above specified isolators internally beneath fan/motor frame, and be additionally isolated externally with neoprene pads having 2 mm (min) deflection.

Note 2 : All pipework to be isolated between the plant and the first structural penetration using AV hangers/mounts with the above specified static deflection, and thereafter with brackets having neoprene inserts. Flexible connectors should be used between pumps and associated pipework.

Note 3 : CW booster pipework should ideally be isolated throughout using AV hangers/mounts with the above specified static deflection. We understand this is often not practically possible, in which case pipework fluid flows should be designed in line with CIBSE recommendations and pipework after the first structural penetration should be supported by brackets having neoprene inserts.



Somers Town Energy Centre

Site Plan Showing Measurement Position 1 & 2

Site Plan 6571/SP1

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Somers Town Energy Centre

Photograph 6571/P1

Photograph Showing Measurement Position 1

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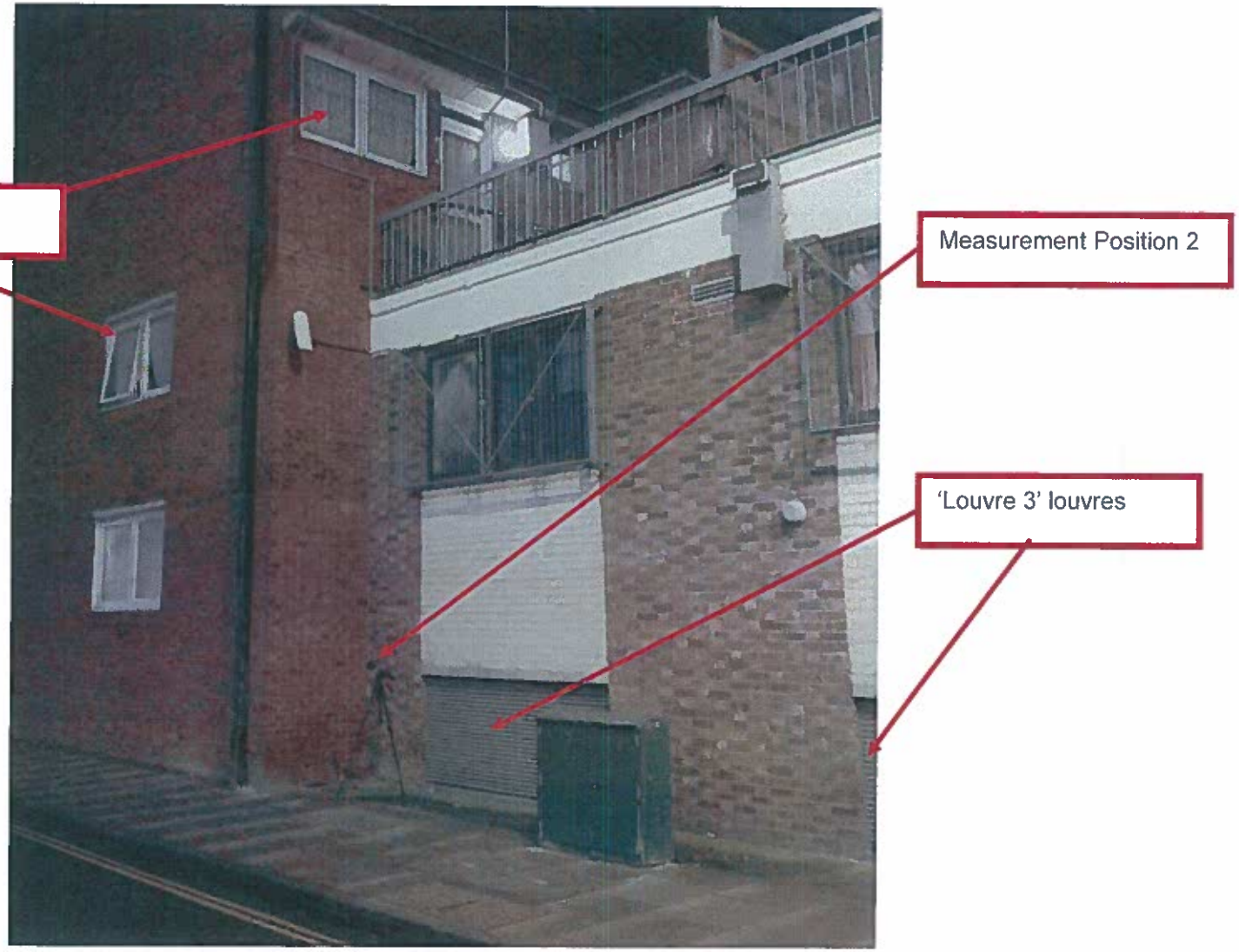

Somers Town Energy Centre

Photograph Showing Measurement Position 2

Photograph 6571/P2

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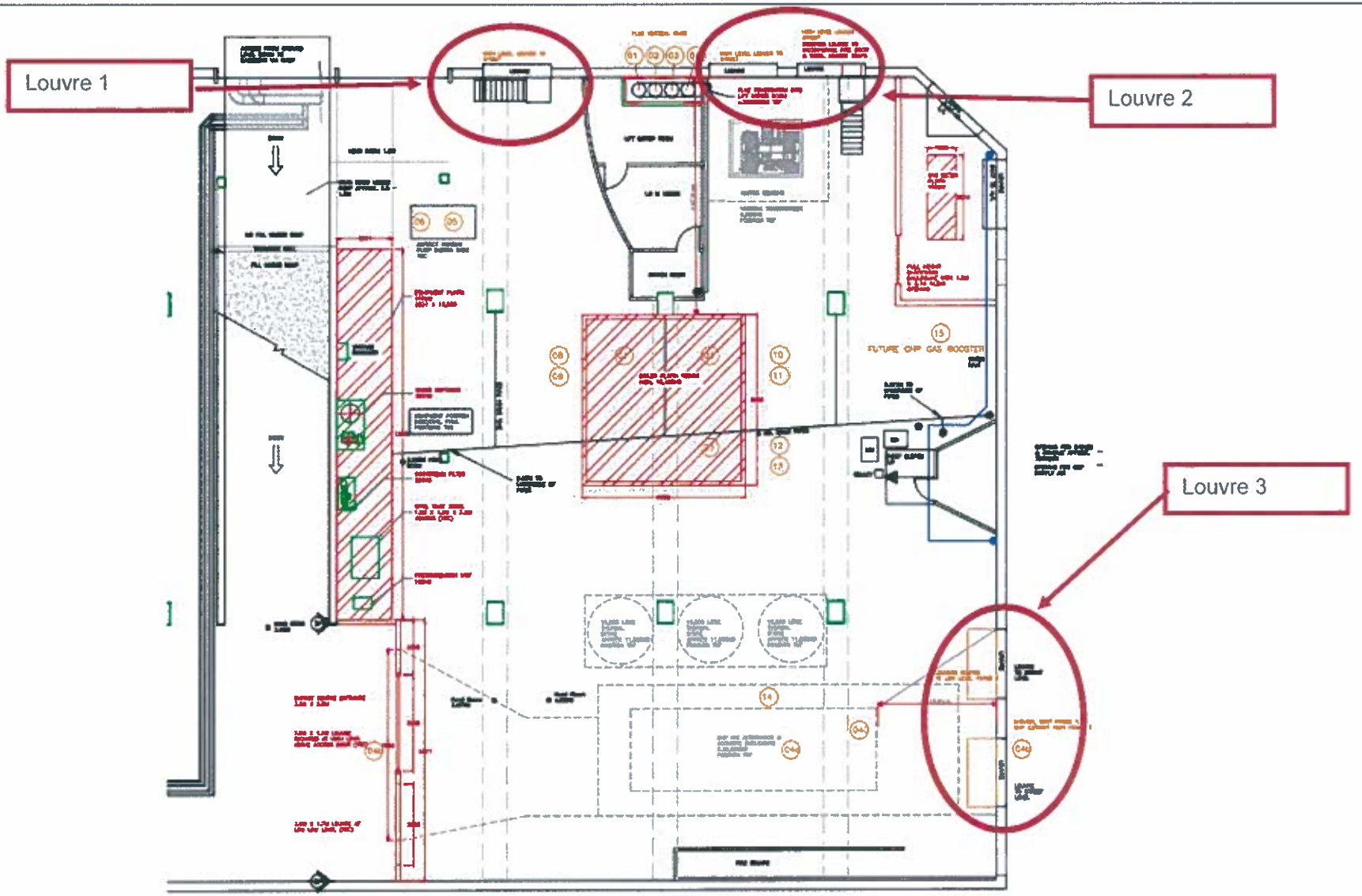

Somers Town Energy Centre

Site Plan Showing Plant Room Layout

Site Plan 6571/SP2

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