Design Statement for Revised Building Design with Plant Flues | Kentish Town Church of England Primary School

February 2010

Haverstock associates

Doc No.	Design Statement	Author	MK	Check	MK	Aprvd	CB	Date	17.02.2010

Revision	Description	Author	Check	Aprvd	Date

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| Introduction

Kentish Town Church of England Primary School has been granted with planning approval with conditions on the extension and refurbishment of the existing building to provide a new inclusive resource base for children with Autistic Spectrum Disorder. The reference number for the application is 2009/0581/P.

This document serves to support the planning amendment application for revised building design with plant flues to the previous approved scheme.

2.0 | New plant boilers to the school

The current boilers serving the Victorian school building are located in a basement plant room beneath the existing chimney which rises above the existing pitch roof. The boilers are near the end of their service life and the extension will be building over the basement plant room. Therefore the proposal is to replace them with a more energy efficient gas fired condensing boiler plant and a dedicated hot water generator in a new plant room in the extension, which will be more accessible.

With the incoming services coming from the Islip Street, the location of the new plant room is most suitable at the south west corner of the building facing Islip Street. This allows the school to maximize external play area away from the plant room and means the extension is not building over live services. This position however could result in flues very visible on the front elevation - with this in mind our proposal seeks to minimise the impact of the flues.

2.1 | Design considerations for the plant flues

The addition of the new boilers and water heater will require 2 extract flues, 150 and 350 mm diameter, both needs to terminate above the roof line. Please refer to Appendix for the report from CBG Consultants (M&E engineers), on details of the system and reasons for the size of the flues. The height of the flues needs to be compliant with the 1956 Clean Air Act as explained in detail in CBG's report. In summary, the flue needs to be:

- Above the highest point of the building within a 4m radius of the flues and
- 3m above any adjacent openable area

3.0 | Design options for the plant flues

The design team has explored in detail various options on the design of flues to minimise the impact of on the street elevations:

3.1 | Option 1 - Flues directly above the plant room

The most straightforward and economic solution would be terminate the flues on the roof directly above the boilers/plant room. This results in the flues being 2.5m in height rising above the ridge of the pitched roof. Please refer to diagram 1. The location of the flues would be at odds with the strong rhythm created by the new roof pitches. It will also have a strong impact on the Islip Street and Frideswide Place frontage as well as the entrance of the extension by having such a dominant position.

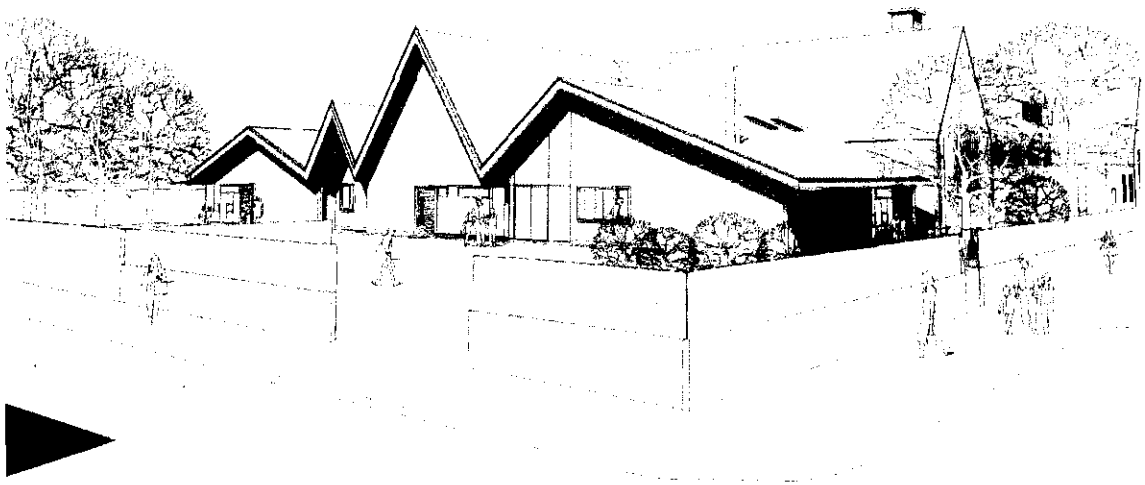

Diagram 1. Option 1 flues directly above plant room

| Option 2 - Flues away from pitched roof

To avoid puncturing the pitched roof with the flues, the design team has looked into taking them across the building and bringing them out at the flat roof between the existing building and the pitched roof extension. This will reduce the impact at the entrance. However the flues are determined by the height of the existing pitch roof which results in a 4.3m rise. Please refer to diagram 2. This is similar to the height of the existing chimney and being in close proximity to Islip Street, the scale of the flues could be more apparent.

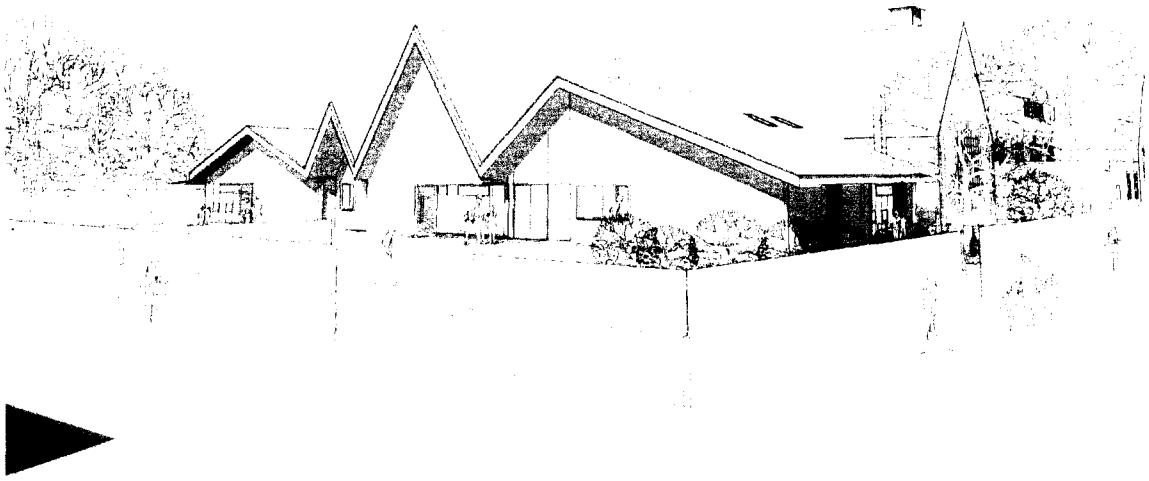

Diagram 2. Option 2 flues away from pitched roof

| Option 3 - Flues set back from main elevations

To minimise the impact on the street frontage, we are proposing to run the flues ducts as far as physically possible so that they are set back from the south and west elevations. The height of the flues however is affected by the openable rooflight on the proposed pitched roof. By slightly adjusting the position of the rooflight, we can reduce the height of the flues to a similar height of the existing chimney. Please refer to diagram 3. We believe that this is the most sympathetic solution as the height and location of the new flues for the boilers will relate well to the existing chimney which is part of the old plant room. The new flues will be partially screened by the new pitched roof extension and the existing building. This means that the flues will not be visible if one is approaching from the existing building. Thus the visual impact is minimised on the streets around the site. Please refer to diagram 4.

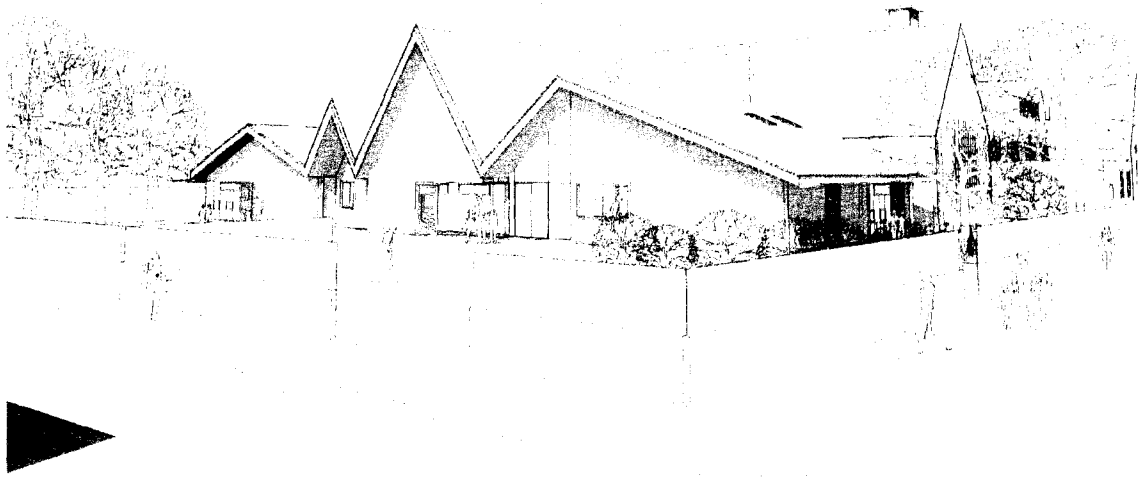

Diagram 3. Option 3 flues set back from main elevations

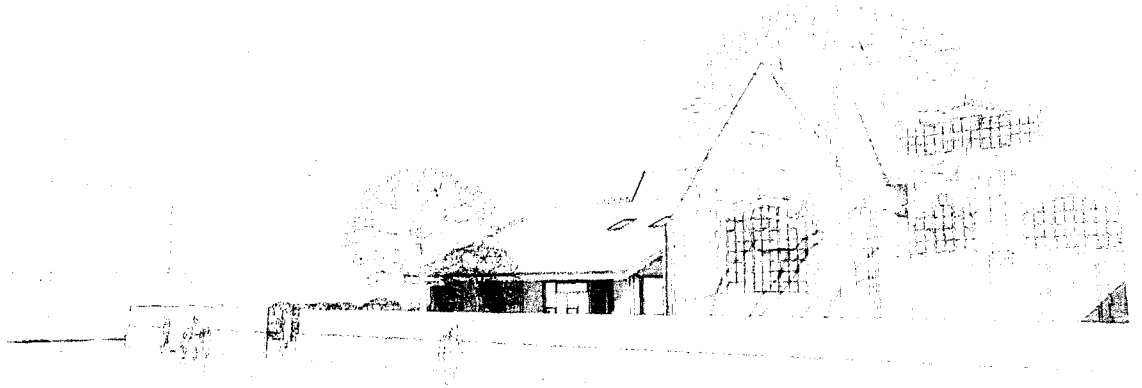

Diagram 4. Option 3 the plant flues are screened by the existing building

3.4 | Conclusion on design options

We believe that Option 3 is the closest to the original approved scheme and is in keeping with the design concept.

4.0 | Materiality and colour

The flues will be seen partially when one approaches the extension from the west. The existing slate roof will be always seen in the background. Therefore we are proposing the metallic new flues to have grey powder coated finish to blend in well with the existing slate roof. Please refer to diagram 5.

5.0 | Acoustic

Please refer to Hoare Lea's report attached in Appendix. In summary the noise emissions from the plant room and flues will satisfy planning requirement of 10dB below the background noise conditions.

Diagram 5. Option 3 the plant flues to blend in with background

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Plans C1000 – C1017_2

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907-C1003	Existing Roof Plan	✓												
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Kentish Town Church of England Primary School

Mechanical Services Design Information

Engineer: Fergus Davidson

Date: 10.02.2010

Contents

CBG CONSULTANTS

1. Design Summary

As part of the new extension at the school, the existing boiler plant shall be replaced with more efficient gas-fired condensing boiler plant to provide space heating to the new and existing parts of the school and a dedicated hot water generator to provide the service demands of the school. Under the requirements of The Building Regulations Approved Document J the following provisions have been included within the flue design to ensure compliance. For fixed combustion appliances as proposed for Kentish Town, The Approved Document J outlines the following requirements:

J1. Air Supply – Combustion appliances shall be so installed that there is an adequate supply of air to them for combustion, to prevent overheating and for the efficient working of any flue.

J2. Discharge of Products of Combustion – Combustion appliances and shall have adequate provision for the discharge of products of combustion to the outside air.

J3. Combustion appliances and fluepipes shall be installed so fireplaces and chimneys shall be so constructed and installed, as to reduce to a reasonable level the risk of people suffering burns or the building catching fire in consequence of their use.

CBG CONSULTANTS

2. Means of Compliance:

J1. The fixed combustion appliances shall be located in a dedicated Plantroom within the new extension. The heating boilers and water heater are 'open flue appliances' and therefore require a permanent means of ventilation to ensure there is adequate air for combustion and to satisfy the maximum temperature criteria as stated in *BS6644[Specification for the installation of gas-fired hot water boilers of rated inputs between 70kW and 1.8MW (net) (2nd and 3rd family gases)]*. The means of ventilation is provided via fixed external louvres located within the Plantroom door at high and level to ensure air movement is provided via thermal effects. The following louvre sizes are included within the Plantroom:

- Low level opening: Provision of $4cm^2$ per total rate kW input.
- High level opening: Provision of $2cm^2$ per total rate kW input.

J2. The flue design identifies that the hot water generator plant is provide with a dedicated flue, whilst the two number heating boilers will discharge into a common flue header within the Plantroom. The flue construction shall be of stainless steel twin walled insulated flue system suitable for condensing boiler plant. A floor gulley shall be installed within the Plantoom to which condensate pipe shall be installed from the boiler to ensure the safe discharge of condensation from within the boiler plant. The flue shall be installed with an adequate fall back to the boiler with drain points provided for adequate discharge of condensate to the Plantroom floor gulley.

The flue serving the HWS generator shall be installed with a fan to guarantee the discharge rate. The fan shall be located with the Plantroom.

The cross-sectional size of the flue for each open flue system is not less than the cross-sectional flue area of the flue inlet at each appliance.

Fixed Gas Fired Appliance	Manufacturers Flue Inlet Size	Flue System Size
Hot Water Generator	125ø (ID)	150ø* (OD)
Heating Boiler	150ø (ID)	150ø** (OD)

(ID internal diameter / OD outside diameter).

*HWS flue system shall require a fan flue due to the length of horizontal run. The HWS burner shall be interfaced with a air flow switch located within the flue to ensure that burner does not fire in the event of fan failure.

**Flue connections from heating boilers to discharge into common flue header (size 300ø)

The flue size and height has been designed in accordance with the *1956 Clean Air Act Memorandum on Chimney Heights (3rd Edition)*. The design is compliant with the following overriding design criteria:

- Flue height is greater than U (0.784m).
- Flue height is greater than 3m above the nearest openable area.
- Flue height is not below any part of the building within 5U of the final termination.

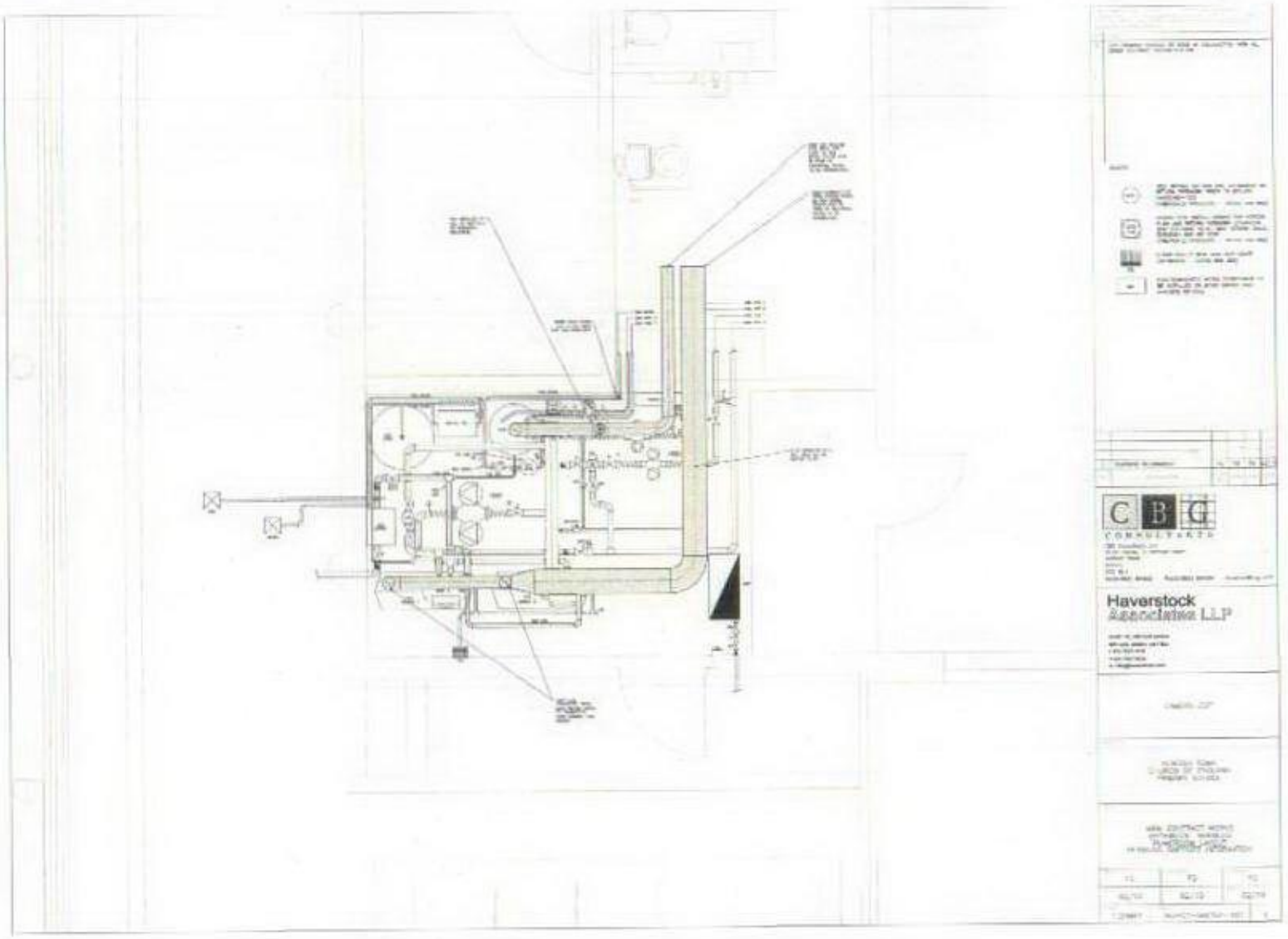
(A detailed design sketch is included within *Appendix* and supplemented by the Architect's documentation).

The final flue design will include adequate access for inspection and maintenance.

J3. The flue system construction will carry a 4 hour fire rated with a maximum temperature limit. The flue will be concealed along its length in occupied areas by a bulkhead ceiling construction to prevent the risk of scalding.

3. Appendix

Mechanical Services Plantroom Flue Lay-out	SK-M001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KENTISH TOWN ASD - PLANNING AMENDMENT FOR THE ADDITTION OF PLAN FLUES – ACOUSTIC STATEMENT

Hoare Lea Acoustics (HLA) have carried out an acoustic assessment of noise emissions from the proposed boiler plant located with the proposed plant room.

This report should be read in conjunction with our original plant noise assessment which was conducted in support of the planning application and is included in our Acoustic Stage D Report issued on 4 September 2009 (ref: REP-1003142-210409-1-TN).

Proposed plant

The proposed plant within the plant room comprising:

- 2 No gas-fired boilers with their flues combined into a common 225mm diameter flue extending about 3m above openable access. Please refer to Figure 2A and 2B.
- Primary and secondary pumps associated with the boilers
- Hot water generator

Proposed plant room

Please refer to Figure 1 for a plan showing the plant room location. There are no openings in the plant room envelope apart from the access door to room which is louvred for ventilation purposes.

Noise Criteria

The assessment provided below is aiming to limit plant noise emissions at 10dB below the background noise conditions. Please refer to Acoustic Stage D Report for a full plant noise assessment.

Plant operational hours

HL are not aware of any specific hours of operation for external mechanical and electrical installations. For the purpose of this exercise, 24hour operation has been assumed (worst case scenario).

Table 1: Plant noise limits at 1m from the nearest noise sensitive dwelling.

	Lowest Background – dB L_{A99}	Limit - dB L_{Aeq}
Daytime (07.00 – 19.00)	49	39
Evening time (19.00-23.00)	47	37
Night time (23.00 – 07.00)	41	31

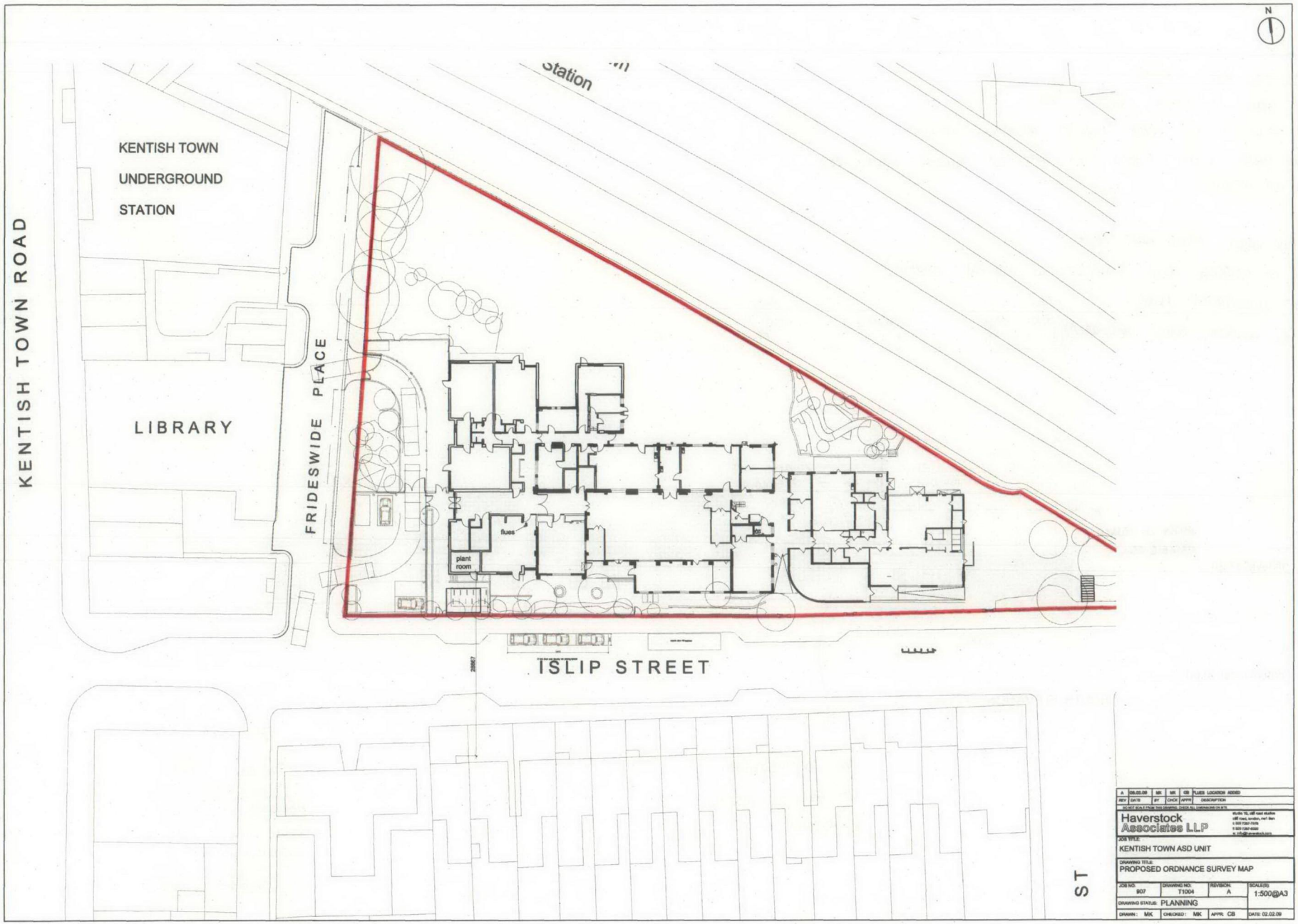
Noise Assessment

HLA have been provided with noise data for the boiler plant by the manufacturer. The noise data state that boiler noise emissions when measured at a distance of 1m from the plant are 62 dBA (for 2 No boilers). It is understood that this is the total noise level emitted from the boiler at a distance of 1m including noise break out from the burner and the boiler flue.

Noise level within the plant room will be dominated by boiler noise. Noise emissions from the plant room to the atmosphere are likely to occur through the louvred access door as well as the flue outlet. Based on the manufacturer's data for the boiler plant, the predicted noise level breaking-out through the louvred access door at the nearest noise sensitive window located approximately 25m away, is estimated to be 28 dBA L_{eq}. This is compliant with the night time criteria shown in Table 1.

Noise emission data from the flue termination are not available from the manufacturer. The proposed boiler is a standard combustion type gas-fired boiler without a flue dilution system which is usually associated with higher flue noise emissions, and experience indicates that noise emissions through the flue in a standard combustion type gas-fired boiler is unlikely to be a problem.

Based on the above considerations and assessment it can be concluded that noise emissions from the boiler plant would be contained within the planning noise limits set out in Table 1 above. It is also suggested that the precise requirements for noise reduction could be controlled through an appropriate planning condition


N
KENTISH TOWN ROAD
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UNDERGROUND
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flues
plant room
ISLIP STREET
ST
A 09.02.09 MK MK CB PLANS LOCATION ADDED
REV DATE BY CHCK APPR DESCRIPTION
Haverstock Associates LLP
JOB TITLE: KENTISH TOWN ASD UNIT
DRAWING TITLE: PROPOSED ORDNANCE SURVEY MAP
JOB NO. 807
DRAWING NO. T1004
REVISION A
SCALE(S) 1:500@A3
DRAWING STATUS: PLANNING
DRAWN: MK CHECKED: MK APPR: CB DATE: 02.02.09

CLEAN AIR ACT CHECKS:

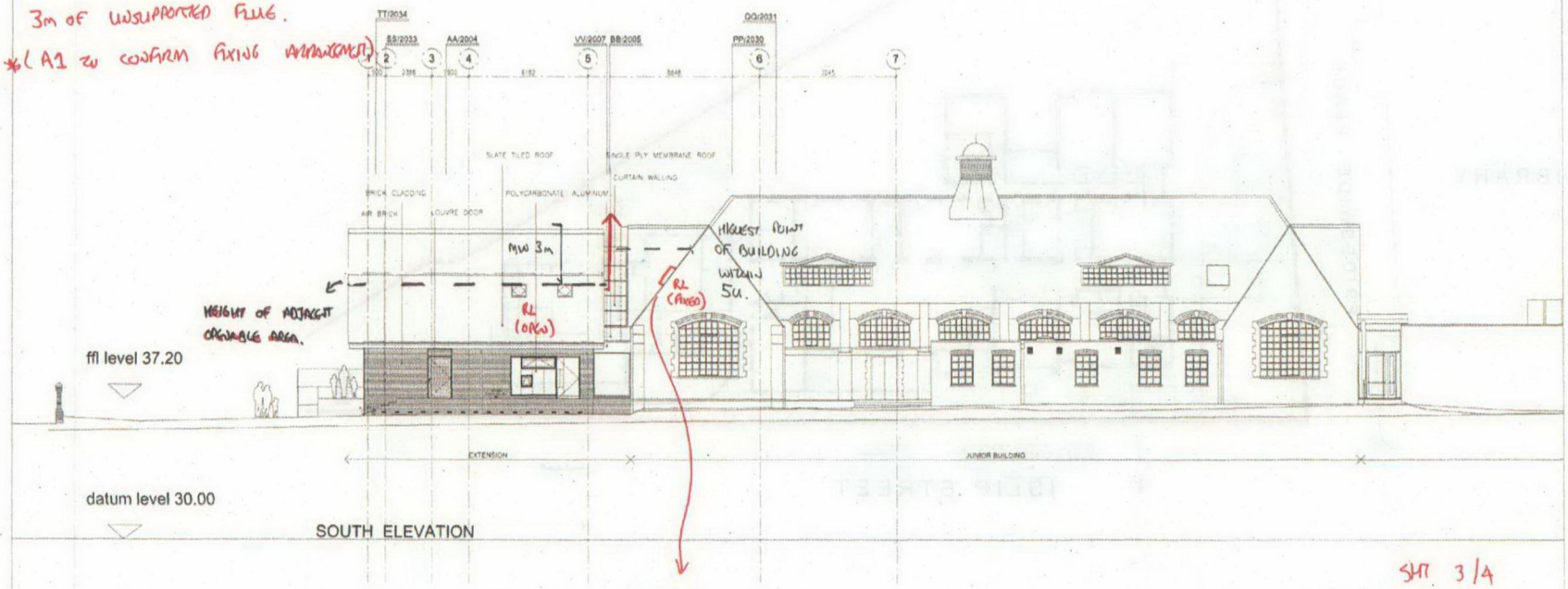
- FLUE HEIGHT IS GREATER THAN 0.784m (✓)
- FLUE HEIGHT IS >3m ABOVE NEAREST OPENABLE ROOFLIGHT ... : (✓)
- FLUE HEIGHT IS NOT BELOW ANY PART OF BUILDING WITHIN 4m OF TERMINATION.

TOTAL FLUE HEIGHT ABOVE GRND. 10m.

3.8m OF EXTERNAL FLUE (SUBJECT TO ROOF EXIT LOCATION)

3m OF UNSUPPORTED FLUE.

*(A1 TO CONFIRM FIXING ARRANGEMENT)



SOUTH ELEVATION

HA TO IDENTIFY LOCATION OF EXISTING ROOFLIGHT.

SHT 3/4

F. DAVIDSON 8/2/10

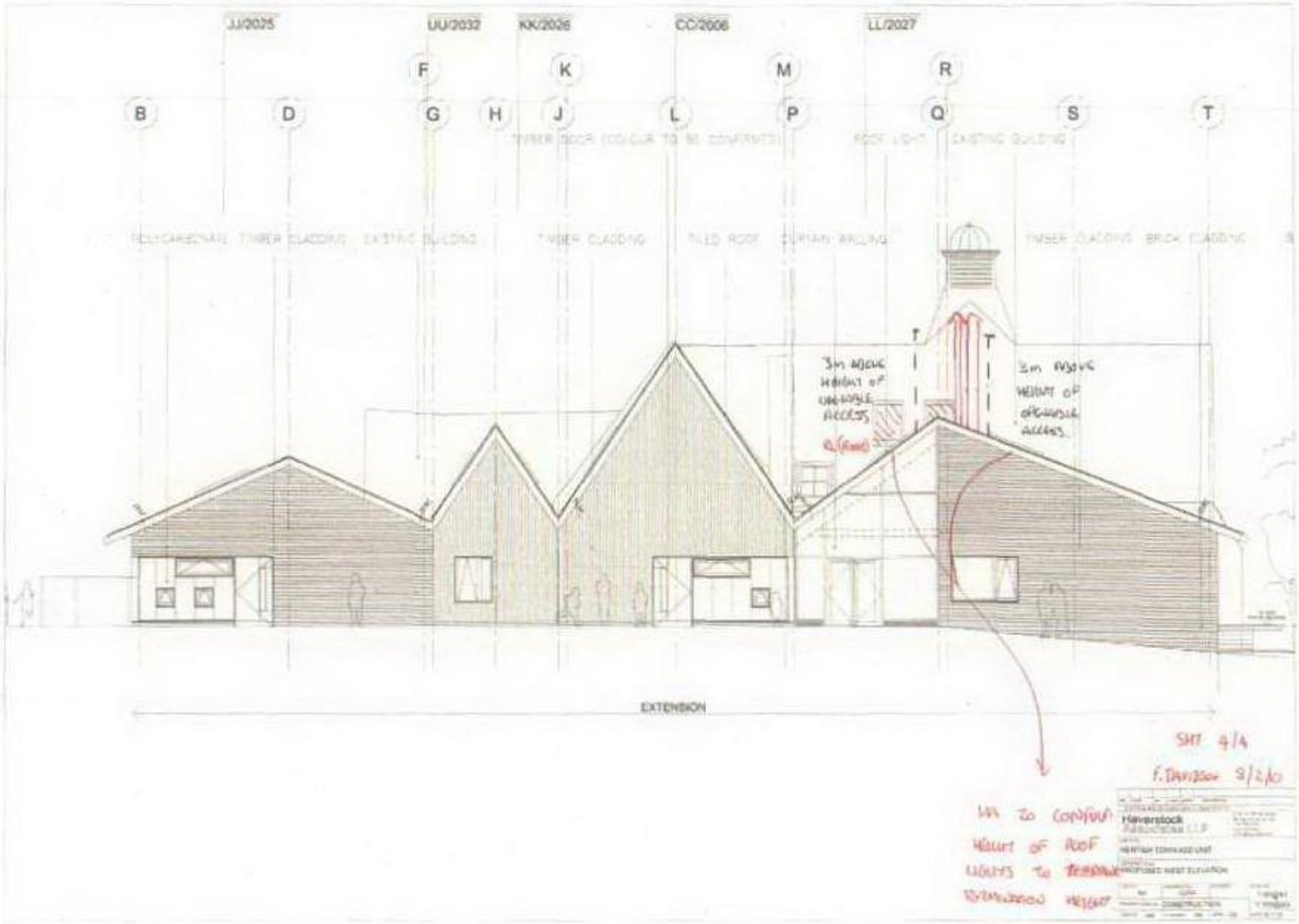
Haverstock Associates LLP

KENTISH TOWN ASD UNIT

PROPOSED SOUTH ELEVATION

507 | 0900 | 1:100@A1 | 1:200@A3

CONSTRUCTION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F. Davidson 9/2/10
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