

BY SCANNED LETTER VIA E-MAIL

Alan Baxter
INTEGRATED · DESIGN

Our Ref: 1693/11/MC/jmc

75 Cowcross Street
London EC1M 6EL

t 020 7250 1555

Tom Croft
Thomas Croft Architects
9 Ivebury Court
325 Latimer Road
London
W10 6RA

e aba@alanbaxter.co.uk
w www.alanbaxter.co.uk

14 March 2016

Dear Tom

11 Rosslyn Hill – Civil Engineering Dynamics

You have asked for our comments in relation to the report recently received from Civil Engineering Dynamics (CED).

CED set out their issues in paragraph 2.4. They refer to noise and vibration during construction and to the long term impacts. The construction issues have been dealt with at length in the Cole Jarman reports and we have dealt with the structural damage and structural movement issues in our work, which has been accepted by CRH. In summary there is no structural damage, as clearly set out in our reports. This deals with CED's points 2.4.2, 2.4.3 and 2.4.4 and leaves 2.4.1; ground borne noise and vibration from underground railway tunnels. I am surprised that CED are raising this, especially as the tunnels are deep and remote from the site, but I am able to offer some comments on the situation based on our experience of the design of buildings containing or adjacent to vibration sensitive equipment much closer to LUL assets than Lyndhurst Hall. Cole Jarman should be able to confirm these.

We have worked on several projects where underground railway noise and vibration has had to be considered, including a very large basement for the London Clinic, very close to the Metropolitan and Circle line tunnels and a basement at St Martins-in-the-Fields close to and above the Northern line (see attached details).

It is not credible that significant energy could somehow be reflected or reradiated into the structure of Lyndhurst Hall from the proposed new structures at number 11.

2/...

ABA STRUCTURAL & CIVIL ENGINEERING URBAN DESIGN MASTERPLANNING TRANSPORT & MOVEMENT CONSERVATION SUSTAINABILITY

Directors

Alan Baxter CBE BSc MICE FStructE
Michael Coombs MSc DIC FStructE
James Gardiner BSc MICE MStructE
Alan Fleet BSc MICE MStructE
William Filmer-Sankey MA DPhil FSA MCIFA
Adam Sewell MEng MStructE

Malcolm Turner MSc MICE
Andrew Morton BSc MICE
Paul Ragsdale BEng MStructE
Simon Bennett MEng MICE MStructE
Richard Pollard MA MA
Nicholas Davies BSc ACA

Associates

John Mason MA MStructE
Ian Taylor BSc MICE MStructE
Clare Coats BSc Dip LA CMLI
David Rathbone BSc MICE MStructE
Adrian Tucker BEng MStructE
Raihan Abu BEng MSc DIC MStructE

Trenton Williams BSc(Eng) MPhil
David Lankester MEng MStructE
Kit Wedd BA
Olivier Fernandez MA
Thomas Roberts BSc MSc MStructE
Ing. Luca Frasca

Fredrik Nyberg MEng

Consultants

Robert Thorne MA FSA
David Johncox BEng MICE MStructE

.../2

The vibrations from the Northern line, which have been measured by CED, are very small indeed and the direct noise path through the ground to Lyndhurst Hall that causes these is much shorter than any reflected noise path would be. The longer reflected noise paths (if indeed reflected noise is a factor, which we believe not to be the case) mean that more energy would be dissipated. Also, the new concrete sub structures are very much stiffer than the clay in which they sit, so they will absorb energy from the ground much more than reflect it. The nature and arrangement of the piled walls with gaps between circular piles, is not like a solid plane wall in terms of reflection. The configuration will result in dissipation and absorption of the noise. CED state that the basement structures may provide a more efficient transmission of ground borne noise and vibration. We do not agree that this is a possibility, based on the configuration and disposition of the new structures and the longer sound path in the ground to them, than the direct sound path to the Hall. The attached marked up sketch illustrates this.

It is significant to note in CED's fig 7.2 that the noise from the further Northern line tunnel is much less than that measured for the nearer tunnel. The noise path from the further tunnel is 1.2 times longer than the noise path from the nearer tunnel, and the noise strength is approximately half. From the sketch I have produced, the noise paths (if there is any reflected noise) from the nearer underground tunnel via the new basements to Lyndhurst Hall are more than double the length (2.1 and 2.2 times) and as noted, the new basement structures will absorb most if not all of the noise.

The BS references CED quote are about piles concentrating loads into the buildings founded on them and not into adjacent buildings.

The Royal Free will be subject to similar minor underground noise and vibration, but from what we are able to establish, they are not taking any special measures in their new development proposals which include a new basement and with piled foundations and housing sensitive medical equipment.

Nothing that our clients are proposing will change this once their project is complete and they have dealt with the issues that need to be considered during construction, as far as I am aware.

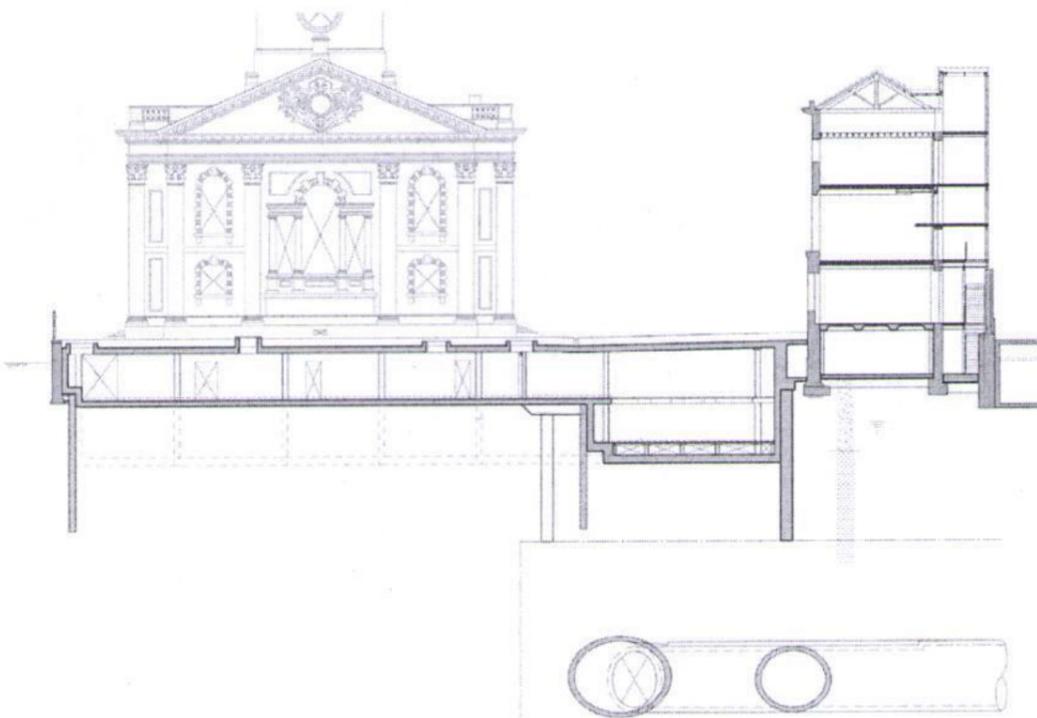
Yours sincerely

A handwritten signature in red ink that reads "Michael Coombs". The signature is written in a cursive style and is underlined with a single red line.

Michael Coombs
for Alan Baxter Ltd

St Martin-in-the-Fields, London

St-Martin-in-the-Fields is a landmark building of world renown, combining worship, education and social care within one of the nation's most splendid ecclesiastical settings. We have acted as engineers on a major extension of the listed Grade I church that has included the careful removal of existing vaults and the construction of a new double basement structure beneath the church yard between two sensitive buildings. The new basement has been constructed on a highly constrained site over the Northern line and between listed buildings requiring careful consideration of ground movements and sequencing.
Client: St Martin-in-the-Fields

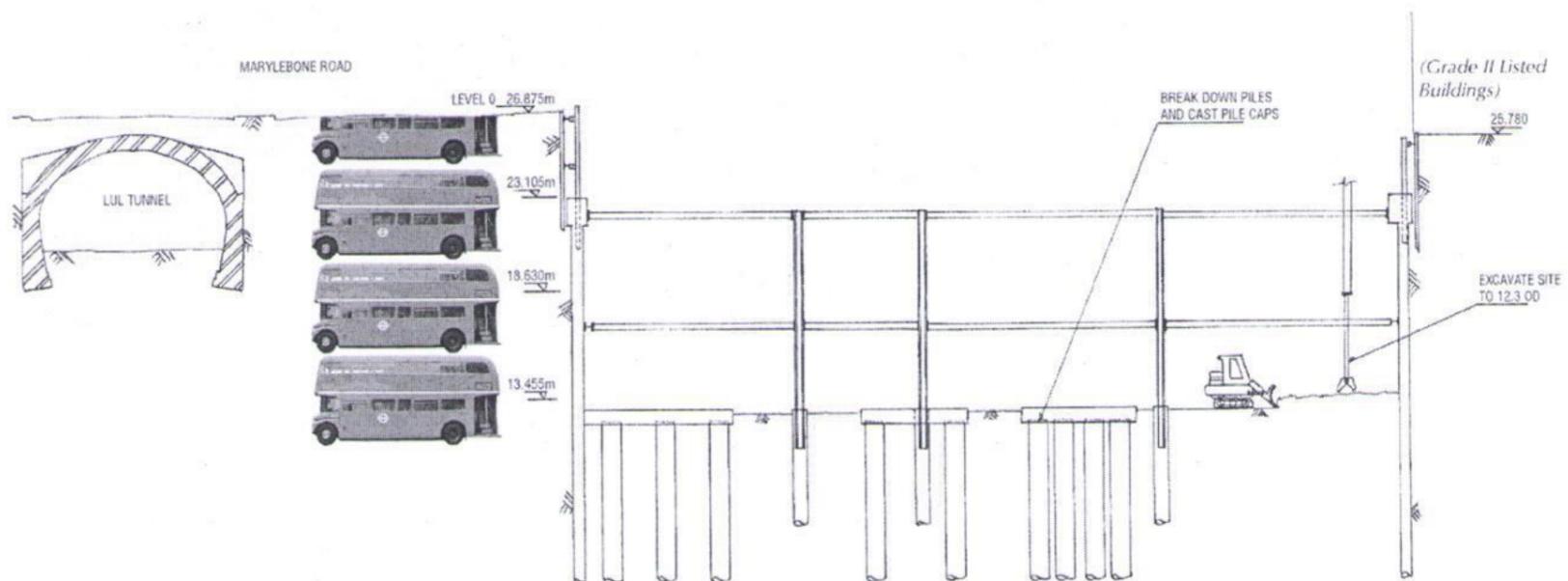
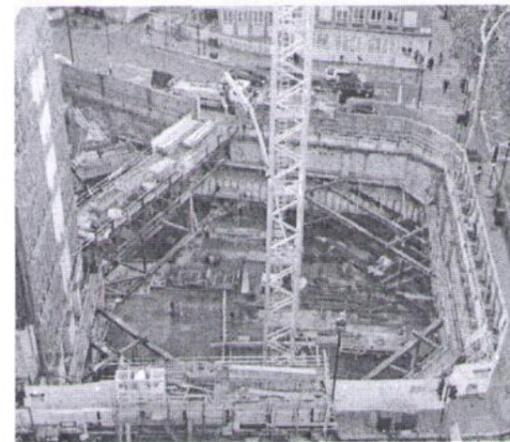
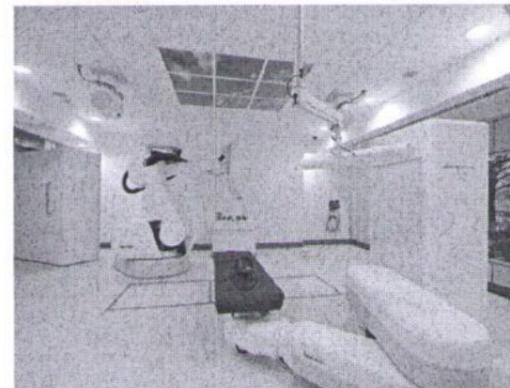


THE NEW BASEMENT IS USED FOR FUNCTIONS AND PERFORMANCES
NO SPECIAL MEASURES WERE INCORPORATED TO DEAL WITH GROUND
BOUNCE NOISE FROM THE NORTHERN LINE.

The London Clinic

A substantial building on Marylebone Road has been the imposing home of the London Clinic for 75 years. We have recently completed a major new cancer centre, which also acts as a new deliveries and servicing hub for the entire hospital. It is linked to the 1932 hospital by a new tunnel under Devonshire Place. This was a highly complex project for which we were responsible for civil and structural engineering design and highways and transport issues. The new building, for example, houses lined linear accelerator bunkers in a 15m deep basement. In addition, an adjoining listed Georgian town house has been restored and integrated into the scheme. The tremendous constraints of the site added to the challenge, with a major road artery, the Circle and Metropolitan underground line and extensive services just a few metres away.

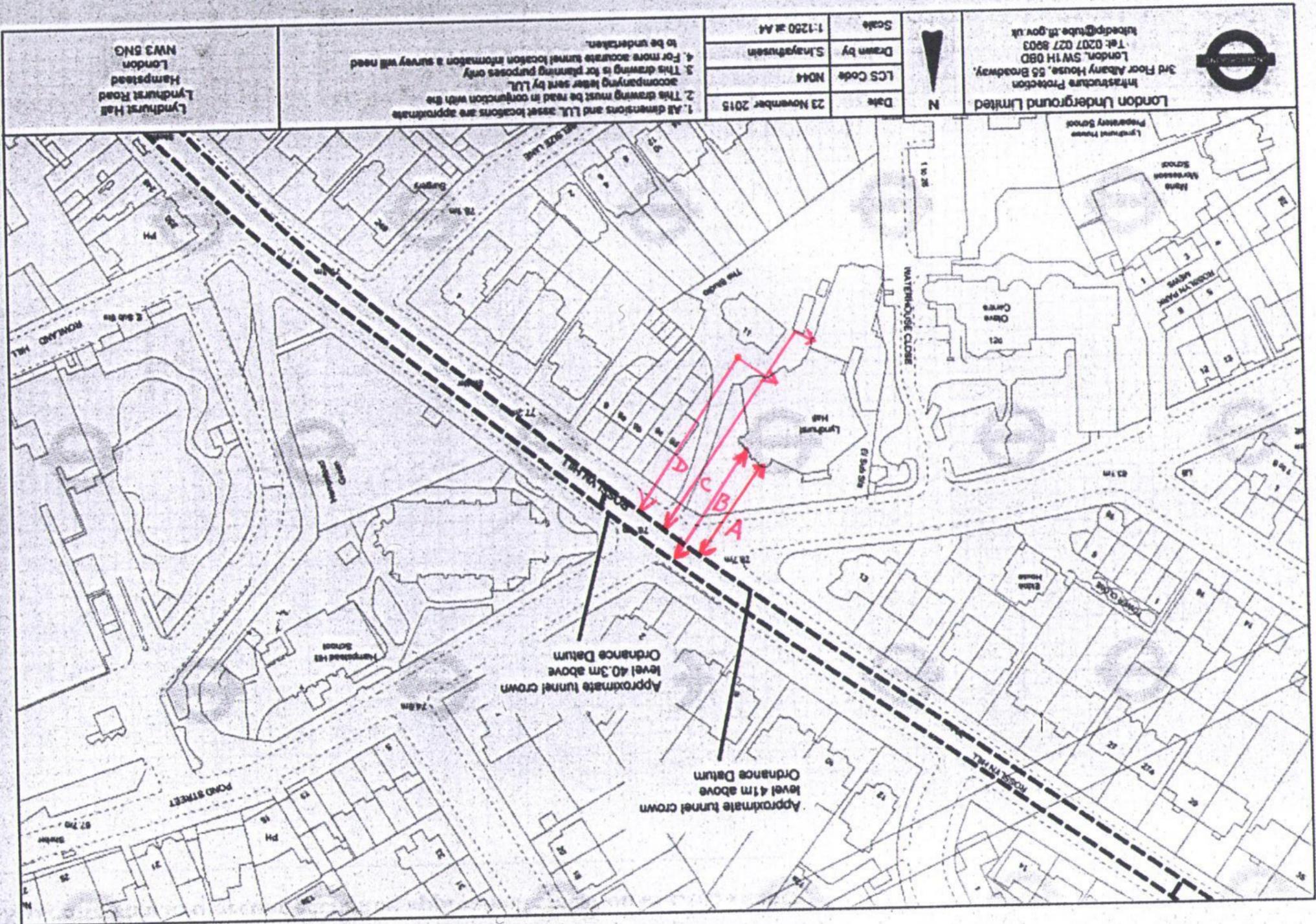
Client: The London Clinic



THE NEW BASEMENT

CONTAINS VIBRATION SENSITIVE MEDICAL EQUIPMENT BUT NO SPECIAL MEASURES WERE NEEDED TO DEAL WITH GROUND BOURNE NOISE AND VIBRATION FROM THE UNDERGROUND LINES.

Alan Baxter



Civil Engineering Dynamics

CED 3400