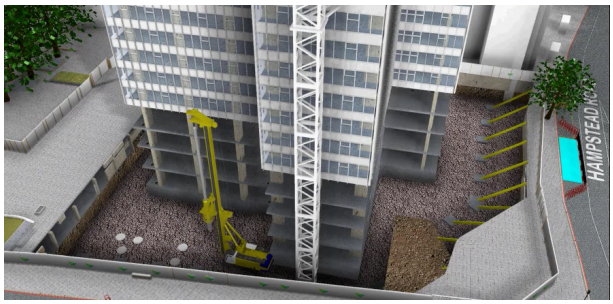
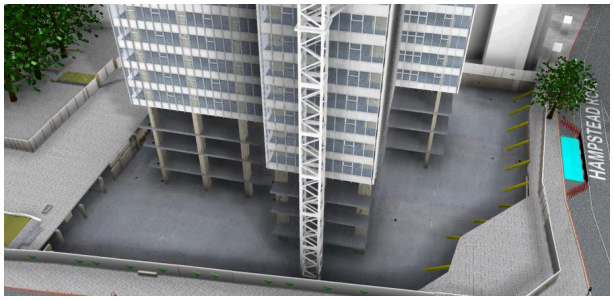
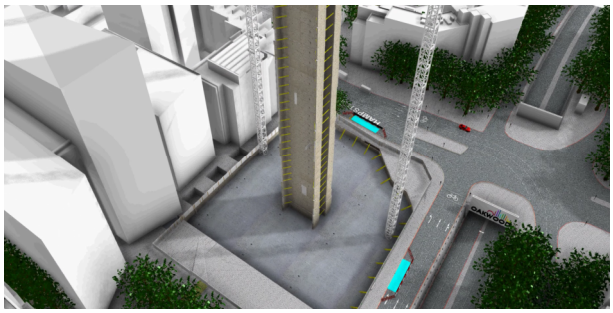
a) Deconstruction of floorplates starting from roof level downwards. Removal of ground floor slab and installation of temporary props to support the basement wall.



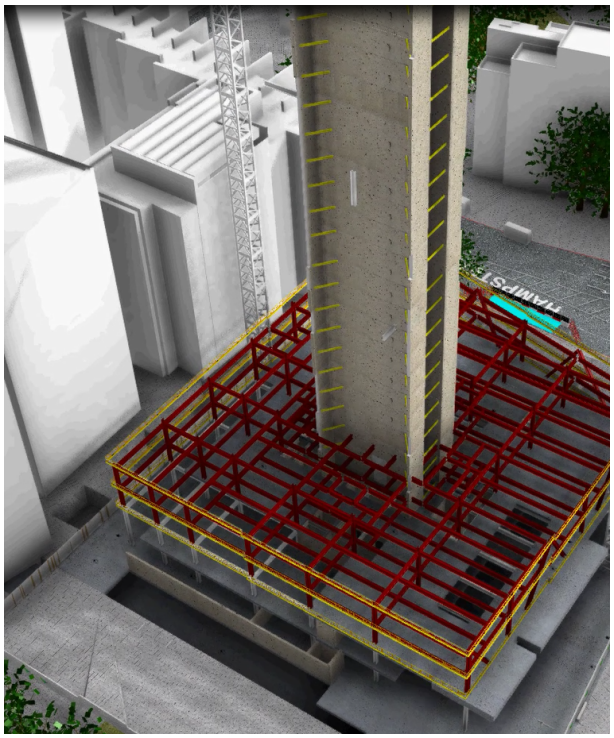
b) Installation of additional foundation piles within the basement.



c) Casting of new piled raft (localised deepening for local proposed Basement 02 not shown)



d) completion of floorplate deconstruction to ground level



e) Construction of ground floor slab and new floorplates above

f) completion of new structure and building

Figure 21: Current anticipated indicative construction sequence (extract from indicative proposal, May 2023)

6. Preliminary ground movement assessment

6.1 Scope of the assessment

A preliminary ground movement assessment for the proposed development has been carried out within this Basement Impact Assessment. The zone of influence for ground movements associated with the proposed development has been determined, followed by assessment of potential impact on neighbouring buildings. Camden Planning Guidance (CPG) on Basements (Camden, 2021) and Policy A5 on basement states that the anticipated damage category for neighbouring structures should not exceed category 1 'very slight' on the Burland scale. The ground movement assessment is described further in the following sections.

The impact of ground movements on third party utility assets (Thames Water, Gas, London Underground and Future Crossrail 2 etc) will be assessed in separate technical assessments for review by the respective third parties ahead of the proposed development.

6.2 Ground movements

6.2.1 Introduction

Ground movements arising from change in loading to the ground have been quantified and considered cumulatively to assess the impact on neighbouring buildings. It is noted that the principal cause of ground movement is the unloading and reloading of the ground from partial deconstruction and construction of new development. The new local B02 basement construction is a small proportion of the calculated ground movement and zone of influence does not extend outside the site boundary. The following sections describe the methodology and results of the ground movement assessment undertaken.

The horizontal movement of the retaining walls to form the B02 local basement area are not considered in the assessment as the surrounding basement of the building encompasses a 45-degree influence zone, expressed from the base of the excavation. Therefore, the effect of the basement construction considered is limited to the unloading/reloading of the ground.

6.2.2 Ground movement assessment

Sources of ground movements arising from the development due to change in loading are outlined as follows:

1. Unloading due to partial deconstruction of existing superstructure
2. Unloading due to localised excavation of proposed local Basement 02.
3. Loading due to addition of new superstructure

Oasys PDISP, analysis software, has been used to calculate ground movements in the short and long-term using undrained and drained conditions respectively. Settlements and/or heave are calculated in PDISP by using a linear elastic soil model and the Boussinesq method for stress distribution. The Boussinesq method calculates the stresses in the soil due to applied loads using equations derived by Boussinesq (1885). In the analysis, settlements/ heave above the applied load is conservatively assumed to be the same as that at the level of applied load. Soil structure interaction effects are not considered in the analysis.

Three key stages have been considered for ground movement assessment and are presented in Table 7.

Table 7: Key stages considered for ground movement assessment.

Considered key stages	Changes in loading	Soil conditions
During construction	Partial deconstruction unloading + basement excavation unloading	Undrained
End of construction (short term)	Partial deconstruction unloading + basement excavation unloading + new superstructure loading	Undrained

Considered key stages	Changes in loading	Soil conditions
End of construction (long term)	Partial deconstruction unloading + basement excavation unloading + new superstructure loading	Drained

An assessment has been carried out to estimate changes in loading as mentioned above, to determine the net unloading/ loading applied to the ground. Figure 22 and Figure 23 illustrate the net unloading/ loading applied at different areas and levels. Unloading due to partial deconstruction of existing superstructure and loading due to new superstructure are assumed to be transferred down the piles within London Clay and applied onto an equivalent raft area empirically determined at 2/3 of the pile depth using a 1H:4V spread.

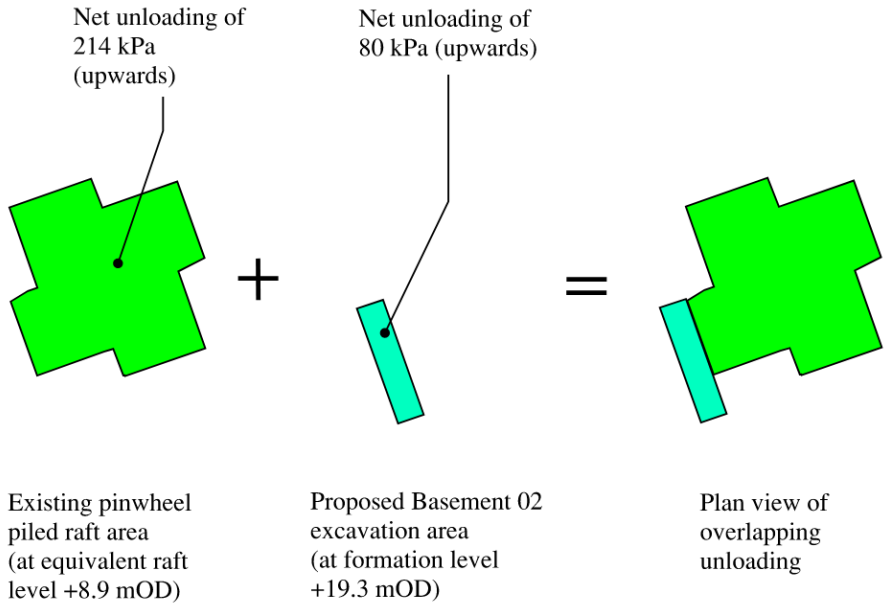


Figure 22: Net unloading applied in Oasys PDISP model, resulting from partial superstructure deconstruction and proposed Basement 02 excavation.

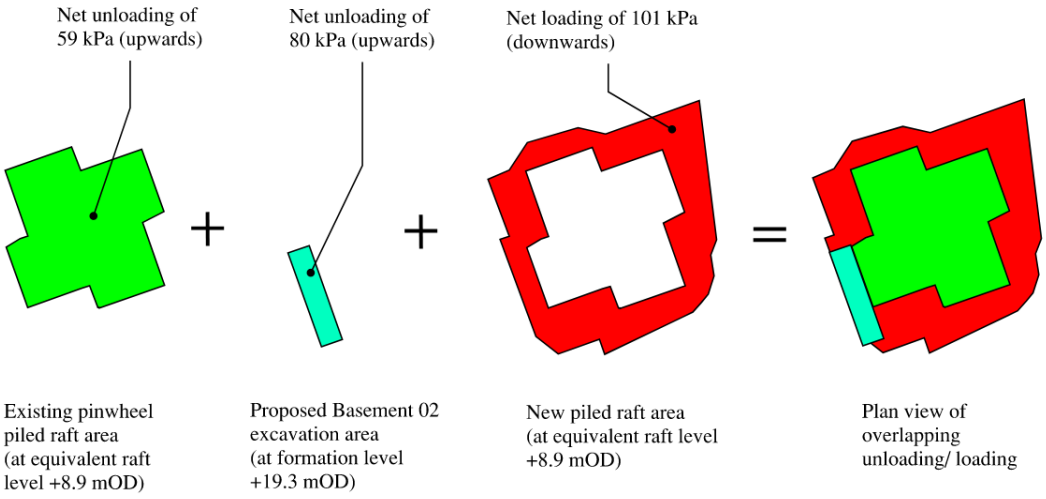


Figure 23: Net unloading/ loading applied in Oasys PDISP model, resulting from partial superstructure deconstruction, proposed Basement 02 excavation and new superstructure loading.

6.2.3 Ground movement results

Short and long term vertical ground movements associated with the considered key stages (see Table 7) are presented in Figure 24 to Figure 26. Zone of influence for ground movements refers to area with calculated vertical ground movements greater than +/-1mm. Downward movements are presented as +ve.

1 Triton Square and 2 Triton Square do not fall within the zone of influence for ground movements associated with the proposed redevelopment.

The calculated ground movements indicate that in the long term, the southern façade of Northeast Quadrant (10-30 Brock Street) would experience settlements between 2mm and 10mm.

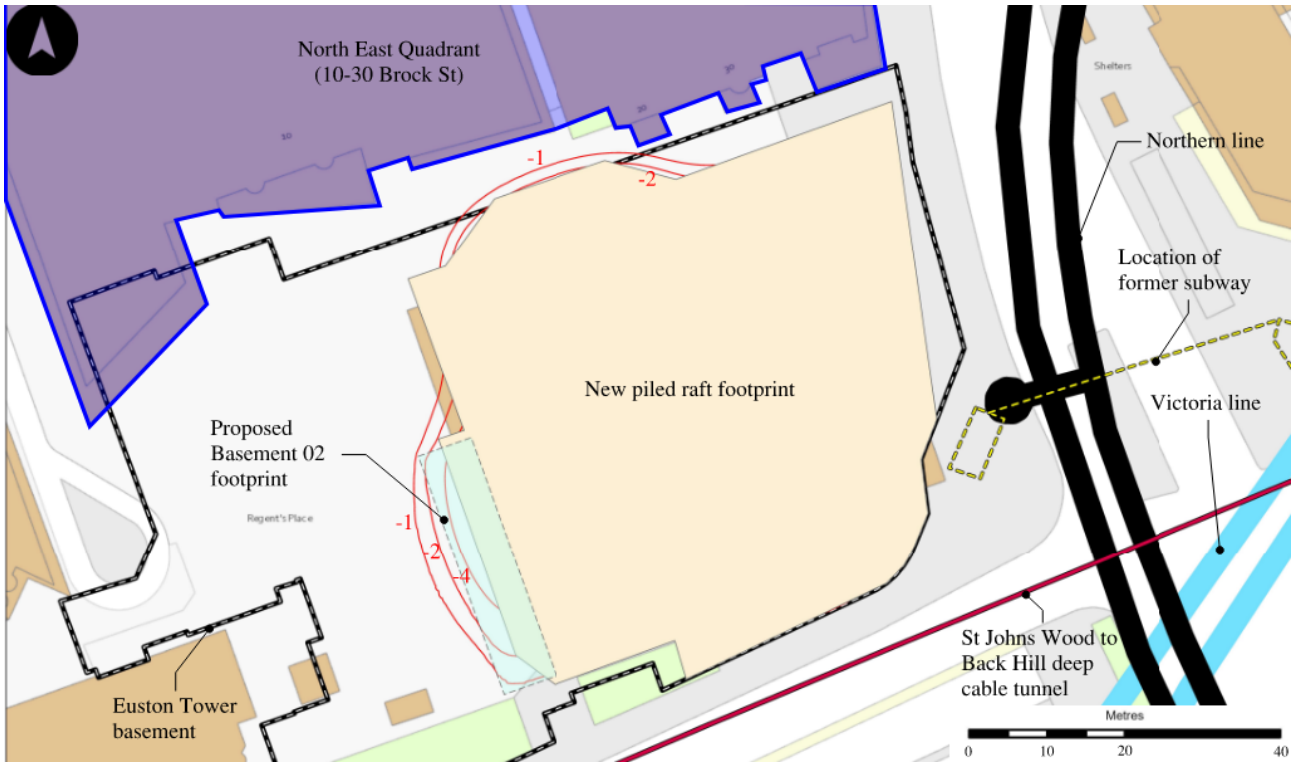


Figure 24: Calculated short term heave (mm) at basement level +21.6mOD resulting from partial superstructure deconstruction and proposed Basement 02 excavation.

Figure 25: Calculated short term settlement (mm) at basement level +21.6mOD resulting from partial superstructure deconstruction, proposed Basement 02 excavation, and new superstructure loading.

Figure 26: Calculated long term settlement (mm) at basement level +21.6mOD resulting from partial superstructure deconstruction, proposed Basement 02 excavation, and new superstructure loading.

6.2.4 Impact on Northeast Quadrant (10-30 Brock Street)

The potential impact of the calculated ground movements on Northeast Quadrant (10-30 Brock Street) is anticipated to be negligible due to the following:

- the calculated greenfield long-term settlements of the NEQ southern façade is less than 10mm.
- the calculated greenfield deflection ratio for the NEQ southern facade is less than 1:500.
- presence of 2-level basement under 10-30 Brook Street will reduce the anticipated settlements experienced by the building; and
- NEQ buildings are expected to be framed buildings, which are considered more flexible in shear than masonry structures therefore and less susceptible to damage (Mair, Taylor and Burland, 1996).

Following guidance presented in CIRIA Report C796, if ground movement are calculated as less than 10mm or imposed deflection ratio is less than 1:500 no further assessment is required, and the impacts of ground movement are deemed to be negligible. The potential impact on Northeast Quadrant (10-30 Brock Street) is therefore not anticipated to exceed category 1 ‘very slight’ on the Burland scale and is compliant with Camden Planning Guidance (CPG) on Basements (Camden, 2021). Accordingly, no further building damage assessment for neighbouring buildings is carried out at this stage.

7. Basement impact assessment conclusions

7.1 Summary

The assessment presented in this BIA report is based on guidance provided in the following documents (listed in top-down hierarchy order):

- Camden Local Plan - Policy A5 'Basements' (Camden 2017).
- Camden Planning Guidance (CPG) on Basements (Camden, 2021); and
- Camden geological, hydrogeological and hydrological study. Guidance for subterranean development (Camden, 2010).

A screening assessment has been carried out on the proposed redevelopment at Euston Tower in accordance with Camden geological, hydrogeological and hydrological study. Guidance for subterranean development (Camden, 2010). The proposed local B02 basement is expected have an impact on groundwater flow and levels locally to the new basement area due to the introduction of a full local cut-off of the shallow aquifer to the London Clay aquiclude through the river terrace deposits (upper aquifer). However, due to the size and location of the local B02 basement proposal this is expected to be negligible and not present a heightened risk to adjacent structures. The proposed B02 waterproof basement also excludes the ground mass within its enclosed area from groundwater. This will tend to reduce field capacity for water retention/storage and may result in locally higher local groundwater level during or following rainfall events, however due to the small size of the basement and location within the site the effect is expected to be negligible.

Based on the screening assessment presented in this report and findings from Flood Risk Assessment report (Arup, 2023, Report ref.: 281835-ARP-XX-XX-RP-CD-0001), it is concluded that the proposed basement development is unlikely to result in groundwater or surface water issues and is therefore compliant with the Camden Planning Guidance (CPG) on Basements (Camden, 2021).

The relative depth of the proposed Basement 02 level is deeper than the existing single level basement. Preliminary ground movement assessment carried out in this report indicated that the neighbouring 1 Triton Square and 2 Triton Square do not fall within the zone of influence for ground movements associated with the proposed redevelopment, defined as greater than 1mm. The southern façade of neighbouring Northeast Quadrant (10-30 Brock Street) falls within the zone of influence and is calculated to experience long term settlements between 2mm and 10mm. However, the potential impact of the long-term settlements on 10-30 Brock Street is anticipated to be negligible and not to exceed category 1 'very slight' on the Burland scale. The proposed redevelopment is therefore considered to be compliant with Camden Planning Guidance (CPG) on Basements (Camden, 2021).

The site falls within the 2015 Crossrail 2 Safeguarding Directions and is located to the west of Northern and Victoria line tunnels, to the north of St Johns Wood to Back Hill deep cable tunnel and Hammersmith & City, Circle and Metropolitan line tunnel). Third party consultation and engagement with the respective asset owners is in progress. Ground movement assessments and construction method statements will be carried out in separate technical submissions for review by the respective third parties ahead of proposed redevelopment.

7.2 Monitoring strategy

A monitoring regime is recommended to be scoped and specified to measure the ground and asset movements during partial superstructure deconstruction, localised excavation, and construction of the new superstructure, in order to verify that they are within the assessed range. The required monitoring will be confirmed at later design stages following development of the construction methodology and agreement with third party building owners.

In addition to monitoring of buildings, monitoring of existing LUL underground assets, and other third-party assets would be scoped and specified based on ground movement assessments of these assets and development of the basement design and construction sequence.

References

Arup (2023), Euston Tower Flood Risk Assessment & Drainage Strategy (Report ref.: 281835-ARP-XX-XX-RP-CD-0001)

Arup (2023), Euston Tower, 286 Euston Road Structural Report

Barton N (1992), Lost Rivers of London

Boussinesq, J. (1885), Applications des potentials a l'etude de l'equilibre et de movement des solides elastiques. (Gouthier-Villars, Paris)

CIRIA Report C796 (2021), Assessing the impacts of construction-induced ground movement on framed buildings.

Groundwise (2019), Desktop Utility Search, Euston Tower, Euston Road, London NW1 3DP (Report ref. URO6731.1DM)

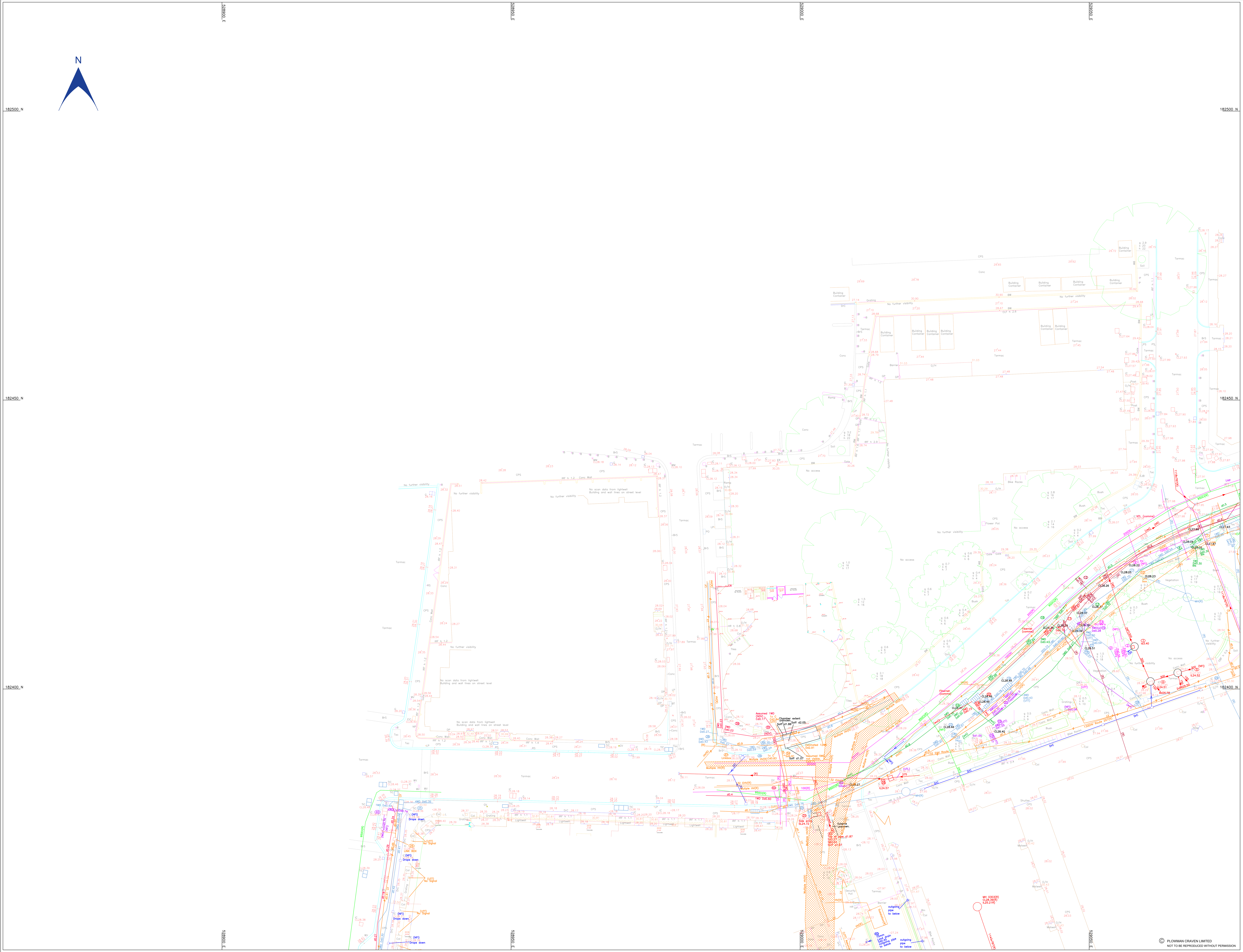
London Borough of Camden (2010), Camden geological, hydrogeological and hydrological study – Guidance for Subterranean Development

London Borough of Camden (2017), Camden Local Plan

London Borough of Camden (2021), Camden Planning Guidance – Basements

Mair, R. J., Taylor, R.N. and Burland, J. B. (1996), Prediction of ground movements and assessment of risk of building damage due to bored tunnelling.

Appendix A – Plowman Craven topographic survey



STANDARD ABBREVIATIONS

A/C	Air Conditioner	LB	Litter Bin
ATM	Automated Telling Machine	LP	Lamp Post
B	Bollard	Max	Maximum
BB	Belisha Beacon	Mb	Multibole
Bh	Borehole	MH	Manhole
Br	Brick	Min	Minimum
BrS	Brick Setts	Mkr	Marker
BRW	Brick Retaining Wall	NB	Notice Board
BS	Bus Stop	NP	Name Plate
BT	British Telecom	OBF	Open Boarded Fence
BW	Brick Wall	O/H	Overhead
BWF	Barbed Wire Fence	OSBM	Ordnance Survey Bench Mark
CBF	Close Boarded Fence	P	Post
CCTV	Closed Circuit Television	PB	Pillar Box
CIF	Corrugated Iron Fence	PGM	Permanent Ground Marker
CL	Cover Level	L	Pavement Light
CLF	Chain Link Fence	PM	Parking Meter
Col	Column	PRF	Post and Rail Fence
Conc	Concrete	PS	Paving Stones
CoW	Cable on Wall	PWF	Post and Wire Fence
CPS	Concrete Paving Slabs	RE	Rodding Eye
CTV	Cable Television IC	RG	Road Gully
d	depth	RS	Road Sign
DC	Duct Cover	RSJ	Rolled Steel Joist
DH	Duct Height	RWP	Rain Water Pipe
DP	Down Pipe	s	spread
DrC	Drainage Channel	SB	Sign Board
EIC	Electrical Inspection Cover	SBM	Site Bench Mark
EJB	Electrical Junction Box	SC	Stop Cock
EP	Electricity Pole	SF	Security Fence
ER	Earthing Rod	ShB	Shrub Bed
ESG	Electrical Switchgear	SL	Sump Level
FB	Flower Bed	SO	Smoke Outlet
FH	Fire Hydrant	SP	Sign Post
FL	Floor Level	SV	Stop Valve
Flt	Floodlight	T	Telephone
g	girth	Tac	Tactile Paving
G	Gully	TBM	Temporary Bench Mark
GC	Gas Cock	TCB	Telephone Call Box
GM	Gas Meter	TCP	Traffic Control Post
GP	Gate Post	TIC	Telephone Inspection Cover
GV	Gas Valve	TJB	Telephone Junction Box
h	height	TL	Traffic Light
HR	Handrail	TLCB	Traffic Light Control Box
IB	Illuminated Bollard	TLIC	Traffic Light Inspection Cover
IC	Inspection Cover	TP	Telephone Pole
IL	Invert Level	Typ	Typical
IRF	Iron Railing Fence	V	Vent
IRS	Illuminated Road Sign	VP	Vent Pipe
JB	Junction Box	W	Window
KO	Kerb Outlet	WM	Water Meter
L	Light	WV	Water Valve

LEGEND

Stair/step arrows point up

Assumed detail

SERVICE LEGEND

FOUL DRAINAGE
SURFACE WATER DRAINAGE
WATER
GAS
ELECTRIC
TFL
VERIZON
COLT
CENTURY LINK
ZAYO GROUP
VODAFONE
BRITISH TELECOM
VIRGIN MEDIA
UNKNOWN SERVICE
UNDERGROUND CHAMBER

SERVICE ABBREVIATIONS

(AC)	Assumed Connection	IL	Invert Level
(AR)	Assumed Route	LV	Low Voltage
CI	Cast Iron	(NFI)	No Further Information
Cd	Depth to top of cable	(NPV)	No Pipes Visible
d	Depth of service (approx)	Pd	Depth to top of pipe
Dd	Depth to top of duct	Pe	Polyethylene
DI	Ductile Iron	(R)	From Records
(e)	Empty Duct	(s)	Service cable
EHV	Extra High Voltage	Sd	Sump Depth
HB	Hatch Box	(UTL)	Unable to Lift without damage
HbL	Hatch Box Level	(UTT)	Unable to Trace
HV	High Volatge	WD	Way Duct
		WL	Water Level

Electro-detection techniques have been used in the location of underground services in some areas. The results are not infallible and trial excavations must be carried out to confirm service identification, position and particularly depths.
Although all reasonable effort has been made in searching available record drawings the completeness of the underground services information cannot be guaranteed.

Unless otherwise stated, drainage pipes are 100mm diameter.

The identification of service covers in some locations has been made by a surface inspection only - critical identifications should be verified by the lifting of covers or a full utilities survey

Due to the inherent instability of paper materials, drawings plotted on paper may be stretched and distorted - dimensions scaled from paper plots should therefore be treated with caution

SHEET LAYOUT

42746T-01-1	42746T-01-2
42746T-01-3	42746T-01-4

ISSUES & REVISIONS

Issue	Details	By	Date
A	Original Issue	PCL	04/04/2016
B	Underground Services Added	PCL	12/05/2016
C	St. Anne's Church Details Updated	PCL	10/07/2017
D	Triton Sq Underground services added	PCL	30/08/2017
E	Topo extended and layout amended	PCL	11/07/2018
F	Topo extended and additional levels added	PCL	18/07/2018
G	Additional Underground Services Added	PCL	21/02/2018
H	Basement Extents Added	PCL	04/03/2018
I	Underground services (Hampstead Road and Euston Road) added.	PCL	18/11/2019

This survey is commensurate with band F accuracy, as outlined in the RICS survey detail accuracy banding table

All levels are in metres and are above Ordnance Survey Newlyn Datum derived by multiple network RTK GPS observations

The survey grid shown on this drawing is positioned on Ordnance Survey (OS) National Grid, obtained by multiple network RTK GPS observations

Unless otherwise stated, levels have been taken to finished floor surface

All quoted dimensions are in metres

Drawing units are metres

CLIENT
British Land

York House
45 Seymour Street
London
W1H 7LX

PROJECT TITLE

Regents Place
London, NW1

3D Topographic Survey

PRESENTATION SCALE 1:200 @ A0

DATE OF ORIGINAL SURVEY June 2018

PC PROJECT No. 42746 CHECKED GH

DRAWING No. 42746T-01-1 ISSUE I

Plowman Craven

Plowman Craven House
2 Lea Business Park
Lower Luton Road
Harpenden
Hertfordshire
AL5 5EQ

115 Southwark Bridge Road
London
SE1 0AX

Tel: +44 (0)1582 765566
Email: post@plowmancraven.co.uk
Web: www.plowmancraven.co.uk

Tel: +44 (0)207 490 7700