

Oriel

Response to Further Technical Queries on the Basement Impact Assessment and Desktop Ground Movement Assessment

April 2021



Oriel
Creating the centre for
advancing eye health



Moorfields
Eye Hospital
NHS Foundation Trust



Moorfields
Eye Charity



Oriel – Response to further technical queries on the Basement Impact Assessment and Desktop Ground Movement Assessment, 21th April 2021

1. Introduction

Moorfields Eye Hospital NHS Foundation Trust, on behalf of Oriel¹ (the ‘Applicant’), submitted a planning application on 16th October 2020 (Application Ref. 2020/4825/P) to the London Borough of Camden (LBC) for a new facility that would allow the existing Moorfields Eye Hospital at City Road (Moorfields at City Road) and University College London (UCL) Institute of Ophthalmology (IoO) services at Bath Street to relocate into a single building at the existing St. Pancras Hospital site (hereafter referred to as the ‘Proposed Development’).

The Proposed Development will be located at part of the existing St. Pancras Hospital site (hereafter referred to as the ‘Site’). The Proposed Development comprises a single building, between seven and ten storeys in height (including Ground Level and Lower Ground Level, together with plant at Roof Level), as well as provision of public realm at ground level, blue badge parking, and a vehicular drop off point on St Pancras Way.

A Basement Impact Assessment was prepared for the Proposed Development (Document Ref. ORL-INF-XX-XX-RP-PL-330_Basement Impact Assessment) and submitted with the planning application.

Campbell Reith, on behalf of the LBC, reviewed the Basement Impact Assessment against the Camden Planning Guidance (CPG): Basements (Ref. 1 and Ref. 2) and raised a number of comments on the report, which were issued to the Applicant on 14 December 2020.

AECOM, as the authors of the Basement Impact Assessment, updated the Basement Impact Assessment report (Revision. 1.0) and provided responses to the comments, which were issued to LBC on 9th February 2021. Campbell Reith subsequently reviewed the responses and the updated Basement Impact Assessment, and concluded that whilst responses to some comments were acceptable not all comments had been satisfactorily addressed.

A Desktop Ground Movement Assessment (GMA) which was submitted to LBC on 9th March 2021 and a document was prepared which set out AECOM’s responses to Campbell Reith was submitted to LBC on the 15th March 2021.

Campbell Reith reviewed the Desktop GMA and the response document, and requested further clarification on a number of matters on 30th March 2021. These clarifications and AECOM’s responses are detailed in Table 1 below.

¹ Oriel is a joint venture between Moorfields Eye Hospital NHS Foundation Trust, University College London Institute of Ophthalmology and Moorfields Eye Charity.

This document should be read in conjunction with the revised Desktop GMA (Revision 1.0) and the updated Basement Impact Assessment (Revision 3.0), which are submitted alongside this document.

Table 1 Responses to Campbell Reith's Comments (30th March 2021)

Query Number	Comment	Response
Desktop GMA		
1.	The ground model adopted (Table 2-2) indicates that London Clay has a thickness of 30m, however Table 2-1 indicates half that figure (c.15), based on the on-site historical BGS borehole.	There is limited existing historical boreholes at the site. A single onsite borehole dated 1976 recorded 15m of London Clay. All other boreholes in the wider area within 300m of the Site record thicknesses of 30m+. It is considered the reference to 15m in Table 2-1 is considered to be erroneous however ground conditions beneath the site will be confirmed via the proposed ground investigation. This has been clarified within the revised Desktop GMA report.
2.	The GMA analysis (Wallap, PDisp & XDisp) assumes an excavation formation level at 15.35m OD for the lower ground floor. The BIA (Section 6.1.4) considers typical excavation levels at 16.450m and 18.450m OD.	A more onerous excavation level of 15.35m OD has been used for the WALLAP analyses to obtain the worst case wall displacements. For the PDISP and XDISP analysis the variation in excavation levels across the basement has been accounted for. The basement has been considered in two zones having an excavation level of 15.35m OD where the excavation is (i) ~ 7.5m (deep excavation) and (ii) ≤3m below ground level bgl. Given the simplified nature of the model and the sloping ground level at site, excavation levels for the GMA have been set to ensure a sufficient depth of excavation is used in the analysis.
3.	It is not clear whether ground movement due to the sheet pile wall installation has been considered in the GMA (Section 3.1) and this shall be clarified.	The Desktop GMA has been revised and the text within the Desktop GMA report has been updated to include consideration of a secant pile wall.
4.	The design parameters adopted in the GMA shall be clearly presented in the main text. Parameters for retaining wall design shall be included.	A table with assumed parameters has been added to the Desktop GMA, see Table 2.3 within the revised Desktop GMA report
5.	A summary table that includes the anticipated ground movement (vertical and horizontal) per stage considered is requested along with a ground movement contour sketch/plan.	As ground movement varies around the perimeter of the Site, it is difficult to summarise this information in a table and graphical representation is considered more appropriate. Therefore contour plans have been added to the Desktop GMA report (see Plots 1 and 2 in the revised Desktop GMA report).
6.	The Building Damage Assessment (Table 3-2) indicates that some wall elements of 'The Ugly Brown Building' to the north, the 'North Wing Building' to the northeast, and the residential building further to the east will likely suffer damage of Categories 2 and 3 of the Burland Scale. This is not in accordance with LBC's policy where the maximum acceptable damage Category is 1. However as noted in the GMA (Section 4), an increase in the support stiffness of the temporary retaining walls could be considered to reduce the damage in adjacent buildings. It is further stated in the 'Response to Technical Queries' that damage to neighbouring buildings will be limited to a maximum of Category 1 by adopting a stiffer support during the final design & construction stage. It is accepted that it should be feasible to design a temporary works scheme that limits damage to Category 1. This should be demonstrated in the BCP using the findings of the ground investigation.	This is noted and is confirmed in Section 4 Conclusions of the Desktop GMA report.

Table 1 Responses to Campbell Reith's Comments (30th March 2021)

Query Number	Comment	Response
7.	A damage assessment of the surrounding footpaths, highways and underground utilities has not been undertaken and is requested.	The Desktop GMA report has been updated and includes commentary on the likely damage to the surrounding footpaths, highways and underground utilities, as set out in Section 3.2 of the revised Desktop GMA report.
8.	Wallap analysis: It is not clear how Wallap analysis has been incorporated into the building damage assessment and this shall be clarified.	The Desktop GMA considers ground movements arising from excavation of the basement, reloading of piles within the basement footprint and deflection of the supporting temporary retaining wall. Movements due to unloading and reloading of the soil within the basement have been assessed using PDISP and wall displacements have been assessed using WALLAP. The outputs from these two analyses have been imported into XDISP to determine the damage category.
	Maximum wall deflection of 36mm is reported in the main text versus 29mm shown in the Wallap output (Appendix A).	The Desktop GMA has been amended to clarify that the maximum WALLAP displacements are 27mm.
	The adopted undrained shear strength (150 kPa) and Young's Modulus (60MPa) values for London Clay are considered high (thus not conservative) for (at least) the top 5-8m of the formation where some degree of weathering is expected. Justification of these values is required or lower values be adopted.	Agreed. For an initial analysis an average undrained shear strength was considered. The analysis has been updated with an undrained strength that varies with depth, based on strength measurements taken from another AECOM project in London. Further details are included in Appendix A of the revised Desktop GMA report
	The pile length assumed in Wallap is indicated to be c.29m (-6.13m OD) and this shall be clarified.	The assumed pile length of approximately 29m was for the sheet piles. In the revised Desktop GMA a bored pile length of approximately 18m was used in WALLAP based on a preliminary pile design and taking account of the anticipated pile loading.
	A prop spacing of 4m is proposed by the main text versus 1m spacing used in Wallap analysis.	Prop spacing of 4m has been used in the analysis and is reported in the text within the Desktop GMA report.
	The adopted Wallap staging indicates that Stage 3 (excavation to 15.35m OD) will be undertaken under the assumed ground water level (Stage 2 groundwater at 22.85m OD) and this shall be clarified as it likely affects the outcome of the analysis.	Water level profile in the revised analysis is lowered to 15.35m on the passive side prior to excavation.
	A note of 'wall tending to move from right to left' in Stage 3 shall be clarified.	The WALLAP file has been updated within the revised Desktop GMA.
	An earth batter suggested by the BIA (Section 6.1.4) has not been considered in Wallap analysis and this shall be clarified.	An earth batter has not been accounted for in the WALLAP analysis. The text in Section 3.1 states: <i>"For the southern and western site boundaries where the excavation will be achieved by battering the ground at a safe slope angle, no movement due to wall deflection has been included in the analysis"</i> .
9.	XDisp analysis: A contiguous bored pile wall has been considered in the analysis versus the proposed sheet pile wall and this shall be justified. The depth of the piled wall considered in XDisp shall be clarified.	An assessment was initially carried out for a temporary sheet pile wall. The analysis showed that this section needed to be of significant depth and the wall displacements were high. To reduce movements and obtain a lower damage category the retaining wall was changed to a stiffer secant piled wall. This approach is explained in the revised Desktop GMA report. The final design of the retaining wall is to be determined during the detailed design stage following completion of a site-specific ground investigation and incorporated into the Basement Construction Plan.

Table 1 Responses to Campbell Reith's Comments (30th March 2021)

Query Number	Comment	Response
BIA		
1.	An outline monitoring plan with trigger limits and contingency measures has been presented in the BIA (Section 6.7) that will need to be further refined post-GI and once the temporary works have been designed.	This is noted.
2.	Section 6.1.4, stage 2, suggests that steel sheet piles will be installed along the internal road adjacent to the southern boundary which contradicts Figure 6-1 which shows an open excavation. Clarification is required.	Steel sheet piling along the southern boundary refers to a superseded excavation plan. Sheet piling in this location no longer forms part of the potential basement construction methodology. Section 6.1.4, stage 2 of the BIA has been updated to remove ' <i>and along the internal road adjacent to the southern boundary</i> '.
3.	The potential swell impact to adjacent foundations of existing buildings due to the proposed removal of the trees needs to be assessed. More specifically, the proposed removal of T14, T28 & T29 shall be assessed with regard to the foundations of adjacent buildings and mitigation measures provided as might be needed.	<p>All buildings within the direct vicinity of T14, T28 and T29 are to be demolished within the same sequence of works as the tree removal therefore potential ground swell will not take place within the time frame between the tree removal and building demolition. Remaining structures on the opposite side of the carriageway are anticipated to utilise deep piled foundations which are unlikely to be affected by the removal of trees. Please refer to the tree protection plan (originally included in the Arboricultural Impact Assessment (Document Ref. ORL-INF-XX-XX-RP-PL-130)) reproduced in Appendix A of this document, for information on the location of trees.</p> <p>It is proposed that the impact of tree removals on adjacent foundations is verified at the detailed design stage following results of the Phase 2 Ground Investigation and final demolition and tree removal methodology, forming part of the Basement Construction Plan. Table 6 and Table 7 within the BIA have been updated to reflect this.</p>

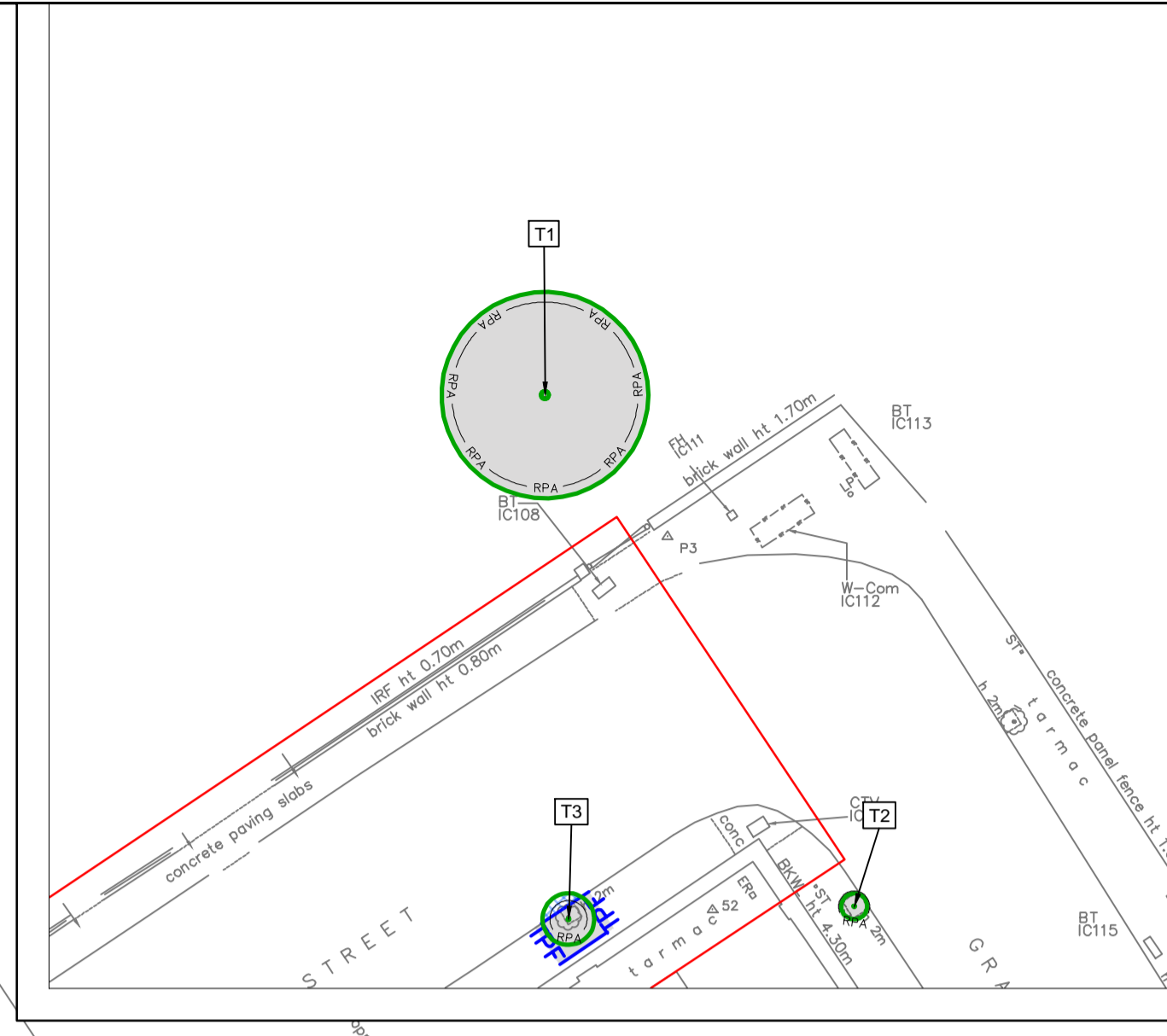
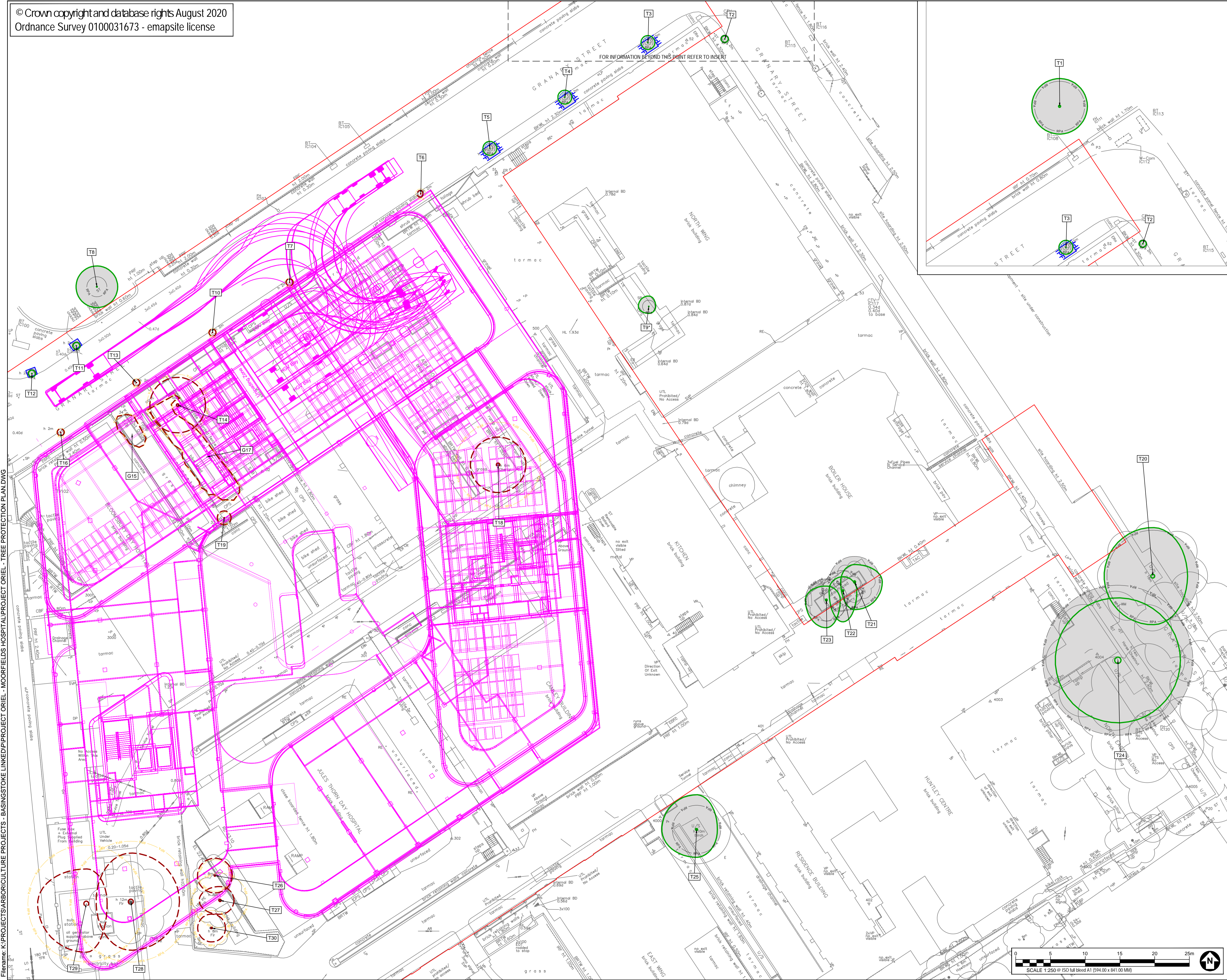
References

- Ref. 1. London Borough of Camden, (2018); Camden Planning Guidance: Basements. <https://www.camden.gov.uk/basement-developments>
- Ref. 2. London Borough of Camden; Basement Impact Assessment: Defining the scope of Engineering input. <https://www.camden.gov.uk/basement-developments>

Appendix A – Tree Protection Plan

Last saved by: CHRISTOPHER COULAND(2020.08.21) Last Plotted: 2020.08.27
 File name: K:\PROJECTS\ARBORICULTURE PROJECTS - BASINGSTOKE LINKED\PROJECT ORIEL - MOORFIELDS HOSPITAL\PROJECT ORIEL - TREE PROTECTION PLAN.DWG
 Project Management Initials: Designer: CC Checked: AW Approver: AK

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PROJECT
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- GENERAL NOTES**
- TREE CATEGORIES AS DEFINED BY BS 5837:2012
 - TREE LOCATIONS ARE BASED ON THE TOPOGRAPHICAL SURVEY AND GPS CO-ORDINATES FROM ON SITE WALKOVER
 - "INDICATES A TREE / GROUP WHOSE POSITION IS APPROXIMATE AS BASED UPON AERIAL PHOTOGRAPHY AND ON SITE OBSERVATIONS.
 - PLANS SHOULD BE READ IN CONJUNCTION WITH THE AECOM ARBORICULTURAL REPORT.
 - THE ORIGINAL OF THIS DRAWING WAS PRODUCED IN COLOUR - A MONOCHROME COPY SHOULD NOT BE RELIED UPON.
 - DRAWING REFERENCES:
 TS18-464T-C1-2D

KEY

- SITE BOUNDARY
- EXISTING TREE, GROUP OR HEDGE TO BE RETAINED
- EXISTING TREE, GROUP OR HEDGE TO BE REMOVED
- ROOT PROTECTION AREAS (RPA) OF RETAINED TREES (AS DEFINED BY BS 5837:2012)
- TREE PROTECTION FENCING
- CONSTRUCTION EXCLUSION ZONE (TRACKING OF PLANT, MATERIALS STORAGE, EXCAVATION AND ALL OTHER CONSTRUCTION ACTIVITIES ARE EXCLUDED WITHIN THESE AREAS FOR THE PURPOSES OF PROTECTING TREE HEALTH)
- CONSTRUCTION WORKING ZONE (MANAGED CONSTRUCTION PROCESSES PERMITTED IN ACCORDANCE WITH THE PRINCIPLES SET OUT WITHIN THE ARBORICULTURAL IMPACT ASSESSMENT)
- PROPOSED DEVELOPMENT LAYOUT (BASED UPON DRAWINGS REF'S: DRG-ACM-XX-XX-000001-S1-Stage 3 Federated Model (Project))
- ROOT PROTECTION AREAS (RPA) OF REMOVED TREES (AS DEFINED BY BS 5837:2012)

ISSUE/REVISION

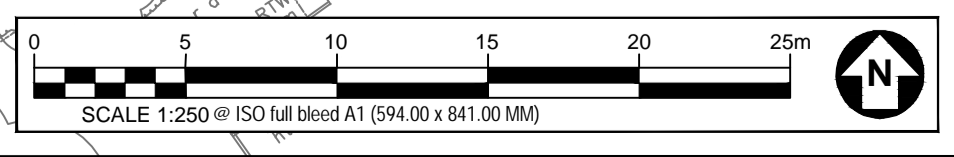
A	DATE	DESCRIPTION
A	21-08-2020	First Issue
I/R		

DRAWING STATUS
 ISSUE

PROJECT NUMBER
 60588325

SHEET TITLE
 TREE PROTECTION PLAN

SHEET NUMBER **REV.**
 60588325-ACM-XX-XX-DR-AB-TPP001 A



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