Providing Ground Solutions

Broxwood View Limited

Barrie House, 29 St Edmund's Terrace, London

Basement Impact Assessment – Revision 4

April, 2023

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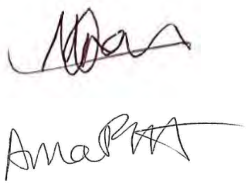
Author	Madeleine Groves, Engineer *MSci (Hons) GMICE* Anna Prescott, Senior Engineer *MSci MA (Hons) FGS*	
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1. INTRODUCTION

Card Geotechnics Limited (CGL) has been commissioned by Broxwood View Limited to undertake a Basement Impact Assessment (BIA) for the site, Barrie House, located at 29 St Edmund's Terrace, London, NW8 7QH, herein referred to as "the site". The purpose of this report is to assess the potential effects of the proposed basement on nearby structures, surface water runoff and ground water flow.

This report adopts an assessment methodology derived from the London Borough of Camden guidance document *CPG4, Basements and Lightwells*[1]. The methodology comprises five stages for a BIA to "*enable the Borough to assess whether any predicted damage to neighbouring properties and the water environment is acceptable or can be satisfactorily ameliorated by the developer".*

The five stages are as follows:

1. Screening;
2. Scoping;
3. Site investigation and study;
4. Impact assessment; and
5. Review and decision making.

A Ground Investigation Report was completed by Soil Consultants in 2012[2], followed by a supplementary Factual Report by CGL in June 2022[3], the results of which are interpreted in a Letter Report completed by CGL in June 2022[4]. The results of these reports have been used to inform the screening, scoping and impact assessment stages. In May 2018 CGL completed a Basement Impact Assessment[5] for the site based on former development plans, which was approved by the London Borough of Camden and of which this report is a revision of.

This report identifies the key issues relating to land stability, hydrogeology and hydrology as part of the screening process (Stage 1) and includes a summary of existing site investigation data to establish a site model (Stages 2 and 3). The report provides an impact assessment (Stage 4) of potential ground movements on adjacent structures and the hydrogeology of the surrounding area for the purposes of planning.

[1] London Borough of Camden. (July 2015). *Camden Planning Guidance, CPG4, Basements and Lightwells*
[2] Soil Consultants. (November 2012). *Ground Investigation Report. Barrie House, 29 St Edmund's Terrace, London NW8 7QH.* 9241/OT/JRCB.
[3] CGL. (June 2022). *Factual Report. Barrie House, 29 St Edmunds Terrace, London.* CG/28408B.
[4] CGL. (June 2022). *Interpretative Letter Report. Barrie House, 29 St Edmunds Terrace, London.* CG/28408B.
[5] CGL. (2018). *Basement Impact Assessment – Revision 2. Barrie House.* CG/28408

2. SITE CONTEXT

2.1 Site Location

The site, Barrie House, is located at 29 St Edmund's Terrace, London, NW8 7QH. The site is located within the London Borough of Camden. The approximate National Grid Reference for the site is 527495E, 183575N.

The site is bound to the south by St Edmund's Terrace and to the west by Broxwood Way. Two rows of terraced houses and apartment blocks are present to the north of the site, referred to as 32 to 72 Kingsland and 1 to 16 Kingsland. To the east of the site, buildings named Regent Heights and 30 to 36 St Edmund's Terrace are positioned. Adjacent to the north-east of the site lies Barrow Hill water treatment plant.

A site location plan is included as Figure 1.

2.2 Site Description

The site comprises a roughly square plot approximately 0.18 hectares in area and is currently occupied by Barrie House, an eight-storey detached 'T-shaped' residential block, understood to have been constructed in the 1950's, as well as an abandoned two-storey masonry lodge. The existing residential block is located approximately centrally within the site and includes a basement beneath the centre of the building footprint currently comprising a plant room and bicycle storage. Historical structural drawings are included within Appendix A. The abandoned masonry 'porters lodge' is located towards the north-western corner of the site, adjacent to the site entrance.

Landscaped gardens are located around the building with several deciduous trees, which are predominantly clustered in an area to the east of the building. Several large stumps are also present along the south and west of the site. Vehicular access to the site is off Broxwood Way and leads to a surfaced car parking area in the north of the site.

Based on a review of historical maps undertaken as part of the structural BIA (included within Appendix H), the existing Barrie House building is understood to have been completed by 1957.

2.3 Proposed Development

The proposed development is understood to comprise demolition of the 'porters lodge', extension of the existing building on site to the north in the area of the current car park, and excavation of a single storey basement beneath the extension as well as under the northern section of the current Barrie

House building on site. The proposed extension will be between 4 and 5 storeys in height (including the basement).

The basement under the existing Barrie House building will provide space for additional bicycle storage and plant rooms with an existing level of some 45mOD and a proposed structural slab level of between 42.475m above Ordnance Datum (mOD) and 42.875mOD (some 2.5mbgl). The existing pad foundations of Barrie House will be utilised, with limited underpinning where required along the south-eastern boundary of Barrie House. The basement will be founded on a 300mm thick concrete slab.

A single storey basement will also be excavated across the entire footprint of the extension across the north of the site, from an existing level of some 46mOD with a raft slab at a structural slab level of 40.770mOD (some 5.2mbgl). 450mm diameter secant piles set out at an assumed male pile spacing of 630mm will be positioned around the perimeter of the basement with the exception of 600mm diameter contiguous piles set out at 700mm centres along the south-eastern section of the wall adjacent to the existing Barrie House pad foundations.

Proposed development plans, including loadings, are included within Appendix B.

2.1 Topography

The site generally slopes down from north to south with the highest point located in the north-east corner of the site at approximately 48.6mOD. The lowest point is in the south-west corner of the site with a level of approximately 42.0mOD. The distance on site between these points is approximately 65m, resulting in a slope of about 1 in 10. With reference to the topographical map of Camden within Camden's Strategic Flood Risk Assessment[6] (SFRA) the local area around the site appears to slope down from Primrose Hill (approximately 200m north-east of the site) towards the south-west. There is also a small slope down to the south towards *Regents Park* (approximately 200m south of the site).

The steepest slope on site is within the west of the building where there is a vehicular ramp down from the car park/building entrance, where the level is approximately 45.4mOD to the level of Broxwood Way, some 43.0mOD. This change in level occurs over approximately 13.5m, indicating a slope of around 1 in 5.6.

2.2 Nearby Structures

The closest the proposed development will be to the site boundary is in the north-western corner, which is anticipated to lie approximately 1.6m from the site boundary. Beyond this northern site

[6] URS. (July 2014). *London Borough of Camden – Strategic Flood Risk Assessment.* 47070547.

boundary lies a strip of land belonging to Thames Water, in which a water mains pipe is located (CGL have produced a separate impact assessment[7] considering the effects of the development on this). The closest neighbouring properties are at a distance greater than 8.2m to the north of the proposed basement excavation, as summarised below and illustrated in Plate 1.

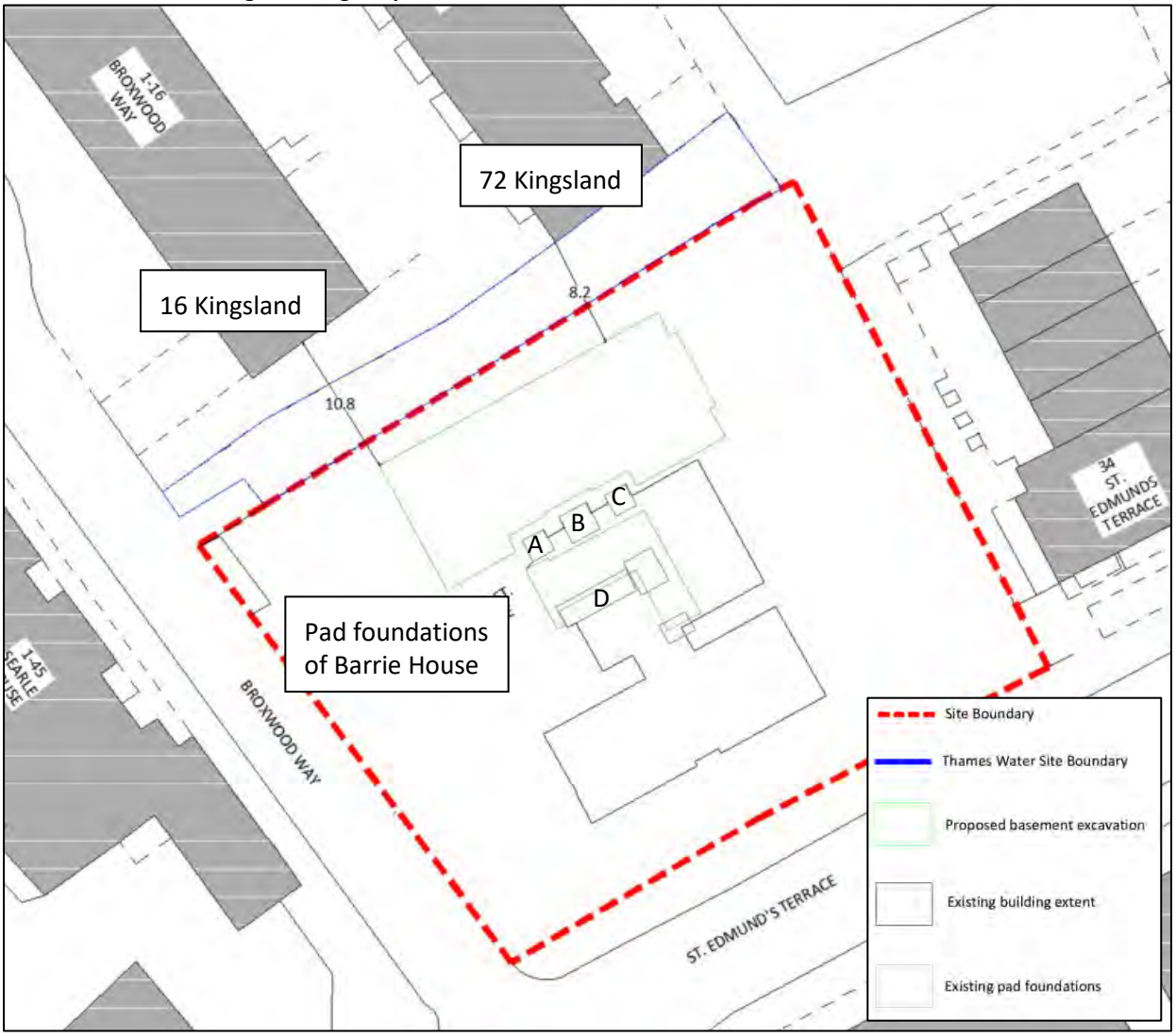
- **16 Kingsland**: 10.8m from the north-west corner of the proposed basement. Understood to be a 4-storey masonry structure approximately 12m in height without a basement. Building is assumed to be founded on strip foundations with a formation level of 45.1mOD.

- **72 Kingsland**: 8.2m from the north corner of the proposed basement. Understood to be a 4-storey masonry structure approximately 12m in height without a basement. Building is assumed to be founded on strip foundations with a formation level of 45.1mOD.

- **Barrie House**: 0.25m south of the proposed basement. Barrie House is understood to be a steel framed structure approximately 30m in height with a small existing basement. The building is assumed to be founded on pad foundations. Pads A to C, as per CGL refence showed in the Plate below, have a formation level of 43.7mOD, and pad D of 42.495mOD.

[7] CGL. (August 2022). *Barrie House, 29 St Edmunds Terrace, London. Thames Water Impact Assessment.* CG/28408B.

Plate 1. Distance to Neighbouring Properties.



2.3 Arboricultural Report Summary

Following a review of the arboriculturist report for the site[8], it is noted that the proposed development includes the removal of four trees:

- Common ash, 7m high (tree reference number 2);
- Hawthorn, 5m high (tree reference number 3);
- Wild plum, 9m high (tree reference number 4); and
- Japanese cherry, 4m high (tree reference number 13).

[8] John Cromar's Arboricultural Company Limited. (September 2018). *Report on the impact on trees of the proposals for development at Barrie House, 29 St Edmunds Terrace, London NW8 7QH.* 1-38-4326/2.

All other trees currently onsite are understood to be retained as part of the proposed development.

2.4 Construction Methodology

The proposed development is understood to utilise the following construction techniques, as illustrated within the proposed development drawings included in Appendix B and detailed within the pile design report produced by Deep Foundation Specialists Ltd (DFS)[9] included within Appendix G and structural statement included in Appendix H:

- Secant 450mm diameter piled (at assumed male pile spacing of 630mm) retaining wall around the majority of the proposed basement utilising low vibration continuous flight auger (CFA) piles;
- Contiguous 600mm diameter piled retaining wall at 700mm spacing along the south-eastern section of the wall adjacent to the existing Barrie house pad foundations utilising low vibration CFA piles;
- Traditional underpinning of small sections of the existing building, in particular under the existing single-storey extension to the north of Barrie House;
- Reinforced concrete perimeter liner wall to protect from groundwater;
- Reinforced concrete raft foundation, bearing onto the stiff London Clay Formation;
- Reinforced concrete ground floor transfer structure; and
- Hybrid CLT and steel superstructure, to minimise the environmental impact and keep structural mass to a minimum for efficient construction.

The proposed main basement construction sequence, as detailed within the DFS pile design[9], comprises:

1. CFA piling works to form piled wall and underpinning of a small section in the north-east corner of the existing Barrie House building wall;
2. Install capping beam and high level temporary props;

[9] Deep Foundation Specialists Ltd. (February 2023). *Broxwood View, 29 St. Edmunds Terrace, London, NW8 7QH. Detailed Design for ⌀450 Perimeter Secant Pile Retaining Wall, ⌀600 Perimeter Contiguous Pile Retaining Wall & ⌀300 Bearing Piles. Revision 4.* DFS221011.

3. Excavating to 3m depth (41.6mOD);
4. Installing low level temporary props and structural steel waling beam in location of 600mm diameter piles at 2.5m depth (42.1mOD);
5. Excavating to formation level of 39.77mOD;
6. Placing 50mm thick blinding and casting 950mm thick reinforced concrete basement raft slab;
7. Casting reinforced concrete liner wall to 3m depth;
8. Removing low level temporary horizontal prop in location of 600mm diameter piles;
9. Completing reinforced concrete liner wall to capping beam;
10. Casting reinforced concrete ground floor slab; and
11. Removing high level temporary props and constructing superstructure.

A small section in the north-east corner of the existing Barrie House building wall will be underpinned using a hit and miss technique, as detailed within the structural drawings included in Appendix B.

3. GROUND AND GROUNDWATER CONDITIONS

3.1 Site Investigation

In September 2012, Soil Consultants[2] undertook a ground investigation on site comprising one cable percussive borehole to 7.5mbgl (BH1), three windowless sample boreholes to a maximum depth of 5mbgl (WS1 to WS3), and three foundation inspection trial pits. In June 2022, CGL[3] undertook a supplementary ground investigation across the site comprising four windowless sample boreholes (WS201 to WS204) to a maximum depth of 6.0mbgl, with the installation of ground gas and groundwater monitoring standpipes. The location of these exploratory holes are indicated on the plan included as Figure 2.

Details of the ground investigations are presented within the letter report written by CGL in June 2022[4], which is included within Appendix E.

3.2 Geotechnical Design Parameters

Geotechnical design parameters have been derived based on the results of the Soil Consultants 2012[2] and CGL 2022[3] ground investigations, including descriptions of soils, and field and laboratory testing. The geotechnical parameters are outlined in Table 1, below. It has been assumed that the Weathered London Clay Formation (as described in the CGL 2022[3] ground investigation) is the same unit as the London Clay Formation (as described in the Soil Consultants 2012[2] ground investigation).

Table 1. Geotechnical Design Parameters.

Strata	*Strata Design Level (mOD)*	*Bulk Unit Weight, γ (kN/m³)*	*Friction Angle, Φ' (°)*	*Undrained Cohesion, c_u (kPa) [c']*	*Youngs Modulus, E_u (kPa) [E']*
Made Ground	46.0	18	28 [a]	[0]	[15]
Head / Weathered London Clay Formation	44.5	20	24 [b]	40 [5]	24 [d] [18] [d]
Weathered London Clay Formation	43.5	20	26 [b]	40 + 10z [c] [5]	24 + 6z [c,d] [18 + 4.5z] [c,d]

a) Peck, R.B., et al. (1967) Foundation Engineering, 2nd edn, John Wiley, New York, pp 310
b) Burland, J.B., et al., (2001) Building Response to Tunnelling: Case Studies from Construction of the Jubilee Line Extension. CIRIA SP200, Thomas Tellford, London
c) Where z= meters below strata design level.
d) Based on 600cu and 0.75Eu, Burland, J.B., et al., (2001) Building Response to Tunnelling: Case Studies from Construction of the Jubilee Line Extension. CIRIA SP200, Thomas Tellford, London

Details of the ground investigation, exploratory hole logs and geotechnical testing are presented within the Soil Consultants GIR[2] and CGL Factual Report[3], and summarised in the CGL letter report[4] (see Appendix E).

Head was encountered in one location during the CGL ground investigation in the far east of the site (WS204). This is not anticipated to be pervasive across the site, although the upper layer of Weathered London Clay Formation was noted to be of consistently lower strength across the site.

3.3 Hydrogeology, Hydrology, Drainage and Flood Risk

Water monitoring results[3] indicate that localised pockets of perched water are present within the Made Ground and Weathered London Clay Formation, between 0.20mbgl and 3.73mbgl (45.92mOD and 41.43mOD). A water strike was recorded during drilling of borehole WS202 at 2.8mbgl occurred in a sand lens, suggesting pockets of water are present within limited granular horizons. The poor recovery of water level during the rising head tests indicates a low permeability, as anticipated for a predominantly silty sandy clay.

The site is approximately 170m north of *Regents Canal* and approximately 750m north of the *Boating Lake* in *Regents Park.* Reference to CGL archive information and Barton's *Lost Rivers of London*[10] indicates the historical (culverted) *River Tyburn* is located approximately 230m south-west of the site (at its closets point) and flows broadly north to south towards *Regents Park* and into the *Boating Lake.* Based on the local topography sloping towards the south-west it is considered that groundwater onsite will run towards the historical *River Tyburn* to the south-west.

The Environment Agency (EA) mapping[11] indicates the site is within a Flood Zone 1. This indicates the site has a less than 1 in 1000 annual probability, a 'low' probability, of flooding from river or sea. As the site is less than one hectare in size a flood risk assessment is not required for the site by the Environment Agency. The flood maps included within CPG4[1] and Camden's SFRA[6] indicate the site location has a 'very low' risk of surface water flooding (less than 1 in 1000 years). Around the border of Primrose Hill (approximately 200m north of the site) the risk from surface water flooding is shown as 'low' to 'medium'. The site is not shown to have experienced extreme flooding in the 1975 nor 2002 flooding events. According to the Camden SFRA SuDS Drainage Potential Map[6] the site lies on the border of an area that is highly compatible for infiltration SUDS and an area with very significant constraints. Environment Agency groundwater flood incidents have been recorded approximately 300m west of the site[6]. The site is located within a critical drainage area but is not located within a local flood risk zone[6].

The EA[11] has produced an aquifer designation system consistent with the requirements of the Water Framework Directive. The designations have been set for superficial and bedrock geology and are

[10] Barton, N. (1992) *The Lost Rivers of London*. Hertfordshire Historical Publications.
[11] http://www.environment-agency.gov.uk (accessed July 2022).

based on the importance of aquifers for potable water supply, and their role in supporting surface water bodies and wetland ecosystems. The site does not overlie a designated superficial or bedrock aquifer as the London Clay Formation is a designated 'non-productive stratum'.

The site does not fall within a Groundwater Vulnerability Zone[11]. The site is located within a Source Protection Zone 1, relating to the Barrow Hill reservoir approximately 20m north-east of the site. This reservoir is of new construction (2014) and is a tanked and concrete lined reservoir.

3.4 Heave Potential

Four trees are proposed to be removed prior to the building construction. These four tree species are all categorized as moderate water demand[12]. A summary of the trees is outlined in Table 2, below.

Table 2. Summary of Trees to be Removed.

Tree	*Actual Tree Height (m)[1]*	*Mature Tree Height (m)[2]*	*Water Demand[2]*	*Tree Zone of Influence (m)[3]*	*Approximate Distance to Proposed Building (m)*	*Action required?*
Common Ash	7	23	Moderate	17	15	Maybe
Hawthorn	5	10	Moderate	7.5	9	No
Wild Plum	9	10	Moderate	7.5	7.5	No
Japanese Cherry	4	9	Moderate	7	3.5	Maybe

1. John Cromar's Arboricultural Company Limited. (September 2018). Report on the impact on trees of the proposals for development at Barrie House, 29 St Edmunds Terrace, London NW8 7QH. 1-38-4326/2.
2. NHBC. (1999). Chapter 4.2. Building Near Trees.
3. 0.75 x mature tree heigh, based on NHBC. (1999). Chapter 4.2. Building Near Trees.

The distance of the hawthorn and wild plum trees from the development are equal to or greater than the estimated tree zone of influence and therefore the removal of these trees is not anticipated to result in significant heave at the development founding depths.

The common ash tree can grow to a mature height of 23m and as such resulting in a zone of influence of 17m. The tree lies some 15m from the proposed basement excavation, however the tree is only 7m high and as such the zone of influence is anticipated to currently be some 5m. The Japanese cherry is located towards the south-east of the site. The potential zone of influence is up to 7m, however as the tree is only 4m high, the zone of influence is anticipated to be some 3m, which is less than the distance of the tree from the building. The removal of these trees is not anticipated to result in significant heave around the proposed basement excavation.

Heave protection measures are not required beneath the proposed raft slab.

[12] NHBC. (1999). *Chapter 4.2. Building Near Trees.*

4. SCREENING

4.1 Introduction

CGL has adopted a screening process based on the Camden Borough Council basement development guidance '*Basements and Lightwells CPG4*'[1]. Relevant questions for the site and proposed development are presented below.

4.2 Subterranean (Groundwater) Flow

This section answers the questions relating to groundwater flow. Table 3 presents a summary of these answers.

Table 3. Responses to Figure 3, CPG4.

Question	*Response*	*Action required*
1a. Is the site located directly above an aquifer?	No. The nearest designated aquifers are 1.5km to the south of the site and 1km to the north of the site. Both are designated Secondary A Aquifers.	None
1b. Will the proposed basement extend beneath the water table surface?	No. Perched groundwater is present within the Made Ground and shallow Head / Weathered London Clay Formation between 0.2mbgl and 3.7mbgl, however these are not anticipated to represent a continuous groundwater body.	None
2. Is the site within 100m of a watercourse, well, or potential spring line?	No. The nearest water course is the *Regent Canal* approximately 170m south of the site. The nearest natural water course is the culverted *River Tyburn* approximately 230m west of the site.	None
3. Is the site within the catchment of the pond chains on Hampstead Heath?	No. The site is some 2.5km south of these pond chains, with groundwater flow towards the south-west.	None
4. Will the proposed basement development result in a change in the proportion of hard surfaced/paved areas?	No. The proposed basement will be constructed adjacent to the existing building on site and in the location of the existing surfaced car park. As such, the area of hardstanding will not be increased.	None
5. As part of site drainage, will more surface water than at present be discharged to ground (e.g. via soakaways and/or SUDS)?	No. A SuDS assessment has been completed by Motion[13] (included within Appendix D) indicating that "the proposed surface water generated from the proposed development attenuated and discharged at a rate far reduced from existing".	None
6. Is the lowest point of the proposed excavation close to, or lower than, the mean water level in any local pond or spring lines?	No. There are no evident ponds or spring lines in the vicinity of the site.	None

[13] Motion. (2018). *SuDS Assessment. Barrie House, 29 St. Edmund's Terrace, NW8 7QH. Marek Wojciechowski Architects.* 170910/mwbarr.

4.2.1 Non-Technical Summary: Subterranean (Groundwater) Flow

The proposed development is underlain by the London Clay Formation, designated an 'unproductive stratum' by the EA. The proposed basement extension will be under the existing building on site. As such the proportion of hardstanding will not be increased and the development is not anticipated to have a significant impact on groundwater infiltration rates.

It is noted that the site is within a Source Protection Zone (SPZ) Inner Zone 1, relating to Barrow Hill reservoir. However, as the proposed development is within the relatively impermeable London Clay Formation, the reservoir is a tanked, concrete lined reservoir, and is upstream from the site, the proposed development is not anticipated to have an impact on the SPZ Inner Zone 1.

4.3 Slope/Land Stability

This section answers the questions relating to site topography, trees, neighbouring infrastructure and potential ground movements associated with the basement development. Table 4 presents a summary of these answers.

Table 4. Responses to Figure 4, CPG4.

Question	*Response*	*Action required*
1. Does the site include slopes, natural or manmade, greater than about 1 in 8?	Yes. The maximum slope on site is about 1 in 5 to the west / south-west of the existing apartment block. The slope stability was assessed in the Soil Consultants report[2] and a factor of safety of 1.45 was found for the slope stability indicating the overall stability should be acceptable. No signs of deep-seated failure were observed.	None
2. Will the proposed re-profiling of the landscaping at site change slopes at the property boundary to greater than about 1 in 8?	No. The proposed development will not significantly alter the profile of the landscaping at the site boundaries.	None
3. Does the development neighbour land including railway cuttings and the like with a slope greater than about 1 in 8?	No. No railway cuttings or steeper slopes have been identified.	None
4. Is the site within a wider hillside setting in which the general slope is greater than about 1 in 8?	No. Whilst there is a steep slope on site where the car park / building entrance area slopes down to Broxwood Way, the hill slopes around the site have a gentler gradient.	None
5. Is the London Clay the shallowest stratum on site?	Made Ground has been identified over the London Clay on the site. The effect of heave of the London Clay due to excavation to form the new area of the basement will need to be considered due to the limited thickness of Made Ground across the site.	Impact assessment

Question	*Response*	*Action required*
6. Will any trees be felled as part of the proposed development and/or are any works proposed within any tree protection zones where trees are to be retained?	Yes. As discussed in Sections 2.3 and 3.4, above, four trees will be removed as part of the proposed development. These are not anticipated to have detrimental effects on the proposed development, and heave protection measures will be utilised. No works are proposed within any tree protection zones.	None
7. Is there a history of shrink/swell subsidence in the local area and/or evidence of such at the site?	Seasonal swelling is likely to occur due to the large number of trees present. Additionally, the proposed structural slab level for the basement development will be between 42.875mOD and 40.77mOD (2.5mbgl to 6mbgl), considered to be beyond the depth of influence of the tree roots.	None
8. Is the site within 100m of a watercourse or a potential spring line?	No. The nearest water course is the *Regent Canal* approximately 170m south of the site.	None
9. Is the site within an area of previously worked ground?	Yes. There is a limited thickness of Made Ground on site likely to be associated with the construction of the existing building.	None
10. Is the site within an aquifer?	No. The underlying London Clay Formation is a designated 'unproductive' stratum.	None
11. Is the site within 50m of Hampstead Heath Ponds	No. The site is some 2.5km south of Hampstead Heath Ponds.	None
12. Is the site within 5m of a highway or pedestrian right of way?	Yes. The site is within 5m of Broxwood Way, however the basement development on site will be some 15m from Broxwood Way.	None
13. Will the proposed basement significantly increase the differential depth of foundations relative to neighbouring properties?	Potentially but neighbours are not directly adjacent to the development. The closest neighbour building (72 Kingsland) is approximately 8.2m from the proposed basement development on site. It will be necessary to determine the potential ground movements from the proposed development at the neighbouring properties, including the adjacent Barrie House building.	Impact assessment
14. Is the site over (or within the exclusion zone of) any tunnels?	No. The site is not understood to be over or within the exclusion zone of tunnels.	None

4.3.1 Non-Technical summary: Slope/Land Stability

The Soils Consultants report[2] found the maximum slope on site to be marginally over 1 in 5, from the west / south-west of the existing apartment block and a factor of safety of 1.45 was found for the slope stability indicating the overall stability should be acceptable. No signs of deep-seated failure were observed. The slopes around the site do not exceed a gradient of 1 in 8. As such the site is not considered to be at risk from slope stability issues.

An impact assessment will be required as the basement excavation will result in unloading of the London Clay Formation, which will result in heave movements. The ground movements generated by the proposed development at the location of the neighbouring properties are anticipated to be low

based on the distance to the properties, which will be confirmed by the impact assessment. Measures to mitigate potentially damaging movements will be provided if found to be necessary.

The London Clay Formation on site has the potential to create a shrink/swell hazard. Due to the high plasticity of the London Clay Formation the removal of any trees could have an effect on the shrink/swell potential of the clay. However, it is noted that the foundations of the proposed basement development will be between 42.875mOD and 40.77mOD (some 2.5mbgl to 6mbgl), considered to be beyond the likely depth of influence of tree roots.

4.4 Surface Flow and Flooding

This section answers questions relating to the impact of the proposed development on existing drainage, permeable surfacing and flood risk. Table 5 presents a summary of these answers.

Table 5. Responses to Figure 5, CPG4

Question	*Response*	*Action required*
1. Is the site within the catchment of the pond chains on Hampstead Heath?	No. The site is some 2.5km south of Hampstead Heath.	None
2. As part of the proposed site drainage, will surface water flows (e.g. volume of rainfall and peak run-off), be materially changed from the existing route?	No. The proposed development does not increase the area of hardstanding on site. Surface water flows are not anticipated to be significantly changed from existing routes into areas of soft landscaping around the hardstanding /building in the centre of the site.	None
3. Will the proposed development result in a change in the proportion of hard surfaced/paved external areas?	No. The proposed extension development extends north over the existing area of car parking, which is currently surfaced.	None
4. Will the proposed basement result in a change to the profile of the inflows of surface water being received by adjacent properties or downstream watercourses?	No. The nearest surface water features are over 300m from the site. Surface water flows are not anticipated to be affected by the proposed development due to the development extending over the existing hard surfaced car park.	None
5. Will the proposed basement result in changes to the quality of surface water being received by adjacent properties or downstream watercourses?	No. The quality of surface water is not anticipated to be affected by the proposed development.	None
6. Is the site in an area identified to have surface water flood risk according to either the Local Flood Risk Management Strategic or the Strategic Flood Risk Assessment or is at risk from flooding, for example because the proposed basement is below the static water level of nearby surface water features?	No. EA mappings[11] indicates the site is at a 'low' risk of surface water flooding and it is noted that the site did not experience flooding in the significant flooding events in 1975 and 2002. The Strategic Flood Risk Assessment[6] indicates the site is at a 'very low' risk of surface water flooding.	None

4.4.1 Non-Technical Summary: Surface Flow and Flooding

The proposed basements will be constructed under the existing building on site and in the location of the existing hard surfaced car park. As such, the proposed development will not affect the proportion of hardstanding to soft landscaping on site, and surface water flows are not anticipated to be affected.

4.5 Summary

Based on this screening exercise, further stages of impact assessment are required for this site. These should address item 2 presented in Table 6.

Table 6. Summary of Screening Exercise

Item	*Description*
1.	***Subterranean (groundwater) flow*** None – the underlying London Clay Formation is a designated unproductive stratum and groundwater is restricted to perched pockets within the Made Ground and shallow Weathered London Clay Formation. The volume of hardstanding on site is not anticipated to change and as such will not impact infiltration into underlying soils.
2.	***Slope/land stability*** Assessment – The proposed development is potentially at risk from shrink/swell of the London Clay Formation; however, the proposed development is not anticipated to affect the shrink/swell capacity of the clay. The impact on the existing structure and nearby properties of unloading of the soils/re-loading with the proposed above ground structure will be considered in a ground movement assessment.
3.	***Surface flow and flooding*** None – the proposed development will not increase the proportion of hard surfacing to soft landscaping on site and is anticipated to have a negligible impact on surface water run-off and surface water attenuation characteristics.
4.	***Cumulative impacts*** As groundwater within the London Clay Formation is restricted to pockets, it is expected that cumulative impacts from the construction of the basement will be negligible. As the proportion of hardstanding on the site will not change the proposed development is not anticipated to impact surface water flow onsite. Based on the distance to neighbouring properties the ground movements are anticipated to have a low impact on the neighbouring structures, which will be confirmed as part of the ground movement assessment.

5. SCOPING

On the basis of the screening exercise undertaken in Section 4 of this report, a ground movements assessment should be undertaken. The ground movement assessment will be used to determine the impact of the proposed development on the existing building and to predict the ground movements at the neighbouring properties. A building damage assessment for the existing building and the neighbouring buildings will be included within this assessment.

A separate Thames Water Impact Assessment (TWIA)[7] has previously been undertaken by CGL to review the impacts of the proposed development on the Thames Water assets adjacent to the site.

6. GROUND MOVEMENT ASSESSMENT

6.1 Introduction

This section provides details of calculations undertaken to determine potential ground movements that may result from the proposed piling, excavation and construction works for the development; and to assess how the associated ground movement mechanisms may potentially affect adjacent structures. The assessment is limited to the impacts on neighbouring properties of the proposed basement under the extension, and does not extend to include assessment of potential impacts resulting from changes in ground level and/or reconfiguration works within the Barrie house building. If required, assessment of these works can be undertaken once details of sequencing, loading and temporary works is available.

A ground movement assessment has been undertaken using OASYS Limited *PDISP* (*P*ressure Induced *DISP*lacement) analysis software to compute vertical ground movements and WALLAP (pseudo-FE retaining wall analysis software) to compute potential horizontal ground movements for the piled wall. The aim of the ground movement assessment is to determine the potential impact of the proposed development on the critical neighbouring buildings and adjacent existing Barrie House building.

A conceptual site model (CSM) relating to potential ground movement, has been developed based on the available data. The CSM is presented in Figure 3.

A detailed pile design has been undertaken by DFS[9] and is included within Appendix G, the relevant pile details of which have been considered within this assessment.

6.2 Building Damage Assessment

The following sections assess the ground movements that may results from the construction of the basement and how these could affect the nearby structures. It is understood that the main excavation under the extension will be retained by a 450mm diameter secant piled wall with a section of 600mm diameter contiguous piles along the south-eastern wall adjacent to the Barrie House pads and underpinning located where the south-eastern wall underlies the existing ground floor north-eastern wall of Barrie House. The smaller basement excavation under the existing Barrie House structure will utilise existing pad foundations and underpinning where required, retained with a 300mm thick concrete retaining wall. Assessment of the impacts of these works under the existing Barrie House building does not fall within the remit of this report.

Ground movements are derived from:

- Pile wall installation: Vertical and horizontal ground movements will be generated during the installation of the secant and contiguous piled wall proportional to the length of the piles.
- Pile wall deflection: Deflections occur as the excavation proceeds and the piled wall is loaded with retained earth and water pressures, this can give rise to lateral and vertical ground movements.
- Heave movements: The London Clay Formation is susceptible to short term heave and time dependant swelling on unloading, which will occur as a result of basement excavation, generating upward ground movements.
- Short and long term construction movements: The net loading on formation soils will generate ground movement, which could affect adjacent foundations. This takes into account existing stress conditions, additional loads from the basement structure and the weight of soil removed.
- Settlement of underpins: Some settlement of underpins following construction is anticipated, however this can be limited by following good construction practice.

It is noted that a small section of the north-eastern wall of the existing Barrie House structure will be underpinned as part of the development. The formation level is proposed at 39.2mOD (7mbgl).

6.3 Critical Sections

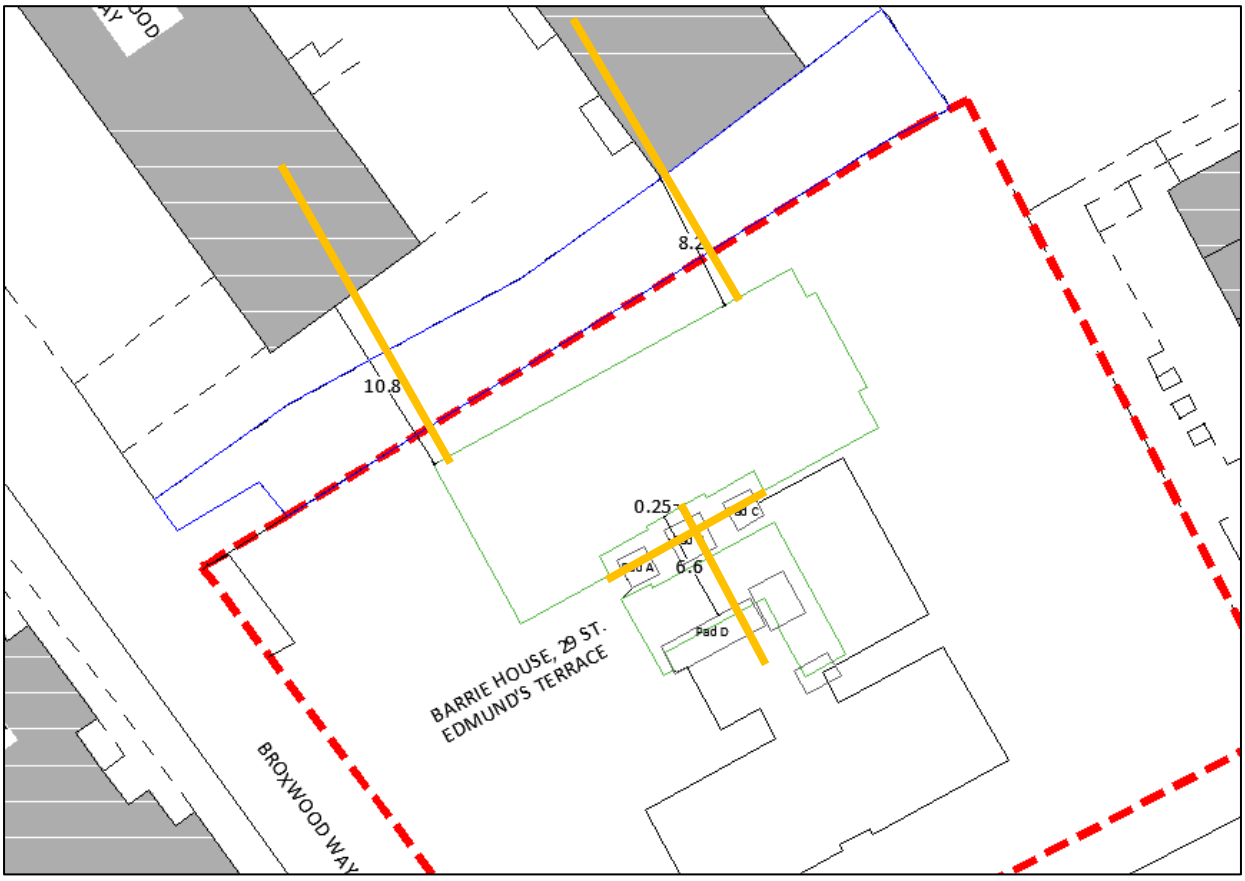
The two closest neighbouring properties are 16 and 72 Kingsland, located 10.8m and 8.2m north of the proposed basement excavation, respectively. The existing Barrie House building, which is founded on pad foundations, lies adjacent to the south of the proposed main basement excavation. The following critical sections have been identified for the building impact assessment:

- **16 Kingsland**: This section extends perpendicular to the basement excavation in a north-westerly direction through the neighbouring property, 16 Kingsland. The building width is assumed to be 5m.
- **72 Kingsland**: This section extends perpendicular to the basement excavation in a north-westerly direction through the neighbouring property, 72 Kingsland. The building width is assumed to be 5m.
- **Barrie House pads A to C**: This section extends behind the proposed main basement excavation areas parallel to the wall intersecting the existing adjacent critical Barrie House pads. The distance between consecutive pads edges is some 3.5m.

- **Barrie House pads B to D**: This section extends perpendicular to the main basement excavation in a south-easterly direction through the existing Barrie House building, intersecting the two critical pads in the centre of the small basement to be excavated. The distance between consecutive pads edges is some 6.3m.

These critical sections are indicated in orange in Plate 2, below. The distances shown in the figure illustrate dimensions between foundations.

Plate 2. Critical Sections (illustrated in orange)



Foundation and dimension details based on drawings provided to CGL for the critical sections identified above are summarised in Table 7, below.

Table 7. Summary of Critical Sections.

Building	*Approximate Distance from Contig. Piled Wall (m)*	*Foundation Formation Level (mOD) [mbgl]*	*Width of Building /Distance between Foundations (m)*	*Height of Building from Ground Level (m)*
72 Kingsland	8.2	45.1 / [1.0] [1]	5[2]	12[3]
16 Kingsland	10.8	45.1 / [1.0] [1]	5[2]	12[3]
Barrie House pads A, B and C	0.25	43.7 / [2.4]	3.5m between pads A/B and B/C	30[3]
Barrie House pad D	6.6	42.5 / [3.6]	6.3 between pads B/D	

[1] assumed based on anticipated ground level and a 1m deep strip foundation solution.
[2] assumed width between strip foundations based on Google Earth imagery.
[3] assumed building height based on Google Earth imagery.

6.4 Damage Categories

Ground movements have been calculated and used to assess potential 'damage categories' that may apply to the neighbouring structures due to the proposed basement construction method and assumed construction sequence. The methodology proposed by Burland and Wroth[14] and later supplemented by the work of Boscardin and Cording[15] has been used, as described in *CIRIA Special Publication 200*[16].

General damage categories are summarised in Table 8 below.

Table 8. Classification of Damage Visible to Walls (reproduction of Table 2.5, CIRIA C580[17]).

Category	*Description*
0 (Negligible)	Negligible – hairline cracks
1 (Very slight)	Fine cracks that can easily be treated during normal decoration (crack width <1mm)
2 (Slight)	Cracks easily filled; redecoration probably required. Some repointing may be required externally (crack width <5mm).
3 (Moderate)	The cracks require some opening up and can be patched by a mason. Recurrent cracks can be masked by suitable linings. Repointing of external brickwork and possibly a small amount of brickwork to be replaced (crack width 5 to 15mm or a number of cracks >3mm).
4 (Severe)	Extensive repair work involving breaking-out and replacing sections of walls, especially over doors and windows (crack width 15mm to 25mm but also depends on number of cracks).
5 (Very Severe)	This requires a major repair involving partial or complete re-building (crack width usually >25mm but depends on number of cracks).

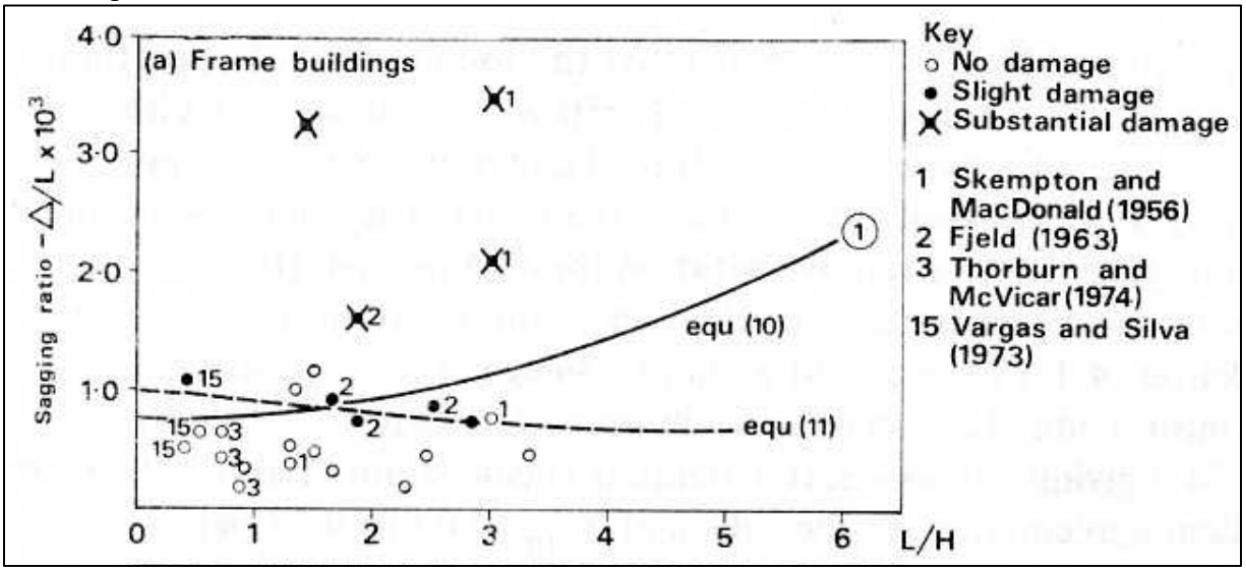
The above assessment criteria are primarily relevant for assessing masonry structures founded on strip footings. Therefore, this methodology is appropriate for the assessment of the impact of the development on the neighbouring properties of 16 and 72 Kingsland.

The adjacent Barrie House building is a framed structure founded on pad foundations. As such, the following assessments have been made:

- As per the methodology proposed by Burland and Wroth[14] for a framed building, the potential 'sagging ratio' between adjacent Barrie House pad foundations has been assessed. As illustrated in Plate 3 below, 'no damage' is anticipated where the sagging ratio is below ~0.8, 'slight damage' when the sagging ratio is ~0.8 to ~1.5, and 'substantial damage' where the sagging ratio is >1.5.

[14] Burland, J.B., and Wroth, C.P. (1974). *Settlement of buildings and associated damage*, State of the art review. Conference on Settlement of Structures, Cambridge, Pentech Press, London, pp611-654
[15] Boscardin, M.D., and Cording, E.G., (1989). *Building response to excavation induced settlement*. J Geotech Eng, ASCE, 115 (1); pp 1-21.
[16] Burland, Standing J.R., and Jardine F.M. (eds) (2001), *Building response to tunnelling, case studies from construction of the Jubilee Line Extension London*, CIRIA Special Publication 200.
[17] CIRIA (2003). *Embedded retaining walls – guidance or economic design*. CIRIA C580.

Plate 3. Figure 11 from Burland and Wroth[14]



According to Skempton and MacDonald[18], the differential movement criteria typical for limiting damage to structural elements is 1:500 where 'cracking in walls and partitions is noted'. 1:150 to 1:250 angular distortion corresponds to 'structural damage'. As such, an analysis of the angular distortion within and between the Barrie House pad foundations has been undertaken.

The angular distortion and the maximum settlement have been analysed between consecutive pads. According to Rankin[19] the following criteria for framed buildings applies:

Table 9. Classification of Damage (Rankin - Ground movements resulting from urban tunnelling, 1988).

Category	*Damage Degree*	*Definition*	*Parameter*	
			Maximum Slope (or Angular Distortion)	*Maximum Settlement of Building (mm)*
1 – Appearance	**Negligible**	Surface cracks	< 1:500	< 10
2 – Appearance	**Light**	Surface cracks, effect on the bearing elements is unlikely	1:500 – 1:200	10-50
3 – Function	**Medium degree**	Surface destructions of bearing elements of buildings and rigid pipelines	1:200 – 1:50	50-75
4 – Function and structure	**Very high degree**	Destruction of bearing elements of buildings, both rigid and flexible pipelines	> 1:50	> 75

6.5 Ground Movements: Piled Wall Installation

Lateral ground movements and settlements are generated during the stages of installation of the piled wall. Guidance provided by CIRIA C760[20] suggests that horizontal movements and settlements due to installation of the concrete secant and contiguous piled walls in stiff soil can be assumed to be equal to

[18] Skempton, A. W and MacDonald, D. H. (1956). *Allowable settlement of buildings. Proceedings of the Institute of Civil Engineers, 3, Vol. 5*. pp 727-768.
[19] Rankin W.J. (1988). *Ground movement resulting from urban tunnelling: Predictions and effects.* Geological Society of London Engineering Geology Special Publications 1988. 5: 79-92.
[20] CIRIA C760. (2017). *Guidance on embedded retaining wall design.* CIRIA C760.

0.04% of the pile length. The influence of the installation movements at ground level extends beyond the wall to a distance of 2 and 1.5 times the installation depth of vertical and horizontal ground movements, respectively, which is assumed to dissipate parabolically with distance from the wall.

Further studies[21,22] on the effects of piled wall installations within the London area indicate that movements due to piled wall installation can be overpredicted following CIRIA´s guidance, particularly where a 'hit and miss' piling methodology is adopted alongside good construction control. Therefore, horizontal and vertical movements due to installation of the concrete piled wall have been assumed to be equal to 0.02%.

The depth of embedment of the secant piles has been modelled as approximately 3m below the formation level of 39.77mOD to a toe level indicated by DFS of 36.6mOD[9]. The existing levels in the area of the basement range from 46.10mOD in the east to 44.50mOD in the west, and as such a pile platform level of 44.6mOD[9] has been assumed, indicating a total pile length of 8m. The depth of embedment of the contiguous piles adjacent to the Barrie House pads has been modelled as approximately 11m, with a toe level of 28.6mOD and a total pile length of 16m as indicated by DFS[9]. It is assumed that the walls will be propped during construction as per the construction methodology indicated by DFS[9].

At the secant piles wall, the maximum horizontal and vertical surface movements due to installation are anticipated to be some 2mm. At ground level, horizontal surface movements will be under 1mm at some 3m from the wall, and vertical surface movements under 1mm some 4m from the wall.

At the contiguous piles wall, the maximum horizontal and vertical surface movements due to installation are anticipated to be some 3mm. At ground level, horizontal surface movements will be under 1mm at some 11m from the wall, and vertical surface movements under 1mm some 15m from the wall.

A summary of the anticipated ground movements arising from the piled wall installation at the neighbouring properties formation levels are outlined in Table 10, below.

[21] *Ball R, Langdon N, Creighton M (2014). Ground Engineering Technical Paper: Prediction of party wall movements using CIRIA report C580.*

[22] *Langdon N, Ball R, Giles D (2021). Ground Engineering Technical Paper: Ground movement prediction for a piled basement – a case study from Garlickhythe, City of London, UK.*

Table 10. Summary of Ground Movements due to Piled Wall Installation (positive vertical movements are settlement, positive horizontal movements are toward the basement)

Building	*Approximate Distance from Contig. Pile Wall (m)*	*Level at which Movements are Assessed (mOD) / [mbgl]*	*Max Horizontal Movements (mm)*	*Max Vertical Movements (mm)*
72 Kingsland	8.2	45.1 / [1.0]	0.2	0.4
16 Kingsland	10.8	45.1 / [1.0]	<0.1	0.2
Barrie House pads A /B /C	0.25	43.7 / [2.4]	3.1	3.2
Barrie House pad D	6.6	42.5 / [3.6]	1.7	2.0

The movements at Broxwood Way, approximately 12m south-west from the basement excavation, and St Edmunds Terrace, some 18m south-east of the basement excavation, are predicted to be a maximum of 1mm of horizontal and vertical movements.

6.6 Ground Movements: Piled Wall Deflection

Lateral ground movements and settlements are generated during the stages of excavation in front of the piled wall line. Lateral ground movements due to excavation have been calculated using the commercial software WALLAP. Maximum vertical ground settlement behind the wall is expected to be half the maximum horizontal wall deflection based on analysis reported in CIRIA C760[20]. Additionally, in accordance with CIRIA C760[20], the influence of the deflection movements at ground level extends beyond the wall to a distance of 3.5 and 4 times the excavation depth for vertical and horizontal ground movements, respectively, which is assumed to dissipate parabolically with distance from the wall.

6.6.1 WALLAP Assumptions

The WALLAP analysis has been undertaken based on the general assumptions as outlined below:

- Serviceability limit state (SLS) criteria have been used to determine wall deflections.
- Based on pile parameters provided by DFS[9], and to ensure at least 3m embedment, the pile wall toe level for the contiguous piles is taken at 28.6mOD and for the secant piles as 36.6mOD.
- For the short-term analysis, undrained parameters have been used; and for the long-term permanent condition, drained parameters have been adopted.
- As recommended in CIRIA 760[20], for a non-load bearing retaining wall, a wall friction coefficient of 0.5 has been conservatively used in the short-term for the London Clay Formation.
- Perched water has been encountered within the shallow ground, however a deeper continuous groundwater body is anticipated below the London Clay Formation. As a result, the groundwater level has been assumed below the toe of the wall.

- The secant piled wall closest to the neighbouring properties to the north has been modelled as a fully embedded wall with piles of 450mm diameter at an assumed spacing of 630mm between consecutive male piles. An initial moment of inertia of 0.00320m^4/m (I_{gross}), a Young's Modulus of 30GPa has been assumed, with stiffness EI per unit length of wall of 67,096kN/m^2/m in the short term (70% EI) and 47,926kN/m^2/m in the long term (50% EI) as recommended in CIRIA 760[20].

- The contiguous piled wall adjacent to the Barrie House pad foundations has been modelled as a fully embedded wall with piles of 600mm diameter at 700mm spacing. An initial moment of inertial of 0.00909m^4/m (I_{gross}), a Young's Modulus of 30GPa has been assumed, with stiffness EI per unit length of wall of 190,852kN/m^2/m (70% EI) in the short term and 136,323kN/m^2/m (50% EI) in the long term as recommended in CIRIA 760[20].

- An existing ground level of 46mOD has been assumed for the secant piled wall along the north-western boundary of the basement excavation, and 45mOD for the contiguous piled wall along the south-eastern boundary of the basement excavation (adjacent to the Barrie House pads).

- The Barrie House pads A/B/C, the existing Barrie House building, and surcharge on the back of the secant wall have been modelled as surcharge pressures, as detailed in Table 11, below. Surcharges 1 to 3 are applicable for the contiguous piled wall adjacent to the Barrie House pads, and surcharge 4 is applicable to the secant piled wall.

Table 11. ***Summary of Assumed Surcharge Pressures.***

Description	Surcharge Reference	Unfactored Load (kN/m^2)	Distance from Piled Wall (m)	Elevation (mOD)	Dimensions (m)
Pad A / C	1	220 + 50*	0.25	43.7	2.0 x 2.0
Pad B	2	220 + 50*	0.25	43.7	2.5 x 2.5
Existing floor load	3	5	1.25	45.0	20 x 20
Surcharge on back of secant piled wall	4	10	0.5	45.0	1.0 x 20

* Loading pressure based on Ove Arup report[2] indicating assumed current loading on pads is 2 tonne per square foot, and there is the potential for a penthouse development on Barrie House which will result in an additional 50kPa of load.

- The piled wall is to be sufficiently propped during basement excavation to limit wall deflections. As indicated in preliminary structural drawings included within Appendix B, a 0.95m thick permanent basement raft floor slab and a permanent 0.30m thick ground floor slab have been modelled with a long-term concrete Young's Modulus of 15GPa. Temporary and permanent strut properties, at levels indicated within the pile design provided by DFS[9], as outlined in Table 12 have been adopted.

Table 12. Summary of temporary and permanent strut properties[c]

Struts	Strut Elevation [mOD]	Strut Spacing [m]	X-section Area of Strut [m²]	Young Modulus [kN/m/m]	Free Length [m]	Strut Inclination [°]
High temporary prop	43.65	1	1	80,000[a]	1	0
Low temporary prop (only applicable to 600mm diameter piles at 700mm centres)	42.10	1	1	80,000[a]	1	0
Permanent raft slab	40.3	1	0.95	1.5×10^7	1	0
Permanent ground floor slab	44.5	1	0.30	1.5×10^7	1	0

Notes:

a. WALLAP assumes that struts provide an elastic support with a spring constant per unit length of the wall. A typical conventional industry standard value (and CGL experience of similar works) has been assumed for the temporary prop in absence of further information, keeping the rest of the properties equal to 1.

b. Proposed structural slabs have been assumed based on structural information provided by Richard Tant Associates.

c. The pertinent results (displacements) from the preliminary analysis are not particularly sensitive to the typical values adopted.

d. A free length of 2.5m has been assumed, which is approximately ¼ of the width of the basement.

The following construction sequence has been assumed, based on information provided by DFS[9]:

1. Apply existing surcharge loading;
2. Install contiguous or secant piled retaining wall from ground level;
3. Excavate for capping beam construction down to 43mOD;
4. Install high level temporary propping frame at 43.65mOD;
5. Excavate to 3mbgl (41.6mOD);
6. Contiguous piled wall only: install low level temporary propping frame at 42.1mOD;
7. Excavate to formation level of 39.77mOD;
8. Install permanent raft slab (centreline of the 950mm thick slab at 40.3mOD);
9. Contiguous piled wall only: remove low temporary prop at 42.1mOD once basement slab has gained strength;
10. Install permanent ground floor structural slab at 44.5mOD;
11. Remove high temporary prop at 43.65mOD once ground floor structural slab has gained strength;
12. Apply long-term ground conditions; and
13. Apply additional 50kPa surcharge loading to model potential penthouse development (only for the contiguous piles wall section which is in proximity to the Barrie House pad foundations).

6.6.1 WALLAP Results

The maximum horizontal displacement of the secant piled wall along the north-western boundary is anticipated to be some 9mm at a level of 46mOD. At a level of 45.1mOD (the assumed level of the

adjacent 16 and 72 Kingsland properties), the displacement is anticipated to be some 7mm adjacent the pile wall decreasing to 3mm at the closest neighbouring building. Adjacent to the existing Barrie House pad B, the maximum horizontal displacement of the piled wall is anticipated to be some 13mm at ground level, with some 12mm predicted in correspondence of the formation level (43.7mOD) of the adjacent pads. Adjacent to the Barrie House pads A and C, the maximum horizontal displacement of the piled wall is anticipated to be some 11mm at ground level, with some 11mm also predicted at the pad formation level of 43.7mOD.

A summary of the WALLAP analysis is included in Appendix F. These movements are in agreement to those proposed within the DFS pile design report[9] (included within Appendix G).

6.6.2 Cumulative Horizontal Movements: Pile Installation and WALLAP

Maximum ground settlement behind the wall is expected to be half the maximum horizontal wall deflection based on analyses reported in CIRIA C760[20]. The maximum vertical displacement behind the wall generated by its deflection and horizontal movements at the critical buildings, considering the combined effects of the piled wall installation and excavation works, are summarised in Table 13, below. Vertical heave movements due to excavation and settlements due to new proposed construction loading are not included. Differential movements across each pad are included.

Table 13. Summary of Maximum Cumulative Ground Movements due to Piled Wall Installation and Excavation Deflection (positive vertical movements are settlement)

Building	*Approximate Distance from Contig. Piled Wall (m)*	*Level at which Movements are Assessed (mOD)*	*Movements at Start and End of Neighbouring Foundations (mm)*	
			Horizontal [Differential]	*Vertical [Differential]*
72 Kingsland	8.2 to 13.2	45.1	3.2 to 1.4 [1.8]	1.7 to 0.5 [1.2]
16 Kingsland	10.8 to 15.8	45.1	2.1 to 0.8 [1.3]	1.0 to 0.2 [0.8]
Barrie House pads A/C	0.25 to 2.25	43.7	13.9 to 11.7 [2.2]	8.5 to 7.2 [1.3]
Barrie House pad B	0.25 to 2.75	43.7	14.9 to 11.9 [3.0]	9.0 to 7.2 [1.8]
Barrie House pad D	6.6 to 8.6	42.5	8.0 to 6.3 [1.7]	4.8 to 3.8 [1.0]

Regarding the predicted wall displacements that may be expected during excavation, it should be noted that WALLAP uses a Winkler Spring analysis to determine the wall displacements. In a Winkler system, springs are used to represent a continuum and there is no transfer of shear stresses between the springs. In general, the application of this concept leads to an overestimation of structural deformations and consequently, ground movements.

6.7 Ground Movements: Unloading / Reloading

An assessment of the vertical ground movements resulting from the proposed development has been undertaken using OASYS Limited *PDISP* (*P*ressure Induced *DISP*lacement) analysis software. *PDISP*

assumes that the ground behaves as an elastic material under loading, with movements calculated based on the applied loads and the soil stiffness (E_u and E') for each stratum input by the user.

6.7.1 Excavation Unloading

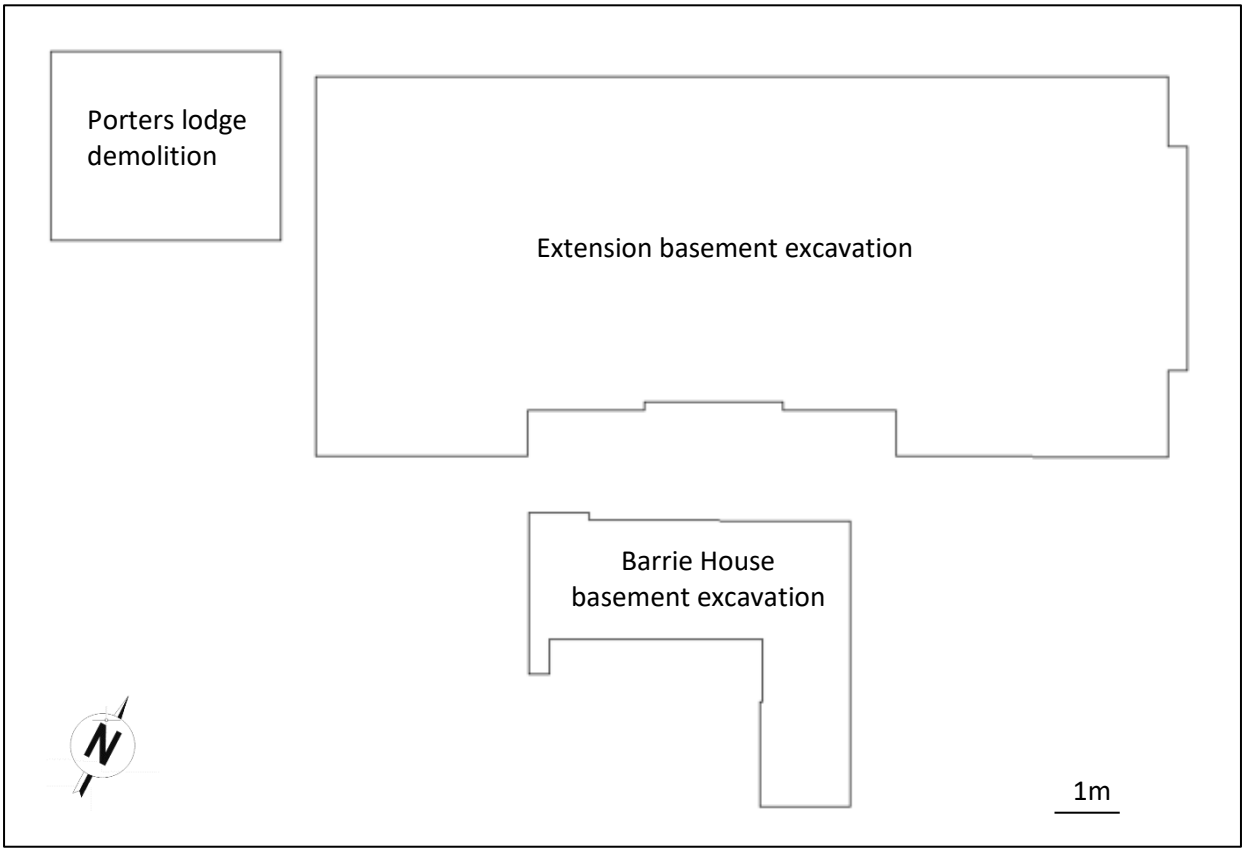
The proposed extension development will involve the unloading of a maximum of some 6.0m of soil. Based on the ground conditions presented in Table 1 and a maximum ground level of 46.1mOD in the area of excavation, this would result in a maximum unloading of some 123.4kN/m^2, at a level of 39.77mOD.

The excavation of the basement under the existing Barrie House building has been assumed to be from an existing level of 45.06mOD to a level of 42.7mOD, resulting in the unloading of some 2.3m of soil. Based on the ground conditions presented in Table 1, this would result in the unloading of some 46.08kN/m^2 at a level of 42.7mOD.

An unloading of 30kN/m^2 has been applied to the PDISP model at 45mOD for the demolition of the two storey porters lodge.

A plan view of the unloading areas is illustrated in Plate 4, below.

Plate 4. Unloading Areas Plan.



6.7.2 Structural loading

6.7.2.1 Building loads

Loads for the building have been supplied by the structural engineer and are presented in 5295-S50B provided in Appendix B. The building is proposed to be supported by a series of internal columns and walls onto a raft slab, which will be 950mm thick for the 4-storey structure. Loads have been grouped into eight loading /patch areas, as well as the perimeter wall and the raft slab, as summarised in Table 14 and Plate 5, below. Loading on the basement excavated under Barrie House (load area reference 8) has been calculated assuming the proposed slab thickness of 300mm and a reinforced concrete unit weight of 25kN/m^3. Loads on the piles have not been included as it has been assumed that these will be transferred to depth.

Table 14. Summary of Loading Areas.

Load Area Reference	*Columns and Walls**	*Total Area (m^2)*	*Total Load (kPa)*
1	C1, C2	11.7	86.4
2	C3, C4	25.0	71.5
3	C9, C11, C12	26.5	55.8
4	C13, C14, W1, W2, W3, W4, W6, W7, W8, W9, W10, W11, W12	103.3	77.0
5	C5, C6, C7, C8, C18, C20	41.4	70.6
6	C10, W5	32.4	32.1
7	C15, C16, C17, C19	27.5	61.8
Wall	PW	17.1	136.6
Slab	Slab self-weight and DL / LL	267.8	29.5
8	(Barrie House basement)	49.9	7.5

* Load references from drawing 5295-S50B, included within Appendix A.

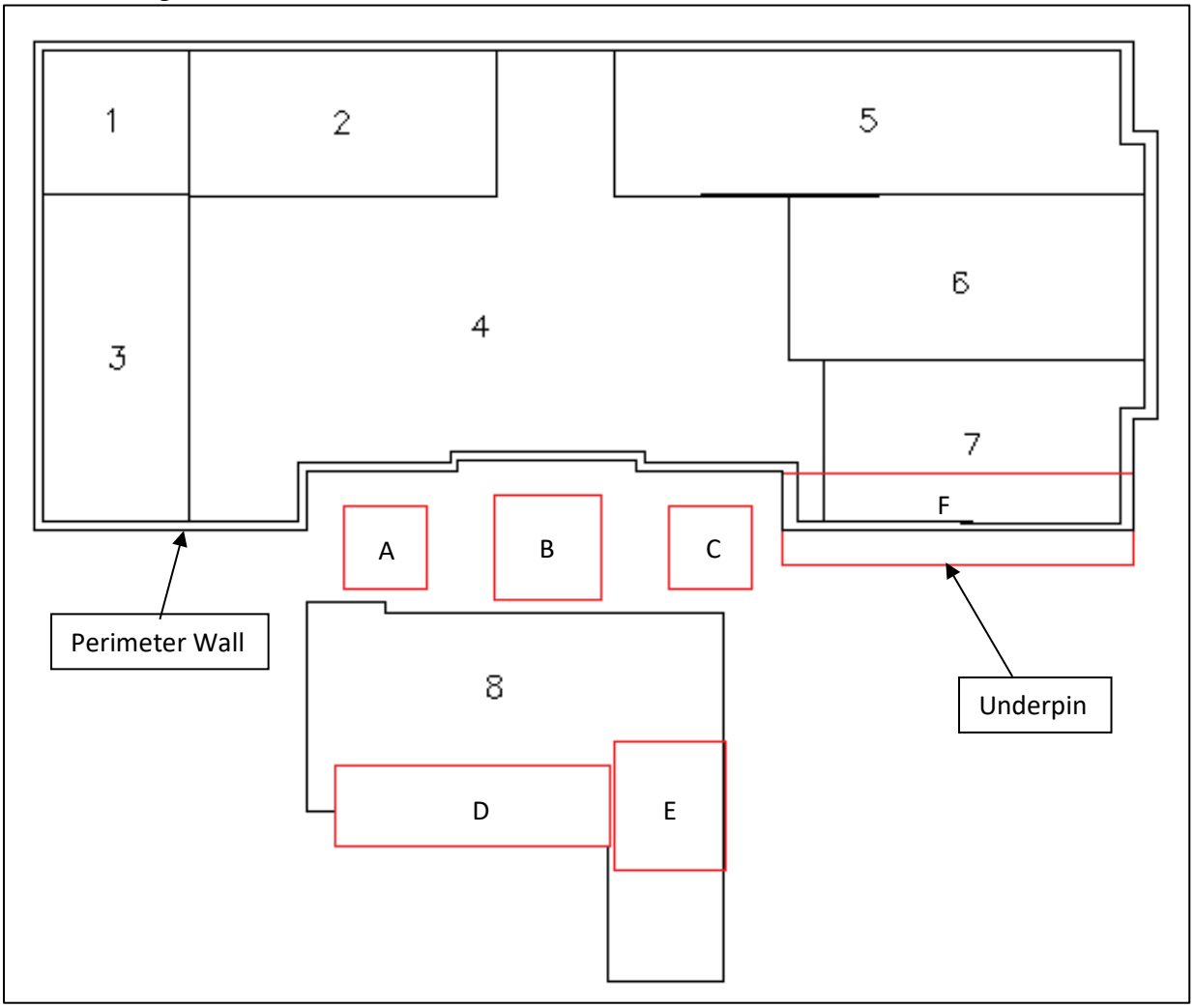
6.7.2.2 Underpin Loads

The existing foundations of the Barrie House structure, for the north-west ground floor wall (labelled pad F in Plate 5, below), are understood to be founded at some 43.7mOD within the London Clay Formation. The underpins are proposed to be founded at 39.2mOD, within the London Clay Formation, 0.6m below the proposed basement slab. The structural drawings included within Appendix B indicate the total line load on the underpin to be 80kN/m (see 5295-S50B), across a width of 2.2m (see 5295-S14D). This results in some 45kPa of pressure which has been modelled in PDISP.

6.7.2.3 Loading Summary

The loading modelled in PDISP is illustrated in Plate 5, below.

Plate 5. Loading Areas Plan.



6.7.3 PDISP analysis stages

Two modelling stages have been undertaken in PDISP:

- Short-term demolition and excavation stage (unloading), utilising undrained parameters; and
- Long-term net construction stage (net between unloading and loading), utilising drained parameters.

6.7.4 PDISP analysis results

Contour plots illustrating the predicted vertical movements at ground level at each of the PDISP stages are presented in Plate 6 and Plate 7, below.

Plate 6. Contour Plot of Predicted Vertical Movements at Ground Level from Short Term Excavation and Demolition (-ve= heave movements)

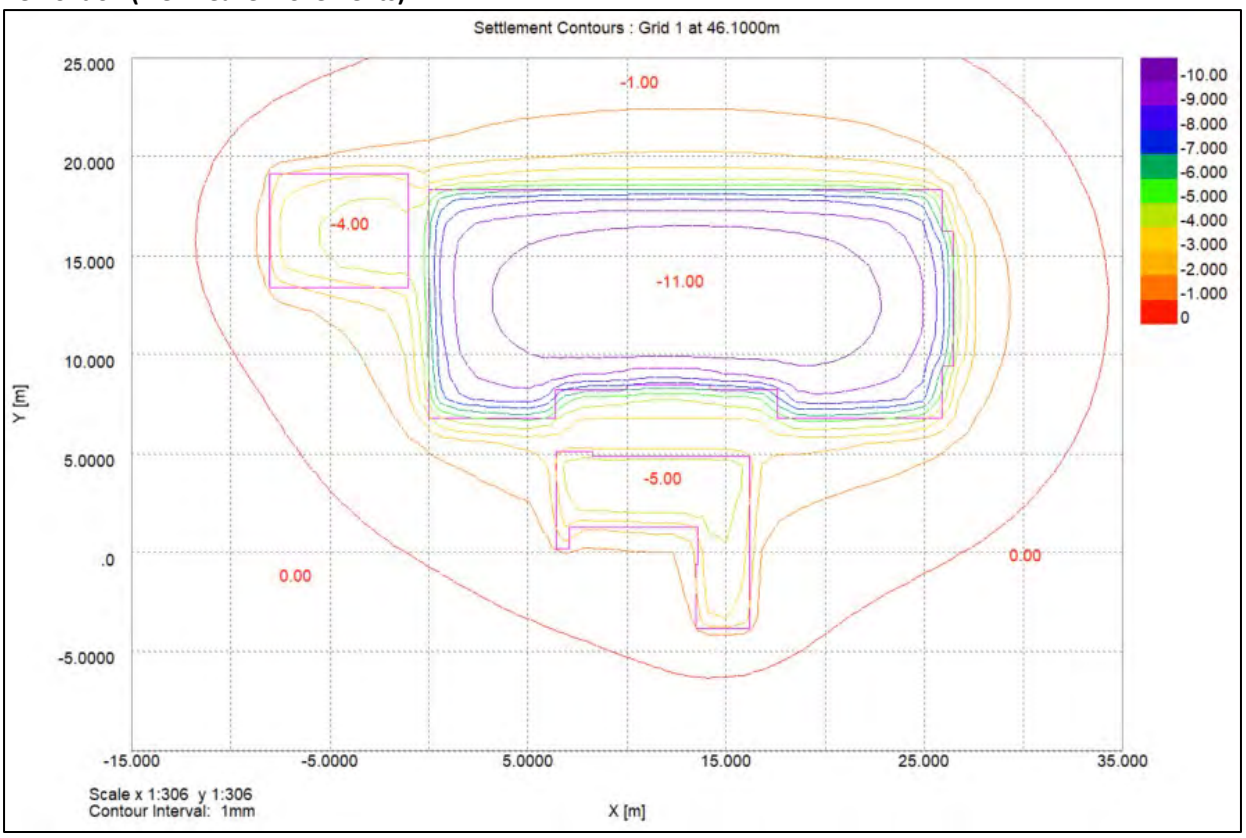
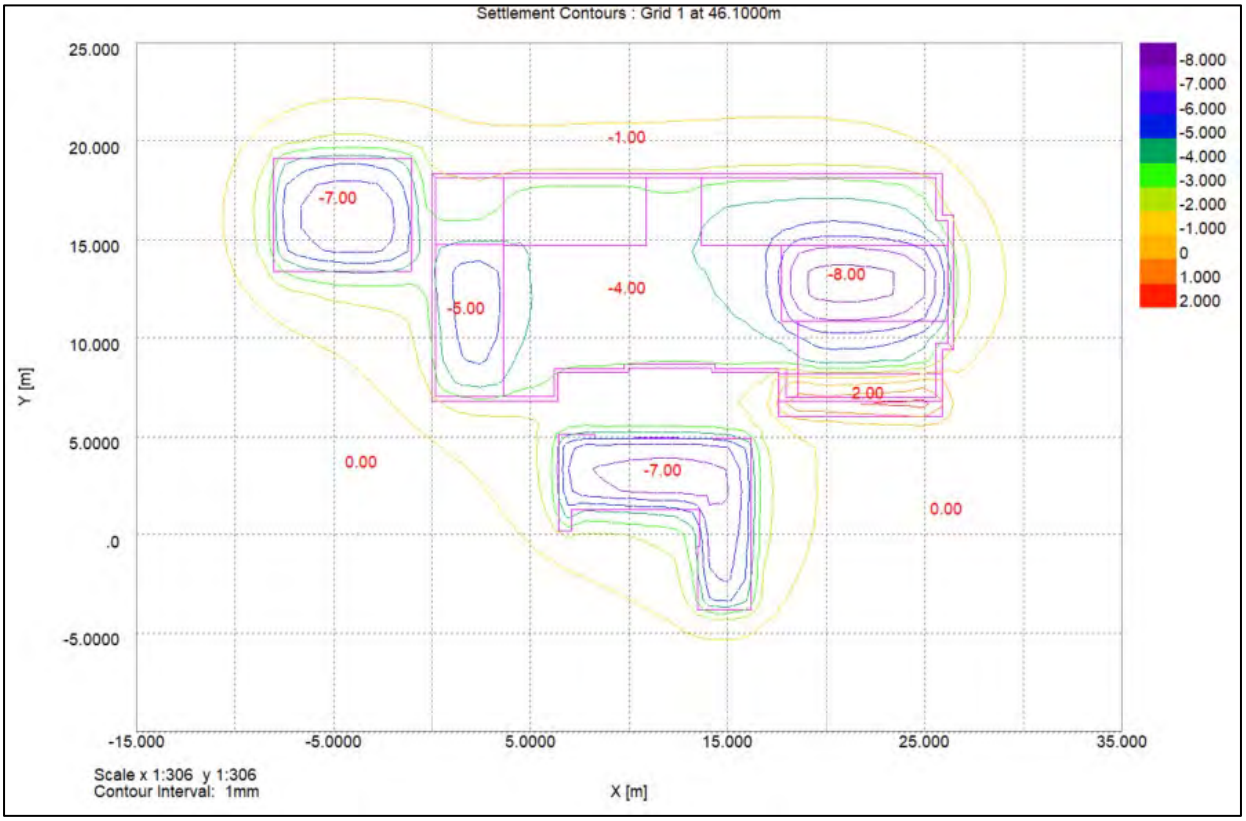


Plate 7. Contour Plot of Predicted Vertical Movements at Ground Level from Long Term Net Construction (-ve= heave movements)



The predicted short term excavation and long term net loading ground movements for the proposed development are presented in Table 15. The PDISP analysis output summary is provided in Appendix F and contour plots illustrating the vertical ground movements are presented in Figure 4. The vertical movements at 16 and 72 Kingsland are modelled at a level of 45.1mOD, and those at the critical Barrie House pad foundations (B and D) at a level of 43.7mOD.

Table 15. PDISP Predicted Vertical Movements Summary (-ve = heave).

Stage	*Maximum vertical movement at formation level (mm)*							
	Proposed Basement Heave	*Proposed Basement Settlement*	*72 Kingsland*	*16 Kingsland*	*Pad A*	*Pad B*	*Pad C*	*Pad D*
Excavation Short term	-11.2	0.0	0.0	0.2	-5.2	-5.3	-5.3	-3.9
Net Construction Long term	-8.2	2.4	-0.3	-0.1	-2.1	-2.5	-1.7	-6.4

The vertical movements from the demolition of the porters lodge at ground level (45mOD) are predicted to be a maximum of 6.3mm of heave in the long term. This is predicted to dissipate to less than 1mm at approximately 2.5m from the porters lodge. The movements due to the demolition are predicted to be negligible at the neighbouring properties, 16 and 72 Kingsland.

6.7.5 Cumulative Vertical Movements

The predicted cumulative vertical ground movements, following the excavation and the construction of the 4-storey building, are summarised in Table 16 below. These movements include the pile installation movements, the vertical movements generated behind the wall by the wall deflection (50% the maximum horizontal wall deflection predicted from WALLAP decreasing along a distance 4 times the wall length) and the movements predicted from PDISP. Conservatively the settlements generated from the wall deflection (50% WALLAP movements) have been ignored in the excavation stage. The differential movements across each of the pads are also presented.

Table 16. Summary of Cumulative Vertical Ground Movements at neighbouring critical assets foundation level (-ve = heave).

Property	*Approximate Distance from Contig. Piled Wall (m)*	*Cumulative Vertical Movements at Start and End of Neighbouring Foundations (mm) [Differential]*	
		Short Term Excavation	*Long Term Net Loading*
72 Kingsland	8.2 to 13.2	0.3 to 0.3 [0.0]	1.4 to 0.5 [0.9]
16 Kingsland	10.8 to 15.8	0.3 to 0.3 [0.0]	0.9 to 0.2 [0.7]
Pad A	0.25 to 2.25	-2.1 to 0.3 [2.4]	6.7 to 5.0 [1.7]
Pad B	0.25 to 2.75	-2.2 to 0.2 [2.4]	7.1 to 4.7 [2.4]
Pad C	0.25 to 2.25	-2.1 to 0.3 [2.4]	6.9 to 5.5 [1.4]
Pad D	6.6 to 8.6	-1.9 to -0.8 [1.1]	-1.5 to 1.6 [3.1]

The cumulative vertical movements at the closest neighbouring property of 72 Kingsland at their foundation formation level (anticipated to be 45.1mOD) are predicted to be a maximum of some 1.4mm in the long term.

The maximum cumulative vertical movement at the Barrie House pads is anticipated to be some 7.1mm at pad B in the long-term. The maximum differential movement between pads A/B or B/C is anticipated to be some 0.4mm. The maximum differential movement between pads B/D is anticipated to be some 8.6mm in the long term. The maximum differential vertical movement across a pad is 3.2mm across pad D in the long term, although it is noted that this is conservative as the stiffness of the pad has not been accounted for.

6.8 Impact Assessment

The cumulative total movements at the closest neighbouring properties of 16 and 72 Kingsland, as well as the structures on site due to the proposed basement development are assessed in the following sections. This report assesses the impact of the proposed new basement on the critical structures, however, does not extend to capture the cumulative effects of potential changes in ground level and/or reconfiguration works within or underlying the Barrie House building itself. If required, assessment of these works can be undertaken once details of sequencing, loading and temporary works are available.

The cumulative horizontal movements are based on the piled wall installation and excavation deflection movements only; and the cumulative vertical movements are calculated based on results from settlements due to the piled wall installation, settlements due to wall deflection during the excavation (50% of WALLAP movements as per CIRIA C760[20]), heave movements due to basement excavation and settlements due to long term construction loading. At 16 and 72 Kingsland, movements have been assessed at an assumed foundation formation level of 45.1mOD. At the existing Barrie House, movements have been assessed at the pad formation level of 43.7mOD.

6.8.1 16 and 72 Kingsland

The angular distortion, vertical deflection and horizontal strain have been calculated for 72 and 16 Kingsland assuming 5m widths of buildings at a founding level of 45.1mOD. The profiles of horizontal and vertical movements at each property are presented in Figure 5. The maximum horizontal strain and vertical deflection at the two properties are summarised in Table 17, below.

Table 17. Summary of Movements

Property	*Maximum Differential Settlement, D (mm)*	*Angular Distortion, D/L*	*Horizontal Strain (%)*	*Vertical Deflection (mm) [Deflection Ratio]*
72 Kingsland	0.9	1/5560	0.04	<0.5 [0.01]
16 Kingsland	0.6	1/7140	0.03	<0.5 [0.01]

As per Burland and Wroth[14], the assessment indicates that Damage Category 0 "negligible damage" is applicable for both 16 and 72 Kingsland, as presented within Figure 7. The predicted movements at the neighbouring properties are small and are likely to result in negligible damage. This is within the allowable limits specified within London Borough of Camden's basement planning guidance.

6.8.2 Existing Barrie House Building

The movements within each pad and the movements between adjacent pads are summarised below in Table 18 to Table 20. The angular distortions have been calculated based on the pad lengths / distances between pads indicated.

Table 18. Summary of Vertical Movements within Pads.

Pad	*Length (m)*	*Maximum Vertical Movement (mm)*	*Maximum Differential Vertical Movement across Pad (mm)*	*Angular Distortion within the Single Pad (2sf)*
Pad A	2.0	6.7	2.4	1/850
Pad B	2.5	7.1	2.4	1/1000
Pad C	2.0	6.9	2.4	1/820
Pad D	2.0	1.9	3.2	1/640

Table 19. Summary of Vertical Movements between Consecutives Pads.

Critical section	*Length, L (m)*	*Building Ratio, L/H*	*Maximum Differential Vertical Movement (mm)*	*Angular Distortion between Consecutive Pads (2sf)*
Pads A to B	3.5	0.1	0.4	1/8000
Pads B to C	3.5	0.1	0.4	1/13000
Pads B to D, closest to wall	6.5	0.2	8.6	1/750
Pads B to D, centreline	6.5	0.2	5.3	1/1200

Table 20. Summary of Horizontal Strain and Vertical Deflection between Pads B and D.

Critical section	*Length, L (m)*	*Height, H (m)*	*Building Ratio, L/H*	*Maximum Horizontal Strain (mm)*	*Maximum Vertical Deflection (mm)*	*Deflection Ratio*
Pads B to D	6.5	30	0.2	0.109	5	0.079

All maximum relative vertical movements within the pads are predicted to be in the short term following excavation of the basement.

All maximum relative deflections between pads are predicted to be in the long term following construction of the proposed building. The profiles of horizontal and vertical movements of pads B and D are presented in Figure 6.

Assuming the Barrie House building is a framed structure, sagging ratio (angular distortion x 1000), angular distortion and maximum settlement have been used to predict the building damage categories as presented in Table 21 to Table 23, below. The sagging ratios as per Burland and Wroth[14] are presented in Figure 8.

Table 21. Building Damage Assessment[14] – Sagging Ratio between Pads.

Pad	*Sagging Ratio*	*Damage Category as per Burland and Wroth[14]*
Pads A to B	0.1	'No damage'
Pads B to C	0.1	'No damage'
Pads B to D*	0.8	'No damage'

* centre of pads considered.

Table 22. Building Damage Assessment[18] – Angular Distortion between and within Pads.

*Pad**	*Angular Distortion (2sf)*	*Damage Category as per Skempton and MacDonald[18]*
Pad A	1/850	'Negligible structural damage'
Pad B	1/1000	'Negligible structural damage'
Pad C	1/820	'Negligible structural damage'
Pad D	1/640	'Negligible structural damage'
Pads A to B	1/13000	'Negligible structural damage'
Pads B to C	1/750	'Negligible structural damage'
Pads B to D	1/1200	'Negligible structural damage'

* Angular distortion of single pads are conservative as they have been calculated ignoring the stiffness of the pad itself. Therefore, actual movements are expected to be lower.

Table 23. Building Damage Assessment[19] – Maximum Settlement and Angular Distortion between Pads.

Pad	*Maximum Cumulative Settlement / Differential Settlement (mm)*	*Angular Distortion (2sf)*	*Damage Category as per Rankin[19]*
Pads A to B	0.4	1/8000	Category 1 – 'Negligible'
Pads B to C	0.3	1/13000	Category 1 – 'Negligible'
Pads B to D	8.6	1/1750	Category 1 – 'Negligible'

Based on the different damage criteria used[14,18,19], the damage to the existing Barrie House building is predicted to be negligible to light /slight. In addition, the stiffness of each pad has not been considered as part of this assessment and therefore actual movements are expected to be lower than predicted. Therefore, the movements are anticipated to fall into allowable limits, however monitoring is recommended as outlined in Section 6.9, below. In addition to this, the direct impact of potential reconfiguration works or changes in ground levels around the Barrie House pads has not been considered and falls outside the remit of this report. Once information detailing sequencing, loading and temporary works are available, a separate assessment of this can be undertaken.

6.9 Recommendations

A construction monitoring scheme will be required to demonstrate that movements are within those predicted by the CGL analysis. A monitoring action and contingency plan[23] has been completed, agreeing targets, methods used, frequency and trigger limits prior to construction.

It is recommended that a condition survey is undertaken on all adjacent walls and property facades prior to the works commencing and ideally when monitoring baseline values are established. Existing cracks or structural defects should be carefully recorded, documented and regularly inspected as construction progresses.

It is recommended that an assessment of the impacts of potential changes in ground level or reconfiguration works under the existing Barrie House building and adjacent to the pad foundations is undertaken once sequencing, loading and temporary works information is available.

[23] CGL. (November 2022). *Broxwood View Limited. Barrie House, 29 St. Edmunds Terrace, London. Monitoring Movement and Contingency Plan – Revision 1.* CG/28408B.

7. NON-TECHNICAL SUMMARY

7.1 Conclusions

The results of this Basement Impact Assessment are informed by previous site investigations[2,3], an interpretative report completed by CGL[4], and provides an update to the previous BIA[5]. The analysis is also informed by drawings and loadings provided by the structural engineer and is undertaken on the assumption of high quality workmanship during the construction of the basement.

- The ground conditions on site comprise a thin layer of Made Ground over Head / Weathered London Clay and subsequently the Weathered London Clay Formation.
- The proposed development is understood to comprise excavation of a basement adjacent to the north of the existing Barrie House building on site, in the location of the existing car park; excavation of a basement under the existing Barrie House building footprint; and construction of a 4-storey residential building.
- The construction of the basement will generate ground movements due to a variety of causes including vertical and horizontal movements due to the secant and contiguous piled wall installation, the wall deflection during the excavation, heave movements due to basement excavation and settlements due to long term construction loading. The nearest neighbouring structure is 72 Kingsland, approximately 8.2m north from the proposed development.
- As outlined within the pile design provided by DFS[9], the contiguous piled wall adjacent to the Barrie House pad foundations has been modelled with 600mm diameter piles at 700mm spacing, with a toe level of 28.6mOD. Adjacent to the neighbouring properties the secant piled wall has been modelled with piles of 450mm diameter at 630mm spacing and a pile toe level of 36.6mOD.
- A temporary prop stiffness of 80,000kN/m/m has been assumed for both the high and low level propping and therefore temporary works would need to be designed to account for this minimum stiffness.
- The movements due to installation of the secant piled wall are anticipated to dissipate to less than 1mm at a distance of 3m from the piled wall and as such will not significantly impact the neighbouring structures and roadways.

- At 72 Kingsland, maximum cumulative vertical movements are predicted to be 1.4mm, with predicted angular distortions of 1/5560. The maximum horizontal strain and deflection ratio of 0.04 and 0.01 have been computed, which corresponds to damage category 0, or 'negligible'[17].

- At 16 Kingsland, maximum cumulative vertical movements are predicted to be 0.7mm, with predicted angular distortions of 1/7140. The maximum horizontal strain and deflection ratio of 0.03 and 0.01 have been computed, which corresponds to damage category 0, or 'negligible'[17].

- The basement development will cause ground movements at the existing pad foundations of the Barrie House building on site.

- Sagging ratios between consecutive pads are predicted to be a maximum of 0.8, indicating 'no damage' as per Burland and Wroth[14].

- All angular distortions between pads and within pads are anticipated to be over 1/500 (between 1/640 and 1/13000) and as such fall into the category of 'negligible structural damage' as per Skempton and MacDonald[18].

- Angular distortions over 1/500 and maximum differential settlements under 10mm are predicted between pads A/B and B/C, indicate damage category 1 'negligible' as per Rankin[19].

- It is noted that the stiffness of the pads itself has not been included in the analysis as the movements have been extracted in greenfield condition, therefore the differential movements within the pad and their respective angular distortion and damage categories are anticipated to be lower than calculated.

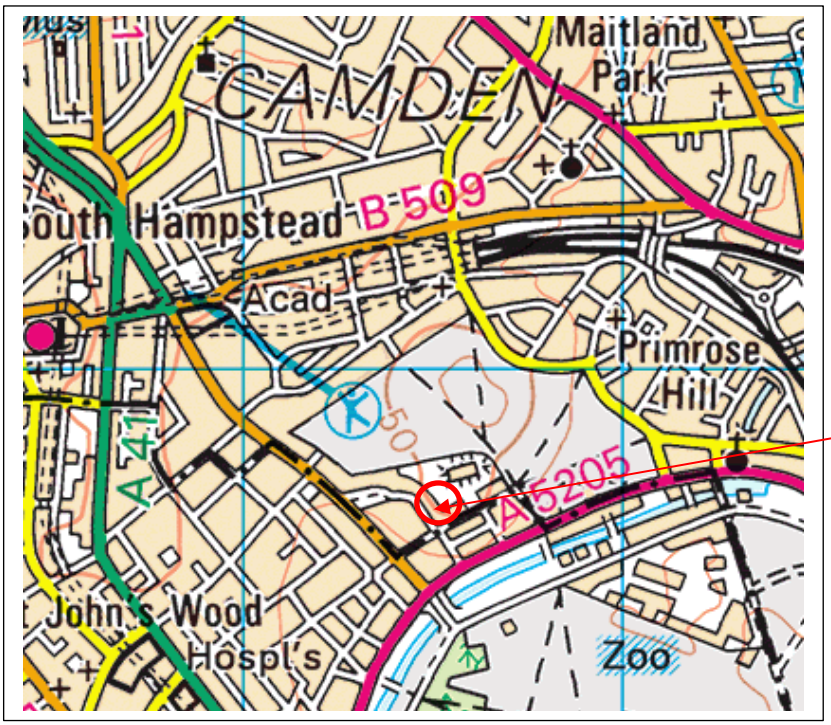
- As requested by the Client, the analysis of the wall deflection in WALLAP has been conservatively undertaken considering an additional surcharge of 50kPa at the existing Barrie House pad foundation in the long term condition (only after the permanent basement raft, liner wall and ground floor are constructed) due to possible future development. It needs to be noted, however, that even in the existing condition, the Barrie House foundation are highly stressed with bearing pressure close to the ULS limits. Therefore, if additional surcharge load is going to be included on the existing Barrie House structure, further analysis would need to be undertaken in order to verify the capacity of the existing foundation.

- In addition to this, it is understood that there are proposed changes in ground levels or reconfiguration works under the existing Barrie House building adjacent to the pad foundations.

Assessment of the impact of these works is outside the remit of this report, and should be undertaken once sequencing, loading and temporary works information is available.

- A monitoring action and contingency plan has been completed for the site[23], agreeing targets, methods and trigger limits appropriate for the development. A condition survey of neighbouring properties should also be undertaken prior to construction.

FIGURES



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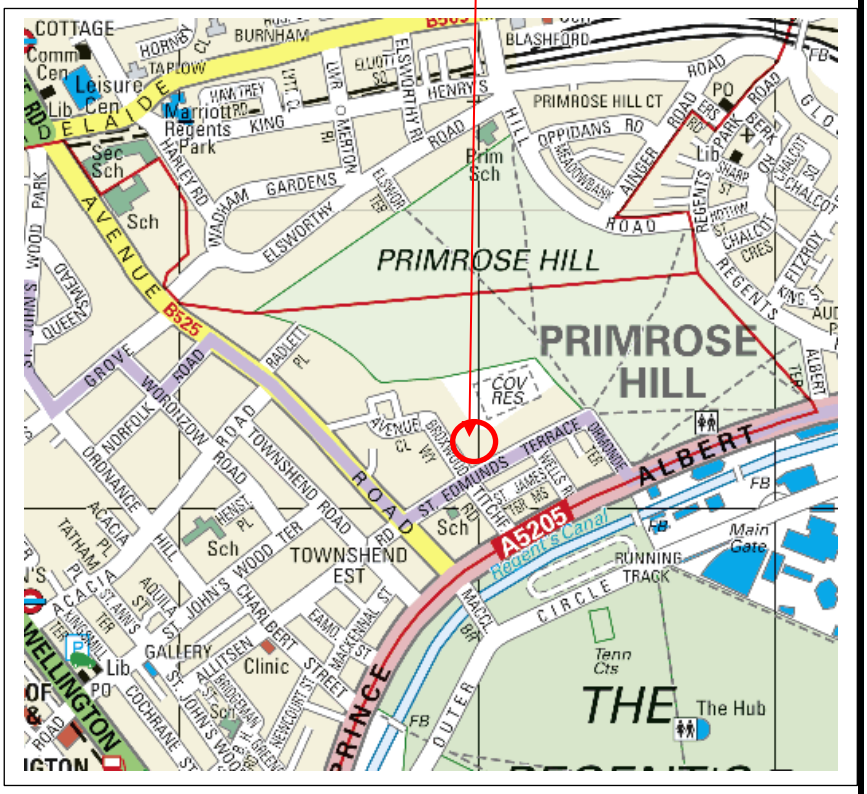
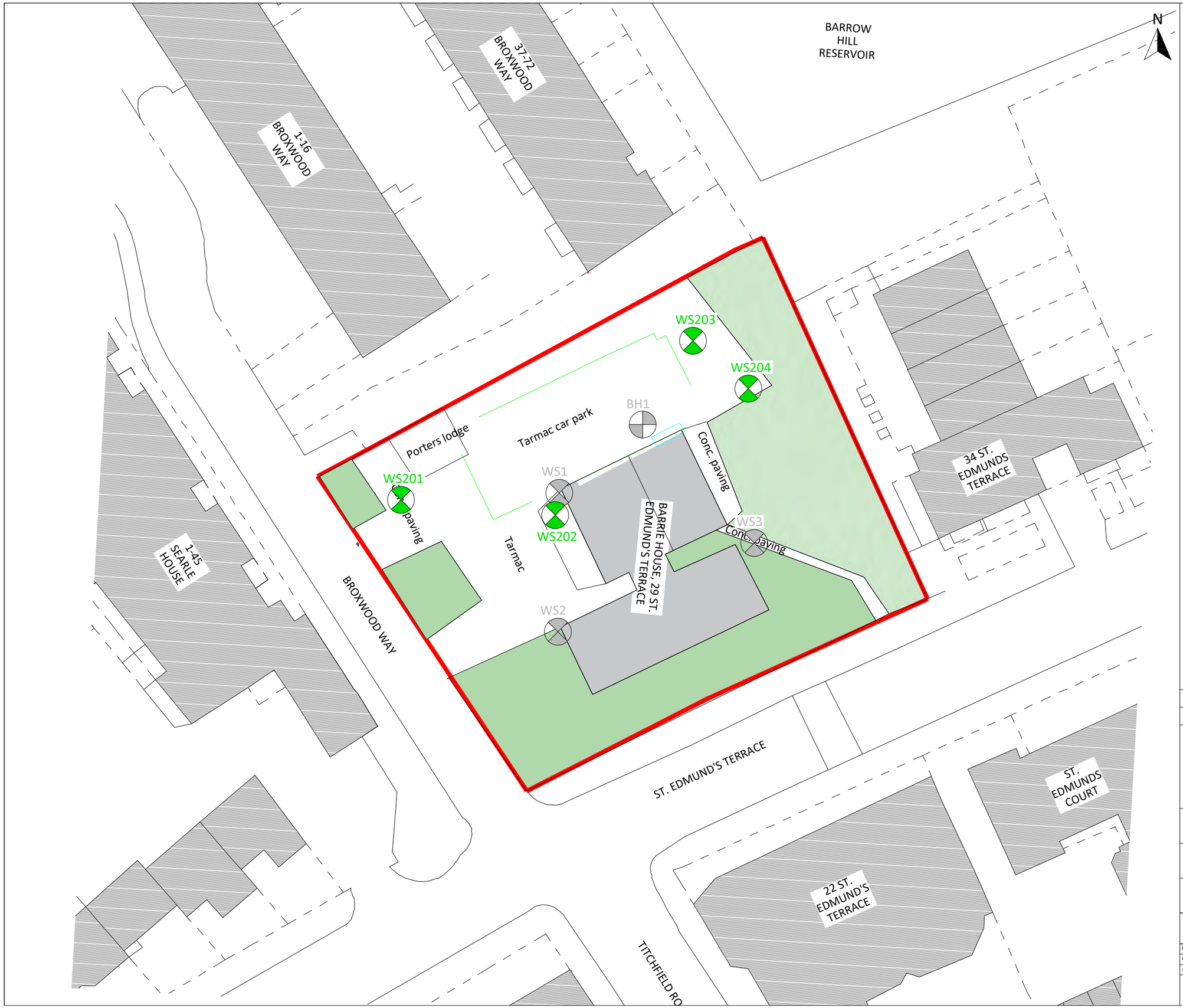
Site location: Barrie House, NW8 7QH



Client	Project	Job No
Broxwood View Limited	**Barrie House, 29 St Edmunds Terrace, London**	**CG/28408B**
CGL	Title: **Site Location Plan**	**Figure 1**



KEY

- Site Boundary
- CGL Window Sampler Boreholes (2022)
- Soil Consultants Window Samples (2012)
- Soil Consultants Boreholes (2012)

Notes

1. Site Layout Plan taken from CGL Drawing "CG/28408 Site Layout_1".

Rev	Date	Comments
0	26/05/2022	

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4 Godalming Business Centre
Woolsack Way
Godalming
Surrey
GU7 1XW
T: 01483 310600

Project	**Barrie House, 29 St Edmunds Terrace, London**
Client	**Broxwood View Limited**
Drawing title	**Figure 2 - Site Layout and Proposed Exploratory Hole Location Plan**
Scale(s)	**NTS**
Job No.	**CG/28408B**

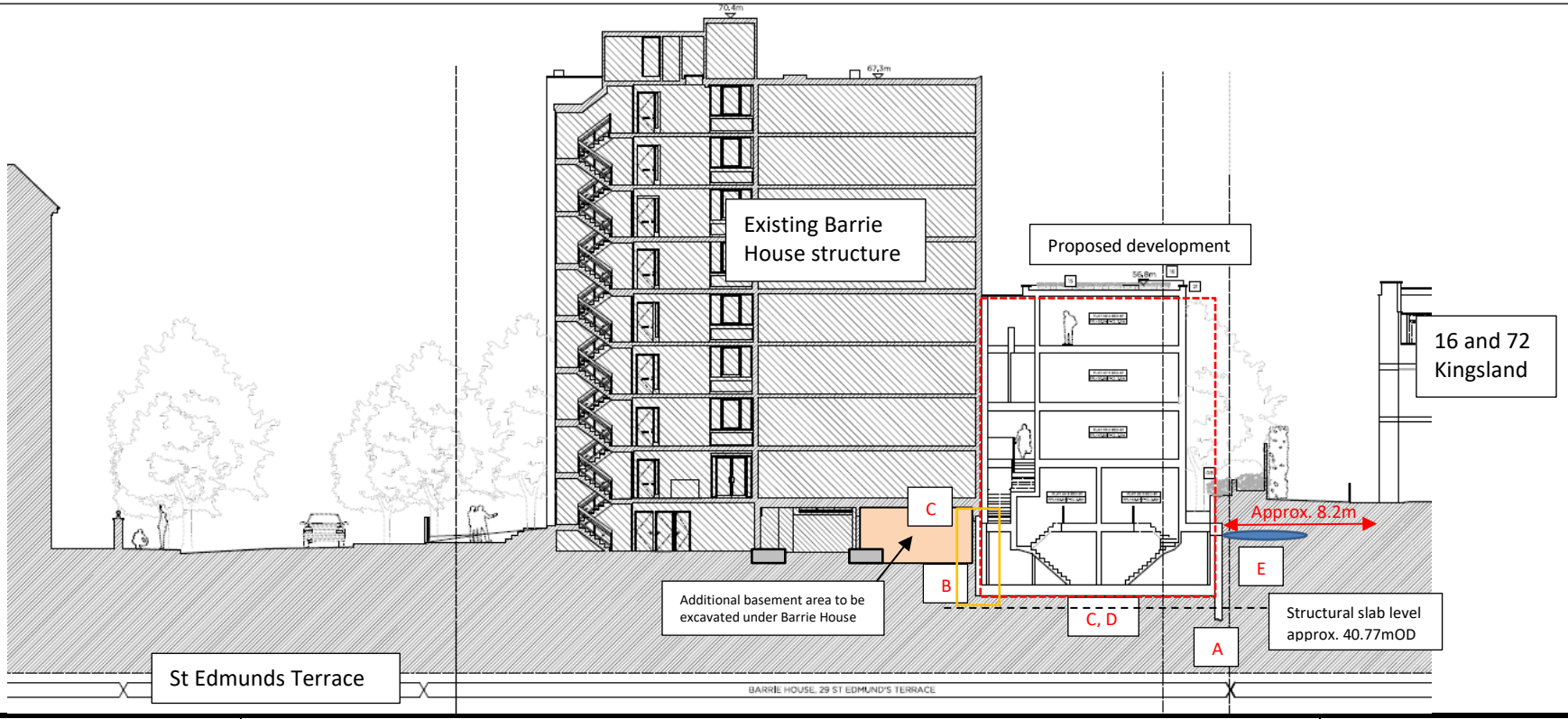
Drawn	OCR	26/05/2022	Dwg No. **CG/28408B-001**	Rev. **0**
Checked	ARA	21/06/2022		
Approved	NJL	22/06/2022		

Potential source of ground movement:

A. Secant and contiguous pile wall installation and deflection during excavation
B. Possible settlement due to underpinning of existing Barrie House structure
C. Possible short and long term heave due to unloading of London Clay Formation
D. Possible settlement due to building loads of the proposed development

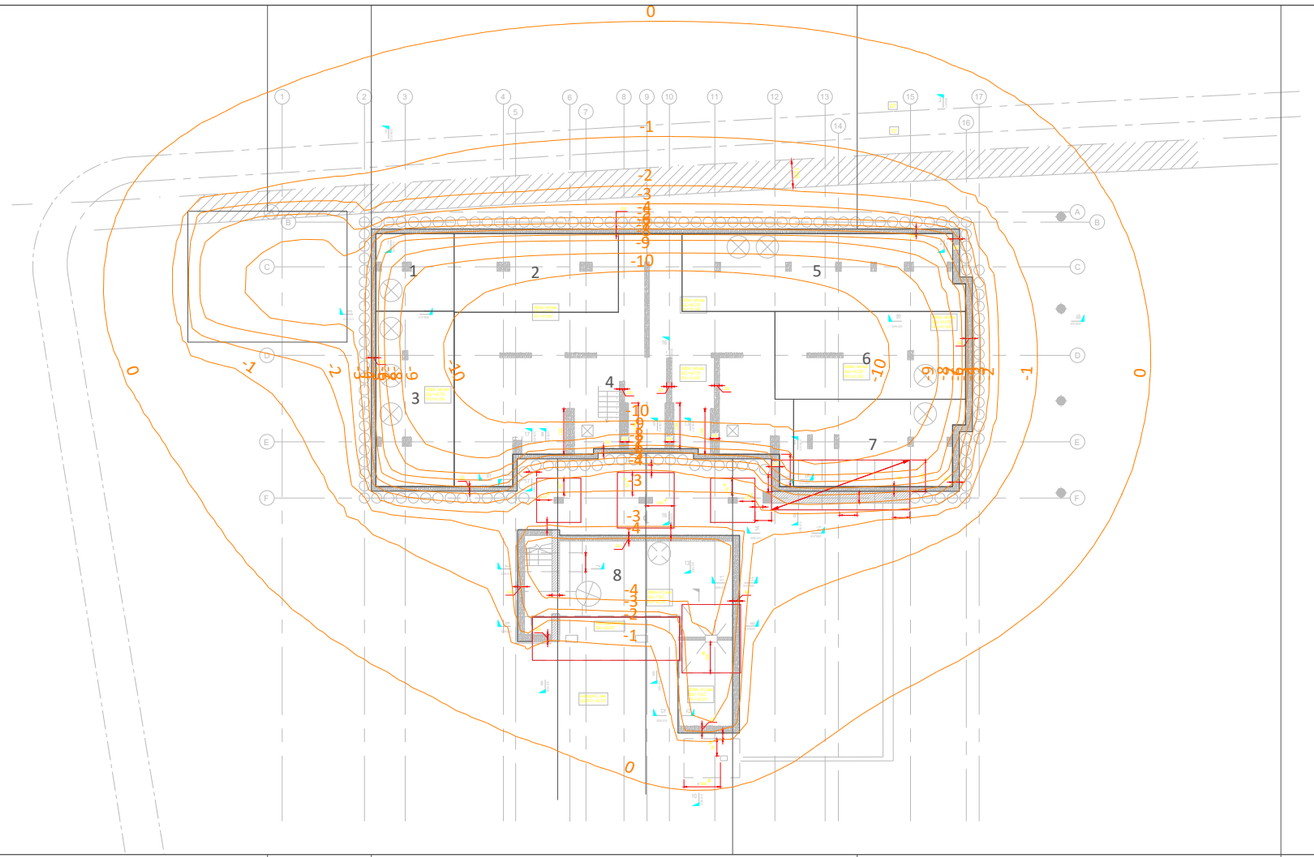
Groundwater:

E. Groundwater present on site within the London Clay Formation - the groundwater is located within a relatively impermeable soil and if groundwater is encountered during the excavation of the lower ground floor ingress is expected to be slow and manageable.

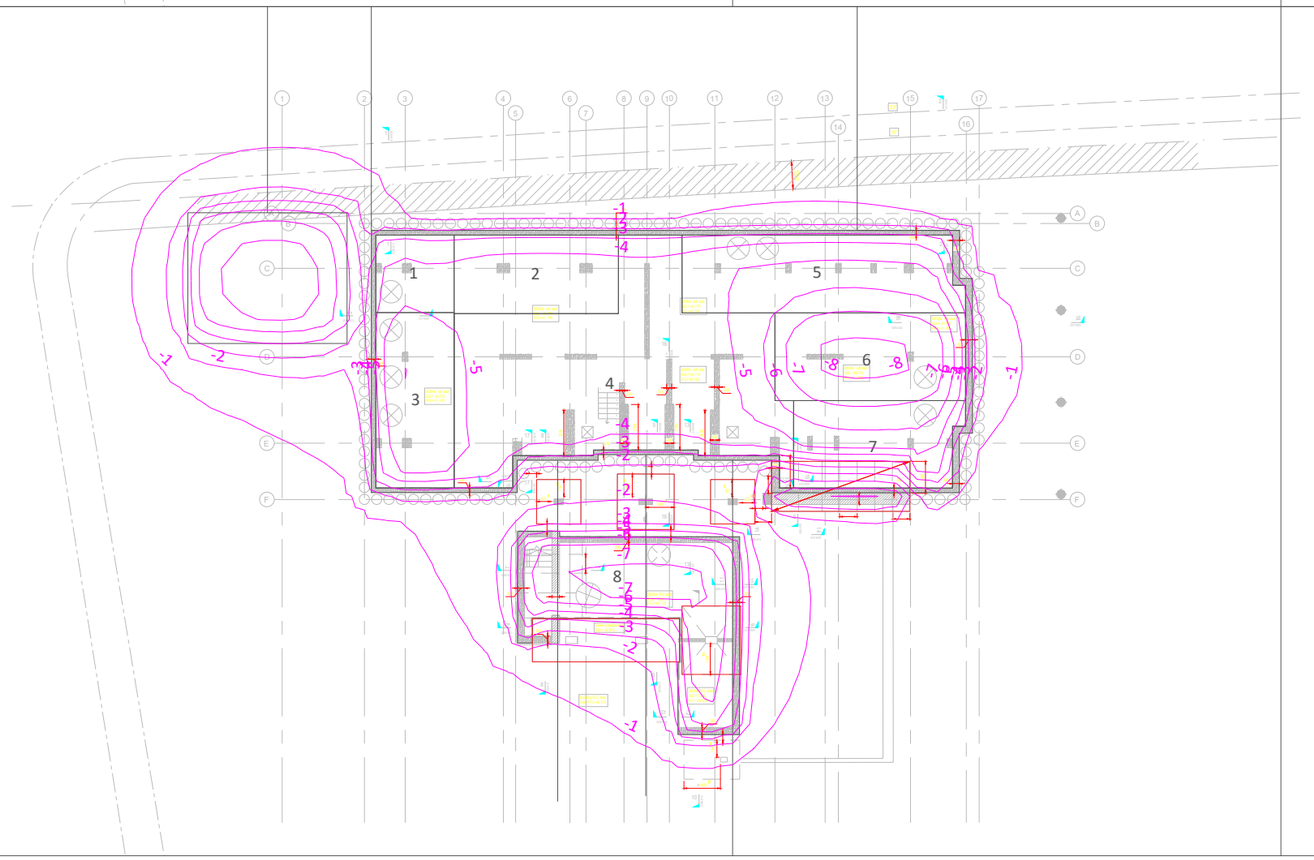


Client	Project	Job No
Broxwood View Limited	**Barrie House, 29 St Edmunds Terrace, London**	**CG/28408B**
CGL	Title: **Conceptual Site Model**	**Figure 3**

SHORT TERM



LONG TERM



N

KEY

Notes

1. Do not scale from this drawing.
2. Base plan taken from 'Proposed Basement Floor' drawing, ref '5295-S02B' & '5295-S03' (05/08/2022).

Rev	Date	Comments
0	17/03/2023	

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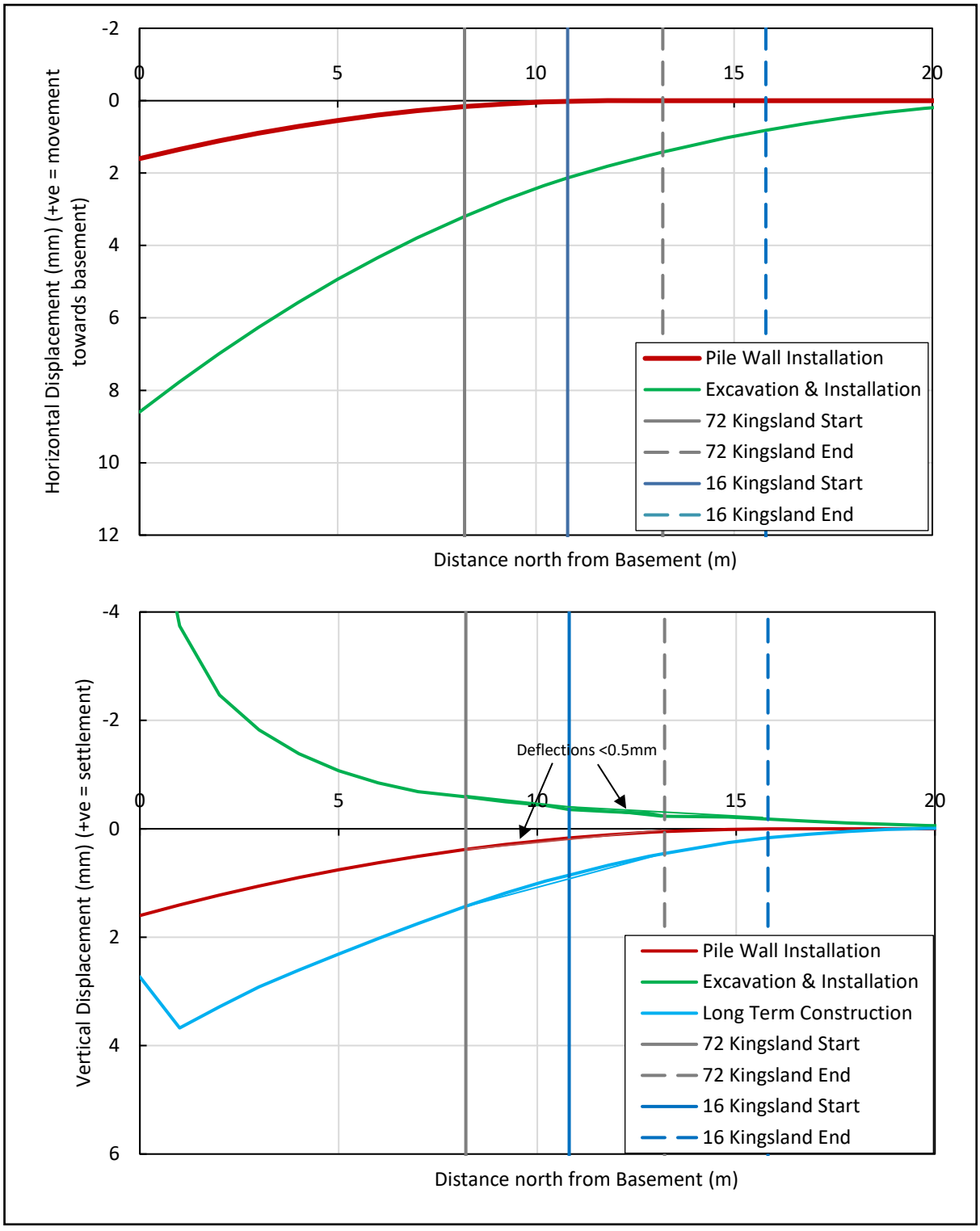
Project: **Barrie House, 29 St Edmunds Terrace, London**

Client: **Broxwood View Limited**

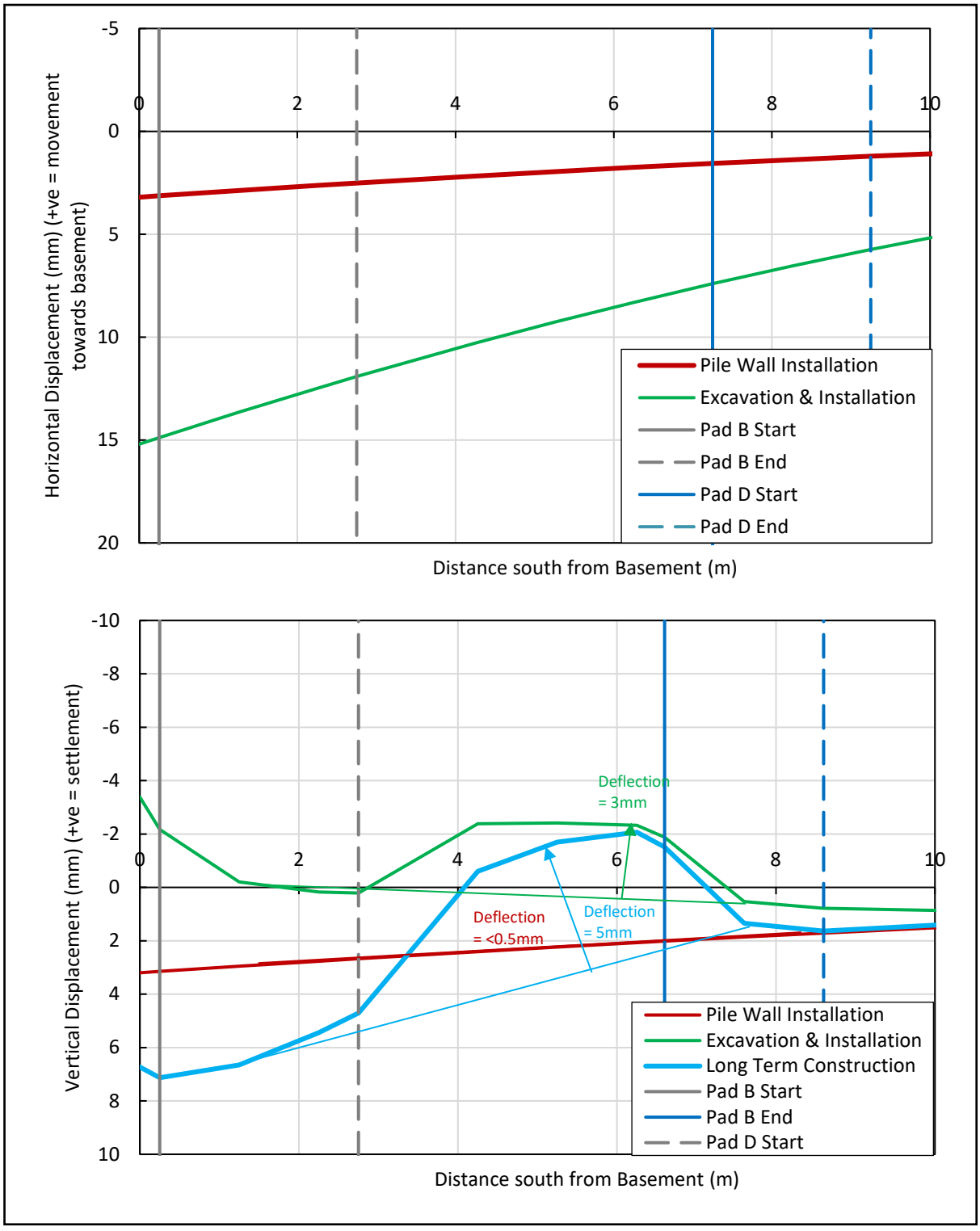
Drawing title: **Figure 4- Predicted Vertical Movements**

Scale(s)	Job No.
NTS	**CG/28408B**

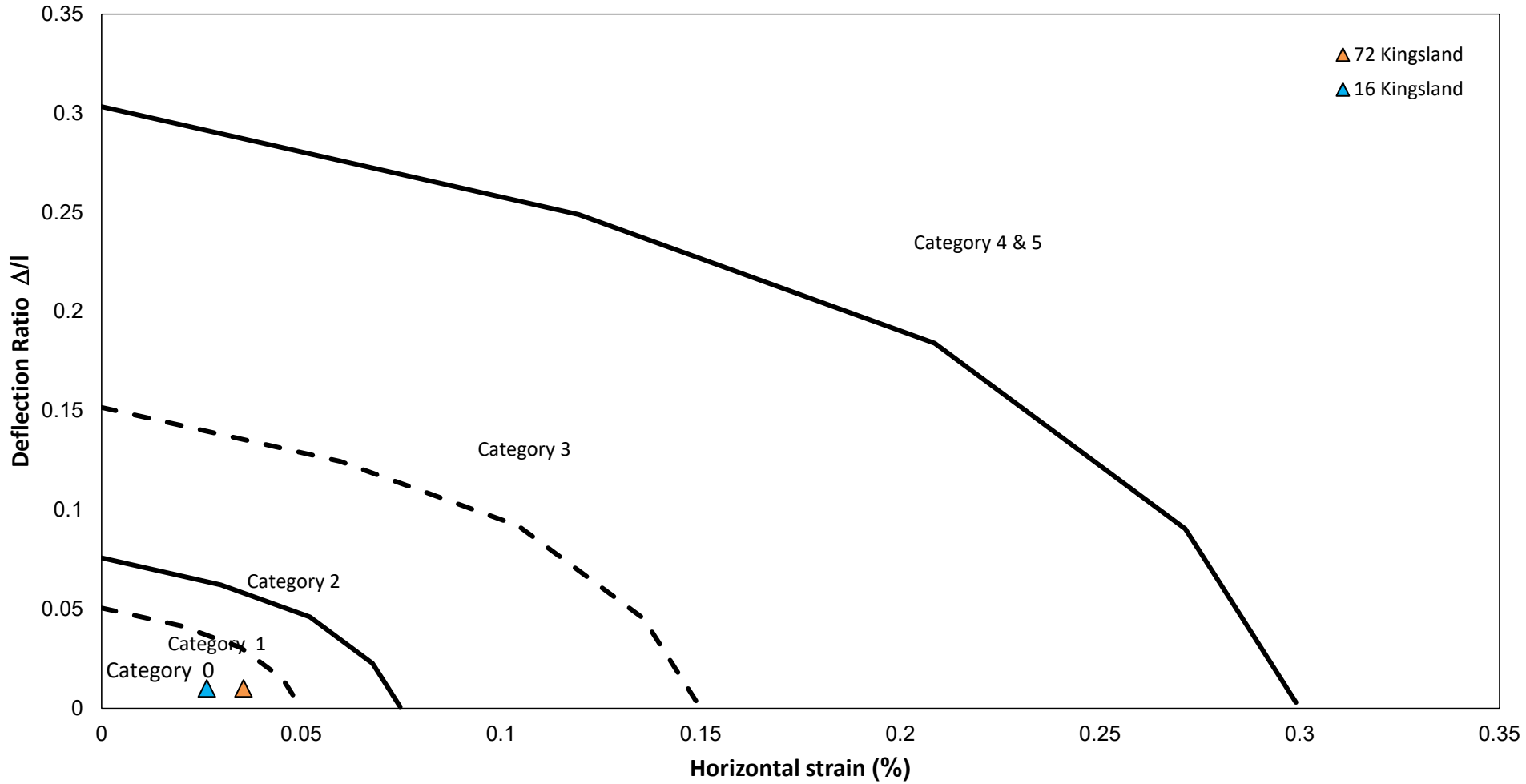
			Dwg No.	Rev.
Drawn	OCR	17/03/2023	**CG/28408B-001**	**0**
Checked	ALP	17/03/2023		
Approved	ANG	17/03/2023		



Client	Project	Job No
Broxwood View Limited	**Barrie House, 29 St Edmunds Terrace, London**	**CG/28408B**
CGL	Title: **Horizontal and Vertical Movements at 16 and 72 Kingsland**	**Figure 5**

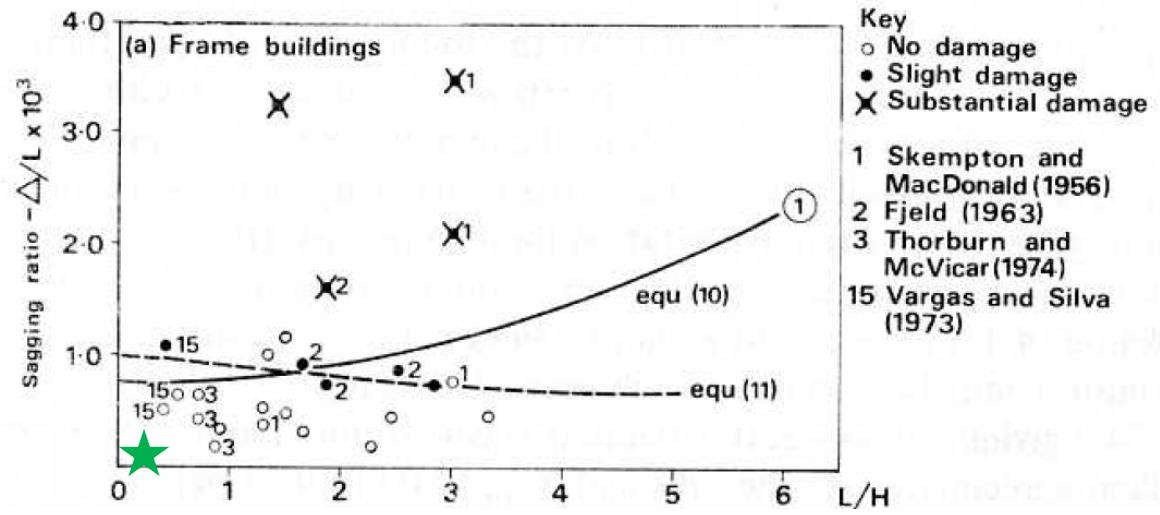


Client	Project	Job No
Broxwood View Limited	**Barrie House, 29 St Edmunds Terrace, London**	**CG/28408B**
CGL	Title: **Horizontal and Vertical Movements at Barrie House**	**Figure 6**

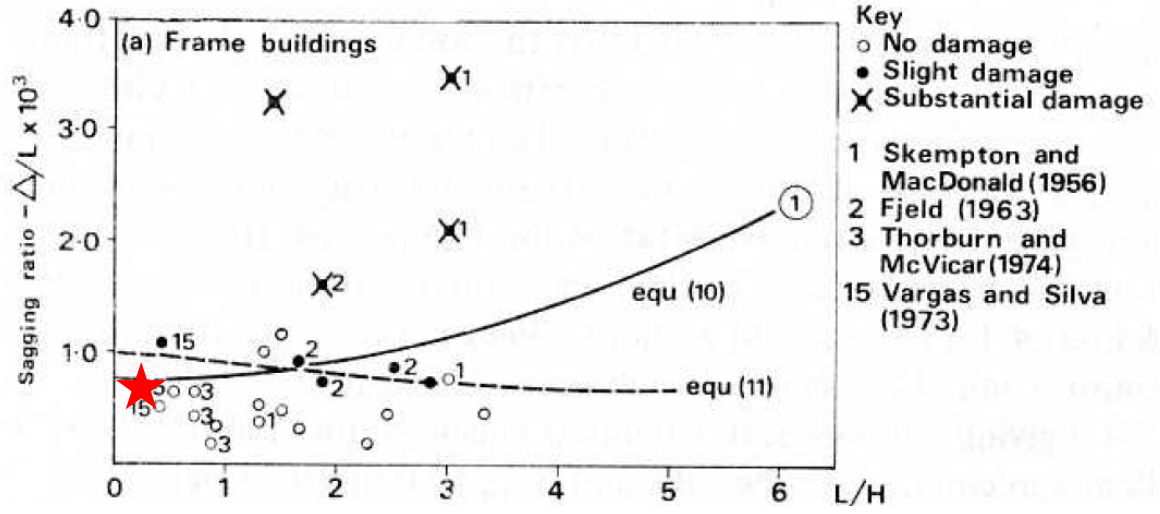


Client	Project	Job No
Broxwood View Limited	**Barrie House, 29 St Edmunds Terrace, London**	**CG/28408B**
CGL	Title **Building Damage Assessment – Neighbouring Properties**	**Figure 7**

Pads A to B / B to C ★



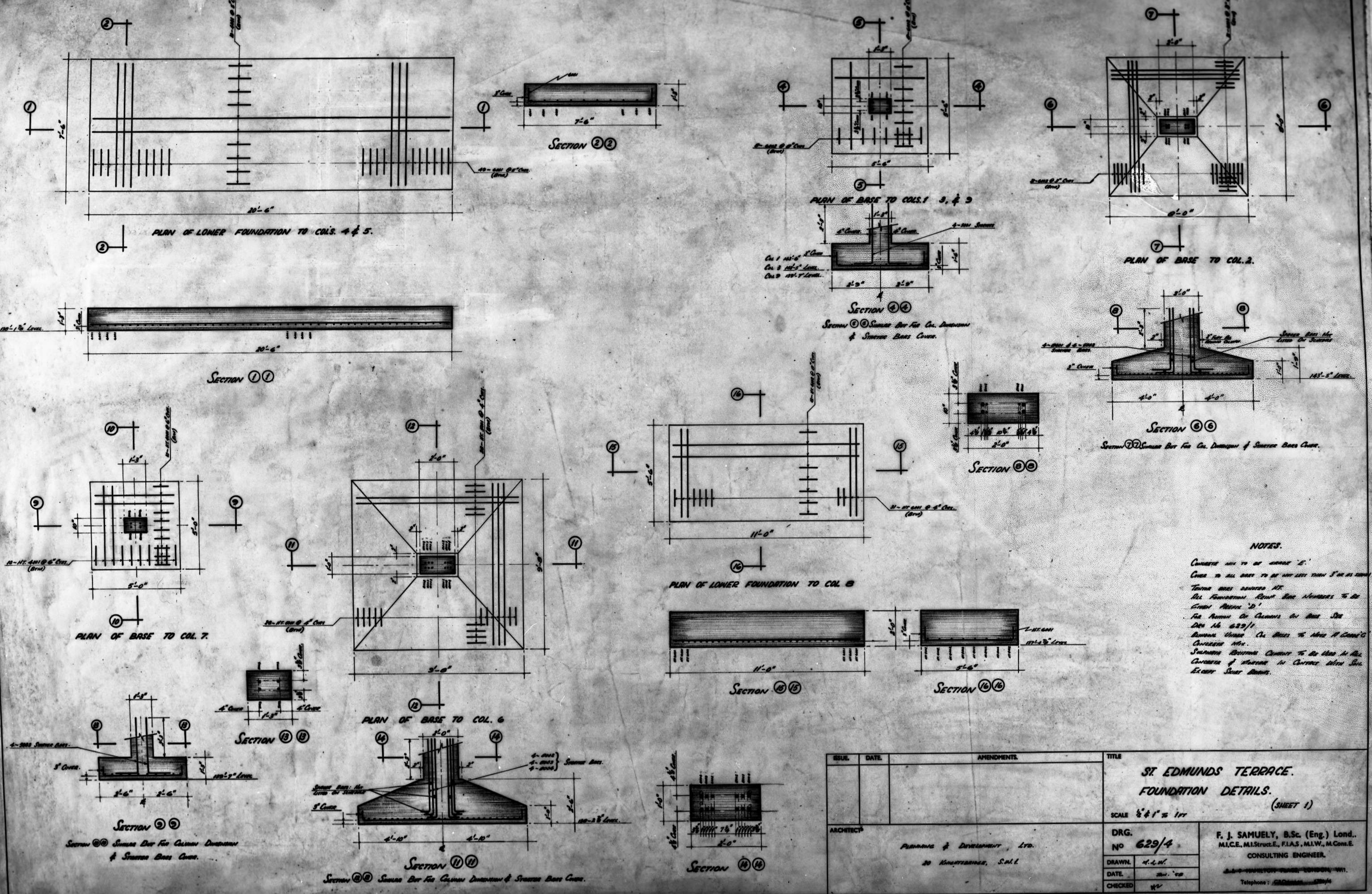
Pads B to D ★



Client	Project	Job No
Broxwood View Limited	**Barrie House, 29 St Edmunds Terrace, London**	**CG/28408B**
CGL	Title: **Building Damage Assessment – Barrie House Pad Foundations**	**Figure 8**

APPENDIX A

Historical Structural Drawings



NOTES.

Concrete mix to be grade 'E'.
Cover to all bars to be not less than 3" or as shown
Tentor bars denoted HT.
All Foundation Reinf Bar Numbers to be Given Prefix 'D'
For Position of Columns on Base See Drg No 629/1
Blinding Under Col Bases to have A Grade 'C' Concrete Mix.
Sulphate Resisting Cement to be Used in All Concrete & Mortar in Contact With Soil Except Skirt Beams.

ISSUE.	DATE.	AMENDMENTS.

TITLE

ST. EDMUNDS TERRACE.
FOUNDATION DETAILS.
(SHEET 1)

SCALE ½" & 1" to 1FT

ARCHITECTS

Planning & Development, Ltd.
20 Knightsbridge, S.W.1.

DRG. No 629/4

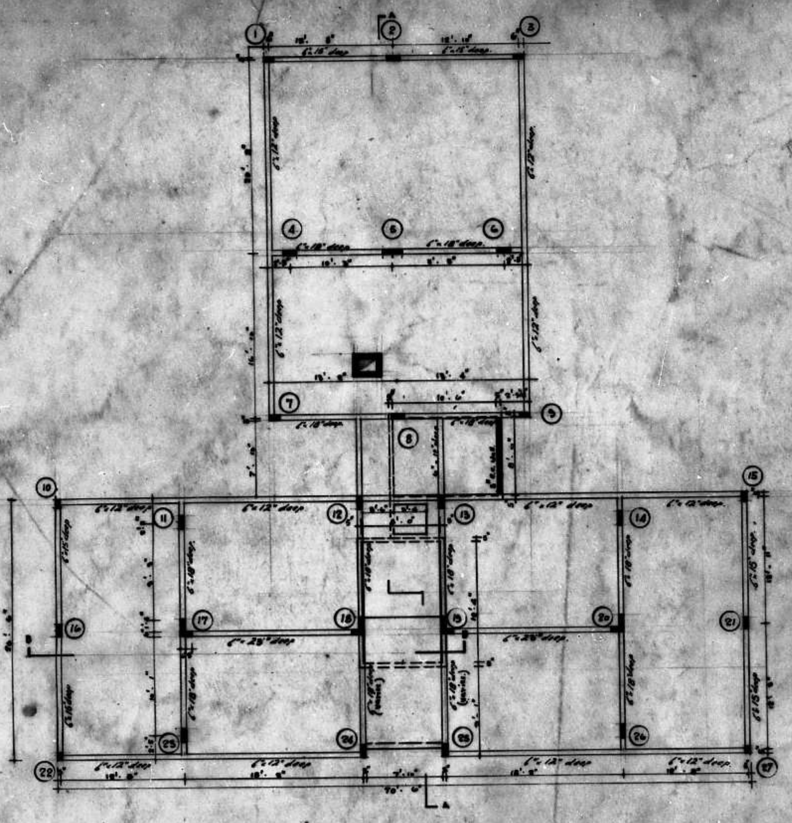
DRAWN. M.L.W.
DATE. JAN. '58
CHECKED KV

F. J. SAMUELY, B.Sc. (Eng.) Lond..
M.I.C.E., M.I.Struct.E., F.I.A.S., M.I.W., M.Cons.E.
CONSULTING ENGINEER.
~~HAMILTON PLACE, LONDON, W1.~~
Telephone :

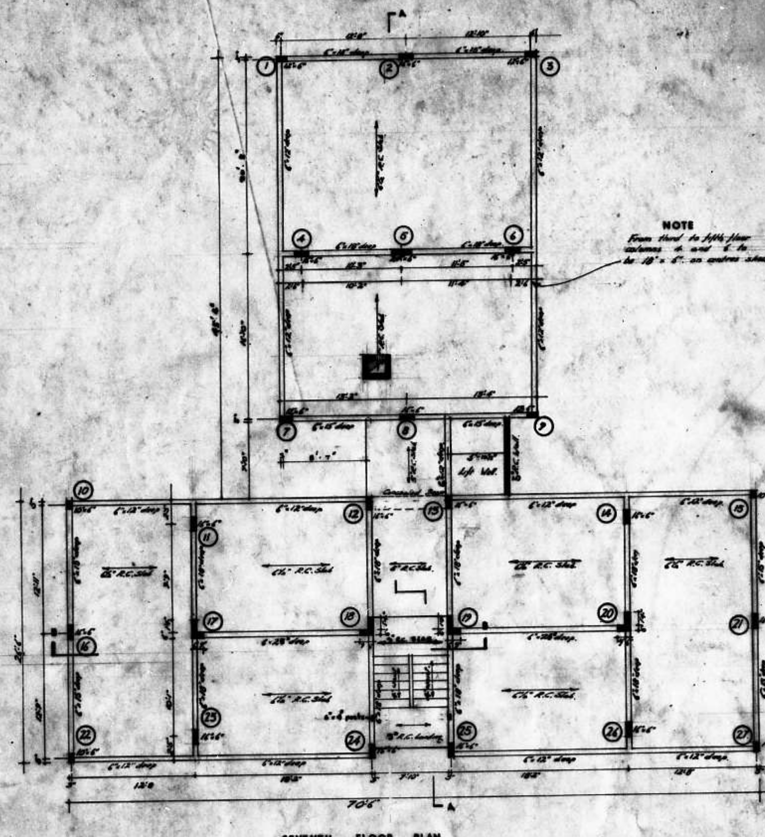
NOTES:-

CONCRETE MIXES:-

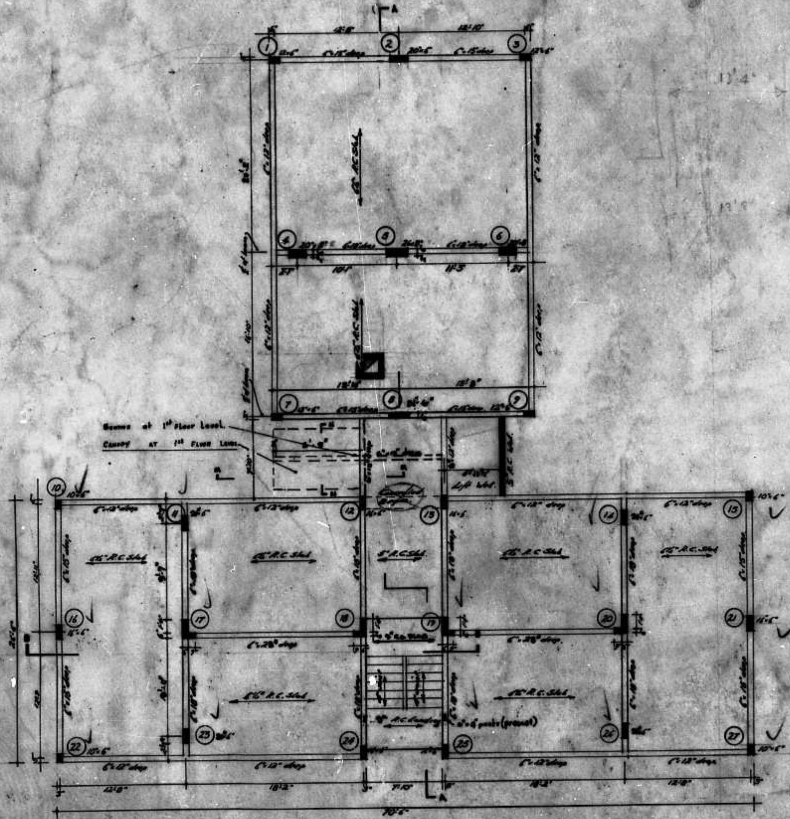
GRADE "A" CONCRETE TO BE USED IN ALL COLUMNS, AND ALL CROSS BEAMS. *Grade above 4th flr.*
6" COLUMNS TO HAVE LIMESTONE AS AGGREGATE.
GRADE "B" CONCRETE TO BE USED IN ALL LONGITUDINAL EDGE BEAMS.
GRADE "C" CONCRETE TO BE USED IN ALL SLABS AND STAIRCASES;
IN BASEMENT WALL AND FLOOR "C.W." TO BE USED.
GRADE "E" CONCRETE TO BE USED IN ALL COLUMN FOOTINGS.
GRADE "F" CONCRETE TO BE USED FOR BLINDING CONCRETE UNDER BASEMENT.
GRADE "G" CONCRETE TO BE USED FOR BLINDING CONCRETE TO FOOTINGS.
SULPHATE RESISTING CEMENT TO BE USED IN ALL CONCRETE AND MORTAR IN CONTACT WITH THE SOIL, EXCEPT SKIRT BEAMS.
IN ALL 6" WIDE COLUMNS EITHER LIMESTONE AGGREGATE OR ¼" MESH TO BE USED AS SPECIFIED.



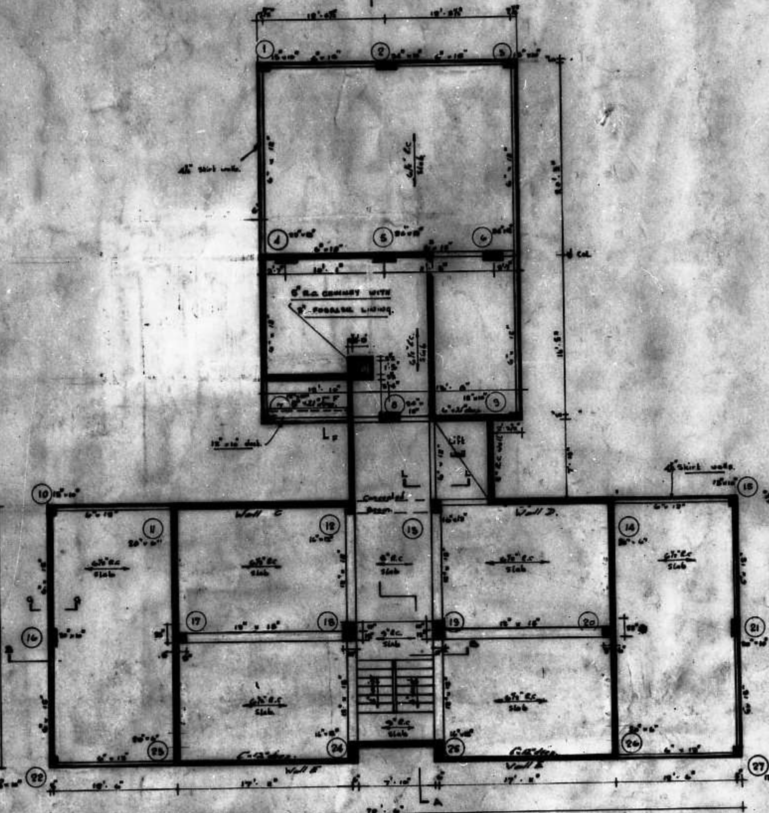
ROOF PLAN



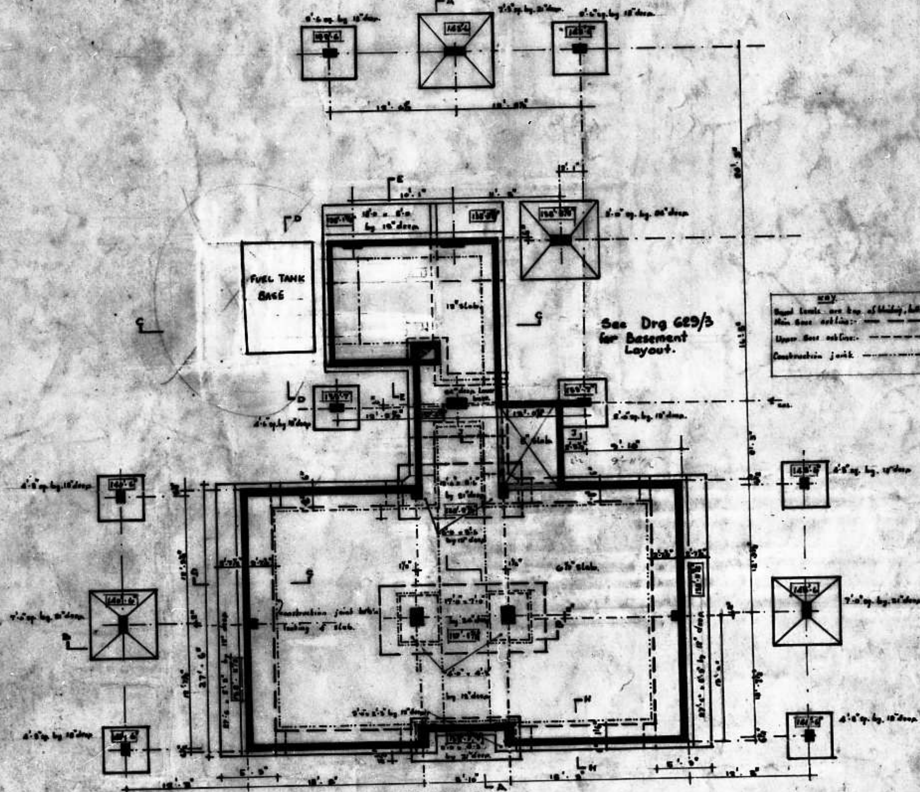
SEVENTH FLOOR PLAN
SIXTH TO THIRD FLOORS SIMILAR



SECOND FLOOR PLAN
FIRST SIMILAR



GROUND FLOOR PLAN



FOUNDATION PLAN

ISSUE	DATE	AMENDMENTS
A	21 Aug 57.	*Floor plan revised.*
B	OCT. 1957.	VARIOUS AMENDMENTS.
C	OCT. 1957	VARIOUS MINOR AMENDMENTS, BASEMENT & FOUNDATION ADDED
D	NOV. 1957.	MINOR ALTERATIONS AND ADDITIONS.
E	NOV. 1957.	SETTING OUT ; & GR. AND COL. SIZES ALTERED.
F	Mar 58	*Beam 7-8-9 at ground floor level amended.*
G	APR. 58	FUEL HOPPER REMOVED.

TITLE

29 ST EDMUNDS TERRACE N.W.8.

FLOOR PLANS FOUNDATION PLAN

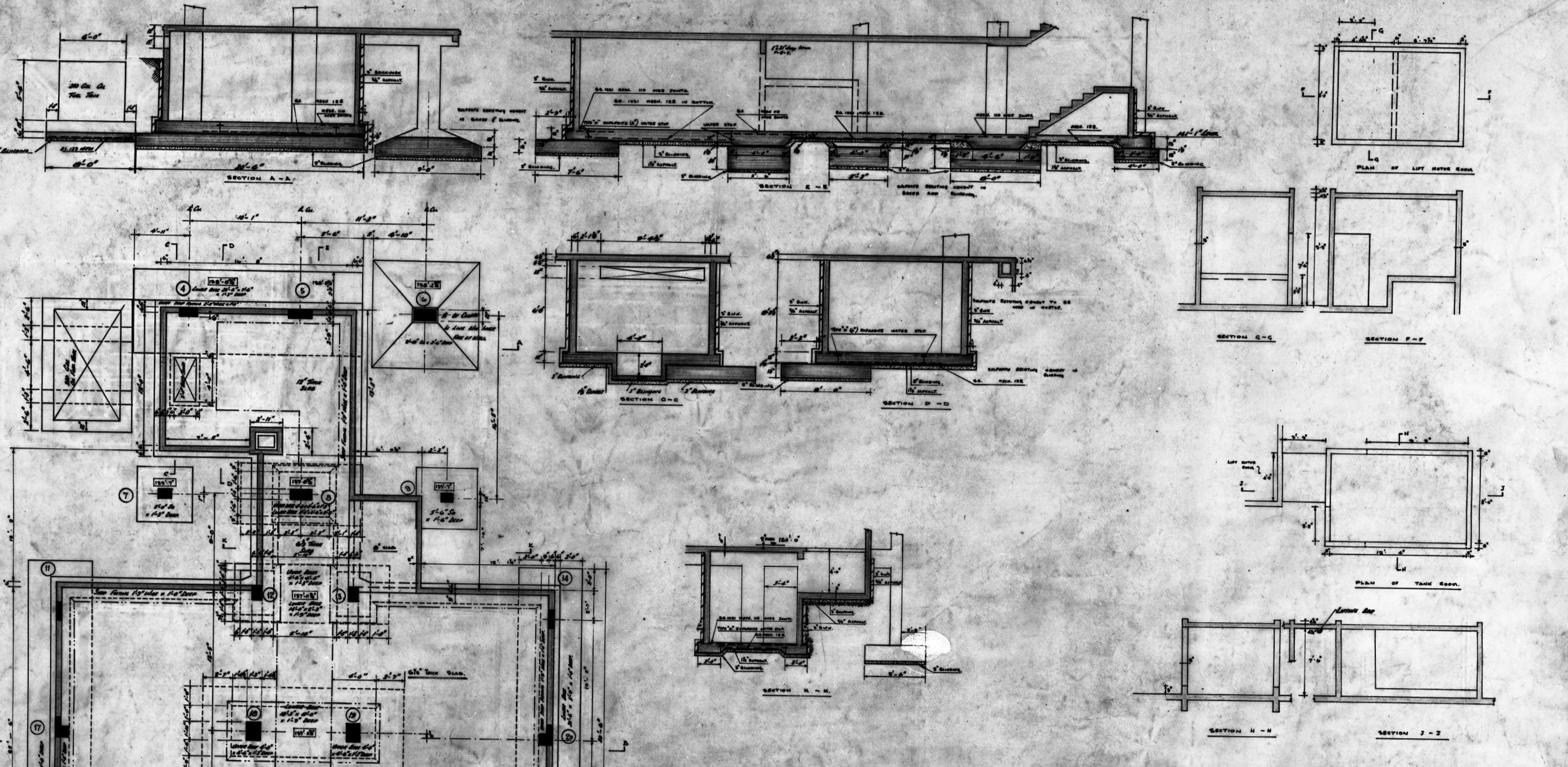
SCALE 1/8" TO 1' 0"

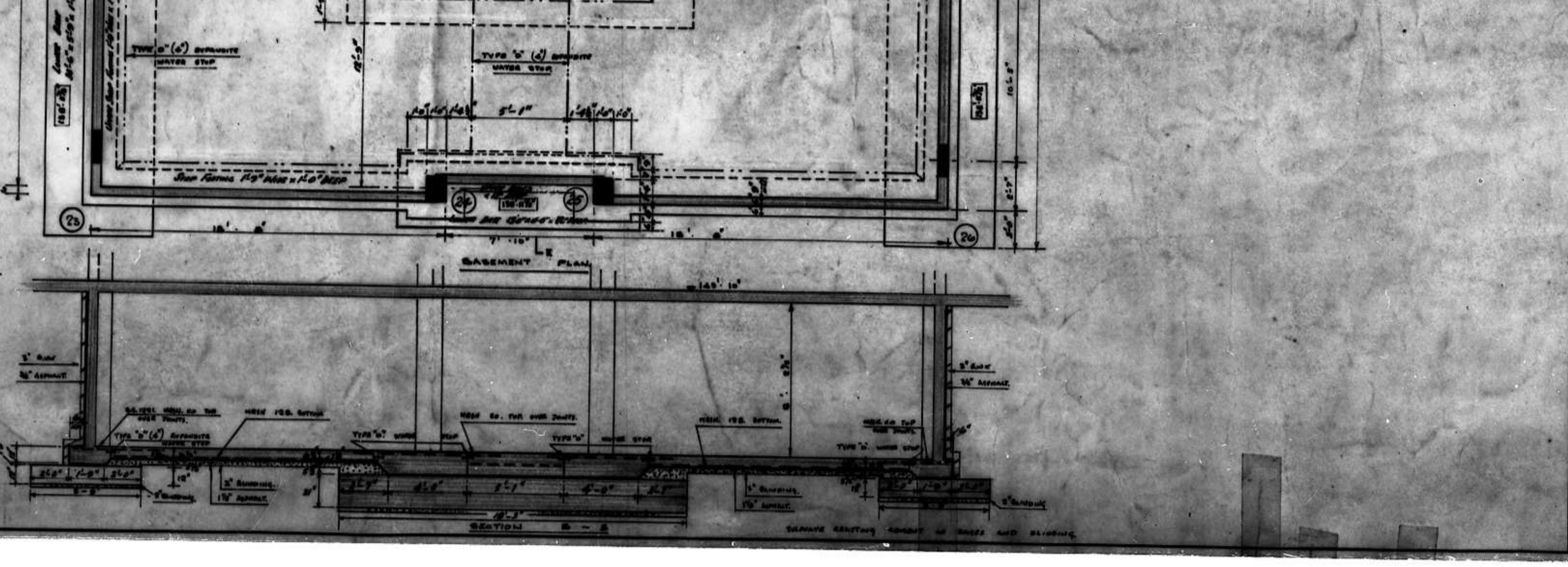
ARCHITECT
PLANNING & DEVELOPMENT LTD
20 KNIGHTSBRIDGE S.W.1.

DRG. No 629/1g

DRAWN	R.S.L.R. & T.T.L.
DATE	AUGUST 57.
CHECKED	P

F. J. SAMUELY, B.Sc. (Eng.) Lond.,
M.I.C.E., M.I.Struct.E., F.I.A.S., M.I.W., M.Cons.E.
CONSULTING ENGINEER.
~~8-&-9~~ ~~HAMILTON~~ PLACE, LONDON, W1.
Telephone: ~~GROsvenor 6701/4.~~





NOTES :-

(i) SULPHATE RESISTING CEMENT TO BE USED IN ALL CONCRETES AND MORTAR IN CONTACT WITH THE SOIL, EXCEPT SKIRT BEAMS. WATERPROOF CONCRETE (GRADE Q.W.) TO BE USED IN BASEMENT WALLS AND FLOOR.

(ii) GROUND PRESSURES:- BASEMENT LEVEL. 2½ TONS / SQ. FT.
3'6 BELOW GRD. LEVEL 2 TONS / SQ. FT.

(iii) PRESSURE ON ASPHALT : 8 TONS / SQ. FT.

iv. DIMENSION SHOWN IN BOX REPRESENTS LEVEL OF TOP OF BLINDING AND BOTTOM OF BASE.

ISSUE	DATE	AMENDMENTS
A	Oct. 1957.	MINOR AMENDMENTS.
B	FEB 1958	COLUMN BASES & WALL FOOTINGS ALTERED.
C	MARCH 1958	BASE FROM ALTERED AND COLUMN BASES & WALL FOOTINGS AMENDED.
D	APRIL '58	SETTING OUT DIMENSIONS CHECKED & CORRECTED.

TITLE
29, ST EDMUNDS TERRACE N. W. 8.
BASEMENT, LIFT MOTOR ROOM & TANK ROOM

SCALE 1/4" = 1'. 0"

ARCHITECT
PLANNING & DEVELOPMENT LTD.
20, KNIGHTSBRIDGE. S.W.1

DRG. No 629 / 3D

DRAWN [illegible]
DATE 24. 10. 57.
CHECKED [illegible]

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APPENDIX B

Proposed Development Plans and Loads

Richard Tant Associates

Consulting Civil & Structural Engineers
54 Lisson Street
London NW1 5DF
Tel: - 0207 724 1002
Fax- 0207 224 8883
e-mail:- info@richardtantassociates.com

Schedule Register & Issue Sheet

Project: Broxwood View - Barrie House
Job No.: 5295
Project Engineer: RT

Sheet No 1

Drawing Title	Dwg no.	Size	Issue/revision																			
Trial Hole Locations	5295-SK01	A1	✔		A																	
Pile Section - Step back	5295-SK02	A3				✔																
Trial Hole Information 1	5295-SK08	A1																				
Trial Hole Information 2	5295-SK09	A1																				
Notes	5295-S01	A1		✔					A	B	C	C	D	E		F	G	H		J	K		K
Proposed Basement Floor, Sheet 1/2	5295-S02	A1							✔	A	B	B	B	C	D			E	F	G	H		H
Proposed Basement Floor, Sheet 2/2	5295-S03	A1									✔	✔	✔	A									A
Proposed Ground Floor, Sheet 1/2	5295-S04	A1									✔	✔	✔	A	B					C	D		D
Proposed Ground Floor, Sheet 2/2	5295-S05	A1									✔	✔	✔	A									A
Section 1-1	5295-S10	A1		✔					A			B	B	C	D					E			E
Section 2-2	5295-S11	A1		✔					A			B	B	C	D					E			E
Sections 3-3 & 4-4	5295-S12	A1							✔			A	A	B	C					D			D
Section 5-5	5295-S13	A1							✔	A		B	B	C	D				E	F	G		G
Sections 6-6 & 7-7	5295-S14	A1							✔	A		B	B	C	D								D
Sections 8-8 & 9-9	5295-S15	A1							✔	A		B	B	C					D	E	F		F
Sections 10-10, 11-11 & 12-12	5295-S16	A1							✔	A		B	B	C									C
Section 13-13	5295-S17	A1							✔	A		B	B	C						D	E		E
Section 14-14	5295-S18	A1							✔	A		B	B	C					D				D
Section 15-15	5295-S19	A1								✔		A	A	B	C				D	E	F		F
Section 16-16	5295-S20	A1										✔	✔	A					B	C	D		D
Section 17-17	5295-S21	A1										✔	✔	A						B	C		C
Section 18-18	5295-S22	A1										✔	✔	A	B					C			C
Section 19-19	5295-S23	A1										✔	✔	A					B	C	D		D
Section 20-20	5295-S24	A1													✔					A	B		B
Section 21-21 & 22-22	5295-S25	A1													✔					A			A
Loading Plan - Basement	5295-S50	A1									✔	A	A									B	
Temporary Paladin Storage - Plan	5295-S101	A1					✔																
Temporary Paladin Storage - Structural Details 1	5295-S102	A1					✔																
Temporary Paladin Storage - Structural Details 2	5295-S103	A1					✔																
Suggested Method of Works 1	5295-SM01	A1											✔										
Suggested Method of Works 2	5295-SM02	A1											✔										
Suggested Method of Works 3	5295-SM03	A1											✔										
Suggested Method of Works 4	5295-SM04	A1											✔										
Suggested Method of Works 5	5295-SM05	A1											✔										
Suggested Method of Works 6	5295-SM06	A1											✔										
Suggested Method of Works 7	5295-SM07	A1											✔										
Suggested Method of Works 8	5295-SM08	A1											✔										
Movement Monitoring	5295-MM01	A1											✔										
		Day	12	22	6	9	13	10	17	1	27	5	15	7	27	4	6	20	1	21	23	3	15
		Month	4	4	5	5	5	6	6	7	7	8	8	9	9	10	10	1	2	2	2	3	3
		Year	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	23	23	23	23	23	23

Distribution.(No. of copies, N=negative, X=issue sheet only, F=fax, D=disc, E=Email)

Andrea Carbogno, Carbogno Ceneda Architects	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E		E
Ben Rogers, Carbogno Ceneda Architects	E	E	E		E	E	E	E	E				E	E	E						
Carlos Foyedo, Carbogno Ceneda Architects	E	E	E		E	E	E	E	E				E	E	E						
Anna Prescott, CGL									E	E	E	E	E			E		E	E		
Client																E					
Nick Langdon, CGL									E				E								
Party Wall Surveyor																	E				
Roy Pentley																					E
Peter, Monalco																					E
Authorised for issue(initial)	RT	RT	RT	RT	RT	RT	RT	RT	RT	RT	RT	RT	RT	RT	RT	RT	RT	RT	RT	RT	RT
Purpose of issue	Preliminary	Preliminary	Preliminary	Preliminary	Preliminary	Preliminary	Preliminary	Preliminary	Preliminary	Preliminary	Preliminary	Tender	Tender	Tender	Tender	Construction	Construction	Construction	Construction	Construction	Construction

GENERAL NOTES

1. This drawing is to be read in conjunction with all relevant Engineers and Architects drawings and specification that should be used to verify layout, setting out, finishes etc. Any discrepancies are to be brought to the attention of the Architect and Structural Engineer prior to construction.
2. Work to figured dimensions only. All dimensions are in millimetres unless noted otherwise.
3. Do not scale from the drawings.
4. The Contractor is to inform the Architect and Structural Engineer if the existing fabric, including foundations, is opened up and found to be inadequate, unsuitable to support the proposed works, or at variance from the details shown on the drawings.
5. The Contractor should note that he is fully responsible for undertaking surveys of the existing building to ensure existing building elements as shown on the drawings are accurate.
6. Items noted on the drawings "to be confirmed on site" are to be exposed by the Contractor for inspection by the Structural Engineer at the earliest opportunity.
7. Do not cut any holes or chases through any structural members without first obtaining the written consent of the Structural Engineer. For Contractor designed elements that require cast-in fixings R.T.A. to be informed prior to reinforcement order.
8. Refer to Architect's drawings for:
a. Site, building and setting out grids.
b. Details of all rebates, arises, chamfers, cast in fixings etc.
c. Details of all damp proofing, insulation and sealants.
d. Location and details of required surface finishes.
9. Refer to services drawings for the following information:
a. Drainage layouts and details and levels.
b. Builders work details.
c. Service pit requirements.
10. Contractor to inform R.T.A. prior to reinforcement order of any Contractor designed elements that require cast-in fixings into structure designed by R.T.A.
11. Slip membrane shall be minimum 250um polythene U.N.O.

CONCRETE

1. Concrete in contact with ground to be DS4-FND4**-C32/40 - minimum cement content of 400 kg/m³ and maximum water/cement ratio of 0.40. Else DS1-FND2-C32/40 in accordance with BS8500. Minimum cement content of 340 kg/m³ and maximum water/cement ratio of 0.50. Maximum aggregate size 20mm. Concrete to be in accordance with the National Structural Concrete Specification.
2. Materials and workmanship are to comply generally with BS 8110-1 and BS 8000-2.
3. Formed and unformed finishes: Refer to Architects specification.
4. Concrete level tolerance to be in accordance with Architects specification.
5. Concrete grade GEN.1 to be used for blinding, mass fill etc.
6. Cover to concrete in contact with the ground to be 50mm else 25mm U.N.O.
7. All reinforcement to be grade 500B or C to BS 8666:2005. Min lap length to be 40 x bar diameter.
8. All reinforced concrete and mass concrete to be cast against shuttered or concrete blinded faces. All shutters to be fully designed by Contractor. Existing walls must not be surcharged.
9. All holes in reinforced concrete are to be formed.
10. No cutting, coring or removal of placed concrete is permitted without prior agreement of Richard Tant Associates.
11. The position and details of all construction joints not shown on the drawings are to be agreed with Richard Tant Associates in good time.
12. Concrete receiving water proofing slurry to be either blast tracked or pressure washed at high pressure 230bar to remove latent defects to waterproofing designer's specification.
13. The Contractor shall provide details of all admixtures to be used in the concrete and agree their use with the Engineer before any concrete is delivered to site.
14. Concrete for padstones is to be 2:3:6 (cement : fine sand : coarse sand) nominal mix, with OPC and 10mm max aggregate.
15. Ready mixed concrete must be obtained from a plant which holds a current Certificate of Accreditation under the Quality Scheme for Ready Mixed Concrete.
16. Site-mixed concrete may be used when agreed with the Engineer. An agreed pre-batched and bagged proprietary concrete must be used unless an alternative site batched concrete has been agreed with the Engineer.
17. Do not place concrete when the ambient air temperature is less than 5°C and take all necessary measures to ensure that the temperature of the placed concrete will not fall below 5°C for the specified curing period.
18. Concrete Cubes to be tested for compressive strength for all reinforced concrete elements. 3 samples per pour or per 50m³. One 7 day test, one 28 test and one sample for future testing if required. All tests to be carried out by UKAS accredited laboratory or equivalent. Testing to BS EN 206-1, annex B and BS 8500-1, annex B.
19. The Contractor is to provide suitable curing for all concrete elements to comply with the requirements of BS 8110-1:1997, Table 6.1.
20. All holes shall be formed and all inserts cast in at the time of pouring concrete. No part of the concrete works shall be drilled or cut away without the approval of the Structural Engineer.
21. Reinforcement shall be fixed adequately using tying wire or steel clips. Concrete cover is to be as specified on the drawings. Chairs and spacers are to be provided as necessary to maintain the specified cover.
22. Unless noted otherwise on drawings, all reinforcement is to be lapped 40d (where d is diameter of the larger bar).
23. All formwork and supporting members shall be sufficiently strong to resist the pressure of the wet concrete and to ensure that the specified tolerances for the finished work are achieved. Formwork and supporting structure to be designed by the Contractor.
24. Unless otherwise specified by the Structural Engineer or Architect the formwork shall be such that the resulting concrete finish shall be Type A of Clause 6.2.7.3 of BS 8110-1:1997, i.e.: Type A finish. This finish is obtained by the use of properly designed formwork or moulds of timber, plywood, plastics, concrete or steel. Small blemishes caused by entrapped air or water may be expected, but the surface should be free from voids, honeycombing and other blemishes. Prior to casting of concrete the Contractor is to confirm finish required from the Architect in writing.
25. The minimum period before striking formwork shall be in accordance with BS 8110-1:1997 Table 6.2.
26. All reinforced concrete to be cast against shuttered or concrete blinded faces. All shutters to be fully designed by Contractor. Existing walls must not be surcharged.

REBAR ESTIMATE FOR COSTING

- Raft Slab: 130 kg/m3
- Walls: 225kg/m3
- Columns : 300 kg/m3
- Beams: 300 kg/m3
- Slab: 225 kg/m3
- Underpin: 200 kg/m3

MASONRY

1. Masonry below ground to be built in either blockwork with a min. compressive strength of 10 N/mm² and with a min. density of 1500 kg/m³ or Class 'B' Engineering bricks both to be laid in Class (i) or (ii) mortar in accordance with BS 5628.
2. All external brickwork to be in facing brick as specified by the Architect & laid in class (iii) mortar.
3. All masonry to be laid in accordance with good practice as stated in NHBC guidelines & BS 5628: Code of Practice for Masonry.
4. Timber wall plates to be strapped down using M2.5 x 30 galvanised M.S. 'L' straps at Max. 2m ctrs. Straps to be at least 1000mm long & screwed to wall with Min. 4 Number no.10 x 50mm long screws, unless noted otherwise.
5. Brick ties to be ST1 stainless steel by 'Ancon Ltd' or similar approved, unless noted otherwise.
6. All masonry units to be class FL.
7. Individual masonry units to be 20kg or less.
8. New blockwork is to be minimum strength 7.0 N/mm.
9. Brickwork and blockwork are to be laid properly bonded as agreed with the Architect and fully bonded into existing work.
10. Do not use frozen materials or lay masonry when the ambient air temperature is at or below 3°C and falling or unless it is at least 1°C and rising.
11. Cavity wall ties shall be stainless steel flat double triangle ties to BS 1243 spaced at 450crs vertically or 6 courses, 750crs horizontally staggered, and at 225crs vertically or 3 courses 150mm from all openings, corners and reveals to BS5268 unless noted otherwise. Minimum embedment to be 50mm into each masonry leaf. Contractor to adopt appropriate ties where required that do not compromise water proofing system.
12. Wall ties elsewhere are to be stainless steel flat double triangle ties, to BS 1243, as noted on the drawings. Minimum to accomodate water proofing system embedment to be 50mm into each masonry leaf. Contractor to adopt appropriate ties where required that do not compromise water proofing system.
13. Bricks and blocks shall not be stored on any floor without first obtaining consent from the Engineer. The Contractor shall ensure that the loadings imposed on the permanent works by the storage of materials do not overstress any part of the permanent works or cause excessive deflection and not to exceed 1.5kN/m².
14. In dry weather, bricks are to be soaked in water before being laid and tops of walls to be raised are to be similarly soaked before work is recommenced.
15. Brickwork and blockwork is to be carried up in a uniform manner and is to be raked back and not toothed up, no section rising more than one metre above the remainder. Brickwork built with standard 65mm bricks shall rise at the rate of four courses to 300mm. No more than sixteen courses shall be built in a day without prior permission of the Engineer.
16. Crack control brick reinforcement is to be provided over doors, over and under windows and at changes in profile (e.g. where the building steps from two storeys to one storey), as follows: 2 layers of BRC Bricktor or Brickforce inthe two bed joint immediately adjacent to the opening. To extend 600mm beyond the opening onboth sides and 600mm either side of the change in profile.
17. Vertical movement joints should be provided in masonry walls to minimise the risk of major cracking, as shown in the following table:

Material	Joint Width (mm)	Normal Spacing
Clay brick	16	12m (15m maximum)
Calcium silicate brick	10	7.5 to 9m
Concrete block and brick	10	6m
Any masonry parapet wall	10	Half the above spacing and 1.5m from corners (double the frequency)

The spacing of the first movement joint from a return should not be more than half of the above dimension.
Provide flat straight stainless steel ties within the joint at 225mm vertical centres de-bonded over one half. Joints to be filled with suitable compressible material with minimum 10mm deep weather proof sealant to the external leaf. In cavity walls, provide cavity wall ties (as clause 11), at 225mm centres vertically within 225mm of either side of the joint. Position of joints to be agreed with the Architect prior to construction.
18. Steel columns, posts and proprietary windposts to be tied to internal block leaf within cavity walls using Halfen HTS framing cramps at 225mm vertical centres, or similar approved product, fixed to steel in accordance with manufacturers specification.
19. Proprietary wall starter systems such as Furfix or similar may be used to tie new masonry extensions to existing masonry in locations where approved by the Structural Engineer.
20. Use proprietary head restraints as detailed by Halfen or Ancon to tie tops of internal block walls to the underside of floor slabs.
21. Slip membrane shall be minimum 250µm polythene U.N.O.

STEELWORK

1. The Contractor to design all steel connections from loads provided by RTA. The design, fabrication and erection of the structural steelwork is to be in accordance with the current version of BS 5950 and the latest edition of the National Structural Steelwork Specification for Building Construction, and all clauses, including appendices are deemed to be part of this specification.
2. All structural steel sections are to be Grade S355 JR to the applicable code from the following list; BS 4-1, BS EN 10210-2.
3. All bolts are to be grade 8.8 Black Bolts to BS 4190 and BS EN 20898 unless shown otherwise on the drawings.
4. All welding is to comply with BS EN 1011 Parts 1 & 2. Site welding shall not be permitted except with the written approval of the Structural Engineer. Where permitted, all site welding to be tested in accordance with the National Structural Steelwork Specification. All site weld test reports to be submitted to the Structural Engineer at least 10 working days prior to the covering of the site welded areas with permanent finishes.
5. All welds are to be full strength butt welds unless noted otherwise on the drawings. Carry out additional weld testing in accordance with the National Structural Steelwork Specification for Building Construction on any critical welds specified by the Structural Engineer.
6. The steelwork fabricator is to obtain dimensions from site. Setting out dimensions are to be obtained from the Architect's drawings. Shop fabrication drawings showing layout, connections and fixing details, are to be submitted to the Engineer for comment at least two weeks before any fabrication is carried out.
7. All painting shall be carried out in accordance with BS 5493, clauses 4.6 and 5.5 of BS 5950: Part 2 and the paint manufacturer's instructions. After preparation by blast cleaning to Sa 2½ to BS 7079: Part A1, all surfaces, which shall be dry, shall be painted with one coat of zinc phosphate primer (100 microns dry film thickness (dft) Leigh's Paints Epigrip C400V3). This coat should be applied in the works with any subsequent damage made good on site. Steelwork in cavities is to be painted, in addition, with 1 coat 125 micron dft black bituminous paint (Leigh's Paints Jetrone). A similar compatible paint specification may be substituted by the Contractor if approved by the Engineer.
8. Where indicated on the drawings the steelwork and fixings shall be hot dipped galvanised to BS 729 in order to give a uniform zinc deposit of aleast 100 microns.
9. Galvanised steelwork that is to be painted should then be treated as follows:
- De-grease with an emulsifying agent, i.e. washing-up detergent.
- Lightly abrade surface.
- Paint with one coat of etch primer (Leigh's Paints K179) brushing to 10 microns dft.
- A minimum of 4 hours later and a maximum of 48 hours later, paint with one coat of undercoat (Leigh's Paints Metagrip L654) to 50 microns dft and one finish coat (Leigh's Paints K267 M10, light grey) to 50 microns dft.
10. Where steelwork is galvanised, in order to minimise problems with Liquid Metal Assisted Cracking (LMAC), the following restrictions should be adhered to for all connections designed by the Contractor:
• Partial end plates – Avoid: use full end plates or bolted cleat connections.
• Part depth stiffeners – Avoid: use full depth stiffeners welded with intermittent fillet welds.
• Use intermittent fillet welds for attachment of brackets.
Prior to erection or application of other coatings, all galvanised structural steelwork is to be visually inspected for cracks or indications of LMAC cracking. Inspection is to be carried out by a suitably qualified person trained and competent in visual inspection for LMAC. Where suspected LMAC defects are identified inform the Engineer immediately.
11. Fire protection to all steelwork is to be to the Architect's details. Any structural steel elements to be left exposed in the permanent condition are to be protected using intumescent paint system as specified by Leigh's Paints to suit the steel section size, and level of fire protection required by the Architect.
12. Unless noted otherwise ends of all steelwork built into brickwork are to be concrete encased. Min 50mm concrete cover unless noted otherwise.
13. Unless noted otherwise, steel frames within box frames installed to form openings in existing masonry walls are to be bolted to the existing masonry using M12 resin anchors at 600mm c/c staggered vertically. Use RAWL R-KEM+ resin system or similar approved.
14. Base plates to be grouted in accordance with manufactures instructions, minimum compressive strength to be 50 N/mm², unless noted otherwise.
15. Steel beams to have a bearing of 100mm on to padstones, unless noted otherwise.
16. All structural hollow sections are produced in accordance with standard BS EN 10210:2006, hot finished S355 J2H.
17. Cold formed hollow section not to be used.
18. All steelwork built in external walls to be coated with appropriate corrosion protection coating carried out as clause 7 and to extend 300mm internally.

FOUNDATIONS

1. New foundations have either been designed using load bearing concrete piles as shown on Richard Tant Associates piling layout and loads drawing, refer to the piling performance specification on the drawing, or on the ground floor drawing or underpinning drawing.
2. If the Building Control Officer requests amendments to the foundations or if conditions differ from those noted above, the Contract Administrator and Structural Engineer are to be notified immediately. The Contractor shall not proceed without receiving instructions from the Contract Administrator.
3. Foundations are to be cast symmetrically about piers, stanchions, or walls, unless noted otherwise on the drawings.

WATERPROOFING

1. The Contractor is responsible for the design, detailing and installation of all waterproofing products including workmanship.
2. The Contractor is to design the waterproofing to the basement assuming that there will be two means of defence against ground water ingress into the basement throughout.

PILING - CAST INSITU CONCRETE PILES TO BE CFA NOT DRIVEN

1. The general design for the piles shall be in accordance with BS 8004 - the Code of Practice for Foundations.
2. No pile shall be more than 75mm off the true centre position and vertical errors shall not exceed 40mm per 3m depth of pile.
3. All pile loads given in the Pile Schedule are unfactored Safe Working Loads (SWL). A minimum factor of safety of 2.6 in compression and 3.0 in tension is required on all pile loads.
4. Integrity test using a sonic impulse method employed by N. D. Technology (023 8046 5992) to be applied to all cast-insitu concrete piles. Testing to be carried out at least seven days after casting.
5. The piles are to be cast to a minimum of 200mm above the designed cut-off level.
6. Vertical reinforcement in all piles shall project a minimum of 40 times the bar diameter above the designed cut-off level and bent over horizontally into the top of the pile caps, ground beams or structural slabs.
7. The piling designer shall carry out an asset search and confirm location of any assets within the proposed piling locations and issue to the design team prior to starting works.
8. All pile locations shall be probed and any obstructions found (except live services) shall be removed by main Contractor and voids backfilled with compacted hoggin.
9. Piles including contiguous and secant shall be designed and specified by a specialist.
10. All piles shall be bored and not driven.
11. Soils report to be carried out by piling specialist and to include for a sulphates test and to be issued to R.T.A. prior to any concrete order. Concrete to be suitabily specified for possible sulphates.
12. Positive values are compressive forces, negative values bracketed are uplift forces i.e. tension forces.
13. Refer to sulphate conditions in CGL factual report dated June 2022 and piles to be designed accordingly.

ADDITIONAL NOTES

1. Refer to Architect's details for fire protection to structural elements.
2. Contractor to ensure no loss of ground below extg foundations where new footings abut all voids to be filled solid with min C20 concrete.
3. Refer to Architect's details for: drainage details, damp course membrane details and waterproofing.
4. Contractor to take full responsibility for all temporary works including design and erection.
5. Temporary works to be checked by specialist prior to any demo works.
6. We note the following regarding ground gas. Ref. CGL letter dated 22 June 2022 the risk to future site occupiers from ground gas is considered low as the site is considered to confirm CSI and no ground gas protection measures are proposed. It is recommended the absence of gas protection measures is approved by the project warrantors and building control prior to commencing construction as additional monitoring visits may be requested.

EXCAVATION AND FILLING

1. A number of trial pits and boreholes have been excavated and records of them are available and are issued with the tender documents. Refer to Site Investigation & Basement Impact Assessment Report dated April 2015 prepared by GEA Ltd. The Contractor should make arrangements to complete any further site investigation he deems necessary.
2. Before beginning any excavation the Contractor must ensure that he has located any live services in the neighbourhood of the intended excavation.
3. No excavation within 3 metres of an existing foundation is to be taken below the level of the existing foundation unless a method statement has been agreed in writing with the Engineer.
4. The Contractor must not excavate below the level of the underside of a party wall foundation within 3 metres, or undermine the bearing of a Party Wall foundation within a 45 degree line from the edge of the base within 6 metres until all necessary Party Wall awards are in place.
5. The Engineer and Building Control Officer shall be given the opportunity of examining all excavations, filling and hard-core before they are concreted or covered up. The Contractor shall give at least 24 hours' notice of when excavations will be ready for inspection. If a good foundation bearing is not obtained at the level shown, the Engineer is to be informed.
6. Excavations shall not be left exposed longer than necessary in order to avoid deterioration from the weather or other causes, and if necessary they should be protected. In clay formations the excavations shall not be left exposed for more than 24 hours. If the formation deteriorates it shall be cleaned out and reformed to the Engineer's satisfaction before any concrete is placed.
7. The Engineer is to be informed immediately if any significant change in strata occurs at formation level.
8. Hard-core for filling shall consist of selected clean broken stone, concrete, hard sound brick, slag or other approved materials, and shall be chemically inert. The materials shall be broken down to a maximum 75mm gauge with a sufficient proportion of fines for thorough compaction. Hard-core shall be well consolidated by means of roller, vibrating plate or mechanical punner. Care shall be taken that no damage is caused to foundation walls and services.

LINTELS

1. Precast concrete lintels are to be to BS 5977-2 by Naylor Lintels Ltd, Tel. 0800 542 4192. Sizes and types as indicated on the drawings. End bearing lengths are to be at least 150mm for spans up to 1.5m, and 225mm for spans up to 2m, unless noted otherwise on the drawings.
2. Galvanized steel lintels are to be to BS 5977-2 by Caradon Catnic Ltd, Pontgwindy Industrial Estate, Caerphilly, Mid Glamorgan CF83 2WJ, Telephone 01222 337900. Sizes and types as indicated on the drawings. End bearing lengths are to be at least 150mm for spans up to 1.5m, and 225mm for spans up to 2m, unless noted otherwise on the drawings.
3. Pre-fabricated masonry lintels to BS 5977-2 to be by Bulmer Brick Cutting to be designed for the loads on RTA drawings.
4. The Contractor shall obtain the Contract Administrator's written approval, prior to commencement of the work, to the use of lintels by alternative manufacturers to those listed above.

MATERIALS AND WORKMANSHIP

1. All articles, materials and goods shall be new and of good quality, suitable for the required purpose and shall conform to the appropriate British Standard where such exists. Where references to the above are made it shall be inferred that the latest edition applies, together with subsequent amendments, unless otherwise specified.
2. The Contractor is to ensure no deleterious materials are used.

STABILITY

1. The Contractor is to accept full responsibility for the stability and structural integrity of the works during the Contract and provide temporary support as necessary. He shall also prevent overloading of any completed or partially completed elements.

DEMOLITION CONSTRAINTS

1. The nature and extent of demolition works are shown on the Architect's drawings. The Contractor is to note the engineering constraints given below and refer to the demolition schedule.

a. The Contractor shall submit and have approved a detailed method statement for the sequence of demolition and new build work before any work commences on site.
b. The Contractor is to integrate the temporary works during demolition to ensure that the stability of the existing structure is maintained at all times over the course of the works. Associated method statement and calculations to be submitted prior to work commencing on site.
c. Do not cut or break out existing foundations without the engineer's approval.

TEMPORARY WORKS

1. The Contractor is entirely responsible for maintaining the stability of all existing buildings and structures, within and adjacent to the works, and of all the works from the date for possession of the site until practical completion of the works.
2. The Contractor shall design, install and maintain all necessary temporary works and shall submit proposals for temporary supports and sequence of construction for the works, to the Structural Engineer and Contract Administrator at least 10 working days prior to starting on site. These proposals shall be supported by design calculations unless agreed otherwise by the Structural Engineer in writing.

TOLERANCES

1. All tolerances are to be agreed with the Architect, and the Contractor will be responsible for ensuring that sufficient tolerances are provided and integrated throughout all elements of the works.
2. The Contractor is to take account of tolerances detailed elsewhere on the drawings and appended Specifications when complying with the above clause.
3. Unless otherwise indicated on the drawings the setting out dimensions and levels of the finished works shall be within the maximum tolerances given below:
Maximum Tolerance
All dimensions of 3m and over: +/- 5mm
All dimensions less than 3m: +/- 3mm

UNDERPINNING

1. The Contractor shall be responsible for ensuring that his operations do not in any way impair the safety or condition of the existing structure or the adjacent properties. He shall provide any temporary supports required for this purpose, and shall carefully inspect the condition of the structure both before and during the execution of the work and immediately inform the Architect if he considers that any more stringent procedure than that specified is necessary.
2. Before starting the work the Contractor is to check for any services that could be damaged by the underpinning work and shall provide for the maintenance of drainage services during the underpinning operation and for the reinstatement of any services interrupted or disturbed by the excavations.
3. Underpinning is to be carried out in short sections not exceeding 1000mm in length, in the numbered sequence shown on the drawings unless noted otherwise.
4. Projecting portions of the existing footings are to be carefully cut off where directed and the underside of the footings are to be cleaned and hacked free of any dirt, soil or loose material before underpinning.
5. The Engineer and Building Control Officer shall be given the opportunity of examining all excavations, prior to any underpinning being carried out.
6. The body of the reinforced concrete underpinning is to be constructed in designated concrete RC40 in accordance with BS8500 and BS EN 206-1, and is to be cast to the widths and depths shown on the drawings. As far as practicable excavation and concreting of any section of underpinning shall be carried out on the same day. Un-concreted sections shall be kept covered to prevent the ingress of water. Refer to the specification above for the mix for the reinforced concrete underpins.
7. The reinforced concrete is to be stopped off approximately 100mm (unless noted otherwise) below the underside of the existing footing, and the final pinning up over the whole extent of the latter is to be carried out with a semi-dry fine concrete, well rammed in as soon as possible after the foundation has set hard. The pinning-up concrete is to consist of 1 part by volume of sulphate resistant cement to 3 parts of aggregate (well graded from 10mm maximum size down to fine sand) with a water/cement ratio by weight of 0.35 with Fosroc Cebex 100 additive.
8. Excavation to any section of underpinning shall not be commenced until at least 48 hours after completion of any adjacent section of the work.
9. The joint between adjacent sections of underpinning is to be formed by creating a rough surface against which the first section is cast. Then, having thoroughly cleaned the exposed concrete face, the adjacent section may be cast and no less than 6 B12 dowel bars used spaced uniformly resin fixed into the adjacent pin unless noted otherwise.
10. The Contractor shall prepare a Sequence of Work and submit it to the Contract Administrator for his comments prior to the commencement of the work.
11. The Contractor is to keep a record of the sequence and dimensions of the underpinning actually carried out, including details of excavation, casting concrete and pinning up for each section.
12. Refer to specific underpinning notes on the underpinning drawings and details.
13. The main contractor is to employ a specialist sub-contractor, who is a member of the 'Association of Specialist Underpinning Contractors' to carry out the underpinning work and associated temporary works.
14. The main contractor must employ a specialist engineer to determine an underpinning installation sequence, and design the required temporary works scheme for the underpinning.
15. Prior to, and during the works the appointed specialists are to fulfil their duties under Construction (Design and Management) Regulations 2015 and produce relevant method statements and guidance notes to all parties concerned with the project regarding their design portion.
16. The contractor shall provide a method statement outlining their proposed method and sequence of underpinning works.

SUGGESTED SEQUENCE FOR UNDERPINNING

1. Excavate stools type 1 (maximum stool length 1000mm) & fit sacrificial vertical props. refer to * below
2. Fit joggle joint as required to form key to adjoining stools to approval of building inspector.
3. After formation level has been approved by building inspector (& engineer if required) cast underpinning to concrete to within 75mm of soffit of extg foundation
4. Wait until concrete has sufficiently matured for a minimum of 24 hours
5. Fill 75mm (nominal) gap with cement/sharp sand (1:3) & Fosroc Cebex 100 expanding plasticising grout admixture by Fosroc, mixed hand damp & rammed in solid
6. Wait until dry pack has matured for a min of 24 hours (or 48 hours if work is to be carried out on adjoining stools)
7. Repeat 1-6 for stools type 2
8. Repeat 1-6 for stools type 3
9. Repeat 1-6 for stools type 4
10. Repeat 1-6 for stools type 5
(i.e. suggested underpinning sequence - 1,2,3,4,5)

The underpinning sequence shown above is a suggestion only & the contractor may submit alternative proposals for consideration by "Richard Tant Associates"

The contractor is to undertake all necessary precautions to safely uphold the extg structure & excavation sides at all times during the course of the works

The contractor is to ensure that ground beneath the floor slab is undisturbed & any remaining voids are filled solid with concrete

* Where underpinning in the corners and/or if labourers are working under wall sacrificial vertical props are to be used to support the above masonry

Notes.

REV.	AMENDMENTS	BY	DATE	CHECKED
K	Piling note, point 9 - contiguous piles added.	AR	23.02.2022	RT
J	Piling note, point 9 amended.	AR	20.02.2022	RT
H	As clouded.	AR	20.01.2022	RT
G	Waterproofing note amended.	AR	06.10.2022	RT
F	Concrete note - item 1 added.	AR	04.10.2022	RT
E	Notes amended. Issued for tender.	AR	07.09.2022	RT
D	Notes added / amended.	AR	11.08.2022	RT
C	Basement plan moved to drg. 5295-S02. Drawing title amended.	AR	05.08.2022	RT
B	Manhole information added. Site trial hole information added. As clouded.	AR	30.06.2022	RT
A	Plans updated to Architect's drawings. As clouded. Suggested Sequence For Underpinning added.	AR	16.06.2022	RT

DO NOT CONSTRUCT FROM THIS DRAWING T.B.C. AFTER C.L.T. LOADS CONFIRMED **APART FROM ONLY PILING AS SHOWN WITHIN DOUBLE BUBBLES.**

Construction Issue for Piling Only. Refer to Note Above.

PROJECT
Broxwood View
Barrie House

TITLE
Notes

ARCHITECTS
Carbogno Ceneda Architects

DRAWING No.
5295-S01K

DATE	22.04.2022
SCALE	As shown @ A1
DRAWN	AR
CHECKED	RT
REVIEWED	-

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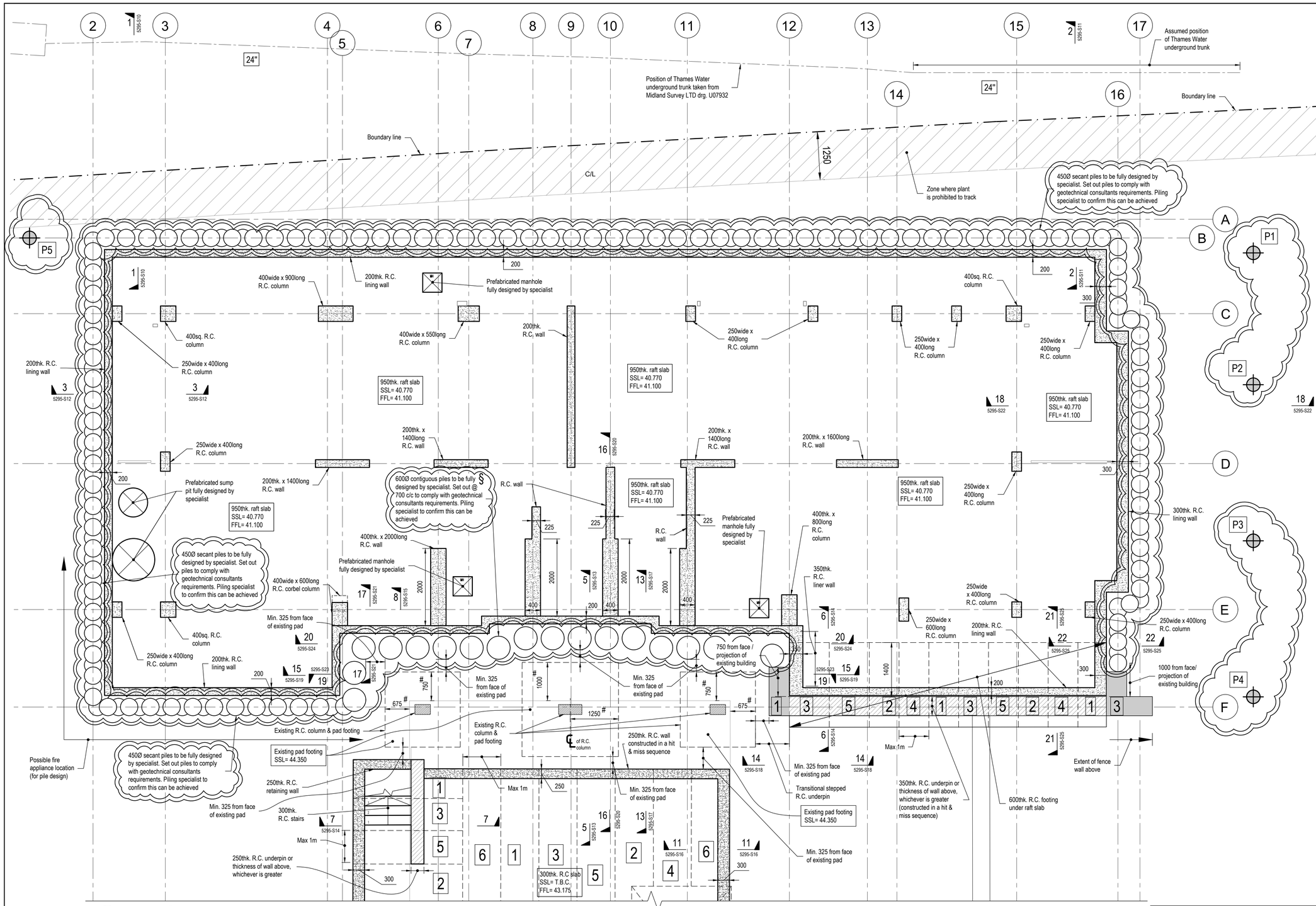

Notes.

NOTES

1. This drawing is to be read in conjunction with the specification and all relevant Engineers and Architects drawings.
2. Work to figured dimensions only.
3. For general notes see drawing 5295 - S01.

Pile Schedule	
Pile No.	Safe Working Load (kN)
P1	250
P2	250
P3	250
P4	250
P5	100

All loads are unfactored S.W.L.
All piles to have a tensile capacity of 25 kN.
Safe horizontal shear at cut off level to be 10 kN for all piles.

Piled wall to be designed for a surcharge imposed load of 10 kN/m² + fire appliance load (refer to plan) + 270 kN/m² under existing pad foundations + vertical load D.L. = 60 kN/m (450 kN/m between gridline 5 and 12 for 600ø piles) + 20 kN/m tensile load + L.L. = 10 kN/m (50 kN/m between gridline 5 and 12 for 600ø piles) + retained soil loads. All loads are characteristic safe working loads.

§ :600mm diameter piles, sleeved to a depth of 5m and installed in a hit and miss approach, noting piles installed first hit should be allowed to cure for a minimum of 24 hours to achieve strength before the remaining piles are constructed. Piles centres to be 700mm c/c in accordance with geotechnical consultants requirements . Piling specialist to confirm this can be achieved. As per recommendations from CGL, allow for a minimum concrete C30/37 is required as per the eurocode, alongside an initial moment of inertia of 0.00848m⁴/m.

:From trial hole info.

:Piles to be fully designed by specialist. Depth of piles to be confirmed by piling designer.

:R.C. underpin. For wall thickness refer to plan.

X : Suggested Sequence of Underpinning & Pouring R.C. Walls (1,2,3,4,5,6). Refer to Suggested Sequence of Underpinning, drg. 5295-S01.

:R.C. retaining wall with water resistant additive. For wall thickness refer to plan.

:350thk. mass concrete underpin or thickness of wall above, whichever is greater (constructed in a hit & miss sequence).

Secant & contiguous piles locations shown indicatively. Pile locations and loads to be determined in detailed design. Layout may change.

For piling note - refer to drg. 5295-S01.

H

Proposed Partly Basement

Scale 1 : 50

DO NOT CONSTRUCT FROM THIS DRAWING T.B.C. AFTER C.L.T. LOADS CONFIRMED **APART FROM ONLY PILING AS SHOWN WITHIN DOUBLE BUBBLES.**

Construction Issue for Piling Only. Refer to Note Above.

REV.	AMENDMENTS	BY	DATE	CHECKED
H	600Ø secant piles replaced with 600Ø contiguous piles. As clouded.	AR	23.02.2023	RT
G	450Ø & 600Ø contiguous piles replaced with 450Ø & 600Ø secant piles.	AR	20.02.2023	RT
F	Piles distance from existing pads clarified - as clouded.	AR	31.01.2023	RT
E	As clouded.	AR	20.01.2022	RT
D	Plan updated to Architect's drawings. Assumed position of Thames Water underground trunks amended. As clouded. Pile P5 added.	AR	27.09.2022	RT
C	Plan updated to Architect's drawings. Issued for tender. RC column, gridline E/12-13 - not required. Diameter of contiguous piles and walls along gridline E amended.	AR	07.09.2022	RT
B	Ground Floor plan moved to drg. 5295-S04. Drawing title amended. Plan updated to Architect's drawings.	AR	05.08.2022	RT
A	Minor amendments.	AR	30.06.2022	RT

PROJECT
Broxwood View
Barrie House

TITLE
Proposed Basement Floor
Sheet 1/2

ARCHITECTS
Carbogno Ceneda Architects

DRAWING No.
5295-S02H

DATE	22.04.2022
SCALE	As shown @ A1
DRAWN	AR
CHECKED	RT
REVIEWED	-

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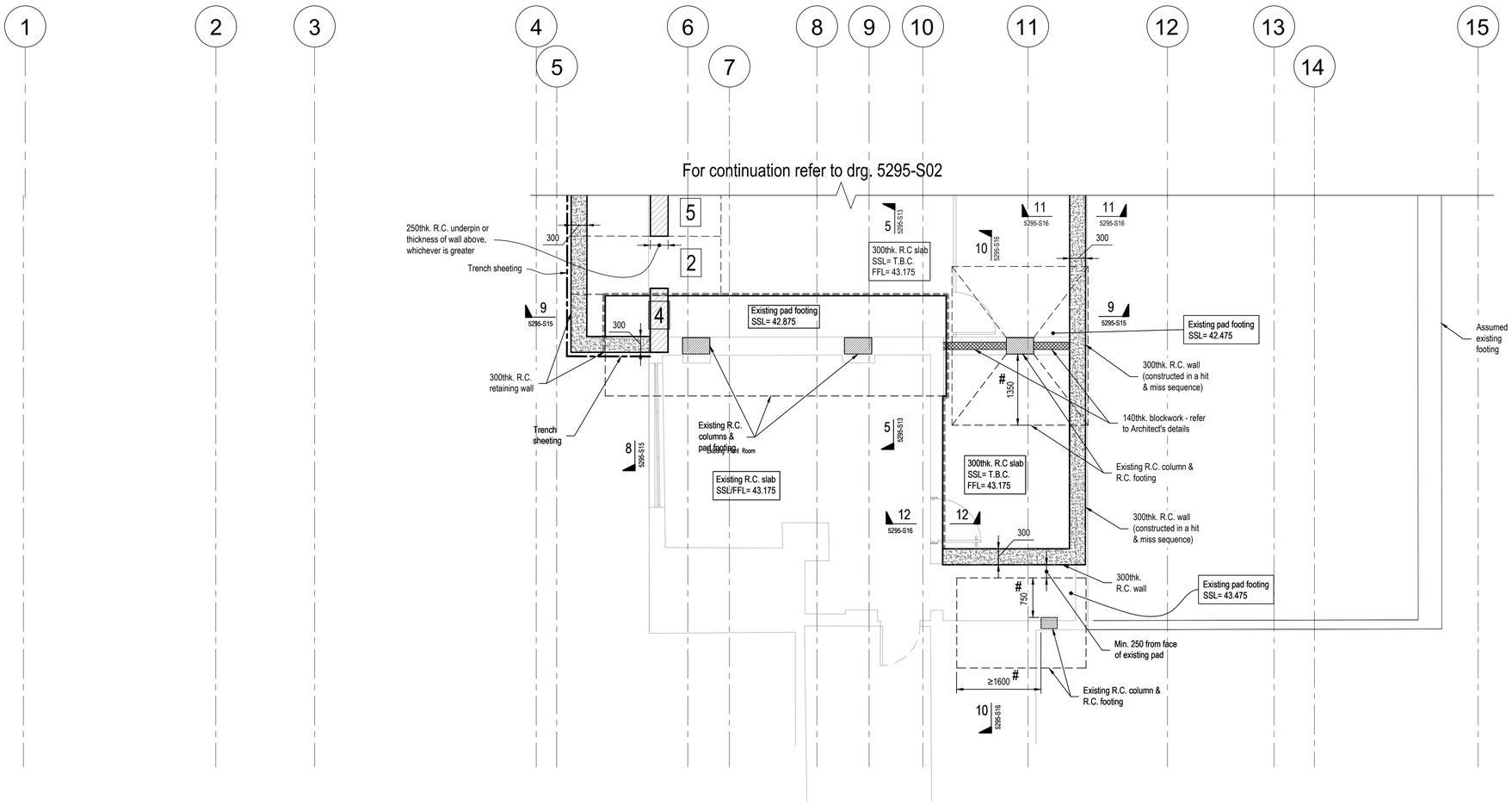
Notes.

NOTES

1. This drawing is to be read in conjunction with the specification and all relevant Engineers and Architects drawings.
2. Work to figured dimensions only.
3. For general notes see drawing 5295 - S01.



:R.C. retaining wall with water resistant additive. For wall thickness refer to plan.

:From trial hole info.

: Vertical slip joint - 2 layers of polythene per joint.

:R.C. underpin. For wall thickness refer to plan.

X : Suggested Sequence of Underpinning & Pouring R.C. Walls (1,2,3,4,5). Refer to Suggested Sequence of Underpinning, drg. 5295-S01.

Proposed Partly Basement

Scale 1 : 50

DO NOT CONSTRUCT FROM THIS DRAWING T.B.C. AFTER C.L.T. LOADS CONFIRMED

TENDER ISSUE

REV.	AMENDMENTS	BY	DATE	CHECKED
A	Plan updated to Architect's drawings. Issued for tender.	AR	06.09.2022	RT

PROJECT
Broxwood View
Barrie House

TITLE
Proposed Basement Floor
Sheet 2/2

ARCHITECTS
Carbogno Ceneda Architects

DRAWING No.
5295-S03A

DATE	03.08.2022
SCALE	As shown @ A1
DRAWN	AR
CHECKED	RT
REVIEWED	-

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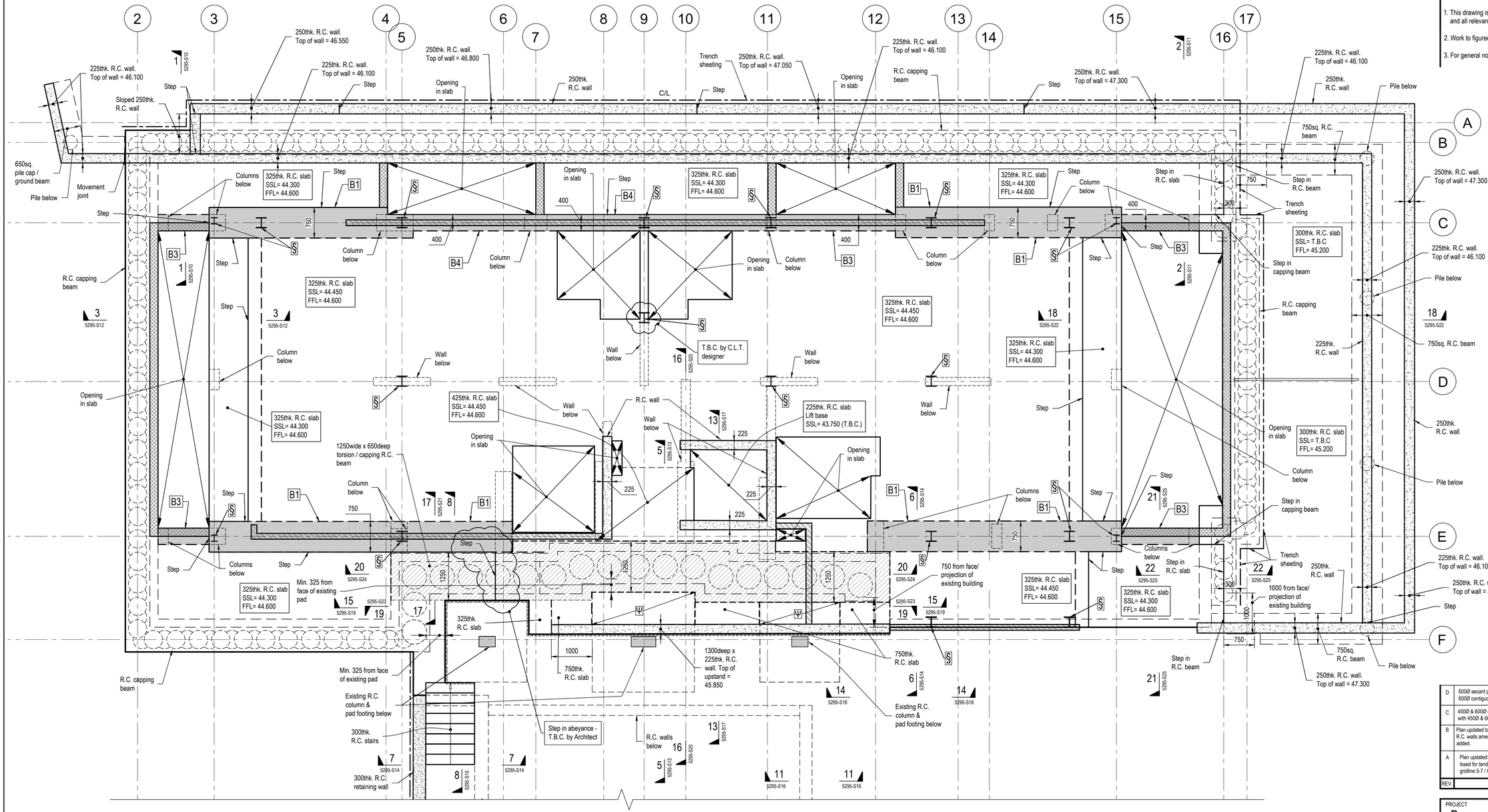

For continuation refer to drg. 5295-S05

: Vertical slip joint - 2 layers of polythene per joint.

: R.C. beams - refer to Beams Schedule.

: R.C. wall - refer to plan for wall thickness.

§ :254UC steel column - refer to B&K Structures drawing, drg. number 01812-S-SK-1010.

Ψ :150 thk. R.C. slab - refer to Section 5-5, drg. 5295-S13.

: 200thk. R.C. upstand.

: 140thk. R.C. upstand.

C.L.T. panel load bearing elements - T.B.C.
C.L.T. panel load - T.B.C.

Beams Schedule		
Beam No.	Depth (mm)	Width (mm)
B1	750	750
B2	750	400
B3	750	400
B4	750	400

Proposed Partly Ground Floor

Scale 1 : 50

DO NOT CONSTRUCT FROM THIS DRAWING T.B.C. AFTER C.L.T. LOADS CONFIRMED

Tender Issue (for QS purposes only)

Notes.

NOTES

1. This drawing is to be read in conjunction with the specification and all relevant Engineers and Architects drawings.
2. Work to figured dimensions only.
3. For general notes see drawing 5295 - S01.

REV.	AMENDMENTS	BY	DATE	CHECKED
D	600Ø secant piles (below) replaced with 600Ø contiguous piles (below).	AR	23.02.2023	RT
C	450Ø & 600Ø contiguous piles (below) replaced with 450Ø & 600Ø secant piles (below).	AR	20.02.2023	RT
B	Plan updated to Architect's drawings. External R.C. walls amended / added. R.C. upstand added.	AR	27.09.2022	RT
A	Plan updated to Architect's drawings. Issed for tender. Beams B5 & 6 not required - gridline 5-7 / C-D.	AR	07.09.2022	RT

PROJECT
Broxwood View
Barrie House

TITLE
Proposed Ground Floor
Sheet 1/2

ARCHITECTS
Carbogno Ceneda Architects

DRAWING No.
5295-S04D

DATE	03.08.2022
SCALE	As shown @ A1
DRAWN	AR
CHECKED	RT
REVIEWED	-

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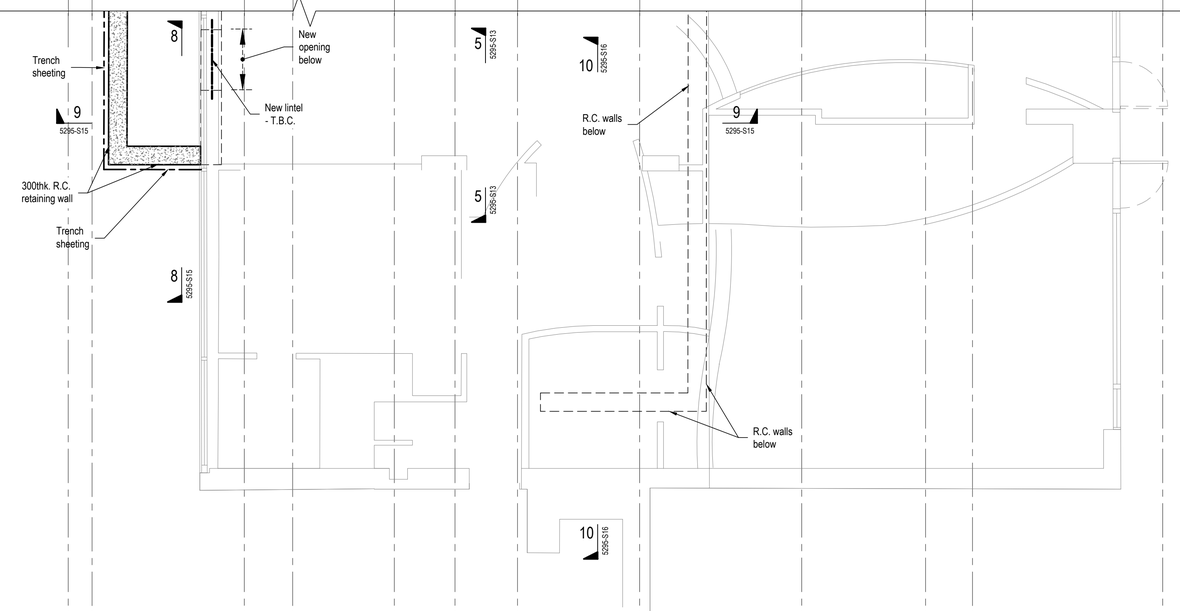
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17

For continuation refer to drg. 5295-S04



: R.C. wall - refer to plan for wall thickness.

Proposed Partly Ground Floor

Scale 1 : 50

DO NOT CONSTRUCT FROM THIS DRAWING T.B.C. AFTER C.L.T. LOADS CONFIRMED

TENDER ISSUE

Notes.

NOTES

1. This drawing is to be read in conjunction with the specification and all relevant Engineers and Architects drawings.
2. Work to figured dimensions only.
3. For general notes see drawing 5295 - S01.

N

REV.	AMENDMENTS	BY	DATE	CHECKED
A	Plan updated to Architect's drawings. Issued for tender.	AR	06.09.2022	RT

PROJECT
Broxwood View
Barrie House

TITLE
Proposed Ground Floor
Sheet 2/2

ARCHITECTS
Carbogno Ceneda Architects

DRAWING No.
5295-S05A

DATE	03.08.2022
SCALE	As shown @ A1
DRAWN	AR
CHECKED	RT
REVIEWED	-

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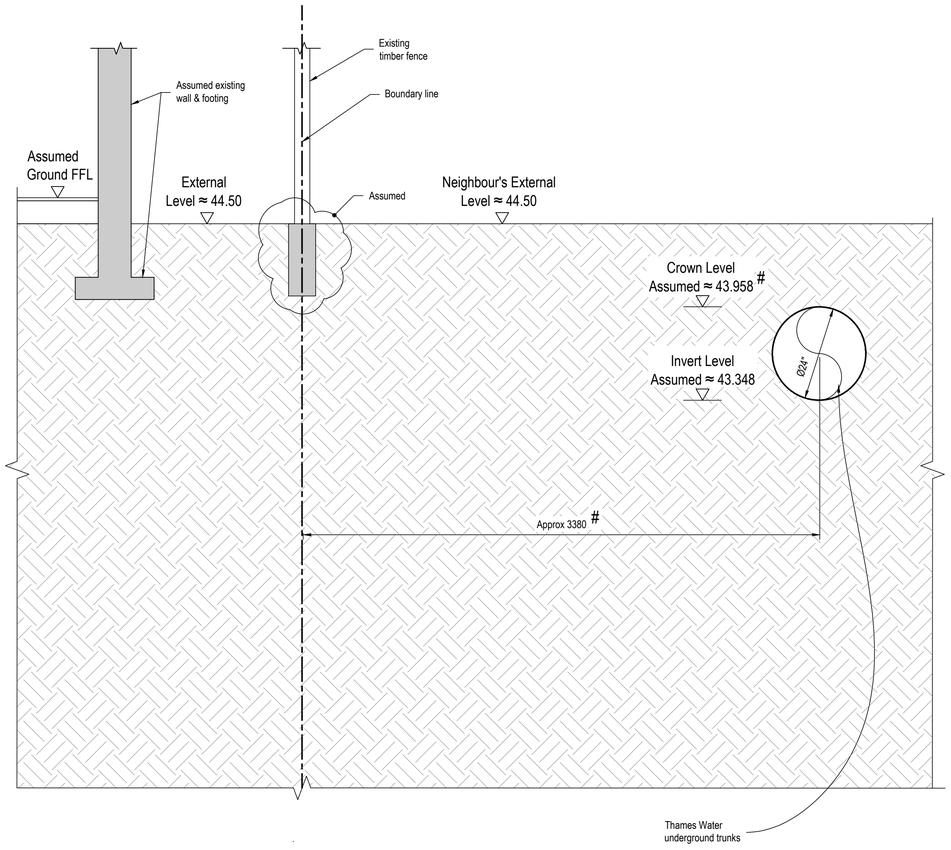
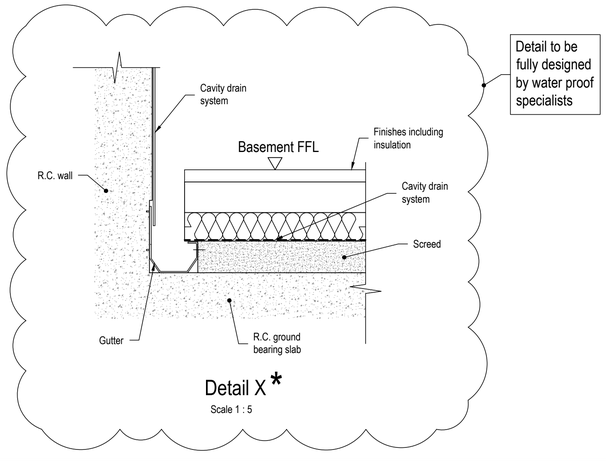


:Taken from Midland Survey LTD drg. U07932.

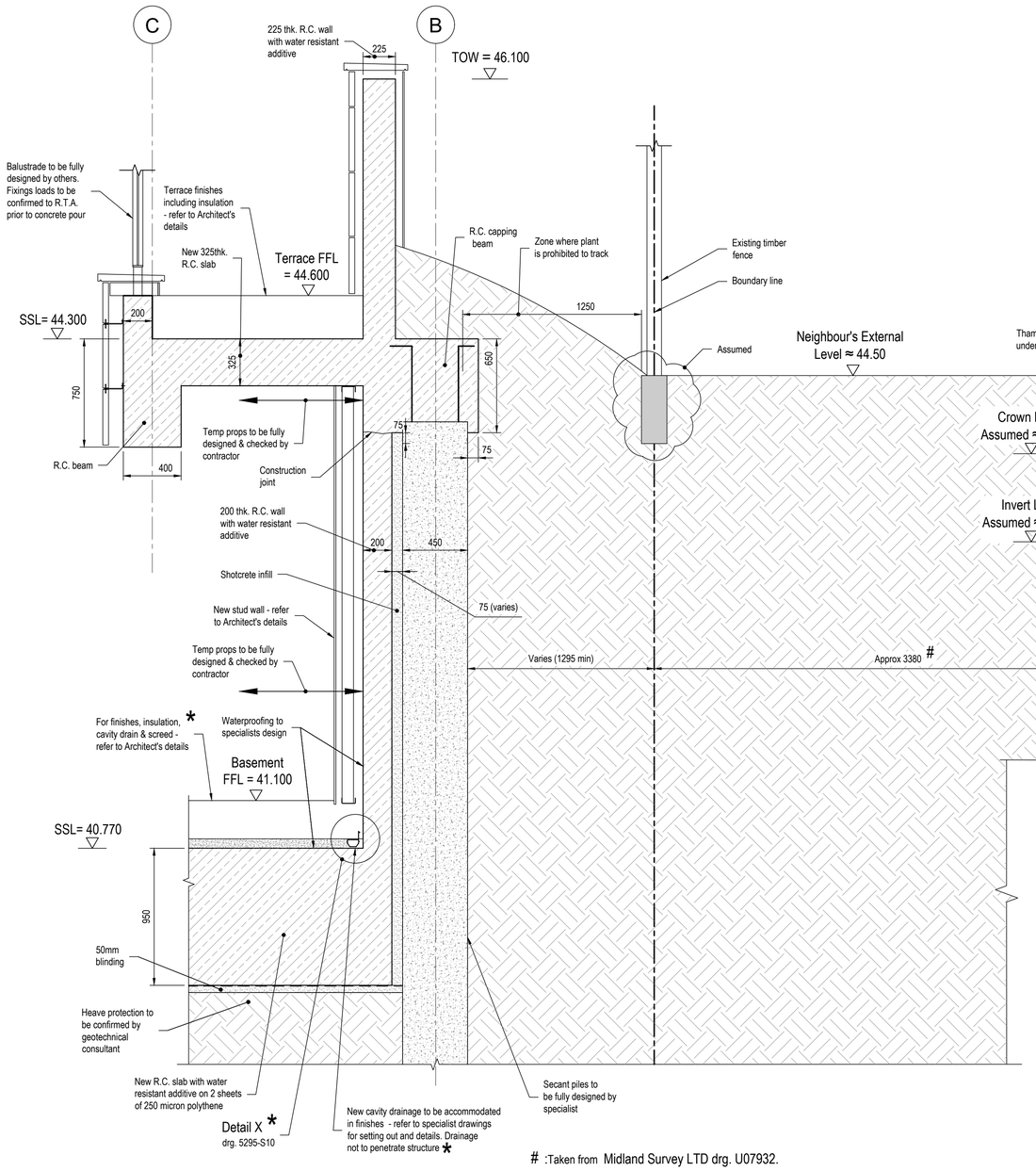
Existing Section 1-1

Scale 1 : 20



Detail X *

Scale 1 : 5



:Taken from Midland Survey LTD drg. U07932.

Proposed Section 1-1

Scale 1 : 20

Heave protection to be confirmed by geotechnical consultant.

* : Details to be fully designed by water proofing specialist & refer to details proposed by water proofing specialist. No liability for water proofing is taken by R.T.A.

DO NOT CONSTRUCT FROM THIS DRAWING T.B.C. AFTER C.L.T. LOADS CONFIRMED

Tender Issue (for QS purposes only)

Notes.

NOTES

1. This drawing is to be read in conjunction with the specification and all relevant Engineers and Architects drawings.
2. Work to figured dimensions only.
3. For general notes see drawing 5295 - S01.

REV.	AMENDMENTS	BY	DATE	CHECKED
E	450Ø contiguous piles replaced with 450Ø secant piles.	AR	20.02.2023	RT
D	Section 1-1 amended.	AR	27.09.2022	RT
C	Issued for tender. Drawing title amended.	AR	07.09.2022	RT
B	Section 1-1 amended.	AR	05.08.2022	RT
A	Section 1-1 - minor amendments. Detail X added.	AR	16.06.2022	RT

PROJECT
Broxwood View
Barrie House

TITLE
Section 1-1

ARCHITECTS
Carbogno Ceneda Architects

DRAWING No.
5295-S10E

DATE	22.04.2022
SCALE	As shown @ A1
DRAWN	AR
CHECKED	RT
REVIEWED	-

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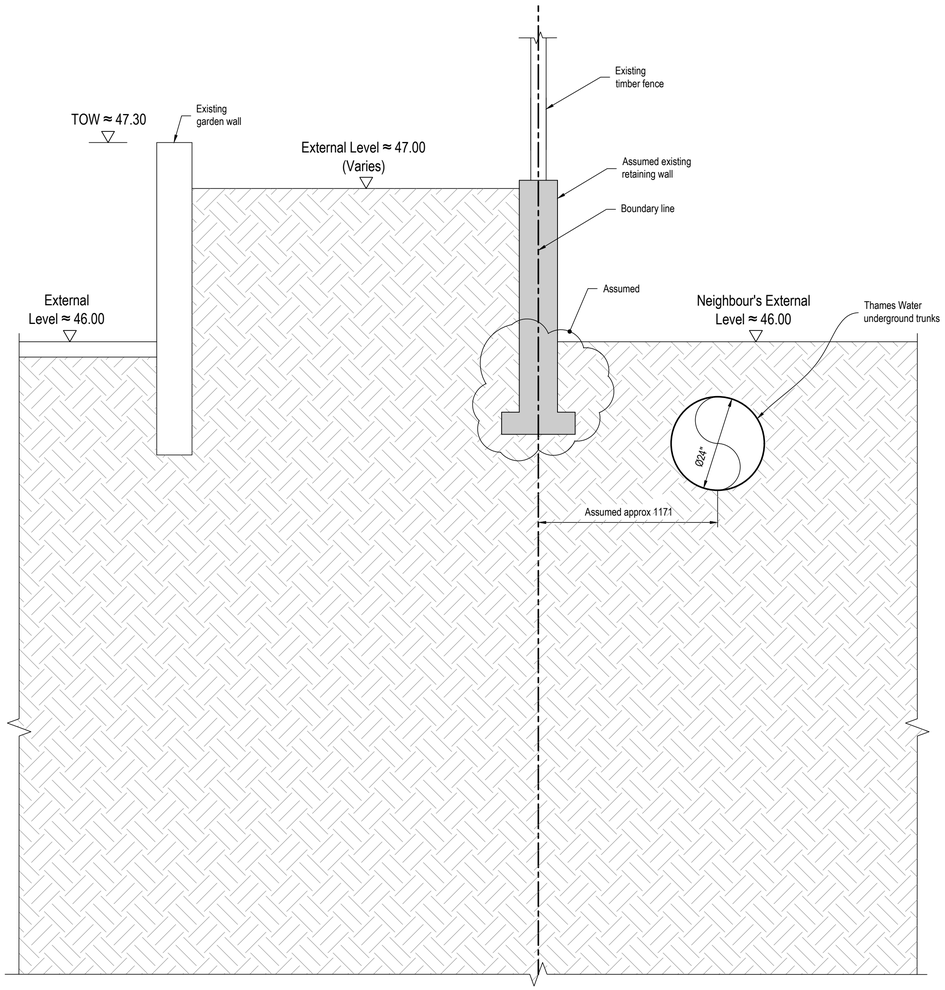
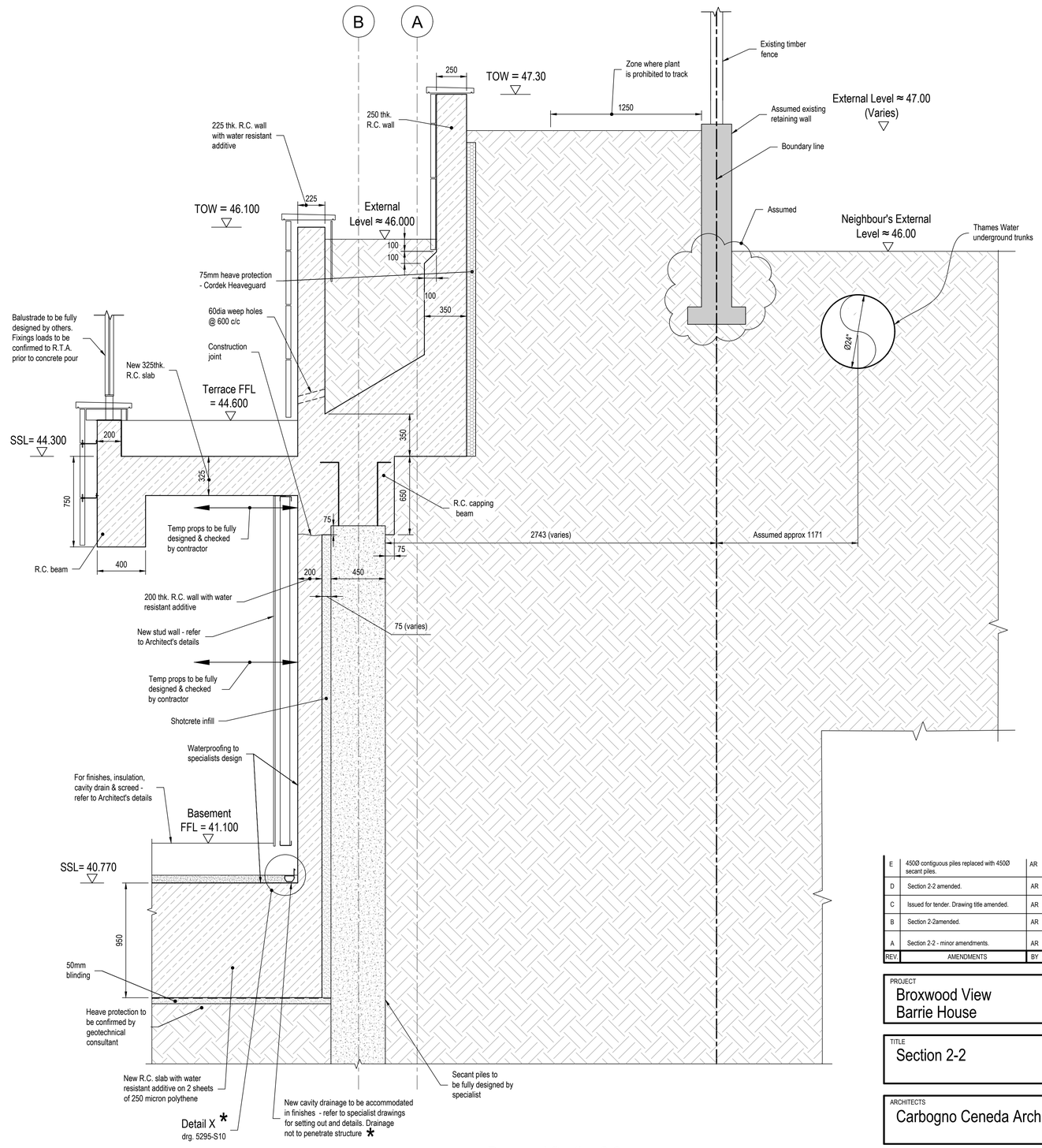


Existing Section 2-2

Scale 1 : 20



Proposed Section 2-2

Scale 1 : 20

* : Details to be fully designed by water proofing specialist & refer to details proposed by water proofing specialist. No liability for water proofing is taken by R.T.A.

Heave protection to be confirmed by geotechnical consultant.

DO NOT CONSTRUCT FROM THIS DRAWING T.B.C. AFTER C.L.T. LOADS CONFIRMED

Tender Issue (for QS purposes only)

Notes.

NOTES

1. This drawing is to be read in conjunction with the specification and all relevant Engineers and Architects drawings.
2. Work to figured dimensions only.
3. For general notes see drawing 5295 - S01.

REV.	AMENDMENTS	BY	DATE	CHECKED
E	450Ø contiguous piles replaced with 450Ø secant piles.	AR	20.02.2023	RT
D	Section 2-2 amended.	AR	27.09.2022	RT
C	Issued for tender. Drawing title amended.	AR	07.09.2022	RT
B	Section 2-2amended.	AR	05.08.2022	RT
A	Section 2-2 - minor amendments.	AR	16.06.2022	RT

PROJECT
Broxwood View
Barrie House

TITLE
Section 2-2

ARCHITECTS
Carbogno Ceneda Architects

DRAWING No.
5295-S11E

DATE	22.04.2022
SCALE	As shown @ A1
DRAWN	AR
CHECKED	RT
REVIEWED	-

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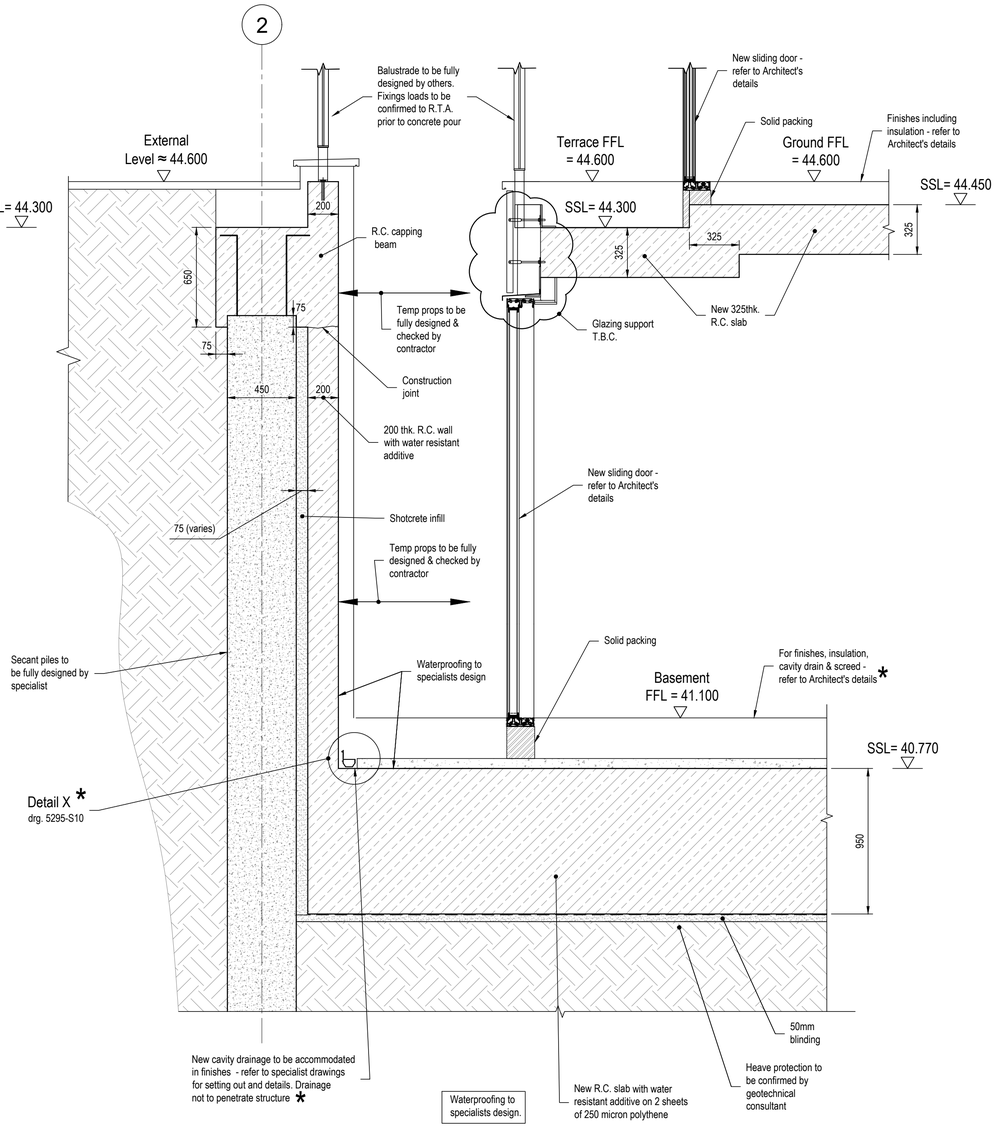
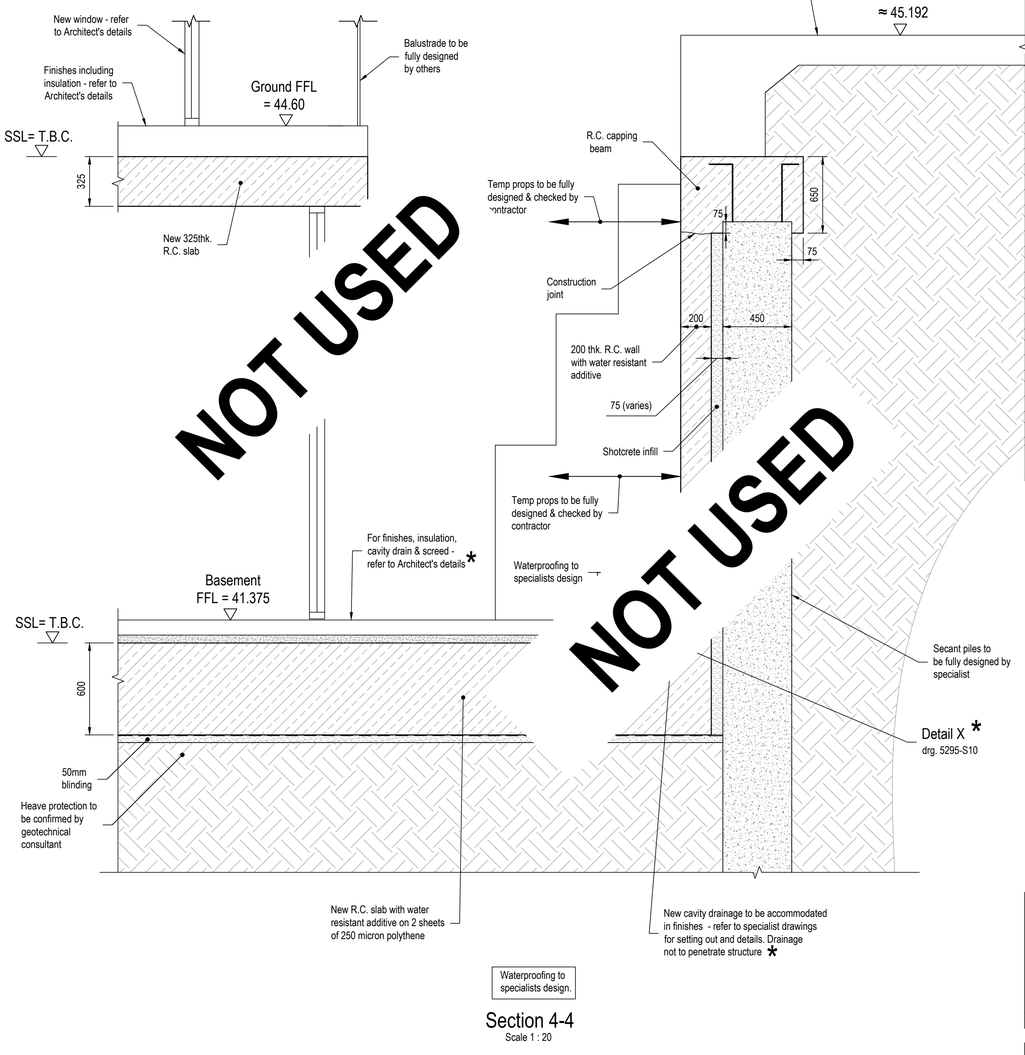


Section 3-3
Scale 1 : 20



Section 4-4
Scale 1 : 20

Heave protection to be confirmed by geotechnical consultant.

* : Details to be fully designed by water proofing specialist & refer to details proposed by water proofing specialist. No liability for water proofing is taken by R.T.A.

DO NOT CONSTRUCT FROM THIS DRAWING T.B.C. AFTER C.L.T. LOADS CONFIRMED

Tender Issue
(for QS purposes only)

Notes.

NOTES

1. This drawing is to be read in conjunction with the specification and all relevant Engineers and Architects drawings.
2. Work to figured dimensions only.
3. For general notes see drawing 5295 - S01.

REV.	AMENDMENTS	BY	DATE	CHECKED
D	Section 3-3 - 450Ø contiguous piles replaced with 450Ø secant piles.	AR	20.02.2023	RT
C	Section 3-3 - R.C. upstand added.	AR	27.09.2022	RT
B	Issued for tender. Drawing title amended.	AR	07.09.2022	RT
A	Section 3-3 amended. Section 4-4 not used.	AR	05.08.2022	RT

PROJECT
Broxwood View
Barrie House

TITLE
Sections 3-3 & 4-4

ARCHITECTS
Carbogno Ceneda Architects

DRAWING No.
5295-S12D

DATE	16.06.2022
SCALE	As shown @ A1
DRAWN	AR
CHECKED	RT
REVIEWED	-

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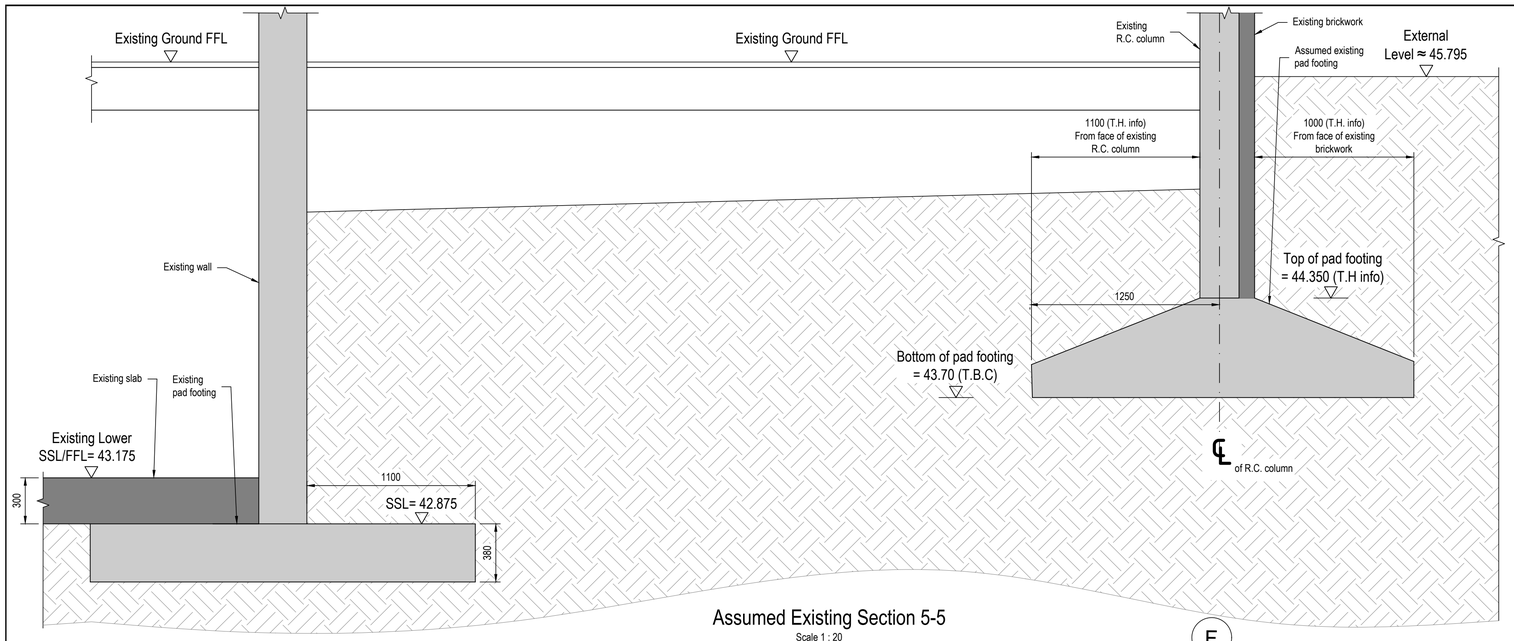
Tender Issue
(for QS purposes only)

DO NOT CONSTRUCT FROM THIS DRAWING T.B.C. AFTER C.L.T. LOADS CONFIRMED

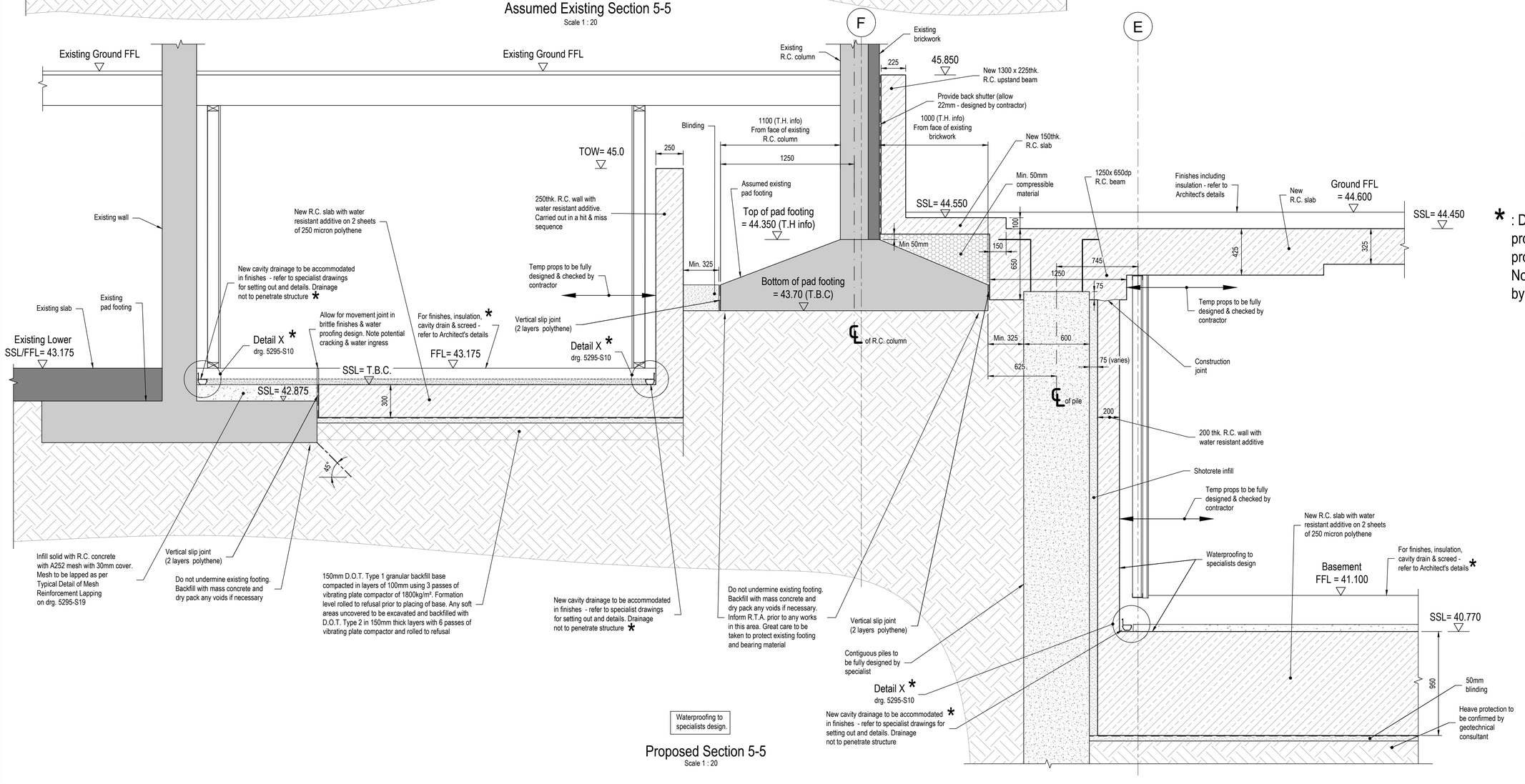
Notes.

NOTES

1. This drawing is to be read in conjunction with the specification and all relevant Engineers and Architects drawings.
2. Work to figured dimensions only.
3. For general notes see drawing 5295 - S01.



Assumed Existing Section 5-5
Scale 1 : 20



Waterproofing to specialists design.

Proposed Section 5-5
Scale 1 : 20

Heave protection to be confirmed by geotechnical consultant.

* : Details to be fully designed by water proofing specialist & refer to details proposed by water proofing specialist. No liability for water proofing is taken by R.T.A.

REV.	AMENDMENTS	BY	DATE	CHECKED
G	600Ø secant piles replaced with 600Ø contiguous piles.	AR	23.02.2023	RT
F	600Ø contiguous piles replaced with 600Ø secant piles.	AR	20.02.2023	RT
E	Section 5-5 - piles / RC wall distance from existing pads clarified.	AR	31.01.2023	RT
D	Section 5-5 - minor amendments.	AR	27.09.2022	RT
C	Issued for tender. Drawing title amended. Section 5-5 amended.	AR	07.09.2022	RT
B	Section 5-5 amended.	AR	05.08.2022	RT
A	Section 5-5 amended.	AR	30.06.2022	RT

PROJECT
Broxwood View
Barrie House

TITLE
Section 5-5

ARCHITECTS
Carbogno Ceneda Architects

DRAWING No.
5295-S13G

DATE	16.06.2022
SCALE	As shown @ A1
DRAWN	AR
CHECKED	RT
REVIEWED	-

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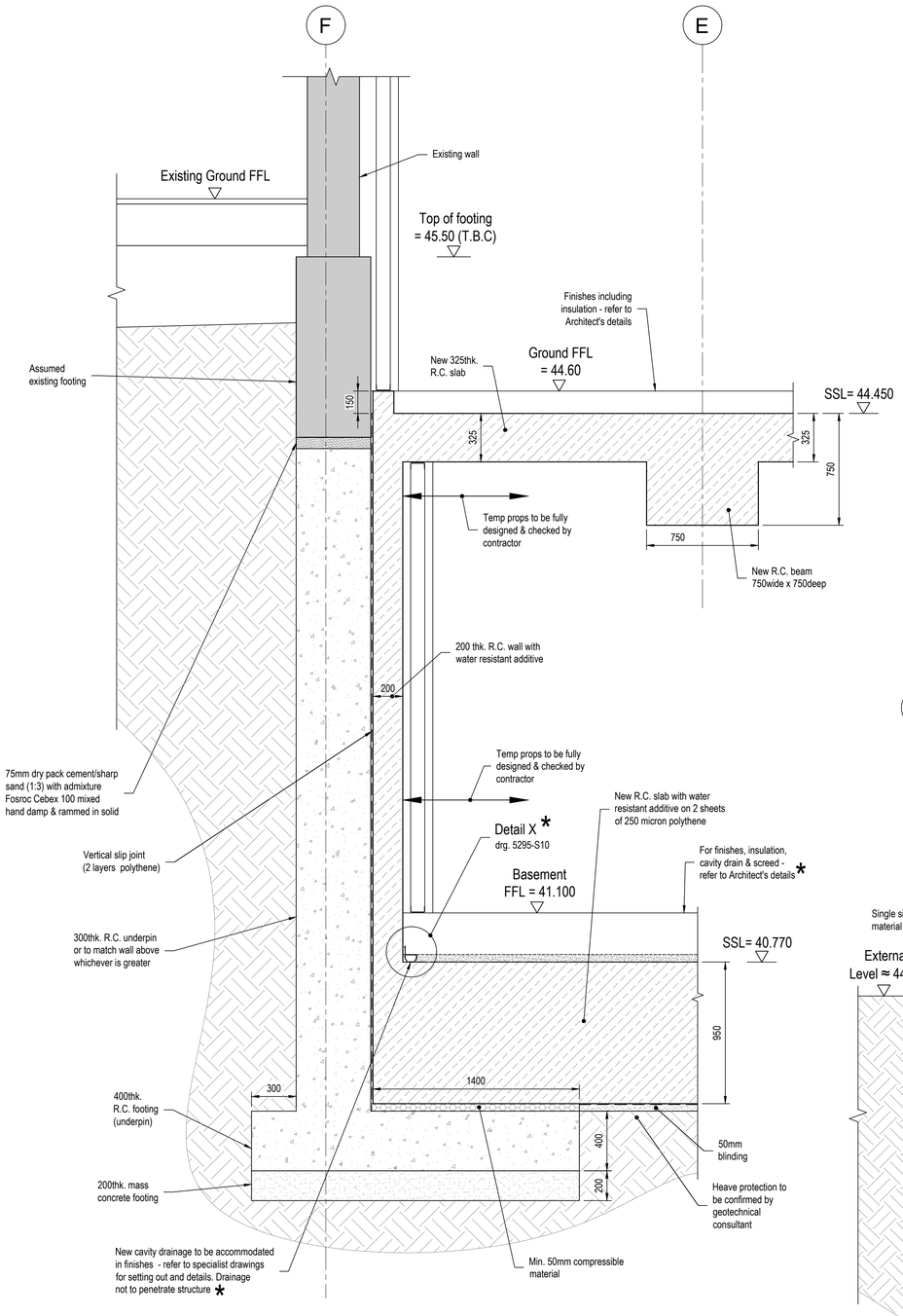
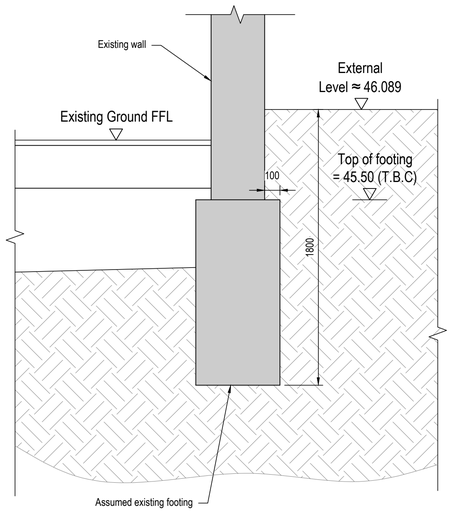
Notes.

NOTES

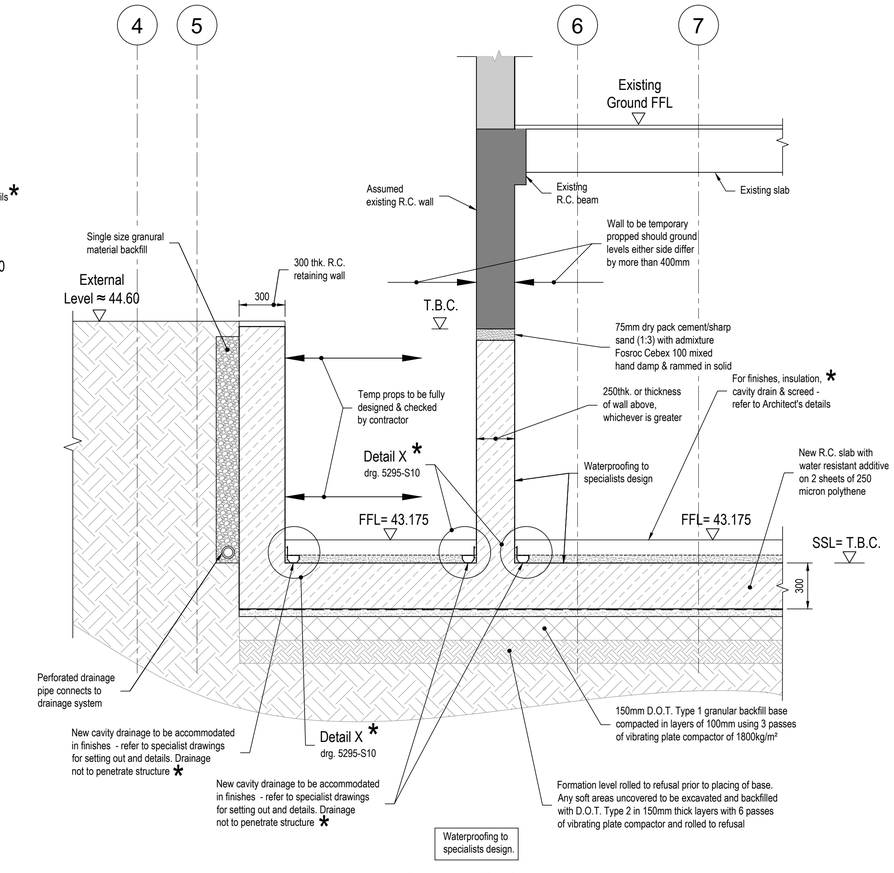
1. This drawing is to be read in conjunction with the specification and all relevant Engineers and Architects drawings.
2. Work to figured dimensions only.
3. For general notes see drawing 5295 - S01.



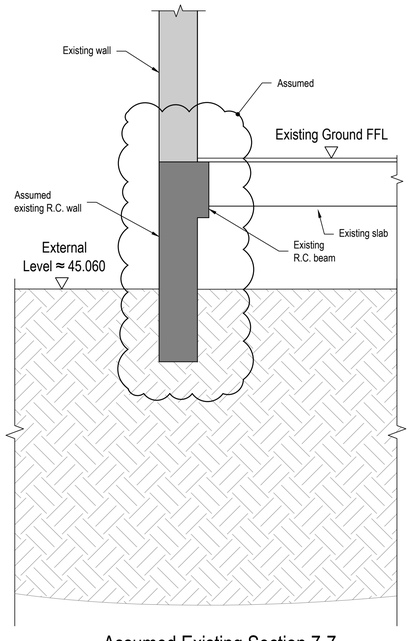
Proposed Section 6-6
Scale 1 : 20



Existing Section 6-6
Scale 1 : 20



Proposed Section 7-7
Scale 1 : 20



Assumed Existing Section 7-7
Scale 1 : 20

* : Details to be fully designed by water proofing specialist & refer to details proposed by water proofing specialist. No liability for water proofing is taken by R.T.A.

DO NOT CONSTRUCT FROM THIS DRAWING T.B.C. AFTER C.L.T. LOADS CONFIRMED

Heave protection to be confirmed by geotechnical consultant.

Tender Issue
(for QS purposes only)

REV.	AMENDMENTS	BY	DATE	CHECKED
D	Section 6-6 - mass concrete footing added.	AR	27.09.2022	RT
C	Issued for tender. Drawing title amended. Section 6-6 amended.	AR	07.09.2022	RT
B	Section 6-6 amended.	AR	5.08.2022	RT
A	Section 6-6 amended.	AR	30.06.2022	RT

PROJECT
Broxwood View
Barrie House

TITLE
Sections 6-6 & 7-7

ARCHITECTS
Carbogno Ceneda Architects

DRAWING No.
5295-S14D

DATE	16.06.2022
SCALE	As shown @ A1
DRAWN	AR
CHECKED	RT
REVIEWED	-

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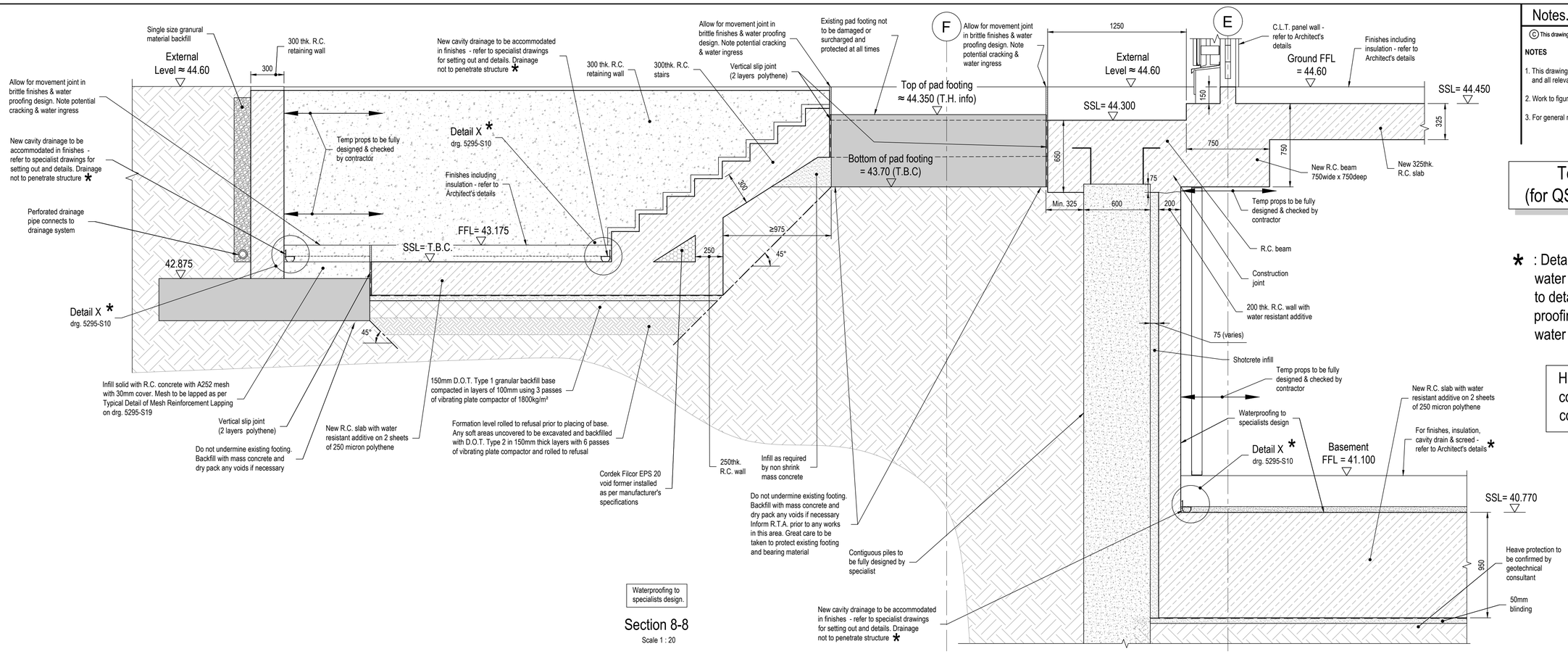

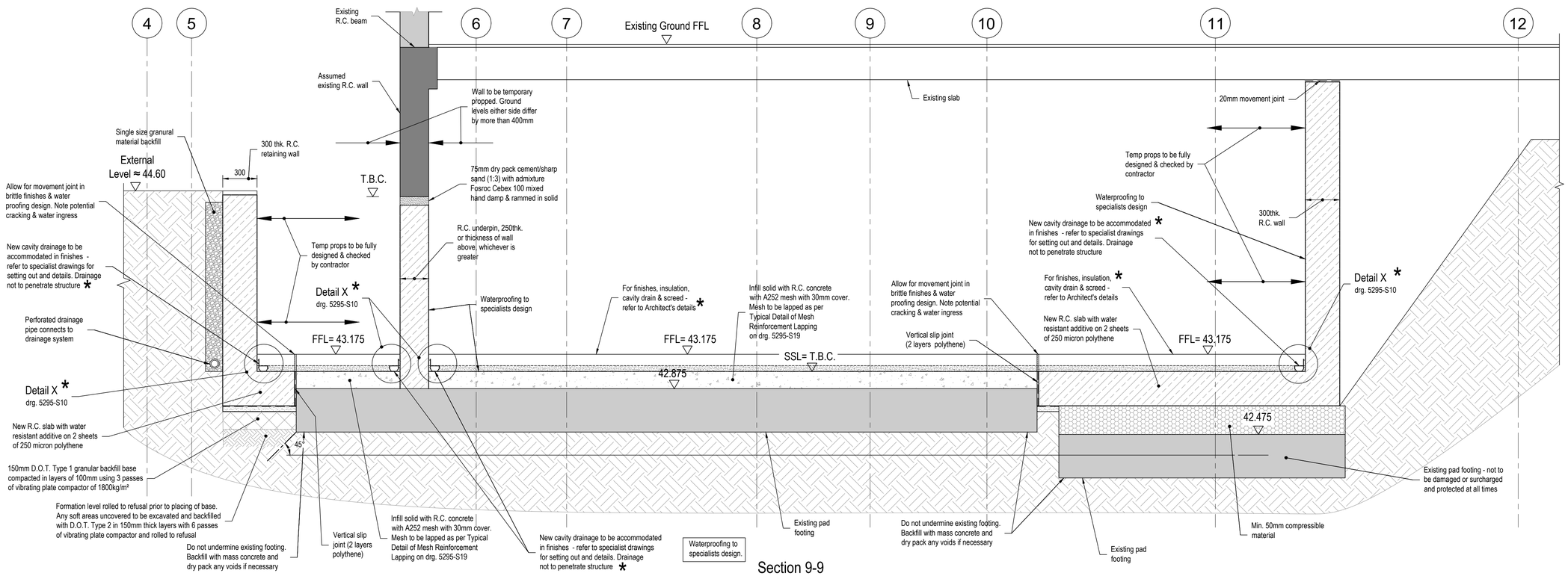

Section 9-9
Scale 1 : 20

Notes.

NOTES

1. This drawing is to be read in conjunction with the specification and all relevant Engineers and Architects drawings.
2. Work to figured dimensions only.
3. For general notes see drawing 5295 - S01.

Tender Issue (for QS purposes only)

* : Details to be fully designed by water proofing specialist & refer to details proposed by water proofing specialist. No liability for water proofing is taken by R.T.A.

Heave protection to be confirmed by geotechnical consultant.

DO NOT CONSTRUCT FROM THIS DRAWING T.B.C. AFTER C.L.T. LOADS CONFIRMED

REV.	AMENDMENTS	BY	DATE	CHECKED
F	Section 8-8 - 600Ø secant piles replaced with 600Ø contiguous piles.	AR	23.02.2023	RT
E	Section 8-8 - 600Ø contiguous piles replaced with 600Ø secant piles.	AR	20.02.2023	RT
D	Section 8-8 - piles distance from existing pads clarified.	AR	31.01.2023	RT
C	Issued for tender. Drawing title amended. Section 8-8 amended.	AR	07.09.2022	RT
B	Section 8-8 amended.	AR	05.08.2022	RT
A	Sections 8-8 & 9-9 amended.	AR	30.06.2022	RT

PROJECT
Broxwood View
Barrie House

TITLE
Sections 8-8 & 9-9

ARCHITECTS
Carbogno Ceneda Architects

DRAWING No.
5295-S15F

DATE	16.06.2022
SCALE	As shown @ A1
DRAWN	AR
CHECKED	RT
REVIEWED	-

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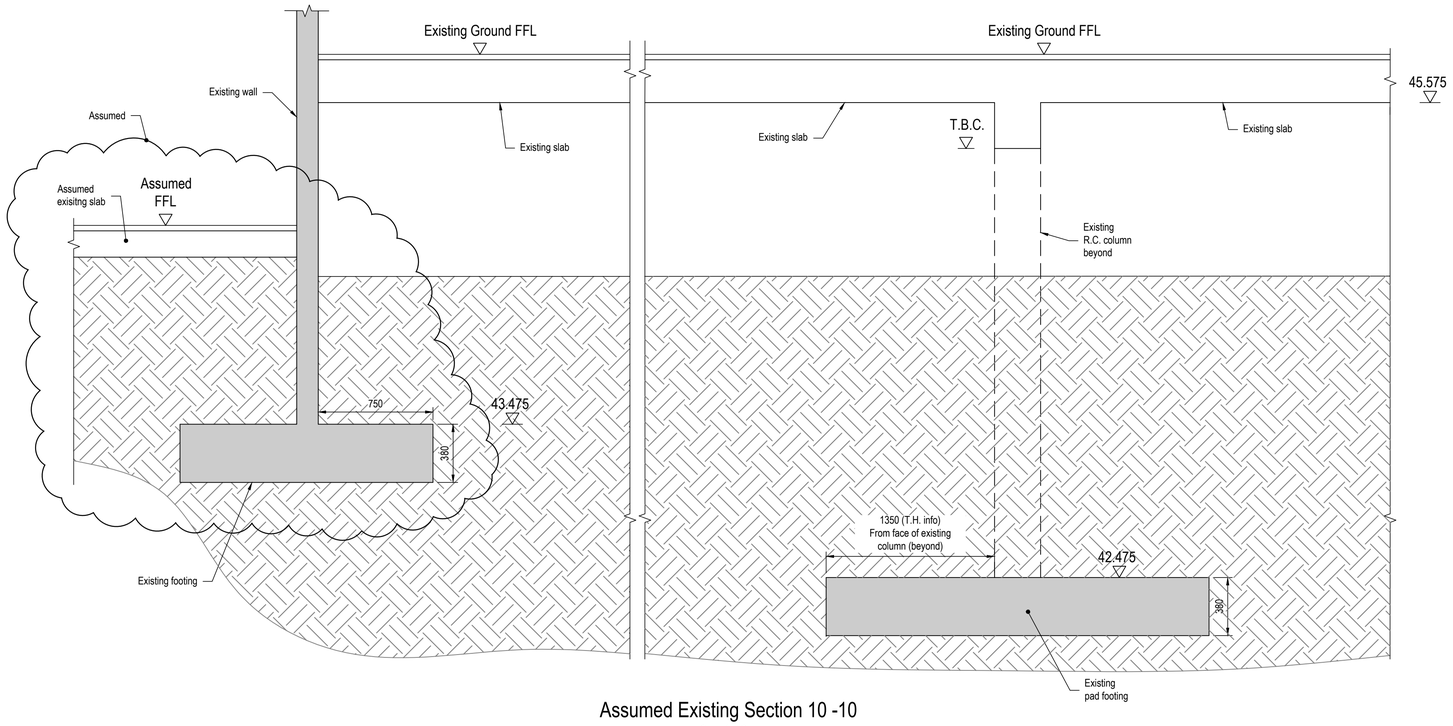
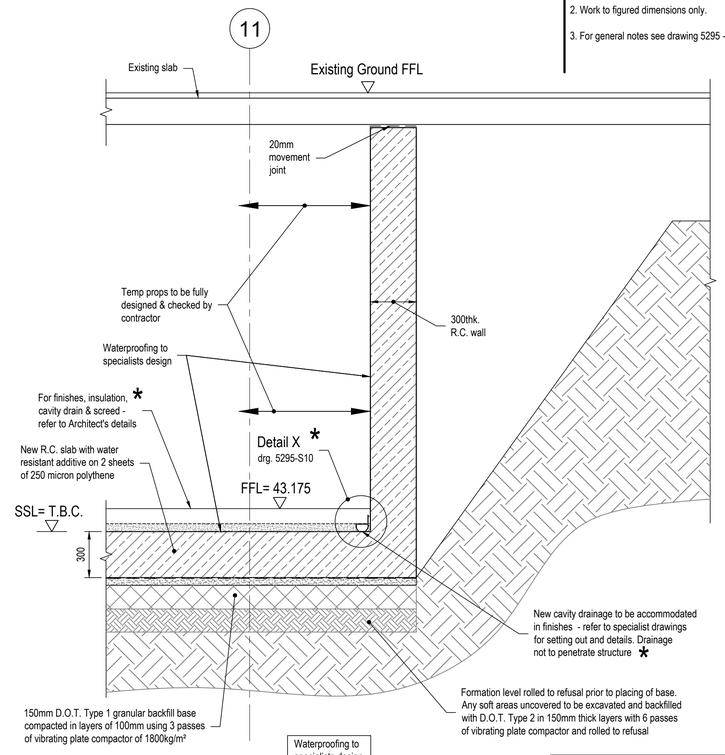


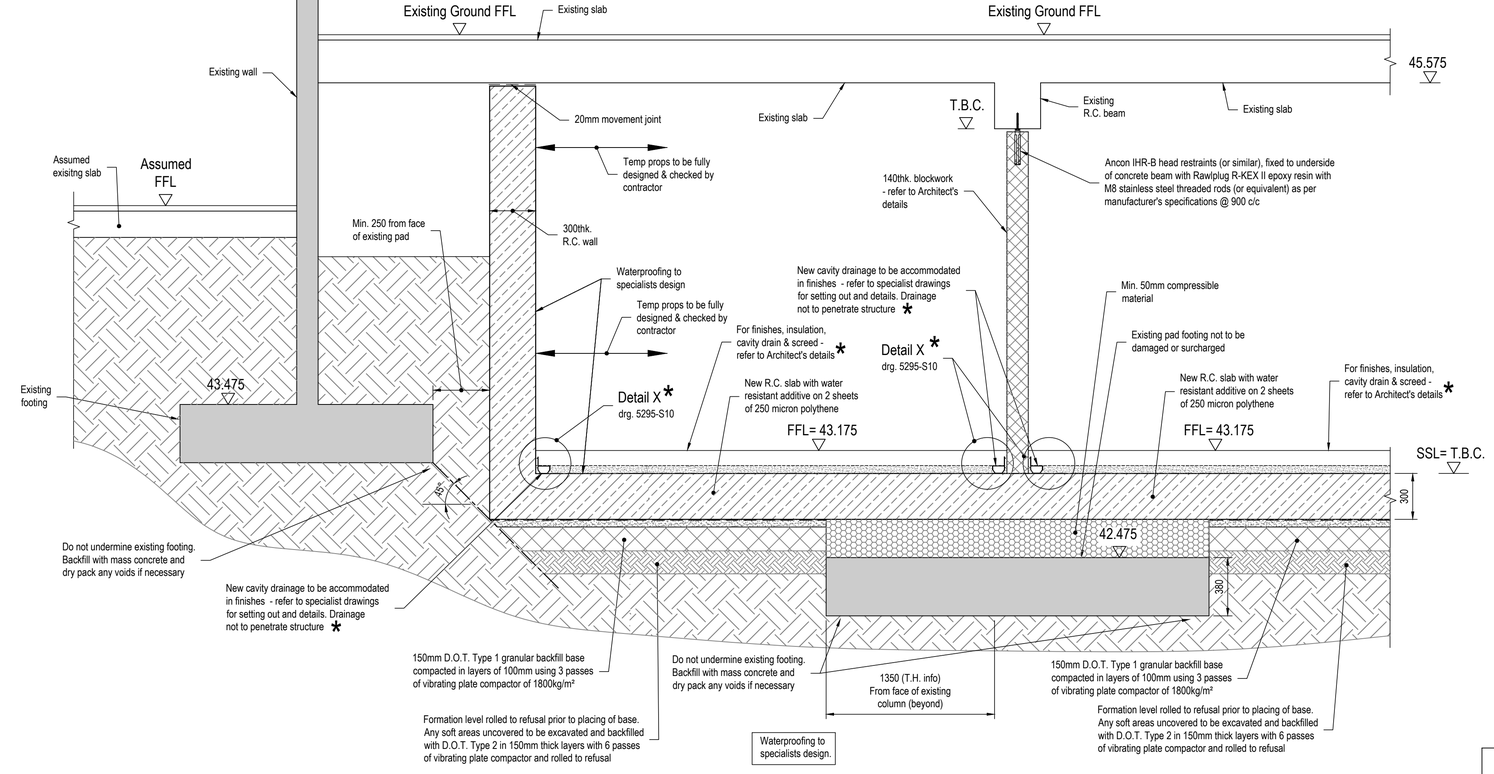
Assumed Existing Section 10 -10

Scale 1 : 20



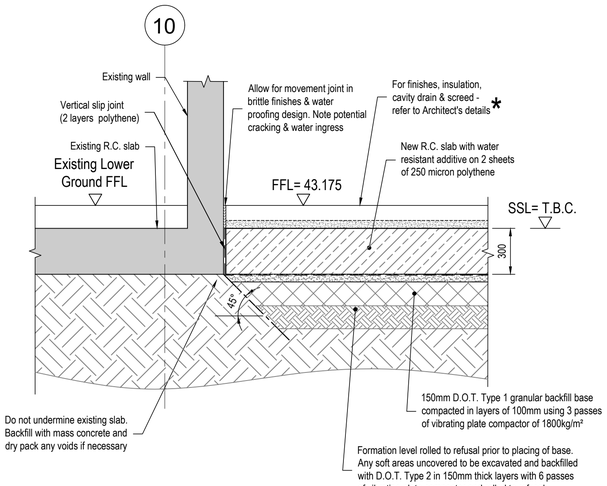
Section 11 -11

Scale 1 : 20



Proposed Section 10 -10

Scale 1 : 20



Section 12 -12

Scale 1 : 20

DO NOT CONSTRUCT FROM THIS DRAWING T.B.C. AFTER C.L.T. LOADS CONFIRMED

TENDER ISSUE

Notes.

NOTES

1. This drawing is to be read in conjunction with the specification and all relevant Engineers and Architects drawings.
2. Work to figured dimensions only.
3. For general notes see drawing 5295 - S01.

Heave protection to be confirmed by geotechnical consultant.

* : Details to be fully designed by water proofing specialist & refer to details proposed by water proofing specialist. No liability for water proofing is taken by R.T.A.

REV.	AMENDMENTS	BY	DATE	CHECKED
C	Issued for tender. Drawing title amended.	AR	06.09.2022	RT
B	Sections 11-11 & 12-12 - grid lines added.	AR	5.8.2022	RT
A	Sections 10-10 & 11-11 amended.	AR	30.06.2022	RT

PROJECT
Broxwood View
Barrie House

TITLE
Sections 10-10, 11-11 & 12-12

ARCHITECTS
Carbogno Ceneda Architects

DRAWING No.
5295-S16C

DATE	16.06.2022
SCALE	As shown @ A1
DRAWN	AR
CHECKED	RT
REVIEWED	-

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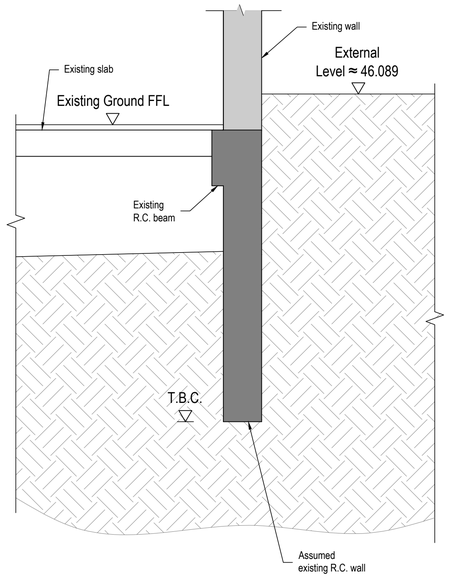
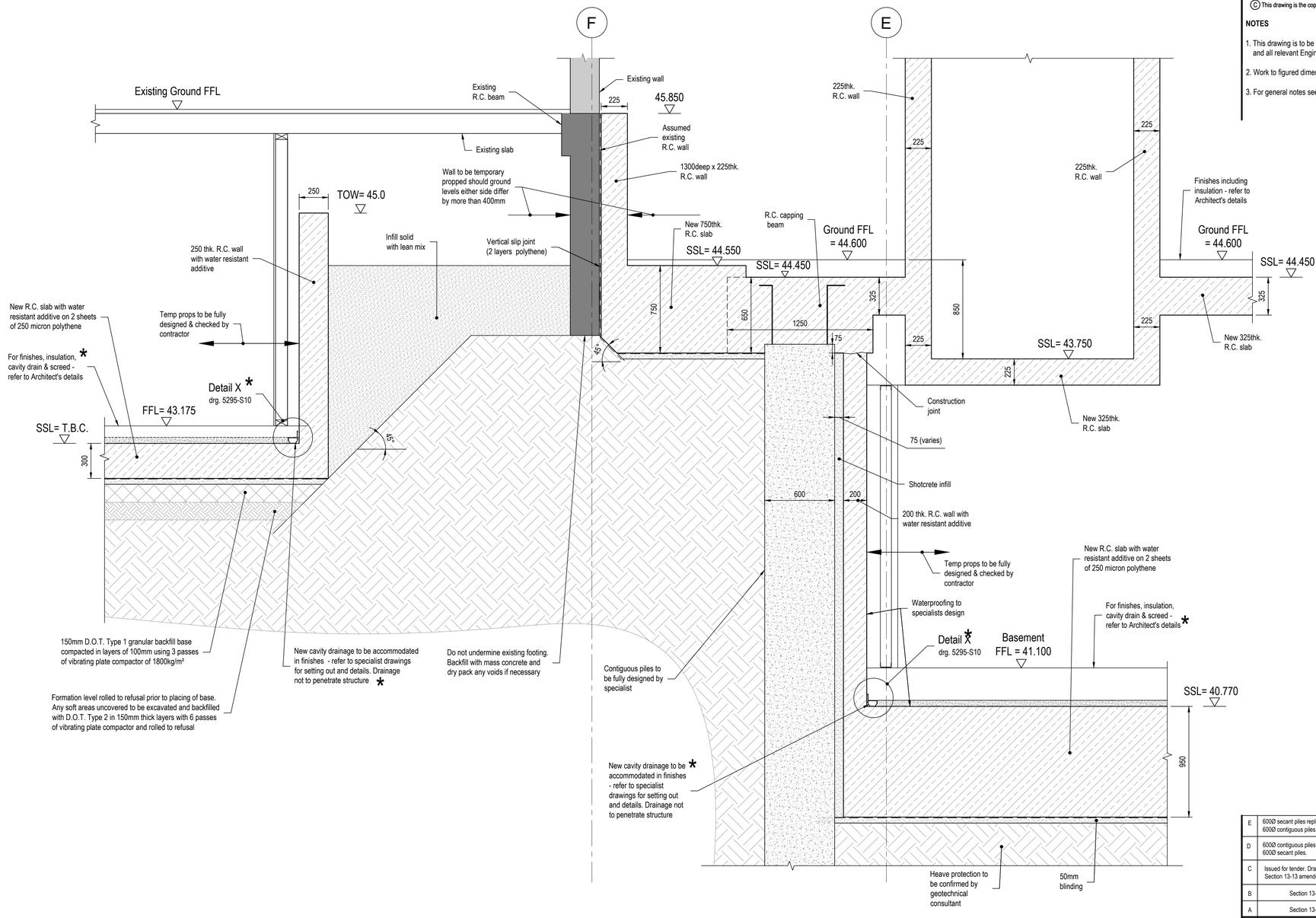


Assumed Existing Section 13-13

Scale 1 : 20



Waterproofing to specialists design.

Proposed Section 13-13

Scale 1 : 20

Heave protection to be confirmed by geotechnical consultant.

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DO NOT CONSTRUCT FROM THIS DRAWING T.B.C. AFTER C.L.T. LOADS CONFIRMED

Tender Issue
(for QS purposes only)

Notes.

NOTES

1. This drawing is to be read in conjunction with the specification and all relevant Engineers and Architects drawings.
2. Work to figured dimensions only.
3. For general notes see drawing 5295 - S01.

REV.	AMENDMENTS	BY	DATE	CHECKED
E	600Ø secant piles replaced with 600Ø contiguous piles.	AR	23.02.2023	RT
D	600Ø contiguous piles replaced with 600Ø secant piles.	AR	20.02.2023	RT
C	Issued for tender. Drawing title amended. Section 13-13 amended.	AR	07.09.2022	RT
B	Section 13-13 amended.	AR	05.08.2022	RT
A	Section 13-13 amended.	AR	30.06.2022	RT

PROJECT
Broxwood View
Barrie House

TITLE
Section 13-13

ARCHITECTS
Carbogno Ceneda Architects

DRAWING No.
5295-S17E

DATE	16.06.2022
SCALE	As shown @ A1
DRAWN	AR
CHECKED	RT
REVIEWED	-

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