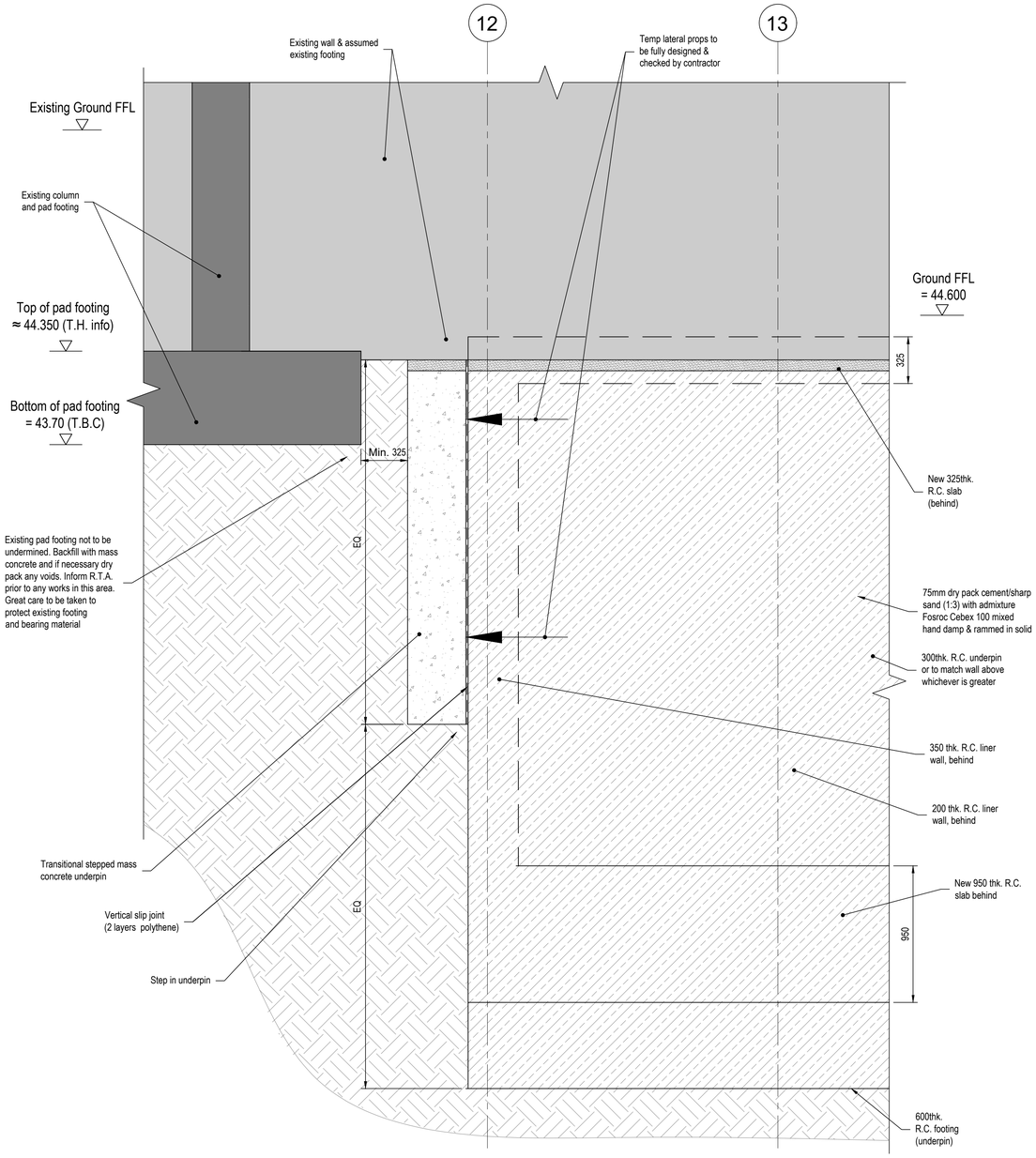

Waterproofing to specialists design.

Section 14-14

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.

REV.	AMENDMENTS	BY	DATE	CHECKED
D	Section 14-14 - underpin distance from existing pads clarified.	AR	31.01.2023	RT
C	Issued for tender. Drawing title amended. Section 14-14 amended.	AR	07.09.2022	RT
B	Section 14-14 - levels amended.	AR	05.08.2022	RT
A	Section 14-14 amended.	AR	30.06.2022	RT

PROJECT
Broxwood View
Barrie House

TITLE
Section 14-14

ARCHITECTS
Carbogno Ceneda Architects

DRAWING No.
5295-S18D

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

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

Tender Issue
(for QS purposes only)

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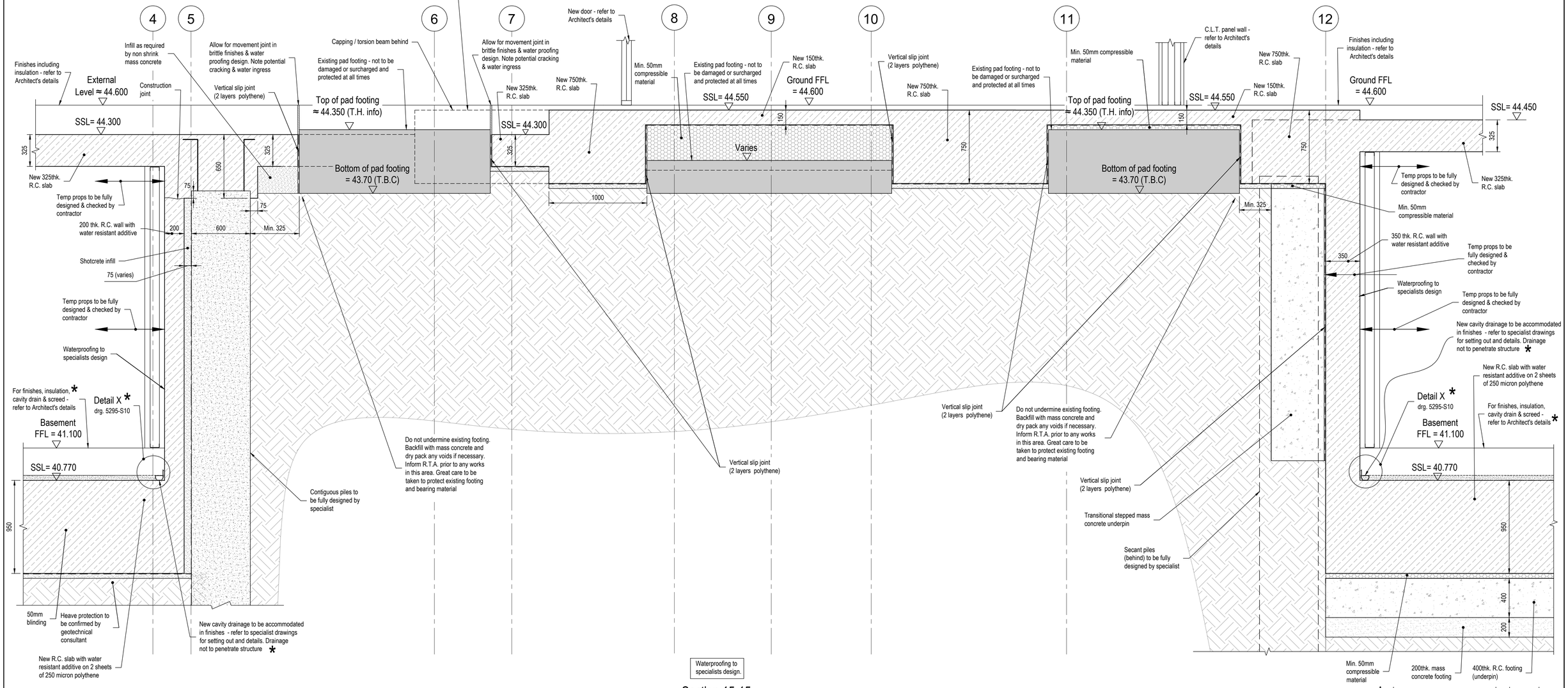
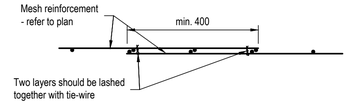


Section 15-15

Scale 1 : 20



Typical Detail of Mesh Reinforcement Lapping

Scale 1 : 10

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
F	600Ø secant piles replaced with 600Ø contiguous piles.	AR	23.02.2023	RT
E	600Ø contiguous piles replaced with 600Ø secant piles.	AR	20.02.2023	RT

PROJECT
Broxwood View
Barrie House

TITLE
Section 15-15

ARCHITECTS
Carbogno Ceneda Architects

DRAWING No.
5295-S19F

DATE	30.06.2022
SCALE	As shown @ A1
DRAWN	AR
CHECKED	RT
REVIEWED	-

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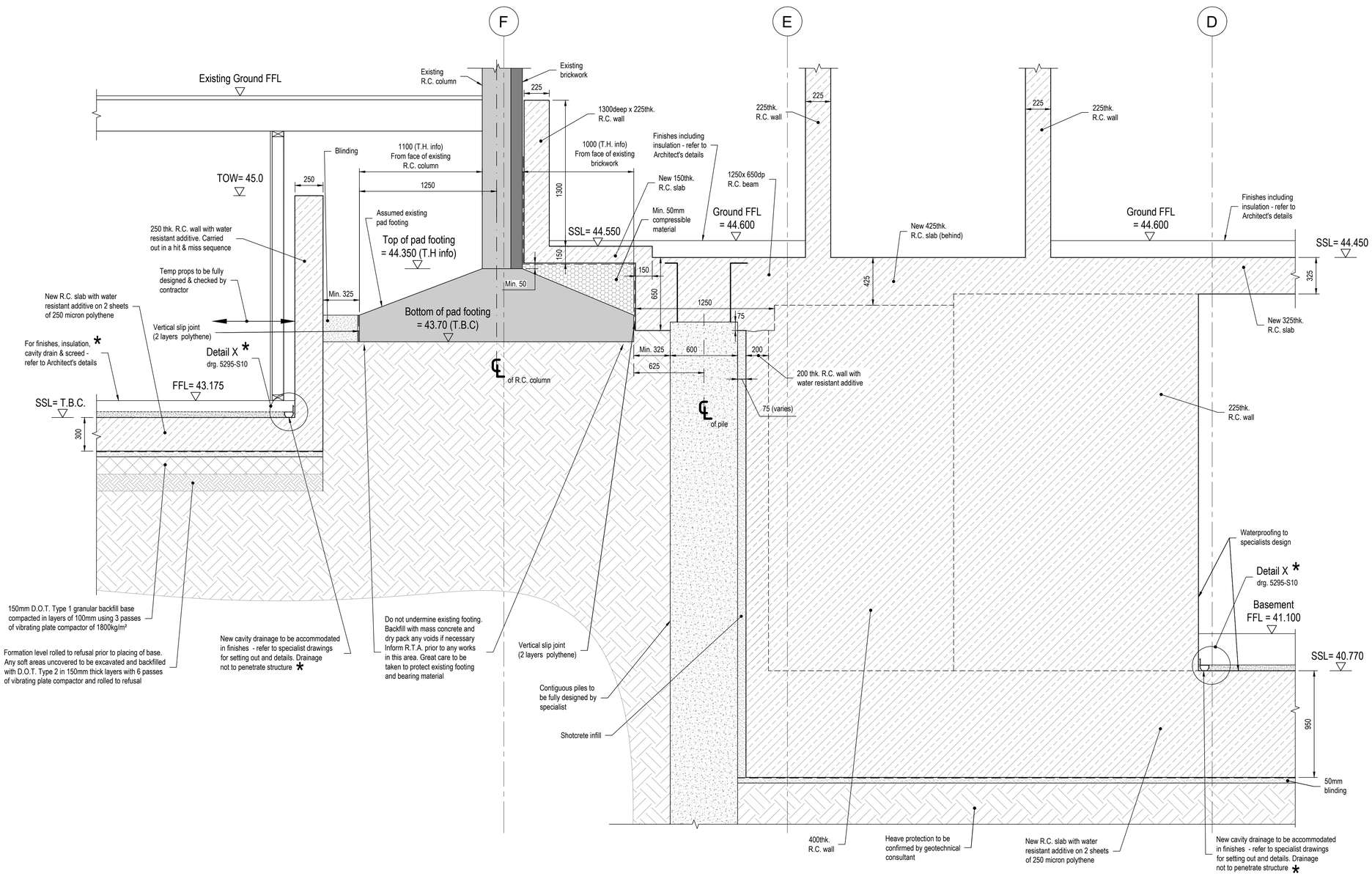

Waterproofing to specialists design.

Section 16-16

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	600Ø secant piles replaced with 600Ø contiguous piles.	AR	23.02.2023	RT
C	600Ø contiguous piles replaced with 600Ø secant piles.	AR	20.02.2023	RT
B	Section 16-16 - piles / RC wall distance from existing pads clarified.	AR	31.01.2023	RT
A	Issued for tender. Drawing title amended. Section 16-16 amended.	AR	07.09.2022	RT

PROJECT
Broxwood View
Barrie House

TITLE
Section 16-16

ARCHITECTS
Carbogno Ceneda Architects

DRAWING No.
5295-S20D

DATE	05.08.2022
SCALE	As shown @ A1
DRAWN	AR
CHECKED	RT
REVIEWED	-

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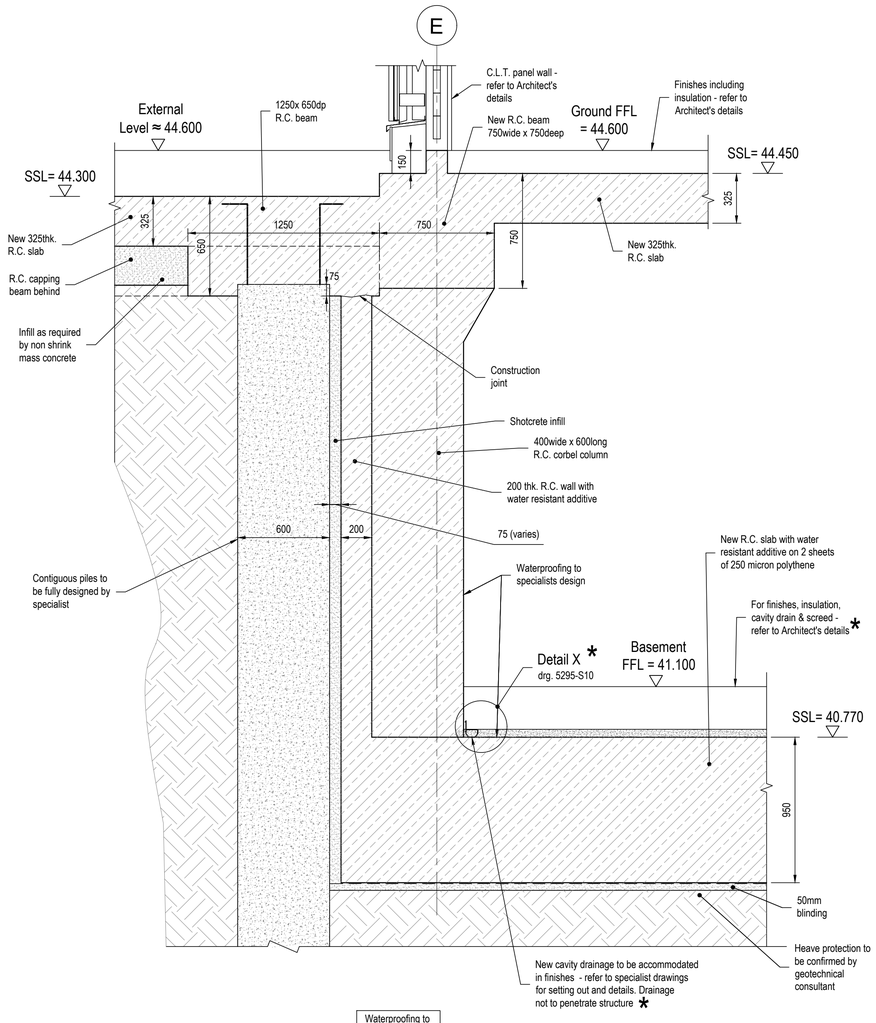

Waterproofing to specialists design.

Section 17-17

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
C	600Ø secant piles replaced with 600Ø contiguous piles.	AR	23.02.2023	RT
B	Section 8-8 - 600Ø contiguous piles replaced with 600Ø secant piles.	AR	20.02.2023	RT
A	Issued for tender. Drawing title amended. Section 17-17 amended.	AR	07.09.2022	RT

PROJECT
Broxwood View
Barrie House

TITLE
Section 17-17

ARCHITECTS
Carbogno Ceneda Architects

DRAWING No.
5295-S21C

DATE	05.08.2022
SCALE	As shown @ A1
DRAWN	AR
CHECKED	RT
REVIEWED	-

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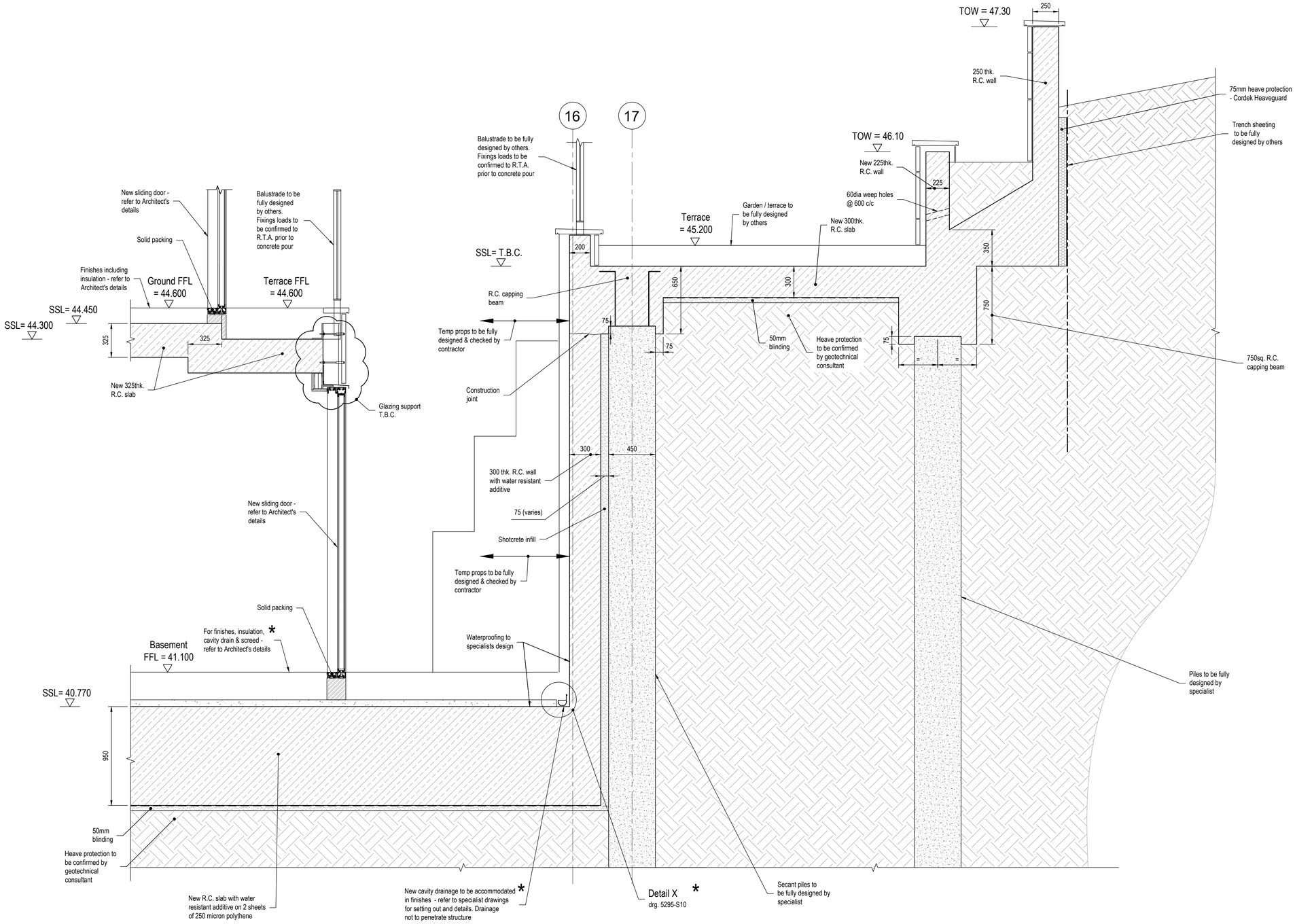

Waterproofing to specialists design.

Section 18-18

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.

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.

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

REV.	AMENDMENTS	BY	DATE	CHECKED
C	450Ø contiguous piles replaced with 450Ø secant piles.	AR	20.02.2023	RT
B	Section 18-18 amended.	AR	27.09.2022	RT
A	Issued for tender. Drawing title amended.	AR	07.09.2022	RT

PROJECT
Broxwood View
Barrie House

TITLE
Section 18-18

ARCHITECTS
Carbogno Ceneda Architects

DRAWING No.
5295-S22C

DATE	05.08.2022
SCALE	As shown @ A1
DRAWN	AR
CHECKED	RT
REVIEWED	-

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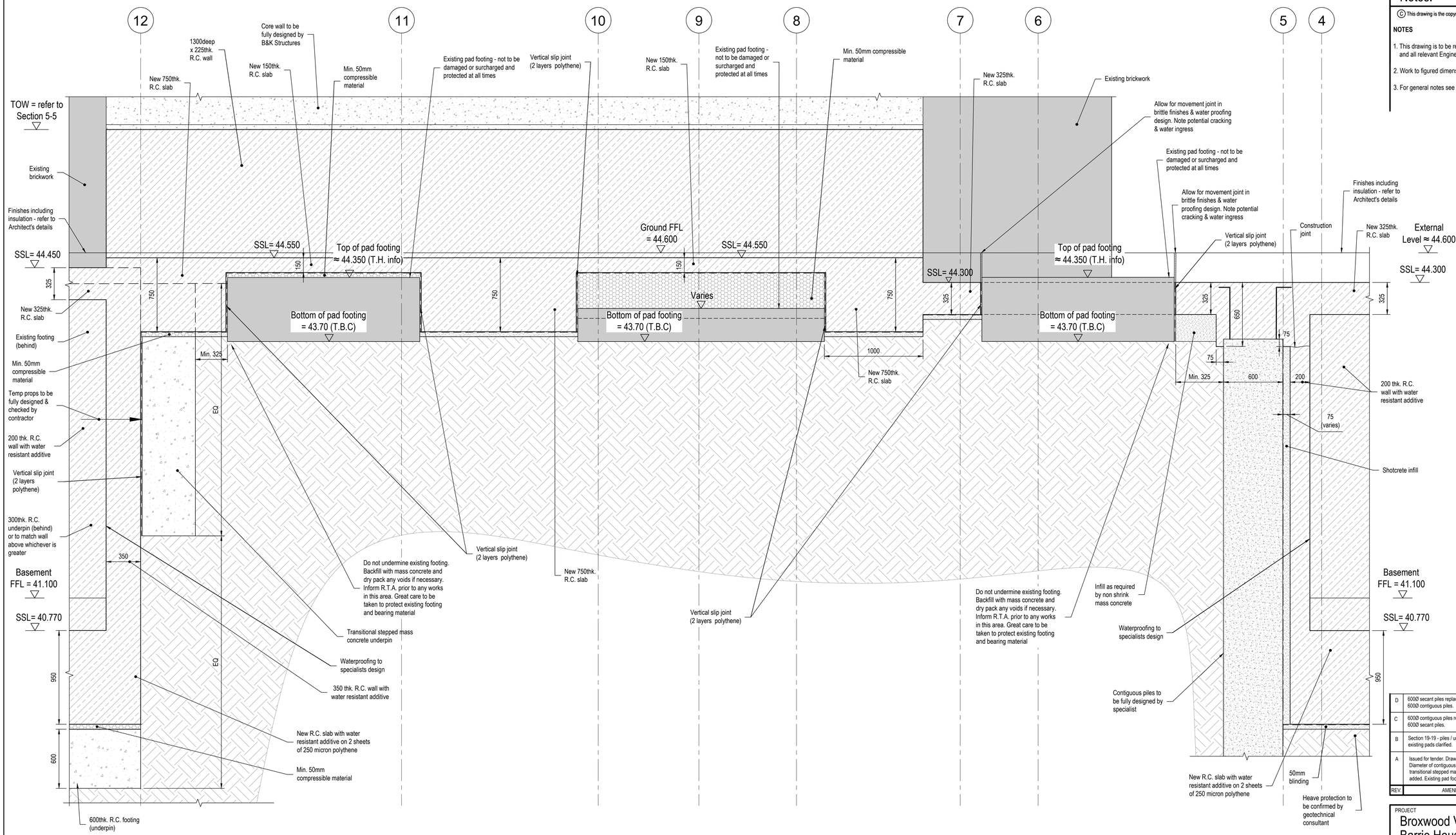

Waterproofing to specialists design.

Section 19-19

Scale 1 : 20

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

* : 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.

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 replaced with 600Ø contiguous piles.	AR	23.02.2023	RT
C	600Ø contiguous piles replaced with 600Ø secant piles.	AR	20.02.2023	RT
B	Section 19-19 - piles / underpin distance from existing pads clarified.	AR	31.01.2023	RT
A	Issued for tender. Drawing title amended. Diameter of contiguous piles amended & transitional stepped mass concrete underpin added. Existing pad footings updated.	AR	07.09.2022	RT

PROJECT
Broxwood View
Barrie House

TITLE
Section 19-19

ARCHITECTS
Carbogno Ceneda Architects

DRAWING No.
5295-S23D

DATE	05.08.2022
SCALE	As shown @ A1
DRAWN	AR
CHECKED	RT
REVIEWED	-

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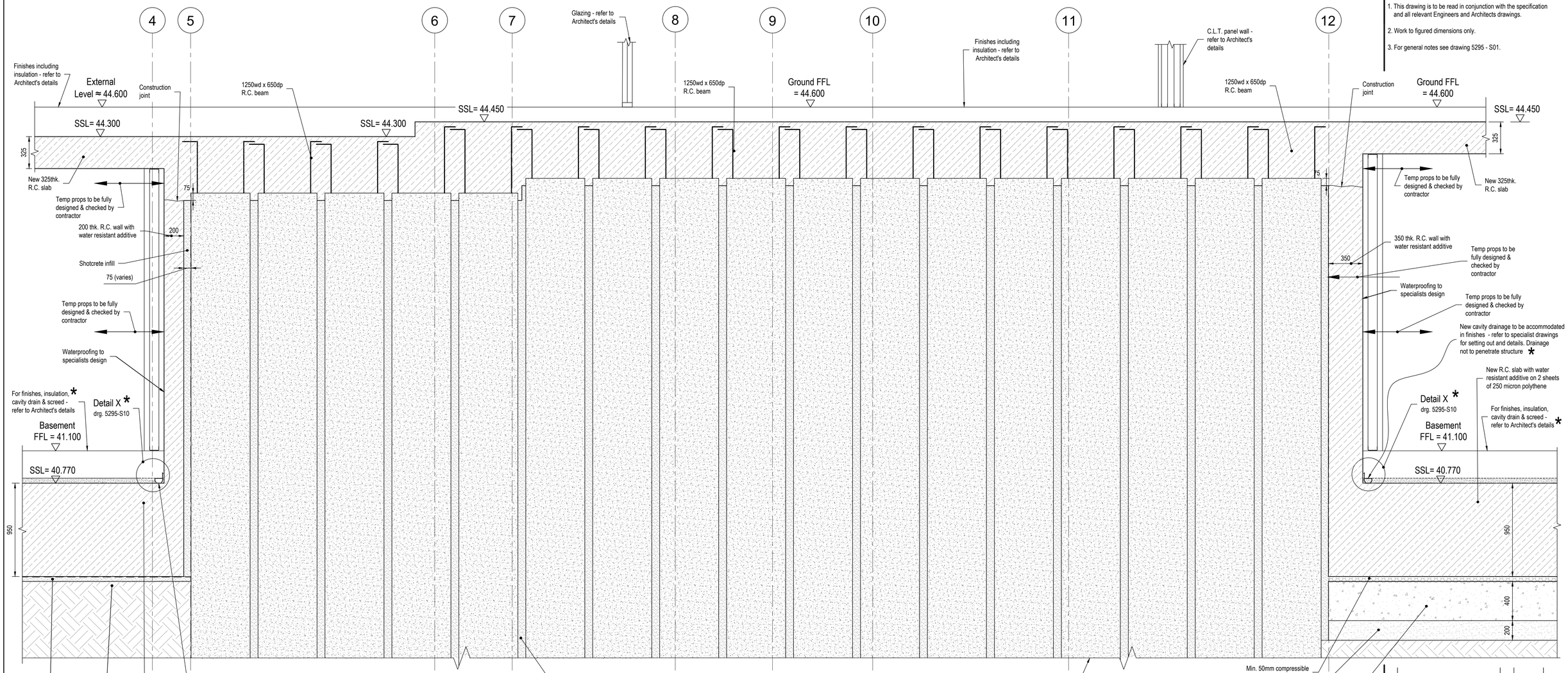

Waterproofing to specialists design.

Section 20-20

Scale 1 : 20

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

* : 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.

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
B	600Ø secant piles replaced with 600Ø contiguous piles.	AR	23.02.2023	RT
A	600Ø contiguous piles replaced with 600Ø secant piles.	AR	20.02.2023	RT

PROJECT
Broxwood View
Barrie House

TITLE
Section 20-20

ARCHITECTS
Carbogno Ceneda Architects

DRAWING No.
5295-S24B

DATE	27.09.2022
SCALE	As shown @ A1
DRAWN	AR
CHECKED	RT
REVIEWED	-

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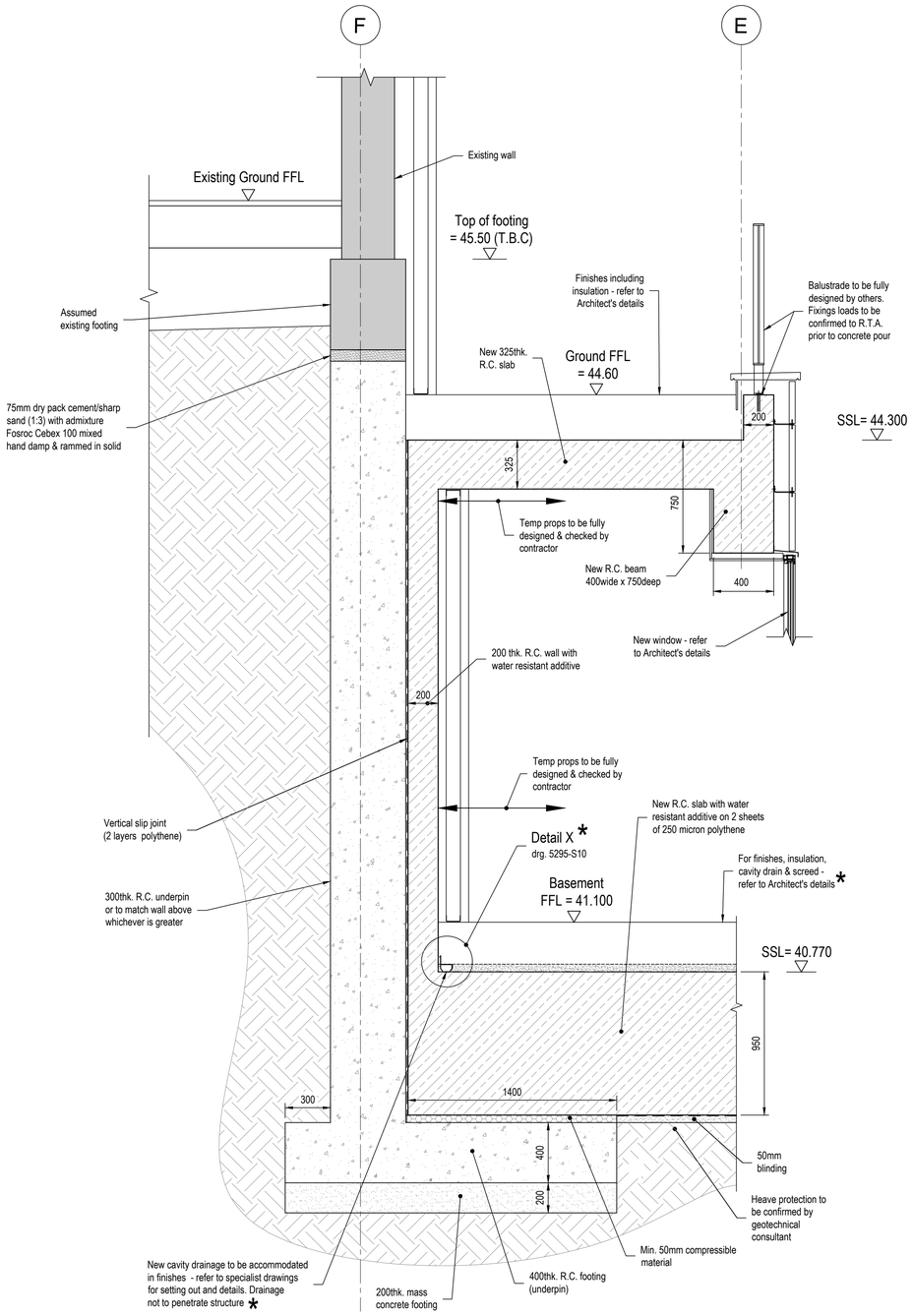
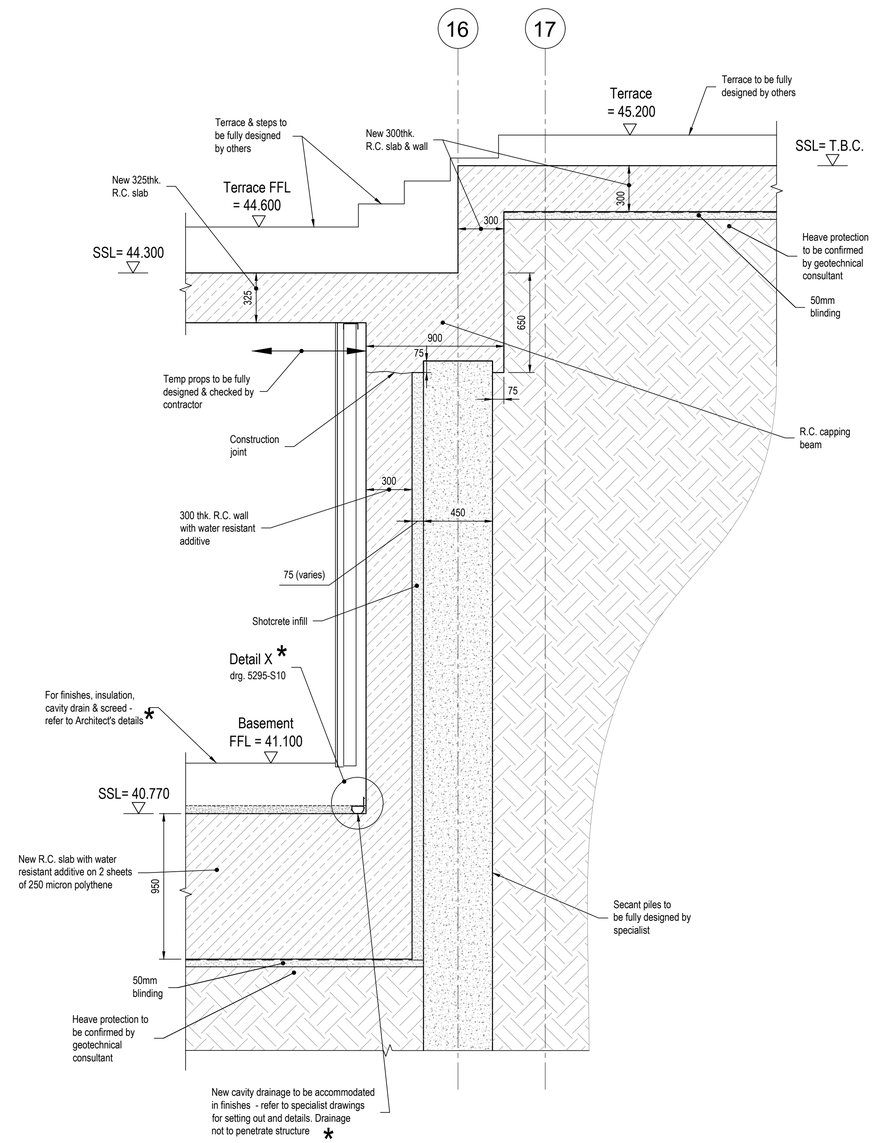


Waterproofing to specialists design.

Section 21-21
Scale 1 : 20



Waterproofing to specialists design.

Section 22-22
Scale 1 : 20

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

* : 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.

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
A	Section 22-22 - 450Ø contiguous piles replaced with 450Ø secant piles.	AR	20.02.2023	RT

PROJECT
Broxwood View
Barrie House

TITLE
Sections 21-21 & 22-22

ARCHITECTS
Carbogno Ceneda Architects

DRAWING No.
5295-S25A

DATE	27.09.2022
SCALE	As shown @ A1
DRAWN	AR
CHECKED	RT
REVIEWED	-

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APPENDIX C

Arboricultural Report

1-38-4326/2

R E P O R T

on the impact on trees

of proposals for development

at

Barrie House,

29 St Edmunds Terrace,

London, NW8 7QH

(24th September 2018)

JOHN CROMAR'S ARBORICULTURAL COMPANY LIMITED

The Old School
Titley
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Registered Consultant of the Arboricultural Association
John Cromar, Dip. Arb. (RFS), F.Arbor A.

01
Introduction and Instructions

I am instructed by Marek Wojciechowski Architects Ltd on behalf of clients to make an assessment of tree amenity value and condition of trees at Barrie House, 29 St Edmunds Terrace, London, NW8 7QH and of the impact of a proposal for development (a residential apartment block) on such trees. Accordingly, I visited the property on 22nd November, 2017 in order to carry out an inspection.

02
Copyright

02.01

03
Notes

03.01
PLANS
1-38-4326/P1 gives an approximate representation (in plan) of actual crown form, and is intended to indicate the relationship of neighbouring trees to each other, and should be read with the comments on crown shape and tree value in TREE DETAILS appended. The plan gives a quick reference assessment of value as per section 4, table 1, of BS 5837:2012 'Trees in relation to design, demolition and construction - Recommendations'. Assessment of value in the TREE DETAILS table appended is, in accordance with this British Standard related mainly but not exclusively to the criterion of *visual value to the general public*. The Standard recommends a way of classifying trees when assessing their potential value in relation to proposed development. Some surveys may not include any trees of one or more categories. Table 1 suggests categories 'U', 'C', 'B' and 'A' , in ascending merit. 'U' **(RED crown outline on plan)** category trees are dangerous \ low value trees that could require removal for safety or arboricultural reasons. 'C' **(GREY or black/uncoloured crown outline on plan)** category trees are of no particular merit, but in adequate condition for retention. 'A' category trees **(GREEN crown outline on plan)** are trees of high vitality or good form, or of particular visual importance: 'B' **(BLUE crown outline on plan)** category are good trees but may be of slightly poorer form or be not sited as importantly as 'A' category trees. See TREE DETAILS appended. Category Assessment appears in column 10. This standard also provides a way of determining an area (see TREE DETAILS column 7) – the **RPA** – root protection area - around the trunk of the tree in which protective measures should be used in order to prevent significant damage to trees. There are various ways of achieving this. A simple way is to use exclusion fencing, but other methods have been shown by established use to be very effective.

03.02
1-38-4326/P2 shows proposed retained trees and is colour-coded to indicate where arboricentric methods are proposed during the construction process.

04
Sources and Documents

Ground level inspection.
Supplied plans :
Office and OnSite Surveying Ltd DRG No.: 2067 - 01
Marek Wojciechowski Architects DRG. NO.: P_41

05
Appraisal

05.01
AMENITY / SCREENING BY TREES AND SHRUBS
Certain trees are of significant general public amenity value, as they are visible from St. Edmunds Terrace and Broxwood Way. Some trees are glimpse or partial / skyline features from slightly more distant public viewpoints. Certain trees are of considerable strictly local amenity value to owners / users of the site, and to those of adjoining properties. Certain of the above trees are the subject of Tree Preservation Orders, as detailed below. Some of the trees listed within the three TPOs believed to be in force according to L.B. Camden were found either to be in poor condition or not to be present, again as outlined below.

05.02
TREES AND LAYOUT - POTENTIAL FOR CONFLICT WITH ROOTS
(Details appear in the tree detail table appended.) The figures in columns 5 and 6 in the **Tree data** table appended indicate the root protection area ('RPA' below), and typically the basic exclusion fence position. New materials and methods have been developed and continue to be developed that assist in promoting the successful retention of trees in association with constructed features. It should be noted that BS 5837:2012 (section 7.4.2) supports 'up and over' methods of construction where appropriate. The design principle of this method is outlined within Arboricultural Practice Note 12 (Through the Trees to Development, - a revision of APN 1, 1996, published originally by AAIS / Tree Advice Trust). This method has been used for many years on the recommendation of John Cromar's Arboricultural Co. Ltd. and has successfully allowed the retention of mature trees very close to construction activities.

05.03
An assessment as per BS5837:2012 section 4.6.2 has been carried out in connection with all trees to be retained. (This section requires that site conditions such as location of structures, tree mechanics, etc., are taken into account in determining the likely position of roots.) This is of particular relevance in connection with this site where several trees to be retained are affected by features of the site such as access roadways, retaining walls, etc.

05.04
ROOTS and DESIGN
SRP is an acronym for *static root plate*, (after *Mattheck*, 1991, etc.) a radial dimension derived from trunk diameter based on studies of wind-thrown trees and thus a guide to where structurally significant roots are likely to be located. RPA is an acronym used in BS5837:2012 and signifying the *root protection area*. The RPA is a guide to where systemically significant roots are likely to be located. Minor encroachment on the RPA of certain retained trees is entailed, as analysed in the table below :

No.	Tree	RPA in m^2	Area m^2 affected	% of RPA affected	Notes
1	ash	142.90	20.30	14.21	Proposed bin store and paving
5	ash	472.00	38.80	8.22	Proposed driveway

In the writer's now extensive experience gained over more than a third of a century in arboriculture, controlled, limited-extent, vertical root cutting is of little or no significance to tree health. The actually damaging operations are those that degrade or compact the ground surface within the RPA, for example by uncontrolled access by mechanical excavators, dumpers, etc.

It should be noted that the very limited root cutting possibly entailed in this proposal is, by an order of magnitude, far less than that entailed in the commercial moving of maturing and even mature trees, which has been practised successfully for centuries.

In view of the above I conclude that no special footings are needed from the arboricultural perspective. In this case all trees to be retained can be adequately protected by exclusion fencing and arboricentric methods as proposed below to reduce impacts on root systems of retained trees.

05.05
PERCEPTION OF TREES

Trees in relation sited mainly to	**Room use on relevant elevation(s)**	**Comments**
tree1 to west	Living rooms	Living room dual lit on ground floor.

The proposed basement will be partly artificially lit. In my view the internal layout of the proposed dwelling has been designed so as to generate minimum shading inconvenience. In view of the above I conclude that shading by and perception of trees has been considered (as sections 5.3.4 and 5.6.2.6 of BS 5837:2012 recommend) and appear not to be negative factors.

05.06
Processing by the LPA of any due application from future owners for permission to carry out tree work will no doubt be carried out with due regard for good arboricultural practice and according to British Standard 3998:2010 'Tree Work – Recommendations'. In any appeal that might arise against refusal of LPA consent to reduce inappropriately, or fell trees, common arboricultural criteria to those of the LPA would be used by any specialist tree inspectors of the Planning Inspectorate, and thus the trees would in my view be thus protected against inappropriate work. I consider that any such notional issues are very likely to be dealt with appropriately as no doubt in the past they have been within the Borough, as such tree/building juxtapositions are far from rare.

05.07
SUPERSTRUCTURE AND TREE APPRAISAL - TREE PRUNING
I note from the elevation drawings supplied that some minor encroachment on the crowns of retained trees G21 and 28 will occur. It is of note however that the form of the trees is such that the defining branch structure is well above or clear of the proposed building line. The minor pruning required is of no importance to the health or appearance of the retained items, and can easily be addressed by tree surgery in accordance with BS5837:2012 5.3.4 (c) NOTE 2, 7.7.3, etc., and is within the bounds of good arboricultural practice / British Standard 3998:2010 'Tree work – Recommendations'. A schedule for the use of a contractor appears below.

05.08
TREE REMOVAL APPRAISAL and REPLACEMENT PLANTING
Please see section **08** for comments on the individual trees proposed for removal. Overall, appropriate replacement tree planting will play an important role in providing for future public and local amenity. The British Geological Survey information for the area indicates that the underlying sub-soil is London clay. This places no significant constraint on species selection for tree and other planting. See plan for locations:

A= smooth-leafed holly (*Ilex aquifolium* 'JC van Tol') 2.2-5m 85L pot
B= mulberry (*Morus alba* 'Platanifolia') 14-16cm girth 85 L pot
C= *Quercus robur* 'Koster' 16-18cm girth 85L pot
D= holm oak (*Quercus ilex*) 20-25cm girth 150L pot

05.09
SUPERVISION
Supervision by and regular communication with an arboriculturist is a nigh-essential element of site management where trees are present and to be retained. I propose that this takes place at key points in the construction process, and additionally whenever required by the architect or LPA. These key stages are as per section 06.01 below.

05.10
PUBLISHED GUIDANCE IN RELATION TO TREES AND DEVELOPMENT
In conserving trees on development sites, expected best practice is as in B.S. 5837 : 2012. Section 5.1.1 notes :

"Certain trees are of such importance and sensitivity as to be major constraints on development or to justify its substantial modification : attempts to retain too many or unsuitable trees on a site can result in excessive pressure on the trees during demolition or construction work, or post-completion demands for their removal."

05.11
The above advice appears to have been considered in formulating proposals for development.

05.12
CONCLUSION
I conclude that the construction proposed, subject to precautionary measures as outlined above and as per the recommendations outlined below, will not be injurious to trees to be retained, nor will require unreasonable numbers of trees of public amenity value to be removed. Any tree losses will be satisfactorily addressed by proposed planting.

06
TREE PROTECTION

06.01

OVERVIEW

It is highly important to tree health and vitality that construction activities are carried out strictly in accordance with the tree protection methods specified below. It is widely not understood that a **single** traverse of a root protection area by a mechanical excavator can cause SIGNIFICANT and PERMANENT (albeit temporarily invisible) damage to trees.

Any such machinery, including, for example, tracked piling rigs, shall be kept at ALL times outside the root protection areas (RPAs) as indicated in the **Tree data** table appended, and/or shall be subject to ARBORICENTRIC METHODS below.

Fences to protect trees shall be respected as TOTAL EXCLUSION fences. Hence, before any site activity, **including demolition**, the fence lines shall be complete.

Protective fencing and any temporary protection of ground surfaces will have to be removed in due course to allow finishing of landscaping, paving, etc., but this shall not take place until all need for vehicular access to the site has passed, and shall be agreed with arboriculturist / planners on site during progress of works.

Supervision by an arboriculturist appointed directly by the client (not the main contractor) should take place at key points in the construction process, and additionally whenever required by the architect, client, main contractor or LPA. These key stages are :

1) **At site possession by contractor, outline all tree protection measures with site agent and resolve any issues arising.**
2) **Ensure remedial tree work including any minor accommodatory tree work required for erection of scaffolding near trees is carried out to specification and sign off. Ensure protective fencing is erected and completed as proposed. Ensure any site cabins, mixing sites for mortars, disposal-to-skip sites, etc., are located appropriately, and sign off.**
3) **Supervise lifting of hard surfacing near trees.**
4) **Supervise laying of temporary or permanent geotextile combination ground protection and sign off.**
5) **Attend as required to supervise digging for and the laying of lighting cable ducts or services.**
6) **Approve any removal or adjustment of protective fencing and sign off.**

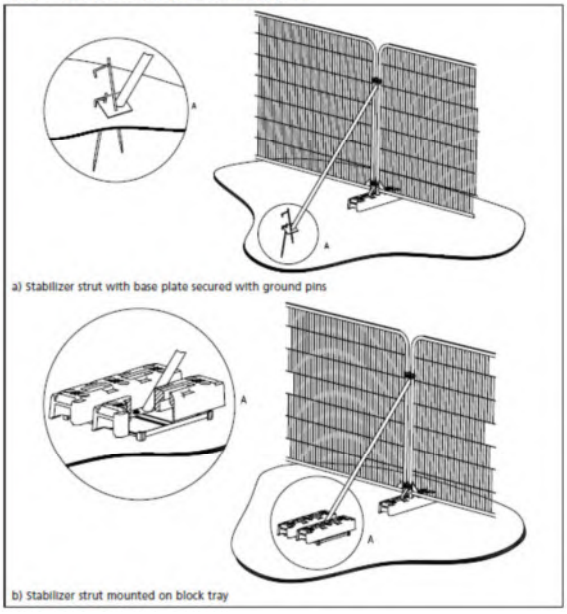
PREPARATION / DEMOLITION

PLEASE READ WITH PLAN REFERENCE 1-38-4326/P2, APPENDED.
The Methods shall be implemented in the order given unless it is stated to the contrary.

Method 1 : TREE WORK
Tree work shall be in accordance with the provided specification and good arboricultural practice, and to BS 3998:2010 'Tree Work - Recommendations', and in accord with spread lines marked on plan. The stumps of certain trees (see SCHEDULE appended) shall be removed by mechanical stump grinder, not by mechanical excavator

Method 2 : TREE PROTECTION FENCING
Tree protection fencing shall be erected, consisting of 'Heras' type fencing (weld-mesh panels), each section securely attached to uprights driven at least 0.6m into ground, as per the layout as shown on the plan (pink lines). No ground levels reduction or excavation shall take place within (=the tree side of) the fence lines. The standard rubber supports ('elephant's feet') shall if used, be as per BS 5837:2012 section 6, figure 3, left; that is, pinned to the substrate with re-bar. Below the crowns of trees with branches extending to less than 2m above ground level, in order to avoid unnecessary pruning, it is permissible to replace sections with manufactured boards at least 11mm thick (hoarding), attached securely to timber uprights driven at least 0.6m into the ground, providing the finished fence stands at least 1.5m above ground level. The fencing shall include, as indicated on plan, the protection of areas where planting is proposed.

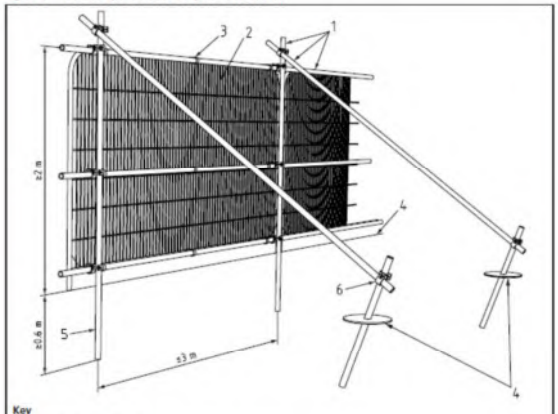
Figure 3 **Examples of above-ground stabilizing systems**



a) Stabilizer strut with base plate secured with ground pins

b) Stabilizer strut mounted on block tray

Figure 2 **Default specification for protective barrier**



Key
1 Standard scaffold poles
2 Heavy gauge 2 m tall galvanized tube and welded mesh infill panels
3 Panels secured to uprights and cross-members with wire ties
4 Ground level
5 Uprights driven into the ground until secure (minimum depth 0.6 m)
6 Standard scaffold clamps

6.2.2.2., Figure 2 : (above left)

Method 3 : TREE PROTECTION FENCING
This method shall apply where indicated by double pink lines. Tree protection fencing shall be erected, in accordance with the heavy-duty specification - BS5837:2012 section

No ground levels reduction or excavation shall take place within (=the tree side of) the fence lines.

Method 4 : GROUND SURFACE HANDLING and PROTECTION
This method shall apply in the zone hatched blue on plan. NO levels reduction shall take place. This includes no 'scraping up' with a mechanical excavator or otherwise. Any existing hard surfacing, any existing surface debris, light vegetation, etc., that lies within the zone shall be removed using hand tools only. A 2D geotextile membrane, such as 'Treetex T300' type shall be laid; 100mm of green-source woodchip; continuously abutted scaffold boards or manufactured boards so as to completely cover this area. This area shall be used for pedestrian access only.

OR

If loads exceed that of pedestrians, a 2D geotextile membrane, such as 'Treetex T300' type shall be laid; 150mm of green-source woodchip; continuously abutted scaffold boards and a layer of manufactured board at least 25mm thick screwed to the underlying scaffold board so as to completely cover this area This area may be used for pedestrian-operated plant up to 2 tonnes in weight.

OR

If loads exceed 2 tonnes the ground surface shall be protected with Zigma Ground Solutions Euromat Ground Guards. The temporary trackways shall be fixed together with manufacturers' approved fixings. On completion of build phase the Zigma GS Euromat Ground Guards or similar appropriate temporary trackway sections shall be lifted by hand or by plant standing outside the zone.

Any scaffold erection shall take its bearing directly off the ground surface via spreader plates/scaffold boards.

These protective layers shall not be modified without reference to an arboriculturist.

Method 5 : TEMPORARY ACCESS - INTENSIVE SITE
This method shall apply in zone gridded green on plan. No reduction of levels shall take place. No wheeled or tracked machinery shall be used, except if standing on completed formation as outlined below. An HDPE impermeable membrane shall be laid over the surface ; 100mm depth sharp sand shall be laid over membrane ; edge restraint shall be of timber formwork around the entire perimeter of the zone ; such edge restraint shall stand 50mm above finished concrete-pour level to prevent concrete leaching into the soil ; concrete shall be poured to a depth of 100mm over sharp sand layer. On completion of construction phase or when all need for vehicular access to the zone has ceased, slab / sand /membrane shall be removed using only hand-held tools or hand-held power tools. Any subsequent works in this zone shall be carried out as per Method 11.

Method 6 : DEMOLITION
This method shall apply generally in the zones outlined orange on plan. Demolition shall be carried out with hand tools or hand-held power tools only. Arisings shall be removed for disposal off site. Any contaminated soil shall be removed with hand tools only and removed from site.

Method 7 : EXISTING HARD SURFACES TO BE SUPERCEDED BY REPLACEMENT HARD SURFACING
This method shall apply in the magenta honeycomb zone (tree 1) on plan. No 'scraping up' with a mechanical excavator shall be carried out. The existing hard surface shall be lifted by hand tools or hand-held power tools only. The sub-base shall remain intact during demolition phase. The underlying sub-base shall be left undisturbed if levels allow and if the sub-base is competent to support the loads envisaged. Otherwise no excavation below the underside of the existing sub-base shall take place.

Edge restraint shall be formed only within the existing subbase, or shall be formed of permanent tanalised timber such as modern railway sleepers pegged or pinned - e.g. with re-bar - to the substrate. The re-bar shall be driven below the upper face of the timber and the hole sealed with a hardwood peg and glued and trimmed flush. Any such excavation in the existing sub-base shall be by hand tools or hand-held power tools only.

Method 8 : EXISTING HARD SURFACES TO BE SUPERCEDED BY SOFT LANDSCAPING
This method shall apply in the magenta hatch zone on plan. The existing hard surface shall be lifted by hand tools or hand-held power tools only. No 'scraping up' with a mechanical excavator shall be carried out. No excavation below the underside of the existing sub-base shall take place. De-compaction measures shall consist of lightly hand-forking over to 250mm depth, or using a pinch bar to loosen the ground surface. The ground surface once exposed shall immediately be protected as per Method 4 above.

CONSTRUCTION

Method 9 : SERVICE TRENCHES
N.B. -This applies to ALL services : Electricity, gas, water, etc. Existing services shall be utilised wherever possible.

These methods shall apply generally within any RPA (orange shapes).

1) The trench shall be opened with an air-spade to required depth. Roots 20mm or more in diameter unearthed shall be temporarily protected with bubble-wrap and insulating or gaffer tape while rest of trench is dug. Services shall be worked under/over/around/ between roots so as not to cut or damage any larger than 20mm diameter.
OR

2) The trench shall be dug with hand tools only. Probes such as screwdrivers or steel rod <10mm diameter to determine root presence ahead of digging shall be used. The work shall proceed cautiously. No roots over 20mm diameter shall be cut. Roots 20mm or more in diameter unearthed shall be temporarily protected with bubble-wrap and insulating or gaffer tape while rest of trench is dug. Services shall be worked under/over/around/ between roots so as not to cut or damage any larger than 20mm diameter.
OR
3) Services shall be thrust-bored using trenchless techniques (compressed air-driven 'mole') at a depth of 700mm or more below ground level, entailing no surface excavation. Starter pits for rams shall be outside any RPA, or reception/starter pits shall be opened according to 1) or 2) above.

Method 10 : ROOT PRUNING
This method shall apply within the RPA (orange shapes) of trees 4, 31 and G24. Any roots encountered shall be trimmed to the edge of excavation using a sharp edge tool such as handsaw or secateurs; the cuts shall be made at right angles to the long axis of the root, and in accordance with BS3998:2010, 8.6. An HDPE membrane shall be placed between any root-bearing soil and any wet concrete to be poured. Impermeable sheeting (to exclude wet concrete) shall be laid and secured locally by temporary weighting / taping as required. Concrete casting shall take place without disturbing this protective layer.

Method 11 : TRANSITION FROM TEMPORARY ACCESS TO PERMANENT POROUS DRIVEWAY /CAR PARKING
This method shall apply in zone gridded green on plan. On completion of construction phase or when all need for construction-related access to the zone has ceased, the formwork shall be removed and edge restraint shall be formed of permanent tanalised timber such as modern railway sleepers pegged or pinned - e.g. with re-bar - to the substrate. The re-bar shall be driven below the upper face of the timber and the hole sealed with a hardwood peg and glued and trimmed flush. (If edge restraints are required to be flush with adjacent ground levels, topsoil shall be loose-tipped and graded by hand to slope to existing levels. Peg holes shall be sealed with timber pegs and cut flush).

On completion of construction phase or when all need for construction-related access to the zone has ceased, the temporary slab / sand /membrane shall be removed using only hand-held tools or hand-held power tools. No excavation below the underside of the membrane shall take place. A 2D geotextile such as 'Treetex T300' type, shall be laid directly on the ground surface, overlaid by a 3D 'CellWeb' type 100 or 150mm deep (available from e.g., Geosynthetics Ltd. 01455 617139), depending on envisaged loads backfilled with 40-60mm CLEAN STONE – NO FINES (typically sold as 'track ballast') , and may also be augmented where required to function as a SUDS feature. A further 2D geotextile shall be laid. Levels can be finely corrected by use of granite chippings - NO FINES. Slabs or paviours shall be laid open-jointed and the joints rammed with granite chippings, or the surface dressed with shingle. For

a resin-bound open-pore gravel finish a further 2D geotextile should be laid over the level-correction layer.

LATE CONSTRUCTION / LANDSCAPING PHASE

Method 12 : BIN STORE
This method shall apply in the zone of yellow fill on plan. Edge restraint shall be formed from timber baulks (e.g. modern railway sleepers) or lighter section tanalised timber pegged or pinned to substrate with 25mm dia. re-bar or similar. A geogrid such as Tensar 'TriAx' shall be laid directly on the ground surface within the timber edges, then a sub-base 75mm deep of 20-40mm clean stone -NO FINES-(typically sold as 'track ballast'), then a 2D geotextile such as 'Treetex T300' type. A coarse shingle layer can be placed directly over this, or for a slab finish, a blinding of lime-free bedding sand or granite chippings may be laid to correct levels, then the slabs. The slabs shall not be bedded on mortar or lean mix.

The enclosure shall be of timber and uprights. Post holes shall be dug with hand tools only. Probes such as screwdrivers or steel rod <10mm diameter to determine root presence ahead of digging shall be used. The work shall proceed cautiously. Roots 20mm or more in diameter unearthed shall be temporarily protected with bubble-wrap and insulating or gaffer tape while rest of hole is dug. It should be borne in mind that the presence of large numbers of roots >20mm in diameter may effectively prevent the completion of the post hole, and typically shall require terminating the dig and moving the post hole to a different location.

The timber superstructure may be placed directly on and affixed to the timber edging or may alternatively be attached to posts placed according to the method outlined.

Method 13 : FOOTPATHS (various finishes possible)
This method shall apply in RPAs (orange shapes) on plan. No reduction of levels shall take place. No wheeled or tracked machinery shall be used : construction shall be by means of hand tools. NO reduction in existing ground levels shall take place – no 'scraping up' with or without a mechanical excavator.

'NIDAGRAVEL'
Edge restraint shall be formed from tanalised timber pinned to substrate with tanalised timber pegs or similar. Levels can be corrected by use of granite chippings NO FINES. A 3D pocket geotextile system, such as the 'Nidagravel' tray system 40mm deep backfilled with 40mm+, clean stone or gravel – NO FINES can be laid directly over the level correction layer. This system provides a wheelchair-friendly finish.

OR

POROUS TARMAC
A separating layer of non-woven geotextile such as 'Treetex' or similar (e.g. Wrekin 'NW8') shall be laid over the level correction layer, then a plain 3D pocket geotextile system such as 'CellWeb' type 75mm deep (available from e.g., Geosynthetics Ltd. 01455 617139), backfilled with 20-40mm (75mm depth CellWeb) CLEAN STONE – NO FINES (typically sold as 'track ballast'). A further non-woven geotextile such as 'Treetex' or similar (e.g. Wrekin 'NW8') shall be laid; the porous tarmac layer then applied. Total thickness over existing ground level can thus be as little as 100-120mm.

OR

SLABS
A 2D geotextile such as 'Treetex' type, shall be laid directly on the ground surface. Levels can be corrected by use of granite chippings NO FINES. Paving shall be laid open jointed and the joints rammed with granite chippings.

Method 14 : TREE GROWTH PROMOTION and SUPPORT

This method shall apply in the zone of brown crosses. Improvement of the substrate via a below-ground deep soil storage system such as 'SilvaCell' (see left and below). Existing levels within the zone shall be reduced to a depth approved by the retained engineer. Provision of adequate soil volume – e.g. at least 23 m^3 – required to sustain a 300-400mm ultimate trunk diameter tree shall be made. The precise configuration of the 'crates' is not critical, and depth of up to 2m below surrounding ground level is possible. If crates are laid to a depth greater than 500mm BGL subsoil shall be laid first in the 'crates' UP to 500mm of the surrounding ground level. 'Carbon Gold' shall be mixed with topsoil at 5% by volume - equates to 20 kgs of product per cubic metre of topsoil (to BS3882 : 2015 topsoil). The mix shall be laid to finish to required levels and allowed to settle via mist irrigation / watering-in / natural rainfall. Trees as specified on plan and in report shall be installed according to

British Standard 8545:2014 'Trees : from nursery to independence in the landscape - Recommendations' section F2.1.(g), for example using carbon fibre earth anchors and steel tendons.

Method 15 : GROUND PREPARATION FOR TREE PLANTING AREAS
This method shall apply after completion of main build only. Ground preparation for tree planting areas shall entail removal of hard surfacing using hand tools or hand-held power tools only, the removal of degraded or compacted or contaminated soil to a depth of at least 0.45m below finished surrounding ground level. The base and sides of the pit shall be forked over to at least one hand fork's spit in depth. Screened topsoil (to BS3882 : 2015 topsoil) shall be laid to replace soil volume removed and to a minimum depth of 0.45m within 1.3m of the trunk location of each tree to be planted. Soil handling of any kind shall take place only after a minimum of 3 days after heavy rain, and shall where possible be carried out 7 days or more after such rainfall. Tree planting shall be in accordance with British Standard 8545:2014 'Trees : from nursery to independence in the landscape - Recommendations'. This enshrines good arboricultural practice: the tree shall be planted so that the root collar lies at finished ground level, shall be short-staked and tied with proprietary tree tie. The ground surface shall be mulched within 0.75m of the trunk location to a depth of 100mm with composted organic material or proprietary mulch mat.

Method 16 : GROUND PREPARATION IN ROOT PROTECTION AREAS
This method shall apply after completion of main build only. Operations shall take place only after a minimum of 3 days after heavy rain, and shall where possible be carried out 7 days or more after such rainfall. Weed treatment if required shall be via BASIS qualified operatives. Ground preparation within root protection areas shall entail removal of perennial shrubs, climbers, ground covering plants to just above ground level. Surface debris shall be removed by hand to barrow and disposed of outside root protection areas. No wheeled or tracked plant shall be used : hand held power tools such as clearing saws and strimmers may be used. Any dressing with topsoil (to BS3882 : 2015 topsoil) shall be restricted to a maximum of 100mm in depth. Turfing or seeding may take place after levelling and minimal consolidation and which shall by hand tools / foot and board only, or naturally. No mechanical compaction whatever shall be used.

Method 17 : REPLACEMENT
If within five years any plant the subject of the planting proposal dies or in the opinion of the LPA becomes seriously damaged or diseased, the same shall be replaced according to the above methods.
(All design subject to engineering approval, but used on other sites and known to be practicable and reliable).

Method 18 : In addition to the above, careful general operation and site handling shall be observed as outlined at 06.02 below.

06.02
GENERAL TREE PROTECTION METHODS

A) No fires shall be made on any part of the site, or within 20m of any tree to be retained.

B) No spilling or free discharge of wet mortar, concrete, fuels, oils, solvents, or tar shall be made on any part of the site.

C) No storage of wet materials shall be made within the protective fences.

D) No breaching or moving of the protective fences shall take place without the approval of an arboriculturist.

06.03
It is recommended that acceptance of the recommendations in this report is demonstrated by, for example, the architect specifying in writing to the building contractor that tree care conditions apply in execution of the contract, and by an estimate or written undertaking from the contractor to the architect demonstrating that the practical aspects of observation of such recommendations have been priced in.

06.04
Note to LPA : if the Authority is minded to grant consent, it is invited to consider the incorporation of the specific *order of implementation* of the arboricentric methods above into any Conditions applied. Such a measure is likely to maximise tree protection.

07
General

If conflicts between any part of a tree and the building(s) arise in the course of development these can often be resolved quickly and at little cost if a qualified arboriculturist is consulted promptly. Lack of such care is often apparent quickly and decline and death of such trees can spoil design aims and can of course affect saleability, and reflect poorly on the construction and design personnel involved. Trees that have been the recipients of careful handling during construction add considerably to the appeal and value of the finished development.

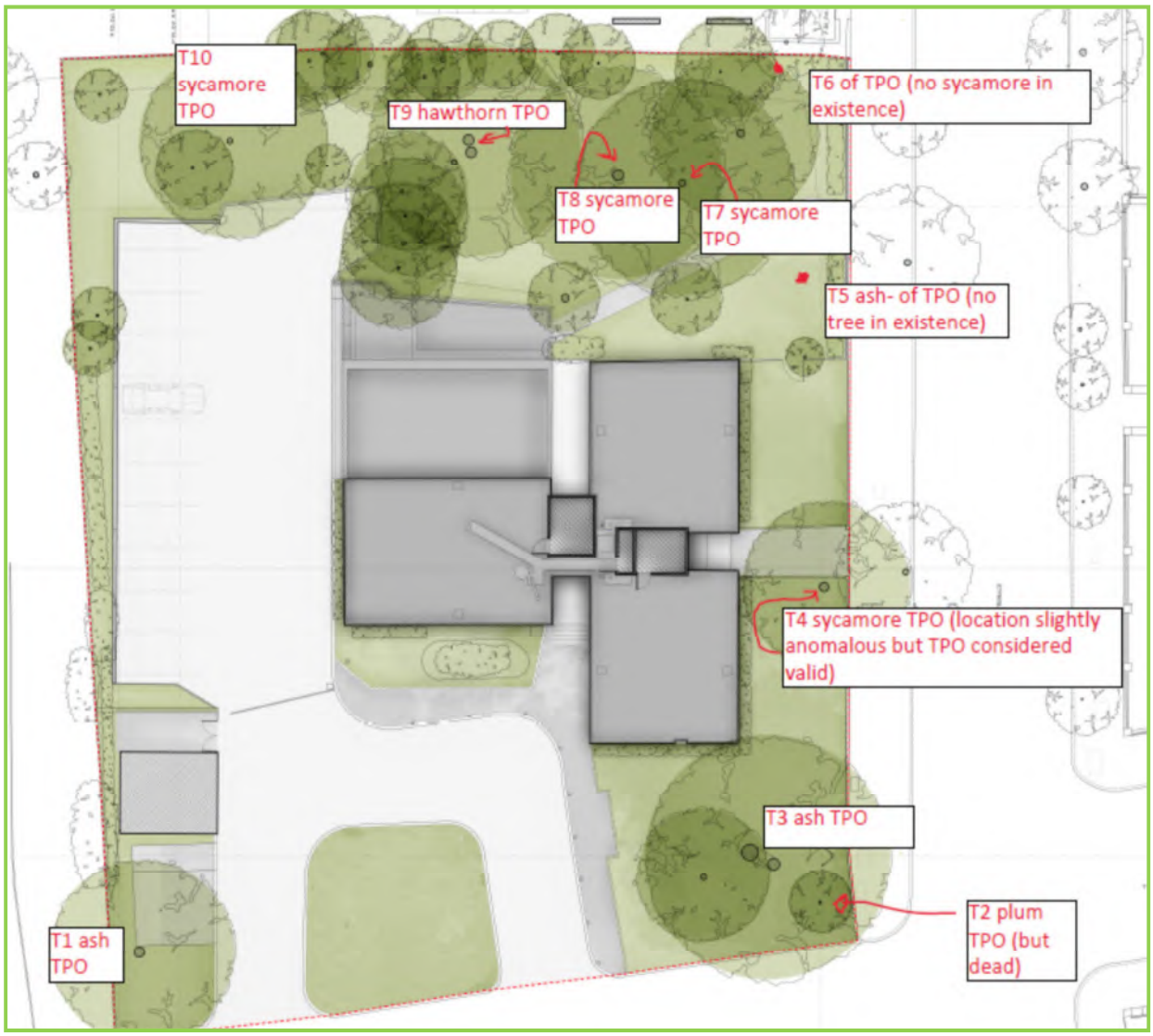
24th September 2018
Signed:

John C. M. Cromar, Dip.Arb.(RFS) F.Arbor A. 01582 808020 / 07860 453072

APPENDICES

08
Tree Data

Please read in conjunction with the mark-up below which applies information kindly provided by L.B.Camden as respects TPOs, to the state of the trees as found:



Tree number	Tree type	Height	Stem diameters	Radius of RPA if circle (mm)	RPA (m^2)	Comments	Life expectancy (years)	Assessed BS5837 value category
1 (TPO T1)	common ash	16	562	6744	142.9	Large ungainly tree. Much dead wood. Crown clean.	20+	B1
2	common ash	7	170	2040	13.1	Poorly sited	20+	C1
3	hawthorn	5	90, 80, 80, 80	1982	12.4	Poor form	40+	C1
4	wild plum	9	334	4008	50.5	Elderly tree	10+	C1
5 (TPO T3)	common ash	18	878, 522	12257	472.0	Base of the 878mm stem badly decayed : large axial cavity. Reduction required to around 12m for safety Potential bat roost. The 522mm stem has a strong lean over the road junction ; reduce to line of kerb of St Edmunds Tce, and to radius of about 10m over Broxwood Way. Basal junction normal. Very prominent.	10+	C1
6 (TPO T4)	sycamore	16	562	6744	142.9	Once pollarded to about 6m in height. Important screening function.	20+	B1
7	holm oak	6.5	100	1200	4.5	Screening potential	40+	C1
8	purple plum	7	130	1560	7.6	Strong lean. O/s site	10+	C1
9	whitebeam	9	330	3960	49.3	Strong lean bearing on fence, possibly unstable. O/s site	<10	U
10	Lawson cypress	10	130, 90, 80	2126	14.2	Softening value O/s site	40+	B1

Tree number	Tree type	Height	Stem diameters	Radius of RPA if circle (mm)	RPA (m^2)	Comments	Life expectancy (years)	Assessed BS5837 value category
11	common ash	19	485	5820	106.4	O/s site	<10	U
12 (TPO T7)	sycamore	19	485	5820	106.4	Good form; prominent; slightly hemmed in. O/s site	40+	B1
13	Japanese cherry	4	140	1680	8.9	Very poor form ; unthrifty	<10	U
14	bay	9	240, 150, 100, 70, 70	3792	45.2	Some local screening value.	20+	C1
15 (TPO T8)	sycamore	17	498	5976	112.2	Distorted by 12. O/s site	20+	B1
16	sycamore	6	90	1080	3.7	Very close to fence line. O/s site	40+	C1
17	whitebeam	6	130	1560	7.6	Strong lean bearing on fence, possibly unstable. O/s site	<10	U
18	purple plum	8	230	2760	23.9	Strong lean O/s site	10+	C1
19 (TPO T9)	hawthorn	9	422, 390	6895	149.4	Large and locally prominent : some screening value. O/s site	10+	C1
G20	wild plum sucker growth	5	<160, <110, <110	2677	22.5	O/s site	20+	C2
G21	bay	7		0	0.0	Mainly local screening value. (Diameters of individual stems used to generate RPA shown on plan)	20+	B2
22	wild plum	5.5	90, 50	1235	4.8	O/s site	10+	C1

Tree number	Tree type	Height	Stem diameters	Radius of RPA if circle (mm)	RPA (m^2)	Comments	Life expectancy (years)	Assessed BS5837 value category
23	common ash	10	190	2280	16.3	Etiolated. Some softening value but no lower branches. O/s site	40+	C1
24	common ash	10	160	1920	11.6	Etiolated. Strong lean. Some softening value but no lower branches. O/s site	40+	C1
25	*Prunus* spp.	3	120	1440	6.5	Dead. O/s site	<10	U
26 (TPO T10)	sycamore	13	438	5256	86.8	Rather poor form, and low vitality. O/s site	<10	U
27	hawthorn	4	90	1080	3.7	Poor form. O/s site	40+	C1
28	tree of heaven	11	300	3600	40.7	Ivy infested ; outside the site. Some screening value and potential for more. O/s site	40+	B1
29(TPO T2)						dead	-	U

In all cases, in the absence of negative comment on vitality and structure, normal systemic and physiological condition should be considered to apply.

Dependent on time of year of survey, deciduous trees may not have been in leaf at the time of inspection. This may have limited precise identification.

09
Schedule

Trees at Barrie House, 29 St Edmunds Terrace, London, NW8 7QH

Please read in conjunction with plan 1-38-4326/P2. Trees outside the curtilage of the property may be included. Boundaries where marked should always be treated as notional, and no statement either implied or explicit as to the ownership of trees should be taken as definitive or precise. **As applicable, the consent to, or acquiescence to, and communication of the timing of the recommended remedial works, as far as the relevant owner is concerned, should be checked before any such trees are actually treated.**

Tree number	Tree type	Height	Stem diameters	Comments
1	common ash	16	562	Crown clean.
2	common ash	7	170	Remove ; grind stumps to 250mm below ground level.
3	hawthorn	5	90, 80, 80, 80	
4	wild plum	9	334	
5	common ash	18	878, 522	The base of the 878mm stem is badly decayed : large axial cavity. Reduce to around 12m (N.B. - potential bat roost). The 522mm stem (strongly leaning over the road junction): reduce to line of kerb of St. Edmunds Tce, and to radius of about 10m over Broxwood Way.
13	Japanese cherry	4	140	Remove ; grind stumps to 250mm below ground level or grub out.
G21	bay	7		Reduce (on NW side only) to spread of 2m
28	tree of heaven	11	300	Reduce (on SE side only) to spread of 2m.

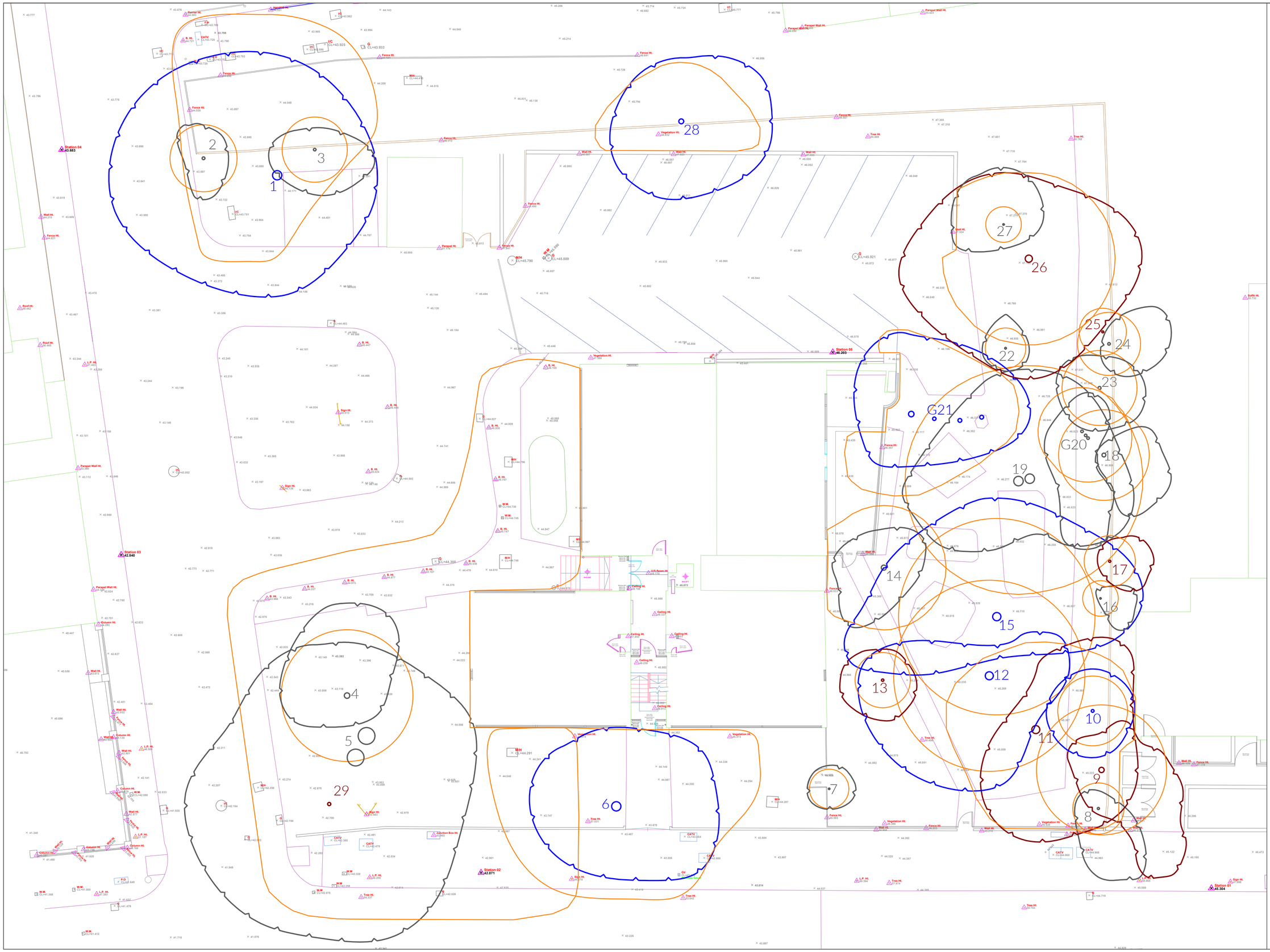
NOTES:
This schedule notifies the LPA, where such notification is required, of intention to prune or remove trees in accordance with TCP Act 1990 Section 211. 42 days after notification should be allowed before proceeding with the work, during which time (and after) the LPA may place a Tree Preservation Order on the tree(s), thus requiring a formal application for any works to living wood.

All tree work should be carried out to BS 3998 : 2010 'Tree Work - Recommendations'. The Wildlife and Countryside Act 1981 protects with certain exceptions all birds and their nests. It is an offence to destroy such nests or take or injure such birds in the course of tree works operations. If a tree is a bat-roost, a licence to work on the tree must first be obtained from the relevant Statutory Nature Conservation Organization (in England : Natural England 0845 601 4523.) Acting without a licence is likely to be justifiable only in acute emergencies threatening human life and where all other legally available option such as footpath diversion, fencing and warning signs cannot be applied.

Ivy and dead wood can be important ecological features. Ivy where specified in the work schedule should be treated as per BS3998 section 7.12. In summary this means trimming back (e.g. with a hedge cutter or secateurs) to near the line of the trunk or branches, and/or removing selected stems so that the structure of the tree can be inspected. In practice this may need to be done outside the bird-nesting season. Treatment of dead wood shall be as per section 7.3.2 – essentially shorten if possible, thus retaining some resource for invertebrates, etc.

10
Plans

1-38-4326/P1 v5
1-38-4326/P2 v9



JOHN CROMAR'S ARBORICULTURAL COMPANY LIMITED

THE OLD SCHOOL, TITLEY, KINGTON, HR5 3RN.
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www.treescan.co.uk

AA Registered CONSULTANT trees.org.uk

KEY TO COLOURS/LINETYPES USED IN RELATION TO TREES

GREEN - High Value
BLUE - Moderate Value
BLACK - Low Value
RED - Remove/Very short life expectancy
ORANGE SHAPES: Root Protection Areas

TOOTHED LINE: Tree spread line

DASHED LINE: Understorey spread line

DOTTED LINE: Removed tree spread

NOTES
Do not use for setting out purposes.
All dimensions to be checked on site.

DRG. NAME
TREE VALUE ASSESSMENT AS PER BS 5837:2012 & ROOT PROTECTION AREAS

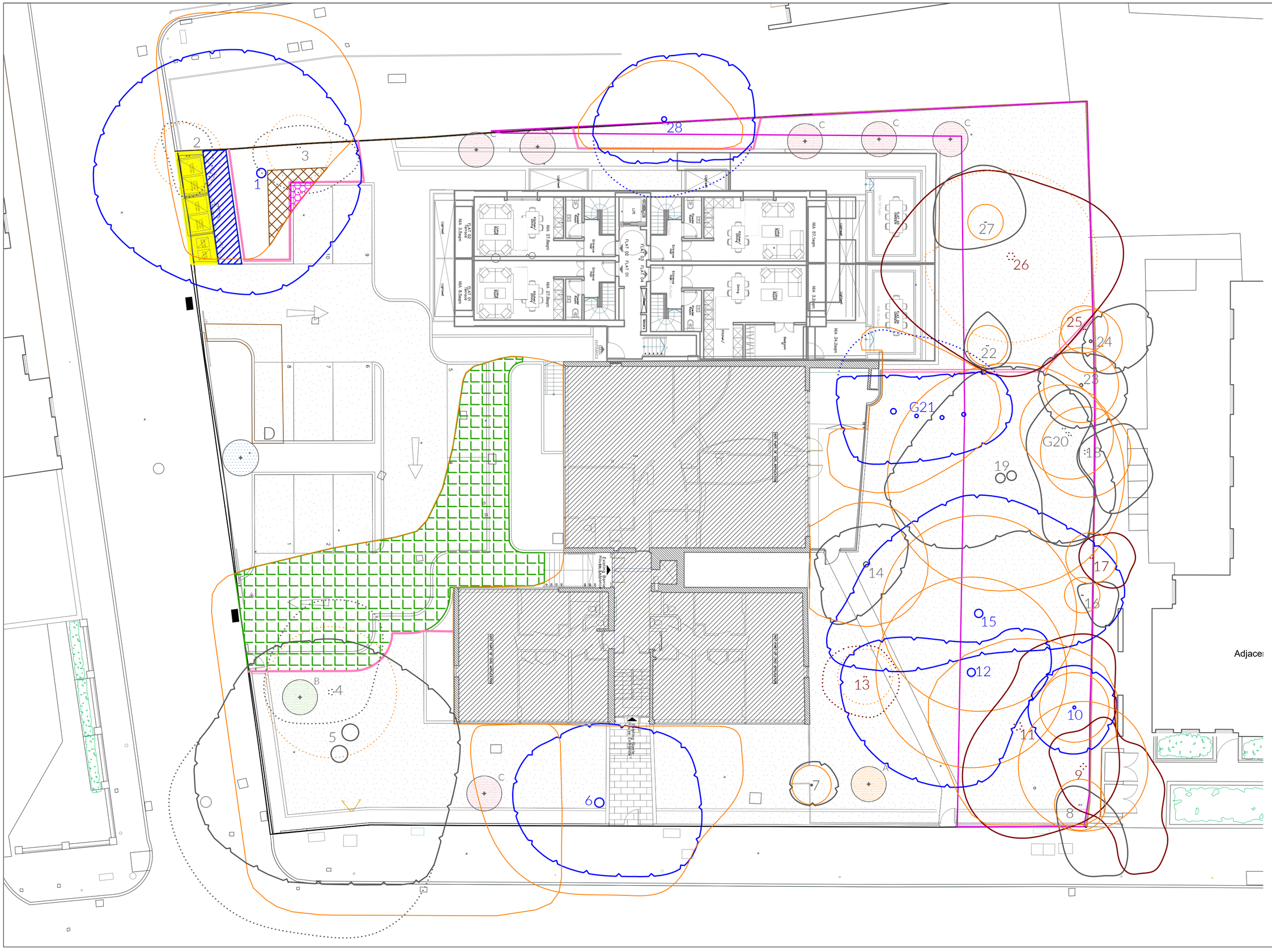
TEXT
FOR FULL DETAILS OF TREE VALUE PLEASE SEE REPORT REF. 1-38-4326

BASED ON
Office and OnSite Surveying Ltd DRG No.: 2067 - 01 SUPPLIED

SITE ADDRESS
Barrie House, 29 St Edmunds Terrace, London, NW8 7QH

DRG. REF.	REV. NO.
1-38-4326/P1	v5
SCALE & SIZE	**DATE**
1:150 @ A2	2-Jan-18

0 8m



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KEY TO PLAN SYMBOLS/COLOURS USED IN RELATION TO TREES

- PINK LINES: Tree Protection Fencing
- ORANGE SHAPES: Root Protection Areas
- BROWN CROSSES: method applies
- BROWN HATCH: method applies
- GREEN HATCH: ground protection
- DARK BLUE HATCH: method applies
- MAGENTA HONEYCOMB: method applies
- YELLOW FILL: method applies
- 'A': Proposed replacement planting
- 'B': Proposed replacement planting
- 'C': Proposed replacement planting
- 'D': Proposed replacement planting

NOTES
Do not use for setting out purposes.
All dimensions to be checked on site.

DRG. NAME
PROPOSED TREE PROTECTION MEASURES, TREE RETENTION AND TREE PLANTING

TEXT
FOR FULL METHOD DETAILS PLEASE SEE REPORT REF. 1-38-4326

BASED ON
Marek Wojciechowski Architects DRG. NO.: P_41 SUPPLIED

SITE ADDRESS
Barrie House, 29 St Edmunds Terrace, London, NW8 7QH

DRG. REF.	REV. NO.
1-38-4326/P2	v9
SCALE & SIZE	DATE
1:200 @ A2	24-Sep-18

0 8m

APPENDIX D

SuDS Assessment

Residential Redevelopment
Barrie House, St Edmund's Terrace,
London

SuDS Assessment

For
Marek Wojciechowski Architects

motion

Document Control Sheet

SuDS Assessment

Barrie House, 29 St. Edmund's Terrace, NW8 7QH

Marek Wojciechowski Architects

This document has been issued and amended as follows:

Date	Issue	Prepared by	Approved by
03/01/18	Draft	GM	NJ
04/01/18	Final	HB	NJ

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Contents

Appendices

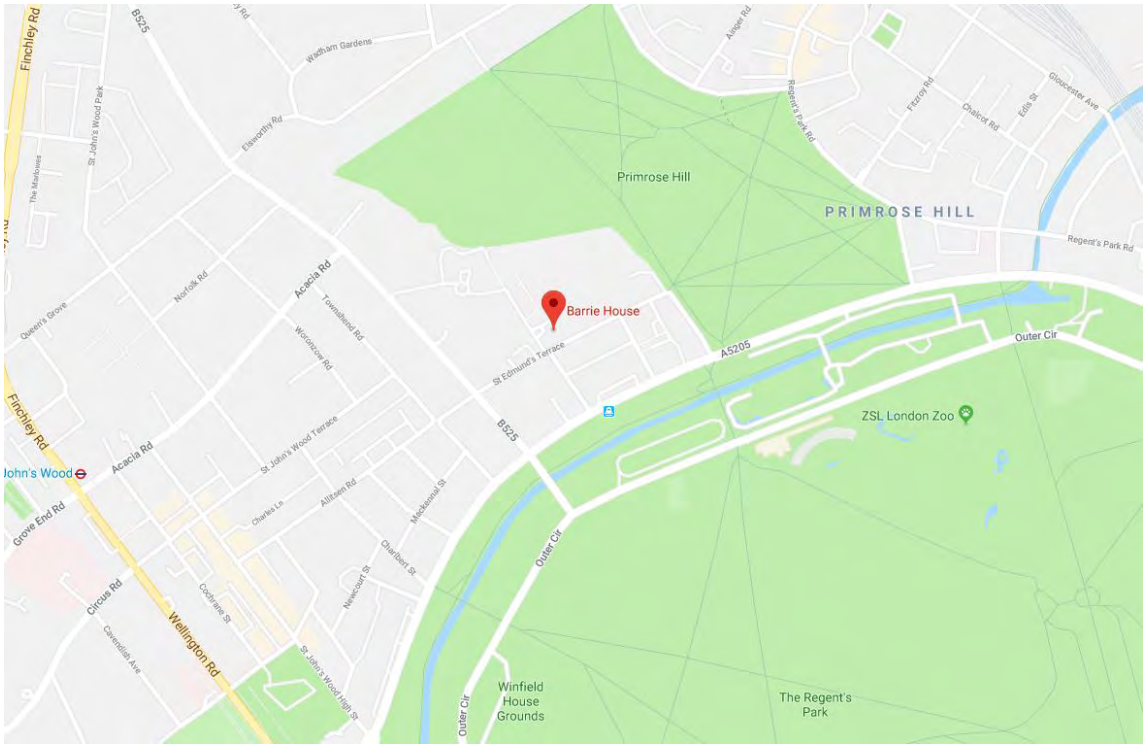
1.0 Introduction

1.1 This SuDS Assessment has been prepared by Motion to accompany a full planning application for a proposed residential redevelopment at Barrie House, 29 St Edmunds Terrace, Camden Town.

1.2 The proposed development site is centred around grid reference TQ27501 83581 and the development area is located approximately 800m east of St Johns Wood Station and 1km south west of Chalk Farm LUL Station.

1.3 The site area is 2245m^2 (0.2245 Ha) according to MWA Drawing 16033-P-21. Approximately 50% of the site is currently hardstanding, with green areas bordering the development along the northern and eastern boundary along St Edmunds Terrace.

1.4 Figure 1 below shows the site location.



2.0 Existing Site

Current Development Layout

2.1 The development site currently consists of an eight storey residential building separated into 3 residential apartments on each floor, along with associated parking spaces and green areas.

2.2 The development site is bound in the north and east by residential flats, in the south by St Edmunds Terrace and in the west by Broxwood Way. Barrow Hill Reservoir borders the site to the north-east. See Appendix A for a red line plan map of the proposed development site.

Current Permeable and Impermeable Material Separations on Site

2.3 The site totals approximately 2245m² (0.245Ha) of total area and is currently a mix of:

- Approximately 321m² Roof area;
- Approximately 696m² of carriageway and parking areas;
- Approximately 100m² of paved pathways; and
- Approximately 1,128m² of grass and planted areas.

2.4 Taking into account the existing connections to the public Thames Water (TW) combined drainage sewers, as well as the borehole records as attached in Appendix B, it can be seen that infiltration of surface water within the site boundary is extremely unlikely.

2.5 The British Geological Survey maps and borehole records indicate a vast mass of clayey composite underlying the proposed development area.

Existing Drainage Regime – Surface Water

2.6 It is understood that Barrie House is served by an existing surface water drainage system that discharges all of the surface water into the Thames Water combined sewer system, manhole reference 4518 located along Broxwood Way. The Thames Water asset plans can be seen in Appendix C.

Existing Drainage Regime – Foul Water

2.7 As above, Barrie House is served by an existing foul water drainage system that discharges into the Thames Water combined sewer system, into manhole reference 4518 located along Broxwood Way. Manhole 4518 has a specified cover level of 43.1 and no recorded invert level.

3.0 Proposed Development, Existing and Proposed Run-off Rates

Proposed Development

3.1 The development proposals comprise the following:

- The demolition of the existing two-storey porters lodge;
- Proposed 9xC3 residential units; and
- Redevelopment of existing car park to accommodate proposed 3 storey extension adjoining Barrie House, over basement, ground, 1st, 2nd and 3rd floor levels, to create 9x self-contained flats.

3.2 The proposed development layout can be seen in Appendix D.

3.3 Camden Council LLFA has been contacted to request pre-development information and guidance, and this report will be updated once a response has been received.

Existing Surface Water Run-Off Rates

3.4 As part of the SuDS Assessment produced for the site, an appropriate brownfield run-off rate must be calculated, in order that an initial estimate of required attenuation storage may be made for the 1 in 30 year and 1 in 100 year storms, in order that the requirements to store those events might be met.

3.5 In order to estimate the brownfield runoff rate from a given area, it is first necessary to estimate the rate of rainfall on the site for the storm events under consideration.

3.6 Average rainfall intensities from a variety of storm durations were sampled from TRRL Report LR595 – Estimating rainfall for drainage calculations in the UK – by C. P. Young.

3.7 Table 3.1 and 3.2 below shows the storm duration for the 1 in 30 year and 1 in 100 year events respectively:

Storm Duration (mins)	Intensity (mm/hr)
15	69.3
30	47.6
60	30.3
120	18.7
180	14.1
240	11.5
360	8.7
480	7.1
600	6

Table 3.1 1 in 30-year event

Storm Duration (mins)	Intensity (mm/hr)
15	97.2
30	70.5
60	47.8
120	30.2
180	22.7
240	18.5
360	13.9
480	11.3
600	9.6

Table 3.2 1 in 100-year event

3.8 It is also essential to calculate the impermeable and permeable areas so as to accurately estimate the run-off rates using the Modified Rational Method.

3.9 Permeable and Impermeable areas can be seen in table 3.3 below.

Section	Area (m2)	Area (Ha)	Cv (Volumetric Run-off)	Cr (Dimensionless Routing Coefficient)
Roof	321	0.0321	0.9	1.3
Tarmac & Brick Setts	796	0.0796	0.75	1.3
Green Space	1128	0.1128	0.15	1.3

Table 3.3 Permeable and Impermeable Areas

3.10 Table 1.3 above also shows the Volumetric Run-off coefficient (Ciria SuDS Manual C753) for the different sections as well as the routing coefficient. Both Cv and Cr multiplied will give a dimensionless figure for C (Run-off coefficient) that will be used to calculate the existing brownfield run-off rates as shown below:

$$Q = 2.78\,C\,i\,A$$

where:

Q = design event peak rate of runoff (l/s)

C = non-dimensional runoff coefficient which is dependent on the catchment characteristics

$$C = C_V\,C_R$$

where C_V = volumetric runoff coefficient

C_R = dimensionless routing coefficient

i = rainfall intensity for the design return period (in mm/hr) and for a duration equal to the "time of concentration" of the network

A = total catchment area being drained (ha)

Note: 2.78 is a conversion factor to address the rainfall unit being in mm/hr.

3.11 The tabulated results for C can be seen in table 3.4 below:

Section	Run-off coefficient C (Cv x Cr)
Roof	1.17
Tarmac & Brick Setts	0.975
Green Space	0.325

Table 3.4 Run-off Coefficient

3.12 The existing Runoff rate has been calculated for the 1 in 30 year 15 minute storm event, as well as the 1 in 100 15 minute event. The results can be seen below:

Storm Duration (mins)	Event	Outflow (l/s)
15	30 Year	28.73
15	100 Year	41.02

Table 3.5 Discharge (l/s) 1 in 30-year and 1 in 100 year events

Surface Water Outflows from the Proposed Development

3.13 It is proposed that the surface water generated from the proposed development attenuated and discharge at a rate far reduced from existing.

3.14 ICP SuDS method (Microdrainage) has been used to calculate the greenfield run-off rate for the entire site in line with the London Plan, with the greenfield rate being 0.3l/s. A practical minimum discharge rate of 5l/s has been adopted for the proposed drainage strategy as flow restriction devices are prone to blockages at flows less than this.

3.15 All surface water generated on site will be subject to filtration through layers of permeable paving, as well as attenuation prior to discharge. This is in line with The London Plan's suggested surface water disposal strategy.

3.16 As the surface water outfalls into a combined drainage network, it will be drained within a separate system and combined at the final manhole prior to its outfall into the Thames Water combined system along Broxwood Way.

Foul Water Flows from Proposed Development

3.17 The following calculations have been extracted from Sewers for Adoption (SfA) 7th Edition:

SfA specified 4000l/dwelling/day of foul water.

9 residential units + 24 existing residential units

4000 x 36 = 132,000 l/ day

132,000 ÷ 24 = 5500 l/h

5500 ÷ 60 = 91.7 l/m

91.7 ÷ 60 = 1.5 l/s

3.18 The total peak flow from the proposed residential development plus the existing 24 residential units is 1.5l/s.

3.19 As the foul water outfalls into a combined drainage network, it will be drained within a separate system and combined at the final manhole prior to its outfall into the Thames Water combined system along Broxwood Way.

3.20 A capacity check should be undertaken with Thames Water to confirm that the system within the wider area can accommodate the additional flows. This is to be confirmed at the detailed design stage.

4.0 Flood Mitigation Measures and SuDS Incorporation

4.1 Sustainable Drainage Systems (SuDS) are essential in managing the surface water run-off from a new development site. This surface water management strategy will ensure that no additional risk is produced to the development as well as neighbouring developments.

4.2 SuDS systems will aid in the initial filtration of the surface water whilst also discharging into the appropriate location at a rate far reduced from the original brownfield site run-off rate.

Applied Drainage Hierarchy to Viable SUDs Methods

4.3 Figure 4.1 below shows the SuDS drainage hierarchy from the Ciria SuDS Manual C753.

The SUDS Hierarchy

	SUDS technique	Flood Reduction	Pollution Reduction	Landscape & Wildlife Benefit
Most Sustainable	Living roofs	✔	✔	✔
	Basins and ponds - Constructed wetlands - Balancing ponds - Detention basins - Retention ponds	✔	✔	✔
	Filter strips and swales	✔	✔	✔
	Infiltration devices - soakaways - infiltration trenches and basins	✔	✔	✔
	Permeable surfaces and filter drains - gravelled areas - solid paving blocks - porous paviors	✔	✔	
Least Sustainable	Tanked systems - over-sized pipes/tanks - storms cells	✔		

Figure 4.1 SuDS Hierarchy - Ciria C753

4.4 Figure 4.1 above details the sustainability level of each of the SuDS techniques, as well as the SuDS system suitability within 3 general criterial areas:

- Flood Reduction;
- Pollution Reduction; and
- Landscape and Wildlife Benefit.

4.5 Ideally, any designed SuDS system should be multi-functioning, fulfilling as many of the criteria areas as possible.

Storage Volume Calculations

4.6 The storage required to attenuate the surplus surface water, as well as the locations available and the topography of the site largely dictate the structure of the SuDS system that is to be designed.

4.7 The site is currently developed (brownfield) with the proposed design remaining largely hardstanding. There is ample opportunity to incorporate an effective and sustainable multi-functioning SuDS system.

4.8 Figures 4.2 and 4.3 below show the required amounts of attenuation needed on site to cater for the 1 in 100-year event + 40% climate change.

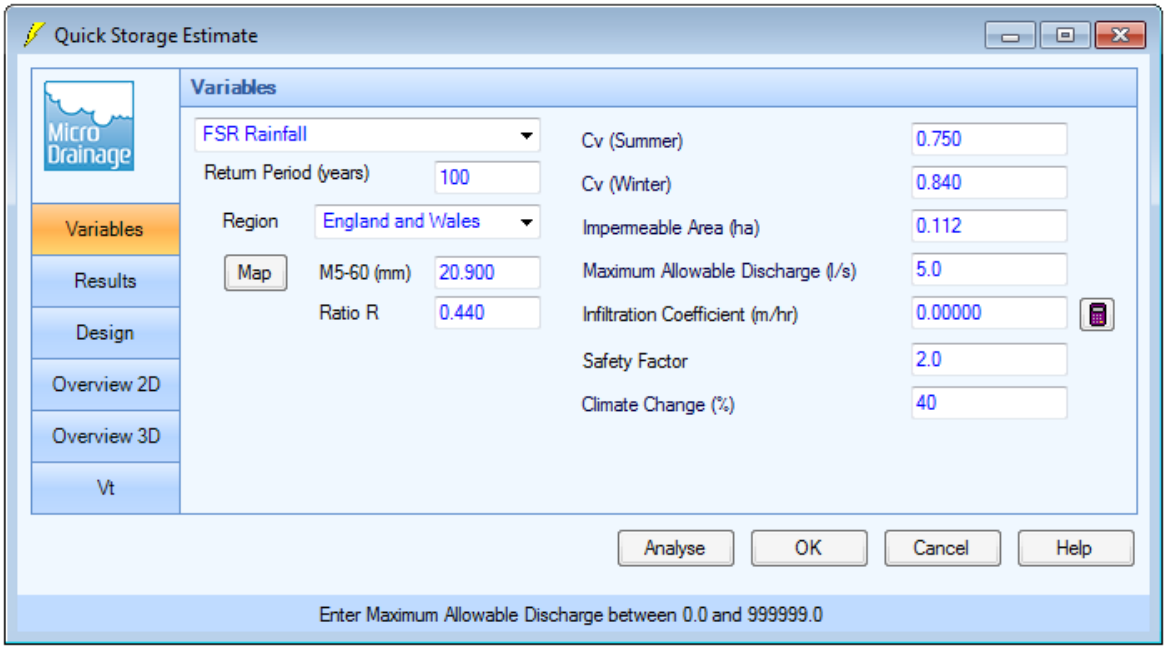


Figure 4.2 Storage Calculation Parameters

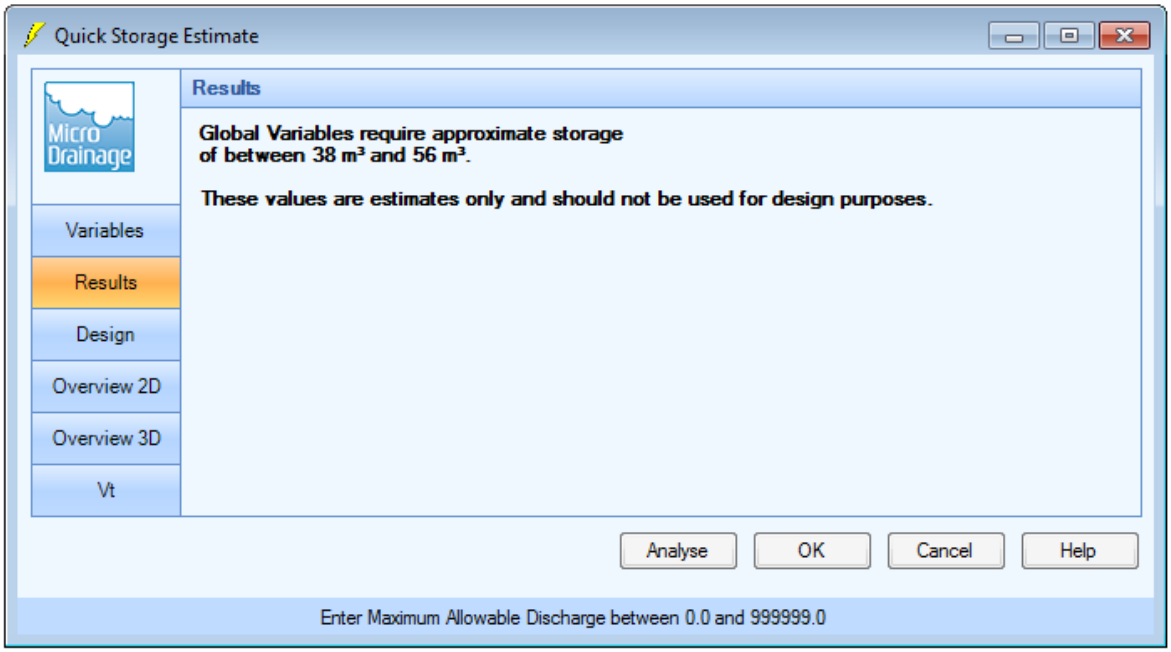


Figure 4.3 Storage Calculation Output

4.9 Figures 4.2 and 4.3 above show that an upper limit of 56m³ of attenuation should be provided so as to cater for the 1 in 100 year +40% CC event.

4.10 A practical minimum discharge rate of 5l/s has been adopted, in line with the London Plan, providing a significant reduction in peak flow rates from the proposed development.

Likely Methods of Attenuation

4.11 Taking into account the volume of storage required and the current masterplan, the ideal method of attenuation would encompass all three SuDS design criteria.

4.12 Referring back to table 4.1 above, the following SuDS devices would offer the needed flood and pollution control, as well as providing ample green space and encouraging biodiversity.

4.13 The SuDS system has been designed to adhere to the London Plan SuDS strategy, reducing peak flow rates of surface water.

Permeable Paving System

4.14 Pervious surfaces provide a surface suitable for pedestrian and/or vehicular traffic, while allowing rainwater to infiltrate through the surface and into underlying layers.

4.15 The water can be temporarily stored before infiltration to the ground, reused, or discharged to a watercourse or other drainage system. Surfaces with an aggregate sub-base can provide good water quality treatment.

4.16 The advantages of the Permeable paving system can be seen below:

- Reduced peak flows to watercourses reducing the risk of flooding downstream;
- Reduced effects of pollution in runoff on the environment;
- Can be used in high density developments with a range of surface finishes that accept surface waters over their area of use;
- Reduced need for deep excavations for drainage, which can have significant cost benefits;
- Flexible and tailored solution that can suit the proposed usage and design life;
- Lined systems can be used where infiltration is not desirable, or where soil integrity would be compromised;
- Allows dual use of space, so no additional land take;
- Removes need for gully pots and manholes;
- Eliminates surface ponding and surface ice; and
- Often very resilient to a lack of maintenance.

4.17 As all SuDS systems, there are disadvantages in the use of permeable paving, these can be seen below:

- Cannot be used where large sediment loads may be washed / carried onto the surface;
- In the UK, our current practice is to implement permeable paving on highways with low traffic volumes and speeds generally less than 30 mph; and
- Risk of long term clogging if poorly maintained.

Cellular Attenuation Systems

4.18 Cellular Storage Crates are suitable for attenuation and are designed to resist compression loads, so they can be located in more convenient locations within public access areas that provide many benefits.

4.19 The benefits can be seen below:

- Modular and flexible
- Dual usage (i.e. infiltration and/or storage)
- High void ratios (up to 96%) providing high storage volume capacity
- Lightweight, easy to install and robust
- Capable of managing high flow events

- Can be installed beneath trafficked or non-trafficked areas (providing structural performance is proven to be sufficient)
- Long-term physical and chemical stability
- Can be installed beneath public open spaces, e.g. play areas.

4.20 As all SuDS systems, there are disadvantages in the use of attenuation crates, these can be seen below:

- No water quality treatment or amenity provision
- Performance can be difficult to monitor
- Can be difficult to maintain

5.0 Drainage Strategy for Proposed Development

Location of SuDS Features

5.1 SuDS features should be integrated into the initial masterplan as early as possible, so as to accommodate for space, ease of access, maintenance and regular inspections.

5.2 The attenuation is to be located beneath the proposed car-parking spaces providing ease of access for maintenance whilst also allowing for a gravity draining system.

5.3 Permeable Paving has been specified for all internal walkways.

Drainage Strategy

5.4 The drainage strategy has been designed to act as a multi-functioning SuDS chain that will collect, filter and discharge excess surface water run-off at a desirable rate of 5l/s for the whole site.

5.5 The existing Thames Water manhole can be seen on the Drainage Strategy drawing in Appendix E.

5.6 The surface water will be attenuated beneath the car parking spaces adjacent to Broxwood Way. 56m^3 of attenuation has been provided so as to cater for the 1 in 100 year +40% CC event.

5.7 Surface water from the roofs will be drained into the permeable paving for conveyance purposes. The permeable paving will be lined and will incorporate perforated collection pipes at the base of the sub-base layer so as to collect and route the surface water.

5.8 A control will be fitted to the attenuation so as to limit the flows from the attenuation tank to 5l/s.

5.9 An additional manhole will be located further down the run that will combine the foul and surface water prior to final discharge into the Thames Water combined sewer manhole reference 4518, giving a combined peak flow rate of 6.6l/s for surface water and foul.

6.0 Maintenance Schedule for SuDS

6.1 As with all drainage systems, regular maintenance is essential so as to insure the continued efficiency of the system.

Permeable Paving Maintenance

6.2 Table 6.13 below shows a maintenance schedule for permeable paving:

Maintenance Schedule	Required Action	Typical Frequency
Regular Maintenance	Brushing and vacuuming (standard cosmetic sweep over whole surface).	Once a year, after autumn leaf fall, or reduced frequency as required, based on site specific observations of clogging or manufacturer's recommendations - pay particular attention to areas where water runs onto pervious surface from adjacent impermeable areas as this area is most likely to collect the most sediment.
Occasional Maintenance	Stabilise and mow contributing and adjacent areas.	As required
	Removal of weeds or management using glyphospate applied directly into the weeds by an applicator rather than spraying.	As required - once per year on less frequently used pavements
Remedial Actions	Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised within 50mm of the level of the paving.	As requires
	Remedial work to any depressions, rutting and cracked or broken blocks considered detrimental to structural performance or a hazard to users, and replace lost jointing material.	As required
	Rehabilitation of surface and upper substructure by remedial sweeping.	Every 10 to 15 years or as required (if infiltration performance is reduced due to significant clogging)
Monitoring	Initial inspection	Monthly for 3 months after installation.
	inspect for evidence of poor operation and/or weed growth - if required, take remedial action.	Three-monthly, 48h after large storms in first 6 months.
	Inspect silt accumulation rates and establish appropriate brushing frequencies.	Annually
	Monitor inspection chambers	Annually

Cellular Storage Maintenance

Maintenance Schedule	Required Action	Typical Frequency
Regular Maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action	Monthly for 3 months, then annually
	Remove debris from the catchment surface (where it may cause risks to performance)	Monthly
	For systems where rainfall infiltrates into the tank from above, check surface of filter for blockage by sediment, algae or other matter; remove and replace surface infiltration medium as necessary.	Annually
	Remove sediment from pre-treatment structures and/or internal forebays	Annually, or as required
Remedial Actions	Repair/rehabilitate inlets, outlets, overflows and vents	Annually, or as required
Monitoring	Inspect/check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed	Annually
	Survey inside of tank for sediment build-up and remove if necessary	Every 5 years or as required

6.1 Chapter 32 of the Ciria C753 SuDS manual details the operation and maintenance of permeable paving and cellular storage tanks, and these maintenance and operation considerations should be implemented into a regular maintenance plan so as to ensure the efficiency and viability of the drainage system.

7.0 Summary

7.1 Barrie House is a brownfield redevelopment with the construction of one additional three storey building housing 9 self contained units in place of the existing porters lodge, with an additional 3 self contained units within the lower ground floor of the existing structure.

7.2 The entirety of the site lies within Flood Zone 1 and is not subject to flooding from rivers and seas, artificial drainage systems and reservoirs.

7.3 The proposed development will incorporate SuDS systems designed to replicate the natural water cycle in the form of permeable paving and cellular storage tanks.

7.4 The drainage strategy designed reduces the run-off for the 100 year event from the existing rate of 41.02l/s to 5l/s as the practical minimum.

7.5 The surface water will attenuate within cellular storage crates beneath the parking area. A control will be fitted to the tank to limit the discharge to 5l/s.

7.6 The maximum storage needed across the site is 56m³ and this has been provided within the cellular storage tanks. Storage above the 1 in 100 year event is provided within the permeable paving sub-base but this has not currently been factored in to the design.

7.7 The final manhole post-attenuation crates will combine the foul and surface water prior to final discharge to the Thames Water combined sewer at manhole reference 4518.

7.8 This SuDS assessment has demonstrated that there will be no increase in flood risk to the site or to neighbouring developments owing to the redevelopment of Barrie House, and as such issues of flooding and drainage should not constraint the granting of planning permission.

Appendix A

Site Location Plan

Appendix B

BGS Borehole Records

C28

Corner of Ormonde Tce &

WELL BORING at Albert Rd, St. Johns Wood. County

Geol. map 1 in. map New Series 6 in. map 7 N.W. TP/2816/345

Made by TQ 28 SE Date 2775.8355

Sunk feet. Bored feet. 256

Communicated by L.C.C.

Height above Ordnance Datum 104·98 Rest level of water

Yield (38·10m)

Quality (with copy of analysis on separate sheet)

GEOLOGICAL FORMATION	NATURE OF STRATA	THICKNESS Feet	THICKNESS Inches	DEPTH Feet	DEPTH Inches
	Macadam	-	8	-	8 (0·20m)
	Made Ground	2	-	2	8 (0·81m)
	Brown clay.	31	-	33	8 (10·26m)
	Blue clay Limbatoma	44	6	78	2 (23·8)

GEOLOGICAL SURVEY AND MUSEUM, JERMYN STREET, LONDON, S.W.1. (50475X) Wt. W30783/0181 2,500 4/31 H. J. R. & L., Ltd. Gp. 616

~~276–135~~ 142 256 TQ 28 SE/409

GROUND LEVEL: 164·6 A.O.D. 50·14m
NOMINAL B.H. DIA.: 6" Casing to 140ft.
DATE OF BORING: 21 Feb. to 14 March '50 N.G.R. 2755. 8360

BOREHOLE No. 27

GROUNDWATER LEVEL	GROUNDWATER DATE	SAMPLE DEPTH	B.H.	DEPTH 0'-0"	R.L.		DESCRIPTION OF STRATA
							Fairly firm fissured brown clay becoming stiffer with increasing depth
				34'-0" 10·36m	+130·6 +39·78m		
							Stiff grey - blue fissured clay
		Contd.		[illegible]	[illegible]		Mudstone boulder

REMARKS: 39·32m +10·82m

No water in borehole

SAMPLES
■ Undisturbed
● Disturbed

SCALE: 1/8" to 1'-0"

METROPOLITAN WATER BOARD.

MAIN IN TUNNEL BETWEEN THAMES AND LEA VALLEYS.

SOILS No. S/371

DRWG. No. S/R/526

GEORGE WIMPEY & CO. LTD, CENTRAL LABORATORY, SOUTHALL.

Appendix C

Thames Water Record Plans

Asset location search

Thames Water Property Searches

motion
GUILDFORD
GU1 4AU

Search address supplied	Flat 1 Barrie House 29 St. Edmunds Terrace London NW8 7QH
Your reference	MWBARR
Our reference	ALS/ALS Standard/2017_3707052
Search date	12 December 2017

Keeping you up-to-date

Knowledge of features below the surface is essential in every development. The benefits of this not only include ensuring due diligence and avoiding risk, but also being able to ascertain the feasibility for any commercial or residential project.

An asset location search provides information on the location of known Thames Water clean and/or wastewater assets, including details of pipe sizes, direction of flow and depth. Please note that information on cover and invert levels will only be provided where the data is available.

Thames Water Utilities Ltd
Property Searches, PO Box 3189, Slough SL1 4WW
DX 151280 Slough 13

searches@thameswater.co.uk
www.thameswater-propertysearches.co.uk

0845 070 9148

Asset location search

Property Searches

Search address supplied: Flat 1, Barrie House, 29, St. Edmunds Terrace, London, NW8 7QH

Dear Sir / Madam

An Asset Location Search is recommended when undertaking a site development. It is essential to obtain information on the size and location of clean water and sewerage assets to safeguard against expensive damage and allow cost-effective service design.

The following records were searched in compiling this report: - the map of public sewers & the map of waterworks. Thames Water Utilities Ltd (TWUL) holds all of these.

This searchprovides maps showing the position, size of Thames Water assets close to the proposed development and also manhole cover and invert levels, where available.

Please note that none of the charges made for this report relate to the provision of Ordnance Survey mapping information. The replies contained in this letter are given following inspection of the public service records available to this company. No responsibility can be accepted for any error or omission in the replies.

You should be aware that the information contained on these plans is current only on the day that the plans are issued. The plans should only be used for the duration of the work that is being carried out at the present time. Under no circumstances should this data be copied or transmitted to parties other than those for whom the current work is being carried out.

Thames Water do update these service plans on a regular basis and failure to observe the above conditions could lead to damage arising to new or diverted services at a later date.

Contact Us

If you have any further queries regarding this enquiry please feel free to contact a member of the team on 0845 070 9148, or use the address below:

Thames Water Utilities Ltd
Property Searches
PO Box 3189
Slough
SL1 4WW

Email: searches@thameswater.co.uk
Web: www.thameswater-propertysearches.co.uk

Waste Water Services

Please provide a copy extract from the public sewer map.

Enclosed is a map showing the approximate lines of our sewers. Our plans do not show sewer connections from individual properties or any sewers not owned by Thames Water unless specifically annotated otherwise. Records such as "private" pipework are in some cases available from the Building Control Department of the relevant Local Authority.

Where the Local Authority does not hold such plans it might be advisable to consult the property deeds for the site or contact neighbouring landowners.

This report relates only to sewerage apparatus of Thames Water Utilities Ltd, it does not disclose details of cables and or communications equipment that may be running through or around such apparatus.

The sewer level information contained in this response represents all of the level data available in our existing records. Should you require any further Information, please refer to the relevant section within the 'Further Contacts' page found later in this document.

For your guidance:

- The Company is not generally responsible for rivers, watercourses, ponds, culverts or highway drains. If any of these are shown on the copy extract they are shown for information only.
- Any private sewers or lateral drains which are indicated on the extract of the public sewer map as being subject to an agreement under Section 104 of the Water Industry Act 1991 are not an ‘as constructed’ record. It is recommended these details be checked with the developer.

Clean Water Services

Please provide a copy extract from the public water main map.

Enclosed is a map showing the approximate positions of our water mains and associated apparatus. Please note that records are not kept of the positions of individual domestic supplies.

For your information, there will be a pressure of at least 10m head at the outside stop valve. If you would like to know the static pressure, please contact our Customer Centre on 0800 316 9800. The Customer Centre can also arrange for a full flow and

pressure test to be carried out for a fee.

For your guidance:

- Assets other than vested water mains may be shown on the plan, for information only.
- If an extract of the public water main record is enclosed, this will show known public water mains in the vicinity of the property. It should be possible to estimate the likely length and route of any private water supply pipe connecting the property to the public water network.

Payment for this Search

A charge will be added to your suppliers account.

Further contacts:

Waste Water queries

Should you require verification of the invert levels of public sewers, by site measurement, you will need to approach the relevant Thames Water Area Network Office for permission to lift the appropriate covers. This permission will usually involve you completing a TWOSA form. For further information please contact our Customer Centre on Tel: 0845 920 0800. Alternatively, a survey can be arranged, for a fee, through our Customer Centre on the above number.

If you have any questions regarding sewer connections, budget estimates, diversions, building over issues or any other questions regarding operational issues please direct them to our service desk. Which can be contacted by writing to:

Developer Services (Waste Water)
Thames Water
Clearwater Court
Vastern Road
Reading
RG1 8DB

Tel: 0800 009 3921
Email: developer.services@thameswater.co.uk

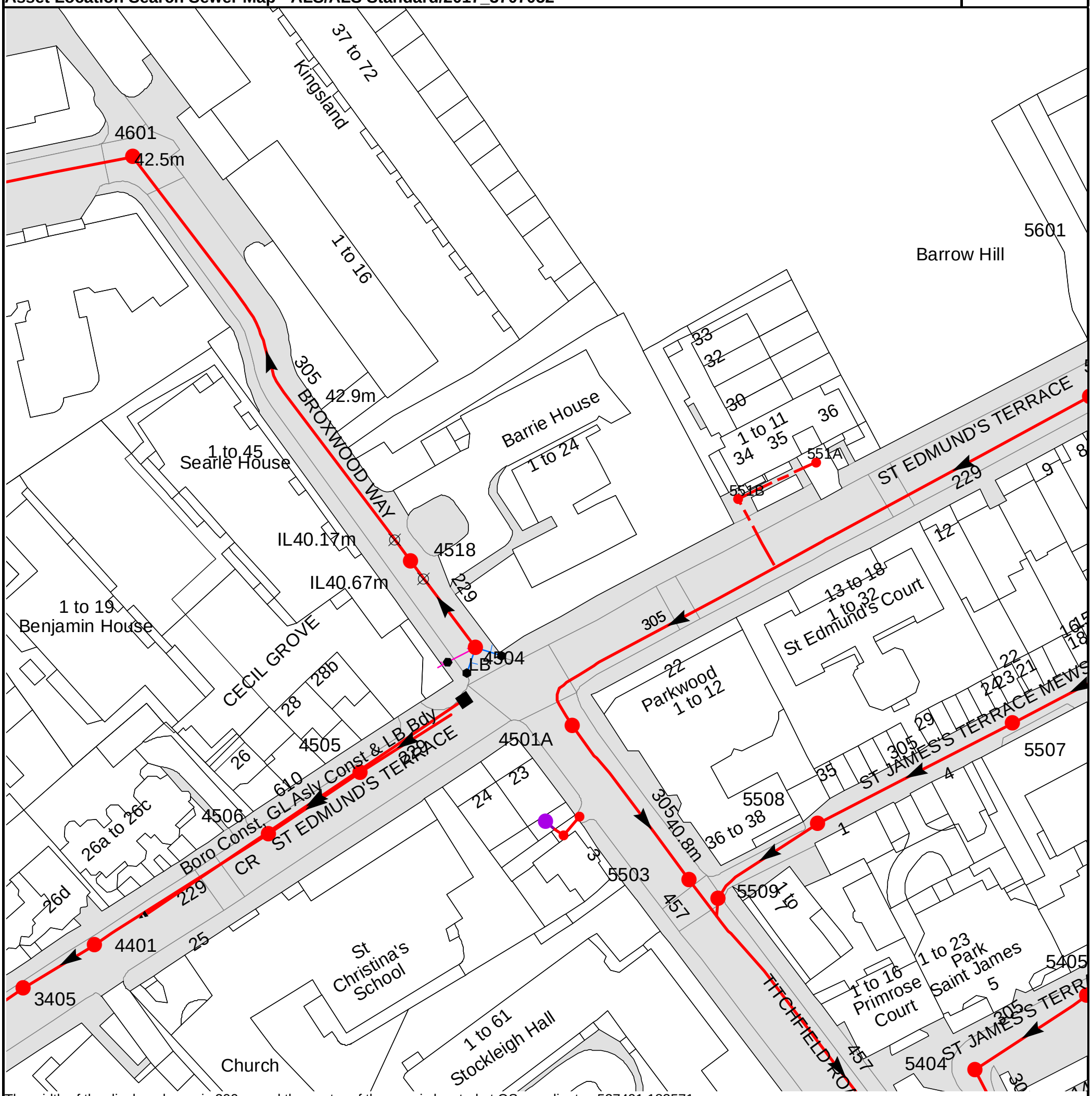
Clean Water queries

Should you require any advice concerning clean water operational issues or clean water connections, please contact:

Developer Services (Clean Water)
Thames Water
Clearwater Court
Vastern Road
Reading
RG1 8DB

Tel: 0800 009 3921
Email: developer.services@thameswater.co.uk

Asset Location Search Sewer Map - ALS/ALS Standard/2017_3707052



The width of the displayed area is 200 m and the centre of the map is located at OS coordinates 527491,183571

The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.

NB. Levels quoted in metres Ordnance Newlyn Datum. The value -9999.00 indicates that no survey information is available

Manhole Reference	Manhole Cover Level	Manhole Invert Level
3405	38.37	37.29
4401	38.74	37.71
4601	42.87	38.62
4506	39.76	38.52
4505	40.57	39.27
4518	43.1	n/a
4504	42.26	40.95
451A	n/a	n/a
45AF	n/a	n/a
4501A	42.16	39.08
45AG	n/a	n/a
5503	40.4	37.83
5509	40.24	38.21
551B	n/a	n/a
551A	n/a	n/a
5508	40.97	39.12
5507	41.65	39.96
5405	39.59	36.15
5404	39.04	35.72

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ALS Sewer Map Key

Public Sewer Types (Operated & Maintained by Thames Water)

Foul: A sewer designed to convey waste water from domestic and industrial sources to a treatment works.

Surface Water: A sewer designed to convey surface water (e.g. rain water from roofs, yards and car parks) to rivers or watercourses.

Combined: A sewer designed to convey both waste water and surface water from domestic and industrial sources to a treatment works.

Trunk Surface Water

Trunk Foul

Storm Relief

Trunk Combined

Vent Pipe

Bio-solids (Sludge)

Proposed Thames Surface Water Sewer

Proposed Thames Water Foul Sewer

Gallery

Foul Rising Main

Surface Water Rising Main

Combined Rising Main

Sludge Rising Main

Proposed Thames Water Rising Main

Vacuum

Sewer Fittings

A feature in a sewer that does not affect the flow in the pipe. Example: a vent is a fitting as the function of a vent is to release excess gas.

Air Valve

Dam Chase

Fitting

Meter

Vent Column

Operational Controls

A feature in a sewer that changes or diverts the flow in the sewer. Example: A hydrobrake limits the flow passing downstream.

Control Valve

Drop Pipe

Ancillary

Weir

End Items

End symbols appear at the start or end of a sewer pipe. Examples: an Undefined End at the start of a sewer indicates that Thames Water has no knowledge of the position of the sewer upstream of that symbol, Outfall on a surface water sewer indicates that the pipe discharges into a stream or river.

Outfall

Undefined End

Inlet

Other Symbols

Symbols used on maps which do not fall under other general categories

Public/Private Pumping Station

Change of characteristic indicator (C.O.C.I.)

Invert Level

Summit

Areas

Lines denoting areas of underground surveys, etc.

Agreement

Operational Site

Chamber

Tunnel

Conduit Bridge

Other Sewer Types (Not Operated or Maintained by Thames Water)

Foul Sewer

Surface Water Sewer

Combined Sewer

Gulley

Culverted Watercourse

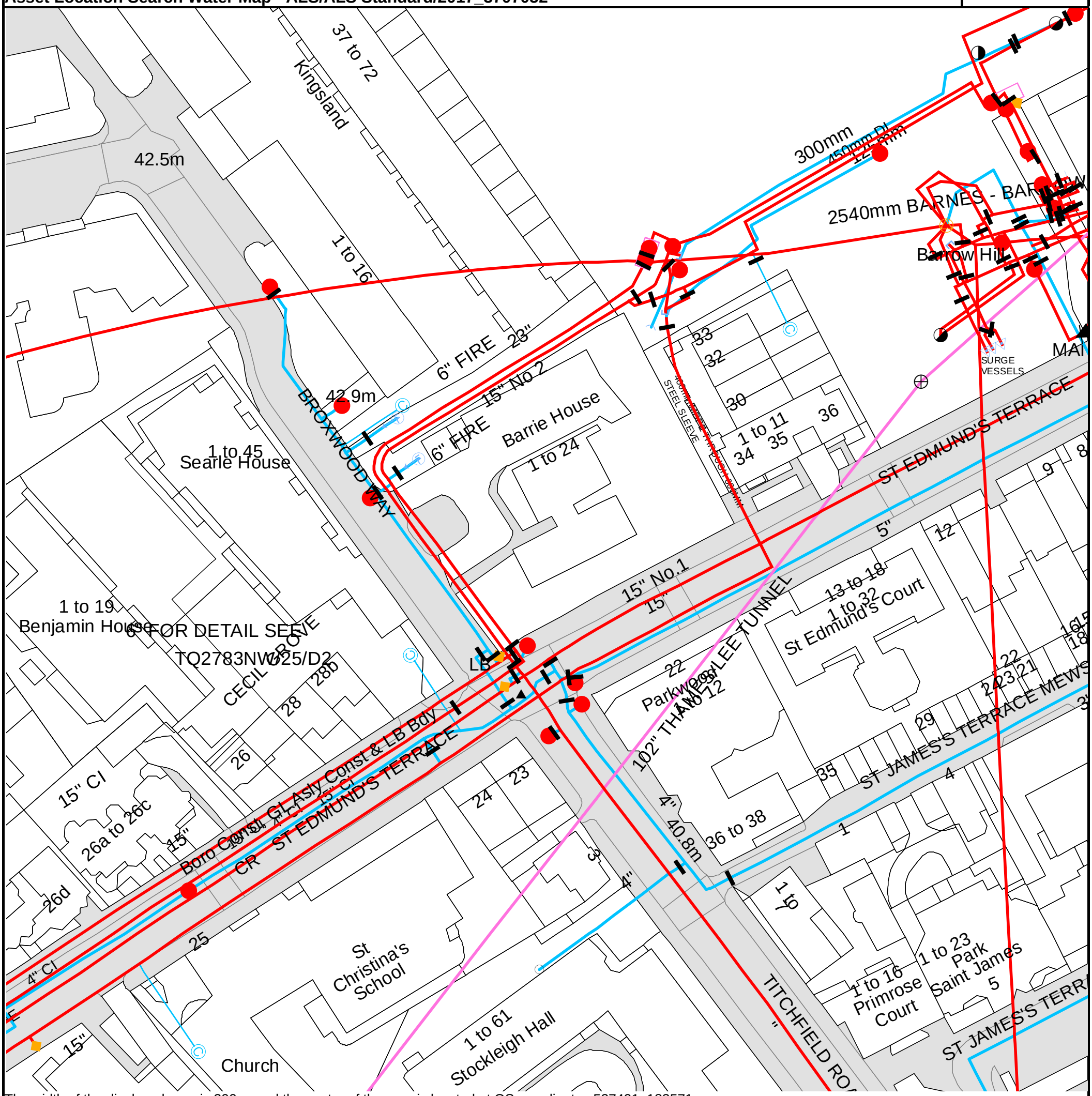
Proposed

Abandoned Sewer

Notes:

1) All levels associated with the plans are to Ordnance Datum Newlyn.
2) All measurements on the plans are metric.
3) Arrows (on gravity fed sewers) or flecks (on rising mains) indicate direction of flow.
4) Most private pipes are not shown on our plans, as in the past, this information has not been recorded.
5) 'na' or '0' on a manhole level indicates that data is unavailable.
6) The text appearing alongside a sewer line indicates the internal diameter of the pipe in milimetres. Text next to a manhole indicates the manhole reference number and should not be taken as a measurement. If you are unsure about any text or symbology present on the plan, please contact a member of Property Insight on 0845 070 9148.

Asset Location Search Water Map - ALS/ALS Standard/2017_3707052



The width of the displayed area is 200 m and the centre of the map is located at OS coordinates 527491, 183571.

The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.

ALS Water Map Key

Water Pipes (Operated & Maintained by Thames Water)

4"

Distribution Main: The most common pipe shown on water maps. With few exceptions, domestic connections are only made to distribution mains.

16"

Trunk Main: A main carrying water from a source of supply to a treatment plant or reservoir, or from one treatment plant or reservoir to another. Also a main transferring water in bulk to smaller water mains used for supplying individual customers.

3" SUPPLY

Supply Main: A supply main indicates that the water main is used as a supply for a single property or group of properties.

3" FIRE

Fire Main: Where a pipe is used as a fire supply, the word FIRE will be displayed along the pipe.

3" METERED

Metered Pipe: A metered main indicates that the pipe in question supplies water for a single property or group of properties and that quantity of water passing through the pipe is metered even though there may be no meter symbol shown.

Transmission Tunnel: A very large diameter water pipe. Most tunnels are buried very deep underground. These pipes are not expected to affect the structural integrity of buildings shown on the map provided.

Proposed Main: A main that is still in the planning stages or in the process of being laid. More details of the proposed main and its reference number are generally included near the main.

Valves

- General Purpose Valve
- Air Valve
- Pressure Control Valve
- Customer Valve

Hydrants

- Single Hydrant

Meters

- Meter

End Items

Symbol indicating what happens at the end of a water main.

- Blank Flange
- Capped End
- Emptying Pit
- Undefined End
- Manifold
- Customer Supply
- Fire Supply

Operational Sites

- Booster Station
- Other
- Other (Proposed)
- Pumping Station
- Service Reservoir
- Shaft Inspection
- Treatment Works
- Unknown
- Water Tower

Other Symbols

- Data Logger

PIPE DIAMETER	DEPTH BELOW GROUND
Up to 300mm (12")	900mm (3')
300mm - 600mm (12" - 24")	1100mm (3' 8")
600mm and bigger (24" plus)	1200mm (4')

Other Water Pipes (Not Operated or Maintained by Thames Water)

Other Water Company Main: Occasionally other water company water pipes may overlap the border of our clean water coverage area. These mains are denoted in purple and in most cases have the owner of the pipe displayed along them.

Private Main: Indiates that the water main in question is not owned by Thames Water. These mains normally have text associated with them indicating the diameter and owner of the pipe.

Terms and Conditions

All sales are made in accordance with Thames Water Utilities Limited (TWUL) standard terms and conditions unless previously agreed in writing.

1. All goods remain in the property of Thames Water Utilities Ltd until full payment is received.
2. Provision of service will be in accordance with all legal requirements and published TWUL policies.
3. All invoices are strictly due for payment 14 days from due date of the invoice. Any other terms must be accepted/agreed in writing prior to provision of goods or service, or will be held to be invalid.
4. Thames Water does not accept post-dated cheques-any cheques received will be processed for payment on date of receipt.
5. In case of dispute TWUL`s terms and conditions shall apply.
6. Penalty interest may be invoked by TWUL in the event of unjustifiable payment delay. Interest charges will be in line with UK Statute Law 'The Late Payment of Commercial Debts (Interest) Act 1998'.
7. Interest will be charged in line with current Court Interest Charges, if legal action is taken.
8. A charge may be made at the discretion of the company for increased administration costs.

A copy of Thames Water's standard terms and conditions are available from the Commercial Billing Team (cashoperations@thameswater.co.uk).

We publish several Codes of Practice including a guaranteed standards scheme. You can obtain copies of these leaflets by calling us on 0800 316 9800

If you are unhappy with our service you can speak to your original goods or customer service provider. If you are not satisfied with the response, your complaint will be reviewed by the Customer Services Director. You can write to her at: Thames Water Utilities Ltd. PO Box 492, Swindon, SN38 8TU.

If the Goods or Services covered by this invoice falls under the regulation of the 1991 Water Industry Act, and you remain dissatisfied you can refer your complaint to Consumer Council for Water on 0121 345 1000 or write to them at Consumer Council for Water, 1st Floor, Victoria Square House, Victoria Square, Birmingham, B2 4AJ.

Ways to pay your bill

Credit Card	**BACS Payment**	**Telephone Banking**	**Cheque**
Call **0845 070 9148** quoting your invoice number starting CBA or ADS / OSS	Account number **90478703** Sort code **60-00-01** A remittance advice must be sent to: **Thames Water Utilities Ltd., PO Box 3189, Slough SL1 4WW.** or email **ps.billing@thameswater.co.uk**	By calling your bank and quoting: Account number **90478703** Sort code **60-00-01** and your invoice number	Made payable to '**Thames Water Utilities Ltd**' Write your Thames Water account number on the back. Send to: **Thames Water Utilities Ltd., PO Box 3189, Slough SL1 4WW** or by DX to **151280 Slough 13**

Search Code

IMPORTANT CONSUMER PROTECTION INFORMATION

This search has been produced by Thames Water Property Searches, Clearwater Court, Vastern Road, Reading RG1 8DB, which is registered with the Property Codes Compliance Board (PCCB) as a subscriber to the Search Code. The PCCB independently monitors how registered search firms maintain compliance with the Code.

The Search Code:

- provides protection for homebuyers, sellers, estate agents, conveyancers and mortgage lenders who rely on the information included in property search reports undertaken by subscribers on residential and commercial property within the United Kingdom
- sets out minimum standards which firms compiling and selling search reports have to meet
- promotes the best practise and quality standards within the industry for the benefit of consumers and property professionals
- enables consumers and property professionals to have confidence in firms which subscribe to the code, their products and services.

By giving you this information, the search firm is confirming that they keep to the principles of the Code. This provides important protection for you.

The Code's core principles

Firms which subscribe to the Search Code will:

- display the Search Code logo prominently on their search reports
- act with integrity and carry out work with due skill, care and diligence
- at all times maintain adequate and appropriate insurance to protect consumers
- conduct business in an honest, fair and professional manner
- handle complaints speedily and fairly
- ensure that products and services comply with industry registration rules and standards and relevant laws
- monitor their compliance with the Code

Complaints

If you have a query or complaint about your search, you should raise it directly with the search firm, and if appropriate ask for any complaint to be considered under their formal internal complaints procedure. If you remain dissatisfied with the firm's final response, after your complaint has been formally considered, or if the firm has exceeded the response timescales, you may refer your complaint for consideration under The Property Ombudsman scheme (TPOs). The Ombudsman can award compensation of up to £5,000 to you if he finds that you have suffered actual loss as a result of your search provider failing to keep to the Code.

Please note that all queries or complaints regarding your search should be directed to your search provider in the first instance, not to TPOs or to the PCCB.

TPOs Contact Details

The Property Ombudsman scheme
Milford House
43-55 Milford Street
Salisbury
Wiltshire SP1 2BP
Tel: 01722 333306
Fax: 01722 332296
Email: admin@tpos.co.uk

You can get more information about the PCCB from www.propertycodes.org.uk

PLEASE ASK YOUR SEARCH PROVIDER IF YOU WOULD LIKE A COPY OF THE SEARCH CODE

Appendix D

Development Proposals

Key Plan, Scale 1:1250

Legend: Proposed Key

— · — · —	Site boundary.
– – – – –	Line of demolished building.
▨	Existing structure / earth.
☐	New Structure.
▨	Existing structure not part of this application.

Proposed notes:

01	Natural stone paving to terrace
02	Natural stone paving on permeable base
03	Resin bonded gravel
04	Resin bonded gravel to car parking space
05	Existing bin store relocated
06	Proposed bin store (2no. 1100 litre eurobins + 2no. 240 litre wheelie bins)
07	Proposed bike store (18 cycles internal & 4 external)
08	Planting border
09	Pedestrian pathway
10	Dwarf wall to site boundary
11	Pedestrian access gate
12	Sliding vehicle access gate
13	Vehicle one way system
14	Lightwell
15	Sedum green roof
16	Lift overrun
17	Profiled anodised aluminium cladding
18	Pressed anodised aluminium window reveal
19	Brickwork
20	Portland ashlar stone
21	Portland stone coping
22	Double glazed window with anodised aluminium frame
23	Anodised aluminum balustrade
24	Structural low iron glass
25	Anodised aluminium fin
26	10 existing residents' parking bays retained as shown
27	AOV smoke outlet
28	Existing porters' lodge to be demolished
29	Anodised aluminium bifolding louvered privacy screens
30	Obsured glazing to 1.7m above finished floor level
31	Clear glass balustrade
32	Attenuated Acoustic Enclosure

Rev - 04.01.18 Issued for Planning

PLANNING

Project No. 16033
Client Kalemister Ltd.
Date November 2017
Scale 1:200 @ A2/ 1:400 @ A4
Project Barrie House, 29 St. Edmunds Terrace
Drawing Title: Proposed Ground Floor Plan
Drawing No. P_21
Rev. -
Drawn MW
Approved TMC
Signed

Marek Wojciechowski Architects

66-68 Margaret Street W1W 8SR T. 020 7580 9336 www.mw-a.co.uk

N

0 2m 5m 10m

Appendix E

Drainage Strategy

RE
CL 46.00
IL 45.30

12.57m/100Ø/1:84

CL 46.30
IL 45.15

RWP

4.21m/100Ø/1:28

CL 46.00
IL 45.00

12.08m/100Ø/1:60

IL 44.80

IL 44.40

CL 45.00
IL 44.08

14.49m/100Ø/1:21

IL 43.40

IL 43.30

10.82m/100Ø/1:100

CL 43.70
IL 43.19

8.69m/100Ø/1:46

IL 43.00

IL 44.70

IL 44.65

IL 44.60

IL 44.20 ◇ IL 44.20

IL 43.95

2.06m
100Ø
1:100

IL 42.90

IL 42.50

FLOW CONTROL
CL 43.40
IL 42.32

2.18m
100Ø
1:10

CL 43.10
IL 42.10

FOUL WATER FROM DEVELOPMENT TO CONNECT IN TO NEW COMBINED CHAMBER

TO CONNECT IN TO EXISTING THAMES WATER COMBINED SEWER

Notes

1. All levels and dimensions are to be checked on site before any work commences. All dimensions are in metres unless stated otherwise.
2. This drawing has been based upon survey information supplied by Marek Wojciechowski Architects Ltd. and Motion cannot guarantee the accuracy of the data provided

Legend

- Proposed Combined Sewer
- Proposed Private Surface Water Sewer
- Pipe Length (m) / Ø (mm) / Gradient — 99.99m/100Ø /1:150
- Surface Water Inspection Chamber
- Foul Inspection Chamber
- Rodding Eye — RE
- Rain Water Pipe — RWP
- Permeable Paving
- Permeable Paving over 1m Deep Cellular Storage

Revision Notes:	Drn	Chk	App	Date
B Permeable Paving Amended	SR	SR	NJ	04-01-18
A Layout Amended	SR	NJ	NJ	04-01-18

Drawing Status:

DRAFT

motion

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Client:
Marek Wojciechowski Architects Ltd.

Project:
Barrie House, 29 St. Edmund's Terrace

Title:
Drainage Strategy

Scale: 1:100	Size: A1	Date: 2018-01-03
Drawn:SR	Chk'd: GM	Appr'd:NJ

Drawing: 170910-300

Revision: B

N:\Projects\mwbarr 170910\Drawings\170910-300b [Drainage Strategy].dwg