1-38-4492/2

R E P O R T

on the impact on trees

of proposals for development

at

2A Templewood Avenue, London, NW3 7XA

(23rd August 2019)

JOHN CROMAR'S ARBORICULTURAL COMPANY LIMITED

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01
Introduction and Instructions

I am instructed by Michael Brod Architect on behalf of clients to make an assessment of tree amenity value and condition of trees at 2A Templewood Avenue, London, NW3 7XA and of the impact of a proposal for development (extensions) on such trees. Accordingly, I visited the property on 17th January 2018 and 5th August, 2019 in order to carry out inspections.

02
Copyright

02.01

03
Notes

03.01
PLANS

1-38-4492/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
1-38-4492/P2 and 1-38-4492/P3 show proposed retained trees and are colour-coded to indicate where arboricentric methods are proposed during the demolition and construction processes.

04
Sources and Documents

Ground level inspection.
Supplied plans :
MICHAEL BROD ARCHITECTS DRG.NO.: 1514-S1B, 1514-1E

05
Appraisal

05.01
AMENITY / SCREENING BY TREES AND SHRUBS
Some of the trees are prominent; others are of no significant general public amenity value, as they are only partially visible from Templewood Avenue as 'glimpse' features. Many of the trees are of considerable strictly local amenity value to owners / users of the site. There are many shrubs in both front and rear gardens ; none of particular landscape value.

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
RPA is an abbreviation used in BS5837:2012, signifying the *root protection area*. An assessment as per BS5837:2012 section 4.6.2 has been carried out in connection with the plotting of all RPAs of all trees. (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 some relevance in connection with this site where several trees to be retained likely have root systems affected by existing structures.

Regular reduction or pollarding promotes shrinkage of the root system, in accordance with established knowledge of tree physiology, e.g. in 'Crown Pruning Effects on Roots' *Coder*, (1997) found:

A decline in carbohydrate from failing photosynthesis (as in green wood pruning) allows carbohydrates to be preferentially held in the shoot. The result is a greater allocation of carbohydrate to shoot production and less to roots. After a time of internal nitrogen reallocation, the smaller allocation of carbohydrate to roots means less nitrogen uptake. As pathogens, damage, toxins, stress, etc. limit photosynthesis, less root area is generated.

Thus decline of the root system of tree 2 to at least some 20% below the orthodox extent of the RPA is now likely to have occurred. However no reliance has been placed on this factor in the calculations below : the full RPA has been accorded the tree.

05.04
ROOTS and DESIGN
SRP is an abbreviation 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. 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. However, it should be noted that the landform and existing 'step-down' internal arrangements are here utilised and have figured prominently in design discussions regarding the rear extension between the architect and the writer. No root cutting is proposed here by virtue of the special footings proposed.

No.	Tree	RPA in sq.m.	Area sq.m affected	% affected	Notes
1	horse chestnut	547.39	1.19	0.22	Proposed extension
1	horse chestnut	547.39	2.92	0.53	Proposed porch
1	horse chestnut	547.39	58.67	10.72	Driveway; N.B. likely to be below this amount of encroachment as minimal surface reduction entailed.
2	beech	228.05	29.23	12.82	Proposed extension ; N.B. no root cutting entailed – see method below.
3	yew	74.91	11.18	14.92	Proposed extension
8	horse chestnut	221.67	0.74	0.33	driveway

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. For example, the use of piled footings with reduced depth ground beams or fully-suspended ground beams is proposed in areas indicated on plan and outlined in method below.

05.05
PERCEPTION OF TREES
The proposed (extended) dwelling is in an almost identical position in relation to the trees as is the existing structure : the existing structure's position in relation to the existing trees has not generated any obvious or reported requirement to prune trees inappropriately. 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 drawings supplied that no encroachment on the crowns of retained trees will occur. It is of note that the form of the trees is such that the defining branch structure is well above or clear of the proposed building line.

05.08
It is typical for landscaping to be a reserved matter consequent to any grant of consent and for a full landscaping scheme to detail tree, shrub and herbaceous planting etc.

05.09
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."

05.10
The above advice appears to have been considered in formulating proposals for development.

05.11
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 any trees to be removed.

05.12
SUPERVISION
Supervision by and regular communication with an arboriculturist is typically an 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 OVERVIEW below.

05.13
Note to LPA : if the Authority is minded to grant consent, it is invited to consider:

a) the incorporation of the specific *order of implementation* of the arboricentric methods below into any Conditions applied.

b) to specify in a Condition that any Construction Management Plan incorporates all the arboricentric methods herein.

Such measures are likely to maximise tree protection.

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.

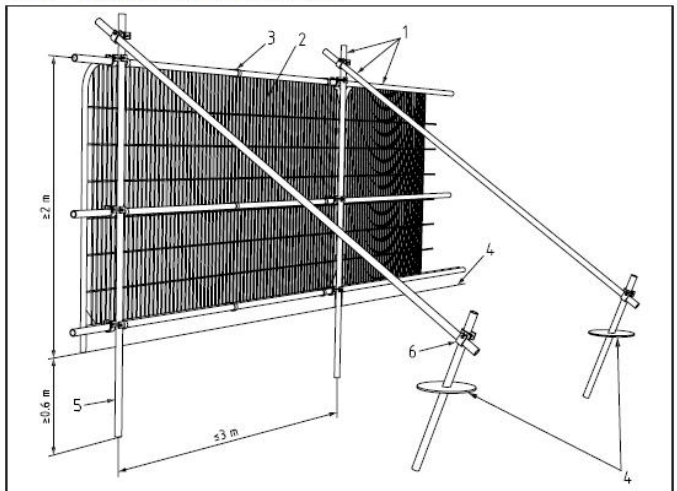
Method 1 : SUPERVISION
Supervision by an arboriculturist appointed directly by the client (not the main contractor) shall take place at key points in the construction process, and additionally whenever required by the architect, client, main contractor or LPA. These key stages are :

1) **At site possession by contractor, outline all tree protection measures with site agent and resolve any issues arising.**
2) **Ensure 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 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 tree protection and sign off.**

PREPARATION / DEMOLITION

PLEASE READ WITH PLAN REFERENCE 1-38-4492/P2, APPENDED.
The Methods shall be implemented in the order given unless it is stated to the contrary.

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

Method 2 : TREE PROTECTION FENCING
This method shall apply where indicated by pink lines. Tree protection fencing shall be erected, in accordance with the heavy-duty specification - BS5837:2012 section 6.2.2.2., Figure 2 :
No ground levels reduction or excavation shall take place within (=the tree side of) the fence lines.
No fires shall be made on any part of the site, or within 20m of any tree to be retained. No storage of materials shall be made within the protective fences.

Method 3 : 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 'Ekotex' 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 'Ekotex' 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

To handle loads exceeding 2 tonnes the ground surface shall be covered (in sequence) by a 2D geotextile membrane, such as 'Ekotex' ; 100mm of green-source woodchip ; TuffTrak^{R} Euromat ground guards or similar appropriate temporary trackway sections. The temporary trackways shall be fixed together with manufacturers' approved fixings. On completion of build phase the ground guards 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.

Method 4 : SIDE ACCESS HARD SURFACE (TO BE SUPERCEDED BY REPLACEMENT HARD SURFACING)
This method shall apply in the magenta crosses zone on plan. No 'scraping up' with a mechanical excavator shall be carried out. The existing hard surface (concrete) shall be lifted by hand tools or hand-held power tools only. The underlying sub-base shall be left undisturbed 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. Any such excavation in the existing sub-base shall be by hand tools or hand-held power tools only. The sub-base shall remain intact during demolition phase. (See method 12 below).

Method 5 : DEMOLITION
This method shall apply generally. Demolition, which shall be by 'top down, sides in' method, shall be carried out with hand tools or hand-held power tools only. Arisings shall be removed for disposal off site. None shall be spread in root protection areas (orange shapes/circles). At the rear the existing patio etc. features shall be removed (orange crosses) only to the extent of reducing in elevation sufficient for laying of method 11 materials and finish.

CONSTRUCTION

PLEASE READ WITH PLAN REFERENCE 1-38-4492/P3, APPENDED.
The Methods shall be implemented in the order given unless it is stated to the contrary.

Method 6 : SERVICE TRENCHES
N.B. -This applies to ALL services : Electricity, gas, water, etc. Existing services shall be utilised wherever possible.

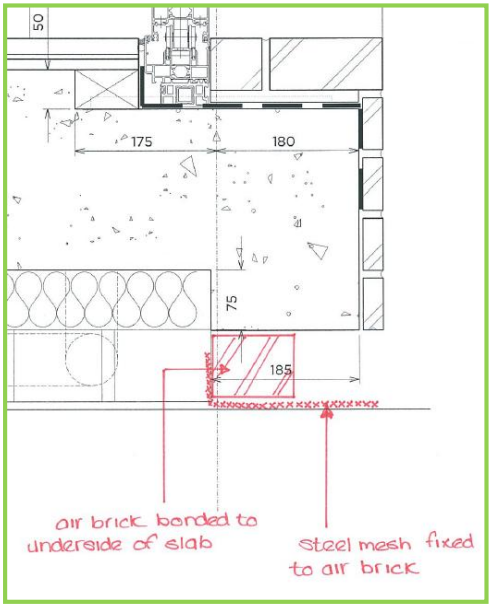
These methods shall apply generally within any RPA (orange circles).

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 7 : ROOT PRUNING – FRONT DRIVEWAY PREPARATION
This method shall apply within only the RPAs (orange circles) on plan, of trees 1 and 8, and in the areas of green roundels. The excavation shall be made with hand tools only. Any roots encountered shall be trimmed to the edge of the excavation using a sharp edge tool such as a handsaw or secateurs. Holes in the ground shall made on a 1m x 1m spacing with a pinch bar to a depth of 20 cm and width of 40mm. 40g (exactly) of sucrose (sugar) shall be dissolved in 1 litre of water and poured into each hole. Treatments should be applied as soon as possible after root cutting but only once in one growing season (March to October). The solution shall be applied gradually to prevent overflow.
The proposed-profile driveway surface shall be laid immediately : a 2D geotextile such as 'Treetex' type, shall be laid directly on the ground surface. Levels can be finely corrected by use of granite chippings NO FINES. Paving shall be laid open-jointed and the joints rammed with granite chippings. The finished surface may be boarded out to prevent damage during construction.

Method 8 : PILE LOCATION DETERMINATION and FULLY SUSPENDED SLAB

This method shall apply within the magenta honeycomb zone on plan. No general reduction whatever of existing ground levels shall take place. The trial pits to determine pile locations shall be dug with hand tools only. N.B. The precise location of piles is flexible within a dimension to be determined by retained engineer, and typically not less than 300mm along the long axis of ground beams. If hand digging is adopted, 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 hole is dug. It shall be borne in mind that the presence of large numbers of roots >20mm in diameter may effectively prevent completion of trial pit, as this would be sufficient reason to terminate the operation and consider its purpose complete or would entail the moving of the trial pit to a different location. If a root > 20mm diameter is inadvertently damaged, it shall be retained *in situ* for appraisal by the arboriculturist. Trial pits to determine suitable pile locations shall be taken to 0.6m below ground level. When trial pits are complete and pile locations have been fixed, the whole area shall be treated as per Method 3 above, except where each of the pile locations lies, where an opening 400mm square centred on the trial pit may be left. The upper 3m of conventional piles shall be sleeved within root protection areas to prevent contact with wet concrete and roots. The upper 1m of screw piles shall be sleeved with high density cardboard tubes where within the root protection areas to prevent contact between ironwork and roots. Movements of screw piling rigs and any other wheeled or tracked plant within RPAs shall be restricted to areas protected as per Method 3. Any delay between trial pit finishing and pile and beam work SHALL instigate the COMPLETE coverage of the entire magenta honeycomb zone on plan as per Method 3 above. A void-former shall be laid after piling is complete. (Any foul drainage pipes shall be laid within this space.) The slab shall be cast.



Method 9 : SLAB EDGE DETAIL FINISHING

This method shall apply in magenta honeycomb zone on plan. Following curing of the slab, saturation and laceration of the void former and impermeable membrane, and clearing of the arising debris at the external margin of the slab for a zone extending at least 250mm under the slab, a formation of airbricks bonded to an open-faced tray composed of (10mm max.) grid stainless steel mesh shall be bonded to the underside of the slab as rodent exclusion measure as indicated left.

Method 10 : RETAINING WALL for PATIO and STEPS CONSTRUCTION

This method shall apply in zone of cyan fill on plan. Footings shall be confined to isolated pads, or piles, dug initially to trial positions. The trial pits to determine pad / pile locations shall be dug with hand tools only, or opened with an air-spade to required depth. N.B. The precise location of pads/piles is flexible within a dimension to be determined by retained engineer. If hand digging is adopted, 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 hole is dug. It shall be borne in mind that the presence of large numbers of roots >20mm in diameter may effectively prevent completion of trial pit, as this would be sufficient reason to terminate the operation and consider its purpose complete or would entail the moving of the trial pit to a different location. If a root > 20mm diameter is inadvertently damaged, it shall be retained *in situ* for appraisal by the arboriculturist. Where roots more than 20mm diameter are unearthed in the pad locations and a pad cannot be re-located, the roots shall be wrapped in bubble wrap. The wrap shall not be wound very tightly against the root. All edges shall be sealed with insulating or gutter tape (not packing tape). (This sleeving both protects the root and forms a compressible layer when wet concrete is poured.) The sleeving shall be chased into the sides of the pit (where the root enters the soil face) for a distance of about 50mm and the entry point ring-sealed with expanding foam. A 25mm minimum thickness of wrap shall be fixed around the roots to be preserved. This protection shall be carried out progressively as the pad pit is dug, so as to protect roots from casual damage during excavation. An impermeable membrane shall line the trial pit and all edges sealed to prevent concrete leachate coming into contact with root-bearing soil. The pads shall be cast and pre-cast lintels or architectural steelwork placed so as to leave a clearance of at least 50mm from retained roots. The wall shall be constructed. Bricks slips may be bonded to any exposed pre-cast lintels or architectural steelwork if desired. The lintels may be set just below (no more than 40-50mm) existing ground level in order to retain the porous back fill effectively. (See Method 11 below)

LATE CONSTRUCTION and LANDSCAPING PHASE

Method 11 : PATIO and STEPS finish
This method shall apply in the zone of red crosses on plan. A geogrid such as Tensar 'TriAx' shall be laid directly on the ground surface. Clean stone 40-60mm no fines backfill shall be laid to ensure a fully porous layer exists to promote gaseous exchange between underlying soil surface and the atmosphere. A further 2D geotextile such as 'Treetex' type, shall be laid. 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 12 : SIDE ACCESS PATH / DRIVEWAY
This method shall apply in brown crosses zone on plan. No reduction of levels below underside of subbase shall take place. No wheeled or tracked machinery shall be used : construction shall be by means of hand tools.

SIDE ACCESS - '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.

Method 13 : LANDSCAPING 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. Ground preparation within root protection areas shall entail removal of perennial shrubs, climbers, ground covering plants by the use of hand tools only. The ground surface shall be thoroughly hand-forked over in vertical mode only to one spit's depth (250mm). Care shall be taken not to damage tree roots greater than 20mm diameter. Biochar (such as https://www.soilfixer.co.uk/biochar-article) shall be incorporated at 5% by volume. Weed treatment if required shall be via BASIS qualified operatives. Surface debris shall be removed by hand to barrow and disposed of off-site. No wheeled or tracked plant shall be used : hand-held power tools such as clearing saws and strimmers may be used. (Outside root protection areas, mechanical cultivation shall be permitted.) The ground surface shall be worked to a fine tilth with hand tools prior to planting. Any dressing with topsoil (to BS3882 : 2015 topsoil) shall be restricted to a maximum of 100mm in depth. Turfing 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. Earthworm Inoculation Units shall be placed 150mm below ground level at 5m intervals in all soil build-up areas.

(All design subject to engineering approval, but used on other sites and known to be practicable and reliable).

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.

23rd August 2019
Signed:

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

APPENDICES

08
Tree Data

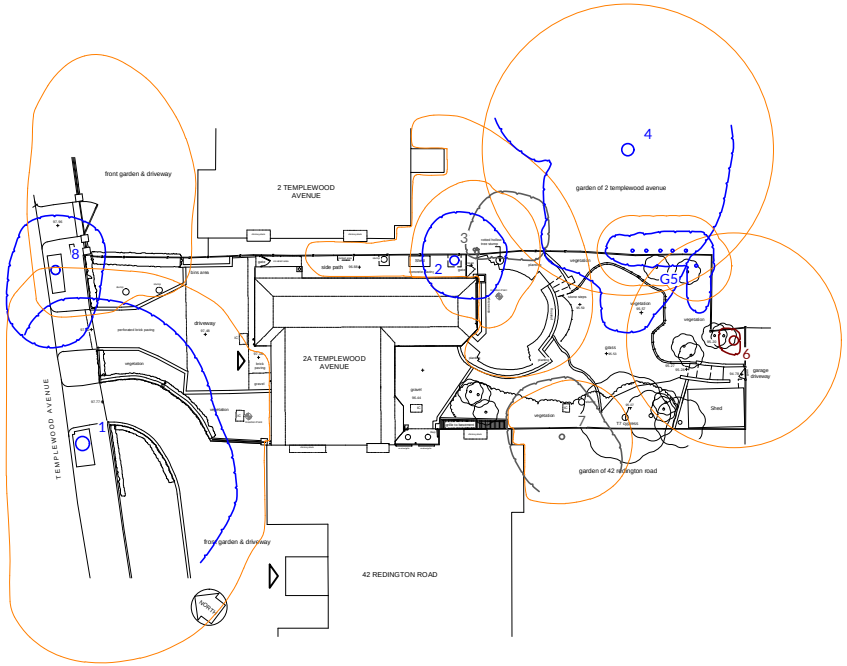
Tree number	Tree type	Height	Stem diameters	Radius of RPA if circle (mm)	RPA (m^2)	Comments	Life expectancy (years)	Assessed BS5837 value category
1	horse chestnut	18	10180	12216	468.8	Prominent; under local authority control	20+	B1
2	beech	14	741	8892	248.4	Reduced to about 15m in height c.2000 and to 14m in 2019. Recommend repeat the reduction periodically to prevent failure of the new stems at the reduction points. This is likely to be required every five to ten years.	20+	B1
3	yew	9	300, 200, 160, 100	4883	74.9	No access. Locally useful screening; in adjoining garden	40+	C1
4	English oak	15	950	11400	408.3	No access. Large spreading tree	20+	B1
G5	yews	9	230	2760	23.9	No access; useful screening.	40+	B2
6	English oak	6.5	700	8400	221.7	Reduced to 6.5m. Some epicormic growth but low vitality	<10	U
7	wild cherry	13	400	4800	72.4	Outside site. Previously reduced in height and spread, c.2014 and 2018. Some screening in summer.	20+	C1
8	horse chestnut	10	380	4560	65.3	Prominent ; under local authority control	20+	B1

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
Plans

1-38-4492/P1 v5
1-38-4492/P2 v4
1-38-4492/P3 v4



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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

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

BASED ON
MICHAEL BROD ARCHITECTS DRG. NO.: 1514-S1B SUPPLIED

SITE ADDRESS
2A Templewood Avenue, London, NW3 7XA

DRG. REF.	REV. NO.
1-38-4492/P1	v5
SCALE & SIZE	DATE
1:200 @ A1	22-Aug-19

0 5 10

Method 1 : SUPERVISION
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3)Supervise lifting of hard surfacing near trees.
4) Supervise laying of temporary 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 tree protection and sign off.

PREPARATION / DEMOLITION

Method 2 : TREE PROTECTION FENCING
This method shall apply where indicated by pink lines. Tree protection fencing shall be erected, in accordance with the heavy-duty specification - BS5837:2012 section 6.2.2.2., Figure 2 :
No ground levels reduction or excavation shall take place within (=the tree side of) the fence lines.
No fires shall be made on any part of the site, or within 20m of any tree to be retained. No storage of materials shall be made within the protective fences.

Method 3 : 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 'Ekotex' 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 'Ekotex' 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.

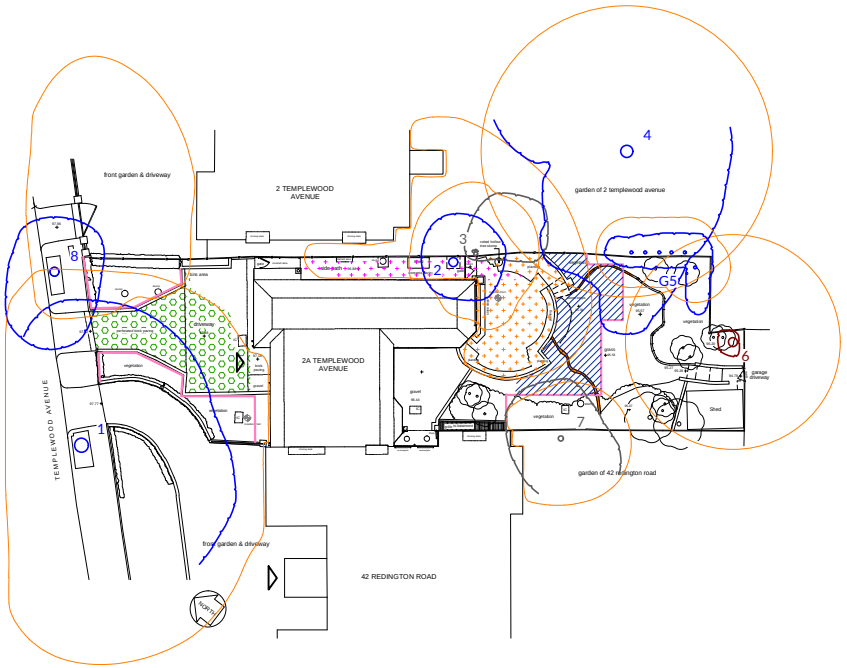
OR

To handle loads exceeding 2 tonnes the ground surface shall be covered (in sequence) by a 2D geotextile membrane, such as 'Ekotex' ; 100mm of green-source woodchip ; TuffTrakR Euromat ground guards or similar appropriate temporary trackway sections. The temporary trackways shall be fixed together with manufacturers' approved fixings. On completion of build phase the ground guards 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.

Method 4 : SIDE ACCESS HARD SURFACE (TO BE SUPERCEDED BY REPLACEMENT HARD SURFACING)
This method shall apply in the magenta crosses zone on plan. No 'scraping up' with a mechanical excavator shall be carried out. The existing hard surface (concrete) shall be lifted by hand tools or hand-held power tools only. The underlying sub-base shall be left undisturbed 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. Any such excavation in the existing sub-base shall be by hand tools or hand-held power tools only. The sub-base shall remain intact during demolition phase. (See method 12 below).

Method 5 : DEMOLITION
This method shall apply generally. Demolition, which shall be by 'top down, sides in' method, shall be carried out with hand tools or hand-held power tools only. Arisings shall be removed for disposal off site. None shall be spread in root protection areas (orange shapes/circles). At the rear the existing patio etc. features shall be removed (orange crosses) only to the extent of reducing in elevation sufficient for laying of method 11 materials and finish.



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

DRG. NAME
TREE RETENTION & TREE PROTECTION MEASURES
(Site Preparation Phase)

TEXT
FOR FULL METHOD DETAILS PLEASE SEE REPORT

BASED ON
MICHAEL BROD ARCHITECTS DRG. NO.: 1514-S1B SUPPLIED

SITE ADDRESS
2A Templewood Avenue, London, NW3 7XA

DRG. REF.	REV. NO.
1-38-4492/P2	v4
SCALE & SIZE	DATE
1:200 @ A1	23-Aug-19

0 5 10

CONSTRUCTION

Method 6 : 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 circles).

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 7 : ROOT PRUNING - FRONT DRIVEWAY PREPARATION
This method shall apply within only the RPAs (orange circles) on plan, of trees 1 and 8, and in the areas of green roundels. The excavation shall be made with hand tools only. Any roots encountered shall be trimmed to the edge of the excavation using a sharp edge tool such as a handsaw or secateurs. Holes in the ground shall made on a 1m x 1m spacing with a pinch bar to a depth of 20 cm and width of 40mm. 40g (exactly) of sucrose (sugar) shall be dissolved in 1 litre of water and poured into each hole. Treatments should be applied as soon as possible after root cutting but only once in one growing season (March to October). The solution shall be applied gradually to prevent overflow.
The proposed-profile driveway surface shall be laid immediately : a 2D geotextile such as 'Treetex' type, shall be laid directly on the ground surface. Levels can be finely corrected by use of granite chippings NO FINES. Paving shall be laid open-jointed and the joints rammed with granite chippings. The finished surface may be boarded out to prevent damage during construction.

Method 8 : PILE LOCATION DETERMINATION and FULLY SUSPENDED SLAB
This method shall apply within the magenta honeycomb zone on plan. No general reduction whatever of existing ground levels shall take place. The trial pits to determine pile locations shall be dug with hand tools only. N.B. The precise location of piles is flexible within a dimension to be determined by retained engineer, and typically not less than 300mm along the long axis of ground beams. If hand digging is adopted, 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 hole is dug. It shall be borne in mind that the presence of large numbers of roots >20mm in diameter may effectively prevent completion of trial pit, as this would be sufficient reason to terminate the operation and consider its purpose complete or would entail the moving of the trial pit to a different location. If a root > 20mm diameter is inadvertently damaged, it shall be retained *in situ* for appraisal by the arboriculturist. Trial pits to determine suitable pile locations shall be taken to 0.6m below ground level. When trial pits are complete and pile locations have been fixed, the whole area shall be treated as per Method 3 above, except where each of the pile locations lies, where an opening 400mm square centred on the trial pit may be left. The upper 3m of conventional piles shall be sleeved within root protection areas to prevent contact with wet concrete and roots. The upper 1m of screw piles shall be sleeved with high density cardboard tubes where within the root protection areas to prevent contact between ironwork and roots.
Movements of screw piling rigs and any other wheeled or tracked plant within RPAs shall be restricted to areas protected as per Method 3. Any delay between trial pit finishing and pile and beam work SHALL instigate the COMPLETE coverage of the entire magenta honeycomb zone on plan as per Method 3 above. A void-former shall be laid after piling is complete. (Any foul drainage pipes shall be laid within this space.) The slab shall be cast.

Method 9 : SLAB EDGE DETAIL FINISHING
This method shall apply in magenta honeycomb zone on plan. Following curing of the slab, saturation and laceration of the void former and impermeable membrane, and clearing of the arising debris at the external margin of the slab for a zone extending at least 250mm under the slab, a formation of airbricks bonded to an open-faced tray composed of (10mm max.) grid stainless steel mesh shall be bonded to the underside of the slab as rodent exclusion measure as indicated left.

Method 10 : RETAINING WALL for PATIO and STEPS CONSTRUCTION
This method shall apply in zone of cyan fill on plan. Footings shall be confined to isolated pads, or piles, dug initially to trial positions. The trial pits to determine pad / pile locations shall be dug with hand tools only, or opened with an air-spade to required depth. N.B. The precise location of pads/piles is flexible within a dimension to be determined by retained engineer. If hand digging is adopted, 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 hole is dug. It shall be borne in mind that the presence of large numbers of roots >20mm in diameter may effectively prevent completion of trial pit, as this would be sufficient reason to terminate the operation and consider its purpose complete or would entail the moving of the trial pit to a different location. If a root > 20mm diameter is inadvertently damaged, it shall be retained *in situ* for appraisal by the arboriculturist. Where roots more than 20mm diameter are unearthed in the pad locations and a pad cannot be re-located, the roots shall be wrapped in bubble wrap. The wrap shall not be wound very tightly against the root. All edges shall be sealed with insulating or gutter tape (not packing tape). (This sleeving both protects the root and forms a compressible layer when wet concrete is poured.) The sleeving shall be chased into the sides of the pit (where the root enters the soil face) for a distance of about 50mm and the entry point ring-sealed with expanding foam. A 25mm minimum thickness of wrap shall be fixed around the roots to be preserved. This protection shall be carried out progressively as the pad pit is dug, so as to protect roots from casual damage during excavation. An impermeable membrane shall line the trial pit and all edges sealed to prevent concrete leachate coming into contact with root-bearing soil. The pads shall be cast and pre-cast lintels or architectural steelwork placed so as to leave a clearance of at least 50mm from retained roots. The wall shall be constructed. Bricks slips may be bonded to any exposed pre-cast lintels or architectural steelwork if desired. The lintels may be set just below (no more than 40-50mm) existing ground level in order to retain the porous back fill effectively. (See Method 11 below)

LATE CONSTRUCTION and LANDSCAPING PHASE

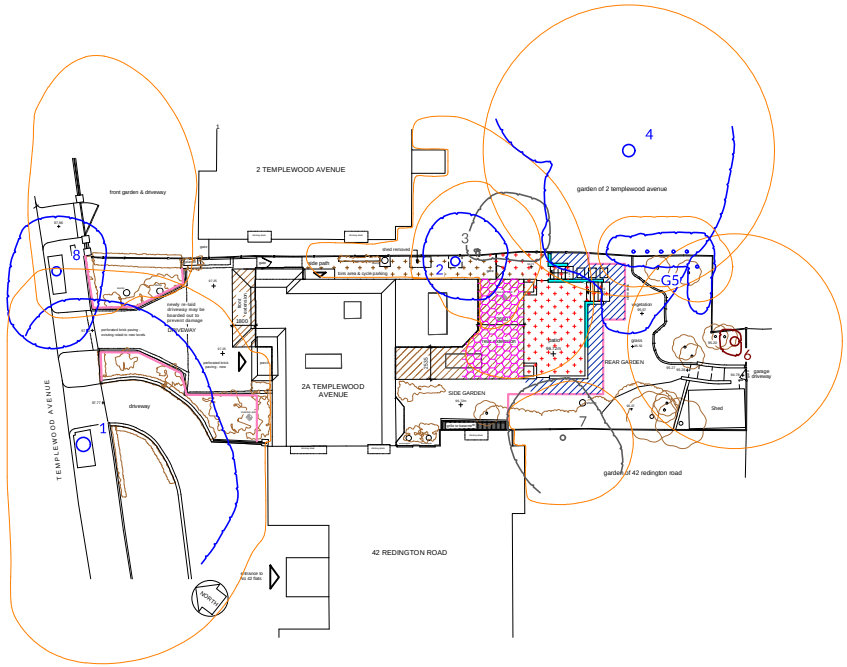
Method 11 : PATIO and STEPS finish
This method shall apply in the zone of red crosses on plan. A geogrid such as Tensar 'TriAx' shall be laid directly on the ground surface. Clean stone 40-60mm no fines backfill shall be laid to ensure a fully porous layer exists to promote gaseous exchange between underlying soil surface and the atmosphere. A further 2D geotextile such as 'Treetex' type, shall be laid. 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 12 : SIDE ACCESS PATH / DRIVEWAY
This method shall apply in brown crosses zone on plan. No reduction of levels below underside of subbase shall take place. No wheeled or tracked machinery shall be used : construction shall be by means of hand tools.

SIDE ACCESS - '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.

Method 13 : LANDSCAPING 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. Ground preparation within root protection areas shall entail removal of perennial shrubs, climbers, ground covering plants by the use of hand tools only. The ground surface shall be thoroughly hand-forked over in vertical mode only to one spit's depth (250mm). Care shall be taken not to damage tree roots greater than 20mm diameter. Biochar (such as https://www.soilfixer.co.uk/biochar-article) shall be incorporated at 5% by volume. Weed treatment if required shall be via BASIS qualified operatives. Surface debris shall be removed by hand to barrow and disposed of off-site. No wheeled or tracked plant shall be used : hand-held power tools such as clearing saws and strimmers may be used. (Outside root protection areas, mechanical cultivation shall be permitted.) The ground surface shall be worked to a fine tilth with hand tools prior to planting. Any dressing with topsoil (to BS3882 : 2015 topsoil) shall be restricted to a maximum of 100mm in depth. Turfing 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. Earthworm Inoculation Units shall be placed 150mm below ground level at 5m intervals in all soil build-up areas.

(All design subject to engineering approval, but used on other sites and known to be practicable and reliable).



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