

TREE SURVEY, ARBORICULTURAL IMPACT ASSESSMENT AND TREE PROTECTION PLAN

A report to accompany a planning application for the enlargement of the lower ground floor and an extension to the rear of 16 Hollycroft Avenue, London NW3 7QL.

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On the instructions of Geoffrey Prentice, Architect

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1. Introduction

- 1.1 Martin Dobson Associates Ltd were instructed by Geoff Prentice Architect on 17 August 2016 to carry out a survey of trees on or immediately adjacent to land at 16 Hollycroft Avenue, London, NW3 7QL. The purpose of the survey was to inform architects of potential tree-related constraints on the site and to provide advice on design options for the enlargement of the lower ground floor and an extension to the rear of the property.
- 1.2 The British Standard 5837: 2012 *Trees in relation to design, demolition and construction – Recommendations* provides a framework for considering trees in the planning process. It gives guidance on categorising the qualities of trees in order to enable decisions to be made as to which trees are appropriate for retention within a development. It then advises on options for protecting trees to be retained during the development (at all stages including demolition, construction and hard landscaping), and the means of incorporating trees into the developed landscape.
- 1.3 16 Hollycroft Avenue is within Redington Froggnal Conservation Area and this means that all trees with a trunk diameter of 75 mm or more benefit from statutory protection and no work can be carried out to them (including cutting roots or branches or felling) without statutory notification to the local planning authority.
- 1.4 Six trees were surveyed and one is considered to be category A and of high value (T1 plane) and one is considered to be category B and of moderate value (T3 sycamore). The rest are considered to be category C and are of low value.
- 1.5 In general category C trees should not be considered a material constraint to development.
- 1.6 Whilst the proposals do not require the removal of any trees it is proposed to remove two category C purple plums. T2 at the front has extensive decay in the main stem and T4 is growing through a boundary wall and has previously been heavily pruned. It is considered that both trees should be removed in any event. Two replacement trees will be planted, one in the front garden and one in the rear garden.
- 1.7 The retained trees will be protected during development. Details of tree protection are contained in this report.

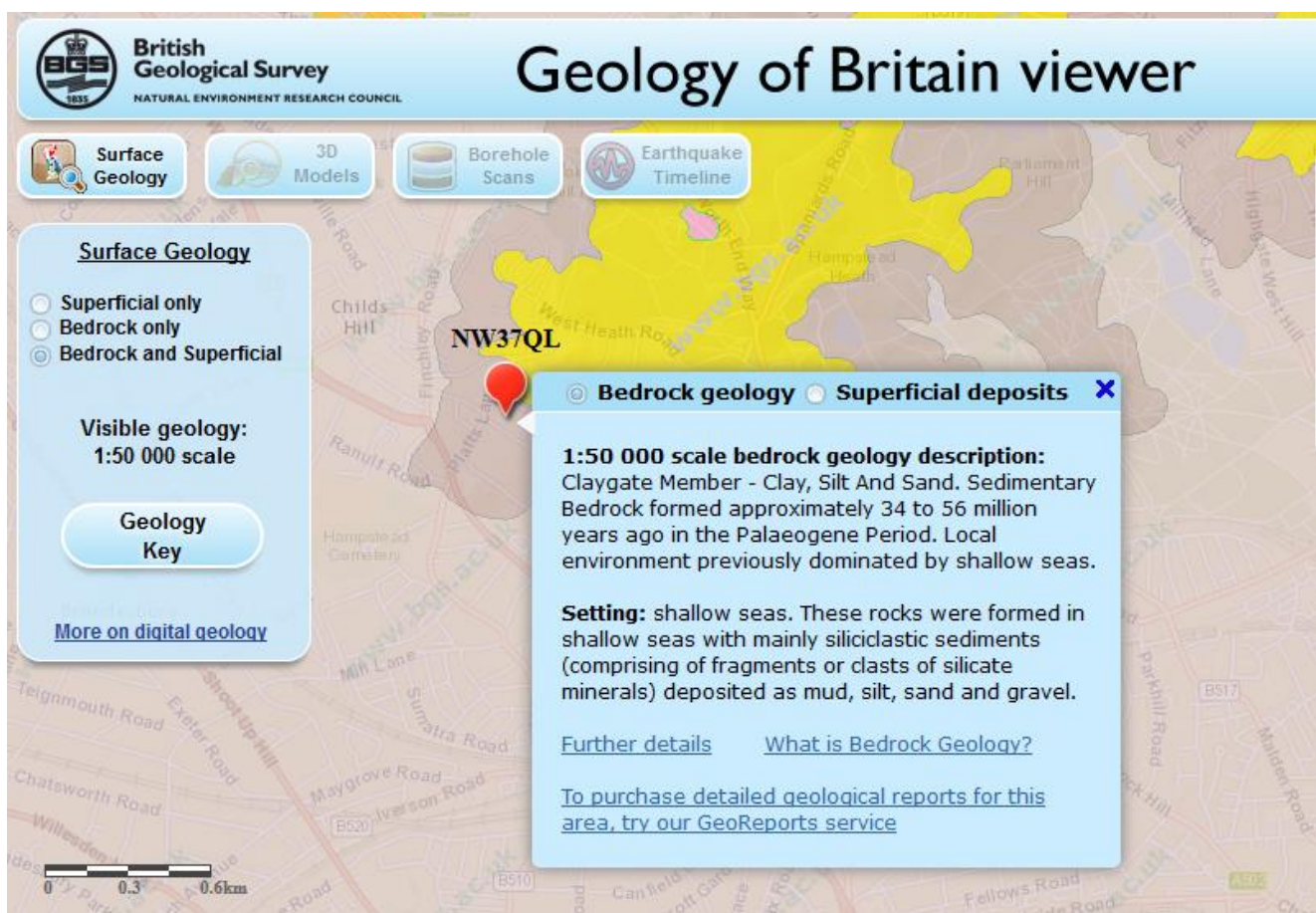
2. Tree survey

- 2.1 The tree survey was carried out by Martin Dobson on 22 August 2016.
- 2.2 Appended at **MD1** is the tree survey schedule which provides details of the six trees present within or immediately adjacent to the property.
- 2.3 The site survey drawing appended at **MD2** shows the positions of the trees surveyed and gives a reasonable indication of their comparative branch spreads. The drawing has been colour coded as follows:
- | | |
|--|-------------|
| A trees (high quality and value, minimum 40 years useful life) | LIGHT GREEN |
| B trees (moderate quality and value, minimum 20 years useful life) | MID BLUE |
| C trees (low quality and value, minimum 10 years useful life) | GREY |
| U trees (unsuitable or dead/dying/dangerous, less than 10 years useful life) | RED |
- 2.4 It should be understood that no individual safety inspection has been carried out on any tree. Similarly, any suggestions for tree work should not be taken as a specification for tree works. But a recommendation has been made that purple plum T2 should be removed as there is substantial decay in the main stem and it is potentially hazardous to pedestrians and passing traffic. T3 sycamore has a cavity in the main stem the extent of which is not known. It is recommended that a climbed inspection by a suitably qualified arborist should be carried out to assess the tree's safety. T5 beech has a large wound where a limb has broken from the tree. This means that the tree has been weakened and its size must be controlled to avoid the tree becoming hazardous.
- 2.5 Adequate protection, both above and below ground, is essential for trees that are to be retained as part of a development. The British Standard BS5837: 2012 *Trees in Relation to Construction - Recommendations* advises that there should be a root protection area (RPA) around trees which is kept free of construction activities by means of an exclusion zone enforced by protective fencing and/or ground protection. The RPA is calculated as the area equivalent to a circle with a radius of 12 times the trunk diameter at a height of 1.5 m above ground level. Based on the tree survey data root protection areas (and radial distances from the trunk to be protected) have been calculated and these are shown as circles around the trees on the tree constraints plan at **MD2** and are tabulated at **MD3**.

3. Soil assessment

- 3.1 BS5837: 2012 advises that soil properties should be considered as part of a tree survey report. This is necessary because trees can cause damage to structures founded on soils that shrink and swell with changes in moisture content (principally clays). Such movement is exacerbated by the influence of trees and therefore if a shrinkable soil is suspected foundations should be designed to extend below the likely zone of seasonal moisture change.
- 3.2 The British Geological Survey 1: 50,000 scale map indicates that the underlying geology of the site is shrinkable Claygate Member – Clay, Sand and Silt (Figure 1) and typically has a high shrinkage potential. Foundations must therefore be designed by an engineer with reference to the National House Building Council's (NHBC) Standards Chapter 4.2 *Building near trees* NHBC which separates trees into three water demand categories, high, moderate and low. Plum, plane and sycamore are regarded as “moderate”.

Figure 1. British Geological Survey 1: 50,000 scale showing that the site is underlain by the Claygate Member – Clay, Sand and Silt.



4. Arboricultural impact assessment

- 4.1 The purpose of an arboricultural impact assessment (AIA) is to evaluate the direct and indirect effects of proposed development on trees and, where necessary, to consider appropriate mitigation. It should set out which, if any, trees are to be removed to facilitate the development and should consider the possible effects on retained trees of potentially damaging activities on the site (for example changes in ground level and installation of below ground services). Requirements for access around trees should be considered and potential conflicts identified, for example, where branches overhang the development area and may require pruning.
- 4.2 Mitigation for any issues identified should be proposed and addressed in the arboricultural method statement (AMS).

Tree removals

- 4.3 The proposed development includes the removal of two category C trees (T2 and T4) one at the front of the property and one at the rear.
- 4.4 T2 is a mature purple plum at the front of the property. This tree has a large decayed cavity in its central stem immediately below the main union as shown in Figure 2. The tree is beside the pavement and road and therefore has a high target area. It is considered that the tree is unsuitable for retention as it is in a hazardous condition and poses an unreasonable risk.

Figure 2. Cavity at 1.5m from ground level in main stem of purple plum T2.



- 4.5 It is proposed that T2 will be felled on safety grounds and a replacement tree planted in a similar location as part of final landscaping once the development is complete.
- 4.6 T4 is another purple plum which situated in the rear garden of the property on the south-eastern boundary. It is a category C tree with no public amenity value, but significant nuisance value – it is growing through the boundary wall. Thus, it can never be allowed to grow any larger due to the risk of further disturbance of the boundary wall. It is therefore proposed that T4 should be felled and a replacement planted in a more suitable location.

Figure 3. Purple plum T4 in the rear garden exhibiting poor form.



- 4.7 A large portion of the RPA of this tree would be affected by the proposed development, as it lies within the footprint of the extension and the basement.
- 4.8 The tree would be rendered unsafe for retention as a result of the development so it will be removed and replaced with a suitable ornamental native tree species in a more appropriate

Tree pruning

- 4.9 No pruning work is required and it is believed that there is sufficient clearance between the trees and all construction activities.

Tree protection

- 4.10 Hoarding up to 2 m will be erected around the trunk of the London plane T1 in the pavement to prevent impact damage. The remainder of the RPA for T1 will be protected by the existing

hard surfacing which will be retained undisturbed and by additional ground protection to provide a temporary load suspension layer, thus preventing soil compaction.

- 4.11 The proposed development includes excavation of a light well within the RPA of T1. This will be an area 7m² which is <2% of the total RPA. It is considered that this small incursion will be of little consequence to the wellbeing of a tree of this size and is therefore deemed to be acceptable.
- 4.12 Where excavation for the basement is required at the northern corner of the property there is also a small incursion into the RPA of T1. This excavation will be under the existing foundations of the house at the outer perimeter of the RPA. It is therefore highly unlikely that significant roots would be present and it is therefore deemed to be acceptable.
- 4.13 Trees T3 sycamore and T5 beech in the rear garden will be protected from mechanical damage to their trunk, branches and roots by the installation of 2 m high protective fencing to create a construction exclusion zone (CEZ) to exclude site workers, machinery and storage of materials with their locations shown in **MD4**.
- 4.14 The RPA of T3 overlaps with the proposed terrace at the rear of the development. This will require a reduction in ground level of 0.5m and will affect 11.8m² of the RPA (shown in the cross section A - A in **MD5**). This area is 5.9% of the total RPA. This loss is deemed to be acceptable as the tree has unrestricted root growth space to the north, south and west in which to compensate.
- 4.15 In order to create working space at the rear of the property part of the RPA of T3 will be protected by ground protection outside the protective fence. The RPA of T5 will be entirely contained within the CEZ.
- 4.16 T6 is a yew set behind the boundary hedge in the front garden of 18 Hollycroft and it is deemed that the hedge will provide a sufficient barrier between the tree and the construction activity. However, where the RPA of T6 extends under the hedge into the site this will be protected by ground protection.

Working space

- 4.17 The proposed construction works are achievable without causing damage to trees. However, space for site offices, machinery, construction materials and spoil are limited and therefore careful consideration will be given to phasing of works in the construction method statement.

5. Arboricultural method statement and tree protection plan

- 5.1 Trees can very easily be damaged during construction activities through their branches being broken by construction traffic passing close to the canopy or by root severance during the digging of foundation or service trenches. The majority of roots are to be found in the upper 600 mm of soil and so even relatively shallow trenches can sever a significant number of roots growing across the direction of the trench. Similarly, the diameter of tree roots tapers sharply within a few metres of the trunk of a tree, so that what might seem to an uninitiated site worker to be an insignificant root (perhaps only a few centimetres in diameter) may actually be highly important.
- 5.2 Tree roots can also be damaged indirectly, often inadvertently, through soil compaction, which disrupts soil structure and can lead to root death through the development of anaerobic soil conditions. Spillage of toxic materials (e.g. oil or diesel) can also result in root damage and ultimately the death of a tree. Protection of the soil around trees by means of a construction exclusion zone (CEZ) is therefore vitally important in order to preserve roots undamaged.

Fencing and ground protection

- 5.3 Tree protection for T3 and T5 will comprise of 2 m tall fencing installed in the positions shown at **MD4** before the building is stripped out or materials are delivered to site or construction commences. The fencing will consist of a scaffold framework, well braced to resist impacts, with vertical tubes spaced at a maximum interval of 3 m (Figure 4). Onto this, weld mesh panels or 2 m high shuttering board will be securely fixed with wire or scaffold clamps. Weld mesh panels alone on unsecured rubber or concrete feet will not be used as these are not resistant to impact and are too easily removed by site operatives. An alternative system of bracing which does not require a scaffold framework is shown in Figure 5.

Figure 4. Diagram to illustrate design of protective fencing with scaffolding anchored into the ground

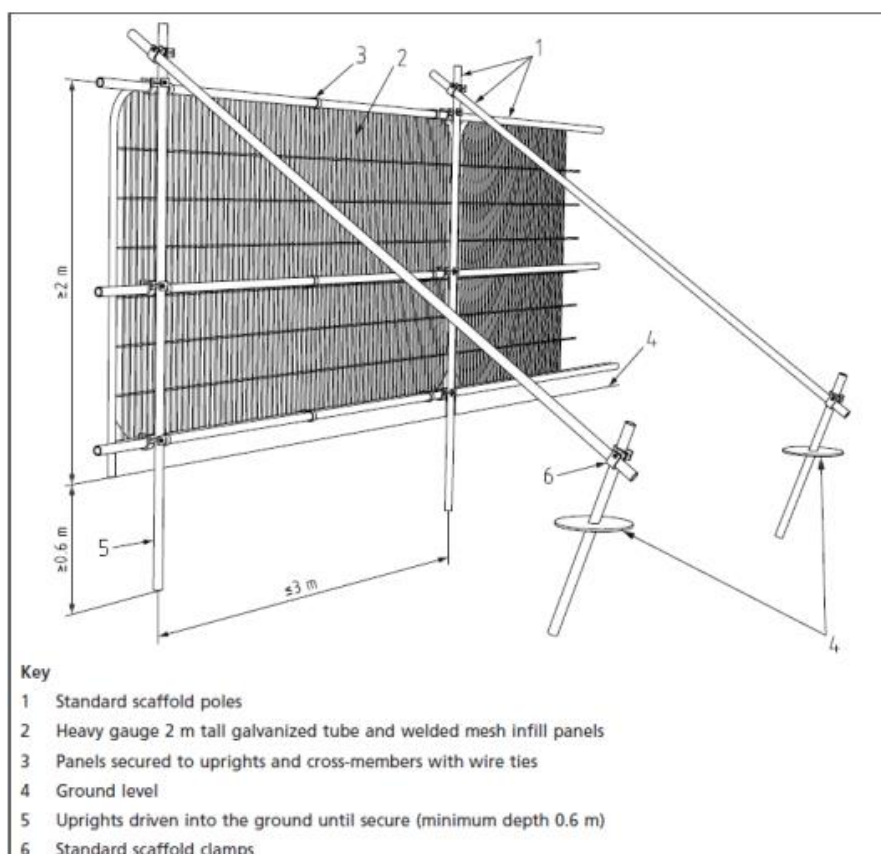


Figure 5. Diagram to illustrate alternative design of protective fencing

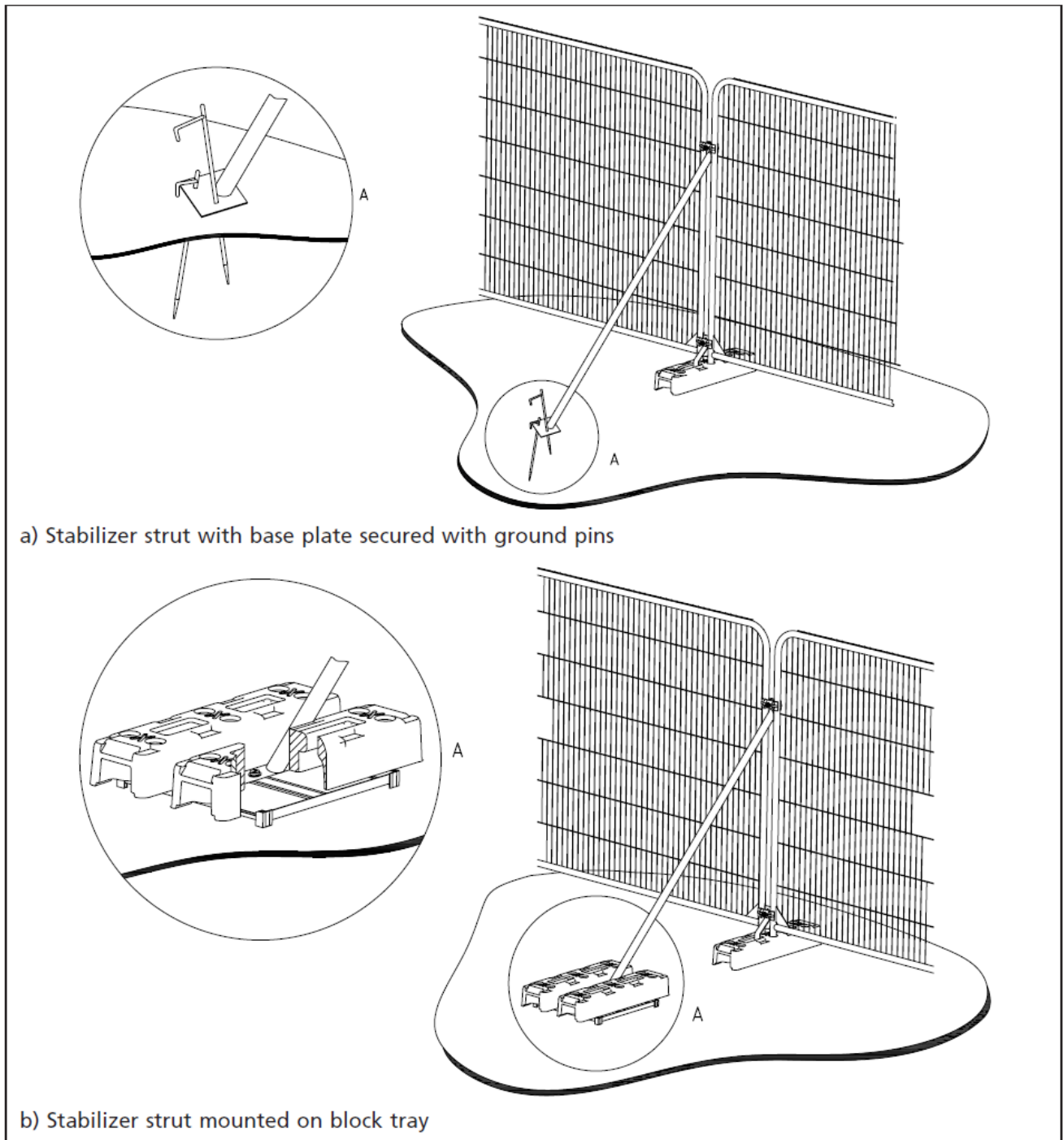


Figure 6. Photograph to illustrate installed protective fencing



5.4 High visibility all weather notices at a size no less than A3 will be securely attached to each panel of the barrier around the CEZ with wording as shown in Figure 7.

Figure 7. Wording to be included in high visibility all-weather sign attached to protective fencing



5.5 Plywood hoarding erected on a wooden frame to a height of 2 m will be installed around the trunk of T1 London plane as shown at **MD4**.

5.6 In order to allow access for construction workers at the rear terrace of the house it is proposed that part of the RPA will be protected by ground protection. This area, shaded purple on the tree protection plans (**MD4**), will be covered by heavy duty plywood boards laid over a 100 mm thickness of a compressible material such as woodchips laid onto the existing surface or, if bare earth, onto a geotextile such as Terram (Figures 8 and 9). Once laid the plywood sheeting will be secured in place by wooden battens screwed into adjacent sheets. Steps will be covered with a single thickness of heavy duty plywood (Figure 10) suitably anchored

Figure 8. Specification for ground protection

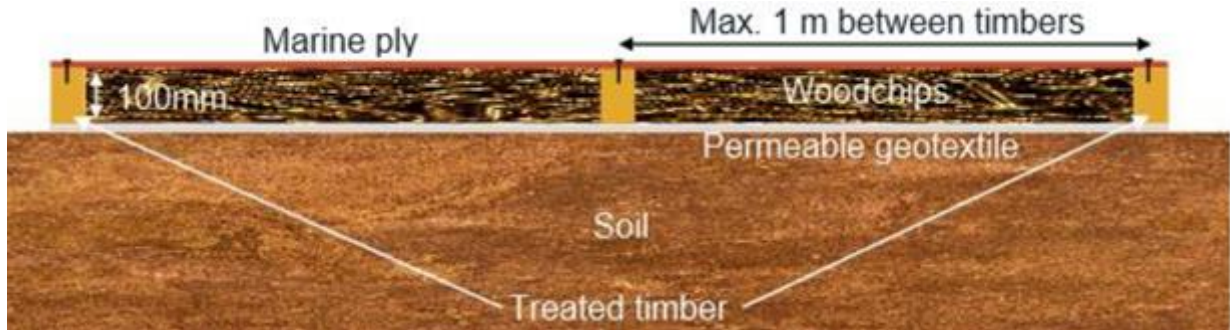
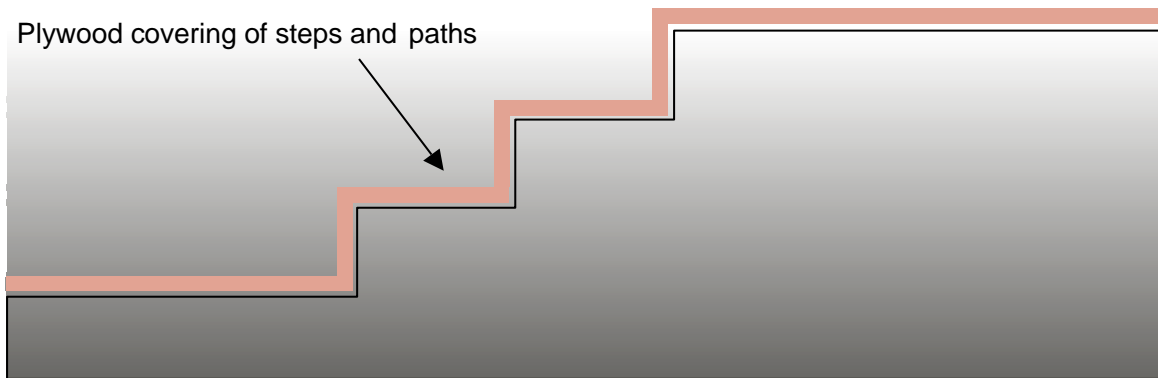


Figure 9. Plywood sheeting used as ground protection.



Figure 10. Steps will be covered by heavy duty plywood.



Arboricultural supervision

- 5.7 Subject to contractual arrangements being in place Martin Dobson Associates Ltd. will be the project arboricultural consultants overseeing tree protection for the duration of the construction/ landscaping contract(s). The appointed project arboriculturists will be consulted on any issues that may arise concerning trees and will visit the site as often as necessary to ensure that trees are protected and/or at the following key stages:
- Prior to contractors commencing works on site in order to meet with the supervising architect and/or the contractor's nominated site manager to ensure that the principles of tree protection are understood and the procedure, timescale and materials for installation of tree protection are agreed;
 - Following installation of tree protection but prior to any works commencing on site to confirm that it is fit for purpose;
 - At any time that there are potential conflicts with tree protection and/or at monthly intervals;
 - At the completion of construction works to confirm that tree protection may be removed to enable final landscaping;
- 5.8 A pre-start meeting will be held on site with the project arboriculturist and the contractor's representative(s) so that the precise details of the schedule of works together with details of installation of tree protection can be agreed and personnel induction carried out. The site manager/foreman will be fully briefed on tree protection measures and procedures before any workers or sub-contractors are permitted onto the site. Following induction, a copy of the Induction Sheet (**MD6**) will be provided to and be signed by the site manager/foreman in recognition of acceptance of their role in enforcing day to day tree protection.
- 5.9 The project arboriculturists will be notified at least five days in advance of any change of site manager and will arrange for induction to take place together with signing of the Induction Sheet.
- 5.10 All contractors involved in the project have a duty to comply with all the specified tree protection measures and all workers will be provided with induction by the site manager/foreman and be required to sign an Induction Sheet confirming they have understood the protection measures. Signed sheets will be kept on site for inspection.

- 5.11 No enabling works will take place until after the meeting has been held and tree protection has been installed, inspected and approved as fit for purpose.
- 5.12 Fencing will not be removed under any circumstances during construction unless with the express approval of the local authority. If in any doubt the site manager must contact the project arboricultural consultant.

Burning of waste

- 5.13 No fires will be lit on site within 3 m of root protection areas, due to the danger of scorching of leaves and branches of overhanging trees.

Space for machinery, parking of vehicles, storage of materials and site huts

- 5.14 All machinery required on site will operate outside of root protection areas or from the ground protection. Huts to accommodate site offices, if required, will be located outside root protection areas but offices and amenities should preferably be within the building.
- 5.15 Delivery vehicles will park in the drive or off site and storage of materials will be outside root protection areas. At each delivery, where materials are unloaded by crane, a banksman will be present to ensure that sufficient clearance is allowed for to avoid conflict with branches of T1. Any incidents must be reported to the project arboriculturist.

Services

- 5.16 Existing services and drainage runs will be used. If new connections are required, the project arboriculturist must be consulted in order to approve them and supervise any digging that may be required to ensure that woody roots are not harmed.

Tree works

- 5.17 Any tree works and clearance of the site will be undertaken as preliminary works. This will be carried out by suitably qualified arboriculturists to the standards set out in BS3998: 2010 *Tree works – recommendations*.

Landscaping

- 5.18 Once construction has demonstrably finished (to the satisfaction of the project arboriculturist) fencing may be removed in order to allow final landscaping to be undertaken. Landscaping plans have been/will be prepared by others and will not/do not involve any changes in soil levels, digging of any trenches or construction of masonry or retaining walls within root protection areas.
- 5.19 A minimum of 2 new trees will be planted in locations to be determined in the landscape plan.

6. Conclusions

- 6.1 A BS5837: 2012 survey of three trees has been carried out on land at 16 Hollycroft Avenue, London NW3 7QL.
- 6.2 One tree is considered to be category A and of high value (London plane T1) and one is considered to be category B and of moderate value (sycamore T3). The remaining trees are considered to be category C and are of low value.
- 6.3 It is proposed that two low value category C trees (T2 and T4) will be removed.
- 6.4 Replanting of two trees (species to be determined in landscape plan) will be carried out to mitigate tree removals.
- 6.5 The trees to be retained will be protected during development and methods for ensuring their protection have been described.
- 6.6 It is considered that the proposed development will pose no threat to trees to be retained and is sympathetic to the leafy character of the area.

APPENDIX MD1
Tree survey schedule (BS5837: 2012)

Tree No.	Species	Height (m)	Trunk diameter (mm)	N (m)	S (m)	E (m)	W (m)	Height of crown clearance (m)	Age class	Physiological condition	Structural condition	Useful life	BS5867 Grade	Comments
T1	Plane	16	960	5	6	6	5	6	M	Good	Good	40+	A	Pollarded street tree in good condition
T2	Purple plum	8	430	2	4	3	3	2	M	Fair	Fair	10 to 20	C	Old tree with central decay at 2 m. Reasonable health but should be crown reduced to 6 m and crown spread reduced to 2.5 m in each direction.
T3	Sycamore	20	660	7	7	8	7	6	M	Good	Good	20 to 40	B	Formerly topped and crown now emanates from topping point. Possible weakness in branch attachment. 'Nesting' hole in occluded pruning wound at 4 m could indicate internal decay. Climbing inspection recommended.
T4	Purple plum	6	220	1.5	1.5	1.5	1.5	4	M	Fair	Fair	<10	C	Heavily pruned and in inappropriate location growing through boundary wall. Fell and replaced with a better specimen in more suitable location.

Tree No.	Species	Height (m)	Trunk diameter (mm)	N (m)	S (m)	E (m)	W (m)	Height of crown clearance (m)	Age class	Physiological condition	Structural condition	Useful life	BS5867 Grade	Comments
T5	Beech	14	500	6	4	6	5	4	M	Good	Poor	10 to 20	C	Major cavity due to branch failure at low level. Crown reduced by 30% to lessen weight bearing onto weakened stem.
T6	Yew	4.5	200	0.5	0.5	0.5	0.5	1.5	SM	Good	Good	10 to 20	C	On neighbouring property.

* multi stem. ^ trunk measured at ground level. Age class: OM – over mature; M – mature; MA – mid-aged; Y - young

