

BS5837:2021 Tree Survey & Impact Assessment

Prepared by Fellgrove on behalf of: **Baxhall Construction**

For proposed development at:

**Gravesend Grammar School
Church Walk
DA12 2PR**

Disclaimer: The trees have been surveyed in accordance with the criteria set in the BS:5837:2012 Trees in Relation to Design, Demolition and Construction 2012. A full hazard assessment of the trees (including assessment of decay or their defects and their implications) has not been undertaken as this is considered beyond the scope of this report. Any obvious hazards and defects have been identified were relevant in the Tree Survey Schedule and appropriate relating works have been recommended. Where relevant, trees not located within the legal property of the owner have been included and any works would be subject (where relevant by law, Statue and Common) to the owner's permission.

Where appropriate further investigative works to be undertaken have been detailed and recommended. This may include climbing inspections, below ground exploratory investigations and the use of specialist decay detection equipment. Detailed ecological considerations are also beyond the scope of this report. UK and European Wildlife Legislation may affect the timing and even prohibit the enhancement of works and operations described in this report.

Most of the information regarding wildlife can be found in the Wildlife and Countryside Act 1981 & updated 1994. This includes information of wild birds, bats, badgers and some insects. Bats in particular are afforded particular protection and a specialist is required to determine if bats are present or may be affected when carrying out tree works. Further information is available from Natural England. It is accepted that this document may need to be updated and more detailed information added throughout the planning and development process. However, this document will be the main documentation for reference in the event of disputes.

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1 - Introduction

Fellgrove have been appointed to provide advice on the arboricultural constraints relating to the provision of a new Teaching Block at Gravesend Grammar School, DA12 2PR.

We undertook a Tree Condition Survey (*see Appendix 3*) during August 2019 and provided revisions during May 2021. This survey assessed the condition of the tree resource, categorised the trees and provided the Root Protection Area (RPA) information according to the BS5837:2012 “Trees in relation to design, demolition and construction – Recommendations”. The tree numbers used in this report refer to the tree numbers used in our Tree Condition Survey.

Following preparation of our Tree Condition Survey we received a copy of the following document(s):

- 1004 CLA B1 XX DR A 0001 P02 S4 Site Plan as Proposed LR

A detailed search with Gravesham Borough Council has been carried out prior to the site survey. We can confirm that there are Trees on site protected by TPO's ref: 1/2002. Please see appendix 8 for details.

****Information obtained from Gravesend Grammar School.***

1.2 Figure 1 - Indicative Site Location Map



2 - Executive Summary

The site is currently Gravesend Grammar School. The proposal is to extend the school facilities with the addition of overflow parking and new teaching building. The tree scape within the local area is typical of schools constructed during the early 1900's with mature species in groups and individual trees. The trees surveyed have high amenity value within the site landscape and a moderate amenity value within the surrounding area. No trees or groups have recommended for removal on arboricultural grounds. Some are showing signs of possible early failure and should be monitored as part of the school grounds maintenance routine.

To allow the proposed development scheme to take place 3 trees will need to be removed T10 and 2 trees from G10 – (*see Appendix 4: Tree Protection Plan for Removals*). T10 and G10 are not currently covered by any TPO. Management recommendations can be found within the *Tree Survey Schedule in Appendix 3*). The overall impact of the proposal on the trees is negligible with the removal of only three trees. None of these are sufficiently important to be worthy of influencing any layout. They are not important in the overall planning context and their loss should not influence the determination of this application.

To mitigate the loss of trees, a new replanting scheme is feasible. The new trees would have the potential to reach a significant height without excessive inconvenience and be sustainable into the long term, significantly improving the potential of the site to contribute to local amenity and character for the long term. This new planting will more than mitigate the loss of the of poor- quality trees.

The trees surveyed consist primarily of early mature and mature species with 10 trees and 10 groups surveyed.

- *Tree Works schedule can be found in Appendix 3: Tree Survey Schedule*

This report seeks to assess the tree stock in accordance with BS5837:2012 “trees in relation to design, demolition and construction – Recommendations”. The survey and report will identify those trees most suitable to be retained and those that can be removed and replaced, as part of any future landscaping scheme for the site. This will provide information for the architect / developer to design a layout within the parameters of the development window with the retention of the best trees where possible.

3 - Scope of Tree Survey

1. To carry out a tree condition survey on the trees immediately effected by the proposal, making recommendations for those trees to be retained and low amenity value and hazardous trees to be replaced.
2. To undertake the tree survey in accordance with the principles of BS5837: 2012 ‘Trees in relation to design, demolition and construction – Recommendations’.
3. To produce tree protection plan (TPP), showing the location of surveyed trees, their BS5837: 2012 categorisation, the theoretical Root Protection Areas (RPA). A tree protection plan showing the location of protection fencing / measures.

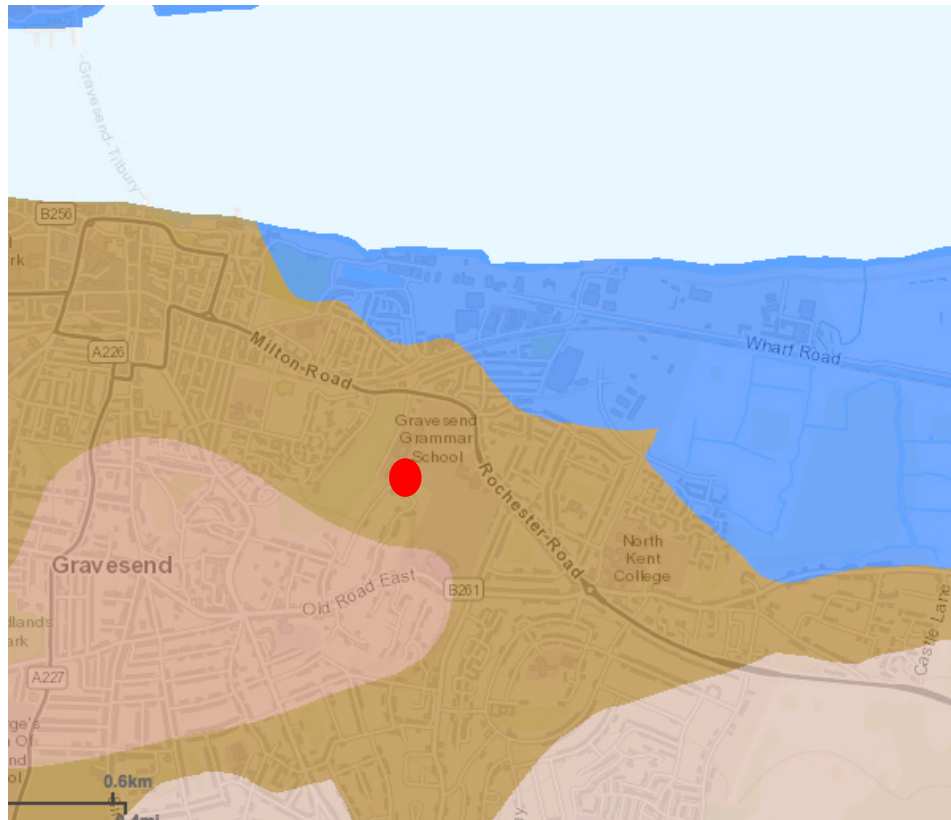
If the guidelines and principles outlined in this report are not adhered to, as with all development sites there is a risk that the construction activities will result in damage to and potentially the death of the retained trees. Damage to the trees will significantly increase the risk of their health declining and may increase the risk of their complete or partial failure.

4 - Site Description and Proposed Works

The immediate and distant landscape character is within the town setting of Gravesend. The general topography of the land is flat. The red mark indicates the indicative site location.

Continued below

Site Location - Soilscape 7 [site location marked in red]



LandIS.org.uk Soilscapes has identified the soil as Soilscape 7. Which are freely draining slightly acid but base-rich soils.

All comments regarding soils should be verified with onsite geotechnical investigations and laboratory testing with foundation depth and design undertaken by a structural engineer in accordance with the requirements of NHBC Chapter 4.2.

5 – Overview: The Trees

The information gathered during the tree survey is recorded within this report and can be found in Tree Survey (appendix 3) along with any recommendations. The trees surveyed have been broken down into categories set out in BS5837 2012, which are also explained in Cascade Chart for Quality Tree Assessment (*please refer to Appendix 2*).

To allow the proposed development scheme to take place 3 trees will need to be removed T10 and 2 trees from G10 – see appendix 4 tree protection plan for removals. T10 and G10 are not currently covered by any TPO. Management recommendations can be found within the tree survey schedule (appendix 3). The overall impact of the proposal on the trees is negligible with the removal of only three trees. None of these are sufficiently important to be worthy of influencing any layout. They are not important in the overall planning context and their loss should not influence the determination of this application.

To mitigate the loss of trees, a new landscaping scheme is feasible, which could include significant new tree planting. The new trees would have the potential to reach a significant height without excessive inconvenience and be sustainable

into the long term, significantly improving the potential of the site to contribute to local amenity and character. This new planting will more than mitigate the loss of the of poor- quality trees.

The trees surveyed consist primarily of early mature and mature species with 10 trees and 10 groups surveyed.

- ***Tree Works schedule can be found in Appendix 3: Tree Survey Schedule***

The survey of the trees has been carried out in accordance with the guidance provided in Annexe C of BS5837. In summary this requires that any tree on the site with a stem diameter of over 75mm at 1.5m above ground level is recorded. Stem diameter measurements were taken using Haglof diameter calipers and are recorded to the nearest full unit or in accordance with Annexe D of BS5837. Where access to the base of the tree was not possible for any reason, the diameter has been estimated. Height measurements are estimated and recorded to the nearest full metre. Crown spread dimensions have been paced and are recorded to the nearest full metre for all four cardinal points. The Survey Schedule of trees can be found in Appendix 3. The locations of the trees have been plotted on the attached Tree Location Plan (TLP).

The trees have been categorised in an order defined in table 1 of BS5837, a copy of which can be seen in Appendix 1, but which can be summarised as:

Category A	Category B	Category C	Category U
2	7	11	0

6 - Impact Assessment

The overall impact of the proposal on the localised tree population is negligible with no removals on arboricultural grounds recommended, to facilitate the proposal it will be necessary to remove T10 and two trees from G10. It is considered that future planting will maintain the sites amenity value within the wider tree scape and uphold the overall tree scape within the school grounds.

Development proposals can impact on trees by causing them to be removed either immediately or in the future. It does this by adversely affecting their potential for retention either through disturbance to the root protection area (RPA) or through the need for pruning / removal.

Above ground constraints & proximity of trees to structures (reference material)

- Where the current and/or ultimate height of a Category A, B or C tree will cause an obstruction to the approved development, this must be considered as a constraint.
- An amenity clearance zone (ACZ) is used to consider the impact of the proximity of retained trees to structures. The ACZ is defined as an area surrounding the tree that enables a satisfactory relationship to exist between the approved development and the tree.

The ACZ is a combination of factors such as:

- Shading (of buildings and open space)
- Direct damage to structures
- Future pressure for removal
- Seasonal nuisance (e.g., leaf fall blocking gutters, fruit fall creating slippery patches and honey dew dripping on vehicles and surfaces)
- Consideration is also given to species characteristics such as:
- Deciduous or evergreen;

Below ground constraints (reference material)

The RPA is defined as the minimum area (in m²) around the tree that is deemed to contain sufficient roots and rooting volume to maintain the tree's viability, and where the protection of the roots and soil structure is treated as a priority.

Section 4.6.2 & 4.6.3 of BS5837 allows for the shape of the RPA to be changed for the likely spread of the roots.

- **Root Protection area** – To protect the RPA during construction protection fencing is recommended. Please see appendix 7 for details and appendix 4 for locations.
- **Foundations** – To prevent any impact, we are recommending protection fencing be put in place between the new canteen and the RPA of retained trees. All protection fencing must be put in place and signed off by the site arborist before demolition or construction starts on site.
- **Surfaces** – Existing surfaces will be retained, where new re-surfacing is required. The existing sub-base will be retained, and the new surface added. At no point will the existing sub-base be removed.
- **Services** – NA
- **Ground levels** – NA
- **Shading** – A small amount of shading will be encountered around the new canteen.
- **Leaf Litter** – We recommend using nonslip surfaces and guards fitted to the guttering and gullies to prevent leaf litter becoming a problem.

7 - Recommendations

The preliminary tree works recommendations are included in the tree survey schedule contained within this report (appendix 3). By liaison with the council tree officer, formal agreement should be sought regarding the proposed removals.

T10 and two trees within G10 are recommended removal and to facilitate the proposal. Prior to demolition and construction all protection fencing must be signed off by the site arborist. Management recommendations can be found within the tree survey schedule (appendix 3). The overall impact of the proposal on the trees is negligible. We recommend the landscape plan include a robust selection of native species such as Oak, Field maple, Birch, Beech and Sweet Chestnut placed around the proposal to achieve the recommendation within this report. Adding young trees now will ensure the long-term tree scape of the school grounds is maintained for generations to come.

Providing all recommendations set out within this and preceding reports are followed, a pragmatic methodology has been proposed that retains those trees of good amenity value, allowing the development to be implemented.

8 - Appendices

Appendix 1: Key to Survey Sheets

BS5837 Category	Description
A	Those of high quality and value: in such a condition as to be able to make a substantial contribution (> 40 years)
B	Those trees of moderate quality and value: those in such a condition as to make a significant contribution (> 20 years)
C	Those trees of low quality and value: currently in adequate condition to remain until new planting could be established (> 10 years)
U	Those in such a condition that any existing value would be lost within 10 years and which should, in the current context, be removed regardless of development

Note: Sub-categories are denoted in the tree survey data (A1, B1, C2 etc.). You are referred to the BS for further detail if required.

Tree No.	T (tree), G (group), H (hedge), W (woodland) + Ref No.
Species	Common and Botanical Name
Ht (m)	Measured height in metres
DBH (mm)	Diameter at 1.5m above ground level
Branch Spread	In m to all four cardinal points
Cr Ht Clearance (m)	Overall height of lowest branches from the ground level on side of proposed development
Life Stage	Young, Semi-Mature, Early-Mature, Mature, Over-Mature
General Observations	Observations on the condition of the tree(s)
Tree Work Specification	Proposed tree works in accordance with BS3998
BS Cat	See above
Life Exp	Estimated remaining contribution in years.
RPA Radius (m)	Radius of the tree Root Protection Area measured from the trunk to the edge of the RPA circle in metres
RPA (m2)	Overall Root Protection Area in m2
*	Indicates where tree data may have been estimated as tree was offsite / restricted access / dense vegetation hindering full inspection

Appendix 2: Cascade Chart for Quality Tree Assessment

TREES FOR REMOVAL				
Category and Definition	Criteria			Identification on Plan
Category U Those in such a condition that they cannot realistically be retained as living trees in the context of the current land use for longer than 10 years	- Trees that have a serious, irremediable, structural defect, such that their early loss is expected due to collapse, including those that will become unviable after removal of other U Category trees (i.e. where, for whatever reason, the loss of companion shelter cannot be mitigated by pruning) - Trees that are dead or are showing signs of significant, immediate, and irreversible overall decline - Trees infected with pathogens of significance to the health and/or safety of other trees nearby) e.g. Dutch elm disease), or very low-quality trees suppressing adjacent trees of better quality.			DARK RED RGB code 127-000-000
TREES CONSIDERED FOR RETENTION				
Category and Definition	Criteria Subcategories			Identification on Plan
	1. Mainly arboricultural values	2. Mainly landscape values	3. Mainly cultural values, including conservation	
Category A Trees of high quality: with an estimated remaining life expectancy of at least 40 years	Trees that are particularly good examples of their species especially if rare or unusual, or essential components of groups, or of formal or semi-formal arboricultural features (e.g. the dominant and/or principal trees within an avenue)	Trees, groups or woodlands of particular visual importance as arboricultural and or landscape features	Trees, groups or woodlands of significant conservation, historical commemorative or other value (e.g. veteran trees or wood-pastures)	LIGHT GREEN RGB code 000-255-000
Category B Those of moderate quality: with an estimated remaining life expectancy of at least 20years	Trees that might be included in category A, but are downgraded because of impaired condition (e.g. presence of significant though remediable defects, including unsympathetic past management and storm damage), such that they are unlikely to be suitable for retention for beyond 40 years; or trees lacking the special quality necessary to merit the category A designation	Trees present in numbers, usually growing as groups or woodlands, such that they attract a higher collective rating than they might as individuals; or trees occurring as collectives but situated so as to make little visual contribution to the wider area	Trees with clearly identifiable conservation or other cultural benefits	MID BLUE RGB code 000-000-255
Category C Those of low quality with an estimated remaining life expectancy of at least 10 years, or young trees with a stem	Unremarkable trees of very limited merit or such impaired condition that they do not qualify in the higher categories	Trees present in groups or woodlands, but without this conferring on them significantly greater landscape value, and/or trees offering low or only temporary screening benefit.	Trees with no material conservation or other cultural value	GREY RGB code 091-091-091

Appendix 3 Tree survey schedule

Ref	Species	Full Structure	Height (m)	Stem Diam (mm)	Combined Stem Diam	Life Stage	Rem. Contrib.	Comments	General Observations	Retention Category	Spread	RPA	Crown Clearance (m)	Lowest Branch (m)	Physical Condition	Pre construction	During construction
G001	Cypress, Monterey (Cupressus macrocarpa)	Group	13	310	1911	Mature	30+ Years	No impacts from the proposed development.	Group of trees running between playing fields and neighbouring boundary wall. Trees 0.5m from boundary wall. Previously reduced in height. Tree nearest school and picnic area growing into BT service pole, cables and stay wire.	B2			3	3	Fair	Clear limbs growing within BT equipment	NA
G002	Elder (Sambucus nigra) Chestnut, Horse (Aesculus hippocastanum) Whitebeam (Sorbus aria) Cherry x1 (Prunus sp. (Cherries)) Sycamore (Acer pseudoplatanus) Hawthorn, Common (Crataegus monogyna) Ash, Common (Fraxinus excelsior) Pine, Scots (Pinus sylvestris) Walnut, Common (Juglans regia) Maple, Field (Acer campestre) Birch, Silver (Betula pendula) Oak, pedunculate (Quercus robur) Poplar, White (Populus alba) Ginkgo biloba (Ginkgo biloba)	Group	22	500	500		30+ Years	No impacts from the proposed development.	Trees adjacent South side access road - Encroaching onto service cables. Low branches (3m) obstruct pedestrian access over unmaintained tamac path. Prolific Ivy on many trees. Trees adjacent public Road on South Eastern side and footpath on South Western side.	C1					Fair	NA	NA
G03	Lime, European (Tilia x europaea)	Group	24	600	600	Mature	40+ Years	No impacts from the proposed development.	Group of Lime trees running along road and footpath on South Western side of the site. Adjacent public footpath. Branches overhanging footpath and road. Low branches over footpath and informal road. Dead wood within crown.	B1.2			2	3	Good	NA.	NA
G04	Lime, European (Tilia x europaea)	Group	18	370	370	Mature	40+ Years	No impacts from the proposed development.	Group of Lime trees running along road and footpath on South Western side of the site. Branches overhanging road. Low branches over footpath. Dead wood within crown.	B1.2			2	3	Good	NA.	NA
G05	Lime, European (Tilia x europaea), Cooper Beech (Fagus sylvatica purpurea), Cherry (Prunus sp.).	Group	24	600	600	Mature	40+ Years	No impacts from the proposed development.	Group of Lime trees running along road and footpath on Western side of the site. Row of trees in front of main school building and access road. Adjacent access gates. Branches overhanging road. Low branches over footpath. Dead wood within crown. Basal growth previously removed.	B1.2			2	3	Good	NA.	NA
G06	Chestnut, Horse (Aesculus hippocastanum)	Group	24	760	760	Mature	30+ Years	No impacts from the proposed development.	Group of four Horse Chestnut trees between road and car parking area in front of main school building. Branches overhanging road and car parking area. Very large section over car parking spaces and access road.	C1			3	6	Fair	Remove large section over car parking area.	Protect using protection fencing.

Ref	Species	Full Structure	Height (m)	Stem Diam (mm)	Combined Stem Diam	Life Stage	Rem. Contrib.	Comments	General Observations	Retention Category	Spread	RPA	Crown Clearance (m)	Lowest Branch (m)	Physical Condition	Pre construction	During construction
G07	Chestnut, Horse (Aesculus hippocastanum)	Group	24	750	750	Mature	20+ Years	Group showing signs of possible early failure.	Group of Horse Chestnut trees located on the Western side of the site and in the South Western corner of The Sanderson Sports Centre site. Trees are overhanging and adjacent to, roads, footpath, service boxes, sub-station, static containers and neighbouring property. Prolific Ivy over majority of tree. DBH measurement and stem inspection limited due to Ivy.	C1			3	10	Poor	Cut back from proposal to provide 2 meters clearance.	Protect using protection fencing.
G08	Chestnut, Horse (Aesculus hippocastanum), Holly, Common (Ilex aquifolium)	Group	19	750	750	Mature	20+ Years	Group showing signs of possible early failure.	Group of five Horse Chestnut trees located on the Western side of the site and in the South Western corner of The Sanderson Sports Centre site. Trees are overhanging and adjacent to, roads, footpath, service boxes, sub-station, static containers and neighbouring property. Prolific Ivy over majority of tree. DBH measurement and stem inspection limited due to Ivy.	C1			3	10	Poor	No action required.	Protect using protection fencing.
G09	Chestnut, Horse (Aesculus hippocastanum), Sycamore (Acer pseudoplatanus), Maple, Norway (Acer platanoides)	Group	18	640	640	Mature	30+ Years	Group showing signs of possible early failure.	Group of three Horse Chestnut trees located on highway verge between road and footpath out with the site boundary. Tree 3m from access gates, 1.5m from road sign and 4m from street light. Trees are 2m from The Sanderson Sports Centre boundary fence and South West of the access gates. The trees overhang the site 9m. Very large sections overhang the site, Grammer School sign and street light/CCTV. Direct damage to adjacent tarmac footpath.	C1			3	3	Fair	Reduce lateral growth. Remove.	Protect using protection fencing.
G10	Sycamore (Acer pseudoplatanus), Chestnut, Horse (Aesculus hippocastanum), Maple, Norway (Acer platanoides)	Group	16	330	330	Mature	20+ Years	Group showing signs of possible early failure.	Group of trees located on the North Western side of the site and in the North Western corner of The Sanderson Sports Centre site. Prolific Ivy over majority of tree. DBH measurement and stem inspection limited due to Ivy. Dead Wood within crown. Basal growth.	C1			2	5	Poor	Remove one tree to facilitate the proposal and allow new access route.	Protect remaining trees using protection fencing.
T001	Cherry (Prunus sp. (Cherries))	Tree	11	330	330	Mature	10+ Years	This tree is showing signs of possible early failure.	Tree located on grass area adjacent car parking / turning area. Crown die back. Buttress growth at base. Ganaderma adspersum at base. Branches on Western side encroaching onto building.	C1	N:5 E:5 S:5 W:5	4.0m	3	2.5	Poor	No action required.	NA
T002	Ginkgo biloba (Ginkgo biloba)	Tree	16	1000	1000	Mature	40+ Years	Due to size and species, it would be desirable for this tree to be retained. The surfacing and levels in the RPA should not be altered as long as the tree is being retained. The RPA will have been affected by nearby building foundations.	Tree located at boundary of woodland between two buildings at Southern side of the site. Due to species and large size, retention recommended.	B1	N:5 E:5 S:5 W:4	12.0m	1.5	3	Fair	No action required.	NA
T003	Oak, Turkey (Quercus cerris)	Tree	18	720	720	Mature	40+ Years	The surfacing and levels in the RPA should not be altered as long as the tree is being retained. The RPA will have been affected by nearby building foundations.	Large tree on boundary of woodland area between two buildings on Southern side of the site. Low branches (3m) obstruct pedestrian access. Dead wood and crossing branches within crown.	A1	N:12 E:12 S:12 W:12	8.6m	1	2	Good	No action required.	NA

Ref	Species	Full Structure	Height (m)	Stem Diam (mm)	Combined Stem Diam	Life Stage	Rem. Contrib.	Comments	General Observations	Retention Category	Spread	RPA	Crown Clearance (m)	Lowest Branch (m)	Physical Condition	Pre construction	During construction
T004	Beech, Copper (Fagus sylvatica purpurea)	Tree	21	910	910	Mature	40+ Years	The surfacing and levels in the RPA should not be altered as long as the tree is being retained. The RPA will have been affected by nearby building foundations.	Very large and prominent tree located within harder standing area adjacent buildings, bike storage area, car parking, road and footpaths. Branches encroaching onto roof of two adjacent buildings. Ivy on main stem. Wooden post growing into stem at ground level. Partially occluded wound at 5m on Southern side.	A1	N:12 E:12 S:12 W:12	11.0m	2	4	Good	No action required.	NA
T005	Holly, Common (Ilex aquifolium)	Tree	10	700	700	Mature	30+ Years	This tree does not form a constraint to the redevelopment of the site.	Tree located between footpath and car parking spaces in front of main school building.	B1	N:3 E:3 S:3 W:3	8.4m	2	3	Good	No action required.	NA
T006	Ash, Common (Fraxinus excelsior)	Tree	12	>75m	0	Early Mature	20+ Years	This tree is showing signs of possible early failure.	Tree located adjacent access road and car parking area at front of main school building. Low branches over footpath and car parking area. Misshapen crown suppressed by adjacent tree. Branches encroaching onto main school building and adjacent property.	C1	N:4 E:7 S:7 W:5	1.0m	2	2	Fair	No action required.	Protect using protection fencing.
T007	Sycamore (Acer pseudoplatanus)	Tree	18	580	580	Mature	30+ Years	The surfacing and levels in the RPA should not be altered as long as the tree is being retained.	Tree located on the North Western side of the site and in the Northern side of The Sanderson Sports Centre site. Tree is immediately adjacent vehicular track leading to parking area. Crown overhanging access road 8m. Dead Wood within crown over access road. Prolific Ivy over main stem. Crown die back. Basal growth.	C1	N:5 E:5 S:3 W:4	7.0m	2	6	Poor	No action required.	Protect using protection fencing.
T008	Maple, Norway (Acer platanoides)	Tree	20	1000	1000	Mature	40+ Years	The surfacing and levels in the RPA should not be altered as long as the tree is being retained.	Tree located on the North Western side of the site adjacent sports field. Large tree located adjacent parking area and Sports field. Dead wood within crown. Tree overhanging car parking area and Sports field. Large sections over Sports field. Crossing branches within crown. Prolific Ivy on main stem. Low branches (5.2) obstruct vehicle access. Encroaching onto floodlight.	B1,2	N:11 E:12 S:13 W:7	12.0m	2	3	Fair	Dead wood (major greater than 25mm). Reduce lateral etc over field. Remove crossing branches. Retain as group. Crown lift to 5.2 metres for vehicle access. Sever Ivy at base. Prune of floodlight.	Protect using protection fencing.
T009	Sycamore (Acer pseudoplatanus)	Tree 2 stems	19	750, 580,	948	Mature	30+ Years	The surfacing and levels in the RPA should not be altered as long as the tree is being retained.	Tree located on the North Western side of the site adjacent sports field. Large and one sided tree suppressed by adjacent trees and overhanging sports field. Dead wood within crown. Large sections over Sports field.	C1,2	N:1 E:3 S:10 W:10	7.6m	2	3	Fair	Remove tree. Dead wood (major greater than 25mm). Reduce lateral etc over field. Remove lower section over field. Retain as group.	Protect using protection fencing.
T010	Ash, Common (Fraxinus excelsior)	Tree	15	360	360	Early Mature	30+ Years	This tree is showing signs of possible early failure. Will form a constraint to the proposal	Tree located on grass verge 0.5m from access road and 5m from prefab classrooms. Area is within compound of Sanderson Sports Centre. Low branches over footpath and access road. Branches encroaching onto school building.	C1	N:6 E:6 S:6 W:6	4.3m	1	3	Fair	Remove tree to facilitate the proposal	NA

Status

Planning

Project

Gravesend Grammar School

Drawing title

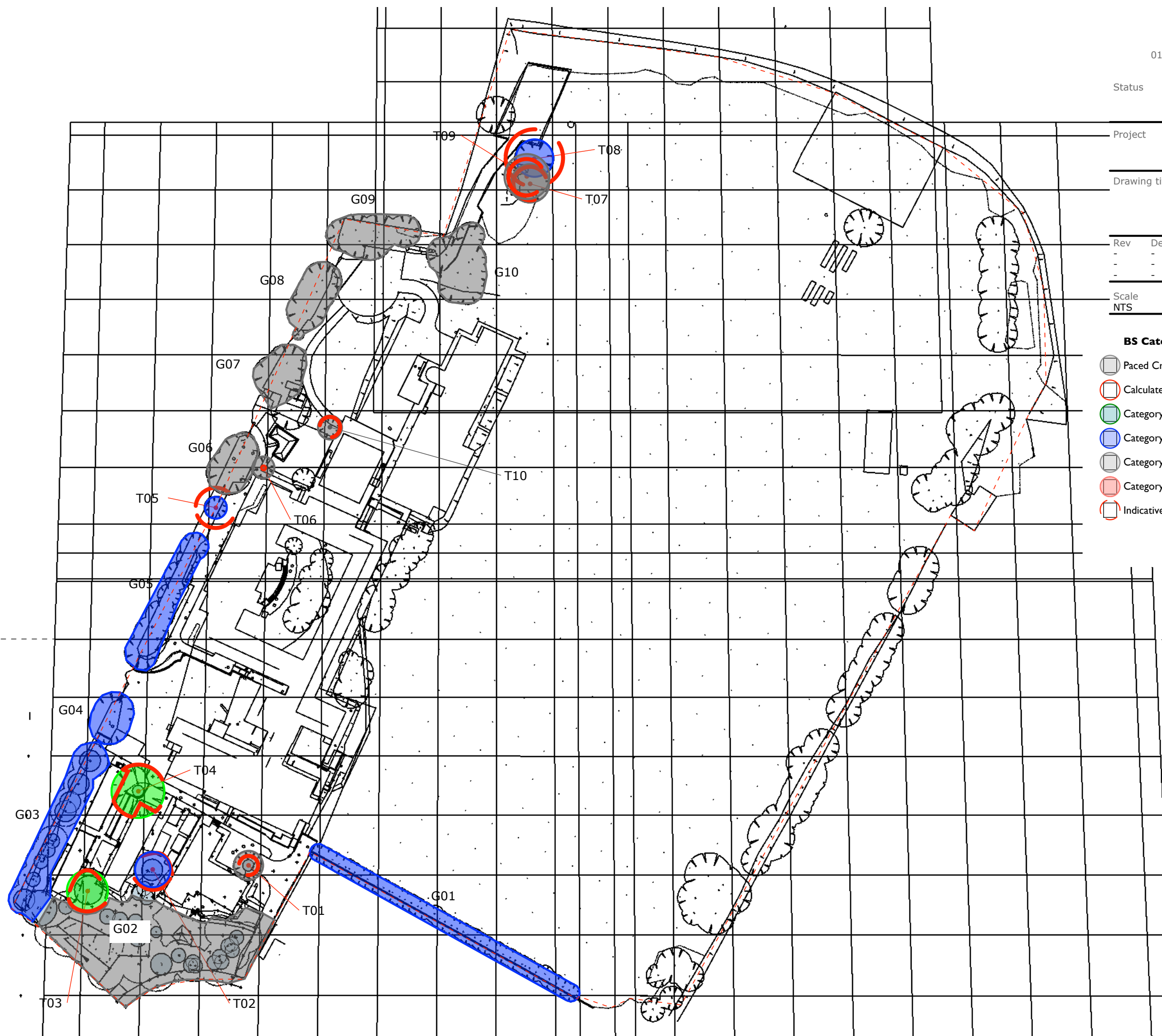
Tree location plan / Proposed plan - Appendix 4

Rev	Description	Date
-	-	-
-	-	-

Scale	Date	Drawing Number	Rev
NTS	29/06/21	2004_01	V01

BS Category of Condition

-  Paced Crown Spread - in category Colour
-  Calculated Root Protection Area - Adjusted to site condition where appropriate
-  Category A
-  Category B
-  Category C
-  Category U
-  Indicative site boundary



Status

Planning

Project

Gravesend Grammar School

Drawing title

Impact Assessment - Appendix 4

Rev	Description	Date
-	-	-
-	-	-
-	-	-

Scale	Date	Drawing Number	Rev
NTS	29/06/21	2004_02	V01

Arboricultural Impact Assessment.

The overall impact of the proposed development on the site trees is negligible. The three trees recommended for removal are of low category and should not impact on the design layout. In planning context they do not warrant retention and an appropriate landscape scheme will be more than adequate to mitigate any impacts.

Services - All services will enter the site via the access route with no impact to retained trees.

Ground levels - No ground level changes will be required within the RPA of retained trees.

Shading - A small amount of shading will be encountered around the proposal.

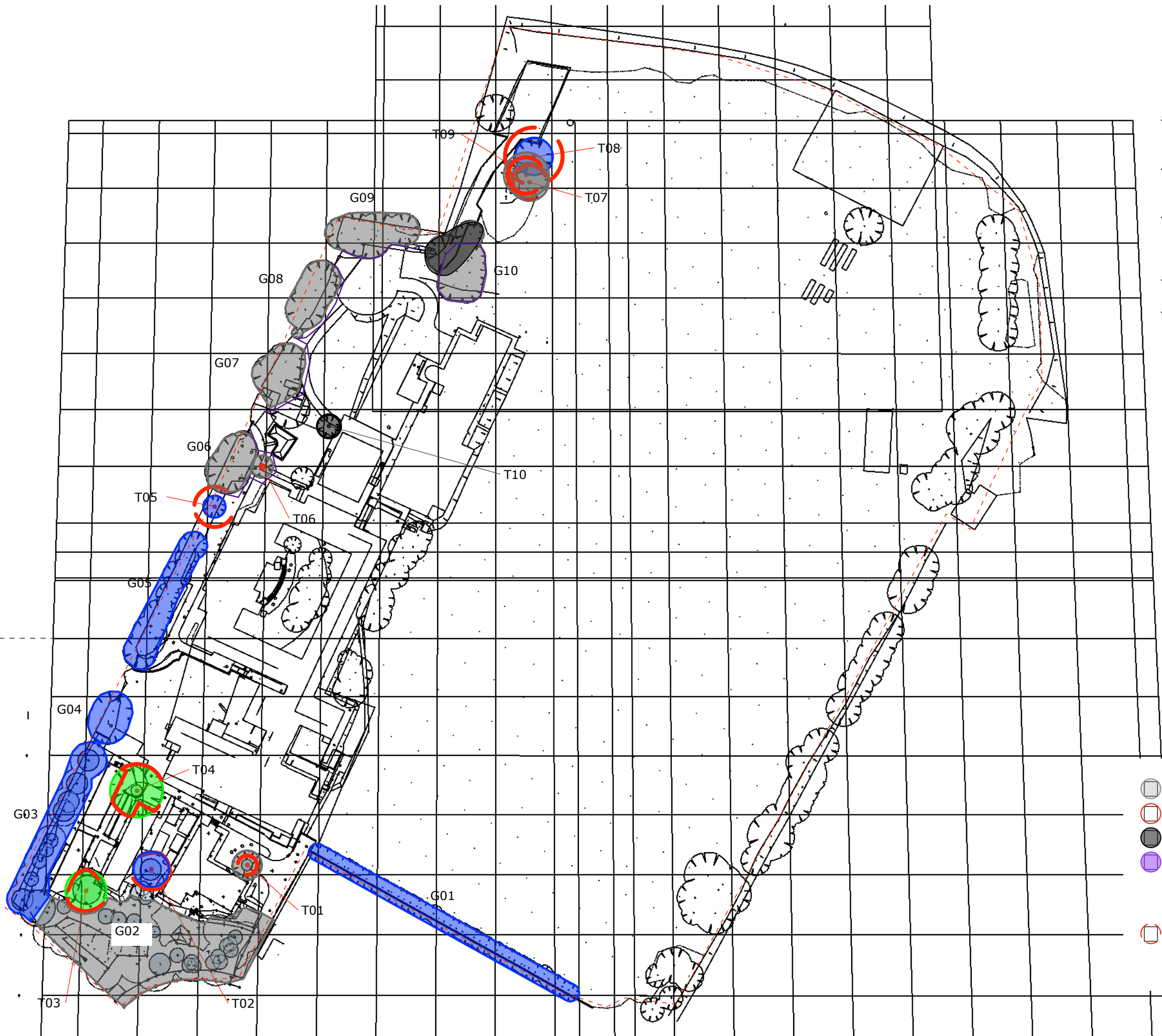
Leaf litter - Impacts may be encountered around paving and building gutters, to mitigate any impact non slip paving and gutter guards are recommended.

Above ground constraints - None encountered

Surfaces / Access - None encountered

BS Category of Condition

-  Paced Crown Spread - in category Colour
-  Calculated Root Protection Area - Adjusted to site condition where appropriate
-  Trees recommended removal to facilitate the proposal
-  Tree protection fencing
-  Indicative site boundary



Appendix 5: Site Inspection and Monitoring Schedule

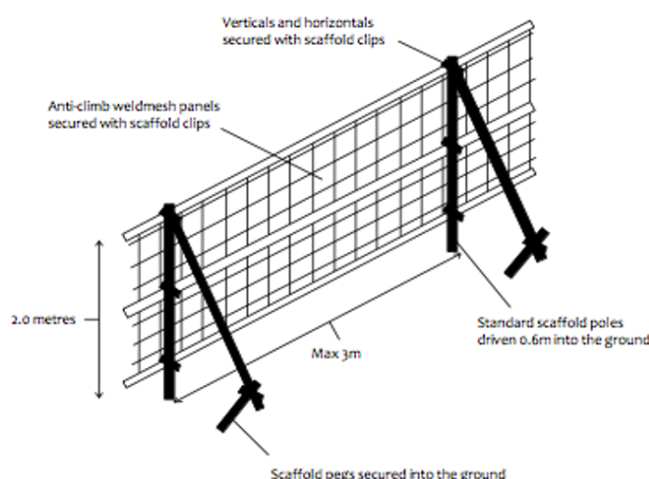
In order to ensure that the principals of tree protection are adhered to, it is important to set out communication details for key individuals and tasks that require supervision. Any on-going monitoring and site supervision shall be agreed with the local tree officer where required.

It should be noted that these visits will only be undertaken if a written instruction is received from the client prior to commencement of works on site.

Inspection	Attendees	Comments
Pre-start Occurring prior to any works taking place on site	Site manager, appointed arborist, architect, site owner	Site manager to study this method statement & contact the appointed arborist to agree all protection measures on site and install.
Tree and hedge removals	Site manager, appointed arborist and appointed contractors	Work to take place before construction on site.
Pre-construction meeting After tree works completed & all protection measures installed. Prior to any other activity	Site manager, appointed arborist	Tree protection fencing locations & specifications checked. Additional ground protection measures checked. Further protection measures/restriction agreed
Pre-construction toolbox talk	Site manager, site staff working near / within RPA fencing	Any member of site staff working near or within the RPA will need to attend a toolbox talk delivered by the site arborist. All attendees will be provided with summary sheets and cautionary notes.
Ground protection install	The appointed arborist shall be invited to oversee the ground protection	At least one week's notice shall be given prior to commencing excavations
Intermediate reporting Throughout entire project, at least once per month	The site manager shall report back to the appointed arborist. Appointed arborist to complete site checks once a month if required.	Site manager to liaise with the appointed arborist regarding any issues which may affect trees. General site photos indicating tree protection measures to be provided monthly
Post-Construction meeting Post construction activity but prior to removal of fencing & Landscaping operations	Site manager, appointed arborist	Retained trees inspected, further landscape operation and restrictions to be agreed.

Appendix 6: Tree and Ground Protection Specification

The In-Ground System



This system may be installed where indicated by a solid purple line on the Tree Protection Plan. It should be robust enough to withstand occasional knocks by plant machinery and, once installed, shall remain in place throughout the entire construction phase. Vertical scaffold poles are driven into the ground, onto which are affixed horizontal scaffold poles and diagonal bracing struts. Weldmesh panels (or similar – e.g., Heras type fencing panels, or 18mm+ plywood boards) are secured to this scaffold framework using sturdy clips e.g., standard scaffold clips. The system is illustrated in the diagram to the right and is based on BS 5837 guidelines.

The Back-Stay System

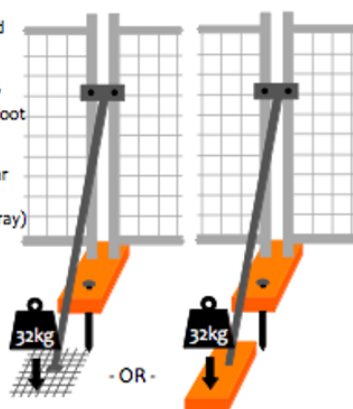
The 'Back Stay System' (an alternative to 'The In-Ground System')

2m X 3.5m weldmesh panels linked with anti-tamper couplings

Each panel attached to a back stay which is founded in an additional foot or mesh tray as illustrated

Minimum 32kg ballast to retain rear foot or tray (including the weight of the foot/tray)

Front feet to be secured with ground pins or additional ballast



This system may be installed where indicated by a solid or dashed purple line on the Tree Protection Plan. It is more practical over existing hard surfaces or where the fencing needs to be moved to enable permitted activities within the RPA. This system should be able to withstand occasional knocks by machinery and should not be relocated except with the consent of the site manager and the approval of the site arborist. Within this system, weldmesh fencing panels (minimum height 2m) are affixed into rubber or concrete feet and clipped together with anti-tamper couplers. Where topography permits, two couplers should be used, spaced at least 1m apart. Alternate panels should be attached to a diagonal back stay connected to an additional foot or baseplate secured with ground pins or additional ballast. Where ground pins are not used, the total weight of the foot/plate plus ballast should total not less than 32kg.

Appendix 7: Ground Protection Specifications

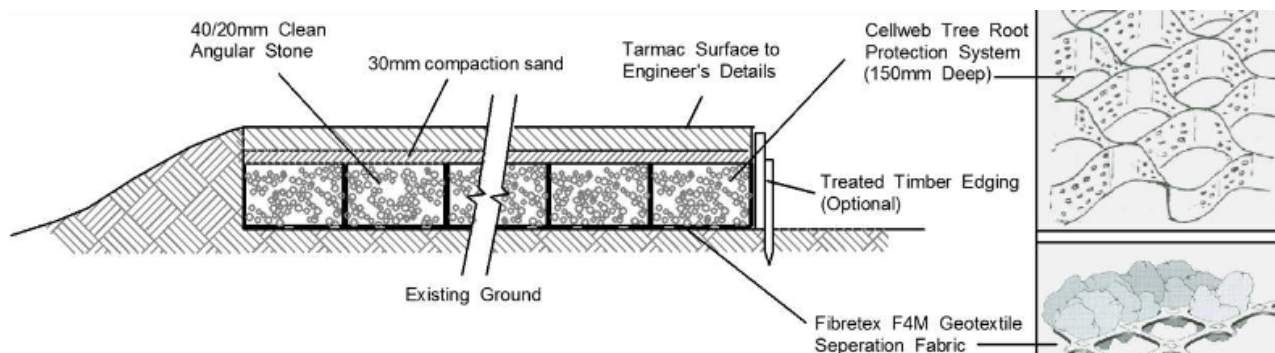
Ground Protection Measures

Where indicated on the Tree Protection Plan, ground protection measures shall need to be installed over any soft landscaping. The purpose of the ground protection is to prevent soil compaction and contamination where it is not practicable to fence off Root Protection Areas because access is required.

Where vehicles or machinery are required to operate within the Restricted Zone, a geotextile fabric shall be installed followed by a compression resistant layer such as 150mm of compressible material (e.g. woodchip) or a 3D cellular confinement system in-filled with 7 – 40mm angular gravel (e.g. Cellweb™).

Either system shall act to spread the load of any vehicles passing through the restricted zone. Above this load spreading layer, 25mm wooden boards or 12mm road plates shall be secured. Plant machinery shall be limited to 2 tonnes.

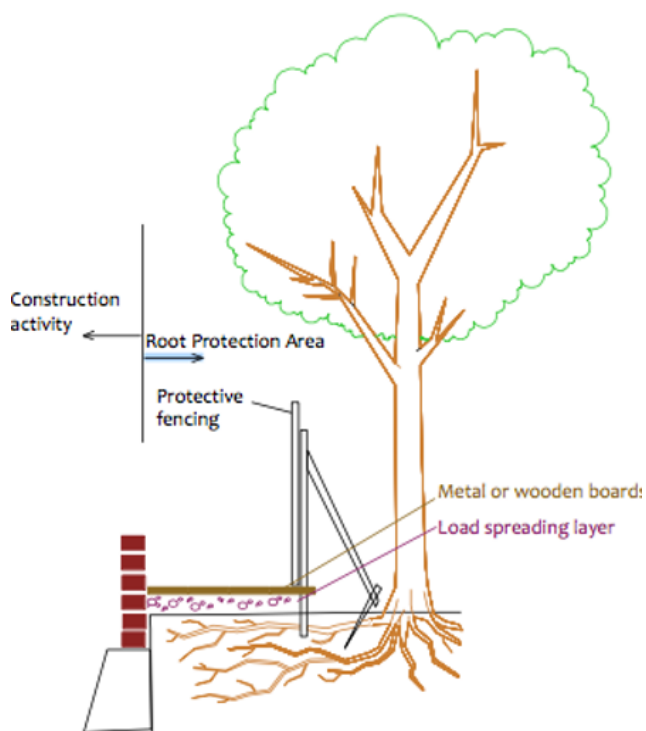
Example of Above Soil Surfacing



Ground Protection where root protection areas are outside the Construction Exclusion Zone

If only pedestrian access is required, then 25mm wooden boards, e.g. scaffold boards firmly affixed together and laid directly onto the ground shall suffice. If the ground is uneven, then it shall first be made even using sand or soil to ensure the boards distribute loads over a large area of ground. Boards shall be appropriately weighted or pinned to prevent movement. Alternatively scaffold boards may be supported above ground on a scaffold framework. Where existing hard surfacing is to be retained throughout the entire project it shall not be necessary to install additional ground protection measures. However, the hard surfacing must be firm enough to spread the load of any traffic passing overhead. Paving slabs shall need to be reinforced with scaffold boards or similar if vehicles or machinery are to be used in this area.

The ground protection measures shall be installed and approved before commencement of demolition and construction activity and before the arrival of plant machinery or materials. They shall remain in place until all heavy construction activity is complete or until they are due to be replaced with a new hard surface.



Reference Documents

- BS5837:2012 'Trees in Relation to Design, Demolition and Construction – Recommendations'
- BS3998:2010 'Tree Work – Recommendations'
- NJUG 4 – National Joint Utilities Group "Guidelines for the Planning, Installation and Maintenance of Utility Apparatus in Proximity to Trees. Volume 4, issue 2. London: NJUG 2007"
- BGS Open-Source Soil Data – accessed: <http://www.bgs.ac.uk/nercsoilportal/maps.html>