BACTON LOW RISE REDEVELOPMENT

Camden Greengage

TREE SURVEY, IMPLICATIONS ASSESSMENT AND CONSTRAINTS

NOVEMBER 2012

QA

Bacton Low Rise, Tree Survey, Implications Assessment & Constraints Report

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1.0 INTRODUCTION

OVERVIEW

1.1 Greengage Environmental LLP were commissioned to undertake an appraisal of trees at Bacton Low Rise, Camden, London, to the BS 5837:2012 Trees in relation to design, demolition and construction – Recommendations.

1.2 Two separate visits were made to the site; the first being on the 4th July 2012 and the second on the 31st August 2012 to survey trees within one of the courtyards that had previously been inaccessible. The trees were inspected following the guidance in the British Standard. The crowns and stems were inspected from the ground using the 'Visual Tree Assessment (VTA)' method; no invasive techniques were used at this stage.

1.3 The purpose of the report is to provide an assessment of the arboricultural value of the trees based on their current quality and to provide recommendations, to help inform any initial design and site layout considerations for a proposed re-development of the assessment site.

1.4 The survey has focused on the major trees within the site, and those directly adjacent to the assessment site, that would be directly affected by any proposed development. The report also indicates any trees requiring removal on the grounds of sound arboricultural management and those that would not be considered a major constraint to any development that may occur on the site. Appendix 1.0 includes site photographs of the trees that were recorded during the site survey.

LIMITATIONS

1.5 This report includes information on only the trees that were inspected and the condition they were observed in at the time of survey. The condition of trees can change, and as such any findings from this report should be held valid to inform for purposes of development for no longer than 12 months from the survey date.

1.6 No guarantee can be given for the structural integrity of any trees on site as a full hazard assessment has not been made.

1.7 In one case three trees that appeared within the development footprint, within the northern courtyard of the estate itself, were not immediately accessible, impeding the survey.

2.0 METHODOLOGY

2.1 Trees, tree groups and woodlands have been considered following evaluation into one of four categories (R, A, B, C) based on tree quality as outlined in British Standard 5837 (2012) which has been followed. Categorization of trees following the British Standard gives an indication as to the trees importance in relation to the site and the local landscape and also, the value and quality of the existing tree stock on site. This allows for informed decisions to be made concerning which trees should be removed or retained, should development occur. For a tree to qualify under any given category it should fall within the scope of that category's definition. In the categories A, B, C which collectively deal with trees that should be a material consideration in the development process, there are three sub-categories which are intended to reflect arboricultural, landscape and cultural values respectively. Category R trees are those which would be lost in the short-term for reasons connected with their physiological or structural condition. They are, for this reason, not usually considered in the planning process.

2.2 In assigning trees to the above categories the presence of any serious disease or tree-related hazards have been taken into account. If the disease is considered fatal and/or irremediable, or likely to require sanitation for the protection of other trees, the trees concerned may be categorised as R, even if they are otherwise of considerable value.

2.3 In assigning trees to the A, B or C categories the presence of any serious disease or tree related hazards are taken into account. If the disease is considered fatal and / or irremediable, or likely to require sanitation for the protection of other trees it may be categorised as R, even if they are otherwise of considerable value.

2.4 Category (A) – trees whose retention is most desirable and is of high quality and value. These trees are considered to be in such a condition as to be able to make a lasting contribution (a minimum of 40 years) and may comprise:

- Trees which are particularly good examples of their species especially 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 which provide a definite screening or softening effect to the locality in relation to views into or out of the site, or those of particular visual importance (e.g. avenues or other arboricultural features assessed as groups); and
- Trees or groups or woodlands of significant conservation, historical, commemorative or other value (e.g. Veteran or wood-pasture trees).

2.5 Category (B) – are trees whose retention is considered desirable and are of moderate quality and value. These trees are considered to be in such a condition as to make a significant contribution (a minimum of 20 years) and may comprise:

- Trees that might be included in the high category but because of their numbers or slightly impaired condition (e.g. presence of remediable defects including unsympathetic past management and minor storm damage), are downgraded in favour of the best individuals;
- Trees present in numbers such that they form distinct landscape features and attract a higher collective rating than they would as individuals. Individually these trees are not essential components of formal or semi-formal arboricultural features, or trees situated mainly internally to the site and have little visual impact beyond the site; and
- Trees with clearly identifiable conservation or other cultural benefits.

2.6 Category (C) – are trees that could be retained and are considered to be of low quality and value. These trees are in an adequate condition to remain until new planting could be established (a minimum of ten years) or are young trees with a stem diameter below 150mm and may comprise:

- Trees not qualifying in 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; and
- Trees with very limited conservation or other cultural benefits.

2.7 Category (R) – trees for removal are those trees in such a condition that any existing value would be lost within 10 years and which should in the current context be removed for reasons of sound arboricultural management. Trees within this category are:

- 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 category R trees;
- Trees that are dead or are showing signs of significant, immediate or irreversible overall decline; and
- Trees infected with pathogens of significance to the health and or/safety of other trees nearby trees or very low quality trees suppressing adjacent trees of better quality.

2.8 Species has been recorded by common name and recorded as such in the Arboricultural Data Tables in Appendix 2.0. Height has been estimated in meter and stem diameters have been measured at breast height (measured at 1.5 metres above

ground level) and recorded in millimetres. Crown spreads have been measured in meters and taken to the point of greatest spread unless the crown has presented a pronounced asymmetrical form and therefore measurements have been taken for the four cardinal points. The measurements have always been considered in the following sequence, North, East, South, and West, and therefore appear as such within the Arboricultural Data Tables.

2.9 In the assessment particular consideration has been given to the following when deciding the most appropriate British Standard Category and Sub-Category allocation:

(a) the health, vigour and condition of each tree;

(b) the presence of any structural defects in each tree and its life expectancy;

(c) the size and form of each tree and its suitability within the context of the proposed scheme; and

(d) the location of each tree relative to existing site features, e.g. its value as a screen or as a skyline feature.

2.10 Age class is assessed according to the age class categories referred to in BS 5837.

- YNG : Young trees up to five years of age;
- SM : Semi-mature, trees less than 1/3 life expectancy;
- EM: Early mature, trees 1/3 – 2/3 life expectancy;
- M : Mature trees over 2/3 life expectancy;
- OM : Over mature – declining or moribund trees of low vigour; and
- V : Veteran - Characteristics have been noted where a tree exhibits certain characteristic features of veteran trees.

2.11 The overall condition of the tree, or group of trees, has been referred to as one of the following. A more detailed description of condition has been noted in the Tree Schedule and discussed in the Tree Assessment Report.

- Good: A sound tree, trees, needing little, if any, attention;
- Fair: A tree, trees, with minor but rectifiable defects or in the early stages of stress, from which it may recover;
- Poor: A tree, trees, with major structural and physiological defects or stressed such that it would be very expensive and inappropriate to retain; and
- Dead: A tree, trees, no longer alive. However, this could also apply to those trees that are dying and will be unlikely to recover, or are / have become dangerous.

2.12 Major defects or diseases and relevant observations have also been recorded under Structural Condition. The assessment for structural condition has included inspection of the following defects:

- The presence of fungal fruiting bodies around the base of the tree or on the stem, as they could possibly indicate the presence of possible internal decay;
- Soil cracks and any heaving of the soil around the base indicating possible root plate movement;
- Any abrupt bends in branches and limbs resulting from past pruning, as it may be an indication of internal weakness and decay;
- Tight or weak 'V' shaped forks and co-dominant stems;
- Hazard beam formations and other such biomechanical related defects (as described by Claus Mattheck, Body Language of Trees HMSO Research for Amenity Trees No. 4 1994);
- Cavities as a result of limb losses or past pruning;
- Broken branches;
- Storm damage;
- Canker formations;
- Loose bark;
- Damage to roots;
- Basal, stem or branch / limb cavities;
- Crown die-back;
- Abnormal foliage size and colour;
- Any changes to the timing of normal leaf flush and leaf fall patterns; and
- Other pathological diseases affecting any part of the tree.
- Major defects or diseases and relevant observations have also been recorded. Dead wood has been defined as the following:
- Twigs and small branch material Up to 5cm in diameter;
- Minor dead wood 5cm to 10cm in diameter; and
- Major dead wood 10cm in diameter and above.

2.13 The survey was completed from ground level only, within the curtilage of the assessment site with some inspection from within the neighbouring gardens. Aerial inspection of trees was not undertaken. Investigations as to the internal condition of a tree have not been undertaken. Further investigations of this type can be made and have been recommended where it has been considered necessary, within the report although these investigations are beyond the scope of this report.

2.14 Evaluation of the trees condition given within this assessment applies to the date of survey and cannot be assumed to remain unchanged. It may be necessary to review these within 12 months, in accordance with sound arboricultural practice.

2.15 The individual positions of trees and groups of trees recorded in the Arboricultural Data Tables have been shown on the Tree Constraints Plan, in Appendix 3.0. The positions of trees are based on a topographical / land survey supplied by the development and client in dwg. format for the purpose of plotting the trees.

2.16 The Root Protection Areas to be required by the individual and groups of trees are indicated by the Tree Constraints element of the above plans. The Root Protection Areas (RPA) are formulated as described below.

2.17 Below ground constraints to future development is represented by the area surrounding the tree that contains sufficient rooting volume to ensure survival of the tree, which need protecting in order for the tree to be incorporated into any future scheme, without adverse harm to the tree or structural integrity of buildings. This is referred to as the RPA and is shown as a circle of a given radius.

2.18 The circle may be modified in shape to maintain a similar total area depending on the presence of surrounding obstacles. Where groups of trees have been assessed, the RPA has been shown based on the maximum sized tree in any one group and so would automatically exceed the RPA's required for many of the individual specimens within the group. A RPA is equivalent to a circle with a radius 12x the stem diameter for single stem trees and 10x the basal diameter for trees with more than one stem arising less than 1.5 meters above ground level. The RPA for the trees in the Arboricultural Data Tables are shown on the Tree Constraints Plan in Appendix 3.0.

2.19 A summary table of all the trees included in the Arboricultural Data Tables, detailing further information on each tree and group of trees is shown in Appendix 2.0.

2.20 The surveys were undertaken in July and August 2012 in mild and rainy weather conditions, with deciduous trees in full leaf.

3.0 RESULTS OF SURVEY

3.1 The site is currently occupied by a low rise residential housing facility comprising of several detached buildings, landscaped courtyards and car parking that seeks to residential housing for local people. To the east of the main complex is the District Housing Office; this is also included within the proposals. To the north of the development lies domestic housing, to the east stretches further residential housing and St Martin's Church, to the west is residential flats and to the south a nursing home. Tree cover in the locality is extensive and of good quality.

3.2 Trees on the site are of a generally good quality, there is evidence of extensive pressure from different phases of building works, compaction within the root protection areas, poor pruning and in some cases vandalism. No trees on site are protected by Tree Preservation Orders (TPOs).

3.3 While the survey was in progress, it was noted that works are being carried out for a district-heating scheme. This appears to involve pipe laying north to south down Haverstock Road. It was noted during our visit that no tree protection fencing was in place and the trench was being dug well within the root protection areas of the tree cover in its entirety.

3.4 A total of 46 individual trees were identified within the survey boundary. The root protection zones of each tree are indicated in the Tree Schedule in Appendix 1 and illustrated in the Tree Constraints Plan of Appendix 2.

Table 1 - Number of trees/groups in each category

	Category A	Category B	Category C	Category R
Number of trees/groups in category	0	24	19	3
Tree/group numbers	-	1, 4-7, 15-17, 18-20, 22, 23, 24-26, 32, 34, 35, 39-43	3, 8-14, 21, 29-31, 33, 36-38, 44-46.	2, 27, 28

3.5 The trees are generally in a good condition and are fairly representative of trees found in green spaces within urban areas.

3.6 A break-down of the number of trees belonging to each BS 5837 (2012) category can be found in Table 1.

4.0 ABORICULTURAL IMPACT ASSESSMENT (AIA)

INTRODUCTION

4.1 The purpose of this AIA is to assess the potential threat to existing trees from the proposed development, and highlight the need for the retention or removal or specific trees during construction.

4.2 Works associated with developments of this scale can damage trees, threatening the survival of those that are retained. The following actions can have negative impacts upon tree health:

- Soil compaction;
- Root damage (e.g. severance);
- Soil coverage with impermeable material;
- Alterations in ground level;
- Leaks and spillages from stored materials; and
- Vehicle and heavy plant collision.

4.3 As such, the RPAs that are defined in Appendices 1 and 2 should be considered throughout works to prevent risks to the tree's health.

PROPOSED DEVELOPMENT

4.4 The proposed development seeks to demolish the existing complex and replace it with a mixed development of residential units, gardens and landscaped areas.

TREE TO BE REMOVED, RETAINED OR TRANSPLANTED

4.5 To enable the development, as shown on the plan provided to us, the tree cover present on site at the time of survey will be put under pressure. Not all of the trees within the site will be able to be retained with the plans as proposed, although the proposed development has been designed to avoid as far as practical those trees that have the greatest value. Furthermore, a high level of on-site observation and support throughout the construction works and post completion maintenance aims to provide the framework to retain as many of these trees as possible.

4.6 The development team have been working with the Local Planning Authority to ensure a cooperative approach to the high value on the tree cover in this area is maintained through good quality landscape proposals. It is understood that the Local Planning Authority intends not to be too prescriptive with planting within the new development.

4.7 Trees T1-T3, T9-T11, T36-T38, T39-T43 and T44-46 will all need to be removed to enable the proposed development to come forward. The trees that will be affected by

the proposed development, and the trees that therefore should be removed, are shown on the Arboricultural Methods Statement Plan at Appendix 2.

4.8 Whilst initial discussions included preliminary ideas on the movement of some of these large trees, it will not be feasible, due to the likely ground conditions, access and tree form. Unfortunately, a planting spade big enough to transplant the trees would not be able to access the site, and there is no area to facilitate holding the trees while construction takes place.

4.9 In this case, it would therefore be prudent to mitigate this loss once the development is completed through a high quality landscaping scheme that has been developed in conjunction with the development team. A robust species choice has been and this will negate the loss of trees whilst allowing the development to go ahead as planned.

TREE WORKS

4.10 Trees T2, T27 and T28 are all category R trees and it is recommended they are felled as a management recommendation.

4.11 There are a number of other trees (T1, T3, T4, T7, T9, T10, T11, T17 and T35) that have minor preliminary management recommendations detailed in the data tables at Appendix 1 – some of these are to be removed altogether as part of the development however.

4.12 Close site observation and the use of an air spade, particular around T4, T5 and T6 will be necessary to investigate the location of the main roots and how the construction activities will aim to avoid these as much as possible. Reduction crown will be required on T4 in order to reduce the additional stress where the proposed development has some intrusion into the RPA.

4.13 If any trees are highlighted as requiring work as a function of the development process (i.e. should the development threaten the structural integrity of a tree) then it should be undertaken in accordance with BS 3998:2010 'Recommendations for Tree Work'.

CONSTRUCTION WORK WITH RPA

4.14 Any construction work should take into account the extents of the RPAs and put in suitable protection measures to combat any potential damage upon the tree.

4.15 Any re-surfacing within the RPAs needs to be carried out using a geo-grid no dig technique as per APN-12 which is included within Appendix 4 of this report.

SERVICES AND UTILITIES

4.16 Detailed drawings for the servicing and utilities plans for the proposed development were not available at the time of the survey. However, any new services introduced to the site should be located outside of RPAs and the final placement of such services

should be confirmed with the Local Tree Officer and aribori cultural consultant. If service installation must happen with an RPA then the National Joint Utilities group Publication (NJUG 4) guidelines should be followed.

5.0 SUMMARY

5.1 The quality of the tree stocks on site has been assessed and has been used to inform the proposed development layout:

- Tree stocks should be protected by suitable fencing as set out in BS 5837 throughout the demolition and construction phase, the erection of which should be supervised by the project arboriculturalist, tree stocks on site are particularly vulnerable during the demolition phase, fencing location is shown on the appended arboricultural method statement;
- Dismantle and fell trees marked red for removal in accordance with the arboricultural method statement;
- Any excavation around trees should be carried out under arboricultural supervision using an air spade so as to protect the root network from damage;
- Crown reduction will be necessary for the London Plane trees along Vicars Road;
- Construction of road ways and service installation should be as per the guidance set out in APN12 and of a 'no dig' construction to prevent damage to tree roots;
- Implement a planting plan within the context of the new development and the proposed landscaping plan with a robust and sustainable species choice; and
- Full details of the condition of the tree stocks are included in the attached arboricultural data tables with their positions and conditions shown on the attached mapping.

5.2 To summarise, it is possible to retain the most of the greater value trees, and whilst a limited number have been lost to the development footprint. In aiming to retain the London Plane trees along Vicars Road a programme of crown reduction will be necessary. Furthermore tree protection fencing and site hoarding needs to be robust and located appropriately. Arboricultural supervision throughout the project will be key to retaining trees undamaged.

APPENDIX 1 – ARBORICULTURAL DATA TABLES

tree no	species	height	DBH (mm)	RPA (av. radius)	crown spread N-E-S-W	height to 1st signifi-cant branch	age class	condition	structural condition	preliminary management recommendations	estimated remaining years	Category grade
Individual trees												
T1	Silver Birch	9	268	3.2	5-4-4-3	3	SM	Fair	Low crown, poor previous pruning noted, dead wood present.	Crown lift to clear path and road.	20+	B1-
T2	Rowan	8	160	1.9	1-2-4-3	2	Y	Poor	Mechanical damage to stem, asymmetric crown, limited long term prospects.	Fell	<5	R
T3	Rowan	9	230	2.8	5-5-4-3	3	SM	Fair	Compaction issues, dead wood present, close to adja-cent building.	Reduce back from building, limited long-term prospects.	<10	C1-
T4	London Plane	17	615	7.4	9-9-10-4	4	M	Good	Good structure, form and vigor, occluded wound to stem, roots lifting tarmac.	Crown lift over road.	40+	B1+
T5	London Plane	18	550	6.6	8-6-8-7	4	M	Good	Good structure, form and vigor, occluded wound to stem, roots lifting tarmac.	None required.	40+	B1+
T6	London Plane	19	355	4.3	9-2-6-7	6	SM	Fair	Suppressed by neighboring trees, good vigor.	None required.	<40	B1-

tree no	species	height	DBH (mm)	RPA (av. radius)	crown spread N-E-S-W	height to 1st signifi-cant branch	age class	condition	structural condition	preliminary management recommendations	estimated remaining years	Category grade
T7	London Plane	16	505	6.0	9-6-7-9	2	M	Good	Good vigor, low crown, roots lifting car park tarmac, asymmetric crown.	Crown lift to clear road and foot path.	40+	B1+
T8	White Beam	6	330	4.0	4-4-2-2	1.5	M	Fair	In decline, poor previous pruning, limited long term prospects.	None required.	<20	C1+
T9	Norway Ma-ple	17	380	4.6	8-4-5-4	3	M	Fair	Asymmetric crown, dead wood present, head lean toward adjacent building, located in a grass matrix.	Remove major dead wood.	<20	C1-
T10	Norway Ma-ple	17	560	6.7	6-6-9-5	3	M	Fair	Asymmetric crown, dead wood present, head lean toward adjacent building, located in a grass matrix	Remove major dead wood.	20+	C1+
T11	Norway Ma-ple	16	540	6.5	7-10-10-4	2	M	Fair	Asymmetric crown, in de-cline, located in a grass matrix.	Monitor, remove major dead wood.	<20	C1-
T12	Lime	7	295	3.5	4-4-5-3	4	SM	Fair	Street tree, restricted rooting area, co-dominant stems.	None required.	20+	C1+

tree no	species	height	DBH (mm)	RPA (av. radius)	crown spread N-E-S-W	height to 1st signifi-cant branch	age class	condition	structural condition	preliminary management recommendations	estimated remaining years	Category grade
T13	Lime	9	300	3.6	4-5-5-4	3	SM	Fair	Street tree, restricted rooting area, low crown.	None required.	20+	C1+
T14	Sycamore	15	810	9.7	4-6-3-3	5	M	Fair	Multi-stemmed at ground level, vertical mechanical wound to stem, recently been heavily reduced, wrong tree, wrong place, limited long term prospects due to constrained crown environ-ment.	None required.	<20	C1-
T15	Lime	12	290	3.5	2-5-4-5	3	SM	Good	Asymmetric crown, good structure form and vigor, located in a grass matrix.	None required.	20+	B1-
T16	Lime	13	300	3.6	2-3-5-4	4	SM	Good	Co-dominant stems, good structure and vigor, head lean toward adjacent road.	None required.	20+	B1-
T17	Lime	14	330	4.0	4-5-7-5	2	SM	Good	Snapped hanging limb, good structure form and vigor, located in a grass matrix.	Remove hanger.	20+	B1-

tree no	species	height	DBH (mm)	RPA (av. radius)	crown spread N-E-S-W	height to 1st signifi-cant branch	age class	condition	structural condition	preliminary management recommendations	estimated remaining years	Category grade
T18	Lime	14	350	4.2	3-4-5-4	5	SM	Good	Good structure, form and vigor. Located in a grass matrix.	None required	20+	B1-
T19	Silver Birch	13	315	3.8	2-4-6-5	3	M	Good	Poor previous pruning, good structure form and vigor, located in a grass matrix.	None required.	20+	B1+
T20	Pear	6	145	1.7	1-2-2-1	2	Y	Good	Good structure, form and vigor. Located in a grass matrix.	None required.	20+	B1+
T21	Acacia	16	450	5.4	5-6-8-2	5	M	Fair	Poor form, good vigor, asymmetric crown.	None required.	<20	C1+
T22	London Plane	18	700	8.4	6-10-10-12	3	M	Good	In a tarmac matrix, roots lifting tarmac, good struc-ture, form and vigor.	None required.	40+	B1+
T23	London Plane	18	630	7.6	7-3-6-11	4	M	Good	Head lean toward adjacent road, asymmetric crown, good vigor, located in a tarmac matrix.	None required.	40+	B1-

tree no	species	height	DBH (mm)	RPA (av. radius)	crown spread N-E-S-W	height to 1st significant branch	age class	condition	structural condition	preliminary management recommendations	estimated remaining years	Category grade
T24	London Plane	18	670	8.0	10-9-5-6	4	M	Good	Head lean toward adjacent road, asymmetric crown, good vigor, located in a tarmac matrix.	None required.	40+	B1-
T25	London Plane	16	580	7.0	7-9-10-9	5	M	Good	Good structure form and vigor, low crown over adjacent terrace.	None required.	40+	B1+
T26	London Plane	18	690	8.3	8-14-10-8	4	M	Good	Good structure form and vigor, low crown over adjacent terrace.	None required.	40+	B1+
T27	Ash	11	320	3.8	7-6-1-3	5	SM	Poor	Dead wood present, in decline.	Fell for safety.	<5	R
T28	Ash	12	260	4.3	6-6-4-1	4	SM	Poor	In decline.	Fell for safety.	<5	R
T29	Ash	12	235	2.8	1-5-2-1	6	Y	Poor	In decline, poor form, limited long term prospects.	None required.	<10	C1-
T30	Ash	12	295	3.5	4-6-2-2	5	SM	Poor	In decline, poor form.	None required.	<10	C1-
T31	Ash	13	310	3.7	5-4-3-7	3	SM	Poor	In decline, limited long term prospects.	None required.	<10	C1-

tree no	species	height	DBH (mm)	RPA (av. radius)	crown spread N-E-S-W	height to 1st signifi-cant branch	age class	condition	structural condition	preliminary management recommendations	estimated remaining years	Category grade
T32	London Plane	17	600	7.2	9-9-6-7	4	M	Good	Good structure, form and vigor. Trenching works being carried out at time of survey within RPA, roots severed.	None required.	<40	B1-
T33	Ash	16	410	4.9	8-9-8-8	5	SM	Poor	Mechanical damage to stem, trenching works being car-ried out at time of survey, in decline, limited long term prospects.	None required.	<10	C1-
T34	Ash	18	590	7.1	8-8-6-8	5	M	Good	Good structure, form and vigor. Trenching works being carried out at time of survey.	None required.	<40	B1-
T35	Willow	9	420	5.0	5-7-6-4	2	M	Good	Good structure, form and vigor. Low crown.	Crown lift to clear path.	<40	B1-
T36	Silver Birch	7	180	2.2	3-2-1-2	2	Y	Fair	Poor form, good vigor.	None required.	20+	C1+
T37	Silver Birch	9	370	4.4	2-3-4-2	3	SM	Fair	Poor form, good vigor.	None required.	<20	C1-
T38	Silver Birch	11	430	5.2	3-3-4-5	3	M	Good	Good structure, form and vigor. Low crown.	None required.	20+	C1+

tree no	species	height	DBH (mm)	RPA (av. radius)	crown spread N-E-S-W	height to 1st signifi-cant branch	age class	condition	structural condition	preliminary management recommendations	estimated remaining years	Category grade
T39	Lime	15	420	5.0	3-4-4-3	3	SM	Good	Good structure, form and vigor. Located in court yard.	None required.	20+	B1-
T40	Lime	15	390	4.7	3-2-3-2	3	SM	Good	Good structure, form and vigor. Located in court yard.	None required.	20+	B1-
T41	Lime	14	390	4.7	3-2-3-3	3	SM	Good	Good structure, form and vigor. Located in court yard.	None required.	20+	B1-
T42	Lime	14	370	4.4	4-3-3-2	4	SM	Good	Good structure, form and vigor. Located in court yard.	None required.	20+	B1-
T43	Lime	13	280	3.4	3-3-3-4	5	SM	Good	Good structure, form and vigor. Located in court yard.	None required.	20+	B1-
T44	Silver Birch	20	350	4.2	3-2-3-2	12	M	Good	Good structure, form and vigor. Located in court yard.	Cut back basal growth	20+	C1+
T45	Silver Birch	20	350	4.2	3-2-3-2	8	M	Good	Good structure, form and vigor. Located in court yard.	None required	20+	C1+
T46	Silver Birch	24	380	4.6	4.5-4-4-4	6	M	Good	Co-dominant stems at 6m, good vigour	None required	20+	C1+
End of records.												

APPENDIX 2 – TREE CONSTRAINTS AND ARBORICULTURAL METHOD STATEMENT

Tree Constraints Plan Over Proposed Layout - Bacton Low Rise

Greengage

Note 1:
It is likely that with the proposal as shown, trees T1-T3, T7 T9-T11,T36-T43 and T44-T46 will require removal.

This drawing shows the RPA's of trees that can be retained if the suggestions in the AMS are implemented.

Tree T12-T21 all have a degree of incursion into the RPA with the proposals as shown, this can again be managed through appropriate supervision and no-dig techniques for service runs.

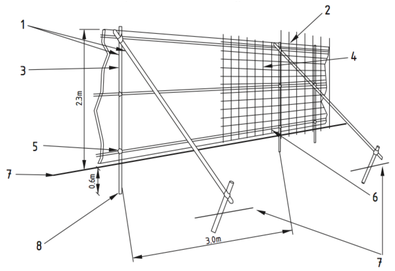
Note 2:
The RPA (root protection area) of many of the retained trees has been off set, as per the British Standard, due to the proximity of root barriers such as buildings and extreme level changes.

TREE CATERGORIES

- Catergory B
- Catergory C
- Catergory R (marked for removal)
- Root protection area (of retained trees)

Greengage Matthew Harmsworth ND RS, Tech.Arbor.A	Project: Proposed mixed use residential development with associated hard and soft landscaping.	Drawing no. GRNGE-BCTNLWRS-TCP_Final_revb	
	Drawing: BS5837 Tree Constraints Plan	Location: Bacton Low Rise, Wellesley Rd, Gospel Oak	Date: 22.11.2012 / Scale: 1:500 @ A3

DETAIL 1
Installation of tree protection fencing



1 Standard scaffold poles
2 Uprights to be driven into the ground
3 Panels secured to uprights with wire ties and where necessary standard scaffold clamps
4 Weldmesh wired to the uprights and horizontals
5 Standard clamps
6 Wire twisted and secured on inside face of fencing to avoid easy dismantling
7 Ground level
8 Approx. 0.6 m driven into the ground

TREE CATERGORIES

Catergory B

Catergory C

Catergory R
(marked for removal)

Root protection area
(of retained trees)

Note 1:
Demolition of the existing buildings will have to be carried out from within the building foot print. In order to protect the retained trees, the tree protection fencing / site hoarding will need to be erected parallel with the existing building footprint as shown.

DETAIL 2
Example signage that should be affixed to tree protection fencing

Arboricultural Method Statement - Bacton Low Rise

Greengage

Greengage Matthew Harmsworth ND RS, Tech.Arbor.A	Project: Proposed mixed use residential development with associated hard and soft landscaping.		Drawing no. . GRNGE-BCTNLWRS-AMS_Final_revb	
	Drawing: BS5837 Arboricultural Method Statement	Location: Bacton Low Rise, Wellesley Rd, Gospel Oak	Date: 22.11.2012	Scale: 1:500 @ A3

APPENDIX 3 – NJUG 4 GUIDANCE ON WORKS TO UTILITY SYSTEMS IN PROXIMITY TO TREES

The National Joint Utilities Group

NJUG Guidelines for the Planning, Installation and Maintenance of Utility Apparatus in Proximity to Trees

Volume 4

NJUG GUIDELINES FOR THE PLANNING, INSTALLATION AND MAINTENANCE OF UTILITY APPARATUS IN PROXIMITY TO TREES

PLEASE ENSURE THAT YOU READ THE LEGAL NOTICE AND DISCLAIMER WHICH APPEARS IN APPENDIX B OF THIS PUBLICATION

Issue 2: 16th November 2007

NJUG has a vision for street works, this vision is simply:

- Safety is the number one priority
- Damage to underground assets is avoided
- Utilities work together and in partnership with local authorities to minimise disruption
- Utilities deliver consistent high quality
- Utilities maximise the use of sustainable methods and materials
- Street Works in the U.K. are regarded as world class

This document forms part of that vision.

Mark Ostheimer
Director, Safety and Policy

NJUG Guidelines for the Planning, Installation and Maintenance of Utility Apparatus in Proximity to Trees

The following volumes constitute the NJUG Publications. They are living documents and may be amended from time to time. There is no attempt to describe any specific industry process as each utility has its own specifications and procedures. Not all the publications will necessarily be available at one time as individual volumes will be published when available.

NJUG PUBLICATIONS	
Current	*Previous*
VOLUME 1	
NJUG Guidelines on the Positioning and Colour Coding of Underground Utilities' Apparatus	NJUG 4 & 7
VOLUME 2	
NJUG Guidelines on the Positioning of Underground Utilities Apparatus for New Development Sites	NJUG 2, 5 & 6
VOLUME 3	
NJUG Guidelines on the Management of Third Party Cable Ducting	New
VOLUME 4	
NJUG Guidelines for the Planning, Installation and Maintenance of Utility Apparatus in Proximity to Trees	NJUG 10
VOLUME 5	
NJUG Guidelines on Environmental Good Practice	New
VOLUME 6	
Legislation & Bibliography	NJUG 1

The following NJUG publications have not been reviewed and have been completely withdrawn:

NJUG 3 – Cable Locating Devices
NJUG 8 – Performance Guide for the Assessment of Metallic Pipe and Cable Locators
NJUG 9 – Recommendations for the Exchange of Records of Apparatus between Utilities
NJUG 11 – Proposed Data Exchange Format for Utility Map Data
NJUG 12 – NJUG Specification for the Digitisation of Large Scale OS Maps
NJUG 13 – Quality Control Procedure for Large Scale OS Maps Digitised to OS 1988
NJUG 15 – NJUG/Ordnance Survey Service Level Agreement (Technical) for Digital Map Products and Services

The National Joint Utilities Group

NJUG Guidelines for the Planning, Installation and Maintenance of Utility Apparatus in Proximity to Trees

CONTENTS

In this document the word 'apparatus' is used to describe both the distribution mains and also the lateral apparatus to properties. The words 'plant' or 'services' are also used to collectively describe this and other equipment.

This volume supersedes NJUG 10 'Guidelines for the Planning, Installation and Maintenance of Utility Services in Proximity to Trees' and has been drafted by NJUG members and arboriculturists.

Background

The statutory right of undertakers (utilities) to carry out works within the public highway in order to provide and maintain their apparatus dates from the mid - 19th century. There are no statutory obligations governing the position or depth at which apparatus should be laid within the highway. The following guidelines should therefore be adhered to wherever practicable.

The New Roads and Street Works Act 1991, as amended by the Transport Act 2000, the Traffic Management Act 2004, the Transport (Scotland) Act 2005 together with the Street Works (Northern Ireland) Order 1995, sets down the legislative requirements to be adopted during the installation, repair and maintenance of apparatus in roads and streets (**see Volume 6 – 'Legislation and Bibliography'**).

Scope

(i) Trees (including shrubs and hedges) play an essential role in the environment and visual amenity of both rural and urban landscapes. They may take decades to grow, but can be destroyed in minutes. Wherever they are growing, whether in public footpaths, private gardens, rural verges or elsewhere, they require space for the adequate development of their root systems and to allow the branches to develop an attractive and natural shape.

(ii) Modern society expects a multiplicity of apparatus (electricity, gas, water, sewage, telecommunications and cable television) each of which requires an extensive distribution network, both above and below ground. These networks also need space, and they are frequently under tight constraints regarding their alignment.

(iii) The space available for both trees and apparatus is often very restricted, and they are frequently forced to share the available space, both above and below ground. Where they are in close proximity, there is the potential for either the tree or the apparatus to be subject to damage. To successfully co-exist precautions should be taken to minimise the risk of damage to both trees and apparatus based upon technical guidance obtained from this document and where appropriate further advice from local authority arboriculturists.

(iv) Legislative mechanisms for ensuring that existing trees (including shrubs and hedges) are safeguarded already exist (see sub-section 7 – 'Legislation'). References to legislation relate to the whole of the United Kingdom (UK) but variations between countries may occur. They seek to provide constructive advice on how to minimise damage to trees by undertakers (utilities) and to utility apparatus by trees and will be helpful to utility companies, contractors, arboriculturists, highway engineers, developers and planners. The guidelines have been prepared in collaboration between representatives of the utilities, the arboricultural and urban forestry professions and the Department for Communities and Local Government. As with all guidelines, their interpretation and application should be complimented at all times by common sense. However, expert guidance on specific instances should be sought from the appropriate utility, local authority or arboriculturist. The emphasis throughout this document is on the need for local liaison and communication.

(v) Certain trees are subject to Tree Preservation Orders (TPOs). Trees protected by a TPO must not be willfully damaged or destroyed and cannot be cut down, uprooted, topped or lopped without the local planning authority consent.

(vi) These guidelines are applicable to all apparatus (underground and overhead) and to trees in any location (public or private, rural or urban). They should be considered when new apparatus is planned to be constructed adjacent to existing trees, when new trees are to be planted adjacent to existing apparatus and where apparatus is to be maintained or repaired and trees are to be managed (e.g. pruning, removal or replacement).

(vii) Site surveys should be undertaken appropriate to the scale of the planned works. These surveys will identify the presence of trees which could impact on works. Advice should then be sought from a local authority tree officer. However, on major projects, a consultant arboriculturist may be employed to liase with the local authority tree officer. Site surveys should be carried out according to the recommendations within BS 5837 (see sub-section 8 – 'Other Useful Publications').

(viii) The principles set out in these guidelines also have relevance in respect of work carried out to highways near trees (e.g. kerbing, footway reinstatement).

1. HOW TREES ARE DAMAGED

Trees are complex living organisms, which are susceptible to damage from a wide range of physical agents or activities. Trees do not heal, damage caused to a tree will remain for the rest of its life. Even minor damage may set up circumstances leading to serious long term decay.

Contrary to popular belief, the root system of a tree is not a mirror image of the branches, nor is there usually a 'tap root'. The majority of the root system of any tree is in the surface 600mm of soil, extending radially in any direction for distances frequently in excess of the tree's height. Excavation or other works within this area are liable to damage the roots.

1.1 The Root System

The base of a trunk typically flares out in buttresses extending into the main lateral structural roots. These rapidly subdivide into the mass of smaller roots which serve to anchor the tree into the soil and transport water and nutrients. Even at a short distance (3m) from a large mature tree, most roots will be less than 10mm in diameter, but these may extend to well beyond the branch spread of the tree. A mass of fine roots, less than 1 mm in diameter, develop off all parts of this root system. These fine roots also absorb the water and nutrients, which are essential for the growth of the tree.

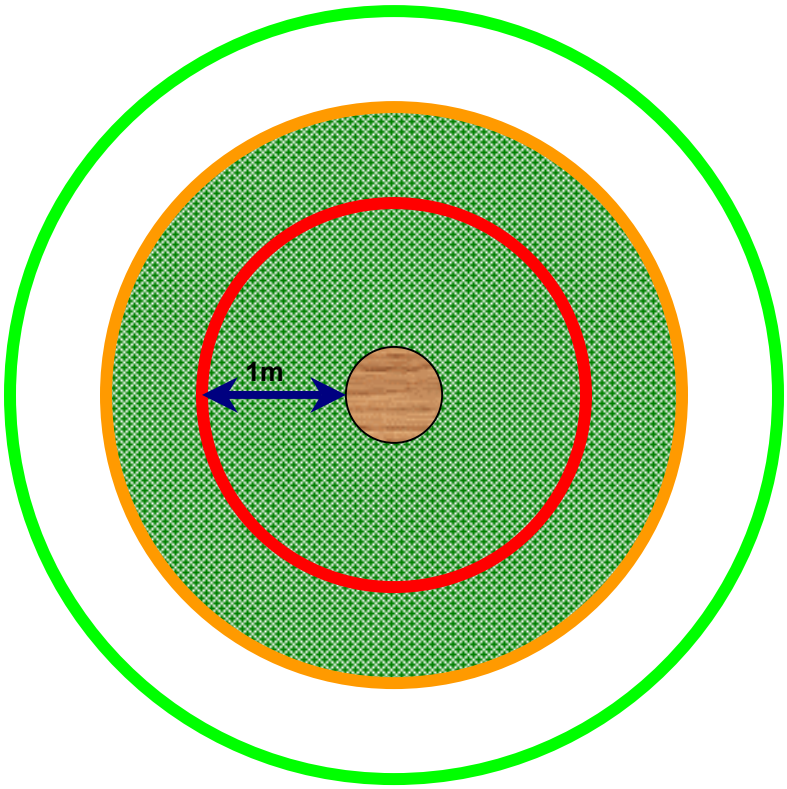
The main structural roots (close to the trunk) develop as the tree grows in response to the need for physical stability. Beyond these major roots growth is influenced by the availability of water, air and nutrients in the soil. Disturbance of soil provides ideal conditions for root growth. Apparatus is often cooler than the surrounding soil encouraging moisture within the soil to condense on its surface stimulating root growth close to the apparatus. For all these reasons root growth is often most prolific within the backfilled trench and in the soil around the apparatus.

There are certain areas around trees, illustrated in Figure 1 – 'Tree Protection Zone', where excavation either must not be undertaken or only undertaken under strict conditions in order to avoid or minimise any damage to a tree's root system.

For the purposes of this guideline document they are called zones;

- the Prohibited Zone (1m from the trunk)
- the Precautionary Zone (4 x the tree circumference)
- the Permitted Zone (outside of the Precautionary Zone)

FIGURE 1 – Tree Protection Zone



Key

Trunk of tree

Canopy or branch spread

PROHIBITED ZONE – 1m from trunk. Excavations of any kind must not be undertaken within this zone unless full consultation with the local authority Tree Officer is undertaken. Materials, plant and spoil must not be stored within this zone.

PRECAUTIONARY ZONE – 4 x tree circumference. Where excavations must be undertaken within this zone the use of mechanical excavation plant should be prohibited. Precautions should be undertaken to protect any exposed roots. Materials, plant and spoil should not be stored within this zone. Consult with the local authority Tree Officer if in any doubt.

PERMITTED ZONE – outside of the precautionary zone. Excavation works may be undertaken within this zone, however caution must be applied and the use of mechanical plant limited. Any exposed roots should be protected.

1.2 Below Ground

1.2.1 **Root systems can be damaged by;**

- the severance of a root, for example by trenching will destroy all parts of the root beyond that point. Even roots less than 10mm in diameter may be serving the fine roots over a wide area. The larger the root severed, the greater the impact on the tree.

Typical root damage caused by excavation works

- damage to the bark on the root. The bark protects the root from decay and is also essential for further root growth. It is loosely attached and easily damaged. If damage to the bark extends around the whole circumference the root beyond that point will be killed.

- damage to surface roots. Care must be taken when using mechanical plant. Materials and vehicles must never be stored within the Prohibited Zone and ideally should not be stored within the Precautionary Zone.

- compaction of the soil. Incidental compaction may occur from storage of materials and / or the passing of heavy equipment over the roots. This can restrict or even prevent gaseous diffusion through the soil, and thereby asphyxiate the roots. The roots must have oxygen for survival, growth and effective functioning.

Poor site management within the Precautionary Zone

- alterations in soil level. Lowering the level will strip out the mass of roots near the surface. Raising levels will have the same effect as soil compaction.

- the application of herbicide - frequently used to clear weed growth on operational land (e.g. substations). The wide-ranging root system of a tree may extend into the operational land and absorb herbicides, which have been applied to the ground. Herbicide absorbed in one part of the root system can kill the whole tree.

NOTE: The selection and application of herbicides must be undertaken by a competent person in accordance with Control of Substances Hazardous to Health (COSHH) regulations.

- spillage of oils or other materials (e.g. diesel oil, cement, resins). Spillage can permeate into the soil and damage root systems (see sub-section 4.3 – 'Chemical Damage to Trees').

1.2.2 **If roots are damaged;**

- close to the trunk. The anchorage and stability of the tree may be adversely affected rendering the tree immediately hazardous.

- anywhere along their length. The distal portion including the fine roots they serve, will be destroyed. Damage to fine roots by severance of a main root, or by compaction or alteration of ground levels, will prevent fine roots from absorbing the water and nutrients which are essential for the well-being, growth and anchorage of the tree.

- by successive excavations. Multi-utility excavations close to a tree can cumulatively damage a root system.

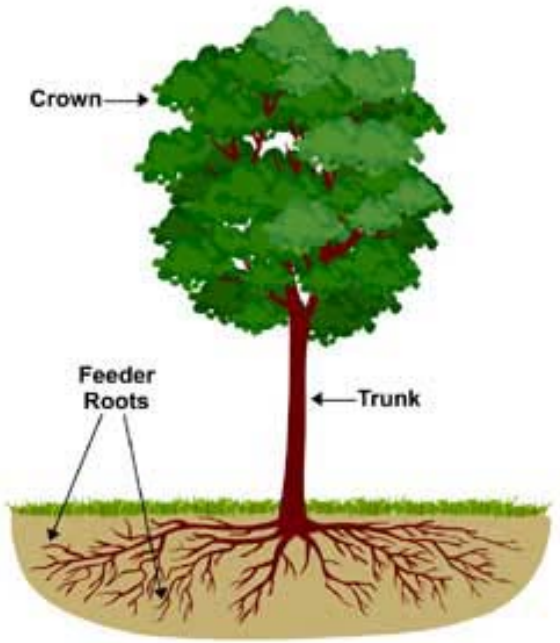


Figure 2 - Typical Tree Structure

1.2.3 **Symptoms**

Trees with damage may not show any immediate symptoms. Such symptoms may range from minor branch dieback to deterioration and ultimate death and collapse of the tree dependent on the severity of damage and the ability of the roots to regenerate.

If a root of 25mm diameter or over is severed, as a precautionary measure, a local authority tree officer / arboricultural officer should be contacted immediately.

1.3 Above Ground

Trees have a single or multi-stemmed trunk supporting a framework of branches and twigs. These structures are protected by a layer of bark, the purpose of which is to protect the functional tissues immediately beneath.

Trees can be damaged by:

- Direct impact by plant or machinery
- Fire and scorching.
- Poor pruning
- Abrasion by overhead apparatus
- Chemicals and fuel oils
- Storage of materials within the Prohibited and Precautionary Zones

1.3.1 **Abrasion**

The tree may be damaged by abrasion with overhead apparatus. Initially this only removes the outer bark. If the abrasion continues it can expose the underlying wood which may increase the risk of fire or eventual collapse of the branch or the tree.

If trees are growing in proximity to overhead apparatus it should be possible to prevent the development of problems by timely pruning and tree management. This requires knowledge of the growth pattern of the many different species of tree, consideration of the effects of the pruning on the appearance of the tree and application of the correct pruning techniques. All pruning should be in accordance with BS 3998 (see sub-section 8 – ‘Other Useful Publications’). All operatives should be authorised and competent.

For all works other than emergency or urgent works, notification and consultation with all interested parties is necessary before work commences (see section 5 – ‘How to Avoid Damage to Apparatus by Trees’).

1.3.2 **Permissions / Notifications**
Any work to trees adjacent to an area of operations that extends beyond what is absolutely necessary for operational requirements may require either written permission from the local planning authority (in respect to tree preservation orders) or six weeks' notification to the local planning authority (in respect to trees in conservation areas)(see also section 6 – 'Sites with Designated Status').

2. HOW APPARATUS IS DAMAGED

The positioning and type of underground apparatus are detailed in NJUG publication **Volume 1 – 'NJUG Guidelines on the Positioning and Colour Coding of Underground Utilities' Apparatus'.**

Construction methods and utility service materials are subject to change and any cluster of utility services is likely to consist of a variety of historic and modern materials constructed to various specifications. In general utility apparatus includes the following:

Pipes
Cables
Ducts
Chambers
Poles/Towers/Masts/Satellite dishes
Above ground installations

2.1 Below Ground

Underground apparatus (especially those less than 600mm deep) may be affected by tree roots. The risk will depend on the ability of the apparatus, in particular any joints, to resist or tolerate distortion.

2.1.1 **Direct damage**
Direct damage is caused by the annual increase in root thickness resulting in eventual contact with apparatus. However, it is usually either the root or the adjacent soil that will distort rather than the apparatus itself. The potential for damage depends on how much the root thickens and is greatest in the main structural roots within 3 metres of the tree. Roots may grow around an apparatus to form a sheath but this will rarely exert sufficient pressure to cause any damage. Surface wrappings inadequately attached to an apparatus, if non-toxic, may be colonised by roots and eventually lifted off.

2.1.2 **Indirect damage**

Indirect damage is restricted to shrinkable soils, mainly clays but also peat and some silts. Such soils shrink as they dry with the potential to distort any apparatus supported by the soil. Vegetation growing within the same area of soil may increase the drying effect.

The degree of the shrinkability of the soil will affect the amount of movement caused by drying and thus the potential for damage to occur. In situations where apparatus passes from a shrinkable soil into a rigid structure there is the possibility of extreme distortion taking place. Regular seasonal movement can also cause damage even in the absence of roots, particularly with short segmented pipes (see sub-section 3.1.4 – 'Shrinkable Soils').

2.1.3 **Root incursion**

Intact apparatus will not generally be penetrated by roots. However roots can exploit existing defects such as;

- defective pipe joints
- cracks in foul or surface water drains
- inadequate or degraded pointing of inspection chambers.

Where internal conditions are moist and aerated and therefore most conducive to root growth, root proliferation may occur and ultimately block the apparatus. If root thickening occurs where it passes into apparatus, root related enlargement of a defect may occur. This is unlikely at distances 3 metres or more from the trunk.

2.1.4 **Trees and Wind Movement**.

The potential for damage to apparatus close to a tree may increase due to movement of the lower trunk and a structural root as the tree sways in strong winds. Such movement may result in direct pressure being applied to the apparatus. Furthermore, if a tree is uprooted, any apparatus passing across or through the disturbed root plate may also be displaced. Such events are unlikely and are restricted to situations where apparatus is in close proximity to the trunk of the tree, but the potential may be increased if other structural roots are severed. Encasing apparatus in lean mix or course concrete can exacerbate this problem as fine roots may penetrate the material providing a greater 'hold' on the apparatus unless an appropriate root barrier material is used to separate the apparatus from the root system.

2.1.5 Mechanical Removal of Trees and Stumps

The mechanical removal of tree stumps by grinding or grubbing may disturb or damage apparatus passing across or through the root plate of the tree. Using a mechanical digger to uproot a tree scheduled for removal is very likely to damage apparatus within and also close to the Prohibited or Precautionary Zones as the roots will apply pressure to the apparatus as they are uprooted.

2.2 Above Ground

If overhead apparatus come into contact with trees they may be damaged as a result of:

- Abrasion when the tree and / or apparatus move in the wind bringing them into contact. The resultant abrasion can damage wires affecting their efficiency, strength and causing interference or loss of supply.

- The collapse of a branch or a whole tree which could bring down overhead lines.

3. PLANNING OF WORKS

The inherently variable nature of trees, and also the generally low incidence of damage to underground apparatus, makes it neither practical nor justifiable to impose absolute limits on the proximity of trees to apparatus. Therefore site specific liaison and agreement between the asset owner and other interested parties is essential.

With respect to overhead apparatus there are minimum established clearances which must be maintained. Details of these clearances can be obtained from the utility network operator.

Before new trees are planted the advice of a local authority tree officer or arboriculturist should be obtained.

3.1 Special Considerations when Planning the Installation of Underground Apparatus

3.1.1 New / Renewal of Apparatus - New Trees

In considering the location of new or renewed apparatus in conjunction with a new tree planting scheme early consultation is essential between the relevant