

Fitzalan High School (Existing Site),  
Lawrenny Avenue, Cardiff  
Tree Survey, Arboricultural Impact Assessment & Method Statement



For:  
**Cardiff City Council**

Based on an inspection  
carried out  
8<sup>th</sup> February 2023

By  
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Revision E



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Lawrenny Avenue, Cardiff

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*Plans:*

<i>Tree constraints plan – (drwg. no. 19/716/03A)</i>
<i>Tree protection plan – (drwg. no. 19/716/04E)</i>

## 1 Summary:

- 1.1 The following report was prepared at the instruction of Stride Treglown on behalf of Kier and concerns the school grounds at Fitzalan High School (Existing Site).
- 1.2 Tree Survey Summary: *Total number of trees to be removed*

BS5837:2012 Quality Category:	Total no. (Individual trees)	Total no. (Group trees)	Total no. (Woodland areas)
A – High	0	0	0
B – Moderate	1	0	0
C - Low	3	0	0
U - Poor	3	0	0
Total nos.	7	0	0

## 2 Introduction:

- 2.1 The report is based upon the findings of a survey carried out on 16<sup>th</sup> October 2020 & extended survey carried out on 8<sup>th</sup> February 2023 to assess the existing trees in terms of health, condition, form and overall significance within the local environment, the main objective being to assess the degree of constraint it represents with regard to the proposed development of the site. The methodology used is outlined in Appendix 1, while Appendix 2 sets out definitions of the terms used and codes used in the Tree Schedule.
- 2.2 Weather conditions were warm & sunny with adequate visibility for the purposes of this investigation. All inspections were made from ground level only: only those features apparent at the time of the inspection could be considered and no liability can be accepted regarding trees or their parts that were inaccessible or obscured in part or in whole.
- 2.3 It should be noted that, although the health and safety of the trees is part of the assessment methodology used, this report is intended for planning purposes only; it should not be construed as a tree risk assessment. Faults may be identified and recorded as part of this study but unless the trees in question represent a significant hazard under the existing site conditions, management recommendations will not normally be made. It remains the tree owner's responsibility to ensure the trees are managed appropriately: the assessor can accept no liability for damage or injury sustained as a result of the failure of any tree or its parts.
- 2.4 This report remains valid for a period of 3 years from the date the survey was carried out.

### **3 Inspection and General Observations:**

- 3.1 The survey area is as indicated on the accompanying tree constraints plan. This has been based upon the existing topographical survey provided by the client.
- 3.2 At the time of writing there are no tree preservation orders which apply to the site and it is not located within a designated Conservation Area.
- 3.3 The site consists of the existing school buildings, surrounding grounds and play areas with groups of trees along the front, southern boundary and along the eastern boundary.
- 3.4 The trees consist of formal planting of primarily category 'B' Norway maple, lime, walnut, sweet chestnut, hornbeam, weeping willow, Lombardy poplar and horse chestnut together with a number of category 'C' birch, ash, cherry and thorn.
- 3.5 There are two good specimen trees of Indian bean tree which have been classified as retention category 'A' trees.
- 3.6 There is one dead thorn (16) at the front of the school, an ash (34) and goat willow (35) which have been classified as a retention category 'U' trees.

### **4 Arboricultural Impact Assessment:**

- 4.1 The proposed demolition works and redevelopment of the eastern half of the site will provide a senior grass sports pitch, two Multi-Use Games Areas together with a 3m wide pedestrian and cycle highway, area for cycle parking and a swale for surface water drainage.
- 4.2 The proposed works would result in the removal of a mature category 'B' horse chestnut (12), together with three early-mature category 'C' hawthorns (28).
- 4.3 The cycle way/ footpath works will impact on a category 'C' cherry (11). The works will infringe into the 'nominal' RPA of the tree by 11%, however it is considered that this tree could be retained by off-setting the RPA north into the adjacent grassed area to accommodate the total rooting volume required.
- 4.4 A temporary footpath through the site is proposed to be constructed with a 2.4m high hoarding & Heras fencing being used as security barriers. The post holes for the hoarding will impact on the RPA's of an ash (4) and walnut (5). Posts are to be hand-dug within the RPA's of these trees with roots greater than 20mm being retained intact.
- 4.5 All other remaining trees will not be impacted by the proposed works and can be retained.
- 4.6 Retained trees will need to be protected by the provision of suitable barriers as outlined in the tree protection plan (revision D) and Appendix 2A (Type 1 barriers). This will ensure there are no excavations or ground disturbance within the root protection areas of trees to be retained.
- 4.7 Service runs where possible are to be located to avoid the root protection areas (RPA's) of all retained trees and any proposed earthworks for the development should not extend into the construction exclusion zones defined by the RPA's of the retained trees.

- 4.8 The loss of trees as a result of the proposed works will be mitigated by the planting of four new trees, an Indian bean tree (CaBi), two silver limes (TiTo) and a ginkgo (GiBi)- refer to Austin Smith Lord proposed tree planting plan (Drwg. No. FHS-ASL-ZZ-ZZ-DR-B-0013).

## **5 Arboricultural Method Statement:**

- 5.1 The following Arboricultural Method Statement (AMS) is based upon the findings the tree survey report, Tree Constraints Plan (revision A) and Tree Protection Plan (revision D). The method statement outlines the general principles to be applied when working within the root protection areas of the retained trees and hedgerows. The Method Statement should be further informed by any additional detailed proposals or amendments as and when information becomes available.
- 5.2 The Method Statement sets out how the pre-commencement tree works associated with this scheme are to be carried out minimising the damage caused to the trees. It includes details on how the works will be managed and how the retained trees will be protected during the works.
- 5.3 Copies of the AMS must be available for inspection on site and all personnel must be made aware of the following primary principles:
- The avoidance of damage to the aerial parts of retained trees (namely the trunk and root buttresses, branches and foliage).
  - The avoidance of direct physical damage to the root-systems of retained trees as a result of severance, abrasion, crushing etc.
  - The avoidance of indirect damage due to soil compaction, disturbance, contamination or other disruption in the areas around retained trees (serious compaction will result from a single passage of a vehicle, especially in wet conditions).
  - Maintaining free gaseous exchange between the upper layers of soil and the atmosphere with adequate (but not excessive) water supply to the soil.
- 5.4 Where required for the purposes of site clearance and access facilitation, pre-development tree work may be undertaken, with the agreement of the project arboriculturist and the local planning authority, before the installation of tree protection measures.
- 5.5 Care should be taken when planning site operations to ensure that plant can operate outside the construction exclusion zones and without coming into contact with any part of retained trees. Any transit of plant in close proximity to trees should be conducted under the supervision of a banksman to ensure that adequate clearance from trees is maintained at all times. Appropriate ground protection must be put in place where works are required within a designated protection area.
- 5.6 All tree work operations are to be carried out in accordance with the British Standard Recommendations for Tree Work, BS3998 (2010). Operations must also conform to all current health and safety legislation as well as to the Wildlife & Countryside Act 1981 and

subsequent legislation (with particular reference to the protection of nesting birds and to bats, which may commonly be found in trees).

- 5.7 A project arboriculturist shall be on call to advise on all matters relating to the care and protection of trees on and in the immediate vicinity of the construction area and inspect the setting out of the protective barriers once erected.
- 5.8 All operations shall be carried out in accordance with all additional relevant regulations and guidance, including:
- Working at height regulations 2005
  - Lifting operations & Lifting Equipment Regulations 1998
  - Provision & use of work equipment regulations 1998
  - National Joint Utilities Group (NJUG) 4 Guidelines 2007

## 6 Pre-Commencement Tree Works:

- 6.1 Tree work operations will be carried out prior to erection of the protective barriers in order to remove the dead/moribund category U trees (16, 34 & 35). Trees scheduled for removal to accommodate the works will also be removed (12 & 28). Operations are to be undertaken by suitably experienced and qualified arboricultural contractors working in accordance with current industry best practice as set out in BS3998:2010 (Tree Work: Recommendations).

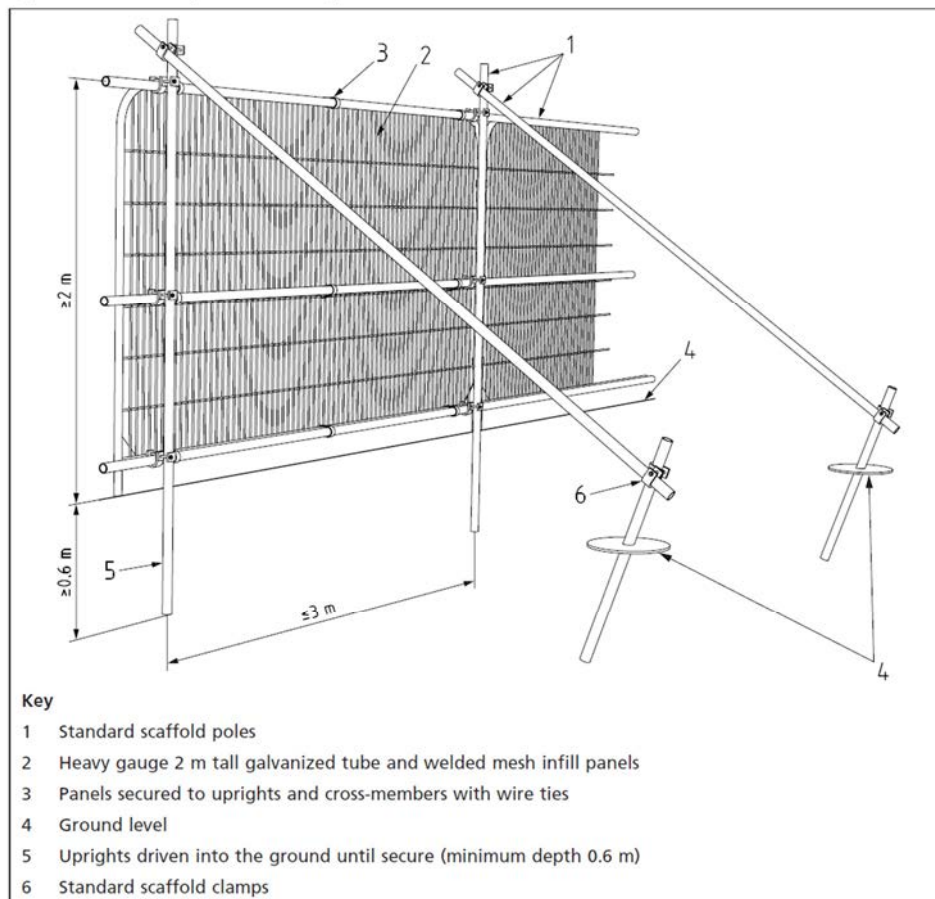
## 7 Demolition Work:

- 7.1 Where existing buildings and hard surfacing are scheduled for removal, care should be taken not to disturb tree roots that might be present beneath them. Stripping of hard surfacing should be undertaken using appropriate machinery, provided it is positioned on the existing hard surface and works backwards over the area, so that the machine is not moving over the exposed ground. Note that if a new hard surface is to be laid, it might be preferable to leave any existing sub-base in situ, augmenting it where required.

## 8 Tree Protection & Site Security Barriers:

- 8.1 A **CONSTRUCTION EXCLUSION ZONE** should be established around all trees intended for retention, based upon the Root Protection Areas (RPAs) of those trees. These zones should be adequately protected by both **Protective Barriers & Ground Protection** throughout the all demolition & construction process. The barriers shall be erected as indicated on the Tree Protection Plan (Dwg No: 19/716/04E) and conform to the specifications given below.
- 8.2 These barriers must be erected **before any materials or machinery are brought onto the site and before any development work or stripping of soil commences**. The project arboriculturist should confirm that barriers and ground protection have been erected and set out correctly prior to the commencement of other operations, and that they are fit for purpose. Where required, pre-development tree work may be undertaken before the installation of tree protection, with the agreement of the project arboriculturist and the local planning authority.

- 8.3 **Once erected, barriers and ground protection should be regarded as sacrosanct**, and should not be removed or altered without prior recommendation by the project arboriculturist and approval of the local planning authority. Special attention should be paid to ensure that barriers remain rigid and complete throughout the construction period.
- 8.4 Temporary barriers (Type 1 barrier) will be erected where protection is required. The panels should be securely joined together on a scaffold framework as illustrated below:



- 8.5 Warning notices: One weather proof sign (600 x 600mm min.) to be located at the site entrance stating **“Tree Protection Measures in force on this work site – obtain further details from the site manager on arrival”**. Weather proof signs (200 x 300mm min.) are to be fixed to the tree protection barriers stating clearly that there shall be no admittance into Construction Exclusion Zones.

## TREE PROTECTION AREA

### KEEP OUT!

THE FOLLOWING **MUST** BE OBSERVED BY ALL PERSONS:-

- THE PROTECTIVE FENCING MUST NOT BE REMOVED
- NO PERSON SHALL ENTER THE PROTECTED AREA
- NO MACHINE OR PLANT SHALL ENTER THE PROTECTED AREA
- NO MATERIALS SHALL BE STORED IN THE PROTECTED AREA
- NO SPOIL SHALL BE DEPOSITED IN THE PROTECTED AREA
- NO EXCAVATION SHALL OCCUR IN THE PROTECTED AREA

ANY INCURSION INTO THE PROTECTED AREA MUST BE WITH THE WRITTEN PERMISSION OF THE LOCAL PLANNING AUTHORITY

- 8.6 Security hoarding (2.4m high) will be constructed to enclose a temporary footpath through the site. Excavations for post holes within the RPA's of trees to be retained will be carried out by hand with any roots smaller than 20mm being carefully pruned back, preferably to a side branch, with secateurs or small pruning saw. Roots encountered over 20mm diameter should be retained avoiding damage to the protective bark covering on these larger roots. Exposed roots are to be temporarily wrapped in clean dry hessian to prevent desiccation and protect from frost and other rapid changes in temperature. The fencing posts should be placed to fit between the retained roots with concrete footings being poured into tough plastic bags to avoid concrete coming into contact with exposed roots. Where this is not possible consult with the arboriculturist, in order to assess the implications on the health & safety of the tree, before severing roots.

## 9 Ground Protection:

- 9.1 Where construction working space or temporary construction access is justified within the RPA, this should be facilitated by a set-back in the alignment of the tree protection barrier. In such areas, suitable existing hard surfacing that is not proposed for re-use as part of the finished design should be retained to act as temporary ground protection during construction, rather than being removed during demolition. The suitability of such surfacing for this purpose should be evaluated by the project arboriculturist and an engineer as appropriate.
- 9.2 Where the set-back of the tree protection barrier would expose unmade ground to construction damage, new temporary ground protection should be installed as part of the implementation of physical tree protection measures prior to work starting on site. Such temporary ground protection should be capable of supporting any traffic entering or using the site without being distorted or causing compaction of underlying soil.

Ground protection might comprise one of the following:

- a) *for pedestrian movements only, a single thickness of scaffold boards placed either on top of a driven scaffold frame, so as to form a suspended walkway, or on top of a compression-resistant layer (e.g. 100 mm depth of woodchip), laid onto a geotextile membrane;*
  - b) *for pedestrian-operated plant up to a gross weight of 2 t, proprietary, inter-linked ground protection boards placed on top of a compression-resistant layer (e.g. 150 mm depth of woodchip), laid onto a geotextile membrane;*
  - c) *for wheeled or tracked construction traffic exceeding 2 t gross weight, an alternative system (e.g. proprietary systems or pre-cast reinforced concrete slabs) to an engineering specification designed in conjunction with arboricultural advice, to accommodate the likely loading to which it will be subjected.*
- 9.3 In all cases, the objective should be to avoid compaction of the soil, which can arise from the single passage of a heavy vehicle, especially in wet conditions, so that tree root functions remain unimpaired.



## 10 Additional Protection Measures:

- 10.1 Materials that are likely to have an adverse effect on tree health (such as oil, bitumen or cement) will not be stored or discharged within 10 metres of the trunk of a tree that is to be retained. Attention must be paid to the slope of the land to ensure that contaminated materials do not flow towards the trees.
- 10.2 Where any mechanised plant has to be used within a root protection area or within the designated 'precautionary' area as indicated on the Tree Protection Plan (Dwg.no. 19/719/04D) it is to be the smallest practicable for the proposed works, with the lowest ground-pressure, tracked where possible (i.e. tracked barrows, tracked mini-digger).
- 10.3 No notice boards, telephone cables or other services shall be attached to any part of the tree. Fires will not be permitted within the root protection areas of trees to be retained.
- 10.4 **N.B. The site agent shall be required to notify the project arboriculturist of any incidents or events that affect or have the potential to affect the well-being of the trees, including the identification of significant roots (over 25mm diameter) exposed in excavation works.**
- 10.5 An initial meeting with the appointed site agent will be held to ensure that matters relating to the care and protection are fully understood. (See Arboricultural Supervision section below).

## 11 Compound Area & Storage of Materials:

- 11.1 Storage of materials and access routes for deliveries are to be sited to avoid unnecessary damage to tree roots. Siting of welfare facilities, storage areas and temporary contractors vehicle parking areas are to be located in agreed areas outside the RPA's of retained trees.
- 11.2 Locations for operations involving phytotoxic materials (cement mixing, fuel storage, herbicide etc) are to be located to avoid damage to retained trees by run-off from accidental spillages.

## 12 Arboricultural Supervision:

- 12.1 The project arboriculturist shall be on call to advise on all matters relating to the care and protection of trees on and in the immediate vicinity of the construction area.
- 12.2 An initial meeting with the appointed site agent will be held to ensure that matters relating to the care and protection are fully understood. Further visits shall be paid to monitor the ongoing work at various stages, including (provisionally):
  - To confirm the correct location and specification of tree protection barriers and ground protection measures.
  - During the periods when excavations are opened up and during demolition works within root protection areas.
  - As required during the program of construction.

- On completion, to sign off works.
- 12.3 It is anticipated that the project arboriculturist shall be available to advise on the treatment of tree roots at all stages where excavations are required within the RPA of any trees. It is also anticipated that a degree of flexibility of design must be allowed for in the construction of features in proximity to tree roots so that minor adaptations may be made if required as a result of the configuration of the tree roots exposed during the preparatory excavations.
- 12.4 The site agent shall be required to notify the consultant of any incidents or events that affect or have the potential to affect the well-being of the trees. This shall include the identification of significant roots exposed within the RPA's of retained trees during construction.
- 12.5 Provision for arboricultural site monitoring reports for all site inspections will be issued to the Local Planning Authority within one week of the inspection.

### **13 Existing tree schedule:**

- 13.1 *The table following overleaf provides details of all the trees surveyed; notes on the terms and abbreviations used can be found at Appendix 2 following the tree schedule:*

## TREE SCHEDULE

ID	Species	Stem No.	Trunk Diam (mm)	Height (m.)	Crown Spread (metres)				Clearance (metres)		Life stage	Health & Vigour	Structural Condition	Remaining useful life	Observations	Retention CATEGORY	Protection Radius (m)	RPA (m <sup>2</sup> )
					N	E	S	W	Mean	Lowest over site + Direction								
1	Lime	1	600#	14	3.5	4	3	3	2.5	-	M	Good	Good	40+	Suckers at base	Bi	7.2	163
2	Lime	1	780#	14	4	3.5	3	3.5	2.5	-	M	Good	Good	40+	Suckers at base	Bi	9.4	275
3	Birch	1	340#	12	1.5	1.5	1.5	1.5	2	-	M	Good	Good	20-40		Ci	4.1	52
4	Ash	1	810	16	4.5	5	5.5	5	3	-	M	Poor	Fair	10-20	Significant dieback	Ci	9.7	297
5	Walnut	1	580	12	6	5	4.5	5	3	-	M	Good	Good	40+		Bi	7.0	152
6	Sweet chestnut	1	435	10	4.5	1.5	4	3	2.5	-	M	Good	Good	40+		Bi	5.2	86
7	Birch	2	260	8	2	2.5	2	3	3	-	M	Good	Good	20-40		Ci	3.1	31
8	Ash	1	675	16	5.5	5	6	5	3.5	-	M	Poor	Fair	10-20	Ash dieback	Ci	8.1	206
9	Lime	1	670	16	3.5	3.5	4	4	2.5	-	M	Good	Good	40+		Bi	8.0	203
10	Cherry	1	480	8	6	4	4	5	2.5	-	M	Fair	Good	20-40		Ci	5.8	104
11	Cherry	1	380	6	2.5	3.5	2	2	2	-	M	Fair	Good	20-40		Ci	4.6	65
12	Horse chestnut	1	580	12	4.5	5.5	5.5	5	2	-	M	Good	Fair	20-40		Bi	7.0	152
13	Indian bean tree	1	730	10	6	5.5	4	4.5	2	1.5-N	M	Good	Good	40+		Ai	8.8	241
14	Hornbeam	1	520	12	4	3	4	2.5	2	-	M	Good	Good	40+	Fastigate	Bi	6.2	122
15	Thorn	1	195	3	2	2.5	1.5	2	1.5	-	M	Fair	Fair	10-20	Lean to east	Ci	2.3	17
16	Thorn	1	220	4	3	3	3	3	2	-	M	Dead	Poor	<10	Dead tree	U	2.6	-
17	Indian bean tree	1	645	10	5	4.5	3.5	3	2	1.5-N	M	Good	Good	40+		Ai	7.7	188

ID	Species	Stem No.	Trunk Diam (mm)	Height (m.)	Crown Spread (metres)				Clearance (metres)		Life stage	Health & Vigour	Structural Condition	Remaining useful life	Observations	Retention CATEGORY	Protection Radius (m)	RPA (m <sup>2</sup> )
					N	E	S	W	Mean	Lowest over site + Direction								
18	Thorn	1	320	7	3	3	3	3	2.5	-	M	Fair	Fair	10-20		Ci	3.8	46
19	Horse chestnut	1	690	12	4.5	5	5	4	1.5	-	M	Good	Good	20-40		Bi	8.3	215
20	Birch	1	530	16	3	4	3.5	3.5	2	-	M	Good	Good	20-40		Bi	6.4	127
21	Norway maple	1	590	12	5.5	5	4.5	5	2	-	M	Good	Good	40+		Bi	7.1	157
22	Ash	1	660	18	6	6	7	5	3.5	-	M	Good	Good	20-40		Bi	7.9	197
23	Ash	1	520	14	3	3	3.5	3	3	-	M	Good	Good	20-40		Bi	6.2	122
24	Norway maple	1	520	12	3	3.5	4	3	3	-	M	Good	Good	20-40		Bi	6.2	122
25	Norway maple	2	560	12	3.5	5	4.5	4	2	-	M	Good	Good	20-40		Bi	6.7	142
26	Norway maple	1	550	12	4.5	7	5	4	3.5	-	M	Good	Good	20-40		Bi	6.6	137
27	Norway maple	1	710	16	4.5	6	6	4	3.5	-	M	Good	Good	20-40		Bi	8.5	228
28	Thorn	1	190	4	1.5	1.5	1.5	1.5	2	-	M	Fair	Fair	10-20	Group of three small trees	Ci	2.3	16
29	Sycamore	1	610	16	6	6	5	6.5	3	2.5-N	M	Good	Good	40+		Bi	7.3	168
30	Norway maple	1	300	14	2.5	5.5	2.5	3	4	-	M	Good	Fair	10-20		Ci	3.6	41
31	Thorn	1	150	5	1.5	2	1.5	3	2	-	M	Fair	Fair	10-20		Ci	1.8	10
32	Thorn	1	275	7	3	3	4	4	3	-	M	Fair	Good	10-20		Ci	3.3	34
33	Norway maple	2	400	10	4	3.5	4.5	3.5	3	-	M	Good	Good	20-40	Located in raised brick planter, stem taper buried	Bi	4.8	72
34	Ash	1	290	8	2.5	3.5	3	2	3.5	-	EM	Poor	Fair	<10	Ash dieback	U	3.5	38
35	Goat willow	3	385	8	2	3	3.5	2.5	3	-	M	Poor	Poor	<10	Significant decay throughout stems & branches	U	4.6	67
36	Goat willow	2	520	10	4.5	7	4.5	2	3	-	M	Fair	Fair	10-20	Significant lean to the east, birdbox	Ci	6.2	122

ID	Species	Stem No.	Trunk Diam (mm)	Height (m.)	Crown Spread (metres)				Clearance (metres)		Life stage	Health & Vigour	Structural Condition	Remaining useful life	Observations	Retention CATEGORY	Protection Radius (m)	RPA (m <sup>2</sup> )
					N	E	S	W	Mean	Lowest over site + Direction								
37	Field maple	1	265	7	3	3.5	2	1.5	2.5	-	M	Fair	Fair	10-20	Birdbox	Ci	3.2	32
38	Amelanchier	m/s	220#	4	1.5	1.5	1.5	1.5	1	-	EM	Good	Good	10-20		Ci	2.6	22
39	Lombardy poplar	1	800	23	2	2	2	2	4	-	M	Good	Fair	20-40	Ivy	Bii	9.6	290
40	Lombardy poplar	1	670	23	2	2	2	2	4	-	M	Good	Fair	20-40		Bii	8.0	203
41	Lombardy poplar	1	670	23	2	2	2	2	4	-	M	Good	Fair	20-40	Ivy	Bii	8.0	203
42	Lombardy poplar	1	760	23	2	2	2	2	4	-	M	Good	Fair	20-40		Bii	9.1	261
43	Weeping willow	1	600	17	9	3	3.5	3	3	-	M	Good	Fair	10-20	Twin stemmed from 3.0m, historic branch shedding, tear wound	Bii	7.2	163
44	Ash	1	540	16	6	5	2.5	4.5	4	3-N	M	Good	Good	20-40	Four stemmed from 2.5m	Bii	6.5	132
45	Ash	1	565	16	6	8	6.5	1.5	3	-	M	Good	Good	20-40	Twin stemmed from 2.5m	Bii	6.8	144
46	Alder	1	380	10	4	4	4	4	3	2.5	M	Good	Good	20-40	Ivy	Bii	4.6	65
47	Birch	1	270	6	2	2	2	2	1.5	-	EM	Good	Good	20-40		Cii	3.2	33
48	Alder	1	210	4	3.5	1.5	1	2	1.5	-	EM	Fair	Fair	10-20		Cii	2.5	20
49	Oak	1	205	7	1.5	1.5	3	1	2	-	EM	Fair	Fair	10-20		Cii	2.5	19
50	Lawson cypress	2	480	6	2.5	2.5	2.5	2.5	1.5	-	EM	Good	Good	10-20		Cii	5.8	104
51	Leyland cypress	1	530	10	3.5 x 3.5m				2	-	EM	Good	Good	10-20	Ivy	Cii	6.4	127
52	Leyland cypress	1	320	10	3.5 x 3.5m				2	-	EM	Good	Good	10-20	Ivy	Cii	3.8	46
53	Leyland cypress	1	370	10	3.5 x 3.5m				2	-	EM	Good	Good	10-20	Ivy	Cii	4.4	62
54	Leyland cypress	1	380	10	3.5 x 3.5m				2	-	EM	Good	Good	10-20	Ivy	Cii	4.6	65

ID	Species	Stem No.	Trunk Diam (mm)	Height (m.)	Crown Spread (metres)				Clearance (metres)		Life stage	Health & Vigour	Structural Condition	Remaining useful life	Observations	Retention CATEGORY	Protection Radius (m)	RPA (m <sup>2</sup> )
					N	E	S	W	Mean	Lowest over site + Direction								
55	Leyland cypress	1	400	10	3.5 x 3.5m				2	-	EM	Good	Good	10-20	Ivy	Cii	4.8	72
56	Leyland cypress	1	310	10	3.5 x 3.5m				2	-	EM	Good	Good	10-20	Ivy	Cii	3.7	43
57	Leyland cypress	1	400	10	3.5 x 3.5m				2	-	EM	Good	Good	10-20	Ivy	Cii	4.8	72
58	Leyland cypress	1	430	10	3.5 x 3.5m				2	-	EM	Good	Good	10-20	Ivy	Cii	5.2	84
59	Leyland cypress	1	420	10	3.5 x 3.5m				2	-	EM	Good	Good	10-20	Ivy	Cii	5.0	80
60	Leyland cypress	1	300	10	3.5 x 3.5m				2	-	EM	Good	Good	10-20	Ivy	Cii	3.6	41
61	Leyland cypress	1	560	10	3.5 x 3.5m				2	-	EM	Good	Good	10-20	Ivy	Cii	6.7	142
62	Birch	1	495	12	4	4.5	4.5	3.5	2.5	-	M	Good	Good	20-40		Bi	5.9	111

# Estimated tree diameter

*Details of the Terms & Abbreviations used are provided in Appendices*

## APPENDIX 1: Methodology

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- The report has been framed as an 'Arboricultural Constraints Report', as defined in BS5837:2012 - *Trees in relation to design, demolition & construction-Recommendations*. Its purpose is to set out and to quantify the degree of constraint offered by existing tree cover with regard to any development or alteration in land-use that may be proposed and is intended to be used to inform feasibility studies and design options. As such it reflects the conditions *as they existed at the time of our inspections*: no account has been taken of any specific development proposals, although it has been assumed that certain unspecified alterations in site usage patterns are likely to occur, which are likely to result in an increase in site occupancy levels. Additional arboricultural input may be required at subsequent stages of design, planning and implementation in relation to the assessment & management of possible arboricultural impacts.
- The survey parameters are as set out in BS5837:2012 and based on the findings each tree or group is allocated to one of four 'Retention Categories' (see Appendix 2, p2). The factors taken into account in categorising the trees include their overall arboricultural quality, their general health and structural stability, their likely useful life-expectancy, their significance to the local landscape and general public amenity value, the degree to which they provide wildlife habitat and enhance local biodiversity and any other social or cultural values that they may embody.
- Also integral to the methodology of BS5837 is the calculation of **Root Protection Areas (RPAs)** for each of the trees in question. The RPA is defined as a "*layout design tool indicating the minimum area around a tree 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.*"
- It should be noted that in most cases the plan accompanying this report will show the *nominal* RPAs of the trees, indicated as circles centred upon the tree of a radius such that they enclose an area equal to the relevant RPA. In practice the distribution of roots around a tree will frequently prove to be uneven due to the presence of a variety of constraining influences. These may be physical barriers such as existing foundations etc, or the existence of localised soil conditions inhospitable to root growth, such as waterlogging or soil compaction. Conversely, soil conditions may be particularly *conducive* to root development in one quarter and this might also lead to an asymmetric distribution of roots around the tree. However in most cases the nominal circular areas as indicated will provide a reasonable guide as to where special measures will be required to protect tree roots and preserve good soil condition.
- The RPAs of the trees will provide the basis for defining **Construction Exclusion Zones (CEZs)**, these being areas around all of those trees intended to be retained where access should be prevented throughout the entire process of site preparation and construction. In certain cases the CEZ will exceed the size of the RPA in order to accommodate the aerial parts of wide-spreading trees.
- Access within the CEZ should be prevented through the erection of barriers, constructed in accordance with BS5837:2012. Where access within an RPA is unavoidable, appropriate ground protection should be installed. Outline details of the design of suitable barriers and ground protection are given in Appendices A & B. These protection measures should be put in place prior to any site clearance or construction work commencing on the site and they should remain *in situ* until all works have been completed. Some activities within the CEZs may be acceptable but should not be put in hand until appropriate arboricultural advice has been sought.

## APPENDIX 2: Terms & Definitions (including codes & abbreviations used in Tree Schedule)

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The **DIMENSIONS** Taken are:

- **STEM-No.** indicates the number of main stems (i.e. whether the trunk divides at or below 1.5m; (Used in the calculation of RPA.) “m-s” = Multi-stemmed.
- **DIAMETER** (in centimetres), obtained from the girth measured at approx.1.5m. For trees with 2 to 5 sub-stems, a notional figure is derived from the sum of their cross-sectional areas. For multi-stemmed trees the notional diameter may be estimated on the basis of the average stem size x the number of stems. (A notional diameter may be estimated where measurement is not possible.)
- **HEIGHT**, estimated and expressed in metres.
- The **CROWN SPREAD** is expressed in terms of the crown radii estimated at the four cardinal points (or as otherwise specified) and given in metres.
- **CLEARANCES** are indicated as an estimate of the *mean, overall* height of the canopy above ground level with an additional figure for the height above ground of the *lowest significant branch* within the site, together with the direction of its growth.

**LIFE STAGE** is defined as follows:

- P** recently Planted; sapling: A tree that is still establishing and which would be relatively easy to replace or even transplant. Likely to be vulnerable to damage from (e.g.) strimmers, mowing equipment, drought, vandals, etc. (Easily replaced thus a negligible constraint).
- Y** Young, establishing trees. Should be growing fast, usually primarily increasing in height more than spread, but as yet making limited impact upon the landscape.
- EM** Early-mature. Established young trees, normally of good vigour and still increasing in height, but beginning to spread laterally. Beginning to make an impact upon the local landscape & environment.
- M** Mature: Well-established trees, still growing with some vigour, but tending to fill out and increase spread. Bark may be beginning to crack & fissure. In the middle half of their safe, useful life-expectancies.
- LM** Late-Mature: In full maturity. Still retaining some vigour but growth slowing.
- O** Old: Fully mature with vigour declining. Likely to possess features that could be regarded as potential faults, such as large, ponderous branches, old wounds etc. etc., but also likely to be of high amenity value.
- A** Ancient: Old trees can survive for very many years with healthy growth continuing although the tree may be of low vigour. Crown size usually becomes reduced, either through natural branch-loss or through management (e.g. pollarding). Decay is usually present. Such trees may embody certain hazards but they are also likely to be of considerable conservation value (i.e. “Veteran” trees).

**HEALTH & VIGOUR:** Essentially a snapshot of the general health of the tree based upon its general appearance, its apparent vigour and the presence or absence of symptoms associated with poor health, physiological stress etc. (Fungal infections may be recorded here but *decay giving rise to structural weakness* would be recorded under ‘Structural Condition’ – see next parameter):

- Good** no significant health issues.
- Fair** indications of slight stress or minor disease (e.g. the presence of minor dieback/deadwood or of epicormic shoot growth)
- Poor** Significant stress or disease noted; larger areas of dieback than above
- Bad** Severe decline; widespread dieback and/or severe stress; life-threatening disease.
- Dead** (or Moribund)

**STRUCTURAL CONDITION:** Defects affecting the structural stability of the tree, including decay, significant dead wood, root-plate instability or significant damage to structural roots, weak forks (e.g. those where bark is included between the members) etc. etc. Classified as:

- Good** No obvious structural defects: basically sound
- Fair** Minor, potential or incipient defects
- Poor** Significant defect(s) likely to lead to actual failure in the medium to long-term
- Bad** Defects liable to cause significant failure in the short term, or to lead to a major or total collapse in the foreseeable future
- Severe** Tree that has already suffered or is at imminent risk of a major collapse.



## APPENDIX 2: Terms & Definitions (including codes & abbreviations used in Tree Schedule)

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**REMAINING USEFUL LIFE EXPECTANCY:** An estimate of the length of time in years that a tree might be expected to continue to make a useful contribution to the locality at an acceptable level of risk (based on an assumption of continued routine maintenance)

V - less than 10 years	S - 10+ years
M - 20+ years	L - 40+ years

**RETENTION CATEGORY:** Trees are classed as category **U, A, B** or **C**, based on criteria given in BS5837:2012; summary definitions as follow (see BS5837 for further details). Categories A, B and C are further characterised by the use of sub-categories, which attempt to identify what aspect of the tree is the main source of its perceived value:

(i) **arboricultural** qualities (ii) **landscape** qualities and (iii) **cultural, historic or ecological/conservation** qualities. Examples of these qualities for each of the three categories are given below, although these are indicative only.

Note: *This is NOT a health and safety classification; the classification does not take into account any requirement for remedial tree care or ongoing maintenance apart from that which may affect the trees' general suitability for retention.*

**U** **UNSUITABLE (red)** Trees likely to prove to be unsuitable for retention for longer than 10 years should any significant increase in site usage arise as a result of development.

Dead or moribund trees; those at risk of collapse or in terminal decline;; trees that will be left unstable by other essential works such as the removal of nearby category U trees; trees infected by pathogens that could materially affect other trees; low quality trees that are suppressing better specimens

(Category U trees may have conservation values which it might be desirable to preserve.

It may also include trees that should be removed irrespective of *any* development proposals.)

**A** **HIGH QUALITY (green)** Trees or groups whose retention should be given a particularly high priority within the design process. Normally with an expected useful life-expectancy of at least 40 years.

(i) *Notably fine specimens; rare or unusual specimens; essential component trees within groups, semi-formal or formal plantings (e.g. dominant trees within an avenue etc.)*

(ii) *Trees, groups or woodlands of particular visual importance as landscape features.*

(iii) *Trees, groups or woodlands of particular significance by virtue of their conservation, historical, commemorative or other value (e.g. veteran trees or wood pasture.)*

**B** **MODERATE QUALITY (blue)**: Trees or groups of some importance with a likely useful life-expectancy in excess of 20 years. Their retention would be highly desirable; selective removal of certain individuals may be acceptable, but only after full consideration of all alternative courses of action.

(i) *Fair quality but not exceptional; good specimens showing some impairment (e.g. remediable defects, minor storm damage or poor past management.)*

(ii) *Acceptable trees situated such as to have little visual impact within the wider locality. Also numbers of trees, perhaps in groups or woodlands, whose value as landscape features is greater collectively than would warrant as individuals (such that the selective removal of an individual would not impact greatly upon the trees' overall, collective value).*

(iii) *Trees, groups or woodlands with clearly identifiable conservation or other cultural benefits.*

**C** **MINOR VALUE (grey)**: Trees or groups of rather low quality, although potentially capable of retention for at least approx. 10 years. Also small trees below 15cm diam.

Potentially retainable, but not of sufficient value to be regarded as a significant planning constraint.

(i) *Unremarkable trees of very limited merit or of significantly impaired condition.*

(ii) *Trees offering only low or short-term landscape benefits; also secondary specimens within groups or woodlands whose loss would not significantly diminish their landscape value.*

(iii) *Trees with extremely limited conservation or other cultural benefit.*

**ROOT PROTECTION AREA (RPA):** *This is the area in square metres formed by a circle of radius (the Protection Radius) twelve times the actual or notional stem diameter of the tree (see 'Diameter', above). The RPA represents the minimum area deemed to contain sufficient roots & soil to maintain the tree's viability. It is the basis whereby the layout of the Construction Exclusion Zone (CEZ) is determined, which should encompass an area equal to the RPA, although its form may be adapted in the light of arboricultural considerations and pre-existing physical constraints. The CEZ should be protected by sturdy temporary fencing (see BS5837:2012) throughout the entire process of site preparation and construction.*

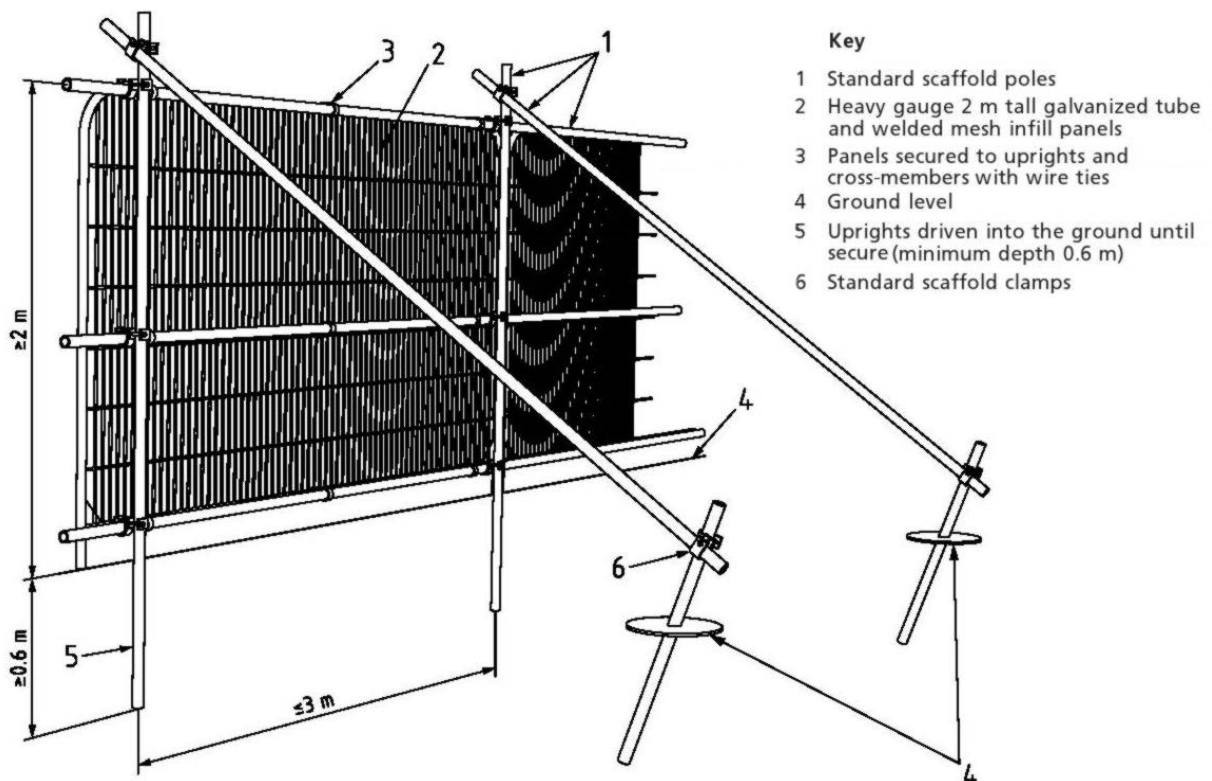
## APPENDIX 3: The Protection of Trees on Demolition & Construction Sites:

A **CONSTRUCTION EXCLUSION ZONE** should be established around all trees intended for retention, based upon the Root Protection Areas (RPAs) of those trees. These zones should be adequately protected by appropriately designed **Protective Barriers & Ground Protection** throughout the all demolition & construction processes.

### A: PROTECTIVE BARRIERS

- Vertical barriers should be erected and ground protection installed **before any materials or machinery are brought onto the site and before any demolition, development or stripping of soil commences**. Areas of new or retained structure planting should be similarly protected, based on the extent of the soft landscaping as shown on the approved drawings. The project arboriculturist should confirm that barriers and ground protection have been erected and set out correctly prior to the commencement of other operations, and that they are fit for purpose
- Where required, pre-development tree work may be undertaken before the installation of tree protection, with the agreement of the project arboriculturist and the local planning authority.
- **Once erected, barriers and ground protection should be regarded as sacrosanct**, and should not be removed or altered without prior recommendation by the project arboriculturist and approval of the local planning authority.
- Barriers should be fit for the purpose of excluding construction activity and appropriate to the degree and proximity of work taking place around the retained tree(s). On all sites, special attention should be paid to ensuring that barriers remain rigid and complete.
- In most cases, barriers should consist of a scaffold framework in accordance with the illustration below, comprising a vertical and horizontal framework, well braced to resist impacts, with vertical poles spaced at a maximum interval of 3m. Onto this, weldmesh panels should be securely fixed.

#### Default specification for protective barrier (Type 1)



- Where driven vertical poles are impractical due to the likelihood of causing damage to tree roots or to underground services, above-ground stabilizing systems may be specified.
- Alternative specifications may be acceptable but should be specified in conjunction with the project arboriculturist but they must always ensure an adequate degree of protection for the conditions likely to obtain on site. Weldmesh panels on rubber or concrete feet (Type 2 barrier) may be sufficient where protection is only required from pedestrians, cars, vans and manually operated plant, but in such cases the panels should be securely joined together using a minimum of two anti-tamper couplers, installed so that they can only be removed from inside the fence. The panels should be supported on the inner side by stabilizer struts. Timber post and sheep net fencing 1.1m high (Type 3 barriers) may be used in instances where deemed acceptable in low risk areas.

### **B: GROUND PROTECTION**

- Where construction working space or temporary construction access is justified within the RPA, this should be facilitated by a set-back in the alignment of the tree protection barrier. In such areas, suitable existing hard surfacing that is not proposed for re-use as part of the finished design should be retained to act as temporary ground protection during construction, rather than being removed during demolition. The suitability of such surfacing for this purpose should be evaluated by the project arboriculturist and an engineer as appropriate
- However, where the set-back of the tree protection barrier would expose unmade ground to construction damage, new temporary ground protection should be installed as part of the implementation of physical tree protection measures prior to work starting on site. Such temporary ground protection should be capable of supporting any traffic entering or using the site without being distorted or causing compaction of underlying soil.
- The ground protection might comprise one of the following:
  - d) *for pedestrian movements only, a single thickness of scaffold boards placed either on top of a driven scaffold frame, so as to form a suspended walkway, or on top of a compression-resistant layer (e.g. 100 mm depth of woodchip), laid onto a geotextile membrane;*
  - e) *for pedestrian-operated plant up to a gross weight of 2 t, proprietary, inter-linked ground protection boards placed on top of a compression-resistant layer (e.g. 150 mm depth of woodchip), laid onto a geotextile membrane;*
  - f) *for wheeled or tracked construction traffic exceeding 2 t gross weight, an alternative system (e.g. proprietary systems or pre-cast reinforced concrete slabs) to an engineering specification designed in conjunction with arboricultural advice, to accommodate the likely loading to which it will be subjected.*
- In all cases, the objective should be to avoid compaction of the soil, which can arise from the single passage of a heavy vehicle, especially in wet conditions, so that tree root functions remain unimpaired.

### **C: ADDITIONAL PRECAUTIONS OUTSIDE THE EXCLUSION ZONE:**

- Once the exclusion zone has been protected by barriers and/or ground protection, construction work can commence. All weather notices should be erected on the barrier with words such as:

**Construction exclusion zone – NO ACCESS**

In addition the following should be addressed or avoided.

- Care should be taken when planning site operations to ensure that wide or tall loads, or plant with booms, jibs and counterweights (including drilling and piling rigs) can operate without coming into contact with retained trees. Such contact can result in serious damage to them and might make their safe retention impossible. Consequently, any transit or traverse of plant in close proximity to trees should be conducted under the supervision of a banksman to ensure that adequate clearance from trees is maintained at all times. In some circumstances it may be impossible to maintain adequate clearance thus necessitating access facilitation pruning. Local Planning Authority consent for such pruning may be required.
- Material which will contaminate the soil, e.g. concrete mixings, diesel oil and vehicle washings, should not be discharged within 10 m of the tree stem.
- Fires should be avoided on sites if at all possible. Where they are unavoidable they must not be lit in a position where heat could affect the trunk, branches or foliage of any tree. The size of the fire and the wind direction should be taken into account, and fires must be attended at all times.
- Notice boards, telephone cables or other services should not be attached to any part of the tree.
- It is essential that allowance should be made for the slope of the ground so that damaging materials such as concrete washings, mortar or diesel oil cannot run towards trees..

## APPENDIX 3: The Protection of Trees on Demolition & Construction Sites:

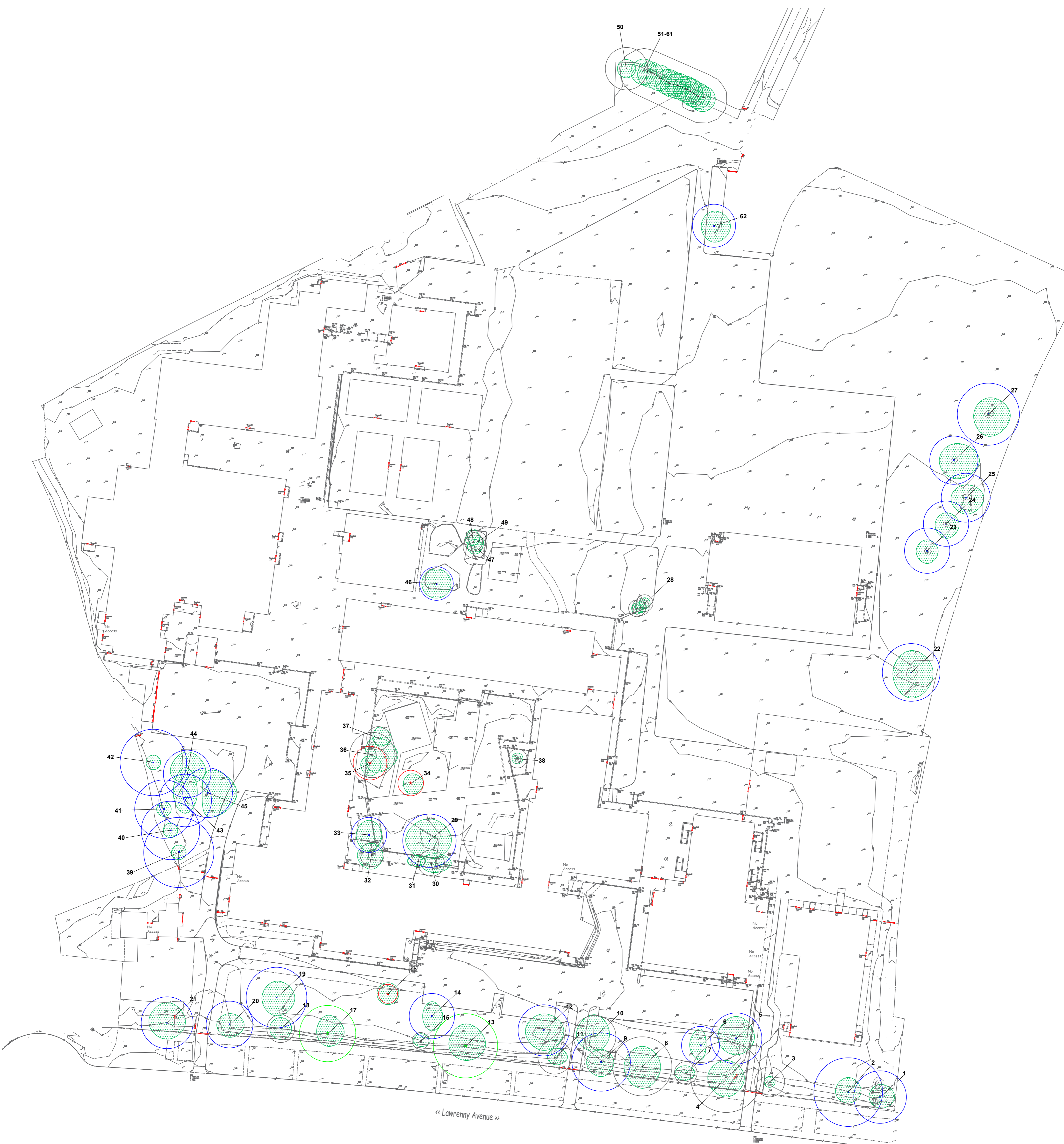
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### D: ROADS, DRIVEWAYS AND PATHS NEAR TREES (including outline notes on 3-dimensional 'Cellular Confinement' load-support systems)

1. The overriding principles to be adhered to in the design of hard surfaces near trees are:  
(i) the preservation of the character of the soil in a form no more compacted or otherwise disturbed, disrupted or contaminated than it is at present; (ii) to maintain gaseous exchange between the upper layers of soil and the atmosphere; (iii) to ensure adequate (but not excessive) water supply to the soil; and (iv) the avoidance of damage to retained trees as a result of root severance, crushing or abrasion.
2. Tree roots are concentrated in the upper metre of the soil, with the great majority 300-600 mm below the soil surface. Beyond 3 or 4 metres from the trunk most of the roots are small in diameter and not readily apparent as originating from trees. They are nevertheless vital to the tree's well-being, as well as being very easily damaged by even rather shallow soil disturbance, such as may be required in establishing a path or driveway.
3. Wherever possible paths etc should be routed well outside the Root Protection Area (RPA), when problems should not arise. Note, however, that the position of a path or road on a layout plan may indicate the surface only: *Allowance must be made for any kerbing, and the footing into which kerbs will be set, when considering possible conflicts between trees and nearby paths, roadways etc.*
4. Where there is no alternative other than for such a route to impinge upon the RPA of a tree, the possibility of damage can be significantly reduced through the use of No-Dig techniques, where an adequately load-bearing sub-base and hard-wearing surface is established over existing roots without them being disturbed. A variety of techniques are available including three-dimensional cellular confinement systems<sup>1</sup>. Alternatively, piles, pads or elevated beams can be used to support surfaces to bridge over the RPA or, following exploratory investigations to determine location, to provide support within the RPA while allowing the retention of roots greater than 25 mm in diameter. The design of all such systems should be specified in liaison with the project arboriculturist.
5. Temporary haul roads must be similarly designed and specified, taking into account the extra loading that is likely to be imposed by construction traffic. Where proposed *permanent* new surfaces will be used for construction access, it is essential that this extra loading and wear is taken into account during the design process. A temporary sacrificial wearing surface may be required for the duration of construction activity.
6. Wherever possible, new surfaces should permit the percolation of moisture into the soil and allow free gaseous exchange. Suitable permeable wearing course include washed gravel (either loose or in laid gravel-retention grids, but note that self-binding gravels and 'hoggin' is NOT suitable) or paving slabs or block pavers with built-in infiltration spaces. These must be laid dry-jointed, bedded onto a free-draining sub-base such as sharp sand or coarse, no-fines aggregate. Porous asphalt and resin-bonded gravels will provide good porosity initially but will eventually become blocked by fines and should be laid following the principles used for impermeable surfaces (see below).
7. New permanent impermeable hard surfacing should not exceed 20% of any existing un-surfaced ground within the RPA. The hard surface should be resistant to or tolerant of deformation by tree roots, and should be set back from the stem of the tree and its above-ground root buttressing by a minimum of 500 mm to allow for growth and movement. Resulting gaps may be filled using appropriate inert granular material.
8. Prior to and during installation, the soil structure in the area beneath the proposed new surfacing must be protected from compaction, using temporary ground protection where necessary (see appendix 2B). During installation the new surface should be "rolled out", using machinery working forward from the surface as it is constructed.
9. If it proves necessary, existing surface vegetation should be killed using an appropriate herbicide that will not leach into the soil and will not affect tree roots. All herbicides must be applied strictly in accordance with the manufacturer's instructions.
10. The soil should not be skimmed to reduce ground levels. However loose organic matter and/or turf should be removed carefully, using hand tools. If the surface needs to be levelled or raised, this should be achieved using a suitable granular fill material (e.g. no-fines gravel, washed aggregate etc.)

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<sup>1</sup> Suppliers of suitable proprietary products include Geosynthetics ('CellWeb') and Terram ('Geocell') and Greenfix ('Geoweb')

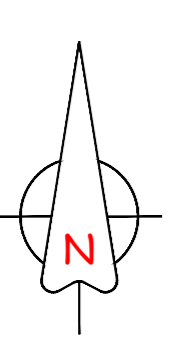


**KEY**

Trees are indicated by symbols below, colour coded to indicate their 'Retention Categories'.

- ★ Category U (defective, negligible or redundant trees)
- Category A (high retention value)
- Category B (moderate retention value)
- ▲ Category C (low retention value)
- ⊙ APPROXIMATE crown spread of individual trees

The nominal ROOT PROTECTION AREA (RPA) of each tree is indicated by a solid line using the colour coding above



All dimensions must be checked on site and not scaled from this drawing.

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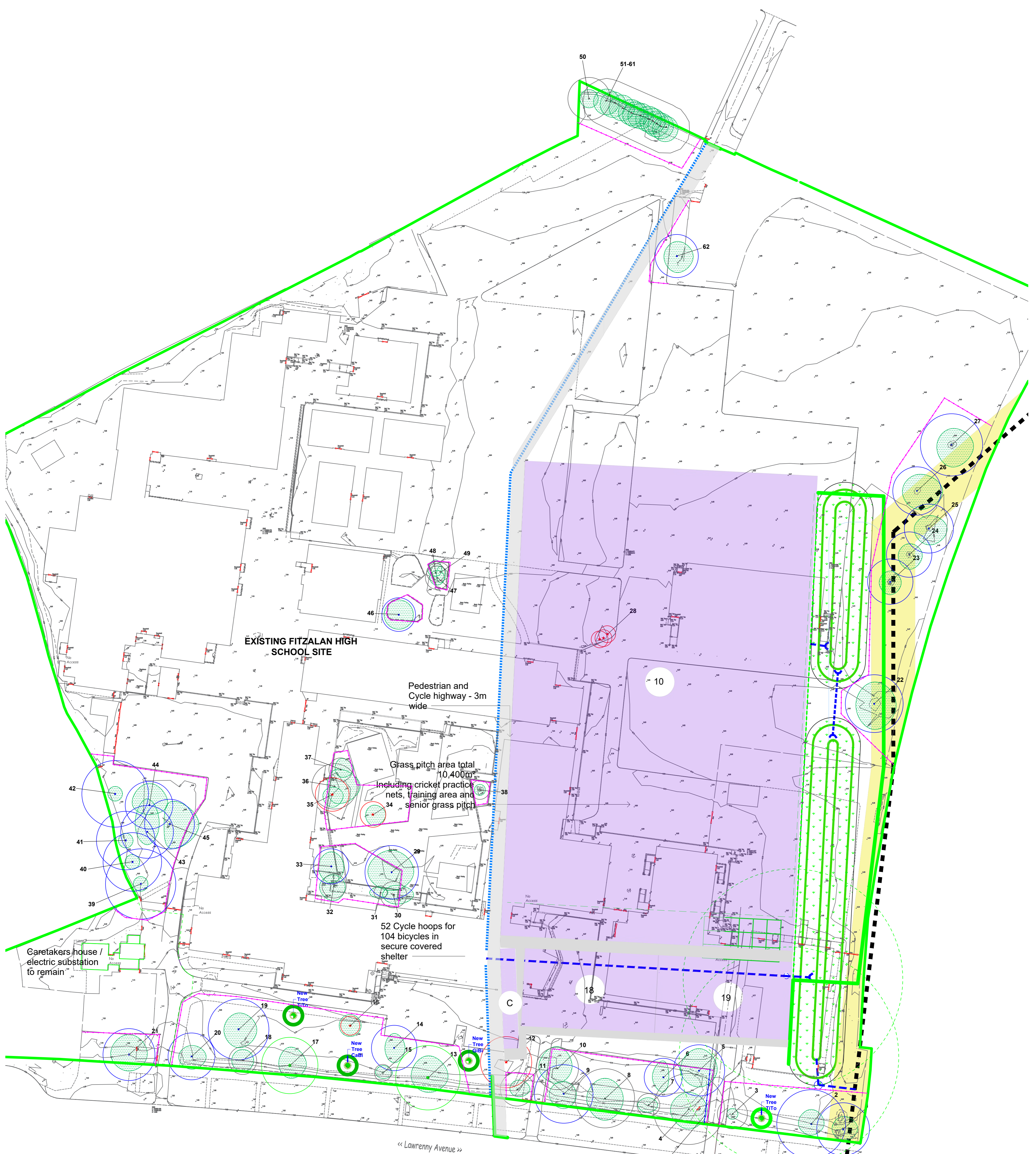
**MACKLEY DAVIES ASSOCIATES LTD**  
 Ffynnon yr Eirin . Crickhowell Road. Gilwern  
 Abergavenny . NP7 0EH . 01873 831796 .  
 wyn@mackleydaves.co.uk

SITE  
 Fitzalan High School (Existing Site),  
 Lawrenny Avenue, Cardiff

CLIENT  
 Kier






DRAWING TITLE  
**Tree Constraints Plan**

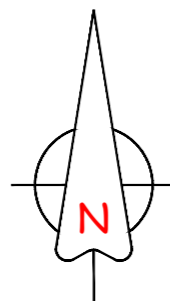
SCALE	1:500 @ A1	Job No.	19/716/03
DATE	October 2020	REVISION No.	A



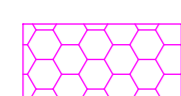


**KEY**

Trees are indicated by symbols below, colour coded to indicate their 'Retention Categories'.

-  Trees to be removed
-  Category A (to be retained)
-  Category B (to be retained)
-  Category C (to be retained)
-  Existing canopy



-  Line of protective fence (temporary barrier)
-  Line of 2.4m high hoarding (temporary barrier)  
Posts holes to be hand-dug within the RPA's
-  Area of 'No-dig' construction

The nominal ROOT PROTECTION AREA (RPA) of each tree is indicated by a solid line using the colour coding above.

Line of 2.4m high hoarding

All dimensions must be checked on site scaled from this drawing.

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wyn@mackleydaves.co.uk

SITE

Fitzalan High School (Existing Site),  
Lawrenny Avenue, Cardiff

CLIENT

Kier

DRAWING TITLE

**Tree Protection Plan**

SCALE	1:500 @ A1	Job No.	19/716/04
DATE	February 2023	REVISION No.	E