



Horticulture & Arboriculture Ltd.

Arboricultural Assessment, Arboricultural Impact and Tree Protection Strategy Report

Tack site,
Sandyford Business Park,
Dublin 18

Project No.	TTAC001	Date	21/03/22
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Arboricultural Assessment

1.1 Client Brief & Methodology

CMK Hort + Arb Ltd. were commissioned by Sandyford Environmental Construction Ltd. to undertake an arboricultural assessment of trees on a site located inside the lands located between the intersection of Ravens Rock road and Carmanhall road at Sandyford Business Park, Dublin 18. The fieldwork was undertaken on the 9th of March 2022.

The survey methodology and documentation follow the recommendations contained within BS 5837 (2012). The analysis of the trees was undertaken using the VTA methodology as developed by Mattheck and Breloer (1994).



Image 1. Site overview with red line outline of survey boundary located at Ravens Rock Road, Sandyford Business Park, Dublin 18.

1.2. General description of trees

A total of 7 individual trees were identified and assessed with a further 58 identified as part of groups (G8-15)

In addition 10 trees on open public lands were located and measured for root and canopy intrusion into the site (PUB 1-10). These were all found to be in good condition (image 4).

The condition of the individually assessed trees within the site is generally moderate to good; with a relatively high spread within categories A and B (table 1).

The highest value trees are the mature oak (*Quercus robur*) and beech (*Fagus sylvatica*) located in the north-west corner of the surveyed site (image 2). The condition and categorisation of individual trees is contained within section 5 of this report and with locations shown on drawing TTAC001 101.

Trees that have been given group descriptions provide screening to the southern and eastern site boundaries (images 5&7). These are generally of poorer condition and predominantly consist of birch (*Betula pendula*), which due to closely spaced planting exhibit drawn/extended form.

Located within the south-western corner of the survey boundary are a group (G13) of mature alder (*Alnus spp.*). These

Category	Number	% of total
A	2	28.6%
B	4	57.2%
C	1	14.2%
U	0	0%

Table 1. Tree Category breakdown of individually assessed trees (see page 8 for tree category explanations).

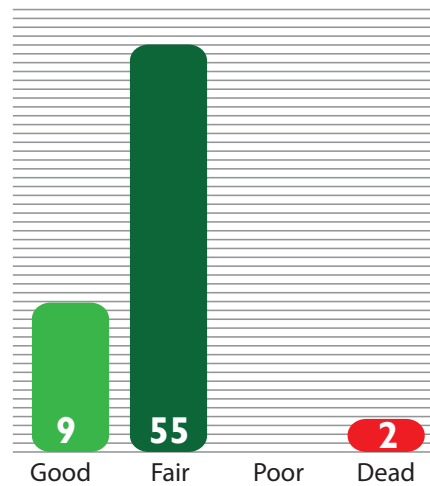


Chart 1. Tree vigour breakdown.

suffer due to close planting and are drawn up with reduced crown cover as a result. Due to potential from windthrow, these trees should only be considered for retention as part of a group (image 5).

The southern site boundary chiefly features young birch (*Betula pendula*) with occasional self-seeded sycamore (*Acer pseudoplatanus*) and more mature alder (image 8).

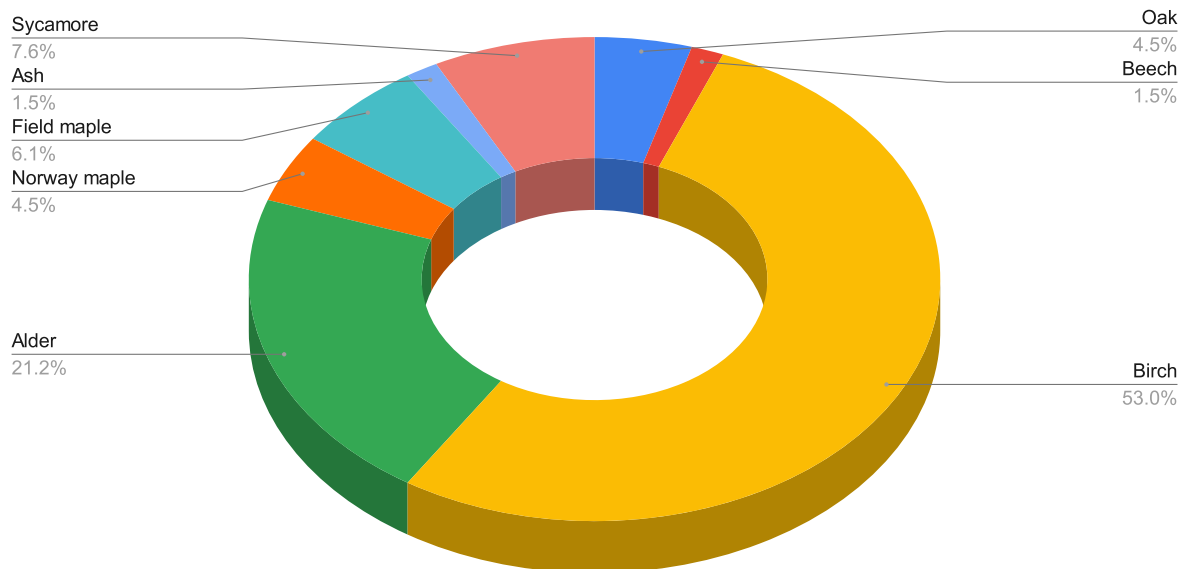


Chart 2. Tree species breakdown (excludes public street trees).



Image 2. Oak #1 shown right in the foreground.



Image 3. Bark damage with associated decay on oak #2.



Image 4. Public street trees outside the northern boundary of the site on a grass verge adjacent to Carmanhall road..



Image 5. Mature alder #G13 in the south-west corner of the site.



Image 6. Young and early mature birch (#5 & #7) in the north-east corner of the site.



Image 7. Juvenile birch, young self seeded sycamore and alder #G14 & G15 screen the southern boundary with Mercury House.



Image 8. Birch #G8 screening the eastern site boundary.

Section 2. Arboricultural Impact and Mitigation

2.1 Arboricultural Impact

The direct impact of the proposed development will necessitate the removal of tree groups #G8-G15 including individually assessed trees #5-7 and #11. These groups provide screening to Mercury House to the south and the adjacent Ravens Rock road. The loss of these trees is not considered particularly significant as they have reduced life expectancy due to their poor form. The mature alder (#G13) being the most pronounced example.

The installation of underground services required to service the site, located outside the site's perimeter will necessitate the removal of a public street tree (PUB10). Additional public street trees (PUB 1, 8 & 9) will require removal to accommodate proposed vehicle entrances on Ravens Rock and Carmanhall Roads.

The retention of the mature oak and beech (#1-4) through design accommodations in the proposed plan is welcomed, as these trees represent the highest value specimens within the site and indeed within the surrounding business Park. Within this space is proposed a pocket park containing a compacted gravel pathway that will be constructed using a no-dig method so as to mitigate impact on roots.

The impact on trees is shown on drawing TTAK001 102.

2.2 Mitigation

NMP Landscape Architects have submitted a comprehensive landscape plan as part of the planning package. This outlines planting to mitigate for the removal of existing trees (refer to appendix II for planting schedule).

Mitigating the loss of existing trees will take time, however the younger age profile of trees being removed and the size specifications of the proposed replacement tree stock should reduce this time period significantly.

To reduce the impact of construction activity, it is recommended to use tree root protection matting (such as Rola-Trac[™] mats; refer to p24) south of trees #1-4. This matting should remain in place for the initial construction phase and removed only for the landscaping phase (refer to drawing TTAC001 103 for locations).

The construction of the proposed apartments south (block 'B') is likely to have an impact on roots for the mature oak tree #4. To avoid any severe impact on these roots it is recommended that building excavation be constrained if possible to 1m north of the proposed northern wall for block b.

A methodology for managing trees during construction is contained within section 3 of this report with the locations of tree protection fencing and protective matting shown on drawing TTAC001 103.

Section 3. Tree Protection Strategy

This section is designed to outline the procedures which will be undertaken to effectively retain trees free from adverse construction impacts for the duration of the construction period on the site of proposed development at Tack site, Sandyford Business Park, Dublin 18. The section is divided into sub-sections which begin at the pre-construction planning stage and follows on to post construction re-assessment of retained trees.

3.1 Key issues

Appointment of an arborist (Site Arborist) to oversee all works relevant to trees.

Scheduling of tree and construction works.

Establishment of tree protection (refer to drawings Tree Protection TTAC001 103).

Monitoring of tree protection (adherence to the Tree Protection Code of Practice).

Supervision of works in the vicinity of trees.

Post construction re-assessment of retained trees.

3.2. Consulting Arborist

A Site Arborist shall be appointed prior to the commencement of site construction works and will be responsible for the setting up and monitoring of tree protection, liaising with local authority tree / planning officers and providing feedback and advice to the design construction teams on issues relevant to trees. The Site Arborist shall be retained for the duration of construction works and should be appointed to carry out a post-construction tree survey/assessment.

3.3 Scheduling of works

3.3.1 Pre-construction meetings/tree works

- An onsite meeting will be held if required, with all relevant parties; including the Developer and or his Agents, Site Arborist and Local Planning Authority
- Remedial works to trees throughout the site where indicated as necessary within the Tree Works Schedule. All works will be undertaken to BS 3998 2010 Tree Work and/or to current best practice.
- Erection of tree protection fencing as per recommendations contained within BS 5837:2012 Trees in relation to design, demolition and construction -Recommendations. Tree protection to be erected under supervision of Site Arborist prior to main construction works being undertake on site (refer to drawings Tree Protection TTAC001 103).

3.3.2 Construction period

- The Site Arborist shall monitor tree protection.
- The Site Arborist shall specify any necessary remedial works to trees which may arise due to construction works.
- The Main Contractor shall carry out any instructions made by the Site Arborist with regard to the protection of retained trees and ensure where necessary that these instructions are followed by any sub-contractors.

4.3.3 Post construction works will consist of:

- Re-survey of retained trees and the implementation of measures contained with the survey document.

3.4 Preservation of Trees

3.4.1 Contractors obligations

The Contractor shall take all precautions to ensure that any trees which are not required to be taken down under the contract shall remain undisturbed and undamaged. All works to trees and all operations adjacent to trees should be undertaken in accordance with the Code of Practice. The Contractor must appoint a qualified arboricultural contractor to undertake all tree works subject to approval by the Consulting Arborist. The Contractor shall undertake no works to trees unless instructed by the Contract Administrator. All works on or within the Construction Exclusion Zone are to be supervised by the site arborist. Five working days notice of intention to undertake works to be given.

3.4.2 Setting out: Protected Tree Zone/Construction Exclusion Zone

The tree protection zone shall be set out in accordance with the Code of Practice (5) and as per drawings Tree Protection TTAC001 103. A notice 'Construction Exclusion Zone' shall be placed on tree protection fencing at regular intervals along the protective fencing. This notice shall include contact details for the Site Arborist. Strictly no access should be permitted to this zone unless instructed by the Site Arborist.

The Contractor is to maintain the protective fencing in good condition to the satisfaction of the Site Arborist for the duration of the contract. Any damage to fencing is to be reported to the Site Arborist immediately. Damaged fencing is to be repaired within 2 hours of the damage occurring. All works within the vicinity of the damaged fencing are to be suspended until the fencing is repaired.

3.4.3 Maintenance of Protected Tree Zone

The Site Arborist should be given 5 days notice of any works within or access required to this zone. The 'Protected Tree Zone' should under no circumstances be used for storage of materials, equipment, or site debris. No fires should be lit within the "Protected Tree Zone", or equipment washed or cleaned.

3.5. Code of Practice for the preservation of trees

The following specification is intended for the preservation of trees.

These guidelines will help sustain vigour and minimise adverse growing conditions for trees set out for retention.

3.5.1 Code of Practice notifications

The Code of Practice will be brought to the attention of all site personnel including those of the Main Contractor, Sub-Contractors and Engineering Specialists associated with the project.

All operations to be in accordance with BS 5837:2012 Trees in relation to design, demolition and construction -Recommendations.

The Contractor should purchase and make available on site a copy of the above

3.5.2 The Site Arborist:

- Supervise the installation of tree protection fencing.
- Supervise all tree works and assess on-going tree protection.
- Liaise with the relevant authorities during the project.
- Constantly monitor the project with regard to tree health to ensure that no damage is caused to the subject trees during the operational works.
- Report any negligent damage to trees which will prejudice their health.
- Monitor, where necessary, all works carried out by the Arboricultural Contractor and Main Contractor within the 'Protected Tree Zone'.

3.5.3 Arboricultural Contractor:

- Submit a full method statement containing machinery to be used, removal of wood etc. to the Site Arborist.
- Carry out works to the most up to date arboricultural practices available e.g. BS 3998. Recommendations for tree work (as amended).
- Undertake work only with suitably qualified operatives in constant consultation with the Site Arborist.
- Trees identified for removal will be section felled in wooded areas so as not to damage remaining trees.

3.5.4 Main Contractor:

- Appoint a member of staff to be responsible for tree protection and this person shall be the point of contact between the Main Contractor and the Site Arborist.
- Undertake all work in accordance with this specification.
- Ensure that all personnel, operatives, sub-contractors etc. are aware of this specification and operate accordingly
- Notify the Site Arborist of any potential conflicts that may affect the health, vigour and viability of trees.

3.5.5 Access:

Access to the site and service roads shall be agreed with the Site Arborist prior to commencement of works. Where it is deemed necessary for heavy machinery access the contractor shall refer to the guidelines within BS 5837 2012 and liaise with the Site Arborist to instigate the most appropriate root protection system.

3.6 Post Construction

A post construction report on the condition of trees should be undertaken and all recommendations made within this report should be carried out to BS3998 Tree Works.

Examples of above-ground stabilizing systems

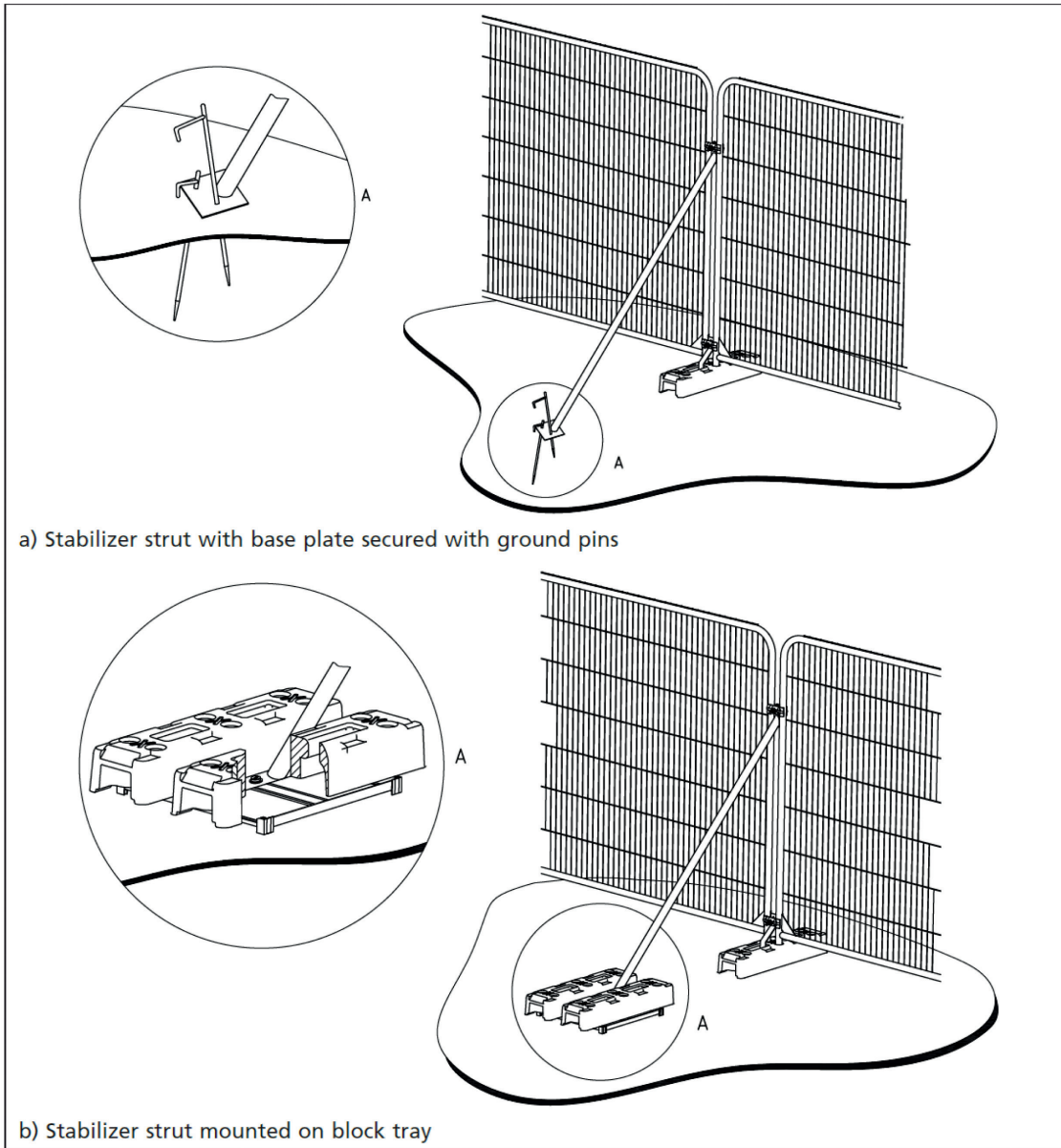


Image 9. Tree Protection Detail (Heras type fencing or similar approved).

4. Limitations of Survey

This survey should be regarded as a preliminary assessment of the trees and deals with the current condition as identified during this survey only.

Every attempt was made to identify hazardous trees in this report however this survey was carried out from the ground and therefore cannot be held to have identified elements of decay which may be hidden out of sight within the crown or beneath ivy or other obstructions. To counter this limitation in the survey process it is vital that during tree works any additional defects found by the climbing arborist are communicated to the consulting arborist to allow appropriate action to be taken.

The details within this survey are based on the condition of the trees during the survey period only. The findings in this survey cannot be held to be valid after any site disturbance, man-made or natural, which may have an adverse effect on any trees present.

5. Relevant legislation

There are no Tree Protection Orders (TPOs) on any of the trees on this site. However unless planning permission which clearly identifies trees for removal has been granted then under Section 7 of the Forestry Act 2014 a person wishing to fell trees must apply to the minister for a licence to do so.

Exempted trees: Section 19 states that the requirement for a felling licence for the uprooting or cutting down of trees does not apply where:

- The tree in question is standing in an urban area
- The tree is considered dangerous and hazardous.
- The tree is within 10m of a public road and regarded as hazardous
- The tree in question is less than 100 ft./30m from a dwelling other than a wall or temporary structure;
- The tree in question is a hazel, apple, plum, damson, pear, or cherry tree grown for the value of its fruit or any ozier;

Other exceptions apply in the case of local authority road construction, road safety and electricity supply operations.

The Act is administered by the Forest Service (Department of Agriculture, Fisheries and Food). The Felling Section of the Forest Service is based in Johnstown Castle, Co. Wexford (053-9160200 or 1890-200223).

If any queries arise re tree felling in general it is recommended that advice is sought from Felling Section of the Forest Service or the local forestry development officer for further information.

No Special Areas of Conservation (SACs) are in effect on the surveyed site or surrounding area.

Bats

Trees may contain bats. Bats are afforded legal protection under Irish and EU legislation and agreements (Wildlife Act (1976), Wildlife (Amendment) Act (2000), S.I. No. 94 of 1997 and S.I. No. 378 OF 2005 implementing the EU Habitats Directive, Bonn Convention (The Convention on the Conservation of Migratory Species of Wild Animal) and the Bern Convention (Convention on the Conservation of European Wildlife and Natural Habitats).

Trees provide roosting opportunities for bats. Mature trees are the most likely to have potential as roost sites. This may be provided by cavities, crevices, limb fractures, storm damage or mechanical damage and may even be by way of loose bark. Felling of mature trees and even surgery to large limbs may place bats at risk and both procedures remove roosting sites for bats.

Professional advice from a licenced surveyor should be sought prior to any works commencing on trees.

6. Terminology

Tree categories

A	Trees of high quality and value due to their size, age, condition, historical/visual merit and/or conservation potential (a minimum of 40 years).
A1	Mainly arboricultural values. Particularly good examples of species, essential components of groups or of formal or semi-formal arboricultural features.
A2	Mainly landscape values. Trees, groups or woodlands which provide a definite screening or softening effects to the locality in relation to views into or out of site, or those of particular visual importance.
A3	Mainly cultural values, including conservation. Trees, groups or woodlands of significant conservation, historical, comparative or other value (e.g. veteran trees or wood-pasture).
B	Trees of moderate quality and value (a minimum of 20 years).
B1	Mainly arboricultural values. Trees that might be included in high categories but are downgraded because of impaired condition (e.g. presence of remedial defects including unsympathetic past management and minor storm damage)
B2	Mainly landscape values. Trees present in numbers, usually as groups or woodlands, such that they form distinct landscape features, thereby attracting a higher collective rating than they might as individuals but which are not, individually, essential components of formal or semi-formal features (e.g. trees of moderate quality within an avenue that includes better A category specimens) or trees situated internally to the site, therefore individually having little visual impact on the wider locality.
B3	Mainly cultural values including conservation. Trees with clearly identifiable conservation or other cultural benefits.
C	Trees of low quality and value (a minimum of 10 years).
C1	Not qualifying in higher categories
C2	Trees present in groups or woodlands but without conferring on them greater landscape value and/or trees offering low or only temporary screening benefit.
C3	Trees with very limited conservation or other cultural benefits.
U	Trees in such 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 that are dead, dying or showing immediate and irreversible decline.

Terminology (cont.)

Comments: Refers to the tree's condition and suitability for the site.

Common name: Most widely used non botanical name.

Co-dominant: Two branches assuming the role of leading shoots. When growing close together may form a weak attachment (included bark) at their point of contact. Trees with this defect may be in danger of splitting at this weak attachment.

Crown Spread: Measured in metres north, east, south, and west.

Decay fungi: Refers to those species of fungi which degrade living wood and which may, depending on the degree of degradation, render the tree structurally unsound.

Defects: Refers to cracks, storm damage and any other damage mechanical or biological.

Diameter: Diameter of the trunk (millimetres) at 1.5m. M.S. after the measurement refers to the tree being multi-stemmed.

Genus & Species: Refers to the botanical names for the tree.

Height: Measured in metres.

Monitor: Refers to trees which need to be re-surveyed on a yearly basis to assess their condition. This timescale may be sooner where works or adverse weather conditions have impacted negatively on the trees.

Overhaul: A reference to standard tree surgery work which consists of the removal of deadwood, crossing branches and balancing where appropriate.

Recommendations: Indicates surgery work necessary for the retention or, where necessary, removal of the tree.

Tree No.: Refers to numbered tag fixed to tree during survey.

7. INDIVIDUAL TREE SCHEDULE

Tag Number	Species	Vigour	Age class	Category	Comments	Recommendations	Long Term Potential	DBH (mm)	Height (metre)	Crown spread NESW (metre)	Clear Stem (metre)
1	Pedunculate oak <i>Quercus robur</i>	Good	Early Mature	A2	Located in north west corner of survey boundary. Single stemmed. Minor dead wood in lower canopy north 3.5m. Slightly drawn up with canopy suppressed east due to local competition. Crown relativity well formed. No visible defects.	Dead wood	20-30	690	19	5.5;4;6;5	1s
2	Pedunculate oak <i>Quercus robur</i>	Fair	Early Mature	C2	Sub-dominant and drawn up as a result. Bark loss south at 1.5m with extensive decay.	Fell	<10	500	N/A	N/A	N/A
3	Beech <i>Fagus sylvatica</i>	Good	Early Mature	B2	Growth predominantly north east due to loss of co-dominant stem south east at 1.75m. A shallow cavity has developed at this point. Though unlikely to limit the long term potential.	Monitor cavity	15-20	660	17	6;6;4;5	2e
4	Pedunculate oak <i>Quercus robur</i>	Good	Early Mature	A2	Single stemmed with a well developed canopy. No visible defects.	No action necessary	30-40	620	17	5.5;5.5;6;4	2s
5	Birch <i>Betula pendula</i>	Good	Early Mature	B2	Located 0.5m east of main building. Tall and well developed. No visible defects.	No action necessary	15-20	230	15	2;2;2;1.5	2w
6	Alder <i>Alnus</i> spp.	Good	Mature	B2	Located on the eastern site survey boundary. Well formed. Light ivy covering lower canopy. No defects visible.	No action necessary	20-30	580	16.5	3;4;3;4	3.5s
7	Birch <i>Betula pendula</i>	Good	Early Mature	B2	Located 0.5m east of central site structure. Tall and well developed. No visible defects.	No action necessary	15-20	190	14	0.5;3;2;1	2.5e
G8	Birch <i>Betula pendula</i>	Fair	Young	C2	Tree group; located on eastern site survey boundary. Planted to screen the site in a 20m line of 10 young birch. These are covered with heavy ivy. Their condition is generally poor due to close competition.	No action necessary	10-15	210	9	1;1;1;1	2n
G9	Norway maple <i>Acer platanoides</i>	Dead	Young	U	Tree group; 3 dead Norway maple. Bark loss west. In a state of decline.	Fell	0	190 avg	8	2;2;2;2	2.5w
G10	Field maple <i>Acer campestre</i>	Good	Young	B2	Tree group; 4 young field maple on the eastern site survey boundary. Spaced 2m apart on an elevated grass verge.	No action necessary	20-30	130 avg	4.5	2;2;2;2	1n
11	Ash <i>Fraxinus excelsior</i>	Good	Young	C2	Located on eastern site survey boundary on the side of an embankment. Well formed with no visible defects.	No action necessary	10-15	240	8	3.5;4;3;3	1n
G12	Birch <i>Betula pendula</i>	Fair	Mature	B2/C2	Located on eastern site survey boundary on the side of an embankment. A group of 4 birch which are relatively well developed with one category C specimen which has become over grown with ivy.	Remove ivy	10-15	210 avg	7-9	2;2;2;2	2n

7. INDIVIDUAL TREE ASSESSMENT

Tag Number	Species	Vigour	Age class	Category	Comments	Recommendations	Long Term Potential	DBH (mm)	Height (metre)	Crown spread NESW (metre)	Clear Stem (metre)
G13	Alder <i>Alnus</i> spp.	Good	Mature	C2	Tree group; 9 mature alder planted in a 6x6m area in the south-west corner of the site survey area. Drawn up due to competition from close planting. Suitable for retention only as part of a group.	No action necessary	15-20	480	13.5	3;3;3;3	5e
G14	Alder <i>Alnus</i> spp.	Fair	Early Mature	C2	Tree group; 4 early mature alder on the southern site survey boundary. Screening the site from Mercury house south.	No action necessary	15-20	280	9	2;2;1;2	3s
G15	Birch <i>Betula pendula</i> Sycamore <i>Acer pseudoplatanus</i>	Fair	Early Mature	C2	A 55 metre line of birch with occasional sycamore that screens the site from Mercury house on the southern boundary.	No action necessary	10-15	180	7	1;1;1;1	NA
Road side trees located on open public lands											
PUB 1	Norway maple <i>Acer platanoides</i>	Good	Early Mature	B2	Located 3.5m outside the eastern site survey boundary. No visible defects.	N/A	20-30	380	8	4;3;3;3	
PUB 2	Norway maple <i>Acer platanoides</i>	Good	Early Mature	B2	Located 3.5m outside the eastern site survey boundary. No visible defects.	N/A	20-30	300	8.5	3;3;5;4;3	
PUB 3	Norway maple <i>Acer platanoides</i>	Good	Early Mature	B2	Located 3.5m outside the eastern site survey boundary. No visible defects.	N/A	20-30	410	12	4;4;4;4	
PUB 4	Norway maple <i>Acer platanoides</i>	Good	Early Mature	B2	Located on grass verge 3m north of survey boundary. No visible defects.	N/A	20-30	310	11	4;5;3;2	
PUB 5	Norway maple <i>Acer platanoides</i>	Good	Early Mature	B2	Located on grass verge 3m north of survey boundary. No visible defects.	N/A	20-30	340	12	4;3;5;3;3;5	
PUB 6	Norway maple <i>Acer platanoides</i>	Good	Early Mature	B2	Located on grass verge 3m north of survey boundary. No visible defects.	N/A	20-30	320	10	4;3;4;3	
PUB 7	Silver maple <i>Acer saccharinum</i>	Good	Young	C2	Located on grass verge 3m north of survey boundary. No visible defects.	N/A	20-30	190	7	3;2;3;5;2	
PUB 8	Silver maple <i>Acer saccharinum</i>	Good	Young	C2	Located on grass verge 3m north of survey boundary. No visible defects.	N/A	20-30	220	8	3;3;1;3	
PUB 9	Norway maple <i>Acer platanoides</i>	Good	Young	C2	Located on grass verge 3m north of survey boundary. No visible defects.	N/A	20-30	220	9	2;2;2;1;5	
PUB 10	Small leaf lime <i>Tilia cordata</i>	Good	Young	C2	Located north of Carmanhall road with a 3m grass verge. No visible defects.	N/A	20-30	190	7.5	2.5;2;2;2	

BS 5837 (2012). Trees in Relation to Design Demolition and Construction

Mattheck and Breloer (1994). The body language of trees

Appendix 1: Arboricultural Method Statement

This section gives general guidance on methods of work to minimise damage to trees. The local authority (or for privately owned trees, the owner or their agent), should be consulted at an early stage prior to the commencement of any works. This will reduce the potential for future conflict between trees and works.

1.1 Below Ground

Wherever trees are present, precautions should be taken to minimise damage to their root systems. As the shape of the root system is unpredictable, there should be control and supervision of any works, particularly if this involves excavating through the surface 600mm, where the majority of roots develop.

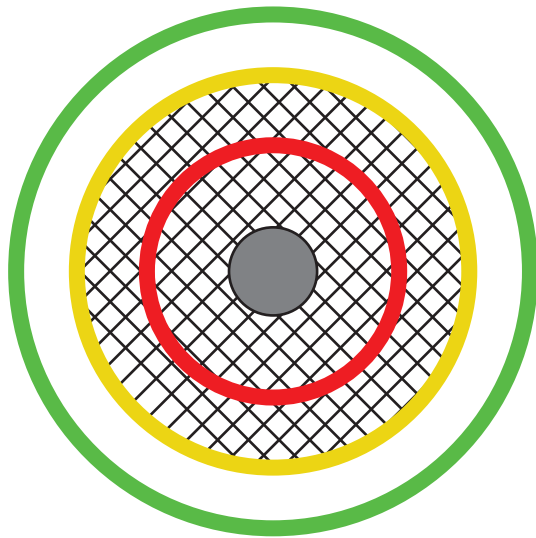
1.1.1 Fine Roots

Fine roots are vulnerable to desiccation once they are exposed to the air. Larger roots have a bark layer which provides some protection against desiccation and temperature change. The greatest risk to these roots occurs when there are rapid fluctuations in air temperature around them e.g. frost and extremes of heat. It is therefore important to protect exposed roots where a trench is to be left open overnight where there is a risk of frost. In winter, before leaving the site at the end of the day, the exposed roots should be wrapped with dry sacking. This sacking must be removed before the trench is backfilled.

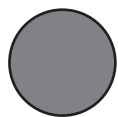
1.1.2 Precautions

The precautions referred to in this section are applicable to any excavations or other works occurring within the Prohibited or Precautionary Zones as illustrated in Figure 1 - 'Tree Protection Zone'.

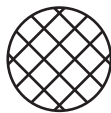
FIGURE 1 – Tree Protection Zone



Key



Trunk of tree



Canopy or branch spread



PROHIBITED ZONE - 1m from trunk. Excavations of any kind must be avoided within this zone. 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.



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.

1.1.3 Realignment

Whenever possible works should always be diverted or re-aligned outside the Prohibited or Precautionary Zones. Under no circumstances can machinery be used to excavate open trenches within the Prohibited Zone.

The appropriate method of working within the Precautionary Zone should be determined in consultation with the local authority (or for privately owned trees the owner or their agent) and may depend on the following circumstances;

- 6.1.3.1 the scope of the works (e.g. one-off repair or part of an extensive operation)
- 6.1.3.2 degree of urgency (e.g. for restoration of supplies)
- 6.1.3.3 knowledge of location of other apparatus

1.1.3.4 soil conditions

1.1.3.5 age, condition, quality and life expectancy of the tree

Where works are required for the laying or maintenance of any apparatus within the Prohibited or Precautionary Zones there are various techniques available to minimise damage.

Acceptable techniques in order of preference are;

a) Trenchless

Wherever possible trenchless techniques should be used. The launch and reception pits should be located outside the Prohibited or Precautionary Zones.

In order to avoid damage to roots by percussive boring techniques it is recommended that the depth of run should be below 600mm. Techniques involving external lubrication of the equipment with materials other than water (e.g. oil, bentonite, etc.) must not be used when working within the Prohibited Zone. Lubricating materials other than water may be used within the Precautionary Zone following consultation and by agreement.

b) Broken Trench - Hand-dug

This technique combines hand dug trench sections with trenchless techniques if excavation is unavoidable. Excavation should be limited to where there is clear access around and below the roots. The trench is excavated by hand with precautions taken as for continuous trenching as in (c) below. Open sections of the trench should only be long enough to allow access for linking to the next section. The length of sections will be determined by local conditions, especially soil texture and cohesiveness, as well as the practical needs for access. In all cases the open sections should be kept as short as possible and outside of the Prohibited Zone.

c) Continuous Trench - Hand-dug

The use of this method must be considered only as a last resort if works are to be undertaken by agreement within the Prohibited Zone. The objective being to retain as many undamaged roots as possible.

Hand digging within the Prohibited or Precautionary zones must be undertaken with great care requiring closer supervision than normal operations.

After careful removal of the hard surface material digging must proceed with hand tools. Clumps of roots less than 25mm in diameter (including fibrous roots) should be retained in situ without damage. Throughout the excavation works great care should be taken to protect the bark around the roots.

All roots greater than 25mm diameter should be preserved and worked around. These roots must not be severed without first consulting the owner of the tree or the consulting arboriculturist. If after consultation severance is unavoidable, roots must be cut back using a sharp tool to leave the smallest wound.

1.1.4 Backfilling

1.1.4.1 Backfilling should be carefully carried out to avoid direct damage to roots and excessive compaction of the soil around them. The backfill should, where possible, include the placement of an inert granular material mixed with top soil or sharp sand (not builder’s sand) around the roots. This should allow the soil to be compacted for resurfacing without damage to the roots securing a local aerated zone enabling the root to survive in the longer term.

1.1.4.2 Backfilling outside the constructed highway limits should be carried out using the excavated soil. This should not be compacted but lightly “tamped” and usually left slightly proud of the surrounding surface to allow natural settlement. Other materials should not be incorporated into the backfill.

1.1.5 Additional Precautions near Trees

1.1.5.1 Movement of heavy mechanical plant (excavators etc.) must not be undertaken within the Prohibited Zone and should be avoided within the Precautionary Zone, except on existing hard surfaces, in order to prevent unnecessary compaction of the soil. This is particularly important on soils with a high proportion of clay. Spoil or material must not be stored within the Prohibited Zone and should be avoided within the Precautionary Zone.

1.1.5.2 Where it is absolutely necessary to use mechanical plant within the Precautionary Zone care should be taken to avoid impact damage to the trunk and branches. A tree must not be used as an end-stop for paving slabs or other materials nor for security chaining of mechanical plant. If the trunk or branches of a tree are damaged in any way advice should be sought from the supervising arboriculturist.

See table 1 -‘Prevention of Damage to Trees Below Ground’ below for summary details regarding causes and types of damage to trees and the implications of the damage and the necessary precautions to be taken to avoid damage.

TABLE 1 - Prevention of Damage to Trees Below Ground

Causes of Damage	Type of Damage	Implications to Tree	Precautions
Trenching, mechanical digging etc.	Root severance	<ul style="list-style-type: none"> The tree may fall over Death of the root beyond the point of damage Potential risk of infection of the tree The larger the root the greater the impact on the tree.	Hand excavate only within the Precautionary Zone. Work carefully around roots. Do not cut roots over 25mm in diameter without referring to the consulting arborist. For roots less than 25mm in diameter use a sharp tool and make a clean cut leaving as small a wound as possible.

Causes of Damage	Type of Damage	Implications to Tree	Precautions
Trenching, mechanical digging, top soil surface removal etc.	Root bark damage	<ul style="list-style-type: none"> The tree may fall over If the damage circles the root it will cause the death of the root beyond that point Potential risk of infection of the tree <p>The larger the root the greater the impact on the tree.</p>	<p>Do not use mechanical machinery to strip the top soil within the Precautionary Zone.</p> <p>Hand excavate only within the Precautionary Zone.</p> <p>Work carefully around roots. Do not cut roots over 25mm in diameter without referring to the consulting arborist.</p> <p>For roots less than 25mm use a sharp tool and make a clean cut leaving as small a wound as possible.</p>
Vehicle movement and plant use. Material storage within the precautionary area.	Soil compaction & water saturation	Restricts or prevents passage of gaseous diffusion through soil, the roots are asphyxiated and killed affecting the whole tree.	Prevent all vehicle movement, plant use or material storage within the Precautionary Zone.
Top-soil scouring, excavation or banking up.	Alterations in soil level causing compaction or exposure of roots.	Lowering levels strips out the mass of roots over a wide area. Raising soil levels asphyxiates roots and has the same effect as soil compaction.	Avoid altering or disturbing soil levels within the Precautionary Zone.
Use of herbicides.	Poisoning of the tree via root absorption	<ul style="list-style-type: none"> Death of the whole tree Death of individual branches <p>Damage to leaves and shoots.</p>	The selection and application of herbicides must be undertaken by a competent person in accordance with COSHH regulations.
Spillage of oils or other materials.	Contamination of soil	Toxic and asphyxiation effects of chemicals, oils, building materials (cement, plaster, additives etc.) on the root system can kill the tree.	Never store oils, chemicals or building materials within the Precautionary Zone or within the branch spread of a tree, which ever is the greater.
Placement or replacement of underground apparatus.	Various	Death of all or part of the tree.	Effective planning and liaison with the consulting arborist, taking into consideration the position of trees, and their future growth potential and management.

1.2 Above Ground

1.2.1 Damage by Pruning

Trees (including shrubs and hedges) can be damaged by inappropriate or excessive pruning. The aim of pruning should be to achieve vegetation clearances in ways which minimise the aesthetic and physical impact on retained trees and shrubs.

Reasonable care should be taken to avoid unnecessary damage to flora and fauna and to access ways.

Work should comply with BS3998. Pruning is a skilled job which should be undertaken by appropriately trained and experienced staff.

Given constraints often imposed by others it is not always possible to prune in an aesthetically pleasing way. However an effective Utility Arborist adjusts the work carried out for each plant to achieve the best possible standard, given the prevailing constraints.

- Ideally vegetation is left well balanced with natural crown shapes
- Pruning must also take into account the vegetation re-growth expected in the interval between cuts. This will vary widely between plant species and sites.
- Vegetation management: tree selection for retention and replanting at an early stage can be used to prevent the need for much more intrusive and damaging work in the future when the vegetation grows closer to the overhead line. Good practice often involves interventions over a number of cutting cycles to manage trees and shrubs so that future conflict with local infrastructure is minimised.

Where reasonably possible avoid recognised injurious practices such as:

- o Topping or lopping to an arbitrary height or branch length
- o Unbalancing a tree crown by excessive one-sided pruning
- o Pollarding. Unless pollarding is the existing recognised management technique.
- o Inappropriate use of flailing.
- o Climbing damage - Care should be taken to avoid injuring thin and weak barked species by inappropriate use of rope access techniques.
- o Access damage - Vehicle access and treatment of arisings should avoid injury to low branches, stems, root buttresses and feeder roots.
- o Spreading Disease - Appropriate regard should be given to avoid spreading fungal diseases.
- If the only pruning option is to severely reduce or unbalance a tree, then coppicing, or felling and replacement planting are often better options.

See table 2 - 'Prevention of Damage to Trees Above Ground' below for summary details regarding causes and types of damage to trees and the implications of the damage and the necessary precautions to be taken to avoid damage.

TABLE 2 - Prevention of Damage to Trees Above Ground

Causes of Damage	Type of Damage	Implications for the Tree	Precautions
<p>Impact by vehicle or plant</p> <p>Physical attachment of signs or hoardings to the trunk</p> <p>Storage of materials at base of tree</p> <p>Rubbing by winch or pulling cables</p>	<p>Bark bruising, bark removal, damage to the wood, damage to buttress roots, abrasion to trunk</p>	<p>Wounding with the potential for infection ultimately resulting in death of all or part of the tree.</p> <p>Structural failure of the tree</p>	<p>Surround the trunk with protective free-standing barrier. Exclude vehicles, plant or material storage from the Precautionary Zone.</p> <p>Ensure sufficient clearance of cables or ropes.</p>
<p>Impact by vehicle or plant</p> <p>Rubbing by overhead cables</p>	<p>Bark damage to branches, breakage and splitting of branches, abrasion to branches</p>	<p>Structural failure of the branch.</p> <p>Wounding or loss of a branch with the potential for infection ultimately resulting in death of all or part of the branch or tree.</p>	<p>Exclude vehicles, plant or material storage from the Precautionary Zone. Ensure sufficient clearance of cables or ropes.</p> <p>All pruning should be carried out in accordance with BS3998 (prune affected branches to give appropriate clearance from cables)</p>
<p>Inappropriate siting of overhead apparatus, such as CCTV, lighting fixtures and communications masts and dishes.</p>	<p>Inappropriate pruning, unnecessary tree removal</p>	<p>Severely pruning tree to acquire line of sight signal for communications dish etc.</p>	<p>Effective planning and liaison with arboriculturist, taking into consideration the position of trees, and their future growth potential and management.</p>
<p>Lack of forethought in design and location of apparatus and services entries on new developments</p>	<p>Complete tree removal</p>	<p>The tree is removed unnecessarily</p>	<p>Agree the location and installation of services at the design stage. Consideration should be given to the creation of dedicated service routes wherever possible.</p>
<p>Use of herbicides</p>	<p>Poisoning of the tree via absorption through bark, leaves and shoots</p>	<p>Death of the whole tree, death of individual branches, damage to leaves and shoots</p>	<p>The selection and application of herbicides must be undertaken by a competent person in accordance with COSHH regulations.</p>

1.2.1 Chemical Damage to Trees

Chemical damage to trees adjacent to utility premises and operational land can be avoided if;

- the risk is identified when planning any work involving herbicides or other chemicals ensuring that only appropriate chemicals are used. Particular care should be exercised when considering the use of herbicides recommended for “non crop areas” as many of these also specify “do not use where there may be roots of desirable plants”,
- herbicides are applied only at the rate and in the manner recommended by the manufacturer,
- follow-up applications are not undertaken until weeds reappear on the operational land,
- alternative methods of weed control are considered.

1.2.2 Tree root protection mats

Protective matting such as Rola-Trac™ (image 10) should be placed over the initial work zone areas near tree root systems to mitigate any adverse effects from the presence of machinery and associated construction activity by works personnel. These also have the benefit of protecting the soil from any potential works contaminants due to works.



Image 10. Rola-Trac™ protective matting.

Appendix 2: NMP Planting Schudule

Species	Size	Native
Street Trees		
Liquidambar styraciflua	WRB 18-20cm girth	No
Platanus x hispanica	300-350cm	No
Quercus robur	WRB 20-25cm girth	Yes
Tilia cordata 'Greenspire'	WRB 200-250cm	Yes
Woodland Trees		
Alnus glutinosa	WRB 150-175cm Multi-stem	No
Betula utilis Multistem	WRB 300-350cm Multi-stem	No
Pinus sylvestris	WRB 200-250cm	Yes
Prunus avellana	WRB 200-250cm	Yes
Sorbus aria	WRB 20-25cm girth	Yes
Sorbus aucuparia	8-10cm girth,3m tall	Yes
Feature Trees		
Agr Acer griseum	WRB 150-175cm Multi-stem	No
Acer x freemanii 'Autumn Blaze'	50-80	No
Cercidiphyllum japonicum	40-50	No
Cercis canadensis 'Forest Pansy'	WRB 150-175cm Multi-stem	No
Crateagus laevigata 'Paul's Scarlet'	WRB 150-175cm	Yes
Lirodendron tulipifera	50-60	No
Magnolia Grandiflora	WRB 150-175cm	No
Prunus serrula Multi-Stem	WRB 150-175cm Multi-stem	No
Prunus yedoensis Multistem	WRB 150-175cm Multi-stem	No

