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John Morris Arboricultural Consultancy

Tree Risk Management | Trees, Planning & Development | Expert Witness | Arboricultural Clerk of Works | Government Support

Client: South Dublin County Council
Site: Rathfarnham Castle
Dublin 14

ARBORICULTURAL IMPACT ASSESSMENT & METHOD STATEMENTS

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John Morris Arboricultural Consultancy

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Purpose of Document

This report provides an assessment of trees on land at Rathfarnham Castle in Dublin 14, in accordance with BS5837:2012 *Trees in relation to design, demolition and construction – Recommendations*.

It provides an overview of the constraints posed by trees on or within influencing distance of the site, and assesses the impacts of the development proposal to those trees.

It includes:

- A **Tree Schedule** that provides information for each tree;
- A **Tree Constraints Plan** that illustrates the location and constraints posed by trees;
- An **Arboricultural Impact Assessment** that considers the impacts of the development proposal to those trees, including proposals for arboricultural mitigation and improvements;
- An **Arboricultural Method Statement** that outlines how retained trees will be protected during construction, and;
- A **Tree Impact & Protection Plan** that illustrates the impact of the proposal upon trees and protection measures that should be adopted during construction.

The information contained within this report is provided to allow South Dublin County Council to assess tree related issues associated with the development proposal.

Executive Summary

South Dublin County Council intends to carry out development at the former South Dublin County Council Depot, at the Stables and Courtyards of Rathfarnham Castle and the adjoining Sean Keating Garden, Grange Road/Rathfarnham Road, Dublin14 (D14 FC62 & D14 XT02), Rathfarnham Castle (Protected Structure RPS. 221) Grange Road, Rathfarnham, Dublin 14, on a development site of 1.1725 hectares. The development will consist of the refurbishment and change of use of the former stable buildings and former council depot yards, to provide mixed-use cultural/arts/cafe/ restaurant uses together with retail use, WC's, storage areas and a switch room.

The eastern half of the site comprises a semi-formal parkland landscape of early mature beech, ash, lime and yew with more recent plantings of pin oak and birch in keeping with the historical context of the area. The north-western corner has been recently landscaped with single avenues of pleached limes and formal box hedges. A line of mixed birch species borders the R114 and car park together with a small group of small-leaved lime. Adjacent to the café entrance, a mature Monterey cypress, pedunculate oak and sycamore comprise some of the oldest trees, together with the yews. Street trees comprise semi/early mature Norway maple lining the R114 and early mature London plane forming an avenue on Castleside Drive. Most trees are in fair/good health apart from a semi-mature beech (T7) in advanced physiological decline and one recently planted Pin oak (T15) in poor health. Minor works are required to clear canopies from adjacent buildings, footpaths and road signs as well as removal of small diameter hanging limbs from recent storms.

The proposed works will require the removal of trees 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, G104, 105, 121 & 122, hedge H60 and part of hedge H9. The reason for these removals is to

facilitate a new pedestrian crossing, new vehicular access off the R114, landscaping works and for underground services including attenuation and stormwater.

It is proposed to plant 61 no. new trees comprising 12 different species across the site. This new

planting will increase species diversity and canopy cover in the local landscape to provide a future net gain in canopy cover and improvement on the pre-development baseline.

The following tree protection measures are required on site:

- Tree Protection Fencing
- Construction Exclusion Zones
- Specialist Methods of Working (use of AirSpade / Soil Pick under supervision of arboriculturist for installation of 150mm diameter underground stormwater with Root Protection Area of trees 5 & 6).

CONTENTS

ATTACHMENTS

DOCUMENT TITLE	DOCUMENT REFERENCE
TREE SCHEDULE	24-803-01
TREE CONSTRAINTS PLAN	24-803-02
TREE IMPACT & PROTECTION PLAN	24-803-03

1. INTRODUCTION

Instruction

1.1. Instruction was received from South Dublin County Council on 17th January 2024 to undertake a tree survey and prepare an arboricultural report to in connection with a planning application for proposed works at Rathfarnham Castle in Dublin 14.

Scope

1.2. The survey has been carried out in accordance with BS5837:2012 *Trees in relation to design, demolition and construction – Recommendations.*

1.3. The information collected during the survey has been used to prepare a report in connection with a planning application.

Site

1.4. The site includes land at Rathfarnham Castle, Dublin 14 (Figure 1).

Figure 1. Site at Rathfarnham Castle, Dublin 14.

2. TREE SURVEY

Site Visit

2.1. The tree survey was undertaken on 27th January 2025.

2.2. Details of the survey methodology and assessment criteria can be found in Appendix 1.

2.3. The survey data is contained in the Tree Schedule (Ref: 24-803-01) and illustrated on the Tree Constraints Plan (Ref: 24-803-02) attached to this report.

2.4. The tree survey considered all trees that have the potential to be impacted by the proposal including those outside the application area, but within influencing distance.

2.5. On the Tree Constraints Plan, The above ground constraints posed by canopy spread are plotted

as a continuous line around the tree and shaded in the corresponding BS5837 retention category colour, whilst the below ground constraints posed by the Root Protection Area (RPA) have been plotted as a continuous magenta line with the text RPA inscribed.

Description of Trees

2.6. The eastern half of the site comprises a semi-formal parkland landscape of early mature beech, ash, lime and yew with more recent plantings of pin oak and birch in keeping with the historical context of the area. The north-western corner has been recently landscaped with single avenues of pleached limes and formal box hedges. A line of mixed birch species borders the R114 and car park together with a small group of small-leaved lime. Adjacent to the café entrance, a mature Monterey cypress, pedunculate oak and sycamore comprise some of the oldest trees, together with the yews. Street trees comprise semi/early mature Norway maple lining the R114 and early mature London plane forming an avenue on Castleside Drive. Most trees are in fair/good health apart from a semi-mature beech (T7) in advanced physiological decline and one recently planted Pin oak (T15) in poor health. Minor works are required to clear canopies from adjacent buildings, footpaths and road signs as well as removal of small diameter hanging limbs from recent storms.

Figure 2 & 3. Mature planting within the eastern grounds creating a semi-natural parkland type landscape.

Figure 4. Recently planted formal landscape of low box hedges and pleached limes.

Figure 5. Birch sp. creating an informal avenue adjacent to the R114.

2.7. A summary assessment of the tree quality is contained in Table 1.

Table 1. Overview assessment of tree quality by BS5837 retention categroy.

	Category A	Category B	Category C	Category U	Total
Trees	6	65	69	4	**145**

2.8. A summary of the tree population age classification is contained in Table 2.

Table 2. Summary of age class.

	Young	Semi-mature	Early mature	Mature	Over Mature	Ancient or Veteran	Dead
Trees	3	95	37	7	0	0	2

3. ARBORICULTURAL PRINCIPLES

Trees and Development

3.1. Trees provide a multitude of economic, environmental and social benefits to individuals and communities including (but not limited) to visual amenity and landscape value, ecosystem services and habitats for local wildlife. Trees can also hold historic and cultural importance by providing links to the past that create a sense of place and belonging.

3.2. They are living, self-optimising, mechanical organisms that grow in and react to the environment in which they are located and are capable of being wounded or infected by objects or other organisms that can cause a decline in health or result in death.

3.3. Development proposals that will impact trees should consider the value and contribution made by those trees, the impacts of development activity upon their health and an assessment of future conflicts that may arise between trees and the development proposal.

Below Ground Constraints

3.4. Soils contain organic and mineral material, air and water that provides a medium essential for root growth. The physical properties of soils including texture, porosity and bulk density can greatly impact the availability of water, nutrients and oxygen in the soil available to support the function and growth of tree roots. Protection of the soil environment in which trees grow is therefore essential to ensure tree vitality.

3.5. Tree roots provide support and anchorage and allow the uptake and transport of water, nutrients and oxygen for tree function and growth. Roots are commonly found in the upper 600-1000mm of soil, however depth can vary significantly depending on soil and local site conditions. Typically, tree root systems comprise a network of lateral roots that provide

structural support and smaller fibrous roots that function in the uptake of water, nutrients and oxygen. Protection of the tree roots is therefore essential to ensure tree vitality.

Impacts of Construction & Development

3.6. The processes of construction including the movement of machinery and equipment near trees can cause soil compaction that can starve roots of oxygen and water, resulting in tree decline or death. Increasing ground levels near trees can cause similar impacts, whilst belowground soil excavations can damage root bark or lead to root severance and impair structural stability. Further impacts include (but are not limited to) contamination of soils by toxic substances such as cement or chemicals and root desiccation due to inadequate protection during exposure.

Root Protection Areas

3.7. In accordance with BS5837, the Root Protection Area (RPA) indicates the notional minimum area of ground around a tree deemed to contain sufficient roots and rooting volume to avoid adverse physiological or structural impairment and to support future tree function, growth and health.

3.8. The RPA is calculated in accordance with Section 4.6 of BS5837 and is summarised in Appendix 2.

3.9. The RPA is plotted as a continuous circle centred on the base of the stem, however where pre-existing site conditions such as the presence of built structures, changes in topography, soil type and structure or past management are likely to act as barriers, or alter normal distribution, BS5837 allows modifications to the shape of the RPA can be made based upon sound arboricultural assessment.

3.10. The default position should be that no development works occur inside RPAs, however in accordance with BS5837 when there is an overriding justification, it may be appropriate to implement specialist methods of construction or technical solutions that will reduce or eliminate the impact to roots and soil environments.

3.11. Additionally, where an area of RPA is lost, it should be demonstrated that the tree can remain viable with the area lost from encroachment compensated elsewhere contiguous with its RPA, based on the species, age, condition and past management of the tree, pre-existing site conditions and nature of operations proposed is undertaken.

Above Ground Constraints

3.12. Tree stems and crowns can restrict the availability of space on a development site that may result in conflicts between trees and the new built environment. The design and layout of a site should take into consideration the presence of tree canopies, as well as individual species characteristics and future growth requirements to create a harmonious relationship between trees and the new built environment.

4. PLANNING POLICY, STATUTORY CONSIDERATIONS & TREE LEGISLATION

Planning Policy

4.1. The National Planning Framework 'Project Ireland 2040' and National Development Plan (2021-2030) underpin planning policy across Ireland. These documents recognise the need to manage future growth in a planned, productive and sustainable way.

4.2. At the heart of Green Infrastructure Planning is to protect, preserve and enhance national capital by:

> *"protecting and valuing important and vulnerable habitats, landscapes, natural heritage and green spaces".*

4.3. The Site falls within the jurisdiction of South Dublin County Council, which has a statutory obligation to ensure that provision is made for the protection of trees, woodlands and hedgerows under the Local Government Planning and Development Act (2000), through implementation of a Development Plan. The current plan for South Dublin County Council is the South Dublin County Development Plan (2022-2028).

South Dublin County Development Plan (2022-2028)

4.4. The South Dublin County Development Plan contains various policies in relation to trees and proposals for development including (but not limited to):

NCBH4 Objective 3: To ensure that intact hedgerows/trees will be maintained above the 120m contour line within the County ensuring that the strong rural character will not be diluted and that important heritage features & potential wildlife corridors are protected.

NCB9 Objective 4: To ensure that development along and adjacent to the Grand Canal protects and incorporates natural heritage features including watercourses, wetlands, grasslands, woodlands, mature trees, hedgerows and ditches and includes an appropriate set-back distance or buffer area from the pNHA boundary to facilitate protected species and biodiversity and a fully functioning Green Infrastructure network.

Policy NCBH11: Tree Preservation Orders and Other Tree Protections Review Tree Preservation Orders (TPO) within the County and maintain the conservation value of trees and groups of trees that are the subject of a Tree Preservation Order while also recognising the value of and protecting trees and hedgerows which are not subject to a TPO.

NCBH11 Objective 1: To review Tree Preservation Orders within the County and maintain the conservation value of trees and groups of trees that are the subject of any Tree Preservation Order.

NCBH11 Objective 2: To regularly evaluate and identify trees of amenity value within the County with a view to making them the subject of Tree Preservation Orders or otherwise protecting them and further, to furnish information to the public in this regard.

NCBH11 Objective 3: To protect and retain existing trees, hedgerows, and woodlands which are of amenity and/or biodiversity and/or carbon sequestration value and/or contribute to landscape character and ensure that proper provision is made for their protection and management taking into account Living with Trees: South Dublin County Council's Tree

Management Policy (2015-2020) or any superseding document and to ensure that where retention is not possible that a high value biodiversity provision is secured as part of the phasing of any development to protect the amenity of the area.

GI1 Objective 1: To establish a coherent, integrated and evolving GI Network across South Dublin County with parks, open spaces, hedgerows, trees including public street trees and native mini woodlands (Miyawaki-Style), grasslands, protected areas and rivers and streams and other green and blue assets forming strategic links and to integrate and incorporate the objectives of the GI Strategy throughout all relevant land use plans and development in the County.

GI2 Objective 7: To enhance the biodiversity value of publicly owned hard infrastructure areas by incorporating the planting of new trees, grasses and other species, thereby integrating this infrastructure into the overall GI network.

GI5 Objective 3: To ensure compliance with the South Dublin Climate Change Action Plan and the provisions of the Council's Tree Management Strategy. Green Infrastructure (GI) à Increase the County's tree canopy cover by promoting annual planting, maintenance preservation and enhancement of trees, woodlands and hedgerows within the County using locally native species and supporting their integration into new development. à Identify suitable sites for new urban trees including Miyawaki style mini woodlands, where feasible. à Support the implementation of a co-ordinated regional approach to the maintenance of trees and support the work of the Regional Steering Group on Tree Management to which South Dublin County Council is a participant. à Promote the establishment of tree trails in public parks across the County. Promote the planting of new woodlands and forestry within appropriate open space and park locations within the County. à To plant "pocket forests" in tracts of open grassland to act as an oasis for biodiversity. à The Council recognises the value of mature trees in terms of carbon sequestration and amenity over saplings.

GI5 Objective 6: To provide more tree cover across the county, in particular to areas that are lacking trees.

SM5 Objective 4: To prioritise safety on rural roads and junctions, while considering the protection of biodiversity, green infrastructure and rural character present in roadside trees, hedgerows and banks, etc.

SM5 Objective 5: To design new roads and streets to incorporate green infrastructure elements such as planting of native trees, hedgerows and pollinator species in medians and on roadside verges, as appropriate to the location.

SM7 Objective 9: To ensure that car parking is designed in such a manner as to promote visual amenity, green infrastructure, carbon sequestration and sustainable drainage (SuDS) by applying the following requirements: à Provision of landscaping integrated into the design of all car parking, to include planting of native trees and pollinator species; à Provision of not more than two parallel or five perpendicular spaces between trees/planting bays; à Use of permeable paving, where appropriate.

COS5 Objective 8: To ensure the design of parks and public open space areas is of high quality;

to provide a pleasant setting, accommodate use by people of all ages and abilities, to support life-long activity and good health and well-being by the provision of a balanced mix of active and passive recreation and access to, or view of, nature, ensuring that the design considers: à provision of an appropriate mix of hard and soft surfaced areas; à enhancement of biodiversity and existing trees and hedgerows; à incorporation of water courses, other natural features and existing built heritage into the design of parks and open spaces as appropriate; à provision of new planting, landscape features and appropriate site furniture including a variety of accessible, well located and designed seating.

E11 Objective 1: To ensure the implementation of policy and objectives on tree planting, protection of trees on site and development management standards in relation to new development as set out in the Green Infrastructure, Heritage and Implementation Chapters of this plan.

NCB9 Objective 4: To ensure that development along and adjacent to the Grand Canal protects and incorporates natural heritage features including watercourses, wetlands, grasslands, woodlands, mature trees, hedgerows and ditches and includes an appropriate set-back distance or buffer area from the pNHA boundary to facilitate protected species and biodiversity and a fully functioning Green Infrastructure network.

Tree Preservation Orders & Conservation Areas

4.5. Tree Preservation Orders (TPOs) may be made under Section 45 of the Local Government (Planning and Development) Act, 1963 and subsequent acts. Part XIII of the Planning and Development Act 2000 sets out the provisions for TPOs. A TPO can be made if it appears to the planning authority to be desirable and appropriate in the interest of amenity or the environment. A TPO can apply to a tree, trees, group of trees or woodland.

4.6. The principal effect of a TPO is to prohibit the cutting down, topping, lopping or wilful destruction of trees without the planning authority's consent. The order can also require the owner and occupier of the land subject to the order to enter into an agreement with the planning authority to ensure the proper management of the tree, trees or woodland. A review of the South Dublin County Development Plan (2022-2028) indicates that at the time of the development plan, there were no TPO's in place upon the Site (Table 3.3).

Table 3.3: Tree Preservation Orders

Tree Preservation Order	Location
Dublin County Council Tree Preservation Order (St Brigid's Clondalkin) Order 1973	St Brigid's (now Newlands Garden Centre), New Road, Clondalkin, Dublin 22.
Dublin County Council Tree Preservation Order (Beaufort Downs, Rathfarnham) Order 1987	Beaufort Downs, Rathfarnham, Dublin 14.
Dublin County Council Tree Preservation Order (Quarryvale, Brooklawn) (Liffey Valley No.1) Order 1990	Townland of Quarryvale and Brooklawn, Palmerstown, Dublin 20.
South Dublin County Council Tree Preservation Order (Coolamber Site) Order 2015	Newcastle Road, Lucan.

Felling Licences

4.7. It is an offence for any person to uproot or cut down any tree unless the owner has obtained permission in the form of a felling licence from the Forest Service, with the exception of the following scenarios (under section 19 of the Forestry Act 2014):

- A tree in an urban area. (An urban area is an area that is comprised of a city, town or borough specified in Part 2 of Schedule 5and in Schedule 6 of the Local Government Act 2001, before the enactment of the Local Government Reform Act 2014 (this act dissolved Town Councils, however, the old boundaries of these areas are still considered as urban for the purpose of the Forestry Act 2014).
- A tree within 30 metres of a building (other than a wall or temporary structure) but excluding any building built after the trees were planted.
- A tree less than 5 years of age that came about through natural regeneration and removed from a field as part of the normal maintenance of agricultural land (but not where the tree is standing in a hedgerow).
- A tree uprooted in a nursery for the purpose of transplantation.
- A tree of the willow or poplar species planted and maintained solely for fuel under a
- short rotation coppice.
- A tree outside a forest within 10 metres of a public road and which, in the opinion of the owner (being an opinion formed on reasonable grounds), is dangerous to persons using the public road on account of its age or condition.
- A tree outside a forest, the removal of which is specified in a grant of planning permission, providing it was indicated on the lodged plans as being planned for removal as part of the application.
- A tree outside a forest of the hawthorn or blackthorn species growing in a hedge.
- A tree outside a forest in a hedgerow and felled for the purposes of its trimming the hedge providing that the tree does not exceed 20 centimetres diameter at 1.3 metres above ground level.
- Agricultural holdings can fell a limited small number of trees not exceeding 3 cubic metres.
- The maximum number of trees permitted to be felled under that exemption per year is 4 trees (12 cubic metres)
- Outside a forest, apple, pear, plum, or damson species are exempt from the need for a felling license.

Wildlife

4.8. The cutting of hedges is prohibited during the period 1st April to 31st August every year with limited exceptions under the Wildlife Acts 1976-2008.

5. ARBORICULTURAL IMPACT ASSESSMENT

Development Proposal

5.1. South Dublin County Council intends to carry out development at the former South Dublin County Council Depot, at the Stables and Courtyards of Rathfarnham Castle and the adjoining Sean Keating Garden, Grange Road/Rathfarnham Road, Dublin14 (D14 FC62 & D14 XT02), Rathfarnham Castle (Protected Structure RPS. 221) Grange Road, Rathfarnham, Dublin 14, on a development site of 1.1725 hectares.

5.2. The development will consist of the refurbishment and change of use of the former stable buildings and former council depot yards, to provide mixed-use cultural/arts/cafe/ restaurant uses together with retail use, WC's, storage areas and a switch room.

Design Principles

5.3. The default position has been to avoid works within the canopy or RPA of any tree, however where this has not been possible due to other site constraints a hierarchy of mitigation has been applied in Figure 6.

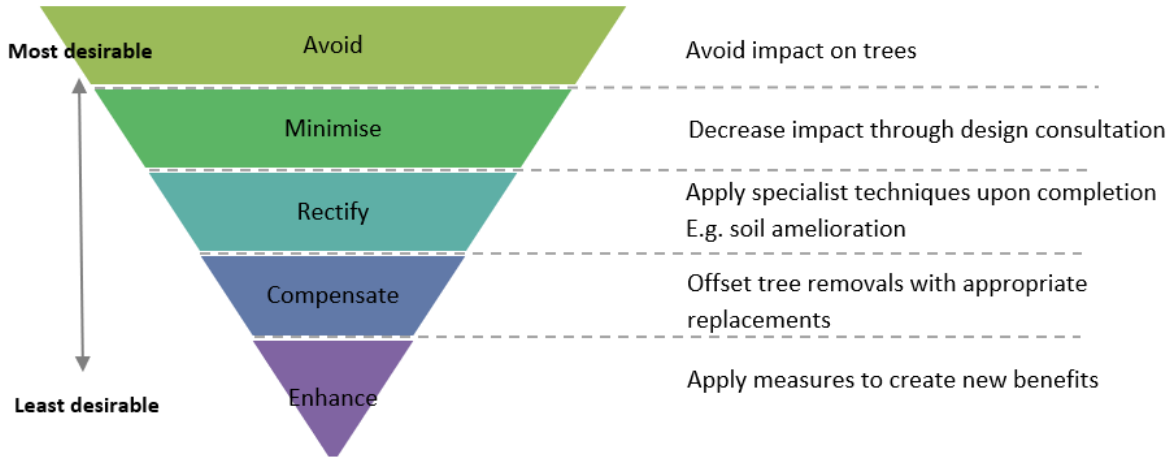


Figure 6. Trees & Development Mitigation Hierarchy (John Morris Arboricultural Consultancy, 2019).

Tree Removals & Pruning

5.4. Tree removals and pruning have been limited to that which is necessary and unavoidable to allow the development proposal to be implemented, with consideration given to species attributes, the tolerance of individual trees to disturbance, and to the presence of surrounding trees and features of the site which may have an influence on retained trees.

5.5. The pruning of trees may be required for reasons of good arboricultural practice or management to promote tree health and longevity, to remove hazards for reasons of health and safety, or to limit the impacts of the development proposal upon trees where incursions into RPAs are unavoidable.

The Impact

5.6. The proposed works will require the removal of trees 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100,

101, 102, 103, G104, 105, 121 & 122, hedge H60 and part of hedge H9.

5.7. The reason for these removals is to facilitate a new pedestrian crossing, new vehicular access off the R114, new landscaping and underground services including stormwater and attenuation.

5.8. A summary of impacts to trees are provided in Table 3.

Table 3. Summary of impacts to trees

Impact	Required within canopy or RPA of trees?	Details
Ground Levels	No	
Excavations	Yes	Excavations for stormwater within Root Protection Area of trees 5 & 6 – to be undertaken using AirSpade or Soil Pick under supervision of arboriculturist.
Services	Yes	Hedge H9 and trees 76 & 95 (storm water) and 94 (attenuation) – to be removed.
Access	Yes	Trees 121 & 122 (pedestrian crossing) and 90, 91, 92, 93, 96, 97, 98, 99, 100, 101, 102, 103, G104 & 105 (vehicular access off R114) – to be removed.
Boundary Treatments	No	
Landscaping	Yes	H60 – to be removed.
Other	No	

Mitigation & Improvements

5.9. It is proposed to plant 61 no. new trees comprising 12 different species across the site. This new planting will increase species diversity and canopy cover in the local landscape to provide a future net gain in canopy cover and improvement on the pre-development baseline.

6. ARBORICULTURAL METHOD STATEMENTS

Purpose

6.1. The purpose of this statement is to provide a system of working to ensure retained trees are protected at all times during construction. It should be read in conjunction with the Tree Impact & Protection Plan (Ref: 24-803-03) attached to this report.

6.2. A copy of this report must be made permanently available for the duration of the development.

It can be:

- Included in tender documents to identify and quantify tree protection and management requirements;
- Used to plan timing of site operations to minimise the impact upon trees, and;
- Referenced on site for practical guidance on how to protect trees.

6.3. The compliance of arboricultural method statements is a recommended as a condition of planning and is necessary to ensure the protection and vitality of retained trees.

Pre Commencement Meeting

6.4. A pre-commencement meeting will be held prior to commencement of any demolition or construction works on site. The pre-commencement meeting may require the attendance of:

- The Main Works Contractor;
- Landscape Architect;
- Structural/Civil Engineer;
- Project Arboriculturist; and
- Any other parties as required.

6.5. The purpose of this meeting will be to agree the details of the tree protection measures and ensure that all aspects of tree protection are understood. The Project Arboriculturist and Main Works Contractor will agree and mark the location of the tree protective fencing and temporary ground protection and any other specific tree protection measures, as required.

Key Responsibilities

6.6. It is the responsibility of the main contractor to ensure that all site personnel fully understand the protection measures on the site, that tree protection measures are adhered to at all times, and that the project arboriculturist is contacted if there are any issues related to trees.

Tree Protective Fencing

6.7. A protective fence will be erected around retained trees, prior to the commencement of materials or machinery being brought onto site, removal of soil or any form of construction. The area within this fencing will form the construction exclusion zone (CEZ) and it will be afforded protection at all times. No works will be undertaken within this zone that causes compaction to the soil, severance of tree roots or damage to tree canopies.

6.8. The fence is to be sited in accordance with the TIPP attached to this report.

6.9. Details of the minimum distance for fencing from trees can be found in the Tree Schedule attached to this report.

6.10. The precise form of fencing can vary provided it is fit for purpose and prevents damaging activities within the CEZ. For a proposal of this nature the Heras 151 system of fencing will afford the necessary level of protection (Appendix 3).

6.11. The fence will have signs attached to it stating that it defines a CEZ and that no works are permitted beyond it.

6.12. An example of a tree protection sign is provided in Appendix 4.

6.13. The protective fencing may only be removed following completion of all construction works.

6.14. The following principles will be adopted by site personnel within the CEZ during construction, to ensure protection of retained trees:

- No level changes.
- No excavations.
- No fires.
- No use of herbicides.
- No storage of materials, machinery or access for construction workers.

Street Trees

6.15. There are several street trees near to existing vehicular access routes that will be used by construction traffic during construction. The stem of these trees is to be wrapped in hessian or rope, then a 1.5m high cleft chestnut fence layer, followed by 3no. layers of orange plastic site hazard fencing, to provide a cushioning barrier. Alternatively, a wooden frame 1m x 1m and 2m high should be built around the stem of the tree with plywood boards fixed to the frame (Figure 7).

Figure 7. Examples of tree protection for street trees.

Site Compounds & Facilities

6.16. Site compounds and facilities will be located outside of all RPAs and CEZs as identified on the TIPP.

Site Cranes, Piling Rigs and Machinery

6.17. The location of all site cranes, piling rigs and other machinery should be sited outside of RPAs to avoid soil compaction.

Pollution Control

6.18. Any storage or mixing station located outside of the construction exclusion zone will be located in a place that minimises the risk of contaminated runoff entering to prevent adverse physiological impacts on trees that may result from contact with rooting environments. This may be achieved by using a non-permeable membrane on the ground, surrounded by sandbags or sawdust to contain any spillage.

Temporary Ground Protection

6.19. Where it is not practical to protect RPAs by use of protective fencing, BS5837 allows for the fencing to be set back and the soil shielded by ground protection. A range of methods can be used including retaining existing hard surfaces or structures that already protect the soil, installing new temporary surfaces, or a combination of both. Whatever the choice of method, the end result must be that the underlying soil remains undisturbed and retains the capacity to support existing and new roots.

6.20. If fences are to be set back on a temporary the following specifications are recommended for use as temporary ground protection to protect roots and soil.

6.21. For pedestrian traffic, a plywood board with a minimum thickness of 40mm should be laid on a minimum of 100mm deep woodchip, with geotextile membrane beneath.

6.22. For small plant machinery with a gross weight of up to 2 tonne, interlinking aluminium or composite tracks with sufficient load bearing capacity should be laid on a minimum of 150mm deep woodchip, with geotextile membrane beneath.

6.23. For heavy machinery with a gross weight of up to 3.5tonne, interlinking aluminium or composite track with sufficient load bearing capacity should be laid over a minimum layer of 200mm deep woodchip, with a geotextile membrane beneath.

6.24. Any temporary protective surfaces must remain in place until all construction activity is finished.

6.25. Upon completion of construction works, the temporary ground protective measures should be removed working backwards from on top of the system. This will need to be done carefully ensure that there is no excavation or compaction of the original surface or change in ground levels.

6.26. Once this material has been removed vehicular access to this part of the site will not be permitted.

6.27. The location of where temporary ground protection is to be located and at what stage of

development is illustrated on the TIPP attached to this report.

Excavations and Removal of Existing Surfaces

6.28. All excavation must be carried out carefully using spades, forks and trowels, taking care not to damage the bark and wood of any roots. Specialist tools for removing soil around roots using compressed air such as an Air Spade may be an appropriate alternative to hand digging, if available.

6.29. All soil removal must be undertaken with care to minimise the disturbance of roots beyond the immediate area of excavation. Where possible, flexible clumps of small roots, including fibrous roots, should be retained if they can be displaced temporarily or permanently beyond the excavation without damage.

6.30. If digging by hand, a fork should be used to loosen the soil and help locate any substantial roots. Once the roots have been located the trowel should be used to clear the soil away from them without damaging the bark. Exposed roots that are to be removed should be cut cleanly with a sharp saw or secateurs 100-200mm behind the final face of the excavation.

6.31. Roots temporarily exposed must be protected from direct sunlight, drying out and extreme temperatures by appropriate covering. Roots greater than 25mm in diameter should only be cut in exceptional circumstances. Roots greater than 100mm in diameter should only be cut after consultation with the project arboriculturist.

Upgrading Existing Surfaces

6.32. Where upgrading of existing hard surfaces is required, the preferred option will be to leave the surface in place and install the new surface specification on top.

6.33. If the retained surface is impermeable, it may be appropriate to remove or puncture sections to create a more favourable environment for roots beneath, before the new surface is laid, through consultation with the project arboriculturist.

6.34. Where the existing surface is to be removed or upgraded, the surface layer should be excavated down the existing subbase and the new surface specification installed on top, to prevent any damage to roots beneath.

6.35. It is recommended that where possible, new and upgraded hard surfaces should be porous (e.g. permeable brick paving, porous resin bound aggregate or tarmac) to allow the flow or water and oxygen to roots. Wet concrete should only be poured if an impermeable geotextile fabric has first been installed to prevent soil contamination from toxic leachate.

6.36. New surfaces and upgraded surfaces should be set back from the base of stems by a minimum of 500mm to allow space for future growth and minimise the risk of distortion with new surface.

Installation of Services

6.37. All services and utilities should be installed within existing service routes and where possible outside of RPAs.

6.38. Where installation of utilities or services is required within RPAs, working practices will be

adopted in accordance with the National Joint Utilities (NJUG) 10, Vol 4, Issue 2, 2007 'Guidelines for the Planning, Installation and Maintenance of Utility Apparatus in Proximity to Trees'.

6.39. In accordance with 4.1.3 of NJUG 10 2007, acceptable techniques in order of preference include:

6.40. Trenchless; b) Broken Trench; and c) Continuous Trench. Trenchless methods involve the use of thrust boring machinery, whilst broken and continuous trench methods require that excavations within RPAs are carried out using hand tools only.

6.41. For a proposal of this nature, broken or continuous trench methods are the most appropriate and should be undertaken as per NJUG 10, to prevent any damage to tree roots or disruption to soil rooting environments.

6.42. The installation of a new 150mm diameter underground stormwater pipe within the Root Protection Area of trees 5 & 6 is recommended to be undertaken using an AirSpade or Soil Pick under the supervision of an arboriculturist.

Installation of Railings, Lighting Columns or Street Furniture

6.43. The erection of a new railings, lighting columns or street furniture will require 'hand-digging' in the location where any foundations or posts are required within RPAs, to prevent damage to tree roots.

6.44. Any soil removal during excavations must be undertaken with care to minimise root disturbance and avoid any damage to root bark.

6.45. Exposed roots that are to be removed should be cut cleanly with a sharp saw or secateurs 10-20mm behind the final face of the excavation.

6.46. Roots greater than 25mm diameter should only be cut in exceptional circumstances and following approval by the project arboriculturist.

6.47. Fibrous clumps of roots must be retained where possible, with any exposed roots protected from desiccation by covering them with a damp hessian sack or damp sharp sand (**builders' sand must not be used).**

6.48. Prior to backfilling, roots must be surrounded with topsoil or sharp sand before the excavated earth is replaced. The soil must be free of contaminates and any foreign objects that may be potentially harmful to roots.

Soft Landscaping

6.49. To avoid damage to existing tree roots and prevent soil compact, any machinery used to remove existing surfaces and ground vegetation for purposes of soft landscaping (e.g. seeding new lawns or laying turf) should be sited outside of RPAs. If this is not possible, hand tools must be used.

6.50. The removal of the surface layer within RPAs must not exceed 50mm, to prevent exposure and damage of tree roots beneath.

6.51. Soft landscaping works must not involve raising or lowering of the existing ground level within

any RPA as this can starve roots of oxygen and cause irreversible physiological damage to trees.

6.52. The use of rotavators within RPAs is prohibited.

6.53. Any level changes outside RPAs must be graded to marry existing soil levels within RPAs.

7. ABOUT THE AUTHOR & LIMITATIONS

Authors Qualifications & Experience

7.1. This report has been written by John Morris, Director at John Morris Arboricultural Consultancy Ltd. John has a First Class BSc (Hons) in Housing (Ulster University) and a Post Graduate Diploma (UK NQF Level 7) in Arboriculture & Urban Forestry (Myerscough College & University of Central Lancashire). John regularly undertakes continuous professional development (CPD) in all areas of arboriculture and wider business administration. John is a Professional member of the Arboricultural Association (AA) and Associate member of the Institute of Chartered Foresters (ICF).

Limitations

7.2. This report is for planning purposes and is not a detailed assessment of the health and condition of trees, however where defects have been identified works have been recommended to ensure site safety.

7.3. This report does not take responsibility for the effects of extreme weather conditions, vandalism, accidents or any works to trees that occur without the authors knowledge, or that are not recommended within this report.

7.4. Tools used during the assessment have been limited to a sounding mallet, probe or binoculars. No invasive or diagnostic equipment has been used, nor have any aerial inspections, belowground root investigations, or soil, leaf or root samples been taken for further testing or analysis.

7.5. Trees were assessed on 27th January 2025 and the information gathered during the survey pertains to that moment in time. The observations within this report will remain valid for two years from the date of inspection. It is recommended that trees are inspected again within two years of the date of this report to assess what works are required for reasons of good arboricultural management and to enable the client to manage their legal reasonability in terms of tree risk management.

7.6. The location of trees places reliance on the accuracy of the topographical survey unless otherwise caveated within the report.

7.7. All works recommendation as a result of the survey should be undertaken by a suitably qualified and insured arborist in accordance with BS3998:2020 *Tree Works – Recommendations* to prevent any structural or physiological impairment to trees.

Appendix 1: Tree Survey Criteria (BS5837:2012)

The assessment of the trees has been carried out in accordance with the guidance provided in Annexe C of BS5837, which requires that any tree on or influencing distance of the site with a stem diameter of over 75mm at 1.5m above ground level be recorded.

Stem diameter measurements were taken using a girthing tape or Biltmore stick, and in accordance with Annexe D of BS5837.

Height, crown spread, and canopy clearance measurements are recorded in accordance with the measurement convention detailed in paragraph 4.4.2.6 of BS5837.

The trees are categorised in an order defined in **Table 1** of BS5837, a copy of which can be seen below in **Figure 1**, but which can be summarised as:

- **Category A** Trees of high quality and value in such a condition as to be able to make a substantial contribution for a minimum of 40 years.
- **Category B** Trees of moderate quality and value in such a condition as to make a significant contribution for a minimum 20 years.
- **Category C** Trees of low quality and value currently in adequate condition and able to remain until new planting can be established with a minimum useful life expectancy of 10 years, and young trees with a stem diameter less than 150mm.
- **Category U** Trees in poor structural condition or physiological decline that cannot be realistically retained in the context of current land use for more than 10 years.

Further subcategories 1-3 indicate the area(s) in which a tree or group retention value lies.

- Mainly arboricultural.
- Mainly landscape.
- Mainly cultural, including conservation.

Table 1 **Cascade chart for tree quality assessment**

Category and definition	Criteria (including subcategories where appropriate)			Identification on plan
Trees unsuitable for retention (see Note)				
Category U Those in such a condition that they cannot realistically be retained as living trees in the context of the current land use for longer than 10 years	• Trees that have a serious, irremediable, structural defect, such that their early loss is expected due to collapse, including those that will become unviable after removal of other category U trees (e.g. where, for whatever reason, the loss of companion shelter cannot be mitigated by pruning) • Trees that are dead or are showing signs of significant, immediate, and irreversible overall decline • Trees infected with pathogens of significance to the health and/or safety of other trees nearby, or very low quality trees suppressing adjacent trees of better quality *NOTE Category U trees can have existing or potential conservation value which it might be desirable to preserve; see **4.5.7**.*			See Table 2
	1 Mainly arboricultural qualities	**2 Mainly landscape qualities**	**3 Mainly cultural values, including conservation**	
Trees to be considered for retention				
Category A **Trees of high quality** with an estimated remaining life expectancy of at least 40 years	Trees that are particularly good examples of their species, especially if rare or unusual; or those that are essential components of groups or formal or semi-formal arboricultural features (e.g. the dominant and/or principal trees within an avenue)	Trees, groups or woodlands of particular visual importance as arboricultural and/or landscape features	Trees, groups or woodlands of significant conservation, historical, commemorative or other value (e.g. veteran trees or wood-pasture)	See Table 2
Category B **Trees of moderate quality** with an estimated remaining life expectancy of at least 20 years	Trees that might be included in category A, but are downgraded because of impaired condition (e.g. presence of significant though remediable defects, including unsympathetic past management and storm damage), such that they are unlikely to be suitable for retention for beyond 40 years; or trees lacking the special quality necessary to merit the category A designation	Trees present in numbers, usually growing as groups or woodlands, such that they attract a higher collective rating than they might as individuals; or trees occurring as collectives but situated so as to make little visual contribution to the wider locality	Trees with material conservation or other cultural value	See Table 2
Category C **Trees of low quality** with an estimated remaining life expectancy of at least 10 years, or young trees with a stem diameter below 150 mm	Unremarkable trees of very limited merit or such impaired condition that they do not qualify in higher categories	Trees present in groups or woodlands, but without this conferring on them significantly greater collective landscape value; and/or trees offering low or only temporary/transient landscape benefits	Trees with no material conservation or other cultural value	See Table 2

Appendix 2 – Calculation of the Root Protection Area

Circle Radius

The circle radius has been calculated by obtaining the stem diameter (measured at 1.5m above the ground) in millimetres and multiplying it by 12. Where the tree is multi-stemmed, an average stem diameter is calculated by the following formula specified in section 4.6.1 (a) & (b) of BS5837.

For trees with two to five stems, the combined stem diameter should be calculated as follows:

$$\sqrt{(\text{stem diameter 1})^2 + (\text{stem diameter 2})^2 \ldots + (\text{stem diameter 5})^2}$$

For trees with more than five stems (not illustrated in Annex C), the combined stem diameter should be calculated as follows:

$$\sqrt{(\text{mean stem diameter})^2 \times \text{number of stems}}$$

This total is then divided by 1000 to provide a circle radius in metres.

RPA Areas

The RPA has been assessed according to the recommendations set out in section 4.6 of BS5837. It is calculated by multiplying the radius squared by 3.142 (π).

Length of sides of a square

Section 5.5.3 of BS5837 recommends that the ground protection and barriers should be shown as a polygon surrounding the stem of the tree. With a circle, the distance from the edge of the circle to the centre will remain constant, but with a square, the distance from the centre of the tree to the sides of the square is less than the distance to the corner of the square. The area of the square must remain the same as the area of the circle. In order to ensure that it is
the case, the length of side of the square is calculated at the square root of the RPA area.

Minimum barrier distance

This is the closest point that a side of the square can be to the centre of the tree.

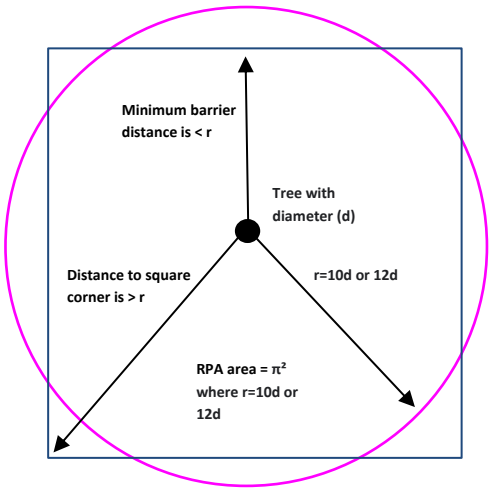


Figure 1. Illustration of area calculations and minimum barrier distances

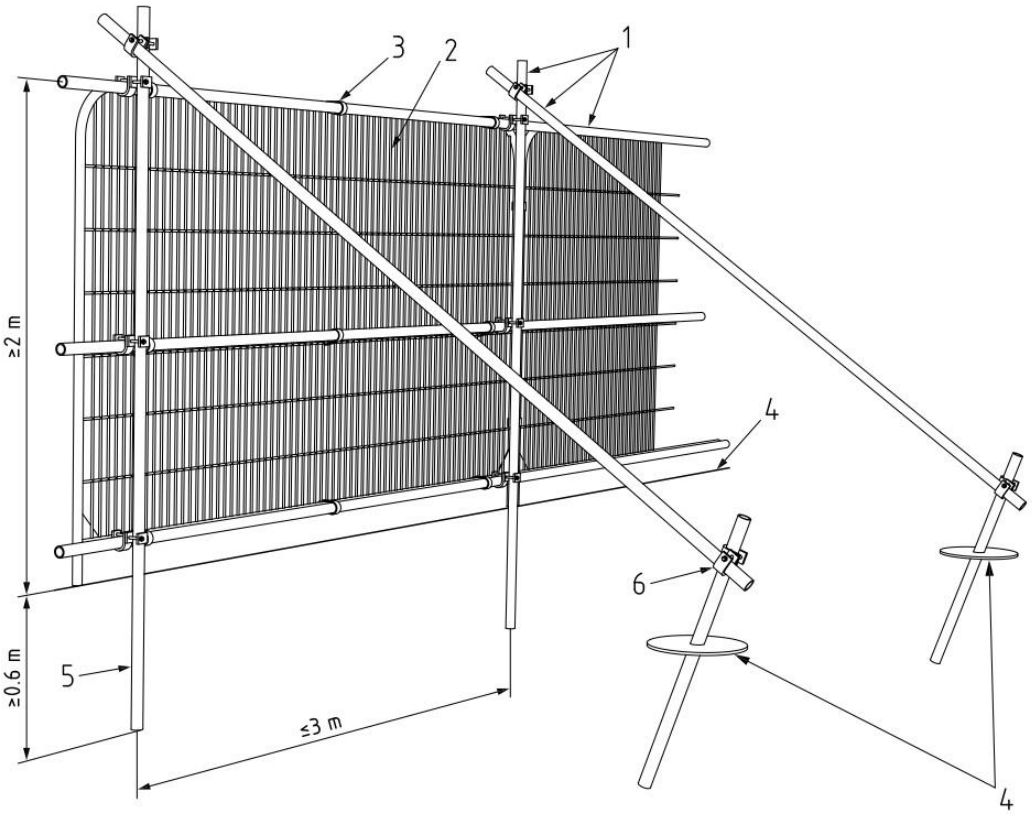
Figure 1 illustrates the differences between a square and a circle in area. Where the distance from the centre of the tree to the corner of the square is greater than the radius of the circle (r), but the distance from the centre of the tree to the side of the square is greater than the radius of the circle (r), the total area will remain the same. The minimum barrier distance from the tree is calculated by taking the length of the side and dividing it by two.

Clarification note on the RPA radius

The RPA radius is not the automatic minimum distance of the tree protection. It is a notional figure for use as a means of calculating the actual area of the RPA. BS5837 clarifies this under *Section 3.7 Root Protection Area (RPA) – layout design tool indicating the minimum area around a tree deemed to contain sufficient roots and rooting volume to maintain the trees viability, and where the protection of the roots and soil structure is treated as a priority.*

Appendix 3 – Example of Tree Protective Fencing

Figure 2 **Default specification for protective barrier**



Key

1 Standard scaffold poles
2 Heavy gauge 2 m tall galvanized tube and welded mesh infill panels
3 Panels secured to uprights and cross-members with wire ties
4 Ground level
5 Uprights driven into the ground until secure (minimum depth 0.6 m)
6 Standard scaffold clamps

Appendix 4 – Example of Tree Protective Signs

Appendix 5 – Example of Temporary Ground Protection

DuraDeck

PRODUCT SPECIFICATIONS
DD1

Traction Surface: **Double-traction tread design includes two parallel traction treads positioned at 90 degrees to adjacent double traction tread sets.**

Module Size:
Length: 8' / 2.44 m
Width: 4' / 1.22 m
Module Size: 32 sq/ft / 2.973 sq/meters
Thickness: ½" thick mat + 3/8" cleat

Module Weight: 86 lbs. / 39.01 kg.
Per Square Foot: 2.69 lbs. / 43 oz. / 1.22 kg. / 1219 grams
Per Square Meter: 28.60 lbs. / 12.97 kg.

Colors: Black, White.
Custom colors available (minimum order required).

Material: Black High-Density Polyethylene (HDPE) post-industrial recycled plastic, naturally UV resistant due to the carbon black used for color. White mats available.

Test Results:

	ASTM	Units	Typical Values
Melt Index	D 1238	g/10min	4.9
Density	D 792	g/cm^3	.960
Tensile Strength @ Yield 50mm/min	D 638	mpa (psi)	30 (4,350)
Elongation @ Break 50mm/min	D 638	%	1 500
Flexural Modulus	D 790	mpa (psi)	1 240 (180,000)
Hardness, Shore D	D 2240	--	70
Compressive Strength:		D695-02a	psi 2,843
Flammability Resistance:	UL-94 HB		Passed

Tread Pattern: **DD1:** Rugged double-traction tread on both sides

Support Structure: Matting incorporates multi-directional structural support (cleat design) allowing for distribution or dispersion of PSI weight factors. Not intended for bridging.

Weight Loading: Varies, depending on sub-surface, up to 80 tons capacity.

Ground Surface: DuraDeck mats are designed to be used with no ground preparation over grass, gravel, soil, concrete, asphalt, mud and sandy soil conditions.

Connection System: DuraDeck mats have eight holes: one in each corner and four in the center line (two on each 8ft side) to create multi-directional roadways of nearly any size or shape. Mats can be connected using metal DuraLink connectors. DuraLinks do not require tools to install.

Shipping: Pallet maximum is 50 units (4' x 8')
20' Ocean Container: 250 – 4' x 8' unit order and/or equal to 29,240 lbs.
40' Ocean Container: 500 – 4' x 8' unit order and/or equal to 43,000 lbs.

Warranty: 7 years against cracking and breaking under normal use.