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

Client: Kildare County Council
Site: Confey Part 8
Captains Hill
Leixlip
Kildare

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ARBORICULTURAL IMPACT ASSESSMENT & METHOD STATEMENTS

John Morris Arboricultural Consultancy

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Purpose of Document

This report provides an assessment of trees and hedgerows on land at Captains Hill in Leixlip, County Kildare, in accordance with BS5837:2012 *Trees in relation to design, demolition and construction – Recommendations*.

It provides an overview of the constraints and opportunities posed by existing trees and hedgerows on or within influencing distance of the site, and assesses the impacts of the scheme on 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 proposed works 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 proposed works upon trees and protection measures that should be adopted during construction.

The information contained within this report allows Kildare County Council to assess tree and hedgerow related issues associated with the scheme.

Executive Summary

The proposals provide for pedestrian and cycle improvements to Captain's Hill (R149), Leixlip. The site extends to the following locations:

- Captain's Hill (R149), from Main Street Leixlip to Cope Bridge
- Existing uncontrolled 'T' junctions with River Forest and Newtown Glendale
- Existing site roads to Rye River Mall, Riverdale, St Mary's Park, Distillery Lane, Avondale

In summary, the proposed development comprises of upgrading the existing junction with Main Street, providing improved pedestrian crossing points on side roads, providing segregated active travel lanes North of Distillery Land, realigning the carriageway, and reconfiguration of the existing 'T' junctions at River Forest and Newtown Glendale to improve safety and efficiency for active travel users.

The proposal will require the removal of 51 of the 224 trees and hedges surveyed, along Captains Hill and public open green space between Captains Hill, Glendale, Newtown Glendale and Newtown Park.

The reason for tree and hedgerow removals is to facilitate footpath widening, rod junctions and new cycle lanes.

To mitigate the removal of trees and two hedgerows it is recommended to plant a diverse variety of new trees and hedgerows across the lands. The aim of new tree planting should be to increase species diversity and therefore the resilience of the local tree population against future threats posed by climate change, pests and disease. The aim should also be to increase future canopy, thereby providing benefits to the local community, wildlife and biodiversity.

The following measures are required to ensure the protection of retained trees and hedgerows during construction:

- Tree Protective Fencing
- Construction Exclusion Zones

CONTENTS

ATTACHMENTS

DOCUMENT TITLE	DOCUMENT REFERENCE
TREE SCHEDULE	25-277-01
TREE CONSTRAINTS PLAN	25-277-02
TREE IMPACT & PROTECTION PLAN	25-277-03

1. INTRODUCTION

Instruction

1.1. Instruction was received from Ballymore Ireland on behalf of Kildare County Council, on 21st May 2025 to prepare an arboricultural report in connection with an Active Travel Scheme along Main Street and Captain's Hill in Leixlip, County Kildare.

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 in the preparation of a report for submission with a planning application.

Site

1.4. The scheme will extend for approximately 1km, linking Leixlip Main Street through Captain's Hill.

2. TREE SURVEY

Site Visit

2.1. The tree and hedgerow survey was undertaken on 12th & 13th June 2025. A survey of additional lands was undertaken on 18th September 2025.

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

2.3. A copy of the survey data can be found in the Tree Schedule (Ref: 25-277-01) attached to this report.

2.4. The extent of the tree survey has been marked on the Tree Constraints Plan (Ref: 25-277-02) attached to this report.

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

2.6. 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.

2.7. The purpose of the tree survey was to provide guidance to the design team on the constraints and opportunities posed by trees and hedgerows, to inform the design and layout of the Site.

2.8. The results of the survey allow the opportunity to balance the retention of significant trees and hedgerows against the opportunity to enhance the existing tree stock through proactive management.

2.9. A summary of trees surveyed by BS5837 retention category is contained in Table 1.

	Category A	Category B	Category C	Category U	Total
No. of trees	14	87	109	14	**224**

Captain's Hill – Adjacent to Newtown Park

2.10. The primary concentration of tree cover along Captain's Hill is located adjacent to the public open space opposite Newtown Park. A wide, predominantly native hedgerow comprised of hawthorn (*Crataegus monogyna)*, sycamore (*Acer pseudoplatanus)* and ash (*Fraxinus excelsior)* runs parallel to the road corridor. This hedgerow serves as a buffer between residential dwellings and the road, providing screening and visual amenity in the local streetscape.

2.11. Within the hedgerow, numerous mature specimens of ash and sycamore are in generally good health. A few ash display symptoms consistent with the early stages of Ash Dieback (*Hymenoscyphus fraxineus)* though with a possibility of retaining in the medium term through management and monitoring to provide bulking and structure within the hedgerow, while other species become established to fill gaps. A group of dead elm within the hedgerow requires removal. Directly to the east of the hedgerow, a linear planting of young Pedunculate oak (*Quercus robur)* is well established with good potential to offer benefits long into the future.

Western Periphery of Captain's Hill – School Grounds and Library

2.12. West of Captain's Hill, adjacent to the school perimeter, a linear group of early-mature beech (Fagus sylvatica), ash and whitebeam (Sorbus aria) extends from the hedge line. More recently established rowan (Sorbus aucuparia) are positioned along the adjacent grass verge, complemented by mixed groups of early mature red horse chestnut (Aesculus x carnea), sycamore and whitebeam from within private grounds. Adjacent to the library, there is a notable grouping of mature broadleaf and coniferous specimens—including sycamore, beech, horse chestnut (Aesculus hippocastanum), field maple (Acer campestre) and Monterey cypress (Cupressus macrocarpa) which provide prominent canopy cover in the streetscape.

Avondale Pedestrian Corridor and Approach to St Mary's Park

2.13. The pedestrian route through Avondale opens onto a landscaped open grassed area, defined by semi-formal hedgerows and sporadic specimen trees. Trees in this section include clusters of wild cherry (*Prunus avium)* and more recently planted Serviceberry (*Amelanchier lamarckii)* lining the internal roads. Descending towards St Mary's Park, the boundary is defined by a mixed hedgerow containing semi-mature ash and lime (*Tilia × europaea)*, augmented by recent plantings of crab apple (*Malus spp.)* and ornamental shrub groups.

Southern Survey Areas

2.14. The smaller survey areas to the south leading to the town centre are typified by semi-mature street trees interspersed with informal scrub and hedge assemblages as well as a prominent semi- mature ash in fair condition on the corner of Rye River Mall.

Photographic Record

Figure 1. Dense hedgerow with early mature ash and sycamore standards lining Captain's Hill providing a valuable screen to the main road.

Figure 2. Young oak avenue behind the roadside hedge providing some form of future proofing for road screening.

Figure 3. Mature tree cover West of Captain's Hill adjacent to the Library contributing to a prominent treescape.

Figure 4. Ash and hawthorn at the junction of Rye River Mall.

Figure 5. Mixed hedgerow with young crab apple and ornamental shrubs at the junction with St Mary's Park.

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.

3.5. 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.

3.6. Protection of the soil environment in which trees grow is therefore essential to ensure tree vitality.

3.7. 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.

Impacts of Construction & Development

3.8. 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

3.9. 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.

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

2.

3.11. 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.

3.12. 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.

3.13. 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

3.14. 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 in order to create a harmonious relationship between trees and the new built environment.

4. PLANNING POLICY, STATUTORY & NON-STATUTORY CONSIDERATIONS

Planning Policy

4.1. The National Planning Framework 'Project Ireland 2040' and National Development Plan (2018-2027) 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 Kildare County Council (KCC), 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 KCC is the **Kildare County Development Plan (2023-2029).**

Kildare County Development Plan (2023-2029)

4.4. The Kildare County Development Plan (2023-2029) provides guidance for trees in relation to proposals of development as follows:

12 Biodiversity & Green Infrastructure

12.9 Trees, Woodlands and Hedgerows

BI P6 *Recognise the important contribution trees and hedgerows make to the county biodiversity resource climate mitigation, resilience and adaptation.*

BI O26 *Prevent, in the first instance, the removal of hedgerows to facilitate development. Where their removal is unavoidable, same must be clearly and satisfactorily demonstrated to the Planning Authority. In any event, removal shall be kept to an absolute minimum and there shall be a requirement for mitigation planting comprising a hedge of similar length and species composition to the original, established as close as is practicable to the original and where possible linking to existing adjacent hedges. Ideally, native plants of a local provenance and origin should be used for any such planting. Removal of hedgerows and trees prior to submitting a planning application will be viewed negatively by the planning authority and may result in an outright refusal.*

BI O27 *Require the retention and appropriate management of hedgerows and to require infill or suitably sized transplanted planting where possible in order to ensure an uninterrupted green infrastructure network.*

BI O28 *Promote the integration of boundary hedges within and along development sites into development design so as to avoid "trapped hedges" located to the boundary of houses within the development layout. Encourage the planting of woodlands, trees and hedgerows as part of new developments and as part of the Council's own landscaping works ideally using native plants of local provenance and origin.*

BI O29 *Require the undertaking of a comprehensive tree survey carried out by a suitably qualified arborist where development proposals require felling of mature trees; the tree survey shall assess the condition, ecological and amenity value of the tree stock proposed for removal as well as mitigation planting and a management scheme. It should be noted that rotting and decaying trees are an integral part of a woodland ecosystem and can host a range of fungi and invertebrates, important for biodiversity. While single or avenue trees that are decaying may be removed, others that are part of group or cluster may be subject to retention.*

BI O30 *Ensure a Tree Management Plan is provided to ensure that trees are adequately protected during development and incorporated into the design of new developments.*

BI O31 *Restrict the cutting of hedges during the bird-nesting season (1st March until 31st August), except in certain legally defined circumstances, in accordance with the provisions of the Wildlife (Amendment) Act 2000.*

BI O32 *Protect trees which are the subject of Tree Preservation Orders (see Table 12.3) and the 57 Champion and Heritage Trees in Kildare, which are identified on the Tree Register of Ireland.*

BI O33 *Ensure that when considering new forest proposals: a) Landscapes of scenic value are not unduly eroded. b) Areas with environmental and archaeological protections are safeguarded. c) A mixture of broadleaf and native conifer species (yew, juniper, and Scot's pine) are planted where possible so as to support a variety of flora and fauna species and to enliven*

forestry landscapes. d) Promote the avoidance of deforestation or commercial afforestation 399 within Natura 2000 sites unless directly linked to the management of the site for its qualifying interests.

BI O34 *Manage, maintain, enhance, preserve, promote, encourage, and facilitate, as far as practicable, the preservation, proper provision, and retention of the existing network of native ancient woodlands and semi- natural woodlands of amenity value especially broadleaf species.*

BI O35 *Protect existing woodlands and trees and substantial areas of deciduous forest which are of amenity value and/or contribute to and interact with their landscape character and ensure that proper provision is made for their protection and management.*

BI O36 *Natural regeneration of peatlands, river, canal and railway corridors, grass verges along public roads and existing and future greenways shall be encouraged and the use of "Wildflower mixes" shall not be permitted unless they can be certified as being of both native Irish provenance and origin. Where tree planting occurs within semi-natural areas, native species of local provenance and origin should ideally be used, however in the interests of species diversity, non-native species may also be considered. Reduced mowing of vegetation along peatlands, river, canal, and railway corridors is encouraged.*

4.5. The Kildare County Development Plan (2023-2029) has influenced the design proposals by ensuring that the existing trees and hedgerows have been considered in the context of planning policy and retained where appropriate.

Tree Preservation Orders & Conservation Areas

4.6. 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.

4.7. The principle 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.

4.8. A review of the Kildare County Development Plan (2023-2029) indicates that at the time of the development plan, there were no TPO's in place upon the Site (Table 12.3).

Special Amenity Area Orders

4.9. A National Special Amenity Area is a designation for a landscape of national importance for its aesthetic and/or recreational value.

4.10. Planning authorities are empowered (under section 202 of the Planning and Development Act 2000), to make a Special Amenity Area Order (SAAO) for reasons of outstanding natural beauty or its special recreational value and having regard to any benefits for nature conservation. The purpose is to preserve and enhance landscape character and to prevent and limit development.

4.11. A review of the Kildare County Development Plan (2023-2029) indicates that the Site is not within a SAAO.

Location	TPO reference	Map reference (OS map No)
Clane	1987/1	OS 6"14
Ballymore Eustace	1991/1	OS 6"29
Clogheen (Moore Abbey)	1988/1	OS 6"28
Clongowes	1987/1	OS 6" 14

Table 12.3 - *Tree Preservation Orders in Co. Kildare*

Felling Licences

4.12. 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

4.13. The cutting or 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. The proposals provide for pedestrian and cycle improvements to Captain's Hill (R149), Leixlip. The site extends to the following locations:

- Captain's Hill (R149), from Main Street Leixlip to Cope Bridge
- Existing uncontrolled 'T' junctions with River Forest and Newtown Glendale
- Existing site roads to Rye River Mall, Riverdale, St Mary's Park, Distillery Lane, Avondale

5.2. In summary, the proposed development comprises of upgrading the existing junction with Main Street, providing improved pedestrian crossing points on side roads, providing segregated active travel lanes North of Distillery Land, realigning the carriageway, and reconfiguration of the existing 'T' junctions at River Forest and Newtown Glendale to improve safety and efficiency for active travel users.

Design Principles

5.3. The design layout has been directly and indirectly influenced by the existing tree cover on site. The default position has been to avoid development within the canopy or RPA of any retained tree, however where this has not been possible a hierarchy of mitigation has been applied, as illustrated in Figure 6.

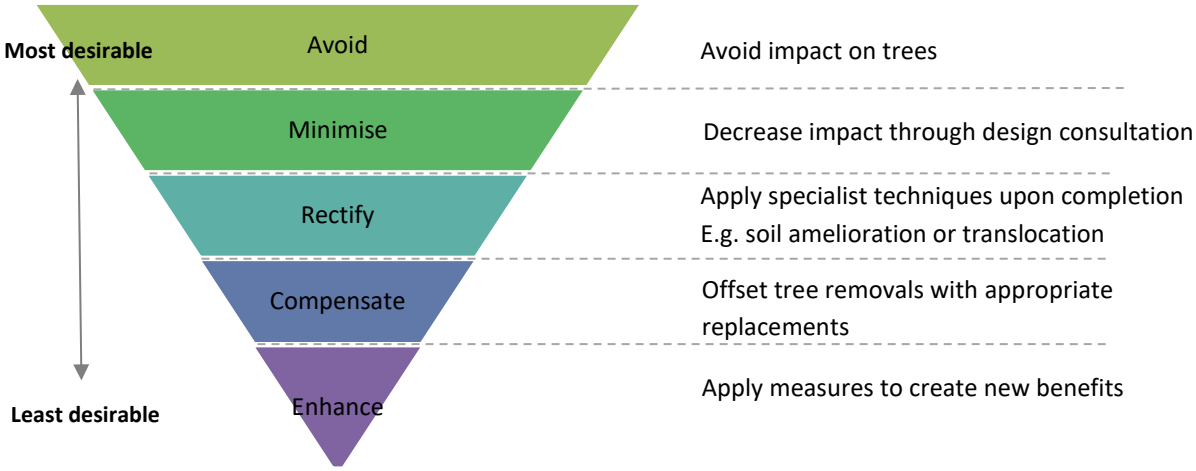


Figure 6. Trees and Development Mitigation Hierarchy (John Morris Arboricultural Consultancy, 2020).

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 also 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 proposal will require removal of:

2, 3, 5, 7, 8, 9, H10, 11, 12, 13, 14, 15, 16, 18, 19, 20, 21, 23, 24, 25, H26, 27, 30, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, H73 (part), 80, 81, 82, 91, 92, 94, 97, 101, 102, 110 & 162 and H181 (part).

5.7. This is 51 or 23% of the 224 trees and hedges surveyed.

5.8. The reason for these removals is to facilitate widening of existing footpaths, junctions and new cycle lanes.

5.9. Those trees and parts of hedgerows to be removed are illustrated on the Tree Impact & Protection Plan (Ref: 25-277-03) attached to this report. Details can also be found in the attached Tree Schedule.

Pruning of Hedgerows

5.10. Pruning of hedgerows along the edge of public open space on Captains Hills will require pruning. To ensure these hedgerows remain in fair health and condition any future pruning works to hedgerows should be undertaken in accordance with 7.11 of BS3998:2010 *Tree work - Recommendations* as follows:

> ***7.11 Pruning of overgrown hedges***
>
> *Pruning of overgrown hedges should be carried out in such a way as to minimise disfigurement and prevent dieback, and to allow the production of new foliage. Final pruning cuts should be made in accordance with 7.2.5. The timing of the work, and its impact on habitat and wildlife, should be determined in accordance with Clause 5.*
>
> ***NOTE** Excessive pruning can be detrimental to certain species of hedging plants, especially conifers. BS 7370-4 gives recommendations for the routine maintenance of hedges.*

Summary of Impacts

5.11. Table 2 provides a summary of impacts upon retained trees.

Table 2. Summary of Impacts to retained trees

Impact	Required within RPA of trees?	Details
Ground Levels	No	
Incursions	No	
Excavations	No	
Services	No	
Access	No	
Boundary Treatments	No	
Landscaping	Yes	See Arboricultural Method Statement in Chapter 6
Other	No	

5.12. Table 3 provides percentage of trees to be removed by BS5837 retention category.

Table 3. Number and percentage of trees to be removed by BS5837 retention category.

	Category A	Category B	Category C	Category U
No. of trees	2	22	27	0
Percentage of trees	14%	25%	25%	0

5.13. Table 4 provides percentage of trees to be removed by age class.

Table 4. Number and percentage of trees to be removed by age class.

	Young	Semi-mature	Early mature	Mature	Over Mature	Ancient or Veteran
No. of trees	8	24	16	3	0	0
Percentage of trees	26%	22%	22%	27%	0	0

Mitigation & Improvements

5.14. To mitigate the removal of trees and two hedgerows it is recommended to plant a diverse variety of new trees and hedgerows across the lands. The aim of new tree planting should be to increase species diversity and therefore the resilience of the local tree population against future threats posed by climate change, pests and disease. The aim should also be to increase future canopy, thereby providing benefits to the local community, wildlife and biodiversity.

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.

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.

Monitoring

6.6. Once works commence upon the site the role of the project arboriculturists role will switch to monitoring compliance with arboricultural planning conditions, provision of advice in relation to tree related matters and supervision of sensitive works that may impact upon retained trees (if required).

Key Responsibilities

6.7. 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

6.8. 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.

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

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

6.11. 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, a number of fencing/protection solutions will be required including the Heras 151 system of fencing, timber boards and hessian sacking wrapped in chestnut cleft pale.

6.12. Details of the various types of fencing is provided in Appendix 2.

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

6.14. An example of a tree protection sign is provided in Appendix 3.

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

6.16. 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.

Site Compounds & Facilities

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

Site Cranes, Piling Rigs and Machinery

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

Pollution Control

6.19. 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

6.20. 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.

6.21. 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.

6.22. 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.

6.23. 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.

6.24. 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.

6.25. An example of temporary ground protection measures can be found in Appendix 4.

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

6.27. 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 to ensure that there is no excavation or compaction of the original surface or change in ground levels.

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

6.29. 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.

Permanent Ground Protection

6.30. Where permanent hard surfaces are required within the RPA, there must be no excavation into the soil, either through the lowering of levels and/or scraping, other than the removal of turf or other surface vegetation, using hand tools only.

6.31. A 'No-dig' solution should be implemented in accordance with industry best practice and in particular with reference to Arboricultural Practice Note 12 (APN12) which provides details of the 'No-dig' method of construction. The area directly beneath the finished hard surface and on top of the RPA should be protected by the installation of a three-dimensional cellular confinement system, or a suitable alternative solution (e.g. pile and beam, screw piles or other root bridging technique) as specified by the project structural engineer.

6.32. The suitability and type of permanent ground protection required will depend on the existing properties and load bearing capacity of the soil, and the future use and load bearing capacity requirements of the site and should therefore be specified by the project structural engineer.

Three-Dimensional Cellular Confinement Systems

6.33. This is a load bearing system which protects roots from the effects of compaction from regular vehicular, cycle or pedestrian movement. A range of products are offered by various manufacturers but whatever system is used, the end result must be that the underlying soil or rooting environment remains undisturbed and retains the capacity to support existing and new root growth.

6.34. Details of three-dimensional cellular confinement system and general guidance on its installation can be found in Appendix 5. It will be the responsibility of the contractor to ensure that whatever system is used, it is installed in accordance with the latest guidelines provided by the relevant manufacturer.

Installation of Lighting Columns / Street Signs / Street Furniture / Railings

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

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

6.37. 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.

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

6.39. 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**).

6.40. 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.

Installation of Services

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

6.42. 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'.

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

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

Soft Landscaping

6.45. 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.

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

6.47. 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.

6.48. The use of rotavators within RPAs is prohibited.

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

Excavations and Removal of Existing Surfaces

6.50. 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.

6.51. 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.

6.52. 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.

6.53. 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

6.54. 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.

6.55. 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.

6.56. 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.

6.57. 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.

6.58. New surfaces and upgraded surfaces should be set back from the base of stems by a minimum of 50mm to allow space for future growth and minimise the risk of distortion with new surface.

7. ABOUT THE AUTHOR & LIMITATIONS

Authors Qualifications & Experience

7.1. This report has been written by John Morris, Director and Principal Arboricultural Consultant 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 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.

7.5. 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.

7.6. Trees were assessed on 12th & 13th June 2025 and 18th September and the information gathered

during the survey pertains to that moment in time.

7.7. The observations within this report will remain valid for two years from the date of inspection unless conditions around trees change, or works to trees are undertaken that not recommended within this report.

7.8. The location of trees places reliance on the accuracy of the topographical survey.

7.9. 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.

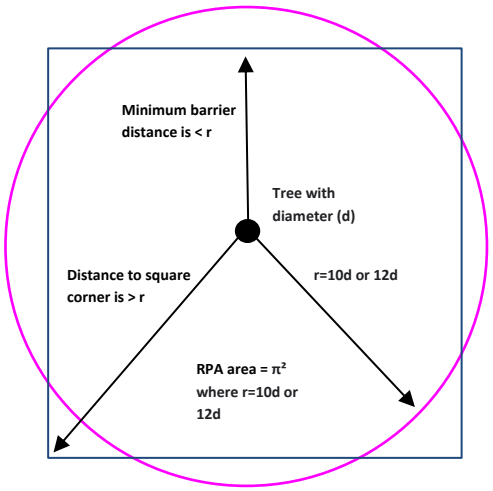


Figure 1. Illustration of area calculations and minimum barrier distances

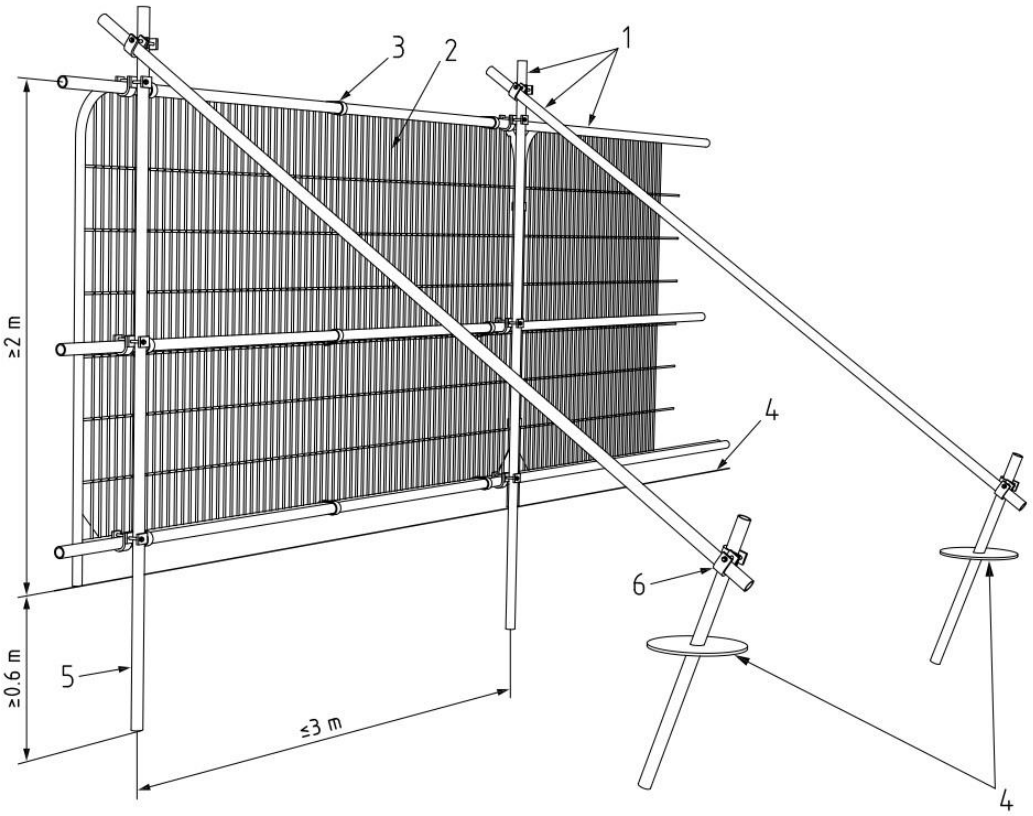
Figure 1 illustrates the differences between a square and a circle in area. Where the distance from the centre of the tree to the corner of the square is greater than the radius of the circle (r), but the distance from the centre of the tree to the side of the square is greater than the radius of the 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.