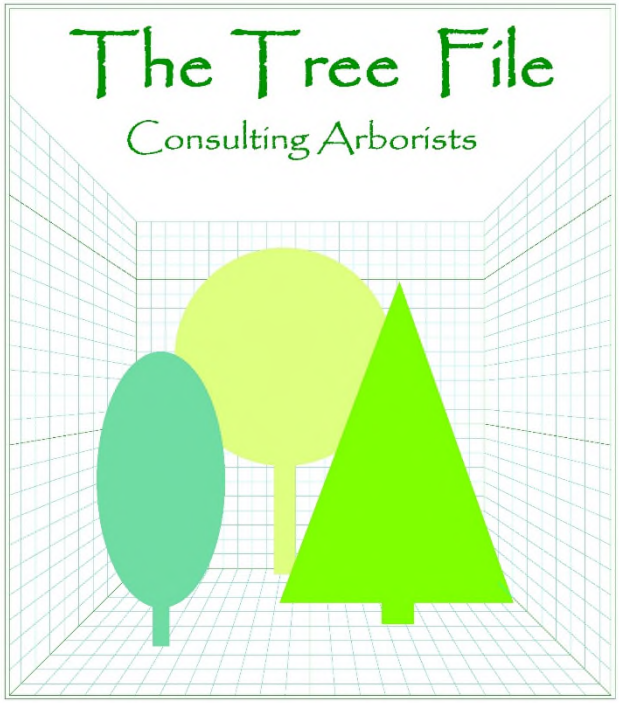

Arboricultural Report
Holy Cross College SHD
Holy Cross College
Clonliffe Road, Dublin 3 and
Drumcondra Road Lower, Drumcondra
Dublin 9
May 2021

The Tree File Ltd
Consulting Arborists
Ashgrove House
26 Foxrock Court
Dublin 18
D18 R2K1
086-3819011

Contents

Associated Drawings

This report must be read in conjunction with the drawings noted below-

Drawing Title	Drawing Subject
1) Clonliffe Tree Constraints Plan (Over 4 A1 sized drawings including North-East, North-West, South-East and South-West)	**Tree Constraints Plan** A plan depicting the predevelopment location, size, calculated constraints, and simplified tree quality category system
2) Clonliffe Tree Impacts Plan (Over 4 A1 sized drawings including North-East, North-West, South-East and South-West)	**Tree Impacts Plan** This plan represents the effects of the proposed development works on the above tree population and depicts trees to be retained and removed.
3) Clonliffe Tree Protection Plan (Over 4 A1 sized drawings including North-East, North-West, South-East and South-West)	**Tree Protection Plan** This plan depicts the nature, location and extent of tree protection measures required to provide for sustainable tree retention.
4) Clonliffe Tree Cover History	A schematic interpretation of tree ages and histories regarding trees currently on site.

1 Introduction

1.1 This report was commissioned by-
CWTC Multi Family ICAV acting on behalf of its sub-fund DBTR DR1 Fund

This report has been prepared by-
Andy Worsnop Tech Arbor A, NCH Arb (PTI LANTRA)
The Tree File Ltd
Ashgrove House
Kill Avenue
Dun Laoghaire
Co Dublin

Qualifications and Experience

1.2 Andrew Worsnop gained his NCH (Arbor) in 1981, studies Arboricultural to Level 6 (UK) and in 2008 gained his "Tech Arbor. A" and PTI (LANTRA) (Professional Tree Inspection) Sinse 1983 he has worked continuously in Arboriculture. 1988, began to undertake all aspects of report writing, Tree Survey compilation and litigation work for Southern Tree Surgeons (Irl) Ltd and for The F.A. Bartlett Tree Expert Co (Ireland) Ltd subsequent to their takeover of Southern Tree Surgeons in 1996. Since May of 2002, he has been responsible for all such works undertaken by TreeForce Ltd and subsequently for The Tree File Ltd.

1.3 Experience to date includes the regular and ongoing submission of Arboricultural reporting to numerous planning authorities and An Bord Pleanala. Additionally, expert witness appearances have been provided in both circuit and high court. I have appeared on a number of expert panels at public enquiry hearings and have provided opinion in numerous occasions of litigation.

1.4 Projects to date include both public and private bodies and include some high profile sites such as "Dublin Castle" (OPW), "Farmliegh" (OPW), Mountjoy Square Restoration (Dublin City Council). St Otterans Hospital (Waterford), St Fintans Hospital (Portloaise), Cherry Orchard Hospital (Dublin), National Rehabilitation Hospital (Dublin), Trinity College Dublin, UCD, UCG, UCC, plus numerous additional sites for the HSE, the Dept of Education and the IDA. I have also worked directly for various city and county councils including Dublin City Council, Fingal County Council, DunLaoghaire Rathdown County Council, Meath County Council, Kildare County Council, Wexford County Council, Mayo County Council, Sligo County Council, Louth County Council. I have also works for organisations including Teagasc, Irish Water, Waterways Ireland,

Report Brief

1.5 An Arboricultural report has been requested in respect of the proposed development. As "BS5837: 2012 Trees in Relation to Design, Demolition and Construction – Recommendations" is the accepted frameworks for such reports, then its composition, inclusions and recommendations have been followed as a general basis for such reporting.

Report Context

1.6 This report makes up an Arboricultural review of the proposed development project. The report is based on an assessment of the site's trees in their current context. The report also assesses the sustainability of various trees in the post-development scenario. The report also reviews the effects and repercussions of the development and construction process upon those trees. It also provides information about the necessary tree protection and the avoidance of damage to trees during the construction process, necessary to achieve sustainable tree retention.

1.7 This assessment summarises the Arborist's findings and recommendations, arrived at after reviewing the proposed project details, as provided. This assessment also gives an evaluation of trees as defined and described in the tree survey at "Appendix 2". This report also includes a preliminary "Arboricultural Method Statement" at "Appendix 1" together with a Tree Protection Plan that illustrates the requisite conservation and protection methodologies necessary to maintain tree sustainability. This report is not intended as a critique of the proposed development but is an impartial assessment of the development implications relating to the sustainable retention of trees, whether that be any, some, or all trees. This report is for planning purposes only.

Report Limitations

1.8 This report relates to the Arborist's interpretation of information provided to him before the report compilation and gained by him during the undertaking of the site review and tree survey. The site review data is subject to the limitations as set out under "Inspection and Evaluation Limitations and Disclaimers" in "Appendix 2" of this report. The findings and recommendations made within this report are compiled, based upon the knowledge and expertise of the inspecting Arborist.

1.9 The "Implication Assessment" element of the report builds on assumptions and estimates, particularly in respect of how construction works might proceed on a day-to-day basis and appreciates the "design" stage of the project, as opposed to "detail design" or "construction" detail.

1.10 Many elements of the "Arboricultural Method Statement" are deliberately broad and generic. They will require review, amendment and consolidation at the construction

stage. For example, in respect of the size and nature of the equipment, plant and machinery that might be utilised by any potential building contractor and any details as may change at "detail design" or "construction detail" stages.

1.11 Accordingly, this assessment is premised on all its elements/recommendations, and the omission or alteration of any part of it, particularly the application of tree protection methodologies. Each of these factors can radically alter outcomes in respect of sustainable tree retention.

2 Report Summary

2.1 This report describes the tree population and Arboricultural scenario as it exists within the Holy Cross College context. It also intends to describe the likely Arboricultural implications of the proposed development on the current tree population. In this respect, this report deals both with the otherwise arbitrary development "red line" area as well as the broader ecclesiastical and educational lands as they currently exist.

2.2 The tree survey review of the site illustrates a tree population of reasonable condition, having received regular management over time, including the removal of faulty trees. Notwithstanding recent site safety and management tree felling works, the site still supports some low quality and unsustainable trees, that are not suitable for retention within a developed context.

2.3 The site history is reflected in its tree population, and though many trees to the east of Holy Cross College are young, much of the woodland belt to the west of the site and adjoining Drumcondra Road appears to be in the order of a century old or more. Only a small remnant of the original landscape associated with the Red House (Clonliffe house) remains. This landscape is now restricted to isolated pockets and particularly to the east of the access drive to Red House and adjoining the eastern façade of the gable walls of the housing terrace on Clonliffe Road. An analysis of the sites Arboricultural and tree cover history is included in section 4 of this report.

2.4 In respect of tree constraints, it is noted that the current tree population asserts a "root protection zone" constraint over more than 22% of available space within the red line area. The provision of planning required development densities and a development proposal including some blocks over basements, access roads and underground infrastructure as well as associated ground modifications to provide workable levels across the site will unavoidably consume space. The efficient development of the site must be considered in respect of the apparent availability of only circa 78% of total site space. This must also be considered considering the dispersed nature of trees across the site that is oftentimes unsympathetic to the efficient use of space. The efficient development of the site appears impossible without the loss of some trees.

2.5 A project of this scale unavoidably requires the use of large plant, machinery, workspace and access, consuming space beyond the simple footprint of proposed buildings and other structures. The consumption and use of this space will for the most part, be of a nature that cannot accommodate the conservation of soil environments and structure, on which existing trees are reliant.

2.6 Appreciating the above and as far as is practicably possible, the design ethos has been to design around the existing landscape. Most new structures will be in gaps and opening within the wooded landscape. Therefore the current design is considered broadly sympathetic to the existing landscape and its tree population. In this respect, a recognisable majority of the site's tree cover has been maintained.

2.7 Arboricultural understanding and investigations (see appendix 2) have guided project design. In some instances, works will occur where tree damage might be expected. However, in some instances, existing physiological barriers have prevented tree root entry into some areas, meaning that the works in those areas will have significantly less effect on those trees. Examples of this relate to works adjoining existing roads and thoroughfares. Specific investigations were undertaken, to review the effect of various roads on tree root development. The results are provided at "Appendix 2" and show that the roads had significant effects on tree rooting extent. In some instances, the road structure resulted in a cessation of root material within a short range of the road edge. In other instances, landscape features, will act as barriers to root development, such as ditches and existing diggings.

2.8 The survey area includes all the Clonliffe, and Holy Cross lands, as well as any directly adjoining lands that support trees. The development area that relates to the planning "red line" comprises a reduced proportion of the total sample area. The tree survey identifies 664 trees in total. The survey notes that the Holy Cross lands supports 518 trees, 296 of which lie within the "red line" area.

Trees on Application Site (red line area)	**Number of Trees/Groups**	**Percentage**
Total number 100%	296	100%
Total retained	179	60.5%
Total removed	117	39.5%
Total compensatory (new planting)	616	N/A
Trees off site:		
Total public trees	2	N/A

Trees on Holy Cross lands	**Number of Trees/Groups**	**Percentage**
Total number 100%	518	100%
Total retained	401	77.4%
Total removed	117	22.6%
Total compensatory (new planting)	616	N/A
Trees off site:		
Total public trees	2	N/A

Table 1

2.9 To date, it is assumed that the proposed works will see the loss of 117no. trees. This number includes the loss of 25no. low quality "Category U" trees that were recommended for removal regardless of any development works. This provides a loss of 92 trees are likely to otherwise have been suitable for retention.

2.10 Throughout the development, great efforts have been made to maximise tree retention by the adoption of necessary tree protection during the construction process. Such protection relies heavily on simple “construction exclusion” afforded by tree protection fencing during the construction phase. Tree protection also includes the use of specific materials and methodologies orientated towards maximising sustainability and for use where unavoidable works are required near trees for retention. Such works include the use of “low-impact” and “no-dig” processes, including manual works.

2.11 Additionally, design amendments have also been adopted; this will maximise tree retention further. These include bespoke structures, including elevated access on minimal foundations and retaining walls to avoid grading and earthworks near trees. In other instances, unavoidable proximities to trees have been addressed by the acceptance of limitations to access and the use of tree protection hoarding at positions particularly close to new structures, in the knowledge that all but pedestrian access will be lost.

2.12 In some instances optimal tree protection cannot be attained. However, the limited extent of encroachment, in conjunction with considerations such as those noted under clause 5.3.1, “a)” and “b)” (BS5837-2012) would suggest that the possible benefits of tree retention would out way immediate removal and replacement. In such instances and while appreciating some risk to sustainability, all the above preventions would be adopted as would additional treatments, potentially including structural tree pruning and interim irrigation.

2.13 Tree retention expectations are discussed later in this report. These outcomes assume the "Tree Protection Plan", and "Arboricultural Method Statement" as outlined in "Appendix 1", will be applied in full. Any changes that come about through amendments at detail/construction design, or as a result of changes relating to conditions of planning could alter the otherwise expected outcome.

2.14 In respect of longer-term Arboricultural management, attention is drawn to the Arboricultural Management Plan out lined at Appendix 3. In this, a framework is set out, explaining the needs surrounding the tree populations associated with the site. From the nature of the plan and appreciating that site safety will be a necessary and significant requirement of the plan is based on a system of review and response revolving about the regular review of retained trees and the maintaining of a regularly updated tree survey. In addition to this requirement, other requirements have been considered for maintaining a sustainable tree population on site whilst accounting for tree management in respect of site safety.

3 Site Description

3.1 The site area is located north of Dublin city centre, to the east of the Drumcondra Road, north of Clonliffe Road and the south-east of the Tolka River. The site includes the Holy Cross College and Diocesan Centre and its attendant lands. While much of the south-eastern site is broadly developed, including many buildings, much of the central, northern, and eastern site is still open, including lawns and playing fields.

3.2 The site is gently sloping, from the higher ground to the west, descending to the east and north-east and the River Tolka. The slope is not uniform, and there is a notable "step" in the site, where currently playing pitches to the north-east are lower than the central and western/south-western site.

3.3 As illustrated in Clonliffe Tree Constraints Plan, the site's tree population tends to take one of three forms. Firstly, in woodland blocks such as that towards the Drumcondra Road and at the "Red House". Secondly, in lines such as the line between the "Red House", and the site's main buildings or the Cypress line north of the Diocesan centre, Thirdly, spread across lawns as part of a dispersed "park-land" setting.

4 Nature of Project Works

4.1 In respect of the proposed planning application, the development has been described as-

4.1.1 The development will consist of the construction of a Build To Rent residential development set out in 12 no. blocks, ranging in height from 2 to 18 storeys, to accommodate 1614 no. apartments including a retail unit, a café unit, a crèche, and residential tenant amenity spaces. The development will include a single level basement under Blocks B2, B3 & C1, a single level basement under Block D2 and a podium level and single level basement under Block A1 to accommodate car parking spaces, bicycle parking, storage, services and plant areas. To facilitate the proposed development the scheme will involve the demolition of a number of existing structures on the site.

The proposed development sits as part of a wider Site Masterplan for the entire Holy Cross College lands which includes a permitted hotel development and future proposed GAA pitches and clubhouse.

The site contains a number of Protected Structures including The Seminary Building, Holy Cross Chapel, South Link Building, The Assembly Hall and The Ambulatory. The application proposes the renovation and extension of the Seminary Building to accommodate residential units and the renovation of the existing Holy Cross Chapel and Assembly Hall buildings for use as residential tenant amenity. The wider Holy

Cross College lands also includes Protected Structures including The Red House and the Archbishop's House (no works are proposed to these Structures).

The residential buildings are arranged around a number of proposed public open spaces and routes throughout the site with extensive landscaping and tree planting proposed. Communal amenity spaces will be located adjacent to residential buildings and at roof level throughout the scheme. To facilitate the proposed development the scheme will involve the removal of some existing trees on the site.

The site is proposed to be accessed by vehicles, cyclists and pedestrians from a widened entrance on Clonliffe Road, at the junction with Jones's Road and through the opening up of an unused access point on Drumcondra Road Lower at the junction with Hollybank Rd. An additional cyclist and pedestrian access is proposed through an existing access point on Holy Cross Avenue. Access from the Clonliffe Road entrance will also facilitate vehicular access to future proposed GAA pitches and clubhouse to the north of the site and to a permitted hotel on Clonliffe Road.

The proposed application includes all site landscaping works, green roofs, boundary treatments, PV panels at roof level, ESB Substations, lighting, servicing and utilities, signage, and associated and ancillary works, including site development works above and below ground.

5 Pre-Development Arboricultural Scenario

Historical Context

5.1 For the purposes of this review, reference has been made to various elements of historical mapping. Particularly, information has been gained from historical ordnance survey information maps. This includes ordinance survey map dates including 1843, 1865, 1875, 1889, 1907-8, 1935-6 and c1985.

5.2 Notwithstanding various lacunas, this information has been used to develop a reasonable understanding of how the landscape and particularly the tree population associated with the proposed development site, has developed, and changed over circa 175 years. It has also assisted in the development of the drawing "**Clonliffe Tree Cover History**" that intends to illustrate the history of those trees currently on the site.

Context

5.3 While the mapping information is in many respects, exceptionally detailed, it is in others, only representational, and therefore interpretation is subject to estimation.

5.4 It is appreciated that representations of trees, tree lines and wooded areas are rarely exact, but serve more as an indication or representation of reality. However, reasonable estimations can be made from symbols used of each of these representations. It is common to be able to differentiate between broadleaf, conifer, or mixed woodland, as

it is to separate a tree line from a woodland. It is more difficult to separate are solid woodlands from areas of mixed trees and grazing such as wood-pasture.

5.5 There is more accuracy found in maps of a site from the depiction of associated landscape features. Structures such as roads and paths, walls, fences and ditches that may define various parcels of land (i.e. field and paddocks) tend to be reasonably accurate. In this respect, referencing early depictions of a landscape with contemporary features can often provide help to corroborate estimations.

Site History

54.6 Reference to the earliest mapping of 1837-44(fig 1), shows that much of the subject site was originally associated with Clonliffe House, sometimes referred to as the "Red House". In 1837, this period dwelling already existed within what appears to have been an established and mature landscape including tree lined avenues. This map illustrates a tree lined avenue to the south, accessing Clonliffe Avenue, as well as areas of mixed woodland, or more likely, wood-pasture and planted field boundaries. These would include the entrance avenue and trees surrounding Clonliffe House and the trees adjoining the eastern gable of the Clonliffe Road terrace of houses. Note is made of other coincidences, such as the Lombardy Poplars that adjoin the River Tolka, however these trees are not of an age as to corroborate this, and therefore, it is assumed that an earlier population has been lost.

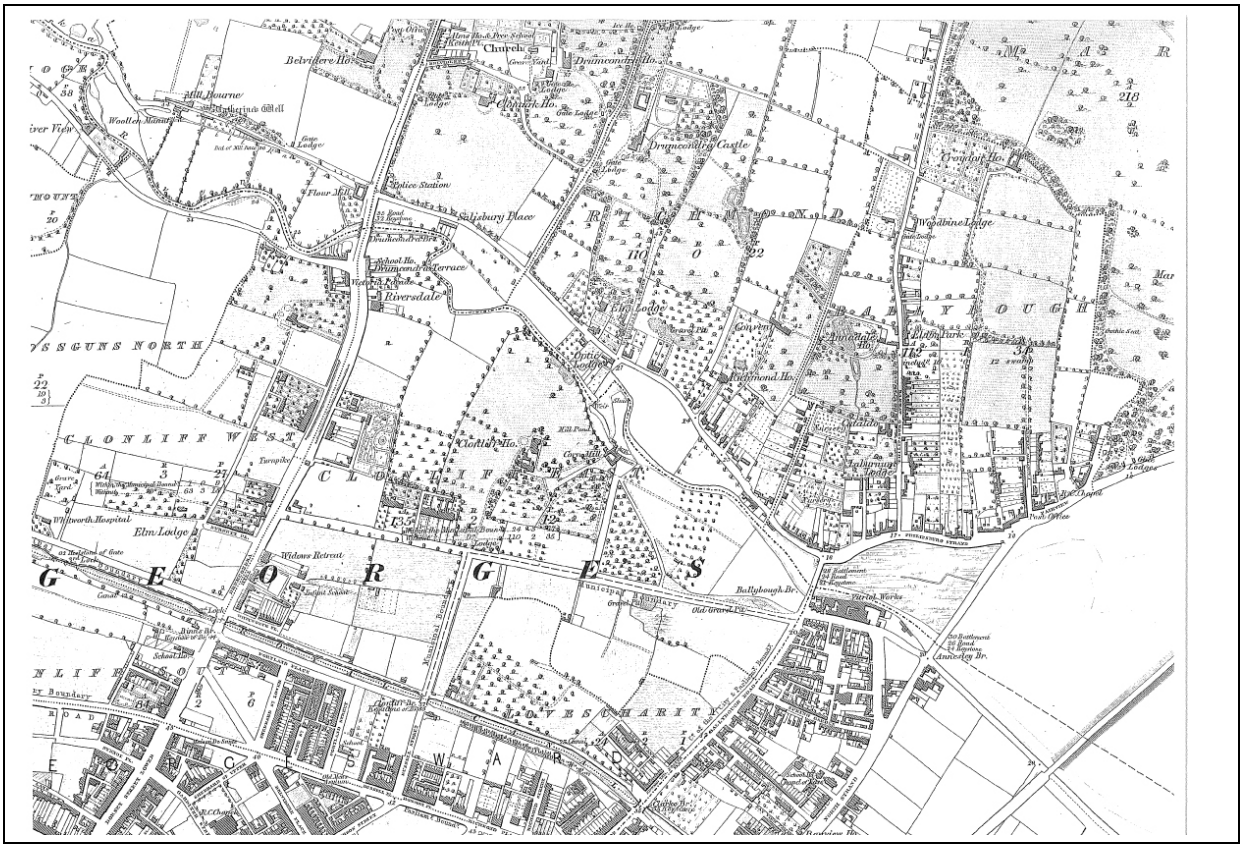

Fig 1 – Mapping of 1837-44

5.7 Overall, the earliest mapping of the mid-19th century is suggestive of a broadly open, parkland setting where trees define fields or comprise semi-ornamental wood-pasture that would allow for under-grazing by stock. In addition to this, some symbols and their spacing would suggest orchards, for example the symmetrical planting west of Clonliffe House and towards the south of where the College buildings stand today.

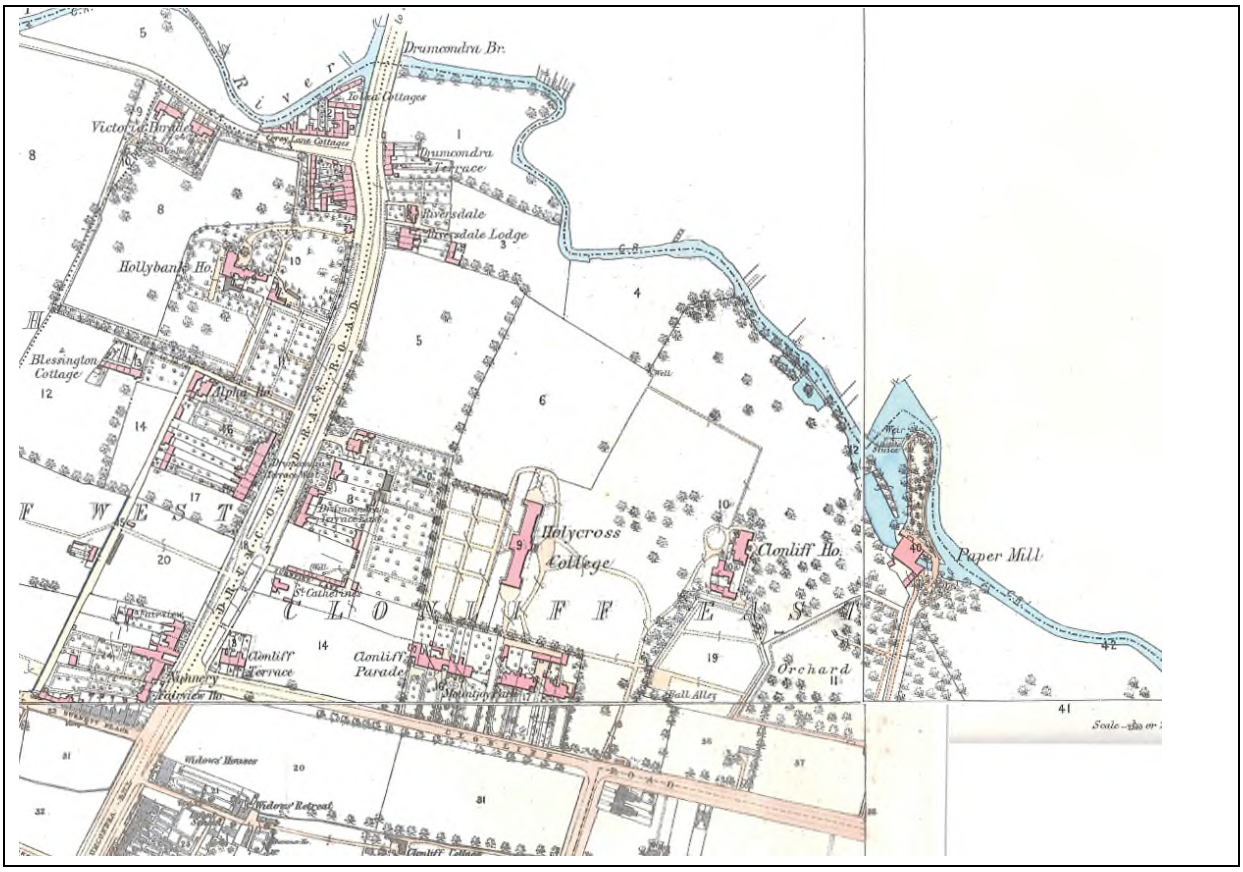

Fig 2 – Mapping of 1864-71

5.8 The mapping of 1864-71 (fig 2), illustrates substantial change over some 20 to 25 years, with the development of the primary College building as well as formal gardens to the west of this. Much of the apparent wood-pasture associated with the broader site remains, as do the field boundary plantings. However, a note is made that what was assumed to be an orchard, has been lost to make space for the College and that the area east of the College now supports entrance and access drives over a broad lawn-like area. Additionally, we note a reference to planting beside the Drumcondra Road, where the symbolism would suggest more mature trees. The symbols would further suggest a single line of trees as opposed to the belt we see today, and the line of trees is limited to the southern 50% of the boundary length. Elsewhere across the site there is little change.

5.9 The 1875-76 mapping (Fig 3) illustrates few changes to the site, other than a substantial extension to the College buildings, with the addition of the Church and other building to the south of the College.

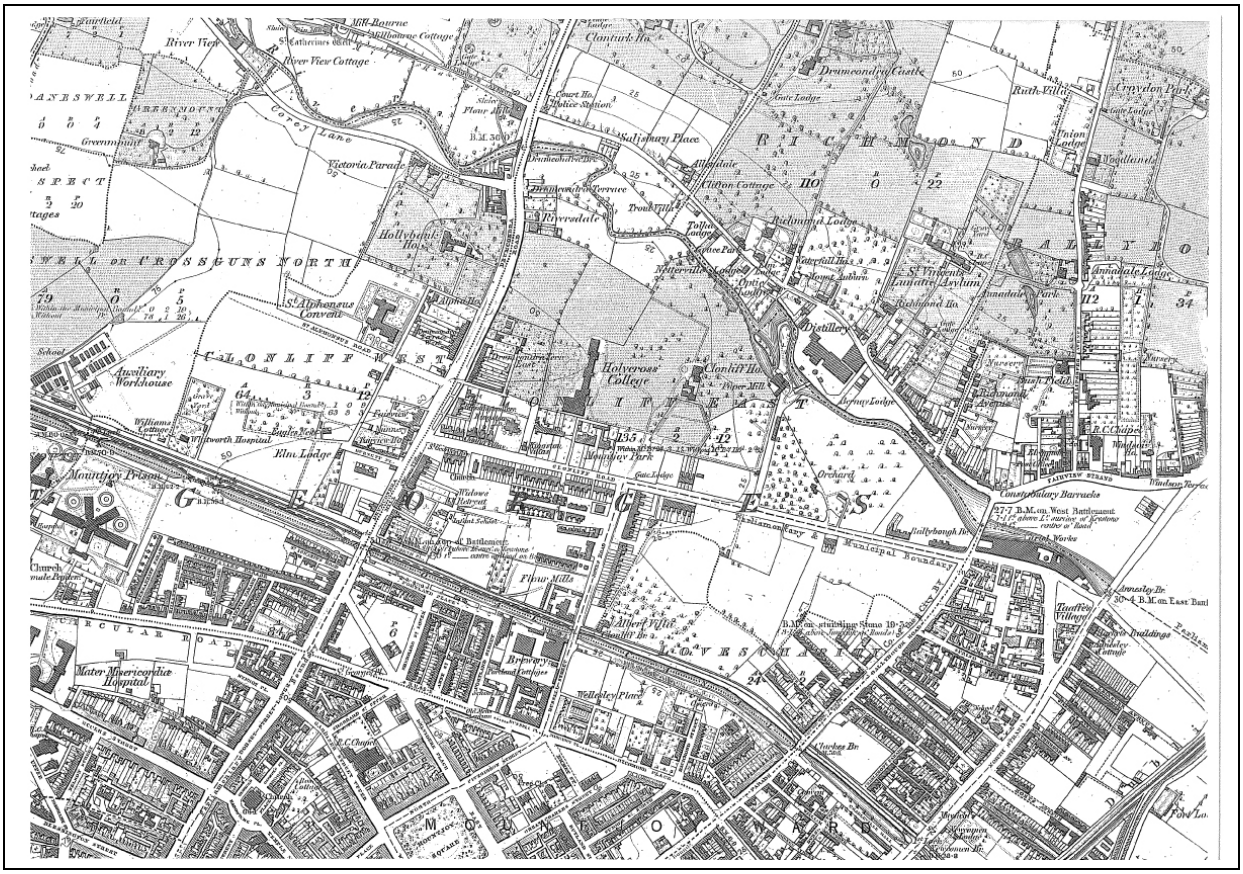

Fig 3 – Mapping of 1875-76

5.10 The 1875-89 mapping illustrates several changes across the site. In respect of the parkland setting west of Clonliffe House, a lot fewer and more dispersed trees are shown. Additionally, many of the earlier field boundaries are missing from the lands north of the College and there appear to be changes to the garden areas to the west of the College buildings.

5.11 We note that the College buildings have been extended to the north and that a new connecting road or drive has been created between Clonliffe House and the northern end of the newly extended College buildings. At the same time, we note that the original driveway that provided access to Clonliffe House and the College has been changed. The drive fork being moved south by between 40 and 50 metres and the previously circular drive, in front of the house has been removed.

5.12 As a contrast to the 1875-89 mapping (Fig 4), we note the development of the "Archbishops House" and that there are substantial changes to the garden areas, including the development of significant wooded corridors to the north. Particularly, we note the creation of the tree belt that adjoins the Drumcondra Road boundary, together with what is most likely to be the current path format. We also note the creation of a small group or spinney with previously open ground, circa 50 metres north of the Archbishops garden, as well as landscape planting associated with the College access drive.

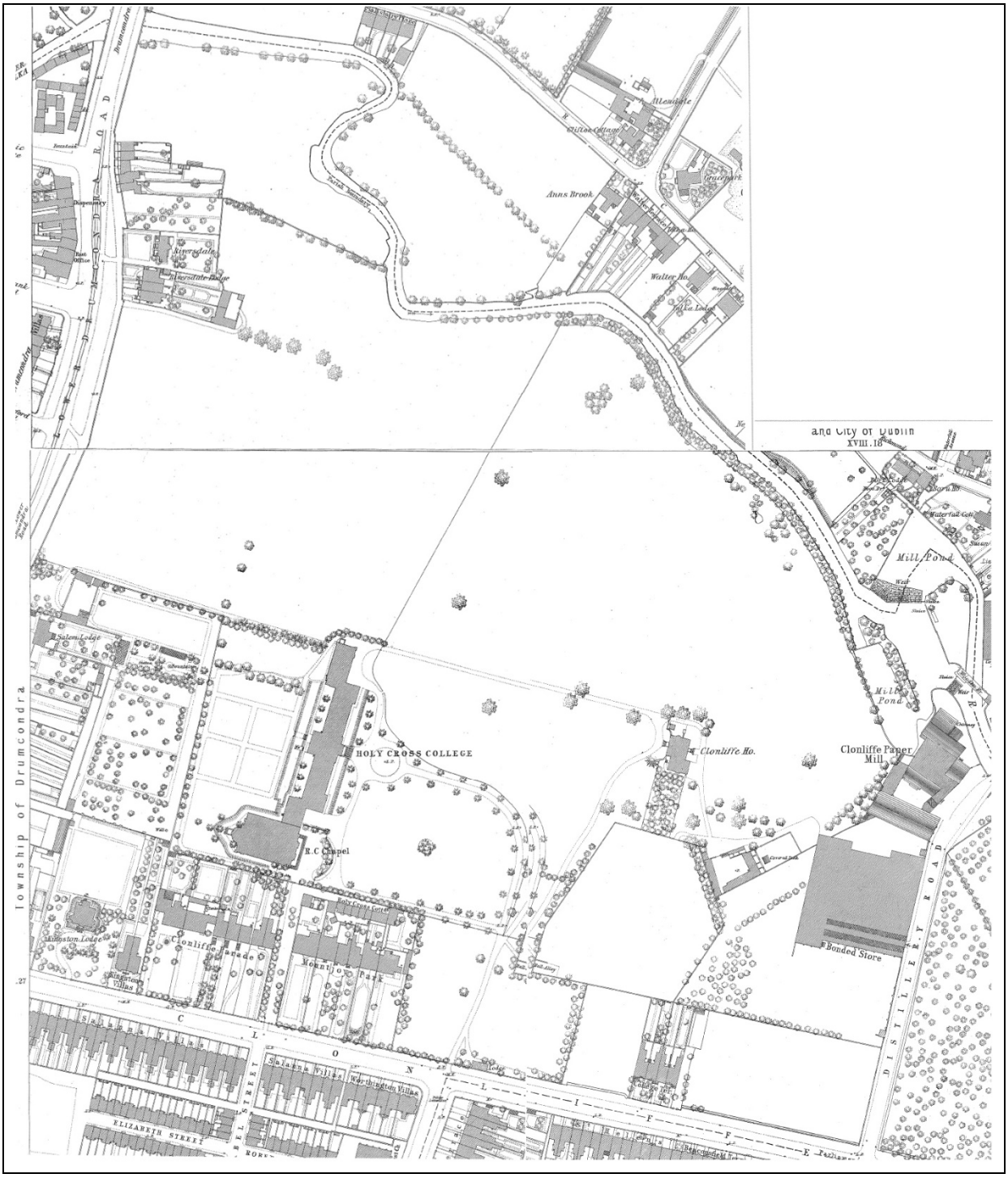

Fig 4 – Mapping of 1875-89

5.13 The absence of trees on the avenue connecting Clonliffe House to the northern end of the then College buildings is something of interest in this sequence of mapping.

Fig 5 – Mapping of 1907-11

5.14 The 1907-8 and the 1907-11 maps (Fig 5) illustrate few changes, other than the maturation of the previous landscape. These maps illustrate interesting changes, when compared to the 1935-38 mapping. In these later maps, we note the planting up of the avenue between Clonliffe House and the northern end of the College, at the same time. Furthermore, we note the complete absence of trees from the banks of the River Tolka. Notwithstanding these differences, it is noted that the landscape of pre-World War 2 context is very similar to that we have today.

5.15 This suggestion appears borne out by the similarities between the 1935-38 (Fig 6) and the circa 1985 mapping. However, we do note that the latter mapping illustrates significant changes to the extent of the College building, both between the Archbishops House and the College, and to the west of the College building, as well as the creation of the new church structure to the west of the original Holy Cross Church, which appears to relate to the post-war period.

Fig 6 – Mapping of 1935-38

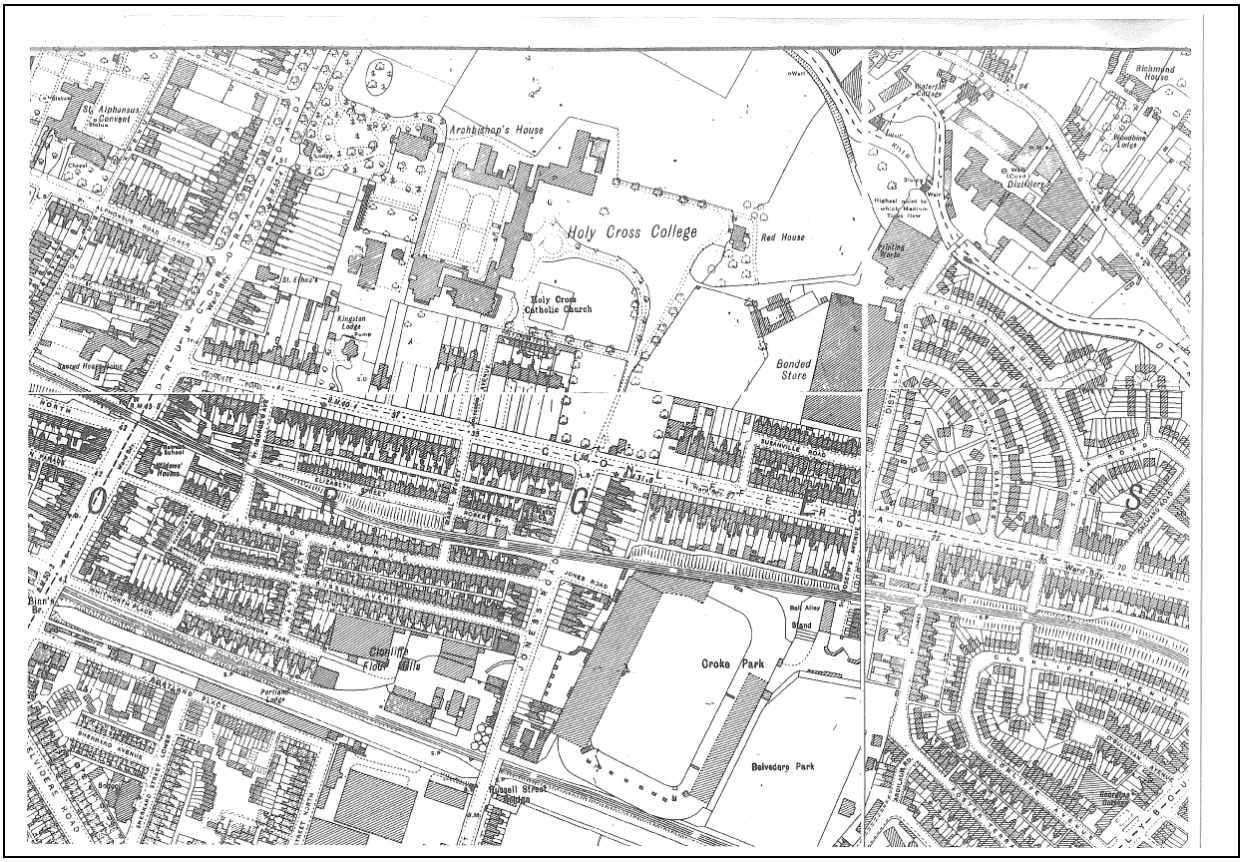

Fig 7 – Mapping of 1985

Interpretation Issues

5.16 In respect of understanding the site's existing tree population and its relationship with the historical context, it appears there are two primary consideration. The first relates to various trees that remain on site that might comprise part of the plantings and populations represented at various mapping dates. Secondly, there appear to be trees that form groups, which though of a younger age, comprise part of a planted feature or area that through various generations, might represent and area of ongoing or continuous tree cover, even if the current trees are not particularly old.

5.18 From the outset, the site supports few trees with any potential to relate directly to trees represented on the earliest mapping. Trees with some potential would be limited to some of those adjoining "Clonliffe House" and its original entrance drive, the eastern gable of the Clonliffe Road terrace and Horse Chestnut No.133, 137 and 293, Monterey Cypress no.219 and Lime nos.322 and 330.

5.19 Elsewhere across the site, there is little evidence to suggest that any other trees from the earliest landscape remain, and that most relate to late 19th and early 20th century plantings. Particularly, note is made of changes that take place relating to the phased development of the College and its relationship with Clonliffe House and the Archbishops House.

5.20 These incremental developments all appear to relate to substantial plantings, including the western boundary belt running parallel to the Drumcondra Road. While there is no evidence of vegetation here before 1889, it is depicted by 1907, when also the Archbishops house is noted.

5.21 It is felt that much of the northern edge of the space between the College and Archbishops House, also relates to this period, and relates to the latest phase of the College building development. Note is made that the tree line between the College and Clonliffe House was modified and foreshortened by the final phase of the College development. This is depicted by the differences between the maps of 1935-38 and the 1985, with the alignment being absent from the 1907-11 mapping.

5.22 In contrast, we note trees associated with the Clonliffe House entrance avenue, trees adjoining the Tolka River, and those adjoining the Clonliffe Road terrace, west of the Clonliffe Road entrance. While these treed areas all coincide with early representations of trees, the current populations comprise only younger trees.

5.23 Notwithstanding the visual importance of the large Lombardy Poplar adjoining the southern bank of the Tolka River, these are solely early to mid-20th century trees only. Similarly, the southern extent of the Clonliffe Road entrance avenue comprises trees of only circa 50 years of age. Continuing towards Clonliffe House, we note some larger, older trees, many are again only circa 50 years of age.

5.24 In respect of the trees adjoining the gable of the Clonliffe Road terrace, we note inconsistencies. Here, trees are depicted on the earliest mapping (1835-38), however, the current population includes only a small number of older trees including Lime Nos.103, 105 and 112 and Sycamore No.109, that offer any potential to relating to the earlier population, with the remaining material being younger. Equally and considering the period of the earlier plantings, it is felt that Sycamore would not have been a broadly used species when compared with Beech, Oak, lime, Chestnut etc.

Current Scenario

5.25 Many of the species found, relate to the site context, that being broad and open. Many of the trees are large-growing species, presenting little if any concern within the current parkland setting. Nonetheless, some trees, particularly those with notable potential for continued growth may be of questionable suitability for retention within the developed context. Nonetheless, such trees will provide interim, short to medium-term value during the maturation of any new planting, even if their long-term retention cannot be guaranteed.

5.26 The species found across the site, and their condition, must be considered in respect of site management and safety. Evidence of mechanical failure and deterioration has been noted. Within the broader context of the existing site, and considering the limited degree of occupation and use, then some of the threat presented by trees may appear minimal. However, some trees, through location close to areas of high use and occupation offer a more tangible threat, and such trees should be dealt with in the short-term. Brittle species such as chestnut and cedar and trees that are likely to be exposed or isolated by felling works must be considered in respect of their retention context.

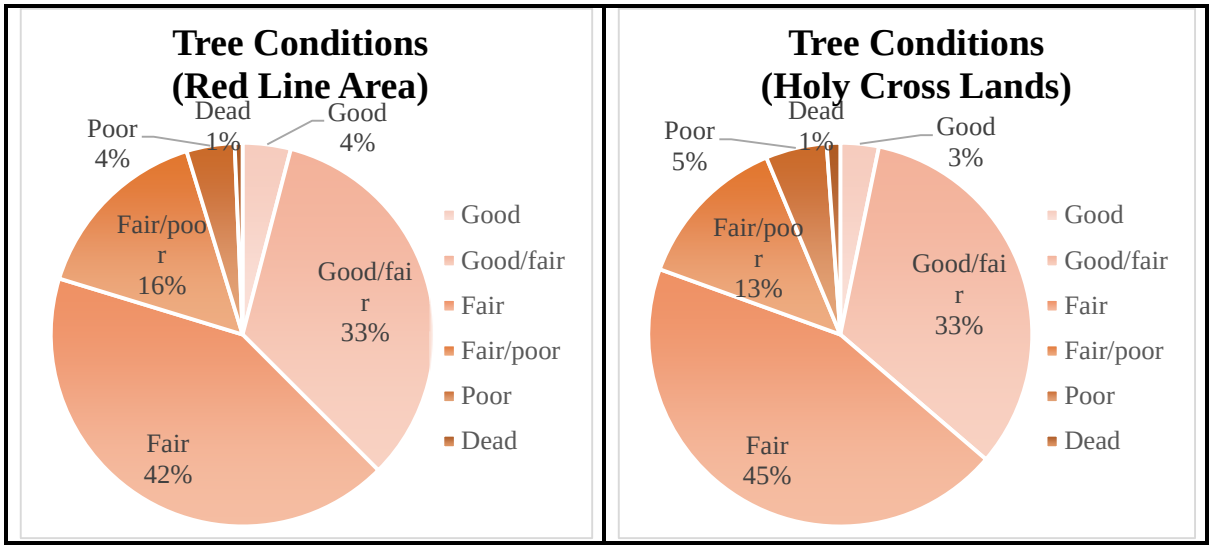

Fig 8 Tree Condition Breakdown

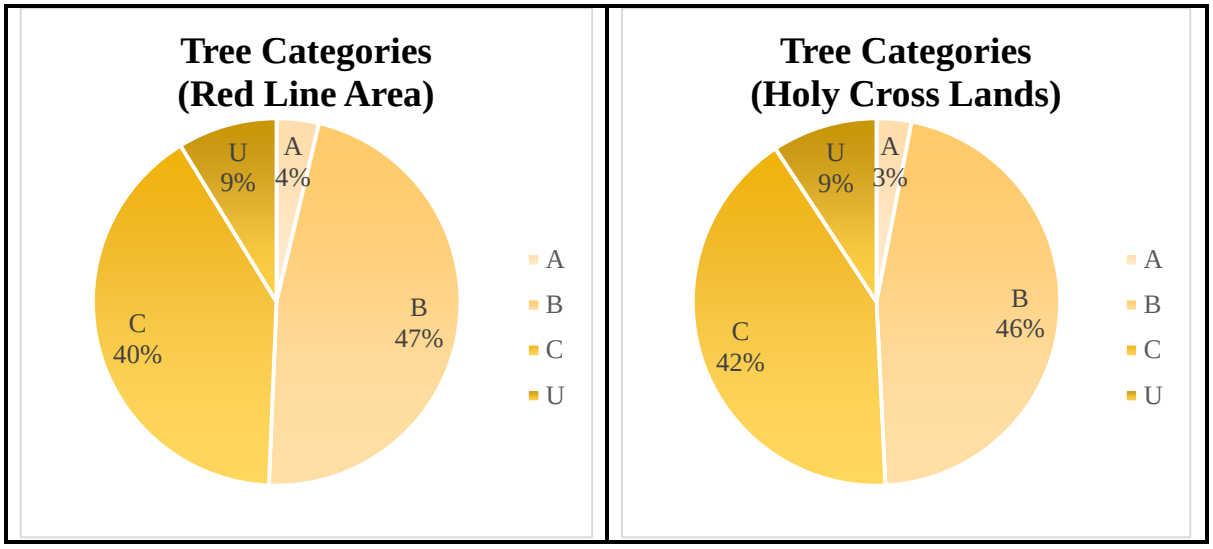

Fig 9 Tree Category Breakdown

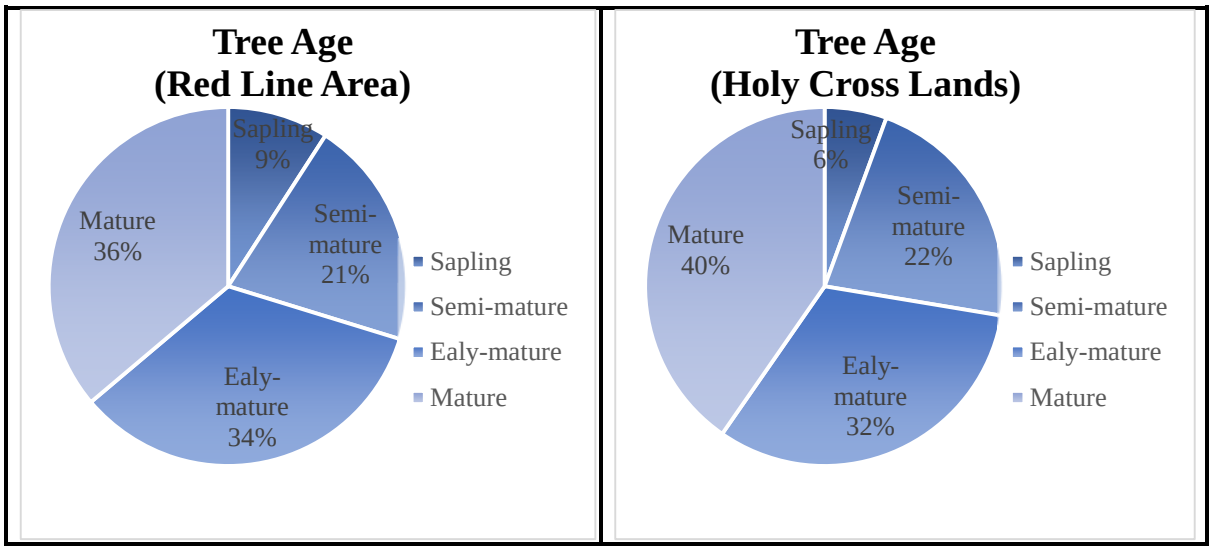

Fig 10 Tree Age Breakdown

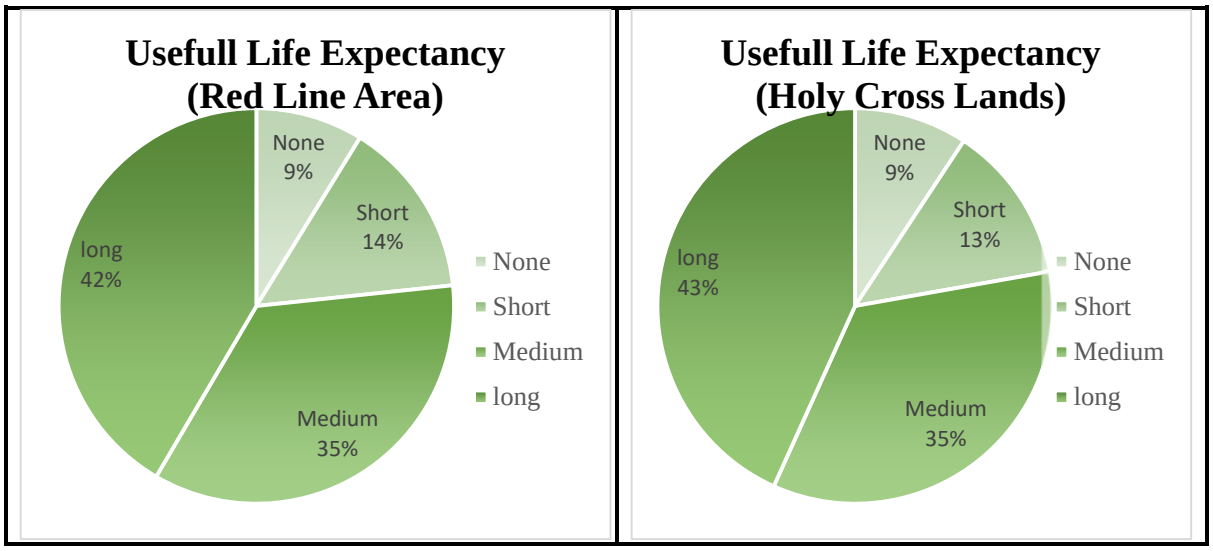

Fig 11 Tree Life Expectancy Breakdown

5.27 As can be seen from the graphs above and below, there is evidence of longer-term management with a skewing of data showing a broadly good or reasonable quality tree population that offers good sustainability. Under the categorisation system of BS 5837-2012, there are many category "B" trees, however category "U" still makes up a notable proportion. Of greater interest are the category "C" trees, that have the potential to deteriorate over time and become category "U" over time. This issue is compounded by the age breakdown, where we note the high proportion of older trees, compared to younger specimens. Notwithstanding, we still note that medium and long-term potential lifespans still dominate. However, a sizeable proportion of trees have been categorised as providing no tangible, useful lifespan, these including both dead, dying and dangerous trees as noted within the survey as well as those considered unsustainable, for example, those arising from footings of built structures.

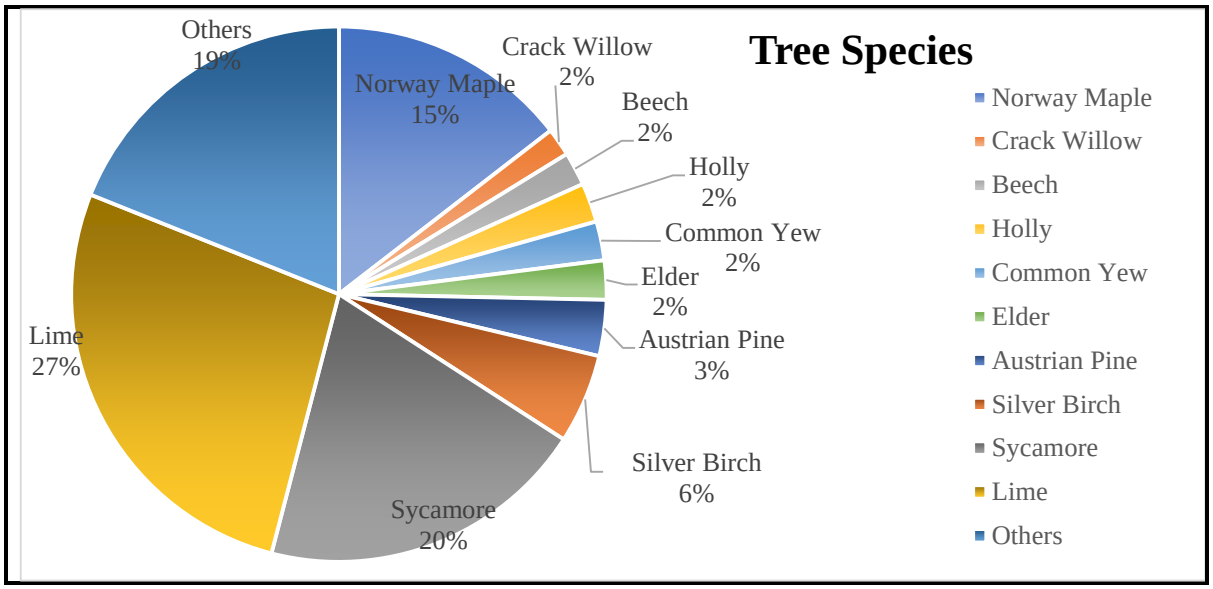

Fig 12 Species Breakdown (Red Line Area)

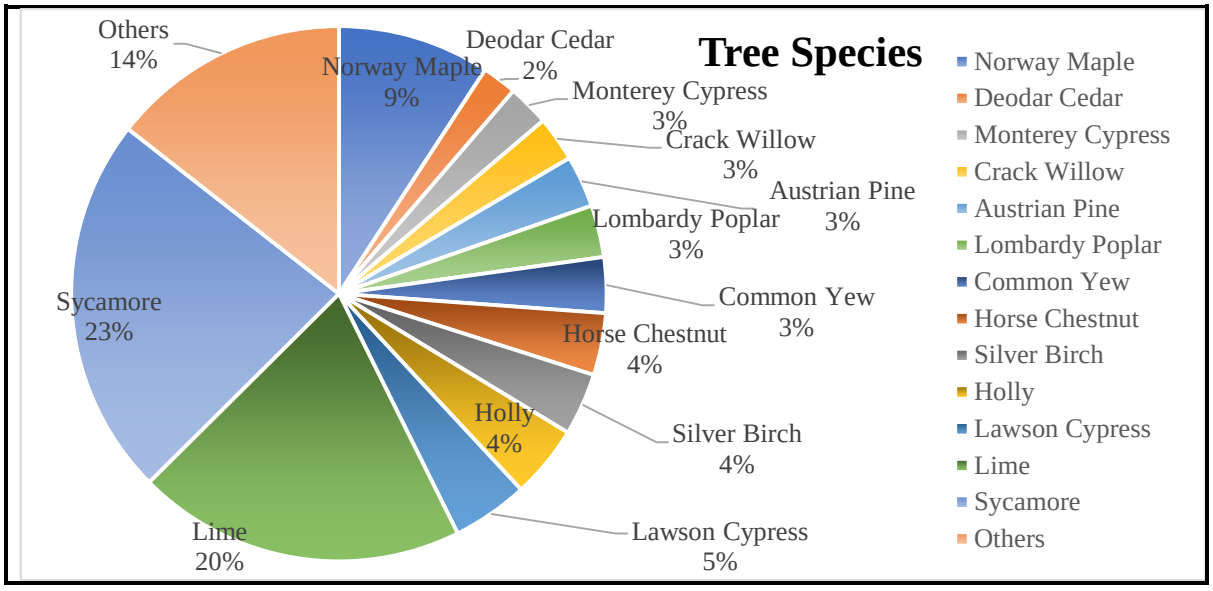

Fig 12 Species Breakdown (Holy Cross Lands)

5.28 The species breakdown as indicated in Fig 12 illustrates a tree population dominated by 10no. primary species, with 19% of the population being made up of an additional 20 species that occur at rates of 4 or less specimens. Of the dominant species, the Lime, Norway Maple, Austrian Pine, Beech, and similar, strongly illustrating the artificially planted nature of the tree population. However, and contradicting this, it is less likely that the 20% Sycamore proportion relates to a fully planted population. It is more likely that only a small proportion of these may have been planted and that the larger proportion relates to naturally emerging trees.

5.29 In addition to the main site, several areas have been reviewed including trees within the grounds of the Archbishop's house and its attendant garden, Holy Cross Avenue, Clonliffe Road and the Drumcondra Road as well as zone north of the River Tolka as it adjoins the site.

5.30 In respect of the Archbishop's house and garden, the tree population reflects similarly to the rest of the Clonliffe lands. It is noted from historical mapping that much of this area was develop towards the end of the 19th and early 20th century, this being reflected in tree sizes and ages. The species encountered tend to be diverse but classical, dominated by species such as Lime, Chestnut, Cedar and Yew.

5.31 An observation is made of more recent planting including numerous small trees planted in recent years as well as significant alignment such as that to the south of the garden comprising a Leyland Cypress hedge.

5.32 Whilst ongoing management means that the site area supports few particularly poor-quality trees, many have issues that will require management over time. Particularly, and relating to the larger trees, inadvertent loss, shelter loss and exposure will have an effect. For example to more brittle species such as Horse Chestnut. Equally, it is noted that many trees on the site have been previously cut, some harshly and this may well have repercussions over time regarding cavity development, deterioration, and the stability of new crown growth. Nonetheless, many trees encountered were of good quality.

5.33 In respect of the Drumcondra Road, the survey area took in a substantial number of visually significant London Plane. These trees are a significant landmark and element of the local landscape and tend to be in good condition. In a small number of instances, a note was made of defects, particularly cavity development that may undermine structural integrity or predispose trees to damage and failure over time. Notably, some specimens, because of prior management and crown reduction works, support elements of localised decay about the middle-crown that could potentially jeopardise higher crown elements. In respect of this, it is suggested that ongoing reviews be maintained and that cyclic and repeated management, for example incorporating the application of crown reduction works, be considered to maintain artificially small crowns over time.

5.34 A similar scenario relates to Holy Cross Avenue to the south of the site. Here, issues, including some storm damage has occurred in recent years. Another more significant issue was that trees arise from an existing pavement scenario, much of which is suffering widespread distortion and uplifting because of the tree and root growth. In some instances, kerbstones are now grossly out of alignment, and some concern surrounds the ability to recreate or amend the existing scenario without causing damage to the trees.

5.35 Nearby, a small number of trees on Clonliffe Road have also been reviewed, however, by comparison to both Holy Cross Avenue and the Drumcondra Road, these trees are young and small. Nonetheless, noted growth-related issues regarding what is a cement footpath, indicate that growth-related problems will occur over time.

5.36 The tree survey has also been extended to include a visual review of trees located on the northern side of the Tolka River. In this respect, there was no access to the site, but trees were reviewed at a distance using visual means and by way of estimation.

5.37 The review reveals an area of little or no management, dominated by Sycamore regeneration as a higher story, with Goat Willow and Elder below. Nonetheless, there are notable instances of Common Alder and particularly, Crack Willow at various points along the bank.

5.38 This area typically includes highly modified and often steep ground incorporating various built and retaining structures. The vegetation it supports appears to be naturally arising as opposed to being planted. In respect of the Sycamores, these are widespread and vigorous colonisers of any derelict ground. However, the Crack Willow and Alder may indicate an element of natural regeneration from elsewhere within the riparian corridor, and indeed will be considered native to the scenario.

5.39 The area supports few large or mature trees, and, considering the species encountered there is immense potential for continued growth over time.

6 Planning Scenario in Respect of Trees

6.1 The bulk of the site area is zoned Z12 "Institutional Land" (Future Development Potential). The area of the River Tolka to the north-east of the site is zoned as a conservation area. The corridor of space within the site but adjoining its south-western bank is zoned Z9 "Amenity/Open Space Lands/Green Network".

6.2 While it is noted that this site supports no specific tree preservation orders, there are other aspects of conservation that may apply. Particularly, it is noted that the site supports several protected structures (RPS Nos.202, 234, 236 and 238) and a "site of archaeological interest". Such designations might afford added protection to trees should the trees be considered as being within the curtilage of, or attendant to, such structures.

6.3 In broader terms, the landscaped nature and history of the site includes large Arboricultural features that are likely to be considered valuable within the urban context and therefore would be considered worthy of conservation and retention.

6.4 In respect of trees as they relate to planning within the Dublin City Council area, note is made of two areas of guidance including - The Dublin City Tree Strategy 2016-2020 and Dublin City Development Plan 2016-2022.

6.5 The Dublin City Tree Strategy 2016-2020 is a strategy document that outlines various intents and desires surrounding trees and woodlands within the city council area.

6.6 Within the Dublin City Development Plan, Chapter 10, Green Infrastructure, Open Space and Recreation, section 10.5.7 deals specifically with trees, with policies GI28, GI29 and GI30 relating directly to tree issues, and objectives GIO25, GIO26, GIO27, GIO28 and GIO29.

6.7 It is also noted that the council supports three current Tree Preservation Orders at Raheny, Kilmainham and Ranelagh.

6.8 Chapter 11 Built Heritage and Culture, section 11.1.5.3 Protected Structures – Policy Application references the importance of trees within the attendant landscape of a protected structure "The traditional proportionate relationship in scale between buildings, returns, gardens and mews structures should be retained, the retention of landscaping and trees (in good condition) which contribute to the special interest of the structure shall also be required". In addition, Section 11.1.5.11 "Trees in Architectural Conservation Areas" Policy CHC7: intends "To protect and manage trees in Architectural Conservation Areas".

6.9 Additionally, Chapter 16 "Development Standards: Design, Layout, Mix of Uses and Sustainable Design" makes specific mention of trees and their retention in Section 16.2.1.1 "Respecting and Enhancing Character and Context". Within the same chapter, section16.3.3 Trees "Existing trees and their protection" expands on the requirement for specific tree retention and management strategies and reporting when dealing with trees on development sites. Section 16.10.3 "Residential Quality Standards – Apartments and Houses Public Open Space" also notes the value of keeping mature trees with public open spaces.

7 Construction Works and their Effects on Trees

General

7.1 BS 5837:2012: Trees in relation to design, demolition, and construction - Recommendations, is a standard referred to and recommended in DCC documentation including the Dublin City Development Plan 2016-2022, and the Dublin City Tree Strategy 2016-2020. The standard sets out guidelines and parameters by which we can

assess impacts to and protect trees from damage, thereby providing some degree of realistic expectation regarding sustainable tree retention.

7.2 Tree retention is costly in respect of available space. There is a substantial difference between physically retaining a tree in situ and gaining any realistic expectation of it surviving into the future and remaining safe; with survival and sustainability being heavily dependent upon the extent and nature of protection it can be afforded during construction phases.

7.3 Trees and woodlands are dynamic in respect of longevity, safety, and health. Trees are living organisms and are highly reliant upon a continuity of environmental factors, the changing of which can easily undermine health and sustainability. As a perennial plant, a trees nature is to necessarily become larger on an annual basis. The survival of the plant and its funding of continued growth requires a minimum import of water and various nutrients, which are provided by the soil in which the tree is rooted. The tree is highly dependent on the nature of that ground and a continuity of conditions and provisions that that ground provides are of particular importance to maintaining tree health and sustainability. Any change extending beyond the short-term, has the potential to affect a tree's metabolism, health, and sustainability.

7.4 Development and construction works can easily result in the loss, changing or denaturing of this ground upon which a tree is dependant. Any action that removes (excavation), disturbs, or denatures (including raising of levels) the existing soil environment in respect of gas flux, hydrology, soil strength or bulk density can damage tree roots, affect root function, and render a soil incapable of supporting tree health. Therefore, these effects must be avoided in the areas upon which a tree is reliant.

7.5 In respect of the above, it must be noted that soil is fragile and easily damaged or denatured. Many activities associated with construction readily denature soil, including trafficking and compaction, as well as grading, filling, trenching, and other excavation works. The most damaging is compaction, in that it may not be apparent to the casual onlooker, but its effects are rapid and long-term. Most modern construction involves the use of substantial plant, equipment, and vehicles. The movement and activity of such machinery quickly denatures the ground, destroying the soil profile and structure, making them inhospitable and of no use to the supported trees.

7.6 Any structure or activity that results in the issues noted above must be regarded as contrary to sustainable tree retention. Where such issues arise within the minimum "root protection area" as defined under "BS5837-2012", the affected tree is likely to be regarded as negative and could render a tree unsustainable and unsuitable for retention.

Contextual Issues

7.8 Some tree losses may be justified because of poor-quality, ill-health or other deterioration that results in the presentation of a risk of failure and/or harm within the

developed context. In some instances, the potential and suitability of keeping such trees, may be limited regardless of any site development. However, some poorer-quality trees are dependent on context and if found in areas of reduced sensitivity or low occupation and use they will be reviewed in respect of retention. An example of this would be on ecological grounds.

7.9 Where the site context changes in respect of occupation and use near trees, repercussions may include a requirement for greater scrutiny and management. Some trees may require specific attention, including structural pruning to reduce risk and improve the safety status within the changed context, and to deal with issues of exposure and shelter loss.

7.10 Tree canopy cover varies by species and can change by season. Therefore, their relationship with the post development site must be considered in respect of additions issues, including shadow-cast and light admission and leaf littering. Tree retention close to buildings should consider the blockage of views and light, and the possible effects on daylight analysis. Trees can have a material effect on these issues and can lead to post development request for more tree removal, for example based on a requirement for artificial light during daylight hours.

7.11 Deciduous tree shed leaves each autumn that can be subject to local wind patterns, creating local drifts and accumulations. Such issues may require management and can lead to drainage issues including the blockage of drains and gullies, or to the creation of slippery surfaces.

7.12 Healthy tree growth and becoming larger with age are important factors to consider. While tree retention is commendable, it must be cognisant of growth and must appreciate the potential size younger trees might reach at maturity. In some instances, sustainability might be limited to the short or medium-term only and management systems should appreciate that some trees may require removal over time on growth and encroachment grounds.

8 Specific Issues and Arboricultural Concerns

8.1 Considering the scope and scale of the proposed development, it is considered likely that most of the issues dealt with at " Construction Works and their Effects on Trees " above, will apply at various points and particularly regarding-

a) Direct conflict with proposed structures, thus requiring tree removal.
b) A partial conflict where the "Root Protection Area" is encroached upon by works or ground amendments and cannot be preserved/protected in full.
c) Environmental damage e.g. compaction, capping, sealing – changing the existing ground environment to one that can no longer support tree root function.
d) Construction activity and the use of large plant and machinery that can denature the ground.

e) A change in site context, shelter or a change in occupation or use that makes a tree unsuitable for retention.

8.2 Some construction and development issues cannot be avoided or mitigated. Where occuring, such conflicts have contributed to the tree losses as outlined in Section 10.

8.3 In respect of the above, the tree survey information provided, intends to show the areas of minimum conservation associated with the sustainable retention of trees within the scope of a development project. In the case of the proposed development, these minimum areas are often exceeded, thus creating a scenario whereby it is reasonable to assume that the development works will have no direct effect or repercussions on tree health.

A Blocks

8.4 As illustrated on Clonliffe Tree Impacts Plan (North West) we note that the proposed A Blocks are predominantly in open spaces. However, block A1 is in a position close to trees as is its connection with the A5 block. The buildings present minimal Arboricultural issues however, there construction and access thereto raise greater concerns. It is noted that there is a proposed access to the Drumcondra Road in a position north-west of A1. To the north-west of "A1", London Plan no.49 found outside of the site, will be affected by the proposed new access to Drumcondra Road. The location of the road, though slightly north of the tree stem, will result in the excavation of more than 50% of the trees "root protection area" radius. This issue is compounded by the trees location within what is a highly constrained ground-space, between the Drumcondra Road carriageway to the west, and the site boundary wall and footpath, to the east. While the proposed works can be achieved without removing the tree, its safe and sustainable retention directly adjoining and overhanging a busy highway, cannot be guaranteed.

8.5 It is intended to maximise tree retention about Block A1 and this has required specific design measures in conjunction with known topographical features. The alignment of the roadway to the north of Block A1 was specifically chosen to account for an existing ditch feature that separates it from tree line 456 – 463. This has allowed for the retention of trees to the north of the block. However, issues have arisen in respect of access between A1 and A5 and the requirement for pedestrian and vehicular access in that area. Substantial work has been undertaken in respect of this and it is believed that a no dig, low impact solution has been sought thereby conserving and maintaining existing ground conditions and levels in this area. To the west of A1, some concern arose in respect of proximity to trees. Once more there is a benefit to be gained from the existence of an original ditch feature and is intended to retain all works to the east of this alignment. Nonetheless, tree retention will be dependent upon the provision of suitable tree protection and limitation of activity in this area. A similar scenario exists to the south of A1 where a pedestrian access route and a play area are envisaged. Earlier issues of disparate ground levels have now been addressed thereby enabling maximised

tree protection and retention. Once more, this has been achieved by the adoption of low impact and no dig paving solutions that have allowed for the retention of existing ground levels and conditions.

B Blocks

8.6 In the vicinity of the B blocks, tree retention and impacts were complicated by the density of development works and existing but often disparate ground levels. In this area, necessary and required access has required the loss of a number of trees however, specific design has accounted for the retention of tree numbers 352 – 357 within the courtyard area whose existing environment will be conserved. Additionally issues including isolation within a broader development of possible environmental changes such as hydrological issues may be addressed by temporary or managed irrigation. To the north of Block 3, Similar issues existed in that the trees at this location are associated with a change in site levels and a notable slope immediately north of the trees. Accordingly, the proximity of Block 3 to the trees were considered in great detail. The block itself raises few concerns, if construction is managed, and adequate tree protection is provided at construction stage including the minimising of and restriction of access to the northern façade of the building.

8.7 A collateral issue arose in respect of access to the northern side of the building exacerbated because of disparate ground levels. In this instance, the finished floor level of 10.00 m in comparison with native ground levels closer to and about 9.00 m has been addressed by the provision of an elevated ramp and steps scenario. This scenario will be reconstructed and supported on localised pads there by avoiding issues relating to soil fill and the raising of ground levels or the excision of substantial foundations. Therefore, with the provision of temporary localised ground protection and access to facilitate the creation of the pad foundations, it is envisioned that all remaining construction will be modular and for the most part construction activities will be above ground.

8.8 The access road to the east of B3 has created issues in that it must straddle 2 distinctly different site levels. Therefore, and regarding the provision of suitable gradients, substantial earthwork and excavation is required in positions east of B3 and close to the Red House. This particularly has caused the loss of a small number of trees.

C Blocks

8.9 In respect of the C blocks, the specific buildings conflict with a few trees. However, the basement element of C1 does result in the loss of several trees within the lawn area to Holycross College. Nonetheless, structural design and tree protection have combined to allow for the retention of the group of trees at a position east of C1 and to the south-west of Block D1.

8.10 In respect of block C2, a small number of trees have been encroached upon and some of these have been designated for removal. The building footprint imposes to a minor extent on other trees. However, in this instance, the degree of encroachment is small, and the benefits of tree retention were considered to outweigh immediate tree loss. For this reason, strict tree protection and limitation of works access to the footprint of the building within root protection zones has been adopted. A similar scenario arises to the east of C2 in respect of the preservation of trees associated with the Clonliffe Road access Avenue. This work will again concern the strict restriction of construction access to little more than the footprint of the proposed building in conjunction with substantial, low impact and no dig Landscape works that extend beyond the red line of the site and have been incorporated into the adjoining hotel development programme.

8.11 An added issue relates to lime no.18 on the Clonliffe Road public footpath. This tree will be affected by the provision of services connection east of the tree stem. Here, concerns are reduced, in that the tree's young age and small stature would allow for replacement in the post construction scenario.

D Blocks

8.12 In respect of the D blocks, D1 creates few direct impacts with a design emphasis being placed upon the retention of the group to the south of D1 and to the east of C1. Blocks D2 and D3 have been designed to maximise available site space and again generate few major tree impacts. Particularly, it is intended to preserve the trees to the west of the block and associated with the existing entrance avenue to the Red House. This has required substantial work including the maintenance of existing ground levels and low impact works in conjunction with the restriction of construction works to little more than the building footprint were associated with tree root protection areas.

General

8.13 Throughout the site, issues have arisen regarding levels and the provision of durable surfaces. As level increases or decreases are particularly damaging trees, these have where possible been avoided and have been accounted for within the assessment of tree impacts. In many instances, landscape features have been utilised to retain proposed levels at native levels thereby conserving existing ground conditions. Additionally, and regarding the provision of roads, certain roads including the access avenue and roadway up to the Red House will not be amended by width or structure. The new road will effectively be a resurfacing process of the existing structures thereby avoiding damage to the ground beneath or adjoining the road edge.

8.14 In respect of this, particular attention is drawn to the trial pit excavations at "Appendix 2" to this report specifically notes the effects of road structures on tree roots. In this respect and where services must be installed in conjunction with roadways, position and alignment of such services has been chosen so to take full advantage of the

restrictive effects of such roads thereby locating the trees at positions where roots are least likely to be encountered.

8.15 Across the site, there will be unavoidable environmental changes. Some of these changes may have a material effect on trees, particularly relating to exposure and shelter loss as well as to potential hydrological issues.

8.16 Not only are some trees being lost from the site, but the site will be radically changed regarding wind patterns, an issue that has potential for mechanical repercussions to trees. Additionally, the extent of occupation and use across the site is going to increase significantly and it is likely that positions in areas near trees will be occupied at far higher rates than they are today. Mechanical issues relating to trees cannot be readily foreseen however, with the apparent development of a greater regularity of severe storms then impromptu tree related damage cannot be ignored. Such issues are exacerbated in light of the proposed development and it is advised that additional structural pruning works will be recommended at the post site clearance tree review. This review has been recommended as part of the tree survey and Arboricultural Method Statement works as the preliminary clearance of the site should be followed up by a review of trees intending to identify issues of mechanical exposure and to make recommendations for additional tree works. At that time, retain trees will also be reviewed with regard to their future context with respect to site usage and a new tree works specification will be created. Such a specification would intend to address exposure, areas of high risk associated with occupation and to address issues of encroachment where construction works occur near trees. It would also address construction needs by way of access, appreciating that much of the sites work will be undertaken by crane and that aerial tree damage must always be considered.

8.17 Considering the scale and nature of the development there is some scope for hydrological impacts. This would occur where trees are heavily encroached upon, for example near the A blocks, between blocks B1 and B2 and adjoining C2and D Block.. In such areas, and particularly if the construction process requires dewatering for excavation purposes then it is advised that temporary irrigation may be required. In the case of the trees between blocks B1 and B2, the limited footprint of available space post construction may require that irrigation be considered on a long-term basis. In respect of the above, it would be advised that advice be gained from a suitably qualified hydrologist regarding likely impacts.

8.18 Considering both the changes that site development will bring about, as well as the fact that the existing tree population includes trees of various ages and conditions, then tree health and sustainability must be regarded as dynamic and subject to change over time. Tree health issues typically manifest themselves over time, and only the most severe impacts generate immediate effects. Tree damage relating to environmental change and disturbance can often result in a slow deterioration and decline, only becoming apparent after some years (2 – 5 years) with a slow deterioration where death may not occur for anything between 2 and 15 years. Understanding the timescale of possible interim

benefits must appreciate the fact that its full extent or rate cannot be quantified at an early stage. This scenario illustrates the need for ongoing review and monitoring so that changes occurring over time can be identified, evaluated and acted upon in a timely manner.

8.19 The proposed development will be imposed on an unlevel site. Roads and access paths in particular are subject to engineering coinstraints, construction requirements and gradients that sometimes require the amendment of adjoining ground levels. Any grading of filling has the potentual to affect tree health and sustainabiulity and must be avoided within the root protection area of any tree intended for retention. Because of this, much work has been put into the minimising and localising of such changes.

8.20 New surface structures are required thoughouts the site, often in postions close to trees. Such structures can be damaging to trees, by needing foundations, or the compaction of soil or sealing of the soil surface. There are alternative construction practices, including no-dig" methodologies that have been adopted widely across the development where potential conflicts occurred. Examples of this include various elements of the development Landscape Plan, relating to site access, paving and other lansdacpe features. The Landscape plan indicates many surface structures, including footpaths, cycle parking areas and play areas. Such features must be installed with particular care and using suitable materials and methodologies, can be achieved without adversely affecting tree health. Issues to be addressed include the maintenance of permeability and existing ground conditions while avoiding work-related compaction.

8.21 Other structures such as new boundary treatments, for example to the north of the Archbishop's garden, raised concern about construction impacts. Within tree protection zones, this feature now avoids any need for an excavated strip foundation. Instead, it will use a "pad" or "pile" foundation, thereby creating localised punctuations as opposed to excavated foundations.

8.22 Throughput the development, great efforts have been made to maximise tree retention by the adoption of necessary tree protection during the construction process. Such protection relies heavily on simple “construction exclusion” afforded by tree protection fencing during the construction phase. Tree protection also includes the use of specific materials and methodologies orientated towards maximising sustainability and for use where unavoidable works are required near trees for retention. Such works include the use of “low-impact” and “no-dig” processes, including manual works.

8.23 In order to further maximise tree retention, design amendments have also been adopted. These include bespoke structures, including elevated access on minimal foundations and retaining walls to avoid grading and earthworks near trees. In other instances, unavoidable proximities to trees have been addressed by the acceptance of limitations to access and the use of tree protection hoarding at positions particularly close to new structures, in the knowledge that all but pedestrian access will be lost.

8.24 In some instances optimal tree protection cannot be attained. However, the limited extent of encroachment, in conjunction with considerations such as those noted under clause 5.3.1, “a)” and “b)” (BS5837-2012) would suggest that the possible benefits of tree retention would out way immediate removal and replacement. In such instances and while appreciating some risk to sustainability, all the above preventions would be adopted, as would additional treatments, potentially including structural tree pruning and interim irrigation.

Construction Specific Issues and Tree Protection

8.25 Notwithstanding the issues dealt with above, it must be appreciated that the construction process itself can be hugely damaging to trees. As sustainable tree retention is dependent on the conservation of ground conditions then construction processes and activities must be considered regarding their damaging effects. Access and trafficking, resulting in ground compaction and soil denaturing affect tree health and can readily result in tree death. Accordingly, the activities associated with the construction process must be regarded in the same light as new structures. For this reason, the tree protection plan is by its nature, highly restrictive, preventing access to sensitive areas of the site. The most part, this will be achieved by the provision of construction exclusion hoarding or fencing, to be erected prior to the commencement of any site works, regardless of construction phase.

8.26 In some instances, it is appreciated that the proximity of proposed structures is so close to trees as to require particular and often restrictive degrees of tree protection fencing. This has been discussed with the design team and it is believed achievable even when such hoarding might be located immediately adjoining the complete façade of new building and restrict available access to pedestrian means only.

8.27 Many elements of the development design have been engineered to accommodate tree protection measures. Particular attention is drawn to the landscape proposals in respect of the provision of new hard surfaces. Such surfaces have been designed to avoid grading or excavation and oftentimes avoid the use of standard foundation types in favour of the use of no dig scenarios such as cellular confinement systems.

8.28 Such design intentions go a long way to maximising tree retention however, provision of such structures regarding construction control is equally important. Therefore, attention should be drawn to the tree protection plan proposals where upon such structures are regarded as special works. Such special works are typically located within Construction Exclusion areas and therefore require the use of low impact methodologies. In some instances, this may be restricted to pedestrian and manual means in others it may be restricted to the use of lightweight, small-scale machinery. This would allow access in conjunction with temporary ground protection means. Regardless of the approach, the intention would be to successfully install the new structures whilst avoiding damage to the soil environment upon which tree roots are dependent.

9 Identification of Development Impacts to Trees

9.1 The expected tree impacts have been represented graphically on the tree impacts drawing "**Clonliffe Tree Impacts Plan"** (North-East, North-West, South-East and South-West) as well as within the narrative of this report.

9.2 This Clonliffe Tree Impacts Plan combines the tree constraints plan information, overlaid with the development details including the architectural and engineering layouts below, thereby allowing for simple direct comparisons to be made between the existing site context and the development proposals in respect of new structures and various works. The Clonliffe Tree Impacts Plan includes both existing site levels (from topographical drawings) as well as proposed levels. It also defines the location and route of dug services, including those associated with site drainage, the provision of mains water and other underground, ducted infrastructure. The intention of this combined Clonliffe Tree Impacts Plan is to provide a direct comparison between the existing and proposed site as well as to provide a reasonable understanding of the nature and extent of ground interventions needed during the construction process.

9.3 In this drawing, trees denoted with "Broken Pink" crown outlines are to be removed and those denoted with "Continuous Green" crown outlines are to be retained.

9.4 Detail of the development proposal details where gained from the Clonliffe Tree Impacts Plan provided by-

- Henry J Lyons Architects including – Architectural information
- Barrett Mahony Consulting Engineers – Drainage and Engineering information
- Nial Montgomery and Partners landscape Architects – Landscape Design
- OCSC Consulting Engineers – Mechanical & Engineering information

9.5 The assessment of impacts is primarily based on minimum protection ranges as defined paragraphs 4.6.1, 4.6.2 and 4.6.3 of BS 5837:2012. Any structure, action or need to enter or otherwise disturb/convert the "root protection area" of a site tree has been considered likely to have a negative impact, with the potential to make a tree unsuitable for retention, unsafe or unsustainable.

9.6 The broader assessment attempts to consider both direct and indirect implications, based on perceived construction requirements, together with how a tree will interact with the development in respect of growth, hazard development, light blockage, and other social concerns in respect of the changing context, including its effect on tree amenity value.

10 Tree Retention and Loss

10.1 The Clonliffe Tree Impacts Plan comprises the tree survey drawings overlaid by the development drawings, thus providing a graphic representation of the relationship

between tree constraints and the development elements. In this drawing, the trees that will be removed, are highlighted in "pink dashed" outlines. This information is related in Table 2 and in figures 13a and 13b below.

10.2 This report notes that the "red line" area supports a total of 296 individually described trees or groups of trees, while the holy Cross lands support 518 trees or groups.

10.4 Normally, all category "U" trees (48 in total across survey area) identified in the survey would be removed. Many should be removed regardless of development, though some might be reviewed in respect of partial/limited retention, dependent upon retention context. Notwithstanding the general recommendation to remove all, it should be noted that the proposed development works require the direct removal of only 17 of these trees, though 26 will be removed from the “red line” site area.

10.5 Of the site's "good" quality, category "A" trees, the development works will require the removal of tree nos. 163, 350, 351 and 362.

10.6 Of the site’s “fair” quality, category “B” trees, the development works will require the removal of tree nos. 18, 49, 105, 115, 143, 164, 172, 174, 179, 197, 200, 202, 203, 205, 208, 219, 220, 224, 348, 349, 356, 417, 418, 419, 454, 456, 462, 467, 468, 469, 471, 472, 473, 475, 1217 and 1225.

10.7 The above list includes two trees outside of the “red line” area, including nos. 18 and 49.

Trees Within Red Line Area		**Trees Within Holy Cross Lands**
11no. category "A" trees,		16 no. category "A" trees,
139no, category "B" trees,		239 no. category "B" trees,
120no. category "C" trees,		215 no. category "C" trees,
26no. category "U" trees,		48 no. category "U" trees,
296 Total No. Trees		**518 Total No. Trees**
Expected Tree Loses		
Category A Trees		
4 (36.4% of category A trees)		4 (25.0% of category A trees)
Category B Trees		
36 (25.9% of category B trees)		36 (15.2% of category B trees)
Category C Trees		
52 (43.1% of category C trees)		52 (24.4% of category C trees)
Category U Trees		
25 (100% of category U trees)		25 (52.0% of category U trees)
117 Total Tree Losses (39.8%)		**117 Total Tree Losses (22.2%)**

Table 2

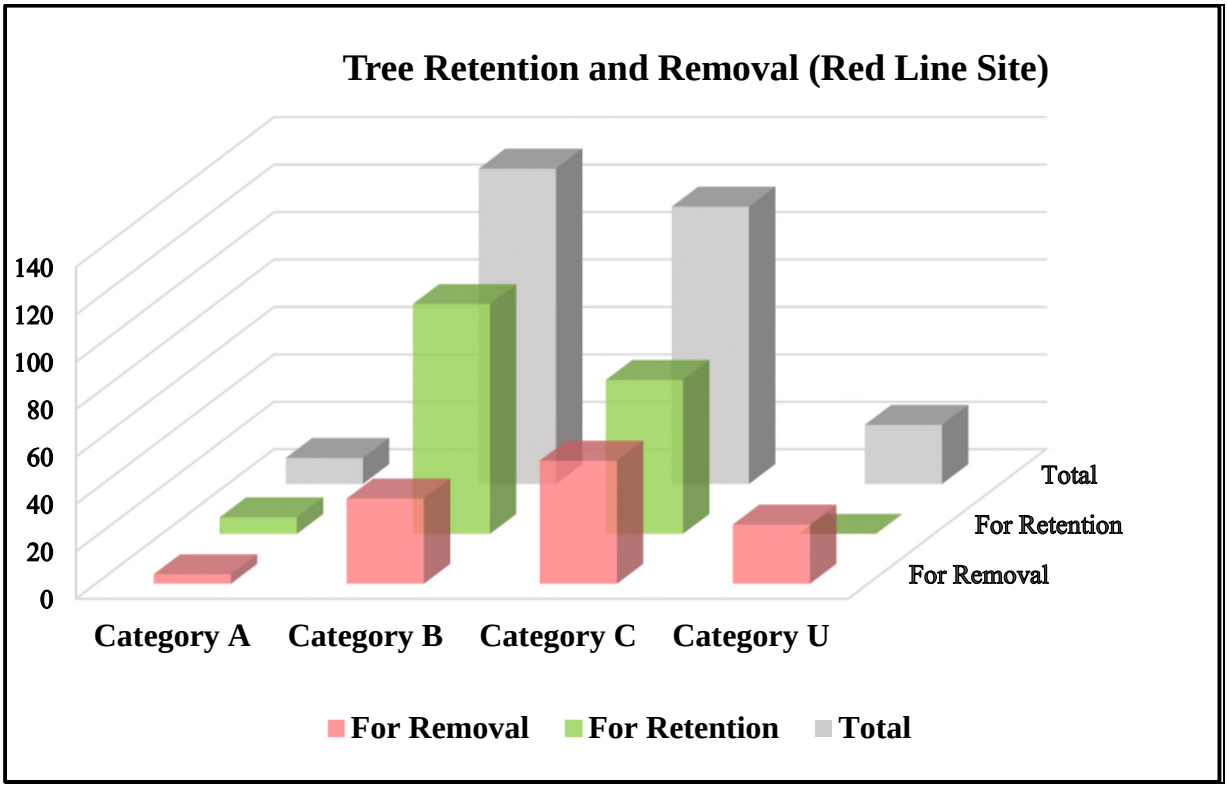

Fig 13a Graphic Representation of Tree Loss/Retention Scenario (Red Line Site)

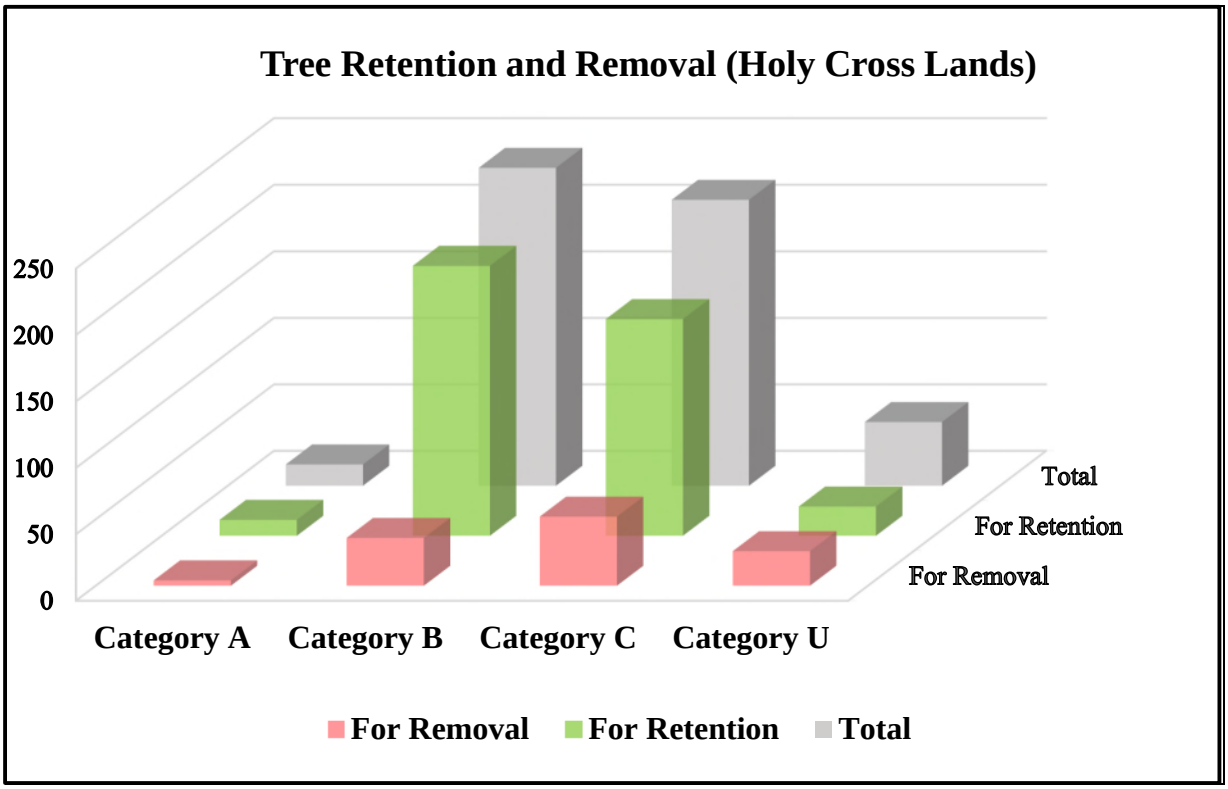

Fig 13b Graphic Representation of Tree Loss/Retention Scenario (Holy Cross Lands)

10.8 Of the site's category "poor" quality "C" trees, the development works appears to require the removal of nos. 107, 109, 142, 171, 180, 192, 194, 195, 196, 198, 199, 201, 204, 206, 207, 344, 347, 358, 359, 360, 363, 420 (group), 453, 455, 460, 470, 474,

1210, 1211, 1213, 1214, 1216, 1218, 1219, 1220, 1221, 1222, 1223, 1224, 1226, 1227, 1228, 1229, 1230, 1231, 1232, 1233, 1234, 1235, 1236, 1237 and 1238.

10.9 Of the site's category U trees , the development will require directly, the removal of nos.101, 102, 147, 155, 227, 345, 346, 415, 416, 466, 483, 1201, 1212 and 1215. However, and in the interest of sustainability and site management, it is advised that the remaining 11no. category U trees are removed, including nos. 141, 230, 231, 232, 233, 234, 251, 276, 277, 278 and 480.

11 Tree Protection within the Scope of a Development

11.1 The design and management recommendations as set out in "BS5837:2012" are considered as "best practice" regarding the selection, retention, protection, and management of tree within the scope of new developments.

11.2 In respect of tree protection, whether vertical or horizontal, all must conform or equate to the recommendations of Section 6, BS5837: 2012, must be fit for purpose and commensurate with the nature of development and the expected day-to-day activities of the site works.

11.3 This report provides a "Preliminary Arboricultural Method Statement" at "Appendix 1" to this report, as well as the associated "Clonliffe Tree Protection Plan.

11.4 In the Clonliffe Tree Impacts Plan, the "Construction Exclusion Zone" is defined by an orange hatching with bold "Orange" lines representing the proposed location of the primary protective "Construction Exclusion Fencing".

11.5 The Clonliffe Tree Impacts Plan provides only a representation of the protection locations and extents that must be located, positioned, and erected under the guidance of the project Arborist. The Clonliffe Tree Impacts Plan requires referral to a figured and dimensioned, "construction stage" version of the "Tree Protection Plan" drawing. All recommended protection measures will be installed before the commencement of any site works and must remain in situ (unless under the guidance of the site Arborist) until the completion of all site works.

11.6 The tree protection plan includes the use of special materials and methodologies intended to minimise the impacts of structures/works near trees. Examples of this include elements of the proposed landscape plan. These areas nominated as "Controlled Work Zones" and depicted by pale blue hatching on the tree protection plan "Clonliffe Tree Protection Plan". In these areas, manual and low-impact procedures and low impact methodologies will be used, that avoid the need for excavation or ground disturbance and keep the drainage and porosity of the ground volume beneath the surface.

12 Preliminary Management Recommendations

12.1 Provided in the tree survey table (Table 1 of Appendix 4) are “Preliminary Management Recommendations”. These recommendations relate to the trees as they existed at the time of the tree review. As in line with the changing context of the site, such recommendations are likely to no longer apply. Examples include where the felling of trees or other specific works are necessary to facilitate development requirements.

12.2 Many of the concerns raised in the tree survey relate to evidence suggesting mechanical failure to trees, ill-health, or contextual issues. These may continue to a point where a trees suitability for retention may change over time.

12.3 Additionally, any development related loss of trees can result in exposure and shelter loss issues. Therefore all kept trees must be reviewed immediately after the primary site clearance works. This will allow for the updating and amending the “preliminary management recommendations” of the primary survey. Such amendments would address such issues as may arise and may include added structural pruning works . Regular reviews of all retained trees must be undertaken regularly, so that early and prompt intervention and action can be applied as required.

12.4 In respect of the management of retained trees and in appreciation of what will be a changes site context, it is advised that a further review of trees will be needed. This should be undertaken at or immediately after primary site clearance works. The intention would be to develop a tree works program that would form part of the tree and woodland management plan, but that would incorporate the changes site context and particularly, issues of exposure and shelter loss resulting from felling works. Such a works program will include a suite of tree management and pruning works orientated towards the developed site but based on a review of the reduced and then exposed remaining tree population.

Appendix 1 - Arboricultural Method Statement (and Tree Protection Plan)

Method Statement Outline

A1.1 This method statement intends to guide in respect of tree protection on a development site. This is a broad and prescriptive method statement, intended to provide general advice and guidance in respect of trees and tree protection on a typical development site, dealing with issues known at the planning stage.

A1.2 Any inability to conform to the recommendations of this method statement or the associated tree protection plan could readily change the sustainability of trees and/or their suitability for retention.

A1.3 This method statement addresses, amongst others, two primary issues, those being –

a) The avoidance/prevention of physical damage to a tree intended for retention.

b) The avoidance/prevention of physical damage or disturbance to the ground/earth upon which a tree is reliant.

Drawings

A1.4 This Arboricultural Method Statement must be read with the associated "Tree Protection Plan" drawing, "Clonliffe Tree Protection Plan". The "planning stage" drawing must be updated for "Construction" stage purposes, to include tree protection ranges/dimensions as defined for that tree within the tree survey table or unless otherwise defined by the project Arborist.

Method Statement Use

A1.5 This Arboricultural Method Statement should be used under the direct guidance of the project Arborist. As limited "construction stage" detail was available at the planning stage, it may require amendment and adjustment to address construction stage issues.

Amendments and Modifications to Tree Protection Plan

A1.6 Any amendment to the tree protection plan must be agreed with the project Arborist, including the adoption of specific methodologies and/or procedures and structures for access into/use of certain parts of the above-defined "Construction Exclusion Zones". Such procedures, including the provision of suitable ground protection, may allow for the relocation of the "Construction Exclusion Fencing" to provide access to and across the previously protected areas.

Works Related Impacts

A1.7 In respect of any necessary and unavoidable structures/works needed within or entry into the "RPA" zone, all efforts must be made to minimise impacts. Aerial issues may require "access facilitation pruning" or clearance pruning. Subterranean works that require excavation must, by design, location, and action, minimise impacts to trees.

Tree Works Specification Updates

A1.8 Many of the tree management recommendations stipulated within the "Preliminary Management Recommendation" section of the primary tree survey relate to the "as was" site scenario. Because of changing site contexts, these may no longer apply and may require modification to account for the changes that the built project will cause.

General Method Statement

Overview and Implementation

A1.9.1 Prior to any site works, this method statement will be addressed and discussed by all members of the construction team management, prior to any site works or construction/demolition related works or access.

A1.9.2 The project Arborist or another suitably qualified person will oversee the application of all tree protection measures and any necessary modifications to this Method Statement (any issues as may have arisen in respect of planning conditions or details as may have changed between the design stage) to provide a basis upon which tree protection will be managed on the construction site.

A1.9.3 Any situation that requires entry into the "root protection zones" of a tree intended for retention must be brought to the attention of the Project Arborist regarding the adoption/amendment of suitable tree protection measures.

A1.9.4 As unforeseen tree losses may compromise project planning permissions; it is imperative that issues relating to tree protection and/or tree damage be brought to the immediate attention of the project Arborist for review and discussion with the relevant planning authority.

Works Sequence

A1.10.1 No construction related works or mechanised site access will occur until the agreed level of tree protection, in accordance with the "Tree Protection Plan", is completed.

A1.10.2 The only exception to the above will relate to the undertaking of tree works and felling as defined in the Arboricultural report and any grant of permission.

A1.10.3 On completion of tree felling/site clearance works, the tree management plan will be reviewed, accounting for (if necessary) the updating of the "preliminary Management Recommendations" stipulated in the original Tree Survey.

A1.10.4 Any revised pruning/cutting works will be agreed with the local authority and applied at the earliest possible opportunity.

A1.10.5 After the completion of primary tree clearance, but before the commencement of construction works, all "Construction Exclusion" and "Protective" fencing must be erected and "signed-off" as complete, by the Project Arborist.

A1.10.6 Only on completion of all construction works will any/all tree protective measures be removed, and only then in a manner, that does not compromise the "Protection Zones". Such works must be agreed and overseen by Project Arborist.

A1.10.7 At construction-works completion stage, all kept trees will be reviewed regarding their condition and longer-term management recommendations and regarding site hand-over.

Tree Protection

A1.11.1 All tree protection measures and locations must be agreed, overseen, and verified by the Project Arborist prior to works commencement.

A1.11.2 All construction, works or access areas must be enclosed and defined by protective fencing, this comprising the "Construction Exclusion Zone" based upon drawings "Clonliffe Tree Protection Plan" (Construction Stage version).

A1.11.3 Unless specifically stipulated by the project Arborist, the default minimum range of the protective fencing from a tree is the range stipulated for that tree within the "RPA" (root protection area) column of the original survey.

A1.11.4 Such a fence must be fit for purpose and commensurate with the nature of activity expected upon the site and should comply with "Section 6.2" of BS5837: 2012.

A1.11.5 The fence should be affixed with notification signs such as "TREE PROTECTION AREA - KEEP OUT"

A1.11.6 Structures such as "lock-ups", offices or other temporary site building, not requiring excavation or underground ducting, might be positioned such as to comprise part of the "Construction Exclusion Zone" fencing. All remaining fencing must be continuous with such features and effectively prevents access to protected ground.

A1.11.7 If entry into the "RPA" (Root Protection Area) zones becomes unavoidable, ground protection systems agreed with the project Arborist, will be utilised.

A1.11.8 No amendment, alteration, relocation, or removal of the tree protection fencing shall occur without prior liaison and approval from the Project Arborist.

Provision of Ground Protection (If Required)

A1.12.1 No vehicular/mechanised access whatsoever will be allowed onto unprotected "Construction Exclusion Area" ground.

A1.12.2 Ground protection can include the use of proprietary materials/structures (installed to manufacturer's specifications and recommendations) or procedures that avoid ground damage/disturbance/compaction, or the use of procedures that avoid such effects e.g. manual/pedestrian installation procedures.

A1.12.3 Any system utilised must effectively spread load-weight, avoid compaction, maintain drainage/percolation/aeration, and be installed in a manner that avoids these issues.

A1.12.4 Newly provided access will be strictly limited to the area of the new protection structure.

A1.12.5 Protection installation will require a progressive laying down of ground protection, with previously laid material providing vehicular access to the next zone will be accepted as an approved method.

Works within "RPA" Zone

A1.13.1 Only works and construction practices, agreed with the Project Arborist prior to commencement, will be allowed in the "RPA" area.

A1.13.2 All works will be undertaken under the supervision and guidance of the Project Arborist who will have the authority to stop works if activities are considered such as to have the potential to damage trees.

A1.13.3 Preference must be given to manual labour and techniques within the fenced "RPA" zone.

A1.13.4 On completion of the required works, the area will be inspected by the Project Arborist regarding the reinstatement of the original protection and the relocation of the protective fencing to a position relating to the original "RPA" area.

Service Installation

A1.14.1 The "Project Arborist" must be consulted for advice and procedural recommendations, in respect of any installation of services within or requiring entry into the "Root Protection Area" of any tree intended for retention.

A1.14.2 Any such works found to be unavoidable, must be undertaken with special care, incorporating the recommendations of both "BS5837: 2012 and the National joint utility groups, guidelines for the planning, installation and maintenance of utility services in proximity to trees (NJUG 10)

A1.14.3 Preference must be given to trench-less techniques including Mole-piping, Directional-drilling manual hydro-trenching (high-pressure water), "Air-Spade" or broken-trench techniques.

Tree Management and Works

A1.15.1 All tree works should be undertaken under the guidance of the project Arborist.

A1.15.2 The primary site clearance and felling should be undertaken at the earliest stage of the overall development works, to enable the re-assessment of all ostensibly retainable trees and the updating of the "Preliminary Management Recommendations" to account for context changes and construction access and/or other issues coming to light.

A1.15.3 All Tree Works must adopt safe work procedures and must be undertaken by staff suitably trained for the purpose at hand and compliant with all legislative, safety and insurance requirements.

A1.15.4 All additional works will be agreed with the local authority and/or other stakeholders and applied at the earliest possible opportunity.

A1.15.5 On completion of site works, the retained tree population will be reviewed and re-evaluated regarding its ongoing condition and the likely requirements of any ongoing or future monitoring or management needs.

Demolition

A1.16.1 All demolition procedures must be agreed and overseen by the Project Arborist or other suitably skilled staff to monitor for damage and to protect exposed roots/cut-trim exposed roots/oversee backfilling of exposed roots.

A1.16.2 Where access into unprotected "RPA" zone becomes unavoidable then suitable ground protection, provided in accordance with an engineer's direction and agreed with the Project Arborist will be installed.

A1.16.3 Care will be taken to avoid damage to soil volumes beneath and adjoining demolished structures that may contain tree root material.

A1.16.4 Whilst existing foundations/structures may provide temporary protected access to areas within the "RPA" zone, preference must be given to the location of demolition plant outside of the "RPA" zone.

A1.16.5 Where tree(s) exist near a structure to be demolished then the demolition should be undertaken inwards within the footprint of the existing building (top down, pull back).

A1.16.6 Underground structures (services etc.) within the "RPA" zone should be reviewed with regards to decommissioning and retention in situ in the interest of avoiding tree damage.

A1.16.7 Preference should be given to the retention existing sub-bases where hard surfaces are removed, particularly if the hard surface is to be replaced.

Ancillary Precautions

A1.17.1 The methodologies as set out in this document apply to all undertakers of work upon or adjoining the site as may require access to the "Construction Exclusion Zone" or the "RPA" area of any tree.

A1.17.2 This document will be issued to all persons requiring access to the work site, with all persons undertaking works either before or after the principal development (site investigation works, Landscape Contractors) are subject to the above requirements.

A1.17.3 Works outside the "Construction Exclusion Zone" must be controlled to create no potential secondary hazard to tree health.

A1.17.4 Large loads accessing the site must be reviewed regarding clearance and potential tree damage.

A1.17.5 Care must be taken regarding materials that may contaminate the ground. No concrete mixings, diesel or fuel, washings or any other liquid material may be discharged within 10 metres of a tree.

A1.17.6 No fires can be lit within 5 metres of any tree canopy extent.

A1.17.7 No tree will be used for support regarding cables, signs etc.

A1.17.8 The trees should be reviewed on a regular basis throughout the development process and on completion. At that time, further recommendations regarding tree management may be required.

A1.17.9 Any issue that has the potential to affect site trees must be brought to the attention of the Project Arborist for review and comment.

A1.17.10 Any circumstances that become known whilst the development project is ongoing that either involves trees or access to/works within the construction exclusion zone must be brought to the attention of the Project Arborist for evaluation and advice regarding approach and methodology.

A1.17.11 It is possible that liaison/agreement will be required with the Local Planning Authority regarding compliance with, as well as the verification of the required tree protection measures.

Appendix 2 - Tree Root Investigations; Excavation of Trial Pits.

A2.1 Throughout the design process, the identification of any potentially adverse effects to trees was paramount and where possible, avoided.

A2.2 The assessment of impacts is based on the "root protection area" (RPA) defined by the tree survey but is known on occasion, to be limited by physical factors.

A2.3 Physical factors can be natural or manmade and would include structures such as roads. Because of this, it is beneficial to understand better, the effects of the many existing roads concerning tree root development.

Methodology

A2.4 There are no non-destructive means to achieve this investigation. Therefore, to minimise ill-effects, small slit-trenches were positioned where tree root damage could be limited, while still providing a reasonable representation of tree root development and distribution.

A2.5 The slit-trenches locations intended to illustrate the effects of the road structure, on ground conditions and root development. To achieve this, the pits where orientated to include a section of the road edge and including approximately 1.00 metre of soft, grassed ground adjoining the road, and a similar 1.00 metre extent of the road area to show the ground beneath.

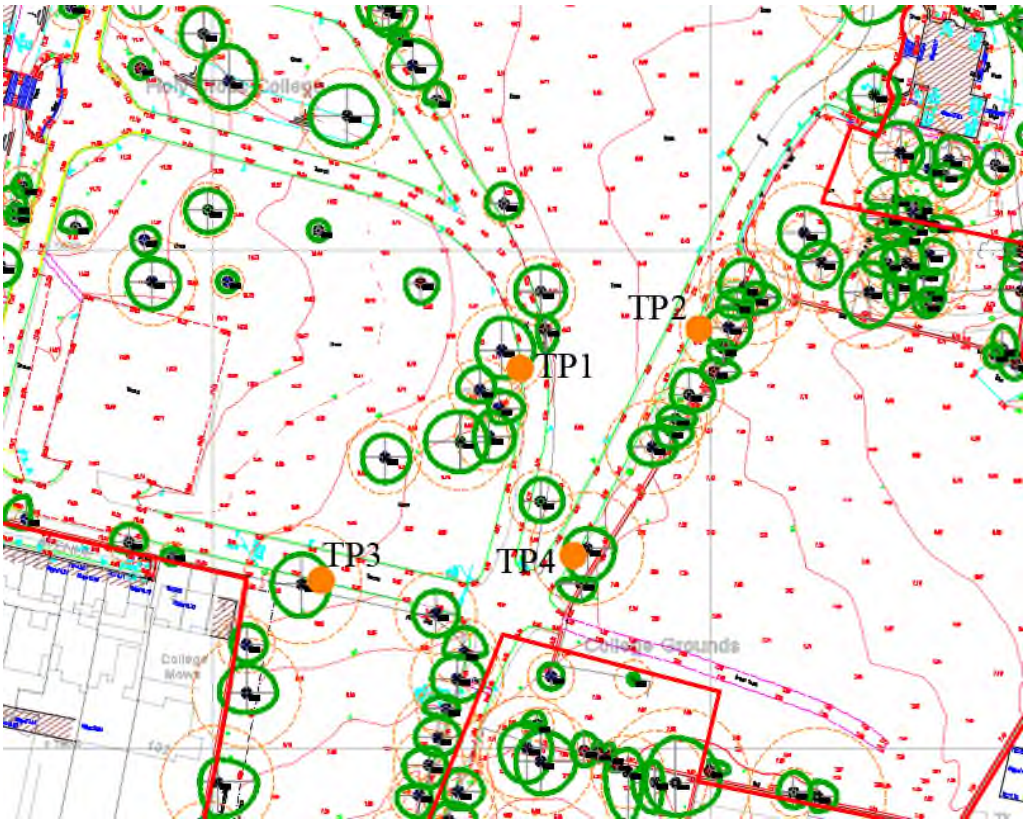

Fig 1 – Trial Pit (TP) Locations Indicated by Orange Circles

A2.6 Most trench positions coincide with potential issues locations, and where a scenario existed, that might apply to several locations within the development context. These locations are shown using orange circles at fig 1 above.

A2.7 The pits were positioned adjoining roadways within the parkland setting. Pit locations were between 90 and 150 metres from the Clonliffe Road entrance to the east of the College buildings and the south-west of the Red House.

A2.8 The trenches here excavated under the guidance of the project Arborist, who advised in respect of the precise location and orientation of each trench.

A2.9 The trial pits straddle the interface between the soft ground of the adjoining lawns and the ground beneath the road structure and kerb edge.

Information Gathering

A2.10 The nature of the review meant the possible loss of much evidence during the excavation process. Therefore, information was gained both during and after the excavation.

A2.11 Trench excavation was on a progressive basis. This methodology provided the best means by which any tree root material within the excised soil could be spotted and reviewed. This procedure allowed for the simple proportionate assessment of root densities, considering those roots remaining visible after excavation, as well as those encountered during the excavation.

A2.12 A photographic record was kept of the open trenches, as represented in the images at the "photographic record" below.

Findings

Trial Pit 1
Location – South-east of Oak 169.

A2.13 The excavation extended to circa 800 mm below open ground and 750 mm below road surface levels.

A2.14 The excavation showed made ground with horizons supporting large elements of building rubble.

A2.15 The primary root zone tends is split, the upper and primary root zone starting at circa 25 mm and extending to circa 350 mm, corresponding to soil fill above the band of recognisable demolition fill.

A2.16 The demolition fill extends from 350mm to a depth of circa 580 mm. This zone supported small proportion of root material and distinctly less than the zone above. Beneath the layer of fill, there is a secondary layer of rooting extending to circa 700 mm below ground level. The rooting in this area was minor and limited in comparison to the upper horizons.

A2.17 By way of approximations in respect of proportions, >75% exists within the upper horizons with <25% in the lower horizons. This lower rooting mass corresponds with a silty subsoil that quickly becomes devoid of tree roots.

A2.18 Laterally, a vast majority, exceeding 90% of tree roots exist within the ground profile beneath the grass. By comparison, the under-road sector supports less than 10% existing, typically limited to 300-400mm of the road edge and quickly diminishing as one progressed towards the road centre.

Trial Pit 2
Location – East of Lime 154.

A2.19 The excavation was open to circa 800mm below road surface level and circa 850mm below adjoining grass surface levels. Within the grassed zone, there is a distinct and profuse subsurface of roots typically less than 120mm depth. However, significant root extent extends to circa 600mm with smaller numbers of still significant size roots (5mm – 10 mm diameter to circa 800mm). The soil profile is reasonable but appears disturbed and unnatural. Notably, a low-level dark horizon at 400mm covered with a mixed and pebbly overburden suggests filling at history.

A2.20 Beneath the road, and in comparison to "Trial Pit 1", there is substantial tree root material. There is profuse proliferation at and about the kerb line suggesting water infiltration at the interface between the tarmacadam road and kerb edge.

A2.21 Though not as extensive as within the grassed area, root material is noted, extending to circa 700mm below ground. This material was of similar density both at the kerb edge and to the easterly most extent of the dig at 1200mm east of the kerb line.

A2.22 In respect of attributing rooting proportions, the below-grassed area of the trial pit would support circa 60% and below road area 40%.

Trial Pit 3
Location – North-west of Sycamore 114.

A2.23 Trial pit 3 extended to circa 750mm below road level and 820mm below adjoining grass surfaces.

A2.24 The soil profile, though mixed, appears broadly natural. In respect of tree rooting volume, beneath the grassed surface, we note a profusion of tree roots between 25 and 300mm. At this point, root densities diminish but remain significant to depths of 750mm. This pit included large, dead, and decayed roots presumed to relate to a previously removed tree.

A2.25 Beneath the road profile, and despite a shallow hardcore like layer that extends to circa 400mm below road surfaces. We again note that the soil profile appears mixed but mostly of soil. In the region of interface between the road, kerb, and grass surface, we note a profusion of tree roots, in positions adjoining and beneath the cement kerb

foundation. These roots tend to be concentrated within depths not exceeding 500mm below road surface levels.

A2.26 Of greater interest is the fact that roots diminish greatly and are almost absent from the soil profile within 350mm of the kerb alignment illustrating highly limited root development in positions beneath the road that are restricted to a narrow corridor associated with the kerb structure.

A2.27 Though broadly like the ground below grass surfaces, the ground beneath the road supports not only a tarmacadam surface but circa 350mm of hardcore over a hard and compacted soil medium. This band appears inhospitable to tree root development.

Trial Pit 4
Location – South-west of Horse Chestnut 148.

A2.28 The trial pit was extended to circa 900 mm depth beneath the grass margin and circa 750mm below the road surface.

A2.29 Below the grass surface, there is much root material extending from circa 30mm to more than 750mm. However, the greatest profusion of roots is between 30 and 450mm. The soil profile supports some stone and broken masonry, showing a mixed nature.

A2.30 At the interface between the road and soft margin we note, in a position beneath the cement foundation to the kerbstone, a massive profusion of tree roots, typically existing in a position directly beneath the cement foundation but extending to circa 600mm depth.

A2.31 Continuing out into the road profile, we note extensive root material in a band between 250mm and 450mm below the road surface. Above this band of roots, there is evidence of a shallow pebble/stone hardcore base but also some broken bricks illustrating its disturbed nature.

A2.32 The road foundation depth is typically shallow. The nature of the soil beneath the road surface and in the vicinity of the roots is still friable and broadly loose. In comparison to other trial pits, the transition between hospitable and hostile ground conditions at or about the road edge does not appear to exist in this scenario. Notwithstanding this, there is a difference in root densities with an estimated 60/40 ratio between the soft ground and below road rooting scenario.

Trial Pit 5
Location – on Clonliffe entrance avenue between Lime numbers 121 and 122.

A2.33 The pit is in a gap in the tree line, suggesting a tree may have been previously lost.

A2.34 The excavation extended to circa 750 – 850 mm below road and surface levels. Beneath the grassed area, there is extensive root material. The roots commence at circa 100 mm below current surface levels, and extends to 700 mm, with the densest band extending between 160 mm and 450 mm. The depth of surface roots suggests a likelihood of shallow infill in recent times.

A2.35 The extent of root material beneath and beyond the kerb edge is similar that that found in other pits.

A2.36 The tarmacadam surface extends to a depth of circa 120 mm. Below the tarmacadam, there are significant amounts of brick fill, extending to a depth of circa 500 mm. Below this fill layer are significant amounts of root material, extending to 700 mm, but with smaller amounts below this level. It is noted that beneath the road, the soil remains friable and broadly loose.

A2.37 This pit illustrates a distinct continuity of hospitable ground conditions, enough to support tree root development, extending beyond the grassed area and into areas beneath the road. Additionally, we see that the road profile includes a substantial depth that is broadly devoid of tree roots; this typically applies to the combined tarmacadam and demolition fill zone. Within this zone, the extent of root material tends to be small.

A2.38 In respect of comparisons, this roadway profile is in keeping with pits 2 and 4.

Additional Pits

A2.39 In an attempt to corroborate suspicions regarding the varying but noted diminutions in root density beneath road surfaces. Two additional pits were opened to ascertain the extent, if any, of any root passage beneath the road width.

A2.40 At a position 7.50 metres north of Sycamore 114, a pit was excavated directly adjoining the road kerb. This range was much less than the calculated root protection area radius of 11.90 metres. This excavation, extending to more than 750mm, revealed no plant root material beneath the 30/35 mm depth of the adjoining turf cover.

A2.41 At a range of circa 6.50 metres to the west of Horse Chestnut 148, a similar pit was excavated. This range was much less than the calculated root protection area radius of 11.50 metres. Here again and notwithstanding prior evidence on this roadway of substantial tree root development beneath the road surface, the pit showed no evidence of tree roots extending from the Horse Chestnut.

Discussion

A2.42 In Trial Pit 1 (Photos 1 and 2), the excavation shows a physiological barrier to tree root development whereby a majority of root proliferation has occurred within the open ground. By comparison, minimal root development has occurred within the road subbase or the soil profile beneath the road subbase. It appears that the combination of hostile environmental factors (, bulk density, soil strength and anaerobic conditions, etc.) have affected root distribution across the area.

A2.43 A similar scenario is found at Trial Pit 3 (Photos 5 and 6), where tree root proliferation was widespread beneath the grass, but quickly diminished and became non-existent at ranges quite close to the road edge but beneath the road surface.

A2.44 Trial Pit 2 (Photos 3 and 4) illustrates a different soil profile beneath the roadway than was encountered in Trial Pits 1 and 3. Here, reduced signs of demolition spoil and the existence of a broadly natural soil beneath a shallow subbase and road surface of

tarmacadam appear to have acted as a far lesser constraint to tree root development. The entire road structure appears much lighter and shallower, and the soil beneath the road, more friable and less compacted.

A2.45 This scenario was replicated in Trial Pit 4 (Photos 7 and 8) and Trial Pit 5 (Photos 9 and 10), with both pits illustrating substantial, and by comparison to trial pits 1 and 3, far-reaching root development beneath the road surface.

A2.46 Throughout the review, the below-kerb structure typically corresponded to a high proportion of tree root development. This development was not considered unusual and is a feature associated with the natural culverting of rainwater by the kerb structure and its filtering through/beneath the kerb/foundation/tarmacadam interface. The resulting area of "dampness" at the edge of what is often a comparatively dry area beneath the road surface, results in natural root proliferation.

A2.47 This issue must be considered for any activity that requires the modification of any existing road edges.

A2.48 The pits have illustrated a fundamental difference in road structures. Trial Pits 1 and 3 appear to relate to modern and standard road structures, with 300-450mm of subbase over notably hard/compacted earth. Additionally, these pits also suggested substantial historical modification and importation of material including soil and demolition rubble.

A2.49 By comparison, the roadway associated with Trial Pits 2, 4 and 5 are more delicate, light, and shallow, though there remains some evidence of soil level changes in the past, but to shallower extents.

A2.50 The current alignment coincides with the first edition ordnance survey map (circa 1830) an access drive to the "Red House". The existing road surface is on top of an earlier gravel drive.

A2.51 By comparison, the pits 1 and 3 correspond with a roadway indicated on the later edition of the map, of circa 1900.

A2.52 The two road types of roads differ in respect of their effects on tree rooting patterns. The roads associated with Trial Pits 1 and 3 appear to have created a barrier to tree root development, resulting in a cessation of root material within short ranges of the road edge. This effect on root development appears to be associated with a combination of road structure depths and high soil strength/compaction rates associated with the road corridor and the soil volume beneath it.

A2.53 By comparison, the roads associated with Trial Pits 2 and 4 have affected tree rooting to a lesser extent. While there is a visible diminution of root densities beneath the road, the soil beneath the riad surface nonetheless supports a significant amount of functional tree root material.

Photographic Record

Photo 1
Trial Pit 1
(Under-grass)

Note is made of profusion of roots within open ground area. Note is made of high proportion of roots adjoining and beneath kerb.

Photo 2
Trial Pit 1
(Under-road)

Note is made of rapid diminution of roots beneath road surface. Additional note is made of deep artificial build-up beneath tarmacadam.

Photo 3
Trial Pit 2
(Under-grass)

Note is made of expected profusion of tree roots beneath grassed surface. Note is also made of substantial root development around and beneath the kerb.

Photo 4
Trial Pit 2
(Under-grass)

Though there is a diminution in proportions, there is still a substantial extent of tree root development continuing beneath road surface.

Photo 5
Trial Pit 3
(Under-grass)

As expected, the ground beneath the grassed surface supports a high density of root development.

Photo 6
Trial Pit 3
(Under-road)

By comparison, the ground beneath the road surface sees a rapid diminution of tree roots, with few noted beyond 300-350mm beyond the kerb edge.

Photo 7
Trial Pit 4
(Under-grass)

As expected, the below-grass area supports a high density of tree roots.

Photo 8
Trial Pit 4
(Under-road)

Though there is a diminution in proportions, there is still a substantial extent of tree root development continuing beneath road surface.

Photo 9
Trial Pit 5
(Under-grass)

As expected, the below-grass area supports a high density of tree roots.

Photo 10
Trial Pit 5
(Under-road)

There is still a substantial extent of tree root development continuing beneath road surface and associated base fill.

Appendix 3 - Tree and Woodland Management Plan

Brief

A3.1 To provide a suitable Tree and Woodland Management Plan, to compliment and broaden the aspect and scope of the general tree survey and tree protection plan information.

Woodland Management Plan Mission Statement

A3.2 To provide and maintain a sustainable, safe, and useable woodland/tree amenity within the proposed development.

The Aims of the Plan

A3.3 The intention of the management plan is to be to provide guidance and a strategy by which the site's existing and future tree population and woodland areas can be managed, maintained, and improved to accommodate the needs, desires and requirements of all stakeholders.

Specific Aims and Objectives

A3.3 The aims and objectives of the management plan would include-

- To provide a sustainable woodland and tree population by the management of existing and the installation of new plants.
- To maximise the amenity value of the site with specific regard to woodland aspects.
- To address biodiversity and ecological issues by way of careful selection of species and location of plants.
- To address existing age profile asymmetries by managing combined tree management/improvement and replacement planting to create a more diverse age profile over time and assist with sustainability.
- To regularly review and monitor tree population regarding site safety and other factors including biotic and abiotic factors.

Proposed Outcome

A3.4 The provision of safe and sustainable tree and woodland population by the adoption of a proactive management approach, intended to minimise management cost over time.

What is the Tree Population Currently?

A3.5 The current tree population comprises a combination of small woodland belts, tree lines and avenues, as well as individual trees, apparently associated with the general ornamentation of the site.

A5.4 Many trees are in good condition, this relating to ongoing management over time and the progressive removal of poor quality and faulty trees. Nonetheless, the population includes several trees whose health is deteriorating or whose sustainability is impaired

for other reasons. For these reasons, the current site population includes many trees suitable for retention, as well as others unsuitable for retention and a small group which, subject to ongoing and regular review, may offer short- or medium-term sustainability.

A5.5 The tree population exists within a site context relating to its current rates of occupation and use. This rate is currently low, with much of the site area subject to minimal and incidental use only. This context will change radically once the site is developed, with many new structures, activities and persons occupying areas sometimes near trees.

What Will the Tree Population Be?

A5.5 Within the context of the developed site, the tree population will provide -

- It will primarily constitute a visual amenity and social use amenity to the proposed development.
- It will provide ecological benefits by way of shelter, food etc. that will in turn attract invertebrates as well as mammals and birds.
- It may provide shelter and a dampening effect particularly during periods of high winds or storm conditions to the general environs of the development area.
- It may provide shadow, shade, privacy, and sound dampening between various elements of the development.

A5.6 The woodland will not be considered of silvicultural or commercial value and as such, silvicultural management techniques and systems would be of minimal merit.

A5.7 Management techniques will be orientated towards the maximising of safe tree longevity, the provision of amenity, shelter, and ecological values.

Management Systems

A5.8 Whilst all management systems should preferably take on a proactive approach, reactive necessities cannot be avoided. The fundamental basis of any management plan applied will rely on the results of constant and regular review, the information and guidance from which will direct, moderate, and focus any management scheme.

A5.9 Considering the context between trees and areas of know occupation and use then tree and site safety will be of utmost importance. In respect of this and considering the information provided by the initial tree survey, it must be appreciated that the existing tree population comprises varying tree conditions and states of decline or deterioration.

A5.10 The preliminary site tree survey carried out as part of the planning process in relation to this development has already highlighted some issues in respect of individual trees and tree groups. Some specimens are noted to be defective or of poor quality and as such may prove to be of limited longevity or suitable only for limited retention on safety grounds. As such, it must be appreciated from the outset that the existing site tree population is partially flawed and cannot be retained in its entirety over time. For this reason, it is understood that more trees will be lost over time, over and above those associated with site development. This appreciation illustrates the need for replacement planting because of both natural and planned tree removal.

A5.11 This should not be regarded as counterproductive as the extent and nature of site development is such as to limit space availability for new planting that in turn is critical

to population turnover, replacement planting, the provision of age and species diversity and hence the promotion of sustainability over time. Additionally and regarding species/context relationships and the fact that many of the trees existing currently may not have been selected for use within the developed context, then the potential to amend and change the species composition over time should be regarded as beneficial.

Future Monitoring

A5.12 It is imperative for site safety and necessary as part of any woodland/tree management plan that the existing tree population be reviewed on a regular basis. Only regular review can hope to identify defective, faulty, or deteriorating trees at an early stage, thereby allowing timely intervention and the minimising of risks. It is equally appreciated that the review of trees can prove onerous and sometimes, would appear to be of variable urgency. In respect of this, it is advised that the site's tree population be divided into various zones, to better identify areas where trees must be reviewed most regularly, as opposed to those areas where less frequent review might suffice. Such zoning will inevitably relate to degrees of occupation and use and the associated potential threat the trees may present to persons or property.

A5.13 An ongoing tree review will over time, identify specimens that need removal on safety grounds. It is also advised that over time and regarding fine-tune works that safety related to extent, and where necessary, the removal of trees to provide for population thinning and space for ongoing growth. This may prove necessary regarding the provision of additional planting space and the maintenance of a diverse age profile, as well as to prevent/reduce the extent of competition within the existing tree population.

A5.14 It is advised that the monitoring process must begin at construction phase and continue an annual basis thereafter. Additional reviews should be undertaken after severe weather events, including storms, high winds or heavy snow events so that mechanical damage and failure can be identified and addressed as required.

A5.15 The initial "construction phase" review is of particular importance as it will enable a review of trees in their" exposed" state, after initial site felling works. It is upon the findings of this survey that the primary tree pruning, and management works program will be based.

Tree Planting Works

A5.16 The size, density and age profile of existing woodland and tree groups is considered such as to provide minimal likelihood of natural regeneration other than in respect of locally dominant species including Cherry Laurel, Elder and Bramble. Therefore, artificial replacement planting may be required to provide any valuable degree of species and age diversity. In respect of this, envisaged occupation, use, desired amenity and ecological factors, species selection must be addressed on an area specific basis.

A5.17 In respect of the above, it is appreciated that some of the retainable tree population does not necessarily constitute woodland and in some instances, the selection and use of larger growing native species may not be justified. In such instances, consideration must be given to more standard amenity tree species that might be better suited to their constrained or otherwise artificial environment as well as respecting any desire for greater ornamentation.

A5.18 Equally, historical factors and prior landscape should be considered, for example the visually dominating use of Lawson, Leyland, and Monterey Cypress in certain areas of the site. These trees currently comprise boundary defining elements of the broader landscape. Such trees while serving a prior purpose are of limited sustainability and might best be considered for replacement with other species.

A5.19 Planting works should where possible, avoid any temptation towards immediacy or attempted short-term completion in favour of works being staggered over time. Age diversity across the existing site is poor and this can be addressed by spreading new planting works over staggered period, for example on a 5 or 10-year basis as well as on a staggered and progressive basis in accordance with available space associated with natural tree losses.

A5.20 Note should be made that the development proposals include substantial tree planting works as part of the overall landscaping package. This planting, intended to be fulfilled at or immediately after construction completion stage, will contribute greatly to the longer-term tree cover of the site and to the mitigation of short-term tree losses. Species selection and location would suggest limited need for management input above that designated by the landscape architect, though such trees should be incorporated into the annual tree review regime.

Site Areas and Zoning

A5.21 It should be appreciated that the existing nature of trees and woodland areas and the expectations of future use, may allow for differing degrees of intervention and management. Such differences must be advised by estimations and expectation of use and occupation. Available resources must be applied in a manner commensurate with tree related risk that in turn will relate to the usage levels of a given area.

A5.22 Where trees and woodlands directly adjoin areas of high use and occupation, such as thoroughfares, roads, paths, buildings, or areas of know occupation or congregation, then such trees must be given the highest degree of scrutiny in respect of suitability for retention and ongoing review over time in respect of the potential development of hazards.

A5.23 Where trees are in areas of limited or reduced use and occupation, or where access is specifically restricted, then the need for intensive management and/or intervention would appear to be less onerous. Accordingly, it may be reasonable to assume that such areas might be specifically designated for “minimal intervention”, for example of ecological grounds and, should the context allow, all including dead and dying trees might be retained in situ.

A5.24 The differences as outlined above will allow for differing strategies, attaining different outcomes over time. Such differences can readily be adopted under the auspices of any management scheme, but expectations should nonetheless be discussed and agreed with all stakeholders.

A5.25 Similar issues arise elsewhere about the site whereby the longer-term strategies may be modified to accommodate or adopt specific stakeholder expectations or goals.

Proposed Management Plan Framework

A5.26 Set out below is the basis of a strategic woodland management plan, separated into its short, medium, and longer-term elements.

A5.27 In its current format, it provides a basis for management, though equally provides for the simple adoption of medium and longer-term goals as may be desired by stakeholders including site managers, residents, and Fingal County Council.

A5.28 In respect of this and with the intention of satiating the needs and desires of all parties, this plan should be reviewed, and any additions or amendment should be raised for review and adoption and inclusion as appropriate.

Immediate Plan

A5.29 Works to be completed during at commencement of development works.

- Undertake works advised within development planning tree survey (including tree felling works).
- Review retained trees in respect of effects of tree felling, shelter loss and exposure and produce a secondary works programs to address same
- Undertake agreed planting works in accordance with development permissions.
- Produce and adopt a monitoring, inspection, and review plan.

Short Term Plan – Annual Basis

A5.30 Annual - To be initiated and adopted from site development –

- Review tree conditions (survey) to identify ongoing conditions and need for specific action.
- Review planted material for establishment failure and need for replacement.
- Amend "Short Term Plan" inclusions to include works recommended by above reviews.

Medium Term Plan – 5 Year basis

A5.31 To be undertaken on a repeating 5-year basis –

- Review age profile
- Review patterns of tree loss
- Assess need and extent of planting works in respect of short-term tree management and longer-term population management desires and objectives.

Long Term Plan – 15 Year basis

A5.32 To be undertaken on a repeating 15-year basis –

- Review management plan to date.
- Assess for need to amend adjust plan.
- Assess for need/benefits of proactive tree removal to provide for planting space or for allocation of new planting areas/zones.