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Part 8 Environmental and Planning Report

Celbridge Link Road

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Chapter 1: Introduction

1.1 Introduction

This Environmental and Planning Report has been prepared by Pat O'Gorman & Associates (POGA) on behalf of South Dublin County Council as part of the documentation to accompany a Part 8 planning process for the proposed Celbridge Link Road. This document was prepared in conjunction with the following design team members:

1. Goodrock Project Management – Project Managers
2. John Spain & Associates – Planning Consultants
3. Ronan McDiarmada & Associates – Landscape Architect
4. Scott Cawley – Ecological/ Appropriate Assessment
5. Atkins – Traffic Consultants
6. Arborist Associates - Arborist

The proposed development includes 820m of new single carriageway two-way road and a new signalised junction where the proposed Celbridge Link Road intersects with the existing R403 Celbridge Road. The scheme proposes a new uncontrolled T-Junction onto Tubber Lane on the western side of the Link Road and a cul-de-sac of Tubber lane on the eastern side of the Link Road.

This Environmental and Planning Report documents the assessment of the potential impacts of the proposed development.

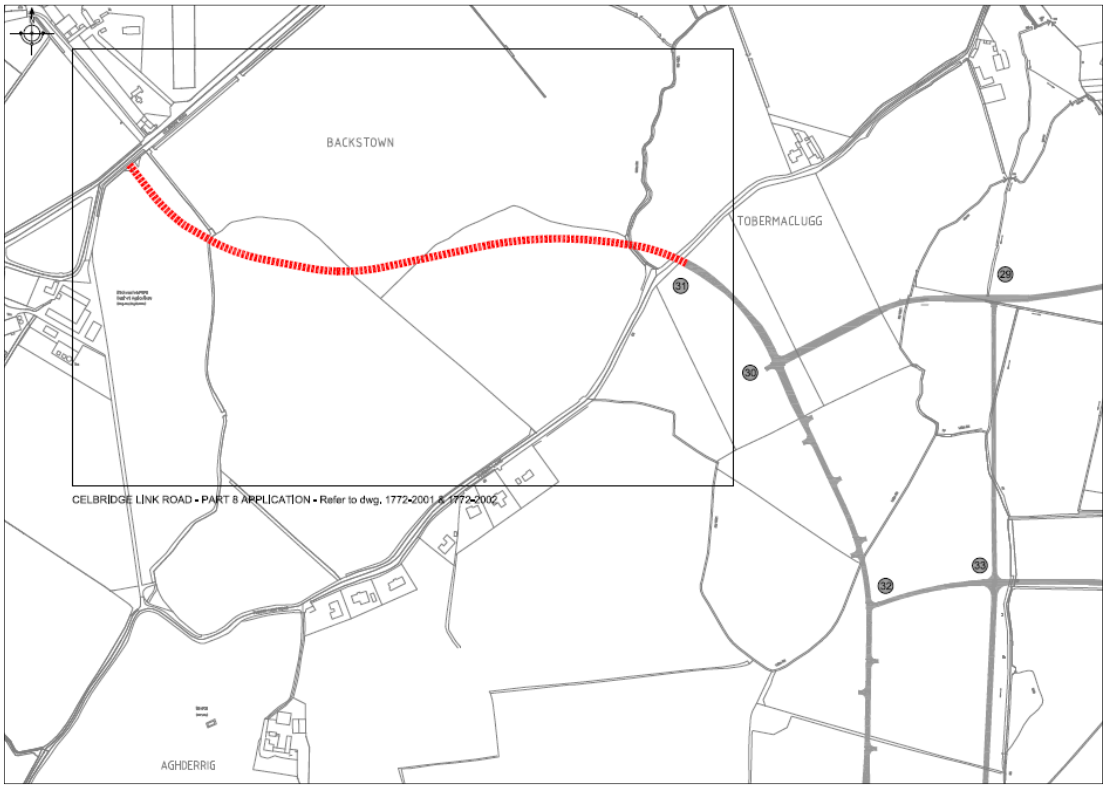

Figure 1.1– Proposed Link Road in Context

1.2 Planning Process

The planning for the proposed improvement scheme is undertaken in accordance with the legislative requirement in Part XI, Section 179 of the Planning & Development Act,

2000 as amended.

Part 8 of the Planning and Development Regulations, 2001 to 2011 details the class of development that is prescribed for the purposes of Section 179 of the Act and the relevant class for the proposed scheme is as follows:

b) "Construction of a new road or widening or realignment of an existing road, where the length of the new road or of the widened or realigned portion of the existing road, as the case may be, would be – in the case of a road in an urban area, 100 metres or more,"

Under Part 8 of the Regulations, the Local Authority is required to make details of the proposed road development available for public inspection and comment and to prepare a report in relation to the proposal for consideration by the elected members of the local authority. This Environmental and Planning Report is therefore prepared to satisfy these requirements and contains information on the potential environmental impacts of the proposed development. It has been prepared in accordance with the information requirements of the Planning and Development Act as amended and Planning and Development Regulations as amended.

1.3 Purpose of this Report

The Environmental and Planning Report has been prepared in support of the Part 8 Planning Procedure, to provide details of the proposed Road development works and to describe the scheme and its interaction with its surrounding environment.

The purpose of the report is to identify the potential impacts the proposed scheme will have on the environment and to propose measures to avoid, reduce or remedy undesirable potential impacts as appropriate.

Specialist reports have been commissioned including an Appropriate Assessment Screening Report, an Arborists Report and Traffic Impact Assessments to ensure that all environmental aspects of the Scheme are fully assessed and appropriate mitigation measures identified. All relevant objectives contained in the County Development Plan in so far as they apply to the proposed scheme will be complied with.

1.4 Legislative Requirement for an Environmental Impact Statement/ Environmental Impact Assessment Report

Article 8 of the Roads Regulations 1994 prescribes the types of proposed road development that require the preparation of an Environmental Impact Assessments as:

- Construction of a motorway.
- Construction of a new road of four or more lanes, or the realignment or widening of an existing road so as to provide four or more lanes, where such new, realigned or widened road would be 8km or more in length in a rural area or 500m or more in length in an urban area.
- Construction of a new bridge or tunnel, which would be 100m or more in length.

The proposed Celbridge Link Road will involve the provision of an 820m length of 7.0m to 10.5m wide single carriageway road and as such does not require the preparation of an Environmental Impact Statement/ Environmental Impact Assessment Report under the relevant legislation.

Chapter 2: Background to Scheme

2.1 Background

Part IX of the Planning and Development Act 2000 (as amended) introduced Strategic Development Zones (SDZs) to facilitate specified development of economic or social importance to the state.

Lands at Adamstown (223.5 hectares) were designated a SDZ for residential development on the 1st of July 2001.

The Adamstown SDZ Planning Scheme 2003 refers to the requirement for a link to connect Adamstown to the R403 to the north west of the SDZ. This link is referred to as the Celbridge Link Road.

The Council has prioritised the construction of Celbridge Link Road as a proposed road to be delivered within 6 years as part of the County Development Plan 2016-2022, to facilitate future development within the Adamstown SDZ and improve the permeability of the road network.

2.2 Planning Policy

Design Manual for Urban Roads and Streets (DMURS)

DMURS provides guidance relating to the design of urban roads and streets. The Manual seeks to address street design within urban areas (i.e. cities, towns and villages). It sets out an integrated design approach. What this means is that the design must be:

- Influenced by the type of place in which the street is located, and
- Balance the needs of all users.

DMURS reorders the design priorities and requires designers to consider the needs of pedestrians first, then cyclists, public transport and finally private motor vehicles, when designing schemes within an urban environment.

Smarter Travel, a Sustainable Transport Future, A New Transport Policy for Ireland 2009-2020

Smarter Travel, A Sustainable Transport Future, (2009) is the transport policy for Ireland for the period 2009-2020. The policy focuses particularly on how existing unsustainable transport and travel patterns experienced in Ireland might be tackled.

It recognises the vital importance of continued investment in transport to ensure an efficient economy and continued social development. It also sets out necessary steps to ensure that people choose more sustainable transport modes such as walking, cycling and public transport. It sets out five key goals:

- To reduce overall travel demand;
- To maximise the efficiency of the transport network;
- To reduce reliance on fossil fuels;
- To reduce transport emissions; and
- To improve accessibility to transport.

The document includes a vision to create a strong cycling culture in Ireland and ensure that all cities, towns and villages will be cycling-friendly and that cycling will be a preferred way to get about, especially for short trips. There is also a commitment to creating a culture in Ireland that encourages people to walk as a matter of routine.

South Dublin County Development Plan 2016 – 2022

The South Dublin County Development Plan 2016 – 2022 includes the Celbridge Link Road (this scheme) as a Six-Year Road Proposal (Figure 2.1 Map No.1 of the Development Plan shown below). The plan describes the link as a '*New road between the Adamstown SDZ lands and Celbridge Road (R403)'* and its function is *'to provide access to Adamstown SDZ lands'.*

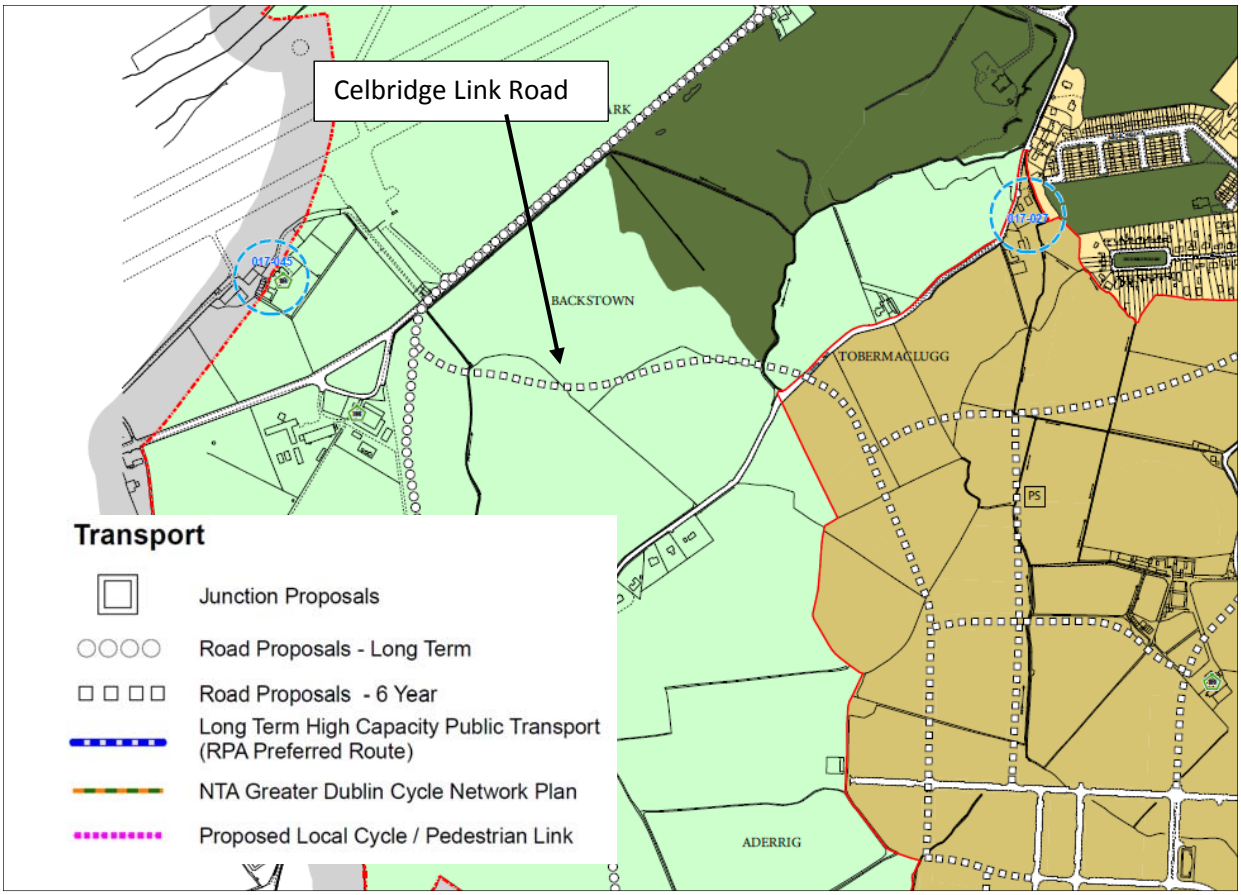

Figure 2.1 – Development Plan Land Use Zoning Map 1 (Map 1 of the CDP)

Adamstown SDZ Planning Scheme 2014

The Celbridge Link Road is also referred to in the Adamstown SDZ Planning Scheme 2014 under road improvements where it is noted that it is proposed to provide a link to the R403 Celbridge Road.

LIHAF (Local Infrastructure Housing Activation Fund)

Adamstown SDZ is included in the list of approved LIHAF (Local Infrastructure Housing Activation Fund) projects published by the Department of Housing, Planning, Community and Local Government. The Celbridge Link Road is included as one of the public infrastructure elements to be delivered as part of Adamstown SDZ under the LIHAF scheme. The project description states;

'The Celbridge Link Road proposal is identified as being a key form of infrastructure within the Adamstown SDZ Planning Scheme, the delivery of which, will directly contribute to the provision of 750 residential units'.

2.3 Objectives of the Celbridge Link Road

The objective of the Scheme is to deliver a new single carriageway two-way road linking the Celbridge road and the Adamstown SDZ with a signalised junction at the existing Celbridge road and a uncontrolled T-Junction onto Tubber Lane on the southern side of the Link Road and a cul-de-sac of Tubber lane on the northern side of the Link Road located between the cluster of houses and the Celbridge Link Road Crossing point. The alignment of the vehicular cul-de-sac and turning head will be shaped and narrowed to prevent illegal parking and encampment. Pedestrian and Cyclist access will be maintained along Tubber Lane with the Turning head provided at the end of the cul-de-sac to facilitate refuge and emergency vehicles.

The key objectives of the Celbridge Link Road are as follows:

(a) To improve accessibility to the Adamstown SDZ and surround area

(b) To provide direct alternative access route to and from the Adamstown SDZ.

(c) To mitigate traffic congestion at the existing Newcastle road

(d) To provide an alternative link from/to Adamstown SDZ and the N4/M4

(e) To facilitate and support the expected growth in traffic arising from the future development envisaged by the Adamstown SDZ and surround area

Chapter 3: Description of Proposed Scheme

3.1 Proposed Development

The proposed development site is located in the north of the Adamstown SDZ and south of the Celbridge to Lucan Road (R403).

The proposed development comprises: -

- 820m of new single carriageway two-way road alignment with off road cycle track and footpaths linking the Adamstown SDZ to the Celbridge Road (R403).
- A new signalised junction where the Celbridge Link Road connects to existing Celbridge Road (R403),
- A new uncontrolled T-Junction onto Tubber Lane on the western side of the Link Road and a cul-de-sac of Tubber lane on the eastern side of the Link Road.
- Pedestrian and Cyclist access will be maintained along Tubber Lane, with a turning circle provided on Tubber Lane to facilitate refuse trucks and emergency vehicles.
- New public lighting provided along the existing Tubber Lane with public lighting provided for the new pedestrian/cycle track connecting Tubber Lane with the proposed new road development,

3.2 Road Layout

The route of the proposed Celbridge Link Road is shown in the figure below on a background of OS Mapping. The proposed road will connect Adamstown SDZ with the existing R403 Celbridge Road via a signalised junction.

The proposed junction will facilitate the proposed Celbridge Link Road which will link the future internal road network within the Adamstown SDZ to the R403. This will allow traffic from the Adamstown SDZ easier access to the N4 and towards Celbridge, removing this traffic from currently congested links such as the R120.

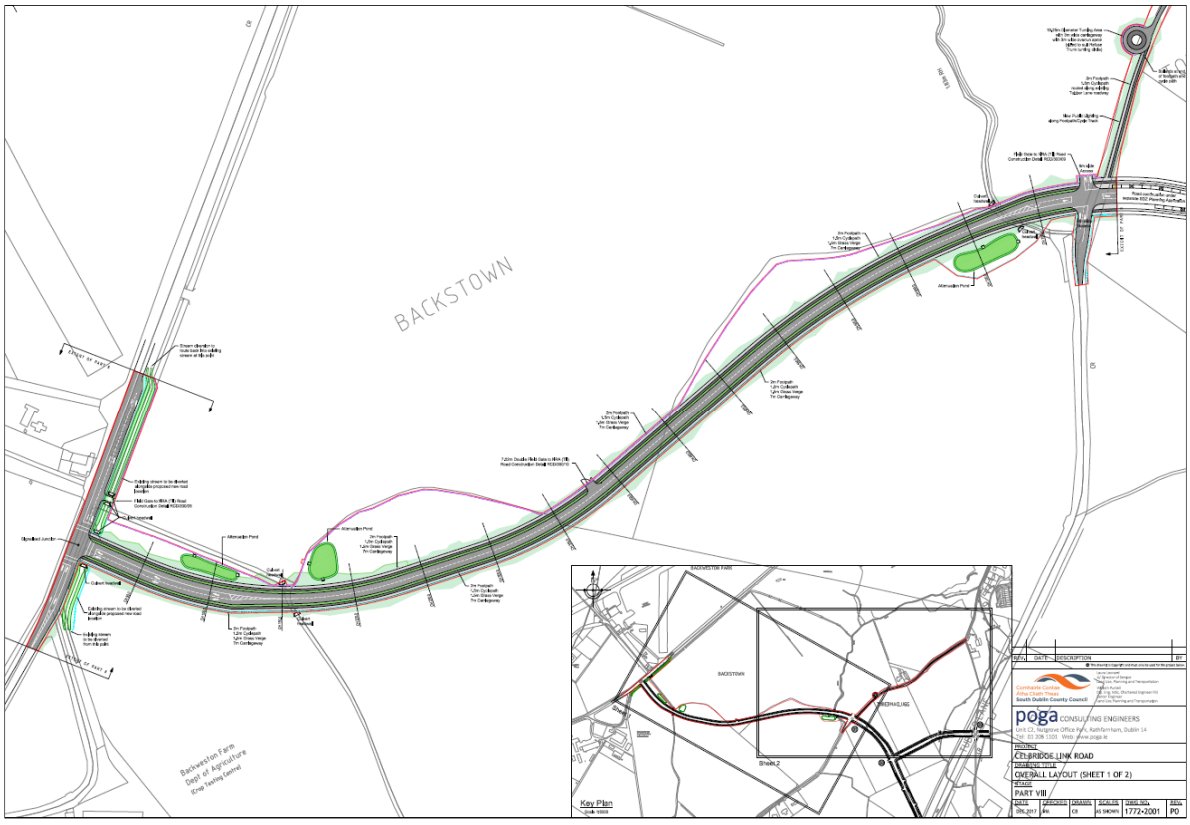

Figure 3.1- Plan of Celbridge Link Road

3.3 Cycling and Walking Facilities

The SDCC Development Plan Policy is to promote cycling and walking through the provision of cycle and pedestrian facilities in the design of public transport routes and road schemes.

It is proposed to provide a 1.5m cycle track and 2.0m footpath at both sides of the new link road, these will be separated from the vehicular lanes by a 1.5m grass and tree verge.

It is also proposed to provide a 1.5m cycle track and 2.0m footpath routed along a section of the existing Tubber Lane roadway, as shown in the accompanying site layout drawings.

3.4 Public Lighting

The public lights along the existing Celbridge Road is at approx. 30m spacing on alternative sides of the road and using an 8m high column. The lighting columns will be located in the grass verge with a minimum clearance to the kerb of 800mm. This lighting scheme will be extended onto the proposed link road through the SDZ. The details of the new lighting will be considered at the detailed design stage. The Lighting will be deigned to meet the "South Dublin County Council, Public Lighting Specification, Rev. 2 14/10/216, or specification current at the time.

3.5 Surface Water Drainage

The surface drainage arrangements are shown on the attached drawing and attenuation is proposed at two locations. A Hydrobrake will be installed to limit the rate of discharge to the adjoining stream and the upstream attenuating pipes sized accordingly. The design complies with the GDSDS standards. The areas beneath the verge and cycle track construction should be constructed of permeable materials to permit infiltration into the surrounding soils.

3.6 Attenuation

In accordance with the SuDS philosophy, a Surface Water Treatment Train approach has been applied to the design of the surface water drainage on this site. The techniques that apply here suit this sites topography, ground conditions and receiving environment.
The treatment train approach assures that both runoff quantity and quality are addressed, through the overall techniques of:

- Source control: conveyance and infiltration of runoff;
- Site control: reduction in volume and rate of surface runoff, with some treatment provided;
- Regional control: interception of runoff downstream from all source and site controls, to provide follow-up flow management and water quality treatment.

Source Control

This element of the treatment train is to detain or infiltrate runoff as close as possible to the point of origin. The use of such source control devices reduces the peak runoff rate and attenuates flows. Infiltration of flows would ensure that unavoidable pollutants are treated where practicable. The proposed open swales will allow the treatment of runoff and recharge the ground water where the infiltration is possible.

Site Control

Site control comprises runoff and treatment installations to serve individual sites, using elements such as attenuation tanks detention basins, permeable paving, or cellular systems.

On this road it is proposed to use three open swales and this allow the store the 1:100-year storm event plus 10% for climate change.

Regional Control

Regional control comprises of treatment facilities to reduce pollutants from contaminated runoff, with the potential to provide biological treatment on a catchment scale. It is proposed to add the treatment of the runoff from the road by providing a downstream defender, or similar devise, on the upstream side of the swales. This will add the removal of fine and coarse particles, hydrocarbons and floatable debris from surface water runoff. It is also proposed to provide a bypass separator on downstream side of the swales to further remove any fine oil particles before the runoff enters the outfall watercourses.

3.7 Cross Sections

A typical cross section of the proposed road is shown in the figure below. The road will consist of 3.5m general traffic lanes (2 lanes), a 1.5m grass/tree verge, 1.5m cycle track and a 2.0m footpath.

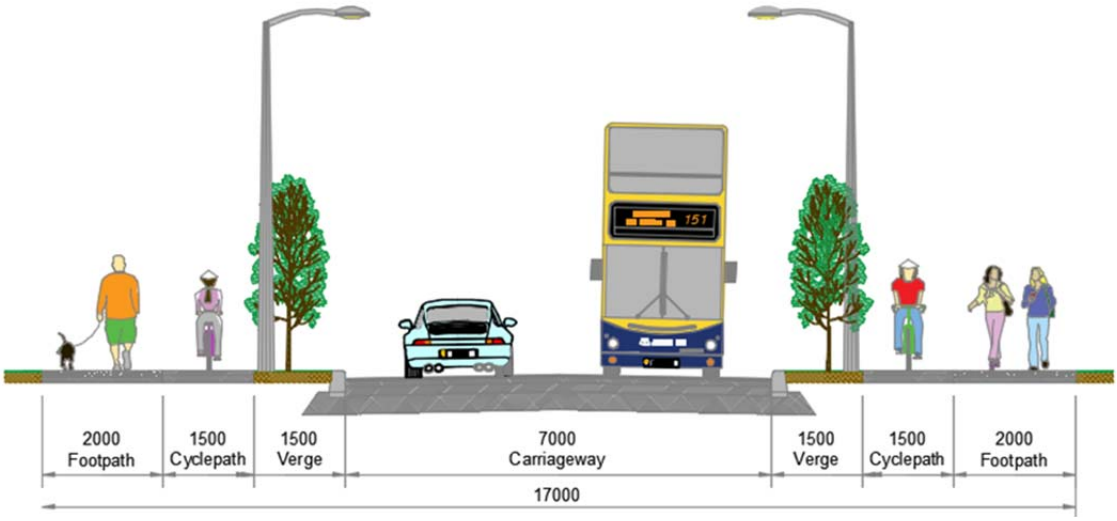

Figure 3.2 – Typical Cross Section

Chapter 4: Alternatives Considered

4.1 Alternatives Considered

The route corridor proposed for the Celbridge Link Road is constrained by the location of the section of the road located within the SDZ, the adjoining Lucan golf course and the access point onto the Celbridge road. Therefore, all alternative alignments considered for this scheme were substantially the same and differed only in the area of land required and minor adjustments to the horizontal alignment.

The do-nothing scenario presents an alternative to the proposed scheme; however, this alternative would not alleviate traffic from any further development within the Adamstown SDZ and result in the continuation of traffic congestion at the existing Newcastle Road.

Chapter 5: Traffic Impacts

5.1 Introduction

The proposed Celbridge Link Road will link to the existing R403 regional road by means of a new signalised junction. Traffic counts were carried out on the R403 at this location to determine the current volumes of traffic using this road. The number of trips generated by the proposed Adamstown SDZ developments were calculated and distributed to determine the volume of traffic using the Celbridge Link Road to access the Adamstown SDZ lands.

5.2 Potential Impacts – Construction Phase

As an internal link road which will have limited interaction with existing roads during construction the potential impacts during the construction phase are considered to be negligible.

5.3 Potential Impacts – Operational Phase

The technical note on traffic impact accompanying this application demonstrates that the junction has adequate capacity to cater for the likely traffic volumes experienced in 2032 following completion of the entire Adamstown SDZ development.

The PM Peak hour has a lower practical reserve capacity than in the AM peak with 2.1% as opposed to 8.9%, however, the overall delay experienced at the junction is lower in the PM Peak.
The maximum degree of saturation experienced by any arm is 88.2% for the R403 southbound in the PM Peak. This is associated with the large number of left turning traffic accessing the Celbridge Link Road towards Adamstown.

While some queueing and delays are shown by the model, these are generally considered to be within acceptable limits. It is likely that the pedestrian stage will not be called in every cycle, given the location of the junction, which will improve junction efficiency further.

5.4 Conclusion

The Linsig model utilised to assess traffic impacts indicates that the proposed junction layout has adequate spare capacity for the anticipated traffic volumes in 2032, following construction of all developments within the Adamstown SDZ. Queueing and delays experienced at the junction are also within acceptable limits

Chapter 6: Environmental Issues

6.1 Introduction

The following sections of this report identify the potential environmental impacts arising from the proposed development and outlines mitigation measures where required, under the following headings: -

(a) Noise & Vibration
(b) Air Quality and Climate;
(c) Hydrology & Hydrogeology;
(d) Soil
(e) Population and Human Health
(f) Biodiversity
(g) Landscape & Visual Impacts
(h) Architectural, Archaeological and Cultural Heritage
(i) Material Assets

6.2 Noise & Vibration

6.2.1 Noise

A variety of items of plant will be in use, such as excavators, lifting equipment, dumper trucks, compressors and generators during the construction phase. There will be vehicular movements to and from the site that will make use of existing roads. No construction traffic will be permitted to use Tubber Lane for the duration of the works.

Working Hours

Normal working times will, in general, be during daylight hours 07:00 to 19:00hrs Monday to Saturday. Works other than the pumping out of excavations, security and emergency works will not be undertaken outside these working hours without the written permission of the Engineer. However, some limited night-time working will be required for the proposed new junction works. This permission, if granted, can be withdrawn at any time should the working regulations be breached.

Works other than the pumping out of excavations, security and emergency works will not be undertaken at night and on Sundays without the written permission of the Engineer.

Potential Impacts – Construction Phase

During the construction phase of the project there will be some small impact on nearby properties due to noise emissions from site traffic and other activities, however no construction traffic will be permitted to use Tubber Lane for the duration of the works. The transient nature of construction works, the application of binding noise limits and hours of operation, along with implementation of appropriate noise control measures, will ensure that noise impact is kept to a minimum.

Potential Impacts – Operational Phase

The predicted noise level generated by the proposed road development during the

operational phase is not expected to represent a significant increase on current noise levels in the area.

Mitigation Measures

The contract documents will clearly specify that the Contractor undertaking the construction of the works will be obliged to take specific noise abatement measures and comply with the recommendations of BS 5228: Part 1 and the European Communities (Noise Emission by Equipment for Use Outdoors) Regulations, 2001. These measures will ensure that:

- No plant used on site will be permitted to cause an ongoing public nuisance due to noise.
- The best means practicable, including proper maintenance of plant, will be employed to minimise the noise produced by on site operations.
- All vehicles and mechanical plant will be fitted with effective exhaust silencers and maintained in good working order for the duration of the contract.
- Compressors will be attenuated models fitted with properly lined and sealed acoustic covers which will be kept closed whenever the machines are in use and all ancillary pneumatic tools shall be fitted with suitable silencers.
- Machinery that is used intermittently will be shut down or throttled back to a minimum during periods when not in use.
- Any plant, such as generators or pumps, that is required to operate before 07:00hrs or after 19:00hrs will be surrounded by an acoustic enclosure or portable screen.

During the course of the construction programme, supervision of the works will include ensuring compliance with the limits detailed in Table 8.9 using methods outlined in BS 5228 “Noise and Vibration Control on Construction and open sites”, Annex E. It should be noted that BS 5228 does not detail any specific noise limits in relation to construction noise.

6.2.2 Vibration

Potential Impacts – Construction Phase

The potential for vibration at sensitive locations during construction is typically limited to demolition, excavation works, rock-breaking operations and lorry movements on uneven road surfaces. The more significant of these is the vibration from excavation and rock-breaking operations; the method of which will be selected and controlled to ensure there is no likelihood of structural or even cosmetic damage to existing neighbouring dwellings.

Potential Impacts – Operational Phase

As a vehicle travels along a road, vibration can be generated in the road and subsequently propagate towards nearby buildings. Such vibration is generated by the interaction of a vehicle’s wheels and the road surface and by direct transmission through the air of energy waves. Some of these waves arise as a function of the size, shape and speed of the vehicle, and others from pressure fluctuations due to engine, exhaust and other noises generated by the vehicle.

Ground vibrations produced by road traffic are unlikely to cause perceptible structural vibration in properties located near to well- maintained and smooth road surfaces. Problems attributable to road traffic vibration can therefore be largely avoided by maintenance of the road surface.

6.3 Air Quality & Climate

6.3.1 Air Quality

Potential Impacts – Construction Phase

There is the potential for a number of emissions to the atmosphere during the construction of the scheme. In particular, the construction activities may generate quantities of dust. If a satisfactory dust minimisation plan is implemented, the effect of construction on air quality will not be significant.

The Contractor will be obliged by the local authority and the relevant legislation to ensure that the surrounding roads are kept free from dirt. In dry weather conditions, the Contractor will be required to minimise airborne dust from the site through spraying of exposed earthworks with water.

Potential Impacts – Operational Phase

Although some increase in pollutant concentrations may occur as a result of the proposed road development, it is considered that no significant increase in pollutant levels will occur. Therefore, the road scheme will result in an imperceptible impact on air quality in the operational phase.

6.3.2 Climate Impact

In terms of climate, Ireland ratified the Kyoto Protocol in May 2002 agreeing to limit the net growth of the six greenhouse gases to 13% above the 1990 level over the period 2008 to 2012. Traffic flows on the proposed road will be a source of greenhouse gas emissions. However, these will be insignificant in terms of Ireland's obligations under the Kyoto Protocol.

6.4 Hydrology and Hydrogeology

Potential Impacts – Construction Phase

During the construction phase there is potential for surface water runoff including pollutants to enter into the water system. There is also potential for silt to enter into watercourses. Therefore, mitigation measures will be put in place to ensure that surface water runoff is free from suspended solids and other pollutants, and that silt laden water is prevented from discharging into watercourses

Potential Impacts – Operational Phase

The surface water runoff for the proposed road extension will be directed into the existing watercourse that cross the road, outfall will be formed at 3 locations. All runoff will be passed through an oil separator (bypass separator) and be fitted with a vortex cleaning devise to remove fine particles, floatable debris, liquid and sediment bound hydrocarbons, sediment bound metals and nutrients

6.5 Soil

Potential Impacts – Construction Phase

This proposed Celbridge Link Road will have no significant impact on soils along the proposed route during the construction phase.

Potential Impacts – Operational Phase

Potential impacts on soils during the operational phase of the development are considered to be negligible.

6.6 Population and Human Health

The proposal is a relatively minor road development with a limited number of properties located in the immediate area.

Potential Impacts – Construction Phase

Impacts on human beings during the construction phase that may be potentially relevant include:

- Short-term negative impacts due to temporary traffic management to facilitate construction works;
- Short-term negative impacts on the immediate environment due to locally concentrated noise and dust
- Positive impacts due to construction employment and local expenditure by those working on the scheme;
- Positive impacts due to the purchases of local materials and services.

Due to the limited number of properties in the area and relatively minor scale of development the impact to population and human health is considered to be negligible during the construction phase.
The proposed development will have positive impacts in terms of jobs created during the construction phase.

Potential Impacts – Operational Phase

Impact on Human Health

The proposed scheme will have a positive impact on human health with the provision of appropriately sized footpaths and cyclepaths to encourage pedestrian and cyclist movements.

Impact on Vehicular Traffic

The proposed scheme will have a positive impact on connectivity as it will provide improved access to the Adamstown SDZ and surrounding area for the future planned growth of Adamstown, will mitigate traffic congestion at the existing Newcastle road and will facilitate and support the expected growth in traffic arising from the future development envisaged by the Adamstown SDZ.

Impact on Vulnerable Road Users

There will be an overall positive impact on road safety for vulnerable road users, with the provision of dedicated cyclepaths (1.5m wide) and footpaths (2m wide) along the extents of the proposed Celbridge Link Road in addition to a 1.5m grass verge which will increase the separation between vulnerable road users and vehicular traffic. The landscape plan provided demonstrates that the proposed link road will be tree planted on both sides of the road

creating an attractive environment for pedestrians and cyclists to travel through. Pedestrian and Cyclist access will also be maintained along Tubber Lane.

Impact on Modal Split and Public Transport

The scheme will have an overall positive impact on sustainable travel through the provision (and hence encouragement) of pedestrian and cycling facilities.

6.7 Biodiversity

Potential Impacts – Construction Phase

The potential impacts of the proposed development on biodiversity during the construction phase are considered to be short term, spatially limited and not significant.

Anti-pollution measures will be specified for the construction works and the contractor's method statements will be required to be approved beforehand. The works will also be closely monitored by site staff.

The Bat survey accompanying this report notes that

'The proposed works on site, which will include the construction of the proposed link road through agricultural fields, the fragmentation of the existing hedgerows and removal of trees and the installation of lighting and landscaping unless mitigated and carried out in accordance with good practice, could result in potential impacts on local bats. It should be noted that the proposal does not involve the demolition or interaction with any nearby buildings and as such, potential for impacts on roosting bats are limited to potential tree roosts only'.

'Loss of any roosts in the site, though unfortunate and a significant impact on the bats involved, would be unlikely to impact on the local bat population given the number of other suitable buildings and trees in the vicinity that would be capable of providing alternative roosting sites'.

The report concludes that the proposed works have the potential to impact on local bats if carried out without mitigation measures. Therefore, measures have been proposed to minimise direct harm to bats and to allow any bats encountered during the works to be recovered and safely relocated or allow to fly away.

The Arboricultural Assessment notes the following impacts during the construction phase;
'541m of hedging dispersed along the entire length of the proposed road will need to be removed along with 10 individual trees made up eight Ash and two Oak with nine of them categorized as C and one as U'.

Potential Impacts – Operational Phase

During the operational phase the primary potential impact is from surface water runoff. The employment of the several SUDs techniques in the proposed surface water drainage system including Hydrobrakes, attenuation ponds, downstream defenders and bypass separators will improve the quality of water discharged from the site and will also reduce the likelihood of suspended solids or pollutants travelling further downstream.

No perceptible impacts on biodiversity are predicted during the operational phase.

The Appropriate Assessment accompanying this application concludes that following an examination, analysis and evaluation of the relevant information, it is possible to rule out likely significant effects on all European sites.

6.8 Landscape & Visual Impacts

Potential Impacts – Construction Phase

Landscape and visual impacts during the construction phase are considered to be temporary, localised and not significant, due to the relatively minor scale of development and small land take and the absence of sensitive receptors potentially impacted by the proposed development.

Potential Impacts – Operational Phase

The visual impact of the tree and hedge vegetation lost from this area is minimal as a result of the proposed layout of this link road as they are spread out over a large area of land with only a small number of trees and sections of hedging being lost from any one area. The loss of tree and hedge vegetation from these lands is to be mitigated with the planting of new tree and hedge planting within the completed development of the road network.

6.9 Architectural, Archaeological and Cultural Heritage

6.9.1 General

This section considers the potential effects of the scheme on Architectural, Archaeological and Cultural Heritage and proposes mitigation measures where necessary.

Potential Impacts – Construction Phase

6.9.2 Impacts on Monuments and Places

The County Development Plan notes one listing in the Record of Monuments and Places located within 300m of the proposed road development; DU017-045 Backweston listed as a Dwelling.

Westonpark house (104) is also listed in the National Inventory of Architectural Heritage (NIAH).

Figure 9.2 – Westonpark house

The description states;
'Detached three-bay two-storey house, c.1825, on an L-plan, with full-height canted bay window to each side. Timber sash windows. Timber panelled door with fanlight set into dressed stone door surround with engaged columns, flanking sash windows and open-bed triangular pediment. Roughcast rendered walls with smooth rendered base course and parallel quoins. Hipped slate roof with smooth rendered chimney stacks. Two-storey wing and flat-roofed veranda to rere. Limestone rubble wall adjacent to house. Cylindrical ashlar stone gate piers at head of drive'.

The appraisal states;
'A handsome, modest house with an attractively detailed doorway, retaining fabric from different building phases enriching its history. The mature grounds and avenue with gate piers enhance its setting'.

Given the distances from recorded monuments and the temporary nature of the proposed development the impact is considered negligible.

6.9.3 Impacts on Protected Structures

There are 2 no. protected structures located within 300m of the proposed road development;

1. RPS Ref No.104 Westonpark House, Celbridge Road, Backwestonpark listed as a detached two-storey house and;
2. RPS Ref No.106 Backweston House, Off Celbridge Road, listed as a Detached Three-Bay Two-Storey House.

Given the distances from protected structures and the temporary nature of the proposed development the impact is considered negligible.

6.9.4 Impacts on Cultural Heritage

Any development that includes topsoil and subsoil stripping, reduction of ground levels and excavation can potentially have a negative impact on archaeological and cultural remains both recorded and unrecorded. The proposals will not directly impact on any recorded archaeological monuments. There is no predicted impact on known archaeological remains.

6.9.5 Mitigation Measures for Cultural Heritage

Archaeological assessment is not required because this area has been subject to previous ground disturbance that would have removed any archaeological features and deposits should they have been present. However, an archaeologist should be retained for monitoring of the earthworks activities.

6.10 Material Assets

The proposed development consists of the Celbridge Link Road to connect Adamstown SDZ with the existing R403 Celbridge Road. The proposed scheme will require a permanent land area of approximately 3.35 hectares.

There are no residential properties located along the proposed route, and a limited number are located within 200m of the intersection of the proposed route with the existing R403. The existing land use along the proposed route of the Celbridge Link Road is agricultural with the

fields mainly being used for arable farming.

6.10.1 Potential Impacts – Construction Phase

As a relatively minor road development requiring a permanent land area of approximately 3.35 hectares on agricultural land with limited interaction with residential properties, there will be negligible impacts on adjacent residential or other existing land uses.

6.10.2 Potential Impacts – Operational Phase

Once the recommended mitigation measures are incorporated, it is considered that there will be a positive residual impact arising from the proposed development. It is proposed to provide a 1.5m cycle track and 2.0m footpath at both sides of the new link road which will enhance the existing sustainable transport infrastructure in the area and encourage cycling and walking.

Overall, the proposed development will provide for enhance connectivity for the Adamstown SDZ. The provision of new footpaths and cyclepaths will benefit existing and future residents of the area. The proposed signalised junction will facilitate the R403 Celbridge Link Road which will link the future internal road network within the Adamstown SDZ to the R403. This allow traffic from the Adamstown SDZ easier access to the N4 and towards Celbridge, removing this traffic from currently congested links such as the R120

Any disruption to services will be minimised and are considered a temporary slight impact. New services will be required to facilitate the signalised junction and it will be necessary to avoid existing services where carrying out the required excavation works. There will be no long-term impact on existing services in the area arising from the proposed development.

Chapter 7: Construction Phase

7.1 Introduction

This chapter of the Environmental and Planning Report outlines the potential environmental effects that may arise during the construction phase. Furthermore, the proposed ameliorative measures, which are generally considered in the previous chapters, are also outlined. This chapter deals with the issue of the timescale for construction, locations and operation of the site compounds and details temporary impacts, not previously described, on residents, road users, pedestrians and cyclists. Where practical, continued access from Tubber Lane West to Lucan will be maintained during the works for as long as possible. This may be subject to road opening and diversions procedures at certain times.

7.2 Time Scale for Construction

The period of time to complete the proposed road scheme is estimated at 12 months.

7.3 Site Compounds

A site compound will be required in a location to suit the construction activities. This compound will provide office and canteen facilities as well as providing a space for storage of materials and construction plant.

7.4 Impact of Construction Activities

Construction Noise: The construction of the road scheme will cause an increase in local noise levels during working hours. No particularly high noise generating activities such as blasting are anticipated. Contract conditions will limit working hours to daytime, thereby avoiding the potential for disturbance of residents at night. However, some night-time operations may be required to complete the road connection and new signal controlled junction at the Celbridge Road.

Pollution of Watercourses: Accidental spillages into the watercourses and drainage systems could lead to pollution. The Contract will include requirements for appropriate measures to prevent an accidental spillage of pollutant materials. Measures will be adopted to prevent discharge of suspended solids into the watercourses during construction phase. The road drainage run-off will be treated before discharging to the receiving waters.

Dirt and Dust: The Contractor will be obliged by the local authority and the relevant legislation to ensure that the surrounding roads are kept free from dirt. In dry weather conditions, the Contractor will be required to minimise airborne dust from the site through spraying of exposed earthworks with water.

Construction Traffic: There will be traffic associated with the construction phase of the proposed Celbridge Link Road. However, as the earthworks are limited, construction movements will not be significant. No construction traffic will be permitted to use Tubber Lane for the duration of the works.

Chapter 8: Summary of Mitigation Measures

8.1 Noise & Vibration

- The application of BS 5228:1997 "Noise Control on Construction and Demolition Sites" should minimise disturbance to local receptors,
- Machinery and compounds will be positioned, where possible, to avoid undue disruption.
- All vehicles and mechanical plant will be fitted with effective exhaust silencers and maintained in good working order for the duration of the contract.
- Machinery that is used intermittently will be shut down or throttled back to a minimum during periods when not in use.
- Any plant, such as generators or pumps, that is required to operate before 07:00hrs or after 19:00hrs will be surrounded by an acoustic enclosure or portable screen.

8.2 Archaeology and Cultural Heritage

- An archaeologist should be retained for the duration of the relevant earthworks, in accordance with current best practice;
- The cessation of machine work must occur as soon as archaeological material has been uncovered.

8.3 Biodiversity

If bats are encountered during works then relevant works will cease until the Local Conservation Ranger of the National Parks and Wildlife Service are consulted. Bat boxes may have to be erected on mature trees, based on the advice of a suitably qualified ecologist.

Any trees to be felled should be section felled and the felled parts left in situ on the ground for a period of 24 hours to allow any bats present to escape.

Any proposed lighting of the subject lands will be designed in a manner which is sensitive to the presence of bats on site. The lighting plan for the proposed development will be reviewed by a competent bat ecologist, and agreed with South Dublin County Council, who shall if necessary recommend adjustments to directional lighting (e.g. through retrofit of cowls, shields or louvres) to ensure the lighting plan is sensitive to the presence of bats in the area.

Landscape planting at the edge of the carriageway where hedgerows meet the edge of the road and have been severed by the proposed development, will include the planting of large trees (up to 3m in height) to provide hop-over features. These hop-overs will help to guide the lower-flying Pipistrellus species of bats to fly up and over the height of vehicles and hence reduced the probability of collision.

Section 6 of the Arborists Report accompanying this application provides a number of mitigation measures for how the tree and hedge vegetation potentially impacted by the proposed development.

The mitigation measures include

- Tree protective fencing to be erected and all other mitigation measures required to be put in place prior to the development works commencing on site and these are to enclose and protect the root zone of the tree and hedge vegetation proposed for retention.
- The client or the main contractor is to appoint a tree surgery company competent of carrying out the remedial tree surgery works and tree felling that are required on this site. The tree surgery contractor is to produce a method statement detailing how he plans to undertake the works and informing the site foreman of the process so the necessary steps can be taken to ensure the works are carried out safely and efficiently. The works are to be carried out by appropriately trained personnel taking account of the recommendations of BS3998 2010.
- Tree removal - Trees for removal are to be identified by the project Arboriculturist and the method of removing the stumps is to be carried out to the recommendations of the project Arboriculturist. The trees in the way of the development layout are to be removed in such a manner not to cause damage to those being retained. Where necessary to avoid damage to the trees to be retained, these are to be removed in sections by a tree surgeon (Arborist). Where necessary, the roots and stumps are to be dug out with a digger except where the stumps are located within the RPA (root protection area) of trees being retained. In this instance, the stumps are to be ground out with a mechanical stump grinder taking care not to cause damage to the roots of trees being retained.
- This project is not to be considered complete until all retained trees have been re-examined by the project Arboriculturist and the remedial works necessary to ensure the health of the trees and the immediate safety of the end user of this development are implemented.

8.4 Material Assets

Public notice will be given for any potential road closures in advance of the works commencing. Should disruption in services be required, the Contractor will be required to give adequate notice to all affected parties.

8.5 Construction Phase

- All measures shall be taken to ensure that surface water runoff is free from suspended solids and other pollutants,
- All storage areas should be in bunded compounds away from watercourses,
- Regular maintenance and servicing of machinery and plant will be required,
- The contractor must set up systems to prevent dirt from being released onto public roads. In the event that site traffic does dirty the roads, then the contractor will be required to clean all the roads affected,
- Control of the release of suspended solids into the public drainage systems will be done through the use of interceptors or traps,
- Contract conditions will require that the contractor prevents silt laden water from discharging into the watercourse,
- On site temporary toilet facilities shall be serviced and maintained by a specialist

contractor.

Chapter 9: Conclusions

9.1 This Environmental and Planning Report has been prepared by Pat O'Gorman & Associates (POGA) on behalf of south Dublin County Council as part of the documentation to accompany a Part 8 planning process for the proposed Celbridge Link Road. This document was prepared in conjunction with the following design team members:

- Goodrock Project Management – Project Managers
- John Spain & Associates – Planning Consultants
- Ronan McDiarmada & Associates – Landscape Architect
- Scott Cawley – Ecological/ Appropriate Assessment
- Atkins – Traffic Consultants
- Arborist Associates - Arborist

9.2 The proposed development site is located in the North of the Adamstown SDZ and south of the Celbridge to Lucan Road (R403).

The proposed development comprises: -

- 820m of new single carriageway two-way road alignment with off road cycle track and footpaths linking the Adamstown SDZ to the Celbridge Road (R403).
- A new signalised junction where the Celbridge Link Road connects to existing Celbridge Road (R403),
- A new uncontrolled T-Junction onto Tubber Lane on the western side of the Link Road and a cul-de-sac of Tubber lane on the eastern side of the Link Road.
- Pedestrian and Cyclist access will be maintained along Tubber Lane, with a turning circle provided on Tubber Lane to facilitate refuse trucks and emergency vehicles.
- New public lighting provided along the existing Tubber Lane with public lighting provided for the new pedestrian/cycle track connecting Tubber Lane with the proposed new road development,

9.3 Copies of the full Part 8 application may be inspected at the following location: -

South Dublin County Council
County Hall
Tallaght
Dublin 24

9.4 Section 179 of the Planning and Development Act 2000 as amended, and Part 8 of the Planning and Development Regulations, 2001 to 2017 set out the process to be used for planning approval of local authority projects that are not subject to a requirement for a formal Environmental Impact Statement under other relevant legislation. The planning approval process will involve a period of public consultation after which South Dublin County Council will review any submissions made by the public.

The proposed scheme will be presented to the Elected Members where it may be accepted, either with or without amendments, and if so will proceed. Alternatively, the Elected Members may reject the scheme in which case the proposed scheme will not proceed.

APPENDIX 1: Appropriate Assessment Screening Report

PROVISION OF INFORMATION REGARDING APPROPRIATE ASSESSMENT SCREENING

PROPOSED CELBRIDGE LINK ROAD
ADAMSTOWN, CO. DUBLIN

PREPARED FOR CASTLETHORN CONSTRUCTION

Project Reference:		**170149**			
Rev.	**Status**	**Author**	**Reviewed By**	**Approved By**	**Issue Date**
D01	Final	CK	PS	PS	20/10/2017

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1 Introduction

The information in this report forms part of, and should be read in conjunction with, the documentation accompanying the application for planning permission for the proposed Celbridge Link Road development at Adamstown, Lucan, Co. Dublin.

This report, which contains information required for the competent authority (in this instance South Dublin County Council) to undertake a screening exercise for Appropriate Assessment (AA), was prepared by Scott Cawley Ltd. on behalf of the applicant. It provides information on and assesses the potential for the proposed development to significantly affect Natura 2000 sites (hereafter "European Sites"[1]).

It is necessary that the proposal has regard to Article 6 of the *Council Directive 92/43/EEC of 21 May 1992 on the Conservation of Natural Habitats and of Wild Fauna and Flora* (as amended) (hereafter "the Habitats Directive"). This is transposed in Ireland primarily by *the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477/2011)* (hereafter the Birds and Habitats Regulations) and the Planning and Development (Amendment) Act, 2010 as amended.

An AA is required if likely significant effects on European Sites arising from a proposed development cannot be ruled out at the screening stage, either alone or in combination with other plans or projects.

It is the responsibility of the competent authority to make a decision as to whether or not the proposed development is likely to have significant effects on European Sites, either individually or in combination with other plans or projects.

Following the preparation of this screening statement it may be objectively concluded that there is no likelihood of any significant effects on any European Sites arising from the proposed development, either alone or in combination with other plans or projects. Therefore it is our view that an Appropriate Assessment is not required in this instance. The information in the tables below provide a summary of the information gathered for this screening exercise and the conclusions made.

2 Methodology

This Screening Statement for Appropriate Assessment was prepared with regard to the following guidance documents, where relevant:

- *Appropriate Assessment of Plans and Projects in Ireland - Guidance for Planning Authorities.* (Department of Environment, Heritage and Local Government, 2010 revision).
- *Appropriate Assessment under Article 6 of the Habitats Directive: Guidance for Planning Authorities.* Circular NPW 1/10 & PSSP 2/10.
- *Assessment of Plans and Projects Significantly Affecting Natura 2000 sites: Methodological Guidance on the Provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC* (European Commission Environment Directorate-General, 2001); hereafter referred to as the EC Article 6 Guidance Document. The guidance within this document provides a non-mandatory methodology for carrying out assessments required under Article 6(3) and (4) of the Habitats Directive.
- *Managing Natura 2000 Sites: The Provisions of Article 6 of the Habitat's Directive 92/43/EEC* (EC Environment Directorate-General, updated April 2015); hereafter referred to as MN2000.

[1] Natura 2000 sites are defined under the Habitats Directive (Article 3) as a European ecological network of special areas of conservation composed of sites hosting the natural habitat types listed in Annex I and habitats of the species listed in Annex II. The aim of the network is to aid the long-term survival of Europe's most valuable and threatened species and habitats. In Ireland these sites are designed as *European Sites* - defined under the Planning Acts and/or Birds and Habitats Regulations as (a) a candidate site of Community importance, (b) a site of Community importance, (c) a candidate special area of conservation, (d) a special area of conservation, (e) a candidate special protection area, or (f) a special protection area. They are commonly referred to in Ireland as candidate Special Areas of Conservation (SACs) and Special Protection Areas (SPAs).

- *Guidelines for Good Practice Appropriate Assessment of Plans under Article 6(3) Habitats Directive.* Findings of an international workshop on Appropriate Assessment in Oxford, December 2009.
- *Communication from the Commission on the precautionary principle.* European Commission (2000).

The above referenced guidance sets out a staged process for carrying out Appropriate Assessment. To determine if Appropriate Assessment is required, documented screening is required. Screening identifies the likely effects on European Sites, if any, which would arise from a proposed plan or project, either alone or in combination with other plans and projects.

If the conclusions at the end of screening are that there is no likelihood of significant effects occurring on any European Sites, as a result of the proposed plan or project, either alone or in combination with other plans and projects, then there would be no requirement to undertake Appropriate Assessment.

However, even if screening makes a finding of no significant effects, and therefore concludes that Appropriate Assessment is not required, these findings must be clearly documented in order to provide transparency of decision-making, and to ensure the application of the '*precautionary principle*'[2].

Screening for Appropriate Assessment involves the following:

- Determining whether a project or plan is directly connected with or necessary to the conservation management of any European Sites[3];
- Describing the details of the project/plan proposals and other plans or projects that may cumulatively affect any European Sites (see Table 1);
- Describing the characteristics of relevant European Sites (Table 2); and,
- Assessing the likelihood of significant effects on relevant European Sites (see Table 2).

The information that was collected to allow the competent authority to screen the proposal was based on a desktop study carried out on 30th August 2017. Information relied upon included the following information sources, which included maps, ecological and water quality data:

- Ordnance Survey of Ireland mapping and aerial photography available from www.osi.ie;
- Online data available on European Sites as held by the National Parks and Wildlife Service (NPWS) from www.npws.ie;
- Information on land-use zoning from the online mapping of the Department of the Environment, Community and Local Government www.myplan.ie;
- Information on water quality in the area available from www.epa.ie;
- Information on the Eastern River Basin District from www.wfdireland.ie;
- Information on soils, geology and hydrogeology in the area available from www.gsi.ie;
- Information on the location, nature and design of the proposed development supplied by the applicant's design team;
- Information on the status of EU protected habitats and species in Ireland (National Parks & Wildlife Service, 2013a & 2013b); and,
- Information on the conservation status of birds in Ireland (Colhoun & Cummins, 2014).

[2] One of the primary foundations of the precautionary principle, and globally accepted definitions, results from the work of the Rio Declaration. Principle #15 declaration notes:

"In order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation."

[3] In this instance the proposed development is not directly connected with or necessary to the conservation management of any European Sites.

The following planning and policy documents were relevant to the subject lands, in particular with regard to the assessment of other plans and projects with potential for cumulative effects

- *National Biodiversity Action Plan 2017-2021, (DCHG, 2011);*
- *Eastern River Basin District, River Basin Management Plan 2009-2015;*
- *South Dublin County Council Development Plan (2016 – 2022); and,*
- *Adamstown Strategic Development Zone Planning Scheme (2014)*

3 Screening for Appropriate Assessment

Table 1 Overview of the Proposed Development and its Receiving Environment	
Brief Site Description	The subject lands are located between Backweston Farm and Adamstown in Co. Dublin, within the Adamstown Strategic Development Zone (SDZ). The subject lands are roughly located between grid reference O 00533 34101 and O 01645 33276. Based on a review of aerial photography, the proposed development site comprises of agricultural lands with mature trees and boundary hedgerows, as well as areas of disturbed ground in its southern extent. According to MyPlan.ie the subject lands are zoned as '*P1- Agriculture'* and '*R3- Residential, mixed residential and other u*ses' under the South Dublin County Council Development Plan 2016-2022 with the following respective planning objectives; '*to protect and improve rural amenity and to provide for the development of agriculture*' and '*to provide for strategic development in accordance with approved planning schemes'*.
Features of the Surrounding Environment	The desktop study found no records of any species or habitats for which European Sites listed in Table 2 are designated within the subject lands or environs. Two old records (dating from 1980) for otter *Lutra lutra* exists from the Grand Canal *c*. 1.7km south-east and along the River Liffey *c.* 1.7km to the north-west of the proposed development respectively[4]. Otter are relatively abundant in Ireland and are found in watercourses throughout the country. According to the EPA online Envision Maps, the subject lands are located within the Liffey and Dublin Bay catchment and the Liffey sub-catchment. The closest watercourse is the Lucan Stream, located approximately 150m east of the proposed development at its closest point. There is no available information regarding the water quality of the Lucan Stream. This watercourse is connected to European Sites within Dublin Bay by the River Liffey. The Lucan Stream flows north-easterly for 2.2km before converging with the River Liffey upstream of Lucan. The Liffey flows for approximately a further 20.7km eastwards to discharge into Dublin Bay, with its associated complex of marine and intertidal European Sites. The quality of the Lower Liffey Estuary transitional waterbody is given as unpolluted, while the quality of Dublin Bay is also deemed unpolluted. All surface, transitional and coastal waterbodies within and downstream of the River Liffey Catchment are identified as having a Water Framework Directive (WFD) risk score of '*at risk of not achieving good status*'. This means that they are at risk of missing targets for water quality as set out within the WFD. The proposed development is located above the Dublin Groundwater body. This is classified as poorly productive bedrock and it is considered to be at extreme risk from human activities according to the GSI online Map Viewer. The bedrock of the area is described as the Lucan Formation, composed of '*dark limestone and shale (calp)*' and is considered to be a poorly productive bedrock. The Dublin Groundwater body is expected to achieve good status based on the WFD commitments.
Description of the Proposed Development	Full details of the proposed development can be found in the applicants planning application. In brief, the proposed development will comprise of: • The construction of 820m of new single carriageway two-way road alignment with off road cycle track and footpaths linking the

[4] According to NBDC online data www.biodiversity.ie (Accessed 22/09/2016)

Table 1	Overview of the Proposed Development and its Receiving Environment
	Adamstown SDZ to the Celbridge Link road. • The road will be a single three-lane carriageway with 60km/h design speed. The overall road reservation will be 17m wide not including side slopes for the embankment. The vertical alignment of the new road falls gently from west to east and at the connection point with the Adamstown SDZ its 2m lower. • A new signalised junction where the Celbridge Link Road connects to existing Celbridge road. • A new uncontrolled T-Junction onto Tubber Lane on the western side of the Link Road and a cul-de-sac of Tubber lane on the eastern side of the Link Road. • Pedestrian and cyclist access will be maintained along Tuber Lane with the Turning head provided at the end of the cul-de-sac to facilitate refuge and emergency vehicles. It is proposed to provide a 1.5m cycletrack and 2.0m footpath at both sides of the new link road, these will be separated from the vehicular lanes by a 1.5m grass and tree verge. • The public lights along the existing Celbridge Road is at approx. 30m spacing on alternative sides of the road and using a 8m high column. The lighting columns will be located in the grass verge with a minimum clearance to the kerb of 800mm. This lighting scheme will be extended onto the proposed link road through the SDZ. The details of the new lighting will be considered at the detailed design stage. The Lighting will be deigned to meet the "South Dublin County Council, Public Lighting Specification, Rev. 2 14/10/216, or specification current at the time. The proposed route of the road crosses the Backstown stream in three locations. In two of these locations it is proposed to culvert the stream under the road while in the third location (the junction where the proposed road and the existing Celbridge road meet) it is proposed to divert the stream and also culvert it under the proposed road. With regards to surface water, attenuation is proposed at three locations over the course of the road. Attenuation volumes are as follows; • Attenuation Pond 1- 244m^3; • Attenuation Pond 2- 343m^3; and; • Attenuation Pond 3- 464m^3. Furthermore, a Hydrobrake will be installed to limit the rate of discharge to the Backstown stream. Discharge will be limited to 1.66l/s. A non-return valve will be installed at the outfall to the Backstown stream. Upstream attenuation pipes will be sized accordingly. This design complies with GDSDS standards. The areas beneath the verges and cycle track will be constructed of permeable materials to permit infiltration into the surrounding soils. A Surface Water Treatment Train approach has been applied to the design of the surface water drainage on this site, in accordance with the SuDS philosophy. This technique suits the sites topography, ground conditions and the receiving environment. The treatment train approach

Table 1 Overview of the Proposed Development and its Receiving Environment	
	ensures that both runoff quantity and quality are addressed through the following techniques: • Source Control- this aims to detain or infiltrate runoff as close as possible to the source/ point of origin. The use of such source control devices reduces the peak runoff rate and attenuates flows. Infiltration of flows would ensure that unavoidable pollutants are treated where practicable. Proposed open swales will allow the treatment of runoff and recharge the ground water where the infiltration is possible. • Site control- this comprises runoff and treatment installations to serve individual sites, using elements such as attenuation tanks detention basins, permeable paving, or cellular systems. On this road it is proposed to use three open swales and this will allow for the storage of the 1:100 year storm event plus 10% for climate change. • Regional control- this comprises treatment facilities to reduce pollutants from contaminated runoff, with the potential to provide biological treatment on a catchment scale. It is proposed to add the treatment of the runoff from the road by providing a downstream defender (or similar) on the upstream side of the swales. This will aid the removal of fine and coarse particles, hydrocarbons and floatable debris from surface water runoff. It is also proposed to provide a bypass separator on downstream side of the swales to further remove any fine oil particles before the runoff enters the outfall watercourses. The inclusion of this suite of SuDS measures will ensure that the volume of surface water runoff discharging to the surface water network is reduced and of a sufficient environmental quality to avoid impacts of downstream habitats and species. Surface water drainage for the portion of the proposed road located in the SDZ lands will be treated in a similar manner. Attenuation for this section of road has been provided for in previous planning applications contained within the overall SDZ lands. Landscaping proposals include the planting of a range of trees including silver birch *Betula pendula*, Scot's pine *Pinus sylvestris*, holm oak *Quercus ilex*, white willow *Salix alba*, fastigate oak *Quercus robur* 'Fastigata', lime *Tilia cordata* and Turkish hazel *Corylus colurna*. In addition, landscape sculpting will be required along the road cutting. The majority of the existing hedgerows will be retained, and some will be partially fragmented where the proposed route of the road requires it. Boundary treatment will comprise the installation of a post and rail fence with plastic coated mesh and hedge planting of hawthorn *Crataegus monogyna*. The duration of the construction phase is estimated to be 12 months.
Defining the Zone of Influence of the Proposed Development	The zone of influence is a distance within which the proposed works could potentially affect the conservation condition of QI habitats or species. There is no set recommended distance for which European sites are considered as being relevant (*i.e.* within the zone of influence of proposed works) for AA. Available guidance (NPWS, 2010) recommends that '*the distance should be evaluated on a case-by-case basis with reference to the nature, size and location of the project, and the sensitivities of the ecological receptors, and the potential for in combination effects*'. As a general rule of thumb, it is often considered appropriate to examine all European sites within 15km as a starting point. In some instances, where there are far reaching hydrological/hydrogeological connections, a whole river catchment or a groundwater aquifer may need to be included in determining the zone of influence. All European sites within 15km of the proposed works are listed in Table 2 below and shown on Figure 1. In this case there is a potential source-receptor pathway connecting the proposed development with downstream

Table 1 Overview of the Proposed Development and its Receiving Environment	
	European Sites in Dublin Bay, and for this reason, European Sites within Dublin Bay have been included within the assessment on a precautionary basis. The source-receptor pathway in this instance, is the surface water network. Surface waters from the proposed development will ultimately drain to Dublin Bay via natural surface water features such as the Backstown stream and the River Liffey.
Potential pressures on European Sites as a result of the proposed development	**Pressures from loss of habitats, and direct loss of QI Species** The subject lands do not physically overlap with any European Sites. They do not contain records of any habitats or species for which the European Sites within the zone of influence have been designated. Based on examination of aerial photography, the subject lands appear to be largely composed of agricultural lands with mature trees and boundary hedgerows and disturbed ground, none of which are listed under the Habitats Directive (1992). These habitats are not indirectly connected with any habitats within European Sites (*e.g.* by groundwater). There is therefore no potential for significant effects on European Sites resulting from loss of habitats, or direct loss of QI species during the proposed development. **Pressures from Water Quality Changes** The proposed development is within the catchment of rivers that drain to Dublin Bay. Several intertidal habitats for which European Sites in Dublin Bay are designated are failing to meet favourable conservation status. For some of these, water pollution is considered to be a threat ranked as being of '*high importance*' (NPWS, 2013a). ***Pressures on European sites in Dublin Bay from surface waters*** With regards to surface waters, there is not considered to be any potential for significant effects resulting from the proposed development alone on downstream European Sites due to the following: • The significant distance between the proposed development and downstream European Sites in Dublin Bay (>20km by watercourse) is considered to reduce the risk of any potential contaminants from the construction phase of the development reaching European Sites to extremely unlikely; and, • Surface waters from the proposed development will pass through a suite of SUDs systems prior to discharge including flow control devices, attenuation ponds, bypass separators etc., thus reducing the likelihood of suspended solids or pollutants travelling further downstream.
Other existing or proposed plans or projects nearby which may lead to cumulative effects on European Sites.	**Cumulative Water Quality Pressures** ***Potential Cumulative Impacts in relation to Surface Waters*** There is potential for '*in-combination*' effects of proposed plans and projects within the *Adamstown SDZ Planning Scheme (2014)*, the *South Dublin County Council Development Plan 2016-2022, Dublin City Development Plan 2016 - 2022*, *Dún Laoghaire-Rathdown County Development Plan 2016 - 2022*, *Fingal Development Plan 2011-2017* and other county level land use plans which can influence conditions in Dublin Bay via rivers and the surface water drainage network. Dublin Bay is of unpolluted water quality status and the pollutant content of future surface water discharges to the Bay is considered likely to be decreased in the long-term. This is because it is an objective of the

Table 1	Overview of the Proposed Development and its Receiving Environment
	Greater Dublin Strategic Drainage Study, and all development plans within the catchment of Ringsend WWTP to include Sustainable Urban Drainage Systems in new development. Together these objectives are considered likely to reduce pressures on designated marine and intertidal species and habitats in Dublin Bay. There are a number of existing and proposed developments[5] within the vicinity of this site which have the potential to produce '*in combination*' effects to water quality in Dublin Bay. However, the potential for cumulative pressures on surface waters is considered to be limited to short duration (12 months during the construction period) impacts resulting from construction activities which could result in elevated levels of hydrocarbons or silts entering the surface water network. These are not considered to be significant given the large (>20km) downstream distance to European Sites. In the unlikely event of a pollution event occurring during construction, this would not be of such a magnitude that would have a significant adverse effect on water quality in Dublin Bay, or affect the Qualifying Interest/Special Conservation Interests of the European sites therein, due to the urban buffer that exists between the site and Dublin Bay and potential for dilution in the local drainage network. There is therefore no potential for cumulative impacts as a result of additional surface water generation. ***Conclusion for potential in-combination effects from surface waters*** It is our professional opinion that there will be no likelihood of significant effects on any European sites during the construction or operation of the proposed development, in combination with other plans or projects. This judgement was reached on the basis that: • The coastal waters in Dublin Bay are classed as unpolluted by the EPA; • It is an objective of all development plans within the catchment of Ringsend WWTW to include Sustainable Urban Drainage Systems for all new development; • In the unlikely event of a pollution event during construction, this would not be of such a magnitude that it would have a significant adverse effect on water quality in Dublin Bay; • The significant distance between the proposed development and downstream European Sites in Dublin Bay (>20km by watercourse) is considered to reduce the risk of any potential contaminants from the construction phase of the development reaching European Sites to extremely unlikely; and; • Surface waters from the proposed development will pass through a suite of SUDs systems prior to discharge including flow control devices, attenuation ponds, bypass separators etc., thus reducing the likelihood of suspended solids or pollutants travelling further downstream.

European Sites within 1km, 5km and 15km of the proposed development site are shown in Figure 1 overleaf.

[5] South Dublin County Council Planning Application Search http://sdublincoco.maps.arcgis.com/apps/Solutions/s2.html?appid=b83a115566bd43648a4b9fa3bb3a4cae Accessed 19/10/2017

Table 2 Analysis of European Sites within 15km.			
Site name and code	**Distance from Proposed Development (approximate)**	**Reasons for designation[6] (*= Priority Habitat)** **(Sourced from NPWS online Conservation Objectives Generic Version 4.0 for SACs and 4.0 for SPAs, unless otherwise stated).**	**Relevant source-pathway-receptor links between proposed development and European Site?** No sites are "Relevant" to the Proposed Development. (European Sites are "Relevant" where a relevant source-pathway-receptor link[7] exists).
Special Areas of Conservation			
Rye Water Valley/ Carton SAC (001398)	Located *c.* 1.6km north of the proposed development site	**Annex I Habitats:** • Petrifying springs with tufa formation (*Cratoneurion*) [7220] **Annex II Species:** • Narrow-mouthed Whorl Snail *Vertigo angustior* [1014] • Desmoulin's Whorl Snail *Vertigo moulinsiana* [1016]	No. The European Site lies upstream of the proposed development site. There is no potential for the development to affect any of the conservation objectives of the European Site.
Glenasmole Valley SAC (001209)	Located *c.* 11.5km southeast of the proposed development	**Annex I Habitats:** • Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites) [6210] • Molinia meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*) [6410] • Petrifying springs with tufa formation (*Cratoneurion*) [7220]	No. The European Site lies within a separate river sub-basin and separate groundwater body to the proposed development. There is no potential for the development to affect any of the conservation objectives of the European Site.
Wicklow Mountains SAC (002122)	Located *c.* 13.2km southeast of the proposed development	**Annex I Habitats:** • Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or *Isoeto-Nanojuncetea* [3130] • Natural dystrophic lakes and ponds [3160]	No. The European Site lies upstream of the proposed development and there are no connections between the two in terms of habitats or fauna. There is no potential for the development to affect any of the conservation objectives of the

[6] "Qualifying Interests" for SACs and "Special Conservation Interests" for SPAs based on relevant Statutory Instruments for each SPA, and NPWS Conservation Objectives for SACs downloaded from www.npws.ie in July 2017.

[7] For significant effects to arise, there must be a risk enabled by having a 'source' (*e.g.* construction works at a proposed development site), a 'receptor' (*e.g.* a SAC), and a pathway between the source and the receptor (*e.g.* a watercourse connecting a proposed development site to a SAC). The identification of a pathway does not automatically mean significant effects will arise. The likelihood for significant effects will depend upon the characteristics of the source (*e.g.* duration of construction works), the characteristics of the pathway (*e.g.* water quality status of watercourse receiving run-off from construction) and the characteristics of the receptor (*e.g.* the ecology including conservation status of the SAC reason for designation). When expert judgment determines, that significant effects are likely to arise, both the pathway, and the European Site are considered "Relevant", and an Appropriate Assessment is triggered.

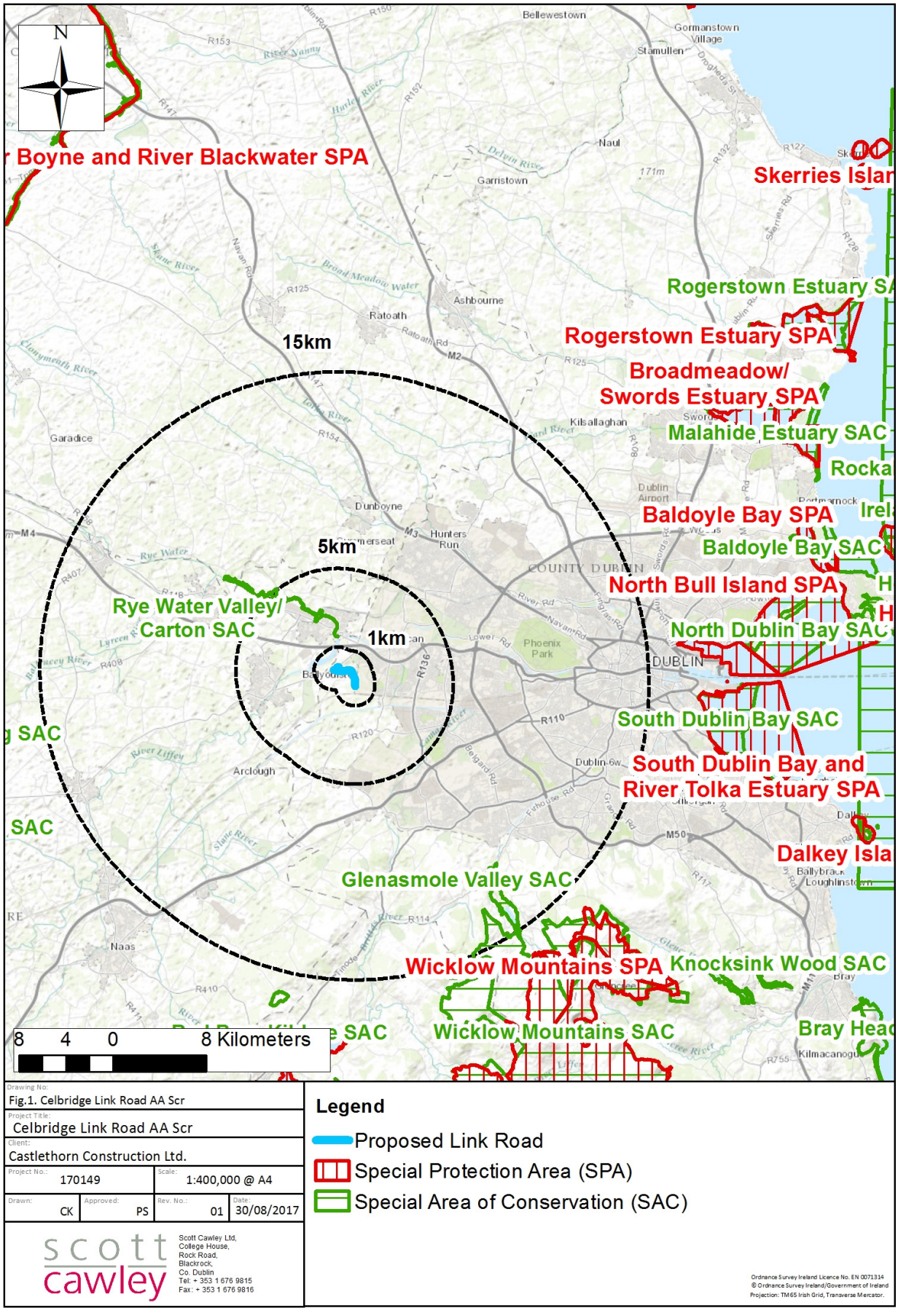
Table 2 Analysis of European Sites within 15km.			
	site	• Northern Atlantic wet heaths with *Erica tetralix* [4010] • European dry heaths [4030] • Alpine and Boreal heaths [4060] • Species-rich *Nardus* grasslands, on siliceous substrates in mountain areas (and submountain areas, in Continental Europe) [6230] • Blanket bogs (* if active bog) [7130] • Siliceous scree of the montane to snow levels (*Androsacetalia alpinae* and *Galeopsietalia ladani*) [8110] • Calcareous rocky slopes with chasmophytic vegetation [8210] • Siliceous rocky slopes with chasmophytic vegetation [8220] • Old sessile oak woods with Ilex and Blechnum in the British Isles [91A0] **Annex II Species:** • Otter *Lutra lutra* [1355]	European Site.
North Dublin Bay SAC (000206)	Located *c.* 19.7km north-east of the proposed development site	**Conservation Objectives Version 1.0 (06/11/13)** **Annex I Habitats:** • Mudflats and sandflats not covered by seawater at low tide [1140] • Annual vegetation of drift lines [1210] • *Salicornia* and other annuals colonizing mud and sand [1310] • Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] • Petalwort *Petalophyllum ralfsii* [1395] • Mediterranean salt meadows (*Juncetalia maritimi*) [1410] • Embryonic shifting dunes [2110] • Shifting dunes along the shoreline with *Ammophila arenaria* ("white dunes") [2120] • Fixed coastal dunes with herbaceous vegetation ("grey dunes") [2130] • Humid dune slacks [2190]	Whilst there is a potential source-receptor pathway between the proposed development and the European site (surface waters from the proposed development ultimately discharge to Dublin Bay), no significant effects are predicted due to the following: • There is a significant distance over the surface water network between the proposed development and the European Sites (>20km); • Surface waters from the proposed development will pass through a suite of SUDs systems prior to discharge including flow control devices, attenuation ponds, bypass separators etc., thus reducing the likelihood of suspended solids or pollutants travelling further downstream; • The known potential for waters in Dublin Bay to rapidly mix and assimilate pollutants (Wilson

Table 2 Analysis of European Sites within 15km.			
			and Jackson, 2011); and; • In the unlikely event of a pollution event during construction, this would not be of such a magnitude that it would have a significant adverse effect on water quality in Dublin Bay.
South Dublin Bay SAC [000210]	Located *c.* 17.5km east of the proposed development site	**Conservation Objectives Version 1.0 (22/08/13)** **Annex I Habitats :** • Mudflats and sandflats not covered by seawater at low tide [1140]	Whilst there is a potential source-receptor pathway between the proposed development and the European site (surface waters from the proposed development discharge to Dublin Bay), no significant effects are predicted due to the following: • There is a significant distance over the surface water network between the proposed development and the European Sites (>20km); • Surface waters from the proposed development will pass through a suite of SUDs systems prior to discharge including flow control devices, attenuation ponds, bypass separators etc., thus reducing the likelihood of suspended solids or pollutants travelling further downstream; • The known potential for waters in Dublin Bay to rapidly mix and assimilate pollutants (Wilson and Jackson, 2011); and; • In the unlikely event of a pollution event during construction, this would not be of such a magnitude that it would have a significant adverse effect on water quality in Dublin Bay.
Special Protection Areas			
South Dublin Bay and River Tolka Estuary SPA (004024)	Located *c.* 16.6km north-east of the proposed development site	**Special Conservation Interest Species:** • Light-bellied Brent Goose *Branta bernicla hrota* [A046] [wintering] • Oystercatcher *Haematopus ostralegus* [A130] [wintering] • Ringed Plover *Charadrius hiaticula* [A137] [wintering] • Grey Plover *Pluvialis squatarola* [A140] [wintering]	No. See entry under South Dublin Bay SAC above. Furthermore, none of the Conservation Interest species for which the European Site has been designated are considered likely to utilise the habitats within the subject lands.

Table 2 Analysis of European Sites within 15km.			
		• Knot *Calidris canutus* [A143] [wintering] • Sanderling *Calidris alba* [A144] [wintering] • Dunlin *Calidris alpina* [A149] [wintering] • Bar-tailed Godwit *Limosa lapponica* [A157] [wintering] • Redshank *Tringa totanus* [A162] [wintering] • Black-headed Gull *Croicocephalus ridibundus* [A179] [wintering] • Roseate Tern *Sterna dougallii* [A192] [passage] • Common Tern *Sterna hirundo* [A193] [breeding] • Arctic Tern *Sterna paradisaea* [A194] [passage] • Wetlands & Waterbirds [A999]	
North Bull Island SPA (004006)	Located *c*. 19.8km north-east of the proposed development site	**Special Conservation Interest Species:** • Light-bellied Brent Goose *Branta bernicla hrota* [A046] [wintering • Shelduck *Tadorna tadorna* [A048] [wintering] • Teal *Anas crecca* [A052] [wintering] • Pintail *Anas acuta* [A054] [wintering] • Shoveler *Anas clypeata* [A056] [wintering] • Oystercatcher *Haematopus ostralegus* [A130] [wintering] • Golden Plover *Pluvialis apricaria* [A140] [wintering] • Grey Plover *Pluvialis squatarola* [A141] [wintering] • Knot *Calidris canutus* [A143] [wintering] • Sanderling *Calidris alba* [A144] [wintering] • Dunlin *Calidris alpina* [A149] [wintering] • Black-tailed Godwit *Limosa limosa* [A156] [wintering] • Bar-tailed Godwit *Limosa lapponica* [A157] [wintering] • Curlew *Numenius arquata* [A160] [wintering] • Redshank *Tringa totanus* [A162] [wintering] • Turnstone *Arenaria interpres* [A169] [wintering]	No. See entry under North Dublin Bay SAC above. Furthermore, none of the Conservation Interest species for which the European Site has been designated are considered likely to utilise the habitats within the subject lands.

Table 2 Analysis of European Sites within 15km.			
		• Black-headed Gull *Croicocephalus ridibundus* [A179] [wintering] • Wetlands & Waterbirds [A999]	

Figure 1. All European Sites within 15km of the proposed development



Drawing No: Fig.1. Celbridge Link Road AA Scr
Project Title: Celbridge Link Road AA Scr
Client: Castlethorn Construction Ltd.
Project No.: 170149 | Scale: 1:400,000 @ A4
Drawn: CK | Approved: PS | Rev. No.: 01 | Date: 30/08/2017

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Legend

- Proposed Link Road
- Special Protection Area (SPA)
- Special Area of Conservation (SAC)

4 Conclusions of the Screening Assessment

Following an examination, analysis and evaluation of the relevant information, including in particular, the nature of the proposed works and their potential relationship with European sites, as well as considering other plans and projects, and applying the precautionary principle, it is the professional opinion of the authors of this report that **it is possible to rule out likely significant effects on all European sites.** The judgement has been reached for the reasons outlined below:

1) The AA Screening process has identified that a number of European Sites in Dublin Bay lie within the potential zone of influence of the proposed development. However, for the reasons outlined below no European Sites are deemed to be at risk of likely significant effects from construction or operation of the proposed development:

Surface Water

The existing natural surface water features, to which surface water runoff will discharge to, are potential pathways between the proposed development and Dublin Bay. No significant adverse effects are predicted due to the following:

- In the unlikely event of a pollution event during construction, this would not be of such a magnitude that it would have a significant adverse effect on water quality in Dublin Bay;
- The distance between the site and Dublin Bay (>20km) and potential for dilution in the drainage network;
- The employment of the several SUDs techniques in the proposed surface water drainage system including Hydrobrakes, attenuation ponds, downstream defenders and bypass separators. This will improve the quality of water discharged from the site and reduce the effects of storm flows on downstream European sites. It will also reduce the likelihood of suspended solids or pollutants travelling further downstream European Sites; and,
- The known potential for waters in Dublin Bay to rapidly mix and assimilate pollutants (Wilson and Jackson, 2011).

For these reasons, it is the professional opinion of the authors of this report that the application for planning permission for the proposed development does not require an Appropriate Assessment.

However, the authors of this report acknowledge that it is for South Dublin County Council, as the competent authority, to issue an AA Screening determination based on the information contained in this report and the recommendation reached in its conclusion. The Council must reach one of the following determinations:

a) AA of the proposed development is required if it cannot be excluded, on the basis of objective information, that the proposed development, individually or in combination with other plans or projects, will have a significant effect on any European sites;

b) AA of the proposed development is not required if it can be excluded, on the basis of objective information, that the proposed development, individually or in combination with other plans or projects, will have a significant effect on any European sites.

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APPENDIX 2: BAT Survey Report

BAT SURVEY REPORT

PROPOSED CELBRIDGE LINK ROAD

ADAMSTOWN,

CO. DUBLIN

Prepared on behalf of
Castlethorn Construction Ltd.

Project Reference:		**170149**			
Rev.	**Status**	**Author**	**Reviewed By**	**Approved By**	**Issue Date**
01	Final	CK	PS	PS	23/10/2017

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Contents

1. Introduction

Currently there are nine species of bat known to breed in Ireland, while two other species have been recorded on a single occasion. All species and their roost sites are strictly protected under both European and Irish legislation including:

- *Wildlife Act 1976 and Wildlife (Amendment) Act, 2000 (S.I. No. 38 of 2000)*;
- *Council Directive on the Conservation of Natural Habitats and of Wild Flora and Fauna 1992 (Council Directive 92/43/EEC)*; and
- *European Communities (Birds and Natural Habitats) Regulations, 2011-2015.*

It is an offence under Section 23 of the *Wildlife Acts 1976-2012* and under Section 51 of the *European Communities (Birds and Natural Habitats) Regulations, 2011-2015* to kill a bat or to damage or destroy the breeding or resting place of any bat species. Under the *European Communities (Birds and Natural Habitats) Regulations* 2011-2015 actions that intentionally or unintentionally harm, damage or destroy a bat or its roosting site are committing an offence. In addition, if it is possible to establish a clear cause-effect relationship between one or more human-induced activities and the deterioration of a breeding site or resting place of a European protected species, then an offence is likely under the regulations. This places an onus of due diligence on anyone proposing to carry out works that might result in such damage, deterioration or destruction.

Furthermore, as a signatory to the *European Bats Agreement (Agreement on the Conservation of Bats in Europe) 1993*, Ireland is required to protect their habitats, requiring the identification and protection from damage or disturbance, of important feeding areas. All Irish bat species are listed in Appendix II of the Bern Convention (1979), as species requiring protection.

Finally, all but two bat species in Ireland are listed as internationally important in the Irish Red Data Book (Whilde, 1993). Natterer's bat (*Myotis nattereri*) and the Whiskered bat (*M. mystacinus*) are both listed as indeterminate. In the updated red list, Common pipistrelle (*Pipistrellus pipistrellus*), Soprano pipistrelle (*P. pygmaeus*) and Nathusius' pipistrelle (*P. nathusii*), Brown Long-eared (*Plecotus auritus*), Lesser Horseshoe (*Rhinolophus hipposideros*), Daubenton's (*M. daubentoni*), Natterer's and Whiskered bats are listed as "*least Concern*", while Leisler's bat (*Nyctalus leisleri*) is listed as "*Near Threatened*" and Brandt's bat (*M. brandtii*) is listed as "*data deficient*" (Marnell et al., 2009). The Greater Horseshoe Bat (*R. ferrumequinum*) status is not yet determined in Ireland as only one record has been confirmed.

Survey Area

The subject lands are located between Backweston Farm and Adamstown in Co. Dublin, within the Adamstown Strategic Development Zone (SDZ). The subject lands are roughly located between grid reference O 00533 34101 and O 01645 33276. Based on a review of aerial photography, the proposed route comprises of agricultural lands with mature trees and boundary hedgerows (see Plate 1), as well as areas of disturbed ground in its southern extent. A small portion of Lucan Golf Club's grounds is within the survey area, while the Department of Agriculture, Food and the Marine's "Crop Initiative Centre" at Backweston Farm lies to the north-west of the proposed route. According to MyPlan.ie the subject lands are zoned as '*P1- Agriculture'* and *'R3- Residential, mixed residential and other uses'* under the South Dublin County Council Development Plan 2016-2022 with the following respective planning objectives; '*to protect and improve rural amenity and to provide for the development of agriculture'* and '*to provide for strategic development in accordance with approved planning* schemes'. The predominant land use of the

surrounding environs is also divided between agriculture and residential. The closest watercourse is the Lucan Stream, located approximately 150m east of the proposed development at its closest point.

Plate 1. Arable fields of crops, in this case spring beans, are bordered by mature and well-structured hedgerows and treelines.

Table 1 below lists all Special Areas of Conservation (SACs) that are located within 15km of the proposed development site. None of the qualifying interests of these SACs include bats [1].

Table 1 Special Areas of Conservation (SAC) within 15km of the Proposed Development
Glenasmole Valley SAC (001209)
Rye Water Valley/ Carton SAC (001398)
Wicklow Mountains SAC (002122)

The site is located within hectad O03 (10km² area). A search of the National Biodiversity Data Centre's database[2] for this hectad returned records for eight bat species; Soprano Pipistrelle *Pipistrellus pygmaeus*, Common Pipistrelle *Pipistrellus pipistrellus*, Nathusius' Pipistrelle *Pipistrellus nathusii*, Leisler's bat *Nycatalus leisleri*, Daubenton's bat *Myotis daubentonii*, Brown Long-eared bat *Plecotus auritus,* Whiskered bat *Myotis mystacinus* and Natterer's bat *Myotis nattereri*. At a closer resolution, the site occurs within two tetrads (2km² areas), O03C and O03B with a record of Daubenton's bat from tetrad O03C and records of Soprano Pipistrelle, Common Pipistrelle and Leisler's bat from tetrad O03B. The occurrence of eight of the nine Irish resident bat species in hectad O03, the variety of bat suitable habitats across the site and the bat detections obtained from both surveys highlight the lack of historic bat recording effort in these tetrads, rather than a genuine lack of bat species diversity. Based on Bat Conservation Ireland's bat landscape suitability index[3], accessed via the NBDC mapping site, both tetrads are assigned a score of 29.78 which is classified as "moderate" landscape suitability for bats.

2. Background

Planning permission is being sought for the provision of a link road connecting the R403 and ongoing residential developments to the west of Adamstown, Co. Dublin. Full details of the proposed development can be found in the applicants planning application. In brief, the proposed development will comprise of:

[1] "Qualifying Interests" for SACs based on NPWS Conservation Objectives for SACs downloaded from www.npws.ie in October 2017.
[2] http://maps.biodiversityireland.ie/#/Map Accessed 2nd August 2017
[3] http://www.batconservationireland.org/irish-bats/bat-landscapes Accessed 2nd August 2017

- The construction of 820m of new single carriageway two-way road, a new signalised junction where the new Celbridge Link Road will intersect with the existing Celbridge Road. The road will be a single three-lane carriageway with 60km/h design speed. The overall road reservation will be 17m wide not including side slopes for the embankment. The vertical alignment of the new road falls gently from west to east and at the connection point with the Adamstown SDZ it is 2m lower.
- The scheme proposes a new uncontrolled T-Junction onto Tubber Lane on the western side of the Link Road and a cul-de-sac of Tubber lane on the eastern side of the Link Road.
- Pedestrian and cyclist access will be maintained along Tuber Lane with the Turning head provided at the end of the cul-de-sac to facilitate refuge and emergency vehicles. It is proposed to provide a 1.5m cycletrack and 2.0m footpath at both sides of the new link road, these will be separated from the vehicular lanes by a 1.5m grass and tree verge.
- The road will also be lit by public lighting, the details of which will be considered at the detailed design stage.

The public lights along the existing Celbridge Road are at c. 30m spacing on alternative sides of the road and using an 8m high column. The lighting columns will be located in the grass verge with a minimum clearance to the kerb of 800mm. the lighting scheme will be extended onto the proposed link road through the SDZ. The details of the new lighting will be considered at the detailed design stage. The lighting will be designed to meet the South Dublin County Council "Public Lighting Specification, Rev.2 14/10/216", or specification current at the time.

3. Methodology

Two dusk bat surveys of the subject lands were carried out on the 3rd and 13th August 2017 by Seán Meehan for Scott Cawley Ltd. The purpose of both surveys was to assess levels of bat activity and the range of species detected in the area. The survey routes traversed fields of arable crops separated by mature hedgerows and treelines and included a western section of Lucan Golf Club.

Surveys were carried out during favourable weather conditions; calm or light breezes, mild temperatures and little or no precipitation. The starting time of the survey on August 3rd was delayed due to a heavy rain shower, although surveying did commence before sunset. The survey on the 13th August commenced thirty minutes before sunset. An +EM3 handheld bat detector was used along with a Garmin etrex 20 GPS device. Both walkovers loosely followed the route of the planned road with approximately 50 metres either side of this road route also surveyed. Two-minute listening stops at notable landscape features such as well-structured hedgerows, mature trees and ditches were included in the walkovers to detect any passing bat activity.

Tables 1 and 2 provide a summary of relevant information for both surveys.

Table 1. Summary of information relating to dusk bat survey on 3rd August

Date	**03/08/2017**
Sunset	21.17
Weather	Rain shower cleared by 21.10. Followed by clear and calm conditions. Wind F2. Temperature +13°C.
Survey starting point	Backweston
Survey finishing point	Adamstown
Survey commencement	21.10
Survey completion	23.27

Survey duration (in minutes)	137
Number of bat passes detected	13
Number of bat species detected	4

Table 2. Summary of information relating to dusk bat survey on 13th August

Date	**13/08/2017**
Sunset	20.57
Weather	Dry and overcast. Wind F2-F4. Temperature +15º C. Light rain from 22.30.
Survey starting point	Adamstown
Survey finishing point	Backweston
Survey commencement	20.27
Survey completion	23.00
Survey duration (in minutes)	153
Number of bat passes detected	9
Number of bat species detected	3

4. Limitations of Surveys and Evaluation of results

Bat activity surveys were conducted within the active bat season (mid-April – mid-September), and within the optimum survey period. It should however be noted that the surveys conducted represent a snap shot in time within a single active bat season. All surveys were carried out to an appropriate level and using appropriate effort for the site. No significant limitations were encountered during the surveys.

5. Bat Survey Results

A combined total of 22 bat passes (detections) representing four species were collected from both surveys. As an individual bat may be responsible for more than one pass, the results from these surveys are more useful in determining levels of bat activity on the site rather than providing a population count. Tables 3 and 4 provide a breakdown of results collected during both surveys and Figures 2 and 3 shows transect routes walked and location of detected bats.

Table 3. Species, location and time per bat pass detected / observed during August 3rd survey

Species	**Grid reference (ITM)**	**Time of detection**	**Bat behaviour**
Nyctalus leisleri	700400, 734163	21.34	Flying over field at a height of c.40m to the north of the R403.
Nyctalus leisleri	700521, 734124	21.36	Flying at c. 40m over open field.
Nyctalus leisleri	700554, 733964	21.44	Flying at c. 30m over open field.
Pipistrellus pygmaeus	700690, 734127	21.58	Foraging at 5 m along a grassy knoll
Pipistrellus pygmaeus	700839, 734013	22.04	Feeding at c.3m along hedgerow
Pipistrellus pipistrellus	701132, 734181	22.21	Foraging amongst conifers in golf club grounds. Not seen.
Nyctalus leisleri	701397, 733831	22.49	Detected over fields. Not seen.
Pipistrellus pygmaeus	701416, 733844	22.55	Foraging along a vegetated dry ditch. Not seen
Nyctalus leisleri	701397, 733831	22.55	Faint call detected. Possibly the same bat as the 22.49 detection.
Pipistrellus pygmaeus	701257, 733714	23.01	Flying at c. 5m along a hedgerow
Pipistrellus pygmaeus	701384, 733525	23.11	Foraging along tree line. Not seen.

Plecotus auritus	701424, 733567	23.12	Observed foraging at c. 2m along treeline. Not detected on recorder but clearly seen in head torch beam.
Pipistrellus pygmaeus	701583, 733283	23.27	A distant call detected at the end of the survey.

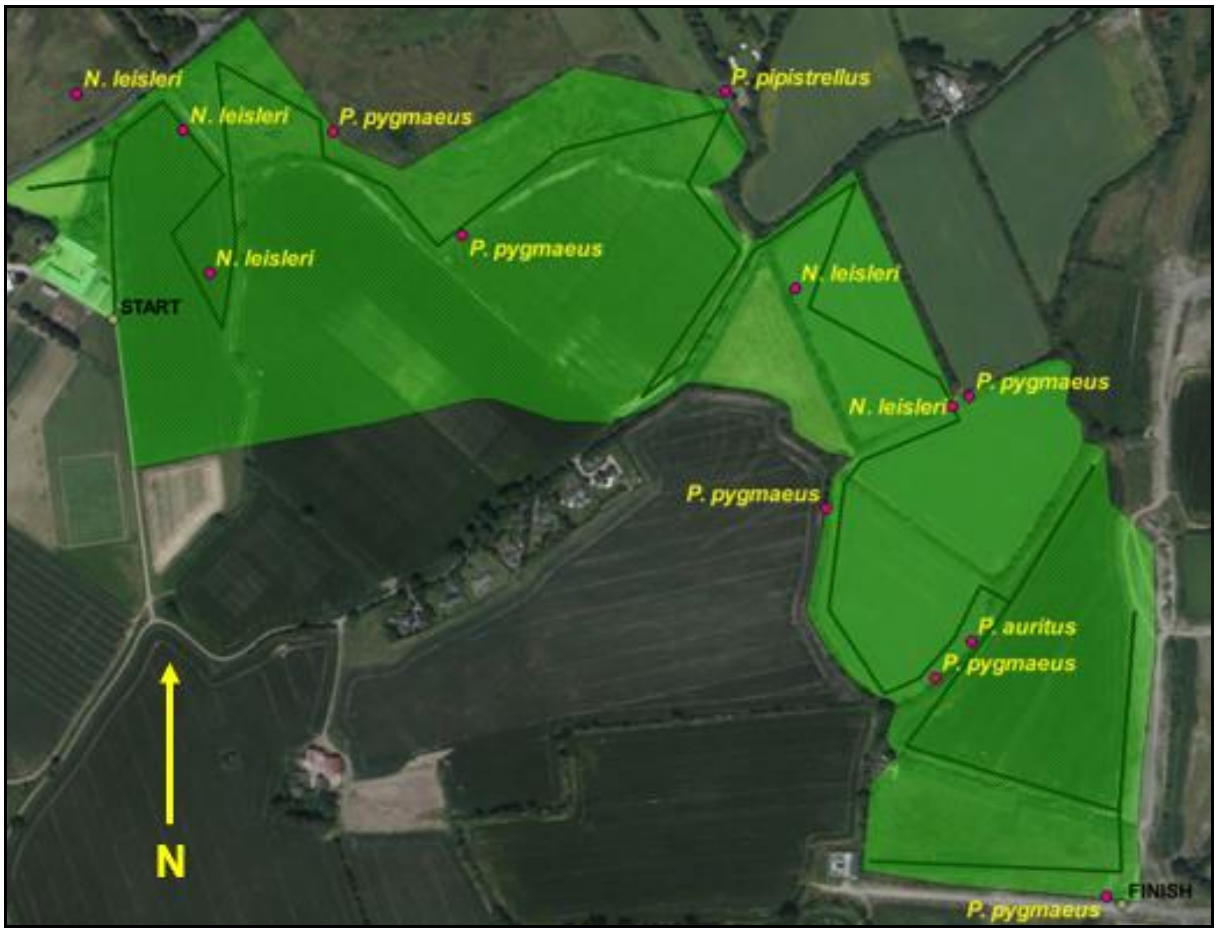

Figure 1. Transect route and location of detected bats from 3rd August survey

Table 4. Species, location and time per bat pass detected / observed during August 13th survey

Species	Grid reference (ITM)	Time of detection	Bat behaviour
Nyctalus leisleri	701538, 733799	21.33	Flying in a westerly direction at c. 40m over arable fields
Nyctalus leisleri	701332, 733754	21.46	Flying in a westerly direction at c. 40m over arable fields Not likely to be the same bat seen at 21.33
Pipistrellus pygmaeus	701331, 733999	22.00	Feeding along hedgerow at c. 4 m
Pipistrellus pygmaeus	701274, 734096	22.04	Feeding along roadside hedgerow at c. 4m
Pipistrellus pipistrellus	701140, 734115	22.27	Feeding amongst conifers in golf club grounds. Flying at c. 5m
Nyctalus leisleri	701061, 734126	22.32	Call detected. Not seen.
Pipistrellus pygmaeus	700571, 734115	22.52	Call detected. Not seen.
Pipistrellus pygmaeus	700428, 724060	22.57	Flying at c. 5 m. Observed in head torch beam.
Pipistrellus pygmaeus	700427, 734005	23.00	Call detected. Not seen.

Figure 2. Transect route and location of detected bats from August 13th survey

6. Evaluation of Survey Results

The site is principally comprised of large arable fields separated by mature hedgerows and treelines that provide good landscape connectivity and feeding opportunities for bats. A small portion of Lucan Golf Club's grounds is within the surveyed area. The airspace over the large arable fields is used by Leisler's bat. The two Pipistrelle species and the Brown Long-eared bat primarily used the hedgerows for commuting and foraging.

The cluster of buildings at the Crop Initiative Centre by the R403 road contains older buildings, such as an old-style farm house, that may support bat roosts. Another building, a gate lodge on the northern side of the R408, also offers bat roost potential (see Plate 2).

Plate 2. Potential bat roost location: Abandoned gate lodge on northern side of the R403.

Notable trees, (labelled A, B, C, D and E in Figure 3) are mature oaks that are in varying stages of decay with dead limbs and thick ivy growth which provide suitable roosting opportunities for bats (Plate 3).

Plate 3. Oak trees (A & B) along the site boundary by the R403.

Hedgerows and treelines across the site are well-structured and dominated by hawthorn, blackthorn, ash and oak, labelled H1, H2, H3, H4 and H5 in Figure 3. Treeline H2 is particularly notable and contains mature ash and oak trees and in sections is more akin to a narrow strip of linear woodland (Plate 4). It was along this treeline that the brown-long-eared bat was observed foraging.

Plate 4. Mature treeline / linear woodland. Marked as H1 on Figure 3.

Figure 3. Locations of notable features on site of potential interest for bats

Bat activity recorded was considered to be as expected for a site of agricultural nature in this location. The site is primarily used by foraging and commuting bats. Foraging activity concentrated on the existing hedgerows, which emphasizes their importance in the landscape. It should be also noted that the presence of large open fields and the nearby Lucan Golf Course, could account for the majority of bat activity being confined to the treelines and hedgerows on site.

7. Impacts of Proposed Works

The proposed works on site, which will include the construction of the proposed link road through agricultural fields, the fragmentation of the existing hedgerows and removal of trees and the installation of lighting and landscaping unless mitigated and carried out in accordance with good practice, could result in potential impacts on local bats. It should be noted that the proposal does not involve the demolition or interaction with any nearby buildings and as such, potential for impacts on roosting bats are limited to potential tree roosts only.

Loss of any roosts in the site, though unfortunate and a significant impact on the bats involved, would be unlikely to impact on the local bat population given the number of other suitable buildings and trees in the vicinity that would be capable of providing alternative roosting sites. Therefore, the principle focus of the following mitigation measures is aimed at protecting individual bats from direct harm and ensuring that bats may be able to cross the landscape as they currently do so without a high risk of collision with vehicles.

To protect against harm to individual bats and to other protected species the following measures must be undertaken by Contractors, as listed below. All measures should be included as contractual requirements.

Measure BM1: If bats are encountered during works then relevant works will cease until the Local Conservation Ranger of the National Parks and Wildlife Service are consulted (Tel: 1890 20 20 21). Bat boxes may have to be erected on mature trees, based on the advice of a suitably qualified ecologist.

Measure BM2: Any trees to be felled should be section felled and the felled parts left *in situ* on the ground for a period of 24 hours to allow any bats present to escape.

Measure BM3: Based on a review of the arborist report for the project, two of the trees which are to be felled (tree nos. 0441 and 0443) have potential for roosting bats. The trees are mature oaks that are in varying stages of decay with dead limbs and thick ivy growth that provide suitable roosting opportunities for bats. Particular care should be given to these trees to prevent any harm to potential roosting bats. Emergence or re-entry surveys should be conducted on these trees, prior to felling. The aim of these surveys should be to establish whether bats are using them for roosting purposes. Based on the results of these surveys further mitigation measures may be required such as the installation of a number of bat boxes. If following these surveys, the trees are identified as bat roosts, their removal would result in an adverse impact significant at the local scale. Their loss would be mitigated for in the installation of a number of bat boxes on suitable trees located nearby.

Measure BM4: Any proposed lighting of the subject lands will be designed in a manner which is sensitive to the presence of bats on site. The lighting plan for the proposed development will be reviewed by a competent bat ecologist, and agreed with South Dublin County Council, who shall if necessary recommend adjustments to directional lighting (e.g. through retrofit of cowls, shields or louvres) to ensure the lighting plan is sensitive to the presence of bats in the area. Lighting of the site during operation will be designed in accordance with the following guidance:

- *Guidance Notes for the Reduction of Obtrusive Light GN01* (Institute of Lighting Professionals, 2011)
- *Bats & Lighting - Guidance Notes for Planners, Engineers, Architects and Developers* (Bat Conservation Ireland, December 2010)
- *Bats and Lighting in the UK – Bats and the Built Environment Series* (Bat Conservation Trust UK, January 2008).

Goals to be achieved in the lighting design are:

- Lighting levels should be the minimum required for health and safety requirements, where possible.
- Vegetated areas around the perimeter should not be lit up nor lighting directed towards it. Lighting in these areas should not increase beyond existing lux levels or 1 lux, whichever is the lesser.
- Vertical light spill at light sources should be below 3m to avoid potential bat flight paths.
- No floodlighting should be used – this causes a large amount of light spillage into the sky. The spread of light should be kept below the horizontal.
- Hoods, louvres, shields or cowls should be fitted on the lights to reduce light spillage.
- Lights should be of low intensity. It is better to use several low intensity lights than one strong light spilling light across the entire area.
- Narrow spectrum lighting should be used with a low UV component. Glass also helps reduce the UV component emitted by lights.

The source of light should be Light Emitting Diodes (LEDs) as this is a narrow beam that is highly directional and a highly energy efficient light source. The lighting should allow for a light level of 3 lux at ground level at the perimeter of the development area. This low lighting is thus easier to control both the direction but also the actual light level because it is so close to the target area.

Measure BM4: Landscape planting at the edge of the carriageway where hedgerows meet the edge of the road and have been severed by the proposed development, will include the planting of large trees (up to 3m in height) to provide hop-over features. These hop-overs will help to guide the lower-flying Pipistrellus species of bats to fly up and over the height of vehicles and hence reduced the probability of collision.

8. Conclusions

Bat activity recorded was considered to be as expected for this site, with three different bat species being recorded. The site was identified as important for commuting and foraging bats. The mature hedgerows and treelines on site are important foraging locations and commuting features for local bats. A number of trees were deemed suitable for roosting bats and these have been described and mapped accordingly. The proposed works have the potential to impact on local bats if carried out without mitigation measures. Therefore, measures have been proposed to minimise direct harm to bats and to allow any bats encountered during the works to be recovered and safely relocated or allow to fly away.

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APPENDIX 3: Arborist Report

94 Ballybawn Cottages, Enniskerry, Co. Wicklow

Tel: 2742011
Mobile: 087-2629589
Email: arborist@eircom.net

Ref: CBLR0789767

12th October 2017

For the Attention of Mr. Ronan MacDiarmada
Ronan MacDiarmada & Associates Ltd.
Gort Na Sì,
Main Street
Newcastle
Co. Dublin

Dear Mr. MacDiarmada,

Re: An Arboricultural Assessment on the Tree and Hedge Vegetation on Lands to be developed as Part of the 'New Celbridge Link Road' at Adamstown, Lucan, Co. Dublin.

I have carried out my assessment of the tree and hedge vegetation on the above lands as requested and have reviewed the proposed road network layout and am pleased to submit my report.

Recommendations and comments made in this report are subject to the knowledge and expertise of the qualified Arboriculturist that carried out the assessment and their understanding of the proposed development works.

If you require further information please do not hesitate to contact us, and we will do our best to be of assistance.

Yours sincerely,
For Arborist Associates Ltd.

_____
Felim Sheridan
F. Arbor. A, RFS Dip, Nat. Dip & NCH in Arboriculture.

Felim Sheridan's qualifications:
Fellow of the Arboricultural Association (F. Arbor. A), Professional diploma Arboriculture (RFS), National diploma Arboriculture (ND) and National certificate Horticulture (NCH).

Arborist Associates Ltd.

An Arboricultural Assessment on the Tree and Hedge Vegetation on Lands to be developed as Part of the 'New Celbridge Link Road' at Adamstown, Lucan, Co. Dublin.

Prepared for: Ronan MacDiarmada & Associates Ltd.

Prepared by: Felim Sheridan F. Arbor. A, RFS Dip, Nat. Dip & NCH in Arboriculture

Date: 12th October 2017

94 Ballybawn Cottages, Enniskerry, Co. Wicklow.

Tel: 2742011
Mobile: 087 2629589
Email arborist@eircom.net

Summary

The proposed 'New Celbridge Link Road' extends across agricultural field's transversing field hedgerows running in a south- east direction from the R403 at 'Backstown' before turning to run southwards after crossing 'Tubber Lane'.

These hedgerows form the boundary between fields that are mainly managed under arable farming where the fields are ploughed annually in tight to the hedgerows. The hedgerows are typical agricultural style for this area made up of Hawthorn and Blackthorn with some Elder, Holly and Privet with an undergrowth of Bramble and Dogrose. The bulk of the hedgerows have been regularly trimmed to contain as low hedges which has helped with their stock proof quality and structure.

Protruding out of these hedges are some individual trees predominantly of Ash with some Oak and Elm. They range in age from seedlings to those of a mature age class that are prominent/visible trees within the treescape of this area.

A condition tree assessment report has been carried out by us to the recommendations of BS5837:2012. See 'Appendix 2' and drawing 'No.CBLR001, Parts 1-5' which has been prepared as a constraints plan for details of our findings.

Within the site corridor of lands assessed for the proposed 'Link Road', 21No.trees were tagged individually and 16 No. hedges were numbered numerically. The following table gives a breakdown of tree species, age classes and category grading:

Category Grade	**No. of Trees**
Category U **3 trees**	**Tree Nos.** 0451, 0452, 0459
Category A **0 trees**	**Tree No.** ---
Category B **1 tree**	**Tree Nos.** 0444
Category C **17 trees** + 16 hedges	**Tree Nos.** 0441, 0442, 0443, 0445, 0446, 0447, 0448, 0449, 0450, 0451, 0453, 0454, 0455, 0456, 0457, 0458, 0460 Hedge Nos. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15 & 16
Total	**21 trees + 16 hedges**

It is being proposed to route a 'New Celbridge Link Road' through these lands to connect to the existing 'R403' at Backstown to allow these surrounding lands to be developed for residential use as per the objective of the Local Area Development Plan. Based on this proposed road layout, I have drawn up my Arboricultural Impact Assessment. See 'Section 5' of this report and drawing 'No.CBLR002, Parts 1-7' for detail which shows the tree and hedge vegetation for removal with a hatched red crown spread and those for retention with a 'Hatched Green' crown spread.

Based on the current layout, 541m of hedging dispersed along the entire length of the proposed road will need to be removed along with 10 No. individual trees made up of eight Ash and two Oak with nine of them categorized as 'C' and one as 'U'.

Based on the current layout, the following tree and hedge vegetation will need to be removed:

Hedge No.1	145m + tree Nos.0441 & 0442 both graded as category C.
Hedge No.2	Not affected by the proposed road layout.
Hedge No.3	25m
Hedge No.4	25m
Hedge No.5	45m
Hedge No.6	22m + tree Nos.0445 & 0446 both graded as category C.
Hedge No.7	40m + tree Nos.0447, 0448 & 0449 all graded as category C.
Hedge No.8	50m
Hedge No.9	53m
Hedge No.10	33m
Hedge No.11	Not affected by the proposed road layout, passes through this hedge as an existing gap/opening.
Hedge No.12	Not affected by the proposed road layout.
Hedge No.13	Not affected by the proposed road layout.
Hedge No.14	24m + tree No.0454 graded as category C.
Hedge No.15	54m + tree No.0455 graded as category C.
Hedge No.16	25m + tree No.0459 graded as category U.

The visual impact of tree and hedge vegetation lost from this area is minimal as the proposed layout of this new link road is spread out over a large area of land with only a small number of trees and hedging being lost from any one area.

The loss of tree and hedge vegetation from these lands is to be mitigated with the planting of new tree, shrub and hedge vegetation within the completed development of the link road. A range of tree sizes are proposed from whips to semi- mature trees and as these establish and grow in size, they will be continuously mitigating any negative impacts and will enhance and secure the treescape of this area into the future.

On drawing 'No.CBLR002, Parts 1-7', I have shown the required work exclusion zone around the tree and hedge vegetation to be retained with 'Orange' hatching. These areas are to be fenced off from the site works using strong robust fencing and this is to be retained until the development is complete and these areas are incorporated into the finished landscaped development.

It will be important that these tree protection measures are put in place at the very start of the works prior to machinery coming on site and are maintained throughout the construction project to ensure that the tree and hedge vegetation which is proposed to be retained is done so successfully. These measures have been highlighted within my impact assessment and tree protection strategy and it is important that they are implemented.

The key issues for the client or project manager regarding tree protection are as follows:

- The appointment of a consultant Arboriculturist for the duration of the project.
- The establishment of tree protection/mitigation measures.
- Monitoring of tree protection and mitigation measures.
- The adherence of tree protection measures by all staff and sub-contractors on site.
- Supervision of works within the vicinity of trees to be retained by the project Arboriculturist.

- Post construction assessment of retained trees by the project Arboriculturist and the implementation of the necessary measures required to promote the health of these trees and safety towards the end users of this property.

1.0 Instructions

1.1 I have been instructed by Ronan MacDiarmada & Associates Ltd (project landscape architects) to assess the tree and hedge vegetation on lands to be developed as part of the 'New Celbridge Link Road' at Adamstown, Lucan, Co. Dublin and report on the following:

A - To assess the present condition of the tree and hedge vegetation within this site area which consisted of a corridor through the lands where the proposed new link road will be located. See 'Appendix 2' for detail of my findings and drawings (No.CBLR001, Parts 1–5) which I have prepared as constraints drawings to aid the design team.

B - To assess the impact of the proposed development layout on the tree and hedge vegetation located within the site area indicating those for removal and retention. See 'Section 5.0' and 'Drawing (No.CBLR002, Parts 1-7) for detail.

C - To develop this drawing as a tree protection plan to show the position of the protective fencing that needs to be erected and other tree protection measures that will need to be put in place around the tree and hedge vegetation to be retained at the very start of the works and be maintained until all construction works are complete.

2.0 Report Limitations

2.1 The inspection of the tree and hedge vegetation has been carried out from ground level only, is a preliminary report and does not include climbing inspections, internal investigations of the timber or below ground investigations. The assessment is based on what was visible at the time of the inspection and recommendations made are subject to the knowledge and expertise of the qualified Arboriculturist that carried out the above inspections.

2.2 This report only relates to factors apparent at the time of the inspection; as a result, further monitoring is imperative if potential problems/hazards are to be avoided. The recommendations within this report are valid for a 12 month period only, unless otherwise stated.

2.3 Before undertaking any work to these trees, it would be advisable to check whether any planning or tree preservation controls are in operation, if they are it will be necessary to obtain consent before undertaking any works (pruning or felling).

3.0 Survey Data Collection and Methodology

3.1 The Arboricultural data which is presented within the attached tree schedule (see Appendix 2), has been recorded in line with BS 5837:2012. The tree survey was conducted by collecting and assessing the following information on all significant trees located on site and plotted on the land survey map provided.

- Tree Number (metal tags attached to each tree).
- Tree species both common and botanical.
- Dimensions (Trunk diameter, height, crown spread and crown clearance).
- Age Class
- Physiological Condition
- Structural Condition
- Preliminary Recommendations
- Estimated remaining contribution within their present environment
- Retention category/category grade

3.2 Each tree included within this assessment has been marked with a small aluminum tag with a reference number that relates to the main condition report. The tag numbers used range from Nos.0441-0460 inclusive and these are attached to the trees at a height of 1.5- 2m from ground level and are orientated in such a way to assist in their relocation. The hedges within this site area have been numbered numerically from Nos.1 – 16.

3.3 The inspection of the trees involves a visual assessment from ground level only and does not include any invasive means of assessing the trees internally, their below ground parts or the aerial parts that are not visible from the ground. Good, fair and poor have been used to summarize the physiological and structural conditions of these trees with the comments giving more detail. Other items that may limit the assessment of a tree included Ivy cover, scrub vegetation and/or basal suckers.

3.4 Their retention category has been assessed and categorized according to their quality and value within the existing context (BS-4.5), and not in conjunction with any proposed development plans. In making this assessment, particular consideration was given to;

Arboricultural Value: An assessment of the trees health, structural form, life expectancy, species and its physical contribution to or affects on other features located on site.
Landscape Value: An assessment of a trees locality including its contributions to other features as well as to the site as a whole.
Cultural Value: Additional contributions made such as conservation, historical or commemorative value.

3.5 The trees have been divided into one of the following categories, in accordance with the cascade chart illustrated in table 1 of BS 5837:2012. The classification process begins by determining whether the tree falls within the (U) category, if not then the process will continue by assuming that all trees are considered according to the criteria for inclusion in the high category (A). Trees that do not meet these strict criteria will then be considered in light of the criteria for inclusion in the moderate category (B) and failing this, they will be allocated a low category (C).

The following summarizes each of the categories:

Category U – Those trees in such a condition that any existing value would be lost within 10 years.

These would be seen as trees that have little or no potential either due to their physiological and/or structural condition and their removal

would been seen necessary either now or in the short-term as the most appropriate management option.

These category 'U' trees have been identified on our drawings (Nos.CBLT001, Parts 1-5 & CBLR002, Parts 1-7) with a 'Red' donut around their trunk positions. Due to the condition of these trees, they should not be considered a constraint on the design layout of the proposed development of this site area.

Category A - Trees of high quality/value with a minimum of 40 years life expectancy.

These would be seen as trees that have the potential to contribute to the tree cover of these grounds for the long-term and consists of trees of all age classes from semi-mature to mature.

The category 'A' trees have been identified on our drawings (Nos.CBLT001, Parts 1-5 & CBLR002, Parts 1-7) with a 'Green' donut around their trunk positions.

Category B – Trees of moderate quality/value with a minimum of 20 years life expectancy.

These would be seen as trees that have the potential to contribute to the tree cover of these grounds for the medium -term and consists of trees of all age classes from semi-mature to mature.

These have been identified on our drawings (Nos.CBLT001, Parts 1-5 & CBLR002, Parts 1-7) with a 'Blue' donut around their trunk positions.

Category C – Trees of low quality/value with a minimum of 10 years life expectancy

These trees would be seen as having the potential to provide tree cover for the short to medium term. As part of the future management, most of these would probably be removed for one reason or another. This category consists of trees of all age classes from young to mature. These trees should not been seen as a considerable constraint on the development of these grounds, but should be considered for retention where viable.

These have been identified on our drawings (Nos.CBLT001, Parts 1-5 & CBLR002, Parts 1-7) with a 'Grey' donut around their trunk positions.

3.6 The bulk of the trees have been plotted onto the attached drawing (No.CBLR001, Parts 1-5) by a land survey company and where they have not been, they have been positioned by ourselves to the best of our ability and their positions will need to be checked by a land survey company. This drawing has been developed as a

constraint drawing to aid the design team in the final layout of the development and the tag numbers referred to in the condition tree report have been shown on this along with their crown spreads and their retention category colour coded as recommended by BS 5837 2012. The constraint (Minimum Root Protection Area) for each tree has been shown with an 'Orange Circle' and all proposed development should be planned to be positioned outside those trees proposed for retention allowing for additional space for construction activities.

The Root Protection Area (RPA) is the minimum area around individual trees to be protected from disturbance during construction works; RPA is usually expressed as a radius in metres measured from the tree stem. Any deviation in the RPA from the original circular plot takes account of the following factors whilst still providing adequate protection for the root system:

a) The morphology and disposition of the roots, when influenced by past or existing site conditions (e.g. the presence of roads, structures, drainage ditches and underground apparatus);
b) Topography and drainage;
c) The soil type and structure;
d) The likely tolerance of the tree to root disturbance or damage, based on factors such as species, age, condition and past management.

3.7 I have developed this drawing to produce a Tree Protection Plan (No.CBLR002, Parts 1-7) to show the proposed layout of the road network to service these lands. On this drawing, we have identified the tree vegetation to be removed to facilitate the proposed development or due to condition with 'Red Hatched' crown spreads and those to be retained with 'Green Hatched' crown spread. We have also shown the positioning of the protective fencing that will need to be erected and other tree protection measures that will need to be put in place at the start of the works and be maintained in place until all works are completed. These measures are to protect the root zone of the trees and to ensure their successful integration into the completed development.

4.0 Summary of Survey Findings

4.1 The proposed link road extends across agricultural field's transversing field hedgerows running in a south- east direction from the 'R403' at Backstown before turning to run southwards after crossing 'Tubber Lane'.

4.2 These hedgerows form the boundary between fields that are mainly managed under arable farming where the fields are ploughed annually in tight to the hedgerows. The hedgerows are typical agricultural style for this area made up of Hawthorn and Blackthorn with some Elder, Holly and Privet with an undergrowth of Bramble and Dogrose. The bulk of the hedgerows have been regularly trimmed to contain as low hedges which has helped with their stock proof quality and structure.

4.3 Protruding out of these hedges are some individual trees predominantly of Ash with some Oak and Elm. They range in age from seedlings to those of a mature age class that are prominent/visible trees within the treescape of this area. These trees have also suffered from past management with limbs/branches that overhung the fields on either sides being cut/broken off to allow machinery to get in close to the

hedges. In the distant past, some of these trees had been coppiced into the hedges and have since been allowed to develop multiple- stemmed crowns from these old stumps which may become problematic as they grow in size due to structural weaknesses caused by poor structure and decay at old wounds. Damage has also been caused to a number of the trees by the ploughing that has occurred within close proximity and this is now showing within the physiological condition of the trees with dieback evident.

4.4 Within the site corridor of land assessed for the proposed 'Link Road', 21 No. Trees were tagged individually and 16 No. Hedges were numbered numerically. The following table gives a breakdown of tree species, age classes and category grading:

Category Grade	**No. of trees**
Category U **3 trees**	**Tree Nos.** 0451, 0452, 0459
Category A **0 trees**	**Tree No.** ---
Category B **1 tree**	**Tree Nos.** 0444
Category C **17 trees** + 16 hedges	**Tree Nos.** 0441, 0442, 0443, 0445, 0446, 0447, 0448, 0449, 0450, 0451, 0453, 0454, 0455, 0456, 0457, 0458, 0460 Hedge Nos. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15 & 16
Total	**21 trees + 16 hedges**

5.0.0 Arboricultural Implication Study

5.1.0 Introduction

5.1.1 This section of the document is designed to assess the impact of the proposed layout of the 'New Celbridge Link Road' on the tree and hedge vegetation on these lands which it transverses and to look at the necessary measures that will need to be undertaken to help retain the tree and hedge vegetation shown for retention free from adverse impacts for the duration of the construction period.

5.1.2 On drawing (No.CBLR002, Parts 1-7), I have identified the tree and hedge vegetation to be removed to facilitate this proposed road construction, on safety grounds and/or as part of active management with a 'Red Hatched' crown spread and those to be retained with a 'Green Hatched' crown spread.

5.1.3 On this drawing, I have also shown the necessary tree protective fencing with 'Orange Hatching'. This will need to be erected at the start of the works and be maintained in place until all works are completed.

5.1.4 The comments made within this impact assessment study are based on my understanding of the proposed development and what is required to allow for its construction.

5.2.0 Impact Assessment

5.2.1 Tree and Hedge loss:

See 'Appendix 2' of this report which provides full details on the tree and hedge vegetation for removal along with drawing No.CBLR002, Parts 1-7.

Based on the current layout of the proposed road and its infrastructure, the following tree and hedge vegetation will need to be removed:

Hedge No.1	145m + tree Nos.0441 & 0442 both graded as category C.
Hedge No.2	Not affected by the proposed road layout.
Hedge No.3	25m
Hedge No.4	25m
Hedge No.5	45m
Hedge No.6	22m + tree Nos.0445 & 0446 both graded as category C.
Hedge No.7	40m + tree Nos.0447, 0448 & 0449 all graded as category C.
Hedge No.8	50m
Hedge No.9	53m
Hedge No.10	33m
Hedge No.11	Not affected by the proposed road layout, passes through this hedge as an existing gap/opening.
Hedge No.12	Not affected by the proposed road layout.
Hedge No.13	Not affected by the proposed road layout.
Hedge No.14	24m + tree No.0454 graded as category C.
Hedge No.15	54m + tree No.0455 graded as category C.
Hedge No.16	25m + tree No.0459 graded as category U.

So in summary, 541m of hedging dispersed along the entire length of the proposed road will need to be removed along with 10 individual trees made up eight Ash and two Oak with nine of them categorized as 'C' and one as 'U'.

5.2.2 Visual Impact

The visual impact of the tree and hedge vegetation lost from this area is minimal as a result of the proposed layout of this link road as they are spread out over a large area of land with only a small number of trees and sections of hedging being lost from any one area.

The loss of tree and hedge vegetation from these lands is to be mitigated with the planting of new tree and hedge planting within the completed development of the road network. See landscape architects drawings and schedule for details.

A range of tree sizes are proposed from whips to semi- mature trees and as these establish and grow in size, they will be continuously mitigating any negative impacts and will enhance and secure the treescape of this area into the future.

5.2.3 Tree retention and protection

The remaining tree and hedge vegetation is proposed for retention and incorporation into the development of this road network, however future development of these lands for other uses may require the removal of some of this. To promote safety towards the 'New Celbridge Link Road', some of these will require pruning works which will not impact on their health or visual appearance. A preliminary list of these works has been given within our condition tree assessment in 'Appendix 2' of this report.

It will be important at the start of the project once the tree and hedge vegetation required to be removed to facilitate the development of the road network has been removed, that the necessary tree protection fencing and other tree protection measures are put in place without delay and prior to the main construction works commencing on site. This fencing needs to be erected to enclose the calculated root protection areas of the tree and hedge vegetation as shown on drawing (No. CBLR002, Parts 1-7) and this is to remain in place for the duration of the works within these areas. It is to be of a strong robust build capable of withstanding the works that are proposed within its vicinity. Where it is expected that there will be a high concentration of construction works, the fencing will need to be 2.3m high and constructed in accordance with figure 2 of BS 5837 2012 (see 'Appendix 1' for detail) using vertical and horizontal scaffold bars well braced together with the verticals spaced out at a maximum of 3m centres and onto this, weld mesh panels are to be securely fixed with wire or scaffold clamps. Where there is a lesser intensity of works, a rail or wire mesh fence structure 1.5m high will be sufficient, (see fencing detail within 'Appendix 1').

Signs will need to be attached to these fences warning people to 'keep out' that this is the root protection area of the trees and that no works are allowed within these fenced off areas without prior consultation and agreement with the project Arboriculturist. See sign detail within 'Appendix 1'.

5.2.4 Services

For the road network, the services are running within the footprint of the land take for its construction and there should be no other impacts on the tree and hedge vegetation being retained outside this area.

5.2.5 Landscaping

The landscaping is being kept simple around the tree and hedge vegetation being retained. The existing hedges are to be tidied up and augmented with new planting of trees and shrub species.

The existing ground levels within the RPA of the tree and hedge vegetation are to be retained and incorporated into the finished landscaped areas. Where changes in levels occur, these are to be graded into the finished levels starting outside the RPA.

All soft and hard landscaping within the RPA of the trees to be retained are to be carried out manually and the soil levels are not to be lowered or raised resulting in root damage. All surfaces are to be porous to allow the free movement of air and moisture to the roots below. Recommendations of sections 8 of BS5837 2012 are to be adhered to during the landscaping within the RPA's of these trees.

Any new tree planting carried out will require maintenance to encourage good growth habits and to alleviate any safety concerns that they may present as they grow in size.

In some areas, there is a need to erect new fences to secure areas and in places it will be necessary to carry out some breasting/cutting back of the hedge vegetation to facilitate these which will not impact negatively on them. The holes for the uprights for these fences within the root zones of the tree and hedge vegetation to be retained are to be dug manually with no machinery allowed inside the root protection areas. Work zones within the root protection areas for these trees will need to be protected during the construction of the boundary fences by boarding as per section 6.2.3 of BS 5837 2012.

5.3.0 Monitoring

5.3.1 Any construction works within close proximity to retained tree and hedge vegetation are advised to be undertaken in accordance with approved method statements prepared by the construction contractor under the direct supervision of a qualified consultant Arboriculturist. Therefore, during the construction works, a professionally qualified Arboriculturist is recommended to be retained by the principal contractor or site manager to monitor and advise on any works within the RPA of retained trees to ensure successful tree retention and planning compliance.

5.3.2 It is advised that tree protection fencing, any required special engineering and supervision works must be included in the main tender documents, including responsibility for the installation, cost and maintenance of tree protection measures throughout all construction phases.

5.3.3 Copies of the tree retention and protection plan (Dwg No. CBLR002, Parts 1-7) a copy of BS 5837(2012) and NJUG 4 (2007) should all be kept available on site during the construction works and all works are to be in accordance with these documents.

5.3.4 On the completion of the construction works, all trees retained are to be reviewed by the project Arboriculturist and any necessary remedial tree surgery works required to promote the health of the trees and safety are to be implemented.

6.0 Arboricultural Method Statement/Tree Protection Strategy

6.1 The objective of this arboricultural method statement/tree protection strategy is to provide information for the main contractor/site manager on how the tree and hedge vegetation need to be protected during a construction project and so that they can prepare their own site specific detailed method statement for their works.

6.2 It is necessary for tree protective fencing to be erected and all other mitigation measures required to be put in place prior to the development works commencing on site and these are to enclose and protect the root zone of the tree and hedge vegetation proposed for retention. See drawing (Dwg No. CBLR002, Parts 1-7), for the position of the protective fencing and other mitigation measures.

6.3 The protection of the tree vegetation shown for retention within this proposed development is divided into three main sections starting with the preconstruction stage right through to post construction and the reassessment of the retained trees.

Stage 1

6.4.0 Pre-Construction Works

6.4.1 Prior to the main construction works commencing on site the following needs to be planned:

1. The developer or main contractor needs to appoint an Arboriculturist for the duration of the project. The Arboriculturist is to make regular site visits to ensure that the tree protection measures are in place and adhered to.
2. The main contractors and all sub-contractors work force are to be briefed on the tree protection and ensure that these measures are to be kept in place throughout the construction period.
3. All personnel are to adhere to the recommendations of the appointed Arboriculturist.
4. Any issues in relation to the trees shown for retention must be discussed with the appointed project Arboriculturist and the necessary mitigation measures put in place without delay and prior to the works being carried out.

6.5.0 Site meeting

6.5.1 Prior to any works commencing on site, it is necessary that a meeting be arranged between the project manager, site foremen, the project landscape architect, the project Arboriculturist and local authority to identify and finalize the trees for removal and the line of the protective fencing.

6.6.0 Tree works

6.6.1 The client or the main contractor is to appoint a tree surgery company competent of carrying out the remedial tree surgery works and tree felling that are required on this site. The tree surgery contractor is to produce a method statement detailing how he plans to undertake the works and informing the site foreman of the process so the necessary steps can be taken to ensure the works are carried out safely and efficiently. The works are to be carried out by appropriately trained personnel taking account of the recommendations of BS3998 2010.

6.6.2 **Tree removal -** Trees for removal are to be identified by the project Arboriculturist and the method of removing the stumps is to be carried out to the recommendations of the project Arboriculturist. The trees in the way of the development layout are to be removed in such a manner not to cause damage to those being retained. Where necessary to avoid damage to the trees to be retained, these are to be removed in sections by a tree surgeon (Arborist). Where necessary, the roots and stumps are to be dug out with a digger except where the stumps are located within the RPA (root protection area) of trees being retained. In this instance, the stumps are to be ground out with a mechanical stump grinder taking care not to cause damage to the roots of trees being retained.

6.6.3 **Remedial tree surgery works -** The necessary remedial tree surgery works required to promote health and safety of the trees to be retained is to be carried out. A schedule of these works is to be produced by the project Arboriculturist taking into

consideration the trees within their new built environment and prior to these works being carried out; they are to be agreed with the local authority.

6.7.0 Erection of the protective fencing

6.7.1 Once the tree and hedge vegetation has been removed, the line of the protective fencing that is required around the tree and hedge vegetation being retained **must be** erected as per Dwg No. CBLR002, Parts 1-7.

6.7.2 Where it is expected that there will be a high concentration of construction works, the fencing will need to be 2.3m high and constructed in accordance with figure 2 of BS 5837 2012 (see fencing detail within 'Appendix 1') using vertical and horizontal scaffold bars well braced together with the verticals spaced out at a maximum of 3m centres and onto this, weld mesh panels are to be securely fixed with wire or scaffold clamps..

Where there is a lesser intensity of works, a three rail fence structure 1.5m high or similar will be sufficient, (see fencing detail within 'Appendix 1').

6.7.3 Signs need to be attached to these fences warning people to 'keep out'. (See detail within 'Appendix 1').

6.7.4 Once the protective fence line is erected, then the main construction works can commence on site.

6.7.5 **Storage of Material, Work Yards and staff car parking -** These areas must be identified on the work drawings prior to the construction works starting. These must be positioned outside the root protection areas around the trees being retained.

Stage 2

6.8.0 The Construction Works Stage

6.8.1 **Protective fencing -** During the course of the works, special attention must be paid to ensure that these fences and all other tree protection measures are kept in place, in good order and remain upright, rigid and complete at all times. They must be checked daily by the main contractor/foreman and any damage noted must be fixed immediately.

If works need to take place inside the protective fence lines, then the project Arboriculturist must be informed in advance of the works taking place and the mitigation measures required to reduce impact on the tree vegetation agreed. These mitigation measures will include the supervisions of these works by the project Arboriculturist.

The protective fencing and all other protection measures are to remain in place throughout the construction works phase and must only be removed when all the works are complete and at this stage incorporated into the finished landscape.

6.8.2 **Excavations -** The excavation works are only to commence once the protective fence line and all other protection measures are in place.

The excavations need to be viewed on site once marked out with the project manager, site foreman and the project Arboriculturist in advance of excavation to determine the extent of the impact and the work space required to allow for the construction works to proceed and to assess what additional mitigation measures will be required to protect those trees to be retained. In certain areas, it may be necessary to use an alternative method of excavating to prevent encroachment into the RPA of the trees to be retained and this may include such methods as retaining walls or similar.

Where roots of trees to be retained are exposed during the excavation works, these are to be assessed by the project Arborist and pruned back beyond damaged material. The excavated face is then to be covered with soil or with Hessian sacking to prevent further drying out and death of root material. Where the Hessian sacking is used, it will be necessary to keep this moist especially during dry periods.

6.8.3 **Working within the RPA** *(Root Protection Area)* – If it becomes necessary to carry out works within the RPA of a tree/trees, these must be discussed and agreed with the project Arboriculturist. All works must be carried out manually. Root pruning is to be undertaken by an Arboriculturist using proprietary cutting tools such as a secateurs or hand pruning saw.

The ground within the RPA of the trees must be protected from damage as per the recommendations of **section 6.2.3** of BS5837 2012. See detail within appendix 1 on ground protection using boarding for pedestrian loading.

6.8.4 **Finished ground levels/Landscaping -** The existing ground levels within the RPA of trees must be retained and incorporated into the finished landscaped

development. Where changes in levels occur, these are to be either graded into the finished levels starting outside the RPA or alternatively, retaining wall structures are to be used differentiating between the different levels.

All soft and hard landscaping within the RPA of the trees to be retained must be carried out manually and the soil levels must not be lowered or raised resulting in root damage to the trees. All surfaces are to be porous to allow the free movement of air and moisture to the roots below. Recommendations of sections 8 of BS5837 2012 must be adhered to during the landscaping within the RPA of the trees being retained.

6.9.0 Other items

6.9.1 The following is a list of additional activities ***that are not allowed*** within the RPA or within the vicinity of the trees being retained.

1 - Storage of equipment, fuel, construction material, or the stockpiling of soil or rubble.
2 - Burning rubbish
3 -The washing of machinery
4 - Attaching notice boards, cables or other services to any part of the tree.
5 - Using neighbouring trees as anchor points.
6 - Care is required when using machinery such as Tele-porters, cranes or other equipment close to trees so as not to damage the crown or any other parts.

Stage 3

6.10.0 Post Construction Works

6.10.1 This project is not to be considered complete until all retained trees have been re-examined by the project Arboriculturist and the remedial works necessary to ensure the health of the trees and the immediate safety of the end user of this development are implemented.

This report has been produced as part of a planning application for these lands and is for the sole use of the above named client and refers to only those trees identified within. Its use by any other person(s) in attempting to apply its contents for any other purpose renders the report invalid for that purpose.

Signed_____ Date_____

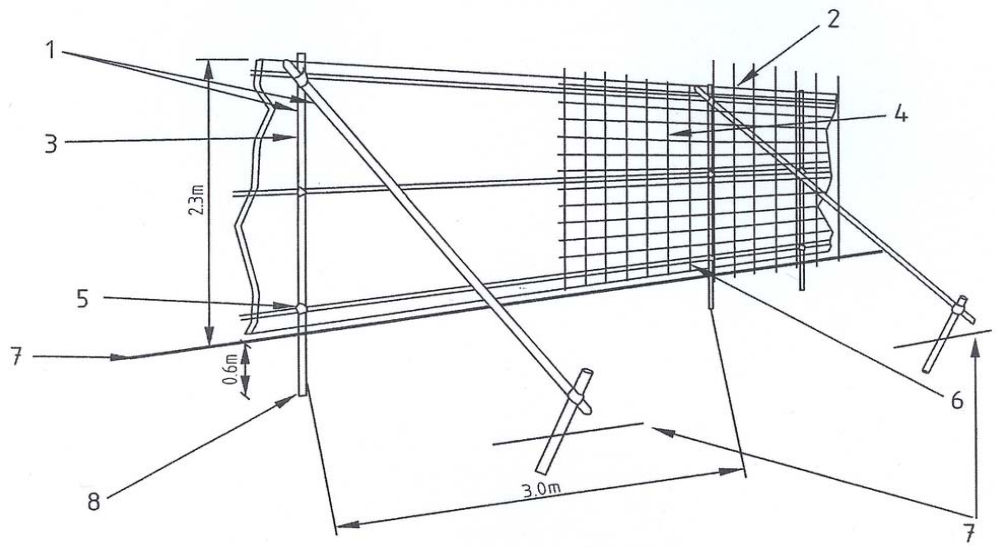
Felim Sheridan
F. Arbor. A, RFS Dip, Nat. Dip & NCH in Arboriculture

Felim Sheridan's qualifications:
Fellow of the Arboricultural Association (F. Arbor. A), Professional diploma Arboriculture (RFS), National diploma Arboriculture (ND) and National certificate Horticulture (NCH).

Appendix 1

Sample of Temporary Tree Protection Fencing Detail.

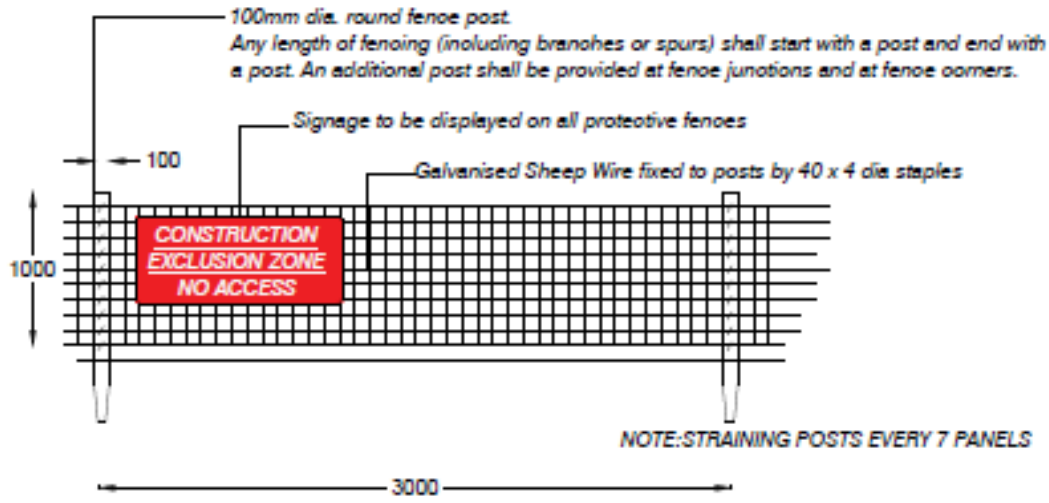
Type 1 Protective Fence –



1 Standard scaffold poles
2 Uprights to be driven into the ground
3 Panels secured to uprights with wire ties and, where necessary, standard scaffold clamps
4 Weldmesh wired to the uprights and horizontals
5 Standard clamps
6 Wire twisted and secured on inside face of fencing to avoid easy dismantling
7 Ground level
8 Approx. 0.6m driven into the ground

Figure 2. – Protective fencing for RPA

Fence Type 2 - Detail of Tree protection fencing for lower intensity work areas.



Appendix 2

Condition Tree Assessment

Of the Tree and Hedge Vegetation on Lands at Celbridge, Co. Dublin to be developed for a 'New Link Road'.

Date: 12th October 2017

Survey Notes

All codes referred to in this report are approximate and serve as a general guide only.

Reference to Numbers: The trees have metal tags attached and these correspond with the numbers in this report.

Reference to age class is as follows:

Young: A tree, which has been planted in the last 10 years.

Semi Mature A tree that is less than 1/3 the expected height of the species in question.
Early Mature: A tree, which is between a 1/3 and 2/3's the expected height of the species in question.
Mature: A tree that has reached the expected height of the species in question, but still increasing in size.
Over Mature: A tree at the end of its life cycle and the crown is starting to break up and decrease in size.

Reference to Physiological, Structural Condition and other comments:

Physiological Condition (Phy Con)

Good: A tree with no major defects, but possibly including some small defects.
Fair: A tree with some minor defects such as bark Wounds, isolated decay pockets or structure affected due to overcrowding.
Poor: A tree with more serious defects such as extensive deadwood, decay or effective to the point of being dangerous.

Structural condition and other comments –
This records noted visual defects and other information about the trees health and structure.

Estimated Remaining Contribution in years

This is based on an Arboricultural assessment of the tree and is estimated based of the findings noted at time. Trees still need to be reviewed on a regular basis, preferably annually.

Less than (<) 10 years remaining contribution
10 + years remaining contribution
20 + years remaining contribution
40 + years remaining contribution.

<u>Category Grade (Cat Grade)</u>

The purpose of the tree categorization method is to identify the quality and value of the existing tree stock, allowing informed decisions to be made concerning which trees should be removed or retained should development occur.

It is carried out in accordance with section 4.5 (Tree Categorization Method) of BS 5837 2012.

Summary

Main categories
Category U – Those trees in such a condition that any existing value would be lost within 10Years. Most of these will be recommended for removal for reasons of sound Arboricultural practice.
Category A - Trees of high quality/value with a minimum of 40 years life expectancy.
Category B – Trees of moderate quality/value with a minimum of 20 year life expectancy.
Category C – Trees of low quality/value with a minimum of 10 years life expectancy

Sub categories

1 – Mainly Arboricultural Values
2 – Mainly Landscape values
3- Mainly Cultural and conservation value

Note: Whilst C category trees will usually not be retained where they would impose a significant constraint on development, young trees with a stem diameter of less than 150mm should be considered for relocation.

If a layout design places Category U trees in an inaccessible location such that concerns over public safety are reduced to an acceptable level, it may be preferable or possible to defer the recommendation to fell.

The terms 'Group, woodland or tree line' is intended to identify trees that form cohesive Arboricultural features either aerodynamically (e.g. trees that provide companion shelter), visually (e.g. avenues or screens) or culturally including for biodiversity (e.g. parkland or wood pasture), in respect to each of the three subcategories.

Reference to Crown spread, Height and Trunk Diameter:
This gives a guide to the area taken up by the tree.
Stem diameter (Stem Dia) is the diameter of the main trunk taken at a height of 1.5m and is recorded in millimeters (mm). Where a measurement is given in brackets, this is the calculated stem diameter for multiple stemmed trees as per BS5837 2012.
Height (Ht) records the overall height of the tree and is given in meters (m).
Branch Spread records the extent of the branches normally in a north (N), south (S), east (E) and west (W) direction from the base of the tree and is given in meters (m).
Clear crown height (C. Ht) records the distance between the ground and the first branch form the base of the tree and are given in meters (m).

Recommended Works
All tree works are to be performed to BS3998 and ANSI A300 pruning guidelines may also be referred to.

Pruning is defined as the selective removal of branches from the tree for specific results. All pruning is to be as specified in the schedule and all pruning cuts are to be made in accordance with 'natural target pruning' methods. All final cuts to be made outside the branch collar and at an angle equal but opposite to that of the branch bark ridge.

If during climbing works, a climber (tree surgeon) discovers any defects not noted in the Arborist report, he should inform and consult the Arborist in question. If it is a minor defect, it would be expected that the tree surgeon would deal with it as part of his contract. If it is deemed a serious problem, then there will be a need to consult with the client/owner and to carry out the agreed works at an additional cost. This problem may arise for example as a result of additional storm damage since the last inspection and it must be borne in mind that the survey is a visual inspection from ground level only and problems in the aerial part of the tree may not be visible from ground level or be hidden under Ivy.

Terms used in explaining this work:

Deadwooding
This is the removal of deadwood (>5cm) without attempting to remove it from the branch tips or green foliage areas as in conifers.
It is expected that major deadwood is removed from all trees that are climbed, even if it is not stated on the survey.
Crown Clean
This includes the removal of deadwood, diseased and dying wood, broken or split branches, epicormac growth, and basal suckers if requested and crossing or rubbing branches.

Crown Thinning (%)
This includes overhauling the crown and the thinning out of the crown in order to allow the wind to travel more freely through the crown and to reduce its wind sail. This mainly involves the removal of secondary branches in the inner crown. This is normally expressed as a percentage of the whole crown volume, which should be considered as an approximate guideline.

Reduction (m)
This includes overhauling the crown and the reduction (careful shortening) of the entire crown or an individual limb in length in all directions to leave a balance branch structure. The finished pruning cuts should not exceed one-third the size of the branch or stem that it is located on. The reduction works are normally expressed as in meters (m) from the outer canopy edge of the crown or branch end and should be considered as an approximate guideline.

Lightening (m)
This technique is a combination of selective thinning together with moderate length reduction of a section or entire crown. The main objective is to reduce the end weight on potentially hazardous crown sections, individual limbs or individual branches. Crown appearance should not be altered greatly by this pruning.

Crown Raising
The removal of the lowest branches that effectively increase the height of the main crown above ground level.

Felling
Trees to be felled shall be cut as low as possible to ground level, unless otherwise specified.

Trees for felling should be dismantled (section- felled) wherever necessary using appropriate rigging techniques to avoid damage to adjacent trees/ structures and other potentially vulnerable landscape features.

Stumps
Generally, stumps of felled trees may be left cut level above ground level. Any stumps in areas of access shall be left at a height that does not present a trip hazard. Conifer stumps are to be treated with urea in accordance with the forestry commission guidelines.

Alternatively, if requested, the stumps are to be ground out using a mechanical stump grinder taking care not to cause damage to neighbouring trees

<table>
<tr><th>Tree No.</th><th>Tree Species</th><th>Ht. (m)</th><th>Stem Dia. (mm)</th><th>Branch Spread (m)</th><th>C-Ht. (m)</th><th>Age Class</th><th>Phys. Con.</th><th>Structural Condition
Other Comments</th><th>Preliminary Recommendation</th><th>Remain Contribute in years</th><th>Cat. Grade</th></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>N-north S-south E-east W- west
Phys.-physiological.</td><td>A- average</td><td></td><td></td></tr>
<tr><td></td><td></td><td colspan="7">A condition assessment of the hedge and tree vegetation located along the route of the ‘Celbridge Link Road’.</td><td></td><td></td></tr>
<tr><td></td><td></td><td colspan="7">The road transverses a number of open fields which have hedgerows forming the boundaries between the fields and adjoining properties. The hedgerows are located on the sides of drainage ditches and are generally been maintained.

The assessment starts along the ‘Celbridge Road’ where the road connects into the existing Celbridge Road and works in an eastwards direction.</td><td></td><td></td></tr>
<tr><td>Hedge No.1</td><td>Hawthorn
Crataegus monogyna
Elder
Sambucus nigra
Bramble
Rubus fruticosus
Dogrose
Rosa canina
Blackthorn
Prunus spinosa
Wild Plum
Privet
Ligustrum vulgare
Holly
ilex aquifolium
Ash</td><td colspan="7">It forms the boundary between the field and the road.
It is of a mature age class in fair condition both physiologically structurally. The main hedge line is located on a soil bank on the inside (eastside) of the drainage ditch in from the road edge. This is a deep drainage ditch and I suspect that it is wet at certain times of the year. The hedge species is made up of Blackthorn, Wild Plum, Hawthorn, Privet, Holly, Elder, Bramble and Dogrose with Ash also forming part of the bulking. This hedge has been cut and well maintained as a low hedge and this has helped to maintain its stock proof quality and structure. The arable farming has come to within c.1m of its base on the inside (east side) and this has most likely resulted in soil and root damage leading to the decline of these trees within this hedge.

<table><tr><th>HT (m)</th><th>Stem Dia (mm)</th><th>C. Spread (m)</th><th>C. Ht (m)</th></tr><tr><td>A1.2</td><td>--</td><td>A2</td><td>--</td></tr></table></td><td>Continue present maintenance at the present time.</td><td></td><td>C2</td></tr>
</table>

Tree No.	Tree Species	Ht. (m)	Stem Dia. (mm)	Branch Spread (m)	C-Ht. (m)	Age Class	Phys. Con.	Structural Condition Other Comments	Preliminary Recommendation	Remain Contribute in years	Cat. Grade
								N-north S-south E-east W- west Phys.-physiological.	A- average		
	Fraxinus excelsior	The following two trees are located within this section of the hedge.									
0441	Oak *Quercus robur*	17	720	4N 5S 6E 5W	2.5	Mature	Poor	Fair/ Poor It is in declining health with a lot of dieback evident within its upper crown with deadwood present throughout.	Due to its close proximity to the road, make safe all dead/ unstable growth. Monitor its condition on a twevle monthly basis.	10+	C1
0442	Ash *Fraxinus excelsior*	16	680	3N 5S 4E 4W	4	Mature	Fair / Poor	Fair It is a large size tree located on the hedgerow bank. The arable farming has come tight to its base on the inside resulting in soil and root damage and this has led to dieback within its crown. There is Ivy cover on the main trunk.	Remove all large size dead/ unstable growth from within its crown. Carry out pruning to improve the shape/ balance of the remaining crown. Monitor its condition on a twevle monthly basis.	10+	C1
Hedge No.2	Hawthorn *Crataegus monogyna* Bramble *Rubus fruticosus* Dogrose *Rosa canina* Blackthorn *Prunus spinosa*	It runs at ninety degrees to hedge No.1 and forms the boundary between two fields and runs in a west to east direction. It is of a mature age class in fair condition both physiologically and structurally. It has been trimmed/ maintained as a low hedge helping to maintain its structure and stock proof quality. The main hedge species consists of Hawthorn, Blackthorn and Hazel with Bramble, Dogrose, Holly and Privet throughout. It is located on the southern side of the boundary drainage ditch. The arable farming has occurred tight to its base on its south side.							Continue present maintenance at the present time.		C2

<table>
<tr><th>Tree No.</th><th>Tree Species</th><th>Ht. (m)</th><th>Stem Dia. (mm)</th><th>Branch Spread (m)</th><th>C-Ht. (m)</th><th>Age Class</th><th>Phys. Con.</th><th>Structural Condition
Other Comments</th><th>Preliminary Recommendation</th><th>Remain Contribute in years</th><th>Cat. Grade</th></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>N-north S-south E-east W- west
Phys.-physiological.</td><td>A- average</td><td></td><td></td></tr>
<tr><td></td><td>Privet
Ligustrum vulgare
Hazel
Corylus avellana</td><td colspan="8"><table><tr><th>HT (m)</th><th>Stem Dia (mm)</th><th>C. Spread (m)</th><th>C. Ht (m)</th></tr><tr><td>A1.2</td><td>--</td><td>A2</td><td>--</td></tr></table></td><td></td><td></td></tr>
<tr><td>Hedge No.3</td><td>Hawthorn
Crataegus monogyna
Bramble
Rubus fruticosus
Dogrose
Rosa canina
Blackthorn
Prunus spinosa
Privet
Ligustrum vulgare
Elder
Sambucus nigra
Holly
ilex aquifolium</td><td colspan="8">It runs at ninety degrees to hedge No.2 and runs in a north-south direction.
It is of a mature age in fair condition both physiologically and structurally. It is located on the east side of a drainage ditch and the main hedge species consists of Blackthorn, Hawthorn, Elder, Bramble, Holly, Privet and Elder. It has been cut into a low hedge which has helped to maintain its stock proof quality and structure. The hedge species, in particular the Bramble is beginning to encroach out onto the surrounding lands.
<table><tr><th>HT (m)</th><th>Stem Dia (mm)</th><th>C. Spread (m)</th><th>C. Ht (m)</th></tr><tr><td>A1.2</td><td>--</td><td>A2</td><td>--</td></tr></table>
The following trees are located within hedge No.3.</td><td>Continue present maintenance at the present time.</td><td></td><td>C2</td></tr>
<tr><td>0443</td><td>Oak
Quercus robur</td><td>15</td><td>720</td><td>4N
5S
5E
5W</td><td>4</td><td>Mature</td><td>Poor</td><td>Fair
It is a large size tree located within hedge No.3. The arable farming has come tight to its base, particularly on the eastern side which has resulted</td><td>Retain as part of the bulking. Make safe all large size dead/ unstable growth.
Prune in remaining exposed</td><td>10+</td><td>C2</td></tr>
</table>

<table>
<tr><th>Tree No.</th><th>Tree Species</th><th>Ht. (m)</th><th>Stem Dia. (mm)</th><th>Branch Spread (m)</th><th>C-Ht. (m)</th><th>Age Class</th><th>Phys. Con.</th><th>Structural Condition
Other Comments</th><th>Preliminary Recommendation</th><th>Remain Contribute in years</th><th>Cat. Grade</th></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>N-north S-south E-east W- west
Phys.-physiological.</td><td>A- average</td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>in soil and root damage which has most likely resulted in its declining health with a lot of dieback evident within its upper crown. Heavy Ivy cover on the main trunk is extending up into its crown increasing its windsail.</td><td>side branches.
Cut Ivy at ground level.</td><td></td><td></td></tr>
<tr><td>0444</td><td>Oak
Quercus robur</td><td>17</td><td>710</td><td>6N
5S
6E
6W</td><td>4</td><td>Mature</td><td>Fair</td><td>Fair
It is located within hedge No.3 and the arable farming has come tight to its base within 2m on the eastern side resulting in some soil and root damage which has become apparent within its health with decline /dieback evident and deadwood throughout. Heavy Ivy cover on the main trunk is extending up into its crown and is increasing its windsail.</td><td>Make safe large size dead/ unstable growth.
Cut Ivy at ground level.</td><td>20+</td><td>B1</td></tr>
<tr><td>Hedge No.4</td><td>Hawthorn
Crataegus monogyna
Bramble
Rubus fruticosus
Dogrose
Rosa canina
Blackthorn
Prunus spinosa
Elder
Sambucus nigra</td><td colspan="6">It runs at an angle to hedge No.3 and forms the boundary between two fields.
It is of a mature age class in fair/ good condition physiologically and in fair condition structurally. It has been trimmed/ maintained as a low hedge and this has helped to improve and to maintain its stock proof quality and structure. It has also been reinforced with fencing. It consists of Hawthorn, Elder, Blackthorn, Bramble and Dogrose. It is a continuous hedge with a gate allowing passage from one field to the next. There is no defined boundary drainage ditch.
<table><tr><th>HT (m)</th><th>Stem Dia (mm)</th><th>C. Spread (m)</th><th>C. Ht (m)</th></tr><tr><td>A1.6</td><td>--</td><td>A2</td><td>--</td></tr></table></td><td>It would benefit from ongoing maintenance in order to contain.</td><td></td><td>C2</td></tr>
</table>

<table>
<tr><th>Tree No.</th><th>Tree Species</th><th>Ht. (m)</th><th>Stem Dia. (mm)</th><th>Branch Spread (m)</th><th>C-Ht. (m)</th><th>Age Class</th><th>Phys. Con.</th><th>Structural Condition
Other Comments</th><th>Preliminary Recommendation</th><th>Remain Contribute in years</th><th>Cat. Grade</th></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>N-north S-south E-east W- west
Phys.-physiological.</td><td>A- average</td><td></td><td></td></tr>
<tr><td>Hedge No.5</td><td>Hawthorn
Crataegus monogyna
Bramble
Rubus fruticosus
Dogrose
Rosa canina
Blackthorn
Prunus spinosa</td><td colspan="7">It runs at ninety degrees to hedge No.4 and forms the boundary between two fields.
It is of a mature age class in fair condition both physiologically and structurally. It consists of predominately Hawthorn with some Blackthorn, Bramble and Dogrose. It has been kept cut / trimmed on an annual basis and this has helped to maintain its stock proof quality and structure. There are some gaps allowing for passage from one field to the other. It contains a small amount of Beech trees throughout and the central section is missing completely. There is no defined boundary drainage ditch.
<table><tr><th>HT (m)</th><th>Stem Dia (mm)</th><th>C. Spread (m)</th><th>C. Ht (m)</th></tr><tr><td>A1.6</td><td>--</td><td>A2</td><td>--</td></tr></table></td><td>Continue present maintenance.
Plant up gaps/ openings to complete this hedge.</td><td></td><td>C2</td></tr>
<tr><td>Hedge No.6</td><td>Hawthorn
Crataegus monogyna
Bramble
Rubus fruticosus
Dogrose
Rosa canina
Blackthorn
Prunus spinosa
Holly
ilex aquifolium</td><td colspan="7">It runs at ninety degrees to hedge No.5 and extends in an east to west direction forming the boundary between two fields.
It is of a mature age class in fair condition both physiologically and structurally. It consists of Hawthorn, Elder, Bramble, Dogrose, Holly and Blackthorn. There is no defined boundary ditch and Bramble is dominating the lower growth. It has received regular trimming and this has helped to maintain its stock proof quality and structure. The arable farming has come close to its base on the southern side. It contains some Ash and Elm seedlings and most of these have been cut into the hedge and form part of its bulking.
<table><tr><th>HT (m)</th><th>Stem Dia (mm)</th><th>C. Spread (m)</th><th>C. Ht (m)</th></tr><tr><td>A1.2</td><td>--</td><td>A2</td><td>--</td></tr></table></td><td>Continue present maintenance.</td><td></td><td>C2</td></tr>
<tr><td></td><td></td><td colspan="7">The following trees are located at the eastern end of hedge No.6.</td><td></td><td></td></tr>
<tr><td>0445</td><td>Ash</td><td>8</td><td>180</td><td>2N</td><td>4</td><td>Young</td><td>Fair/</td><td>Fair</td><td>Requires no work at the</td><td>20+</td><td>C1</td></tr>
</table>

<table>
<tr><th>Tree No.</th><th>Tree Species</th><th>Ht. (m)</th><th>Stem Dia. (mm)</th><th>Branch Spread (m)</th><th>C-Ht. (m)</th><th>Age Class</th><th>Phys. Con.</th><th>Structural Condition
Other Comments</th><th>Preliminary Recommendation</th><th>Remain Contribute in years</th><th>Cat. Grade</th></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>N-north S-south E-east W- west
Phys.-physiological.</td><td>A- average</td><td></td><td></td></tr>
<tr><td></td><td>Fraxinus excelsior</td><td></td><td></td><td>2S
1E
2W</td><td></td><td></td><td>Good</td><td>Self-seeded into this area and is forming part of the bulking within this hedge and is beginning to establish above the height of this hedge.</td><td>present time.</td><td></td><td></td></tr>
<tr><td>0446</td><td>Ash
Fraxinus excelsior</td><td>8</td><td>120/
180/
160</td><td>2N
2S
3E
3W</td><td>4</td><td>Early Mature</td><td>Fair</td><td>Fair
Multiple-stemmed from base and forms part of the bulking within this hedge. The side branches have been cut back during the hedge cutting. It forms a multiple-stemmed tree from base. There is Ivy cover on the main trunk.</td><td>Retain as part of the bulking within this hedge.</td><td>20+</td><td>C1</td></tr>
<tr><td>Hedge N0. 7</td><td>Hawthorn
Crataegus monogyna
Bramble
Rubus fruticosus
Dogrose
Rosa canina
Blackthorn
Prunus spinosa
Privet
Ligustrum vulgare
Elder
Sambucus nigra</td><td colspan="7">It runs at an angle to hedge No.6 and extends in an east-west direction to connect up with the road.
It is of a mature age class in fair condition both physiologically and structurally. It is located on the northern side of the drainage ditch on a hedgerow soil bank. The southern side has been trimmed in to contain encroachment and to allow access to the drainage ditch. It has been allowed to grow up tall and out wider on the northern side. The main hedge species include Hawthorn, Blackthorn and Privet with Bramble and Dogrose dominating the lower vegetation. It also contains some Ash and Elm forming part of the bulking.

<table><tr><th>HT (m)</th><th>Stem Dia (mm)</th><th>C. Spread (m)</th><th>C. Ht (m)</th></tr><tr><td>A1.3</td><td>--</td><td>A3N/1S</td><td>--</td></tr></table>
The following trees are located within hedge No.7.</td><td>Make safe any large size dead/ unstable growth.
Trim in encroaching hedge species to contain its width.</td><td></td><td>C2</td></tr>
<tr><td>0447</td><td>Ash
Fraxinus</td><td>13</td><td>280/
200/</td><td>4N
3S</td><td>4</td><td>Mature</td><td>Fair</td><td>Fair
Multiple-stemmed from base and is growing up</td><td>Make safe any large size dead/ unstable growth.</td><td>10-20</td><td>C2</td></tr>
</table>

Tree No.	Tree Species	Ht. (m)	Stem Dia. (mm)	Branch Spread (m)	C-Ht. (m)	Age Class	Phys. Con.	Structural Condition Other Comments	Preliminary Recommendation	Remain Contribute in years	Cat. Grade
								N-north S-south E-east W- west Phys.-physiological.	A- average		
	excelsior		210	5E 4W				forming part of the higher bulking within this hedge. Heavy Ivy cover on the main trunk is extending up into its crown. The lower branches, particularly on the north side have been cut off in order to raise up its crown. It forms part of a larger group of trees.			
0448	Ash *Fraxinus excelsior*	13	160/ 170/ 180	3N 4S 4E 3W	4	Early Mature	Fair	Fair Multiple-stemmed from base with heavy Ivy cover on the main stems extending up into its crown increasing its windsail. It forms part of an open group and is protruding above the height of this hedge. There is an acute union formation between stems and this may lead to problems in the long-term. The lower branches, particularly on the north side have been cut/ broken off in order to raise up its crown over the field. The ploughing/ arable faming have come within close proximity to its base and are likely to have caused some root damage.	Cut Ivy at ground level.	10-20	C2
0449	Ash *Fraxinus excelsior*	14	200/ 180/ 180	4N 4S 5E 4W	3	Early Mature	Fair / Poor	Fair Multiple-stemmed from base with an acute union formation between stems and this may lead to a structural weakness in the long-term. Ivy cover on the main trunk sis beginning to extend up into its crown. It is growing on the side of a high hedgerow bank. It is suckering from base.	Cut Ivy at ground level in order to improve the windsail of its crown.	10-20	C2

<table>
<tr><th>Tree No.</th><th>Tree Species</th><th>Ht. (m)</th><th>Stem Dia. (mm)</th><th>Branch Spread (m)</th><th>C-Ht. (m)</th><th>Age Class</th><th>Phys. Con.</th><th>Structural Condition
Other Comments</th><th>Preliminary Recommendation</th><th>Remain Contribute in years</th><th>Cat. Grade</th></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>N-north S-south E-east W- west
Phys.-physiological.</td><td>A- average</td><td></td><td></td></tr>
<tr><td>Hedge No.8</td><td>Wild Damson
Hawthorn
Crataegus monogyna
Bramble
Rubus fruticosus
Dogrose
Rosa canina
Blackthorn
Prunus spinosa
Elder
Sambucus nigra</td><td colspan="6">It runs at an angle to hedge No.7 and extends along the western side of the public road.
It is of a mature age class in fair condition both physiologically and structurally. It is a wide hedge consisting of clumps of Hawthorn, Elder, Wild Damson and Blackthorn with Bramble and Dogrose dominating the lower vegetation. The arable farming has come tight to its base on the inside. It is a wide broad hedge which has not been maintained / trimmed on a regular basis and has been allowed to grow up tall and out wide as a result, however it has received some trimming to prevent encroaching out onto the road and the field. It contains a small amount of Ash seedlings. It has suffered storm damage throughout due to structure.
<table><tr><th>HT (m)</th><th>Stem Dia (mm)</th><th>C. Spread (m)</th><th>C. Ht (m)</th></tr><tr><td>A4</td><td>--</td><td>A5N/A4S</td><td>--</td></tr></table></td><td>Make safe large size dead/ unstable growth. Reduce in height to help to bulk up the lower vegetation and to improve its stability.
It would benefit from further general tidying works.
Cut Ivy at ground level where it is heavy on trees.</td><td></td><td>C2</td></tr>
<tr><td>Hedge No.9</td><td>Hawthorn
Crataegus monogyna
Bramble
Rubus fruticosus
Dogrose
Rosa canina
Blackthorn
Prunus spinosa
Privet
Ligustrum vulgare</td><td colspan="6">It runs parallel to hedge No.8 on the southern side of the public road and is located on the western side (inside) of a deep boundary drainage ditch.
It is of a mature age class in fair condition both physiologically and structurally. The main hedge species is Hawthorn, Elder, Privet and Blackthorn with Bramble and Dogrose. It has been cut on a regular basis and maintained as a low hedge helping to maintain its good stock proof quality. It also contains some Ash trees and these have all been cut into the hedge and have been maintained as part of the bulking.
<table><tr><th>HT (m)</th><th>Stem Dia (mm)</th><th>C. Spread (m)</th><th>C. Ht (m)</th></tr><tr><td>A1.2</td><td>--</td><td>A1.5</td><td>--</td></tr></table></td><td>Continue present maintenance.</td><td></td><td>C2</td></tr>
</table>

<table>
<tr><th>Tree No.</th><th>Tree Species</th><th>Ht. (m)</th><th>Stem Dia. (mm)</th><th>Branch Spread (m)</th><th>C-Ht. (m)</th><th>Age Class</th><th>Phys. Con.</th><th>Structural Condition
Other Comments</th><th>Preliminary Recommendation</th><th>Remain Contribute in years</th><th>Cat. Grade</th></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>N-north S-south E-east W- west
Phys.-physiological.</td><td>A- average</td><td></td><td></td></tr>
<tr><td></td><td>Elder
Sambucus nigra</td><td colspan="8"></td><td></td><td></td></tr>
<tr><td>Hedge No.10</td><td>Hawthorn
Crataegus monogyna
Bramble
Rubus fruticosus
Dogrose
Rosa canina
Blackthorn
Prunus spinosa
Privet
Ligustrum vulgare
Elder
Sambucus nigra
Holly
ilex aquifolium</td><td colspan="8">It runs at ninety degrees to hedge No.9 and forms the boundary between two fields.
It is of a mature age class in fair/ good condition physiologically and in fair condition structurally. Both of these fields are being managed in arable crops at the present time. The main hedge species include Hawthorn, Blackthorn, Dogrose, Holly, Privet and Bramble. It is predominately a Hawthorn Hedge running in a north-south direction. It is located on the western side of a deep wet drainage ditch. The sides have been breasted, particularly on the west side to prevent encroachment out onto the crops and the arable farming has come tight within c.1m of its base on the west side. It is of reasonably good stock proof quality with a few gaps. It has been topped in the past but has since been allowed to grow up tall.

<table><tr><th>HT (m)</th><th>Stem Dia (mm)</th><th>C. Spread (m)</th><th>C. Ht (m)</th></tr><tr><td>A3.5</td><td>--</td><td>A4</td><td>--</td></tr></table>
The following tree is located within hedge No.10.</td><td>Tidy up the undergrowth at the present time.
It would benefit from further trimming/ cutting to maintain its stock proof quality and structure.</td><td></td><td>C2</td></tr>
<tr><td>0450</td><td>Oak
Quercus robur</td><td>8</td><td>200/
200/
120</td><td>3N
3S
4E</td><td>3.5</td><td>Early Mature</td><td>Fair</td><td>Fair
It is growing on the side of the hedgerow bank and forms a three-stemmed tree from base. It is a</td><td>Retain as part of the bulking at the present time.</td><td>20-40</td><td>C1</td></tr>
</table>

<table>
<tr><th>Tree No.</th><th>Tree Species</th><th>Ht. (m)</th><th>Stem Dia. (mm)</th><th>Branch Spread (m)</th><th>C-Ht. (m)</th><th>Age Class</th><th>Phys. Con.</th><th>Structural Condition
Other Comments</th><th>Preliminary Recommendation</th><th>Remain Contribute in years</th><th>Cat. Grade</th></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>N-north S-south E-east W- west
Phys.-physiological.</td><td>A- average</td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td></td><td>4W</td><td></td><td></td><td></td><td>tall tree and it is beginning to establish over the height of this hedge and forms part of the bulking. There is Ivy cover on the main trunk. The lower branches have been cut back in the past in order to raise up its crown.</td><td></td><td></td><td></td></tr>
<tr><td>Hedge No.11</td><td>Hawthorn
Crataegus monogyna
Bramble
Rubus fruticosus
Dogrose
Rosa canina
Blackthorn
Prunus spinosa
Privet
Ligustrum vulgare
Elder
Sambucus nigra
Ash
Fraxinus excelsior</td><td colspan="6">It runs in a north-south direction and forms the boundary between two fields.
It is of a mature age class in fair condition both physiologically and structurally. It is located on the west side of a drainage ditch and the lands on both sides are in arable crops and the ploughing has come tight, particularly on the west side. It has been allowed to grow up tall and consists of predominately Hawthorn, with Privet, Bramble and Dogrose with some Ash seedlings beginning to establish over the hedge. The sides have been trimmed to prevent encroachment; however it has been allowed to grow up tall with Ivy suppressing some sections. It is likely to be impacted upon by the arable farming, particularly on the west side. A large central section has already been lost /removed for one reason or another allowing passage from one field to the other.
<table><tr><th>HT (m)</th><th>Stem Dia (mm)</th><th>C. Spread (m)</th><th>C. Ht (m)</th></tr><tr><td>A3.5</td><td>--</td><td>A4</td><td>--</td></tr></table></td><td>Make safe any large size dead/ unstable growth.
Carry out planting to fill in gaps/ openings.</td><td></td><td>C2</td></tr>
<tr><td>Hedge No.12</td><td>Hawthorn
Crataegus monogyna
Bramble
Rubus</td><td colspan="6">It runs at an angle to hedge No.11 in a north-south direction.
It is of a mature age class in fair condition both physiologically and structurally. The main hedge species include Hawthorn, Blackthorn and Elder with Bramble and Dogrose dominating the undergrowth. It is a broad hedge and the arable farming has come tight its base on the west side. The main original hedge line would appear to be located on the west side of the old derelict dry drainage ditch. Due to lapsed</td><td>It is in need of management to encourage lower growth development/ bulking and structure.
Make safe any large size dead/ unstable growth.</td><td></td><td>C2</td></tr>
</table>

<table>
<tr><th>Tree No.</th><th>Tree Species</th><th>Ht. (m)</th><th>Stem Dia. (mm)</th><th>Branch Spread (m)</th><th>C-Ht. (m)</th><th>Age Class</th><th>Phys. Con.</th><th>Structural Condition
Other Comments</th><th>Preliminary Recommendation</th><th>Remain Contribute in years</th><th>Cat. Grade</th></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>N-north S-south E-east W- west
Phys.-physiological.</td><td>A- average</td><td></td><td></td></tr>
<tr><td></td><td>fruticosus
Dogrose
Rosa canina
Blackthorn
Prunus spinosa
Elder
Sambucus nigra</td><td colspan="8">management, the hedge species have encroached out on both sides to create a broader hedge. It has received some trimming, in particular on the west side to prevent encroachment out onto the arable crops, but otherwise it has been allowed to grow up tall. Some sections have failed and other sections are being suppressed by Ivy leaving them more prone to wind damage.

<table><tr><th>HT (m)</th><th>Stem Dia (mm)</th><th>C. Spread (m)</th><th>C. Ht (m)</th></tr><tr><td>A4</td><td>--</td><td>A6</td><td>--</td></tr></table>
The following trees are located within hedge No.12.</td><td></td><td></td></tr>
<tr><td>0451</td><td>Ash
Fraxinus excelsior</td><td>14</td><td>360 X 4 stems</td><td>8N
5S
6E
5W</td><td>3.5</td><td>Mature</td><td>Fair</td><td>Poor
Multiple-stemmed from base and some stems have broken out with basal decay present. It has an open crown as a result of limb failure and most stems are being heavily suppressed by Ivy. It is poorly structured and prone to storm damage as a result.</td><td>Retain at the present time and allow nature to take its course.

Cut Ivy at ground level in order to improve the windsail of its crown.

It would require further management if located within a more managed/ developed area.</td><td><10</td><td>U</td></tr>
<tr><td>0452</td><td>Elm
Ulmus procera</td><td>11</td><td>230/ 240</td><td>3N
1S
2E
3W</td><td>3</td><td>Early Mature</td><td>Poor</td><td>Poor
It consists of a group of stems growing up forming part of the higher bulking within this hedge. Some of these stems are infected by ‘Dutch Elm’ disease leading to decline/ dieback.</td><td>I would recommend its <u>removal</u> and the removal of all debris from site to try and contain the spread of ‘Dutch Elm Disease’.</td><td><10</td><td>U</td></tr>
</table>

<table>
<tr><th>Tree No.</th><th>Tree Species</th><th>Ht. (m)</th><th>Stem Dia. (mm)</th><th>Branch Spread (m)</th><th>C-Ht. (m)</th><th>Age Class</th><th>Phys. Con.</th><th>Structural Condition
Other Comments</th><th>Preliminary Recommendation</th><th>Remain Contribute in years</th><th>Cat. Grade</th></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>N-north S-south E-east W- west
Phys.-physiological.</td><td>A- average</td><td></td><td></td></tr>
<tr><td>Hedge No.13</td><td>Hawthorn
Crataegus monogyna
Bramble
Rubus fruticosus
Dogrose
Rosa canina
Blackthorn
Prunus spinosa
Elder
Sambucus nigra
Elm
Ulmus procera</td><td colspan="6">It runs at ninety degrees to hedge No.12 and extends in an east to west direction between two fields.
It is of a mature age class in fair condition both physiologically and structurally.
The main hedge line would appear to have been located on the north-side of the drainage ditch. The main hedge species is Hawthorn and Elder with some Elm forming part of the bulking with Bramble and Dogrose dominating the lower vegetation. Due to lapsed management, the hedge species have been allowed to grow out and wide, in particular Bramble and Dogrose creating scrubbier areas. The north side has been cut back in more recent times to reduce encroachment and this has left its crown slightly asymmetrical. The eastern end of this hedge has been removed during previous development works.
<table><tr><th>HT (m)</th><th>Stem Dia (mm)</th><th>C. Spread (m)</th><th>C. Ht (m)</th></tr><tr><td>A5</td><td>--</td><td>A2/4S</td><td>--</td></tr></table></td><td>Make safe any large size dead/ unstable growth.
It would benefit from general tidying works and the trimming back of hedge species.
The Elm in decline due to infection by ‘Dutch Elm Disease’ need to be cut back and removed from site.</td><td></td><td>C2</td></tr>
<tr><td>Hedge No. 14</td><td>Hawthorn
Crataegus monogyna
Bramble
Rubus fruticosus
Dogrose
Rosa canina
Blackthorn
Prunus spinosa
Elder
Sambucus nigra
Ash</td><td colspan="6">It forms the boundary between two fields and runs in a north-south direction.
It is of a mature age class in fair condition physiologically and in poor condition structurally. It is a very sporadic hedge consisting of a few isolated clumps of Hawthorn and Blackthorn with large openings/ gaps with no vegetation or being dominated by Bramble. A number of Ash trees form part of the upper canopy formation. The arable farming on the east and west sides come very tight and are likely to have caused some soil and root damage to the trees within in particular. There is no defined drainage ditch on either side.
<table><tr><th>HT (m)</th><th>Stem Dia (mm)</th><th>C. Spread (m)</th><th>C. Ht (m)</th></tr><tr><td>A4</td><td>--</td><td>A5</td><td>--</td></tr></table></td><td>It would benefit from some infill planting to re-establish the hedge line.
Make safe any large size dead/ unstable growth.</td><td></td><td>C2</td></tr>
</table>

Tree No.	Tree Species	Ht. (m)	Stem Dia. (mm)	Branch Spread (m)	C-Ht. (m)	Age Class	Phys. Con.	Structural Condition Other Comments	Preliminary Recommendation	Remain Contribute in years	Cat. Grade
								N-north S-south E-east W- west Phys.-physiological.	A- average		
	Fraxinus excelsior	The following tree is located with hedge No. 14.									
0453	Ash *Fraxinus excelsior*	12	120 X 7 stems	4N 4S 4E 5W	4	Mature	Fair	Fair It forms a multiple-stemmed tree from where it has developed from an old coppiced stool with tall upright limbs. The lower limbs/ branches have been removed in order to raise up its crown and this has impacted on its crown structure and has left wounds and branch stubs remaining. Ivy cover on the lower trunk and base is beginning to extend up into its crown. There is some evidence of soil alterations around its base.	Cut Ivy at ground level. Tidy up branch stubs and broken branches.	10-20	C1
0454	Ash *Fraxinus excelsior*	16	1000	7N 8S 6E 7W	3.5	Mature	Fair	Fair It has a large broad, spreading crown formation. It is located on the hedge bank with evidence of previous soil alterations. Its crown is showing some signs of stress/ decline with dieback present throughout. Heavy Ivy cover on the main trunk is beginning to extend up into its crown. The lower scaffold limbs/ branches, particularly on the east side have been broken off leaving stubs and its crown more asymmetrical.	Make safe all dead/ unstable growth. Cut Ivy at ground level.	10-20	C1
Hedge No.15	Hawthorn *Crataegus monogyna* Bramble	It runs at ninety degrees to hedge No.14 and runs in an east to west direction. It is of a mature age class in fair condition both physiologically and structurally. The main hedge line would appear to be located on the south side of a dry, shallow drainage ditch. It consists of clumps of Hawthorn, Elder, Blackthorn and Bramble with Dogrose dominating the lower vegetation. It contains Ash trees ranging							It would benefit from general maintenance works and trimming in all encroaching hedge species. Make safe all large size dead/ unstable		C2

<table>
<tr><th>Tree No.</th><th>Tree Species</th><th>Ht. (m)</th><th>Stem Dia. (mm)</th><th>Branch Spread (m)</th><th>C-Ht. (m)</th><th>Age Class</th><th>Phys. Con.</th><th>Structural Condition
Other Comments</th><th>Preliminary Recommendation</th><th>Remain Contribute in years</th><th>Cat. Grade</th></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>N-north S-south E-east W- west
Phys.-physiological.</td><td>A- average</td><td></td><td></td></tr>
<tr><td></td><td>Rubus fruticosus
Dogrose
Rosa canina
Blackthorn
Prunus spinosa
Elder
Sambucus nigra</td><td colspan="8">in age from seedlings to mature trees. It has not received maintenance and has been allowed to grow tall and unmanaged with scrub species such as Bramble being allowed to encroach out on the fields in some places. Some sections are beginning to fall out due to being top- heavy and suppressed by Ivy.

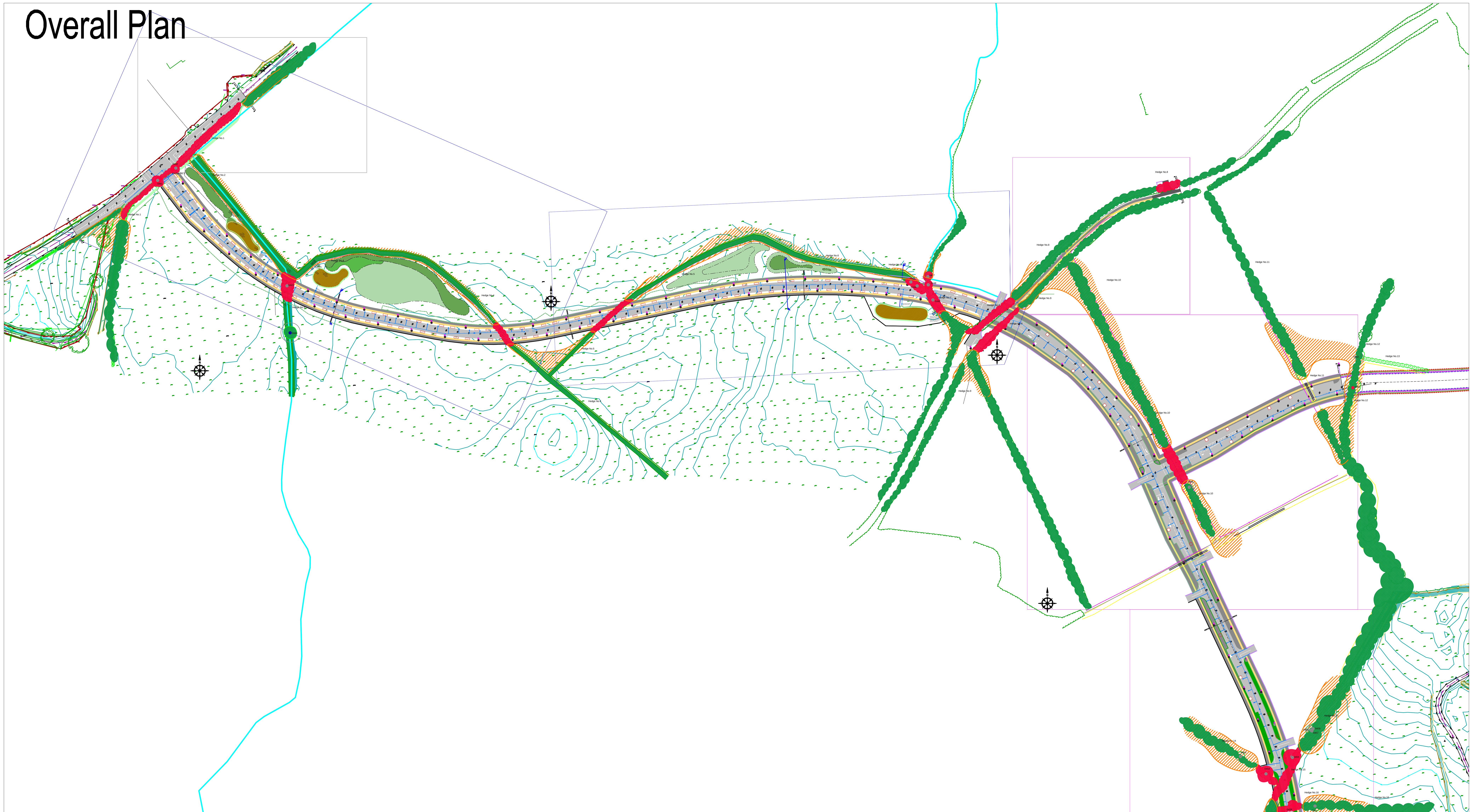
<table><tr><th>HT (m)</th><th>Stem Dia (mm)</th><th>C. Spread (m)</th><th>C. Ht (m)</th></tr><tr><td>A5</td><td>--</td><td>A8</td><td>--</td></tr></table>
The following trees are located within hedge No.15.</td><td>growth.</td><td></td><td></td></tr>
<tr><td>0455</td><td>Ash
Fraxinus excelsior</td><td>16</td><td>720
/640</td><td>7N
8S
7E
8W</td><td>3.5</td><td>Mature</td><td>Fair</td><td>Fair/ Poor
It is a large size tree located on the hedgerow bank. Some roots extend out over the old drainage ditch to the north. It forms a twin-stemmed tree from near base with an acute union formation between stems with some included bark. Due to structure, this tree may be prone to failure at some stage. Heavy Ivy cover on the main trunk is extending up into its crown and is increasing its windsail. Some lower branches have been pruned/ broken back in the past.</td><td>Make safe all dead/ unstable growth.
Cut Ivy at ground level in order to improve the windsail of its crown.

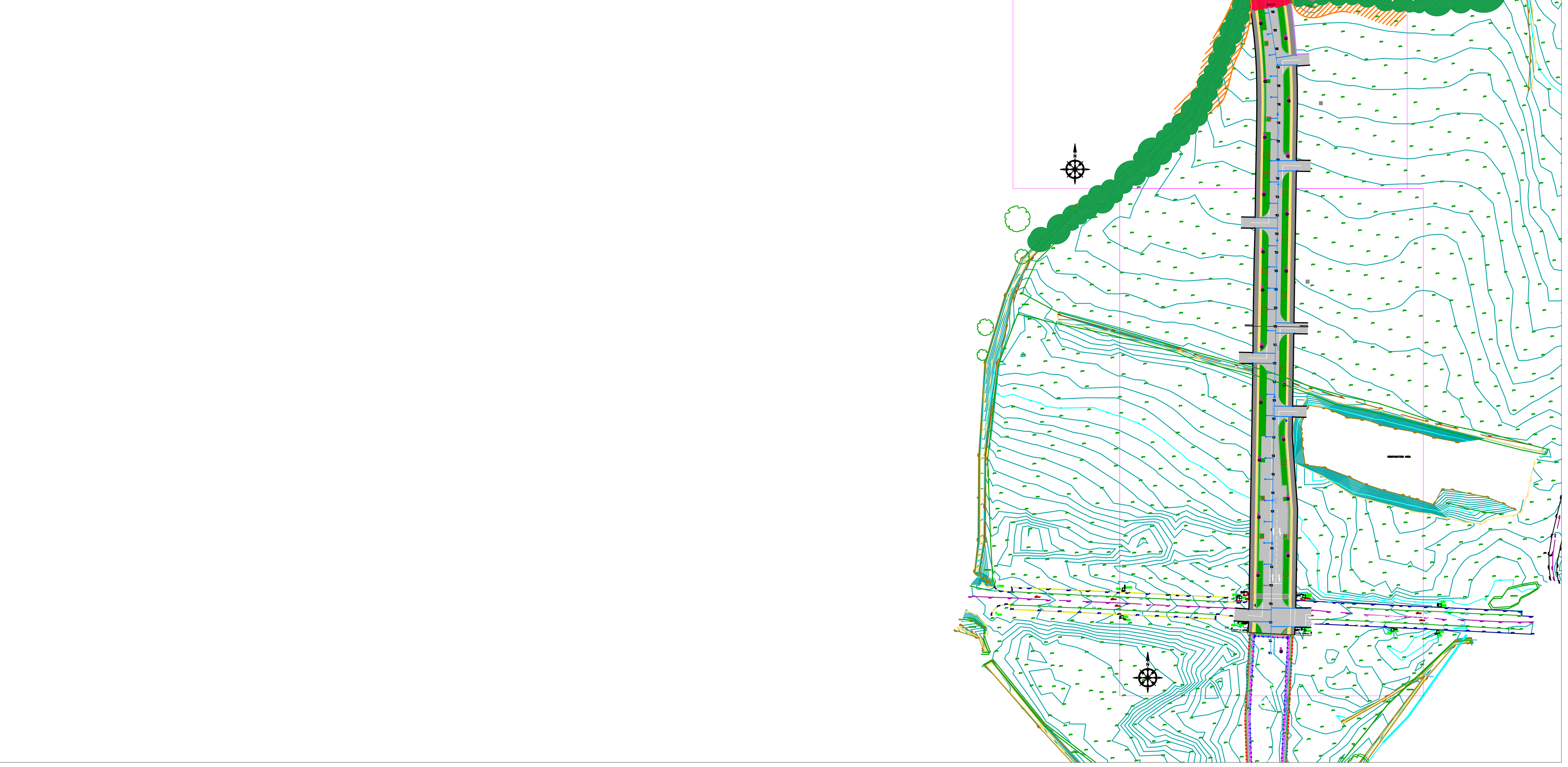
It is likely to require further management if retained within a highly used area.</td><td>10-20</td><td>C2</td></tr>
<tr><td>0456-0458</td><td>Ash
Fraxinus excelsior</td><td>A14</td><td>A350</td><td>A5N
A5S
A4E
A4W</td><td>A3</td><td>Mature</td><td>Fair</td><td>Fair
Collectively they form part of the one group/ canopy formation. Heavy Ivy cover on their main trunks is extending up into their crowns increasing</td><td>Remove large size dead/ unstable growth.
Cut Ivy at ground level.</td><td>10-20</td><td>C2</td></tr>
</table>

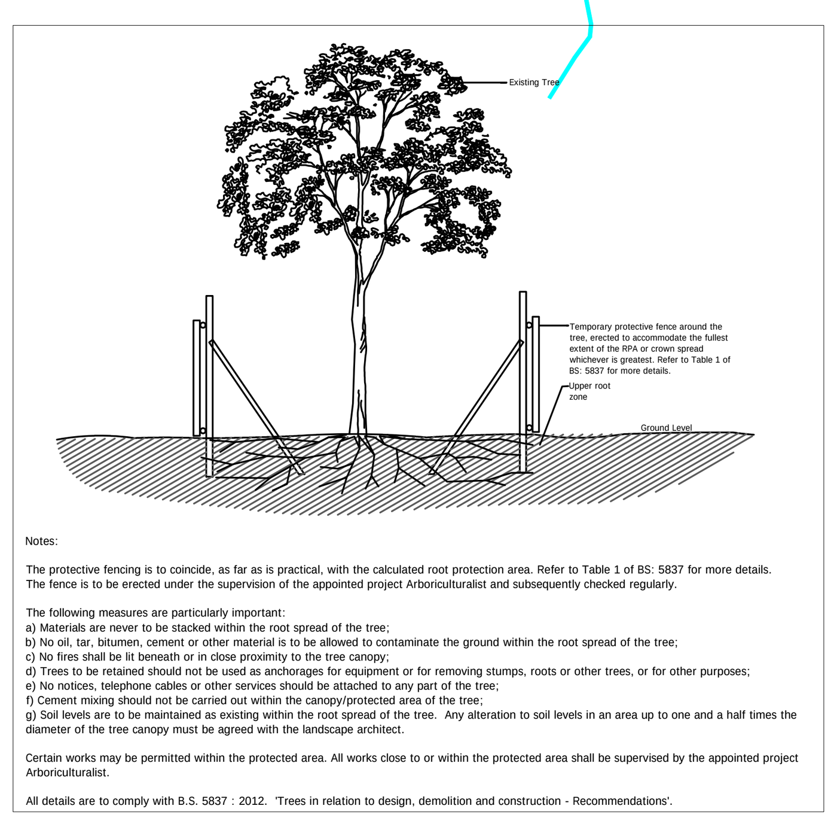
<table>
<tr><th>Tree No.</th><th>Tree Species</th><th>Ht. (m)</th><th>Stem Dia. (mm)</th><th>Branch Spread (m)</th><th>C-Ht. (m)</th><th>Age Class</th><th>Phys. Con.</th><th>Structural Condition
Other Comments</th><th>Preliminary Recommendation</th><th>Remain Contribute in years</th><th>Cat. Grade</th></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>N-north S-south E-east W- west
Phys.-physiological.</td><td>A- average</td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>their windsail. Tree No. 0456 is growing on the north side of the drainage ditch and the other two remaining trees are growing on the south side on the hedgerow bank. Tree No. 0456 has a large decay pocket at its base and this may impact on its structure. There is an acute union formation between stems.</td><td>They will require further management in the future, particularly if retained within a highly used area.</td><td></td><td></td></tr>
<tr><td>Hedge No. 16</td><td>Hawthorn Crataegus monogyna
Bramble Rubus fruticosus
Dogrose Rosa canina
Blackthorn Prunus spinosa
Elder Sambucus nigra</td><td colspan="7">It runs at ninety degrees to hedge No.5 and runs in a north-south direction and forms the boundary between two fields.
It is of a mature age class in fair condition both physiologically and structurally. It consists of clumps of predominately Hawthorn, with some Elder, Bramble, Dogrose and Blackthorn. It is a reasonably continuous hedge, but is sparser at the northern end. It had been coppiced / managed in the past but has been allowed to grow up tall and unmanaged in more recent years with scrub species, in particular Bramble and Dogrose encroaching out on either side.
<table>
<tr><th>HT (m)</th><th>Stem Dia (mm)</th><th>C. Spread (m)</th><th>C. Ht (m)</th></tr>
<tr><td>A4</td><td>--</td><td>A6</td><td>--</td></tr>
</table>
The following trees are located within hedge No. 16.</td><td>It would benefit from some trimming to contain its width and possibly further management in order to contain its size and to maintain a good quality stock proof hedge.</td><td></td><td>C2</td></tr>
<tr><td>0459</td><td>Ash Fraxinus excelsior</td><td>12</td><td>420/
200/
180</td><td>4N
4S
4E
5W</td><td>4</td><td>Mature</td><td>Poor</td><td>Poor
It has been badly damaged by fire and is almost completely dead. Some soil alterations have occurred on the west side and it is becoming decayed and unstable. It has suffered storm damage in the past.</td><td>I would recommend its <u>removal</u> as part of management.</td><td><10</td><td>U</td></tr>
</table>

Tree No.	Tree Species	Ht. (m)	Stem Dia. (mm)	Branch Spread (m)	C-Ht. (m)	Age Class	Phys. Con.	Structural Condition Other Comments	Preliminary Recommendation	Remain Contribute in years	Cat. Grade
								N-north S-south E-east W- west Phys.-physiological.	A- average		
0460	Ash *Fraxinus excelsior*	14	440/ 400	4N 4S 5E 4W	2.5	Mature	Fair	Poor It is growing on the hedgerow bank and is multiple-stemmed from low down. Some limbs have broken out or have been cut out with decay present at its base as a result. Heavy Ivy cover on the main trunk is extending up into its crown increasing its windsail.	Cut Ivy at ground level and remove to a height of c.2m to allow a more detailed assessment.	10+	C1
Notes:											

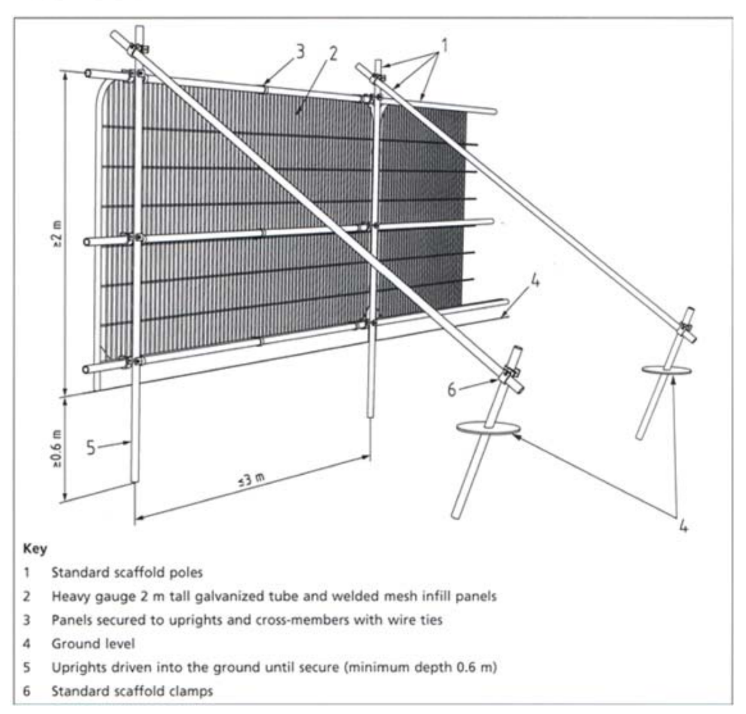
Overall Plan



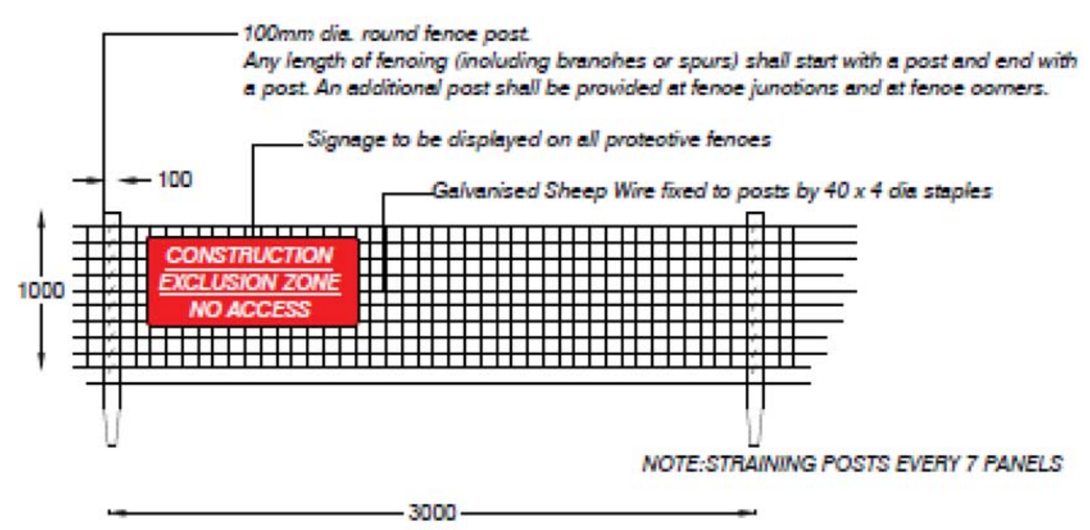




Type 1 Protective fence detail as per BS 5837 2012.

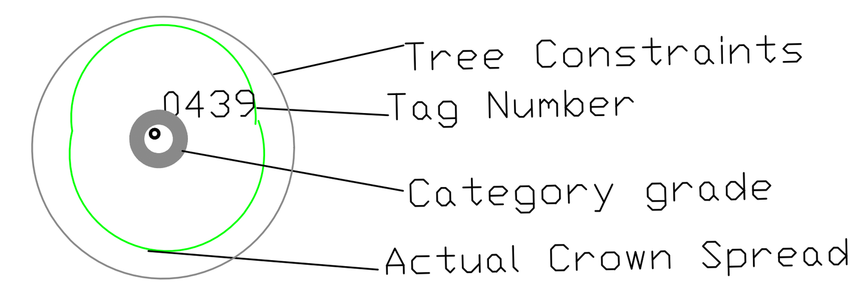


Type 2 Protective Fence Detail



Detail of singage

Notes:



BS5837: 2012 - Category Retention Rating

Category U Trees-
Trees in such a condition that any existing value would be lost within 10 years or being recommended for removal sound arboricultural practice.

Category A Trees
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Sub Categories
1- Mainly Arboricultural values
2 - Mainly Landscape valus
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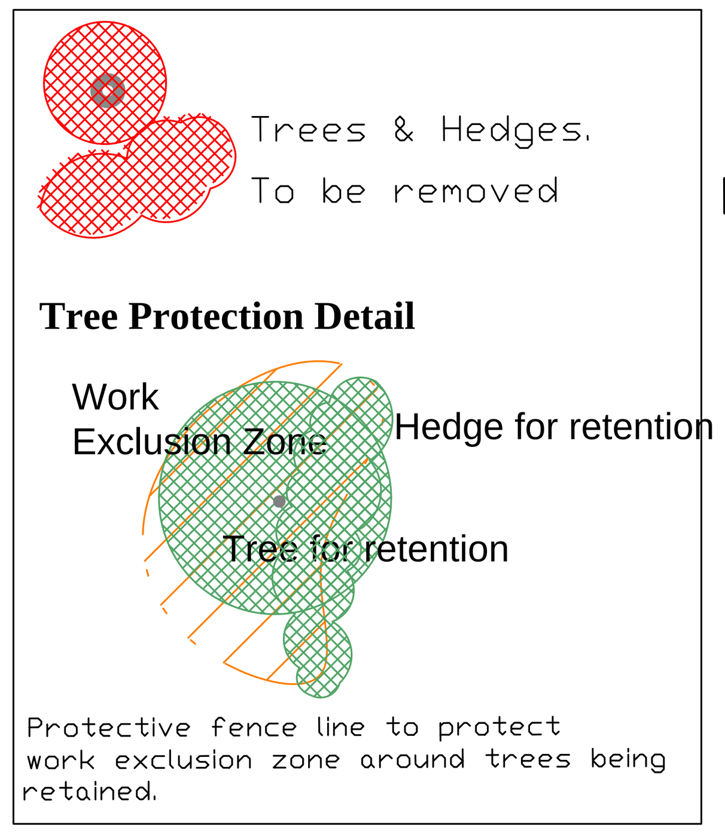


Schedule of events

Works	Schedule
Site Meeting	Prior to any works commencing.
Tree Works – Felling & Pruning	Prior to any construction works commencing.
Tree Protection	After tree removal and pruning is complete and prior to any construction works commencing. The erection and removal of the protective fencing is to be scheduled in accordance with the phasing of the construction works.
Site Monitoring	Ongoing throughout the construction works.
Removal of Tree P rotection	Once all the main construction works are completed and in order to incorporate the area into the finished development.
Tree Review and Certification	Once all works are complete.

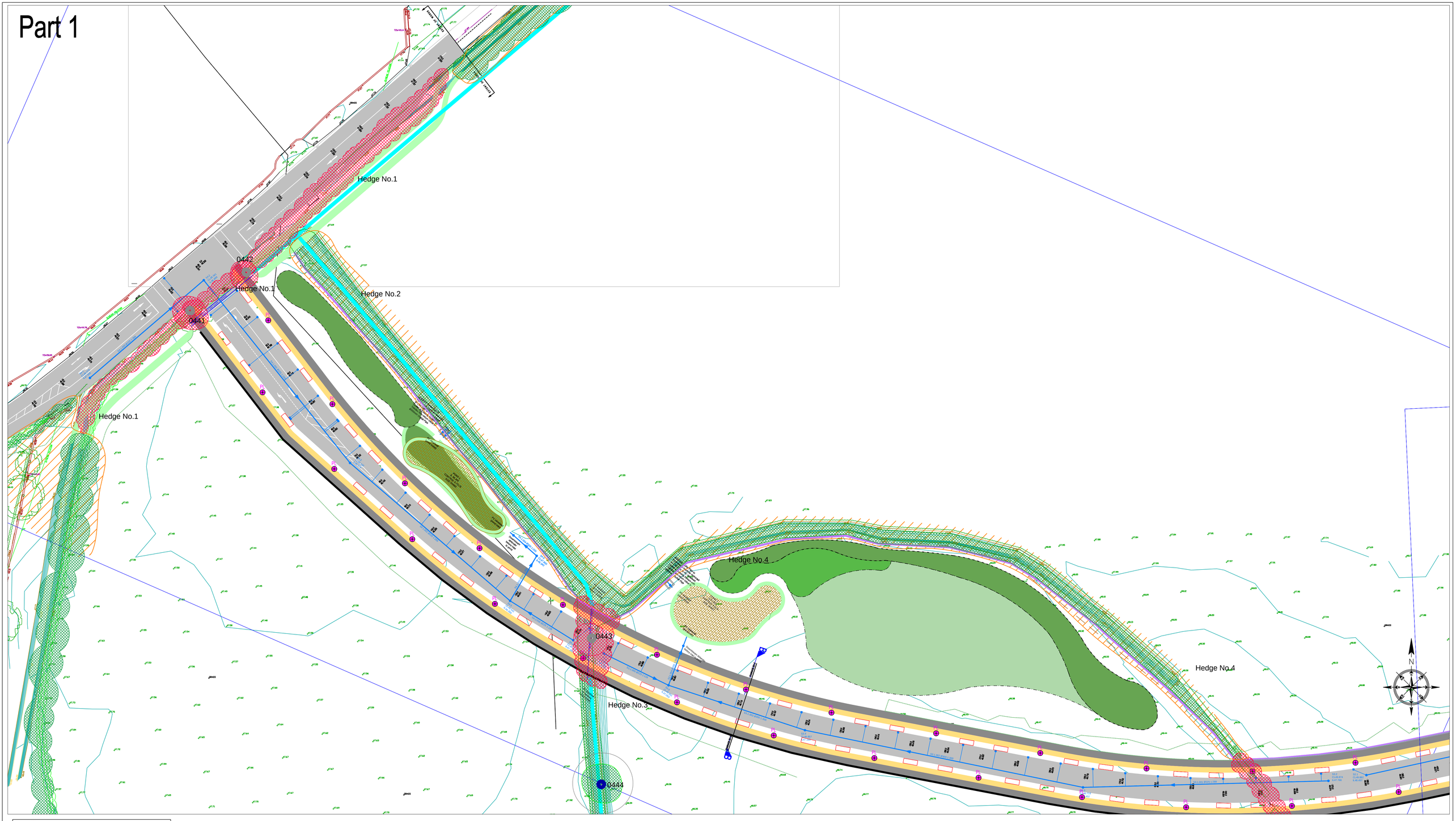
ARBORIST ASSOCIATES LTD.
94 BALLYBAWN COTTAGES, ENNISKERRY, CO. WICKLOW
TEL: 01-2742011 / 087-2629589

TITLE : Tree Protection Plan

Site : Cellbridge Link Road, Overall Area.

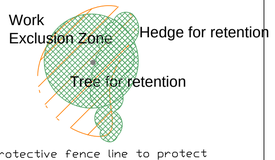
DATE: | Dwg No.CBLR002 | Scale 1:2000 @ A1

Part 1



Trees & Hedges.
To be removed

Tree Protection Detail



Protective fence line to protect work exclusion zone around trees being retained.

Schedule of events

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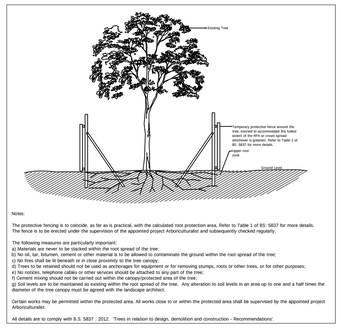
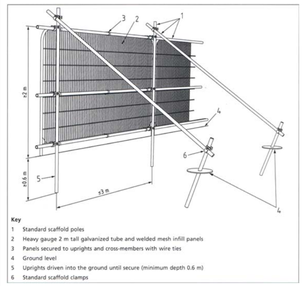
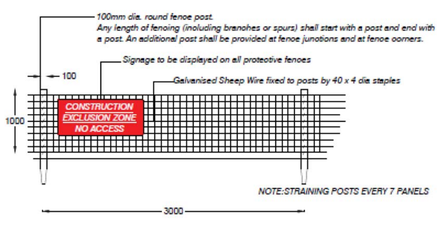


Type 1 Protective fence detail as per BS 5837 2012.



Type 2 Protective Fence Detail



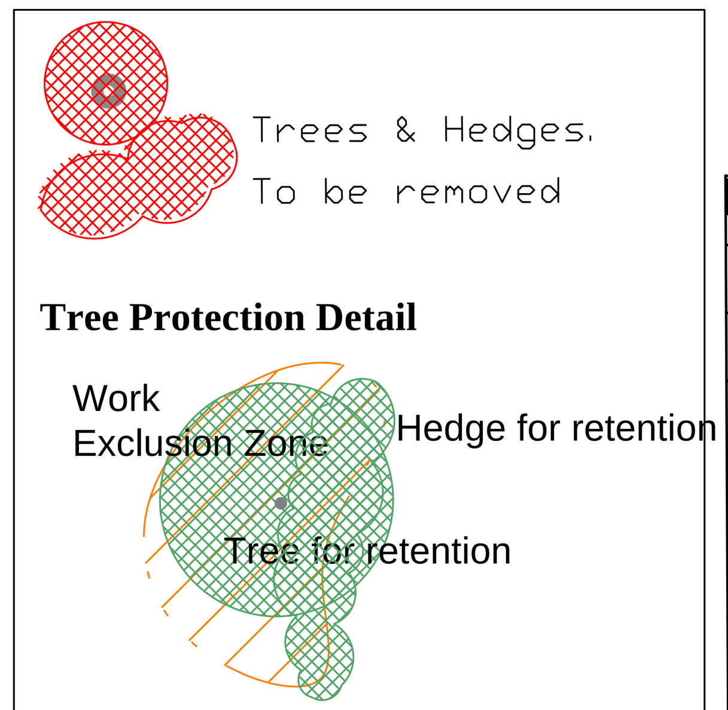
Detail of singage

ARBORIST ASSOCIATES LTD.
94 BALLYBAWN COTTAGES, ENNISKERRY, CO. WICKLOW
TEL: 01-2742011 / 087-2629589

TITLE : Tree Protection Plan

Site : Cellbridge Link Road, Part 1

DATE: | Dwg No.CBLR002 –Part 1 | Scale 1:500 @ A1



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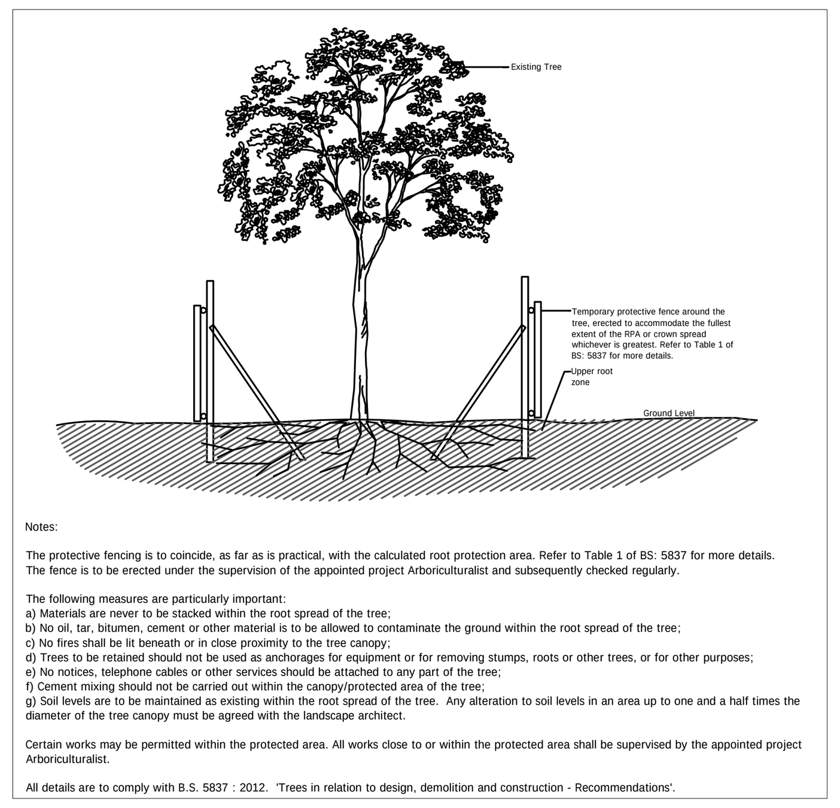
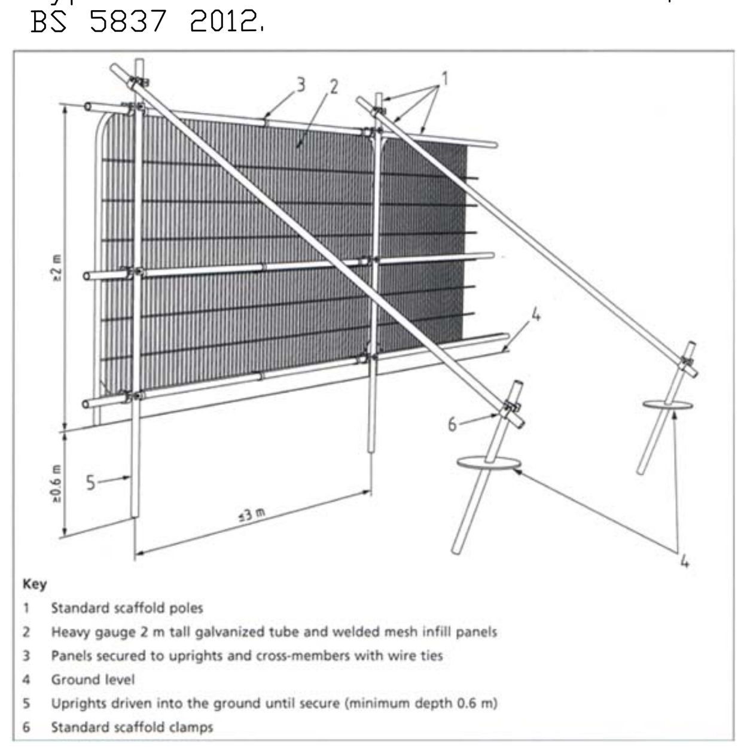
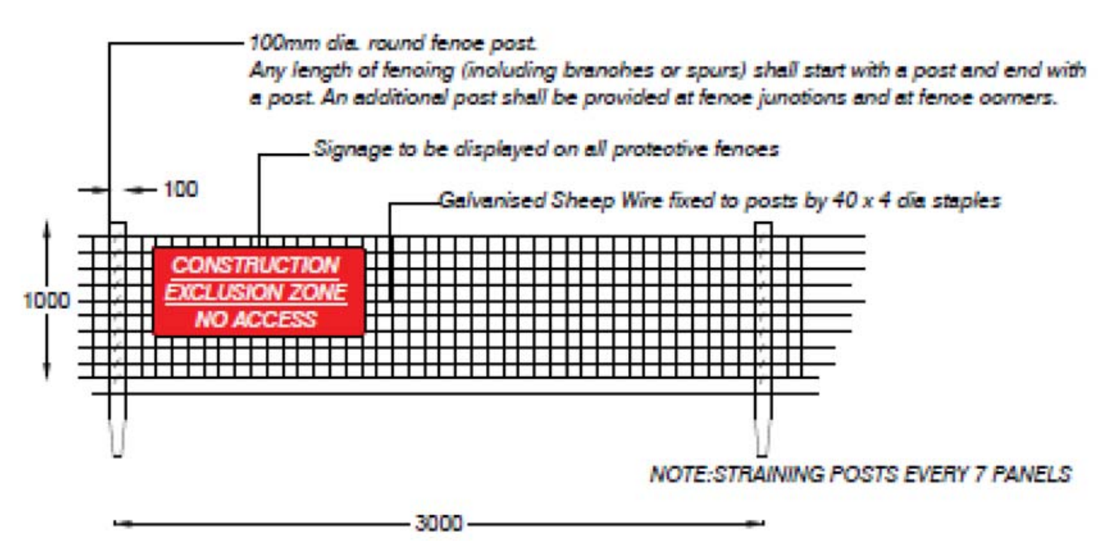


Type 1 Protective fence detail as per BS 5837 2012.



Type 2 Protective Fence Detail



Detail of singage

ARBORIST ASSOCIATES LTD.

94 BALLYBAWN COTTAGES, ENNISKERRY, CO. WICKLOW

TEL: 01-2742011 / 087-2629589

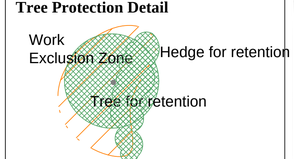
TITLE : Tree Protection Plan

Site : Cellbridge Link Road, Part 3

DATE:	Dwg No.CBLR002 –Part 3	Scale 1:500 @ A1

Trees & Hedges.
To be removed

Tree Protection Detail



Protective fence line to protect work exclusion zone around trees being retained.

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Site Meeting	Prior to any works commencing.
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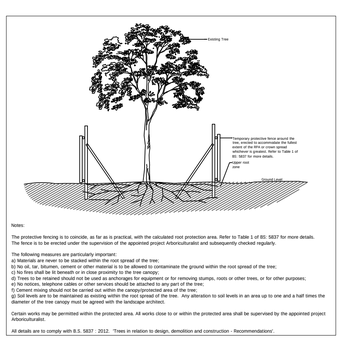
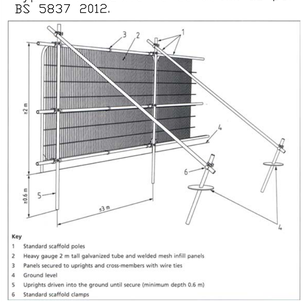
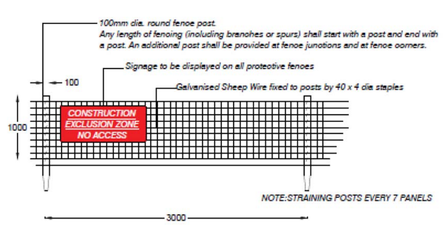


Type 1 Protective fence detail as per BS 5837 2012.



Type 2 Protective Fence Detail



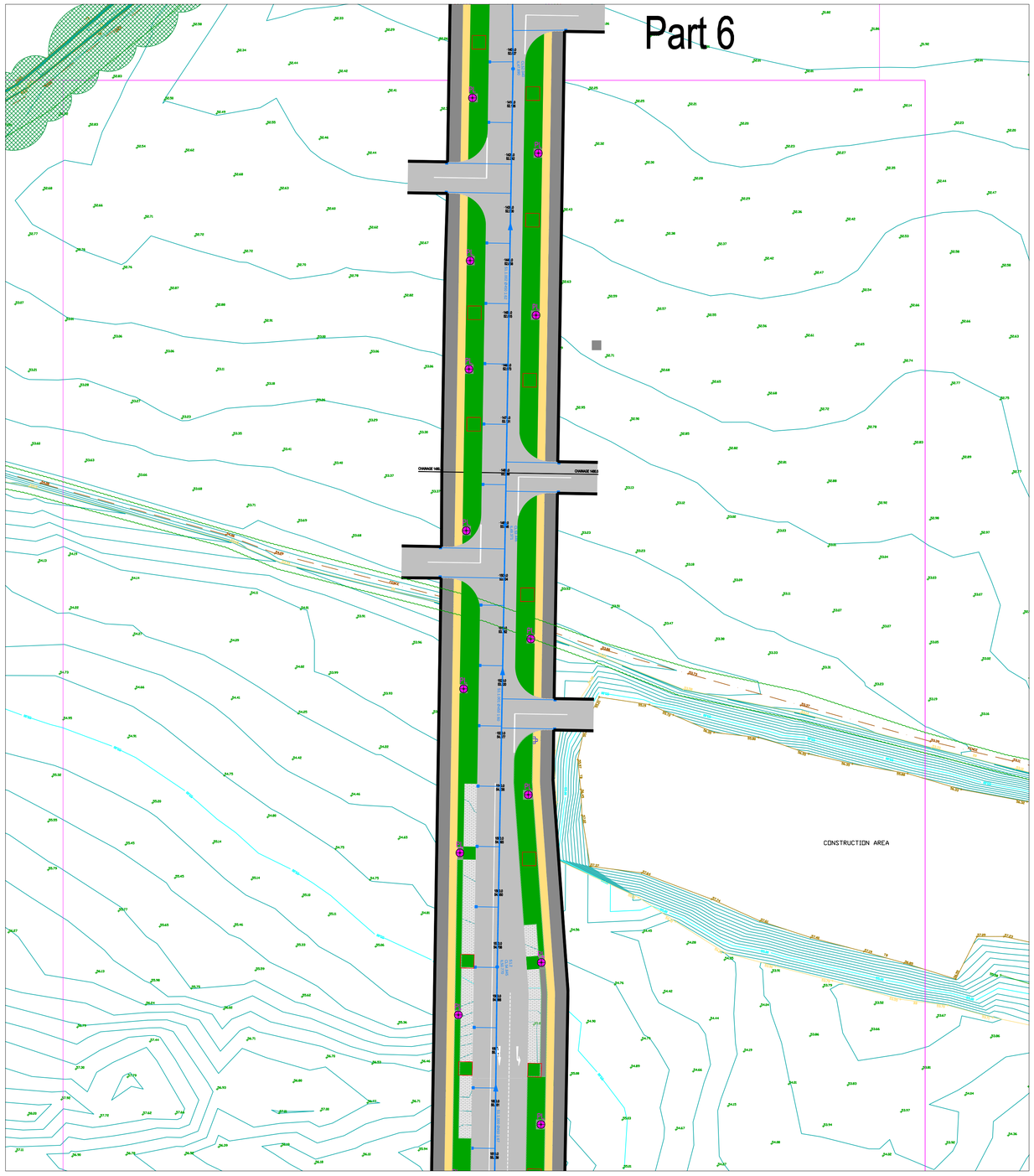
Detail of singage

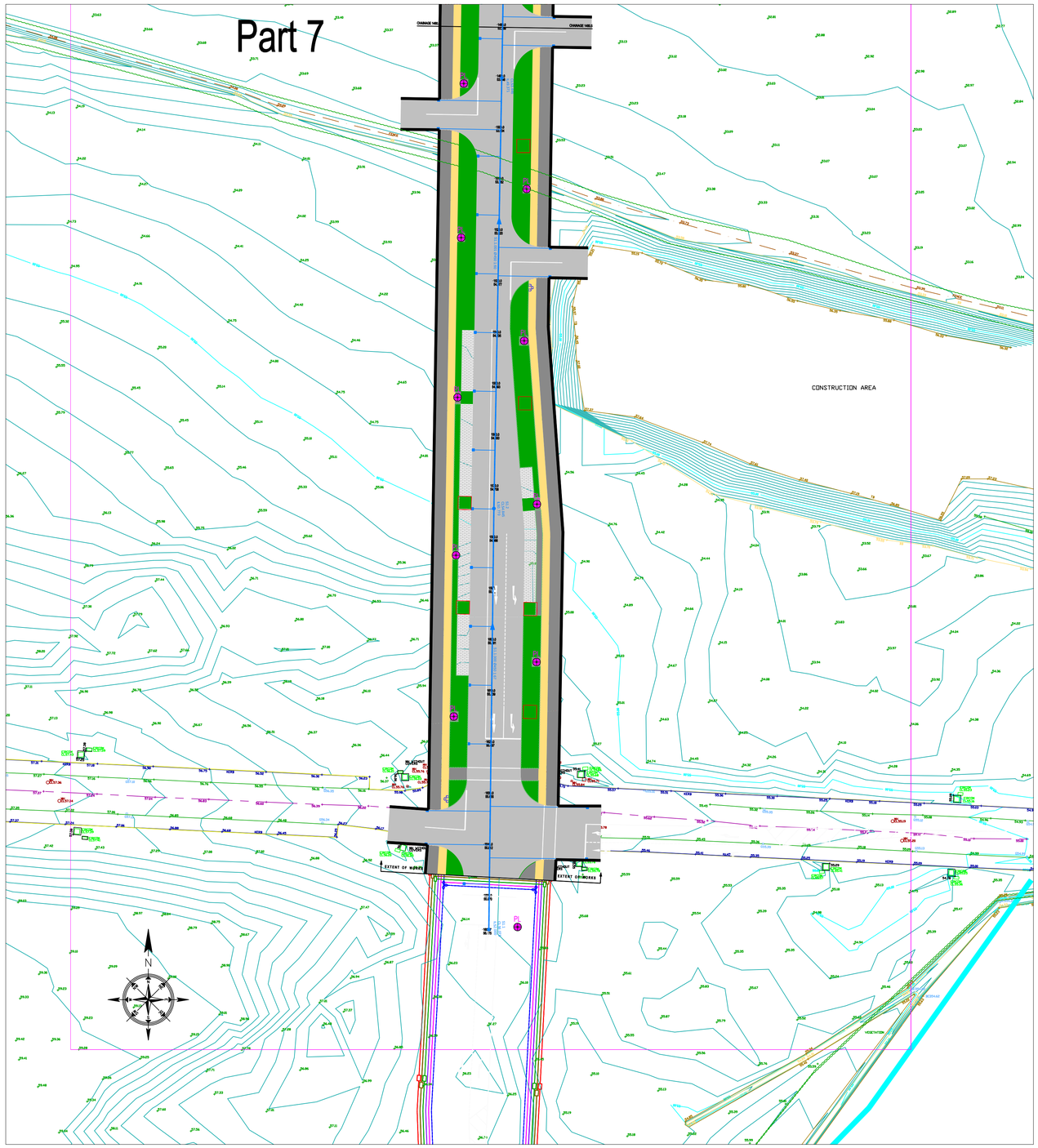
ARBORIST ASSOCIATES LTD.
94 BALLYBAWN COTTAGES, ENNISKERRY, CO. WICKLOW
TEL: 01-2742011 / 087-2629589

TITLE : Tree Protection Plan

Site : Cellbridge Link Road, Parts 4 & 5

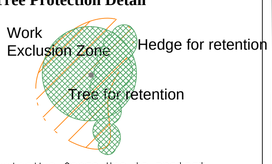
DATE: | Dwg No.CBLR002 –Parts 4&5 | Scale 1:500 @ A1





Trees & Hedges.
To be removed

Tree Protection Detail



Protective fence line to protect work exclusion zone around trees being retained.

Schedule of events

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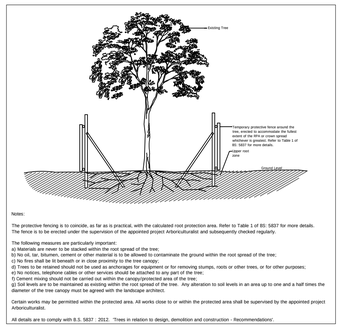
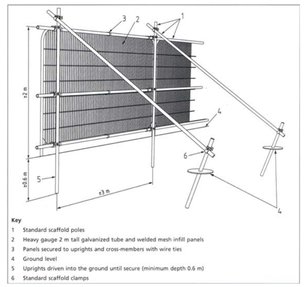
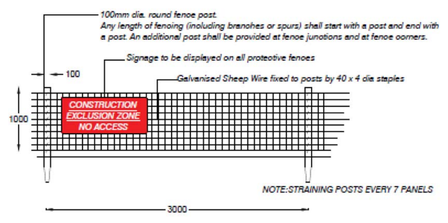


Type 1 Protective fence detail as per BS 5837 2012.



Type 2 Protective Fence Detail



Detail of singage

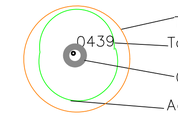
ARBORIST ASSOCIATES LTD.
94 BALLYBAWN COTTAGES, ENNISKERRY, CO. WICKLOW
TEL: 01-2742011 / 087-2629589

TITLE : Tree Protection Plan

Site : Cellbridge Link Road, Parts 6 & 7

DATE: | Dwg No.CBLR002 –Parts 6&7 | Scale 1:500 @ A1

Notes:



BS5837: 2012 – Category Retention Rating

Category U Trees–
Trees in such a condition that any existing value would be lost within 10 years or being recommended for removal sound arboricultural practice.

Category A Trees
Trees of high quality/value with a min. of 40 years life expectancy.

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Sub Categories

1– Mainly Arboricultural values
2 – Mainly Landscape valus
3 – Mainly cultural and conservation values.

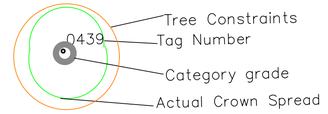
ARBORIST ASSOCIATES LTD.
94 BALLYBAWN COTTAGES, ENNISKERRY, CO. WICKLOW
TEL: 01-2742011 / 087-2629589

TITLE : Tree Constraints Plan

Site : Cellbridge Link Road, Overall Area.

DATE: | Dwg No.CBLR001 | Scale 1:2000 @ A1

Notes:



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ARBORIST ASSOCIATES LTD.
94 BALLYBAWN COTTAGES, ENNISKERRY, CO. WICKLOW
TEL: 01-2742011 / 087-2629589

TITLE : Tree Constraints Plan

Site : Cellbridge Link Road, Part 1

DATE: | Dwg No.CBLR001–Part 1 | Scale 1:500 @ A1

Hedge No.5

Hedge No.6

Hedge No.6

0447

0445

0448

0446

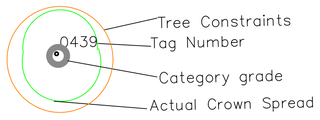
Hedge No.7

0449

Hedge No.5

Hedge No.4

Notes:



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ARBORIST ASSOCIATES LTD.
94 BALLYBAWN COTTAGES, ENNISKERRY, CO. WICKLOW
TEL: 01-2742011 / 087-2629589

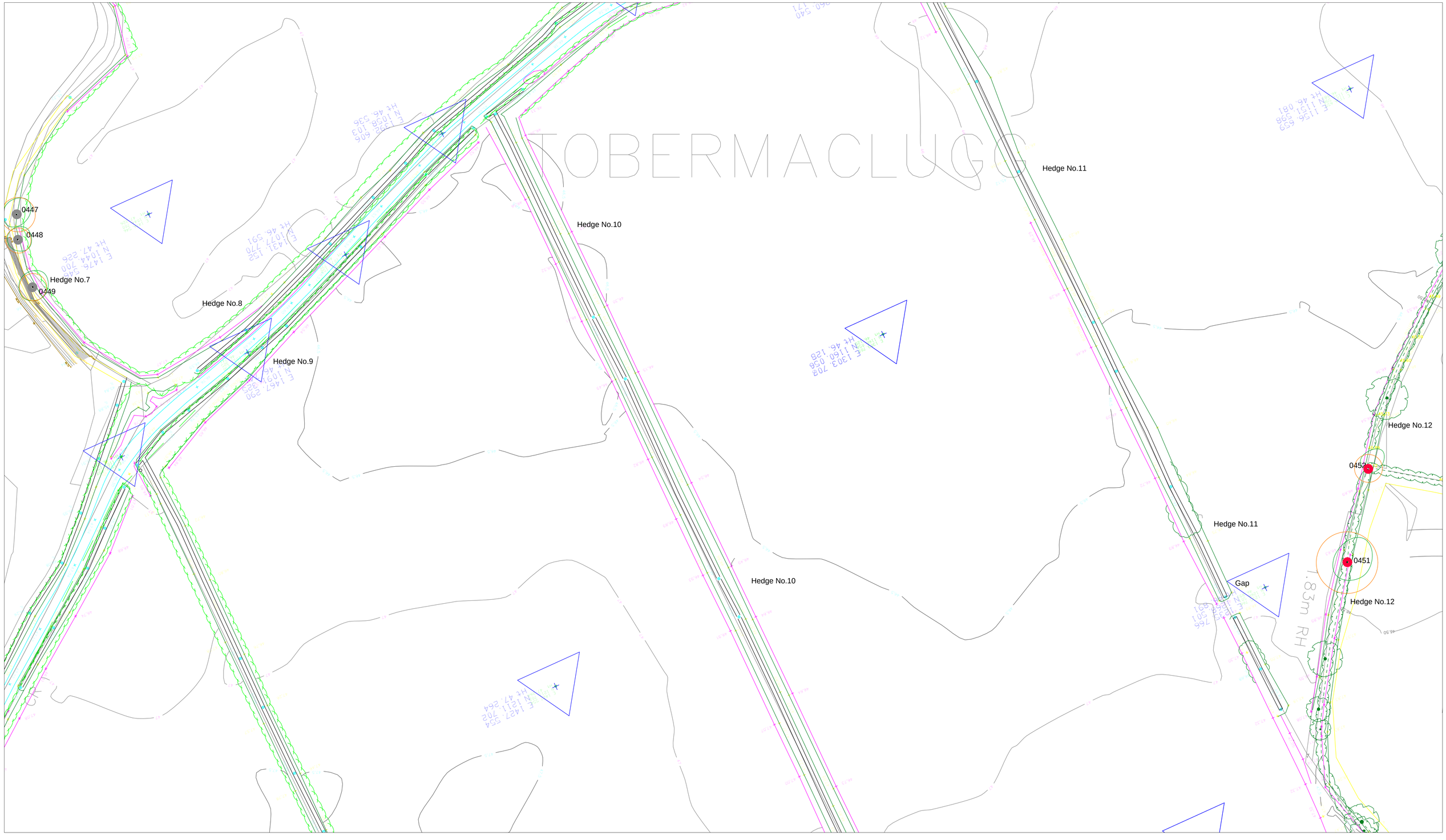
TITLE : Tree Constraints Plan

Site : Cellbridge Link Road, Part 2

DATE:

Dwg No.CBLR001–Part 2

Scale 1:500 @ A1



Notes:

BS5837: 2012 – Category Retention Rating

0439
Tree Constraints
Tag Number
Category grade
Actual Crown Spread

Category U Trees–
Trees in such a condition that any existing value would be lost within 10 years or being recommended for removal sound arboricultural practice.

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ARBORIST ASSOCIATES LTD.
94 BALLYBAWN COTTAGES, ENNISKERRY, CO. WICKLOW
TEL: 01-2742011 / 087-2629589

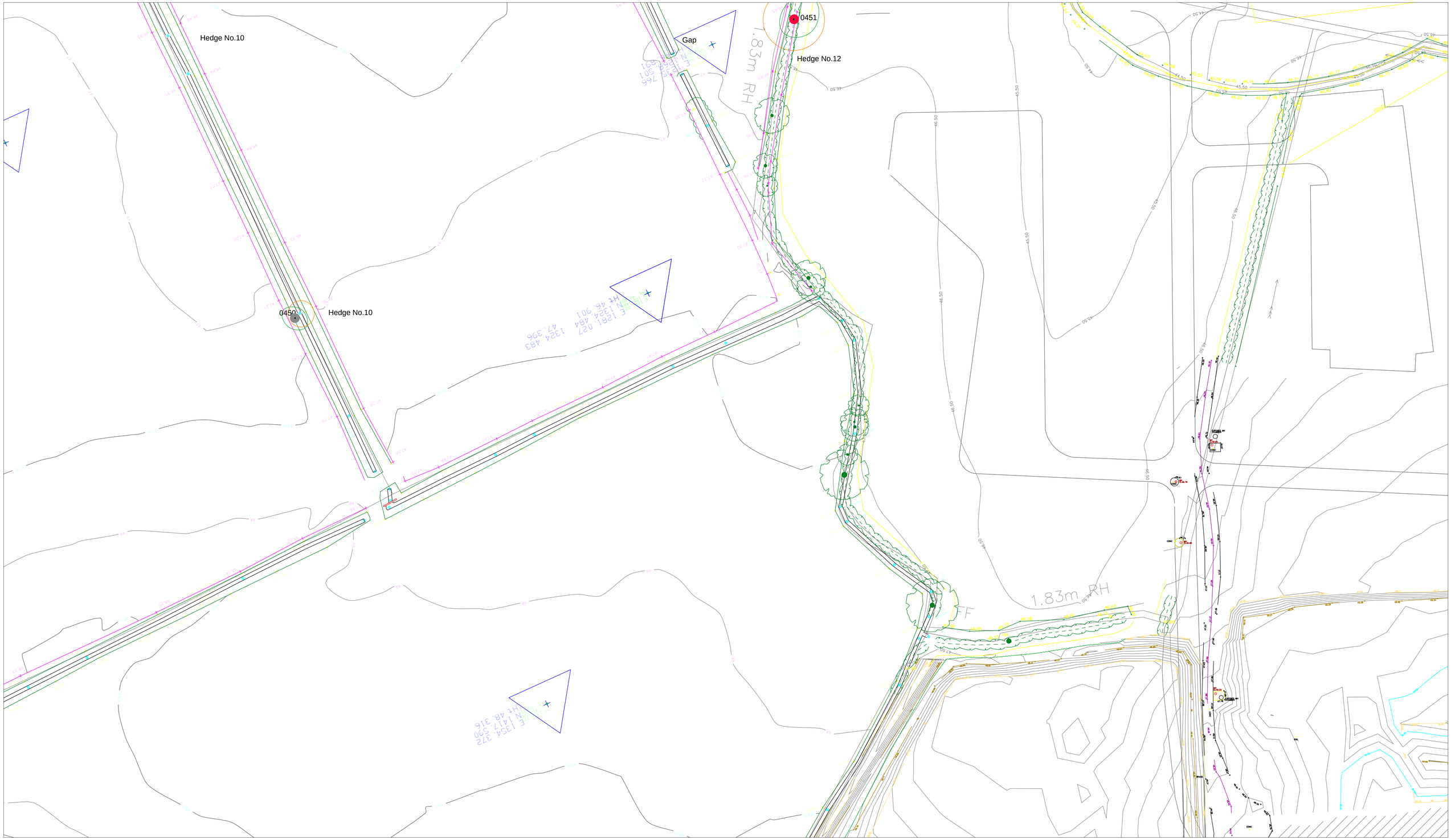
TITLE : Tree Constraints Plan

Site : Cellbridge Link Road, Part 3

DATE:

Dwg No.CBLR001–Part 3

Scale 1:500 @ A1



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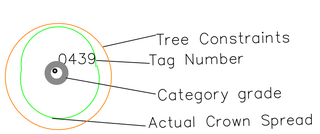

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ARBORIST ASSOCIATES LTD.
94 BALLYBAWN COTTAGES, ENNISKERRY, CO. WICKLOW
TEL: 01-2742011 / 087-2629589

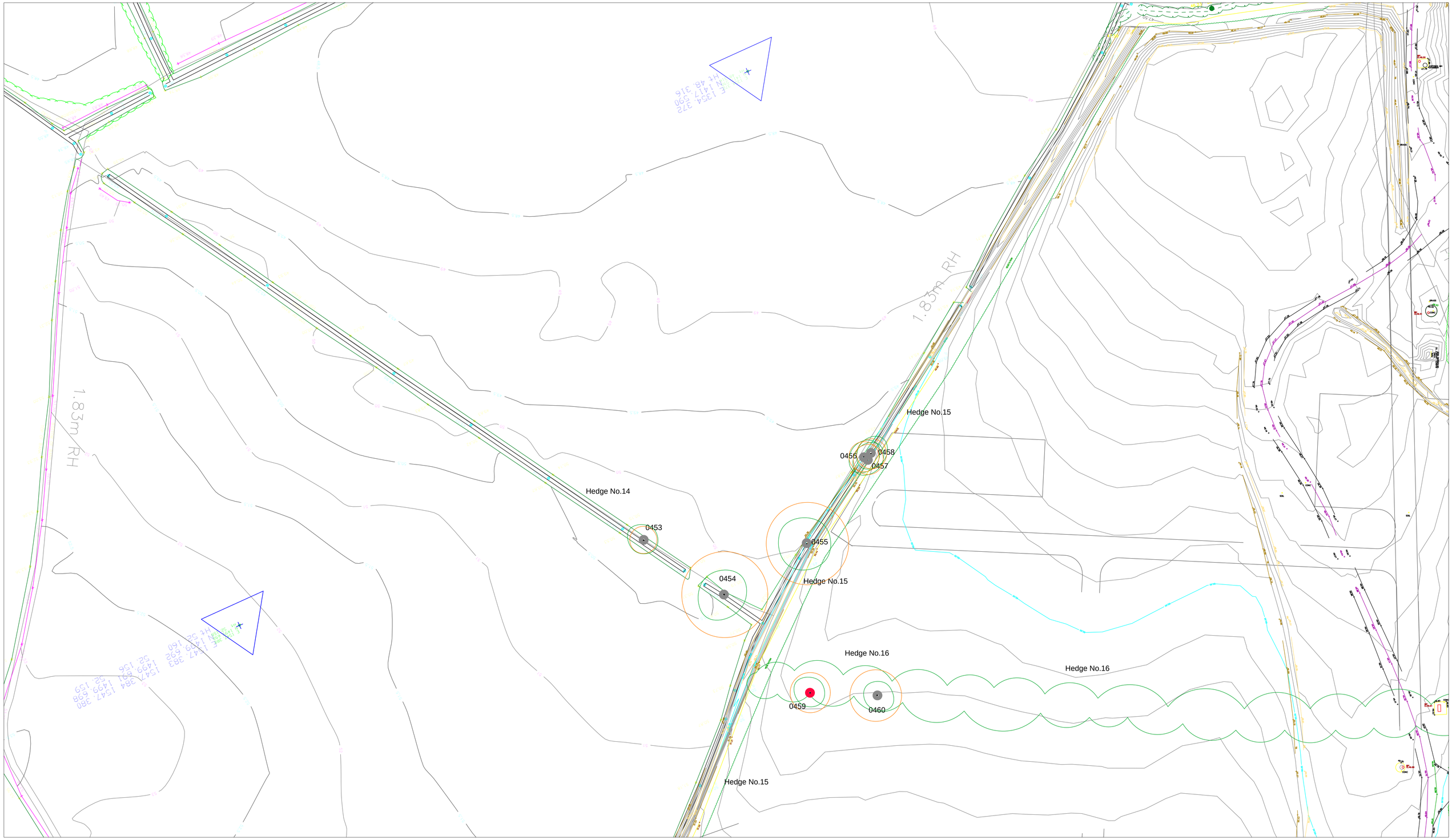
TITLE : Tree Constraints Plan

Site : Cellbridge Link Road, Part 4

DATE:

Dwg No.CBLR001–Part 4

Scale 1:500 @ A1



Notes:

BS5837: 2012 – Category Retention Rating

Tree Constraints
0439 — Tag Number
Category grade
Actual Crown Spread

Category U Trees–
Trees in such a condition that any existing value would be lost within 10 years or being recommended for removal sound arboricultural practice.

Category A Trees
Trees of high quality/value with a min. of 40 years life expectancy.

Category B Trees
Trees of moderate quality/value with a min. of 20 years life expectancy.

Category C Trees
Trees of low quality/value with a min. of 10 years life expectancy.

ARBORIST ASSOCIATES LTD.
94 BALLYBAWN COTTAGES, ENNISKERRY, CO. WICKLOW
TEL: 01-2742011 / 087-2629589

TITLE : Tree Constraints Plan

Site : Cellbridge Link Road, Part 5

DATE:

Dwg No.CBLR001–Part 5

Scale 1:500 @ A1

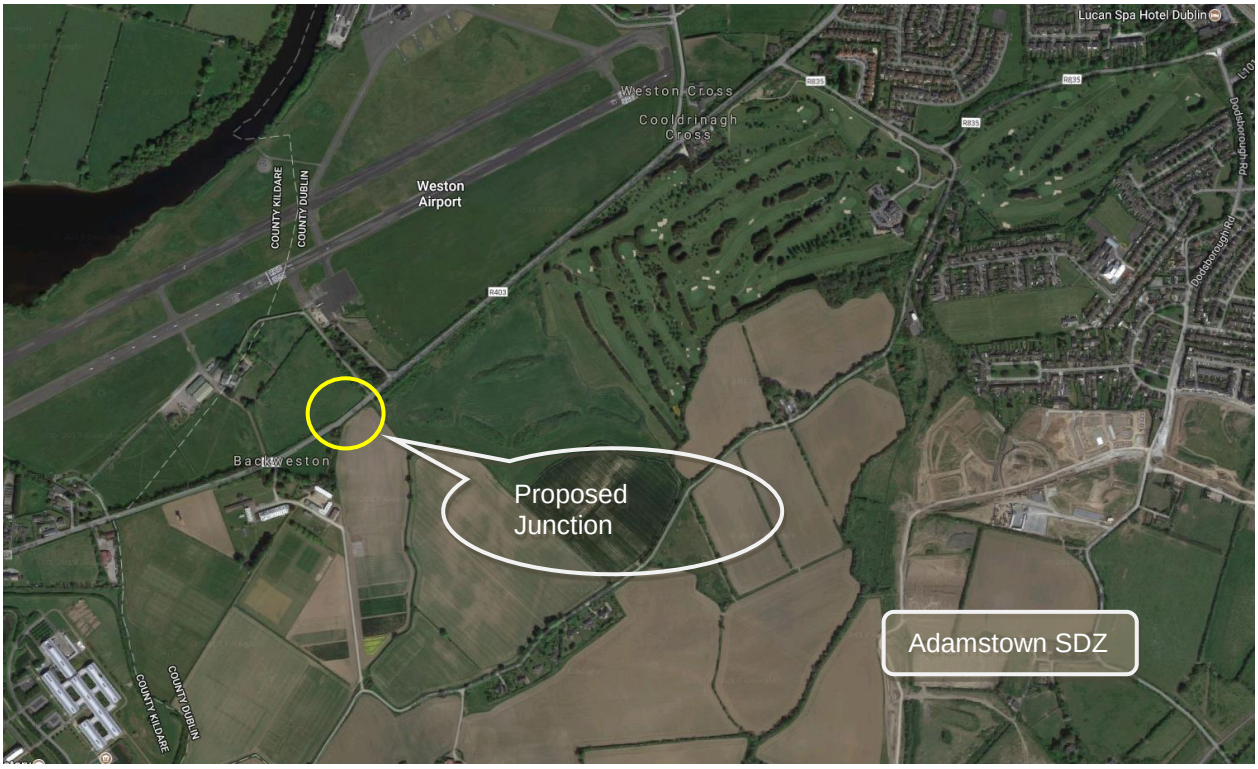
Technical Note

Project:	Adamstown Traffic Model	**To:** Pat O'Gorman & Associates	
Subject:	R403-Celbridge Link Road Junction	**Author:** Stephen Wyse	
Date:	19/10/2017	**Reviewer & Approver:** Kieran Boyle	

1. Introduction

This technical note has been prepared to assess the impact on traffic of the proposed new signalised junction between the R403 and the proposed Celbridge Link Road. The junction is proposed on the R403 at the location illustrated in Figure 1 below and illustrated on Pat O'Gorman & Associates Drawing 1772-1500.

Figure 1 – Proposed Junction Location



The proposed junction will facilitate the R403 Celbridge Link Road which will link the future internal road network within the Adamstown SDZ to the R403. This is an important link as it will allow traffic from the Adamstown SDZ easier access to the N4 and towards Celbridge, removing this traffic from currently congested links such as the R120.

2. Data Collection

- An Automatic Traffic Count (ATC) was carried out on the R403 on the 31st August 2017. The counter was located approximately at the proposed junction location. Traffic data from this count gives the flows in both directions over the entire day.
- The development areas within the Adamstown SDZ lands were examined and the total extent of residential, community and retail for the entire area calculated. This data collection process included examining current masterplans for the various development tiles and using proposed splits for houses

and apartments. In all cases, the maximum allowable development has been assumed. The results of this exercise are summarised in Table 1 below.

Table 1. Adamstown SDZ Development

Development Type	Quantity
Residential Houses	4689 units
Residential Apartments	4041 units
Non-residential development excluding retail	83,000 m^2
Retail development	22,550 m^2

3. Adamstown Traffic Generation

3.1. Trip Rates

Using the above data, the number of person trips for the fully built out Adamstown SDZ lands was calculated. Person trip rates were calculated for the following using the TRICS database:

- Privately owned houses
- Privately owned flats
- Non-Residential, Non-Retail Areas
- Village Centres
- District Centres
- Primary Schools
- Post-Primary School

The calculated trip rates are shown in Table 2 below.

Table 2. Person Trip Rate Calculation

Development Type	AM Peak Arrivals	AM Peak Departures	PM Peak Arrivals	PM Peak Departures
Houses (per dwelling)	0.200	0.748	0.582	0.324
Apartments (per dwelling)	0.111	0.408	0.358	0.146
Non-Residential, Non Retail Areas (per 100m^2)	0.836	0.443	2.311	2.945
Small Retail Areas (per 100m^2)	24.000	23.800	20.800	20.750
Village Centres (per 100m^2)	5.108	3.775	10.866	11.136
District Centre (per 100m^2)	4.178	2.975	6.759	8.311
Primary Schools (per pupil)	1.127	0.311	0.052	0.069
Post-primary School (per pupil)	0.696	0.046	0.012	0.173

These trip rates were then applied to each development area within the SDZ based on the number of residential units and gross floor area of non-residential, non-retail and retail areas. The retail trip rate for each development zone was calculated based on the most relevant retail type for that zone.

3.2. Modal Split

Based on the Census 2016 data obtained from the SAPMAP website from CSO.ie, Table 3 shows the **mode share** by different means of travel in the Adamstown area. The data is based on all of the small areas that have been constructed to date within Adamstown Castle and Airlie Stud. As this data is obtained from the Adamstown area alone, it is reasonable to assume a similar modal split will continue on completion of the full build of the SDZ.

Table 3. Mode Share

Means of Travel	To/From Work (no.)	To/From School (no.)	Total No.	To/From Work (%)	To/From School (%)
On foot	30	501	531	2.10%	51.60%
Bicycle	32	40	72	2.24%	4.12%
Bus, minibus or coach	238	117	355	16.66%	12.05%
Train, DART or LUAS	45	5	50	3.15%	0.51%
Motorcycle or scooter	12	0	12	0.84%	0.00%
Car driver	906	17	923	63.40%	1.75%
Car passenger	46	242	288	3.22%	24.92%
Van	34	0	34	2.38%	0.00%
Other (incl. lorry)	1	0	1	0.07%	0.00%
Work mainly at or from home	21	1	22	1.47%	0.10%
Not Stated	64	48	112	4.48%	4.94%
Total	1429	971	2400		
			Vehicle Use Percentage	66%	27%

3.3. Trip Generation

Vehicle trip generation was carried out for each development zone using the above calculated trip rates and the following assumptions:

- Vehicle trips generated by residential areas have been assumed to be 66% of the total person trips in line with the mode share from Census data.
- Vehicle trips to schools, non-residential and retail areas have been assumed to be 27% of the total person trips in line with the mode share from Census data. It is likely that retail and non-residential trips will be local trips made by active modes as is the case for school trips.
- 60% of retail and non-residential generated trips are assumed to be linked or pass-by trips as these will be generally be made by people in the Adamstown SDZ areas already on the road network, e.g. on their way to/from home. Therefore only 40% of the total vehicle trips generated by these areas are considered.

The total number of trips generated by the fully built out Adamstown SDZ is shown in Table 2 below.

Table 4. Adamstown SDZ Trip Generation

Movement	AM Peak Hour	PM Peak Hour
Arrivals	1840	3253
Departures	3763	1971

3.4. Trip Distribution

From a review of the Clonburris Transport Assessment & Transport Strategy document published by the NTA, modelling for the Clonburris SDZ using the Eastern Regional Model suggests that 19% of all vehicle trips generated within the SDZ remain within the SDZ (ref. Figure 6.6). These would generally be local trips to shops, schools etc. Given the proximity and similarity of the proposed development at Clonburris, it is reasonable to assume that the same distribution is likely to occur within Adamstown. Therefore, 81% of the vehicle trips generated within the Adamstown SDZ are assumed to distribute to the external zones, while 19% remain within the SDZ boundary.

For the purposes of this junction assessment only traffic distributed towards the N4 Westbound and towards Celbridge is considered. The assumed distribution split for both AM and PM peaks based on existing travel patterns and the location of trip attractors in the wider network is:

- 15% of total Adamstown SDZ traffic travels to/from the N4 Westbound
- 5% of total Adamstown SDZ traffic travels to/from Celbridge on the R403 southbound

In addition to the above, it has been assumed that 75% of the traffic travelling to/from the N4 Westbound will make use of the proposed R403/Celbridge Link Road, while the other 25% will use alternative routes such as Dodsborough Road or the R120. All of the traffic travelling to/from Celbridge will use the new junction.

4. Junction Analysis

4.1. Traffic Volumes

Traffic volumes on the Celbridge Link Road are assumed to be as per the previous section.

Traffic volumes on the R403 were calculated based on the counts carried out in August 2017 with an assumed growth as per the Transport Infrastructure Ireland Project Appraisal Guidelines Table 5.3.2 as shown in Figure 2 below:

Figure 2 – Growth Rates

Table 5.3.2: Link-Based Growth Rates: Annual Growth Factors

Region		Low Sensitivity Growth				Central Growth				High Sensitivity Growth			
		2013 - 2030		2030 - 2050		2013 - 2030		2030 - 2050		2013 - 2030		2030 - 2050	
		LV	*HV*	*LV*	*HV*	*LV*	*HV*	*LV*	*HV*	*LV*	*HV*	*LV*	*HV*
1	**Dublin**	1.0089	1.0221	1.0004	1.0135	1.0134	1.0237	1.0038	1.0176	1.0149	1.0242	1.0054	1.0195

The central growth rate for Dublin has been assumed for the calculation with a design year of +15, i.e. 2032. It is assumed that the full construction of the Adamstown SDZ lands will be complete at this design year. Traffic using the Celbridge Link Road has been assumed to be travelling to/from the Adamstown SDZ area only.

Figures 3 and 4 show the turning volumes at the proposed junction in 2032 for the AM and PM peaks respectively.

Figure 3 – 2032 AM Peak Hour Turning Movements

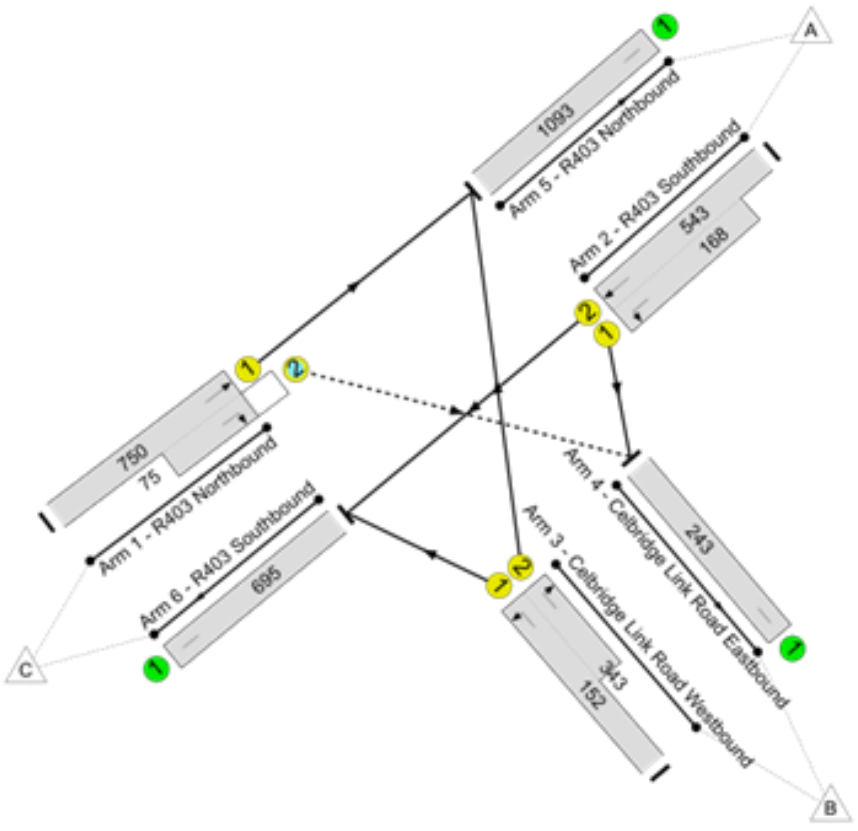
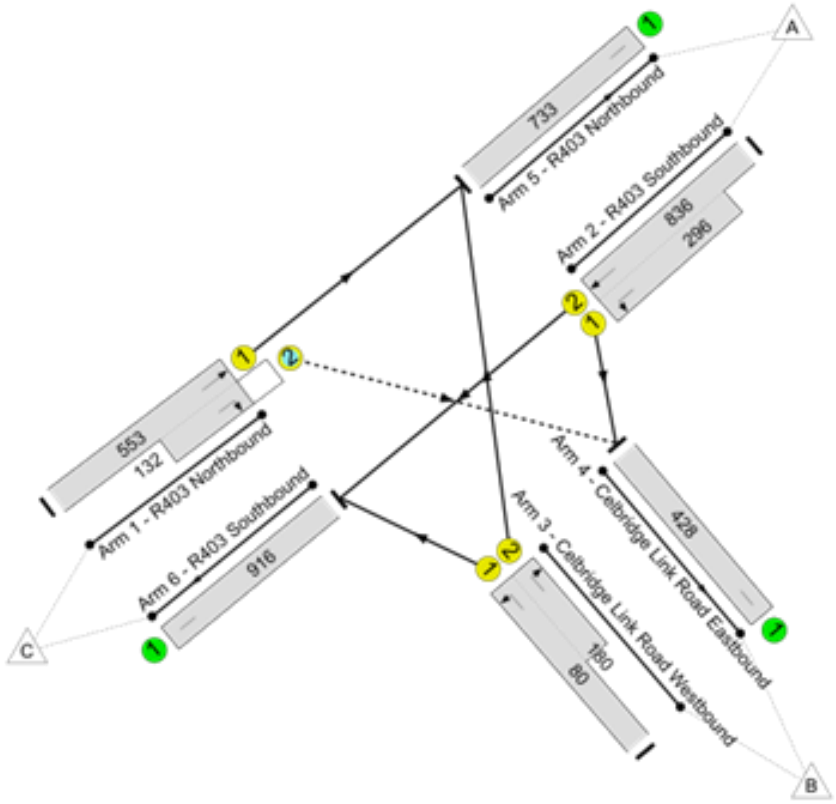


Figure 4 – 2032 PM Peak Hour Turning Movements

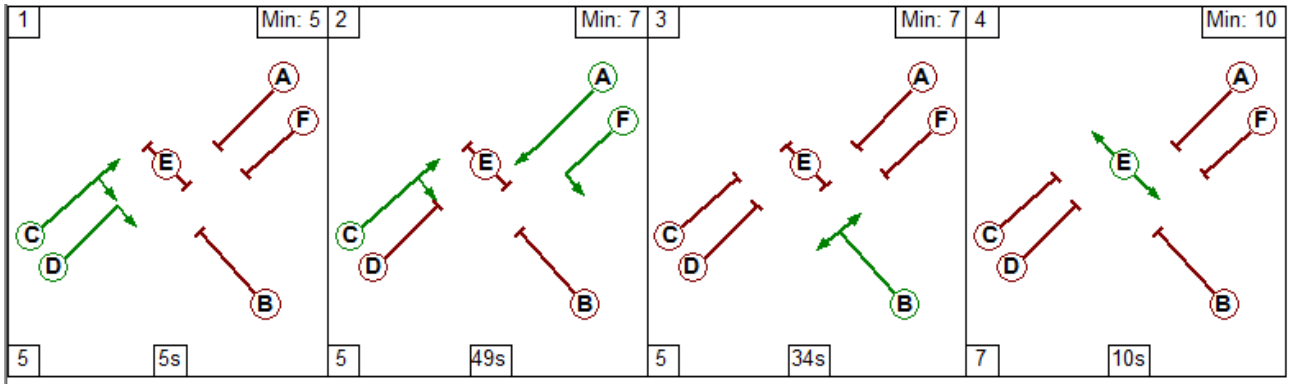


4.2. Junction Model

A junction model was prepared using Linsig V3.2.39.0 with the geometrical layout as per Pat O'Gorman & Associates Drawing 1772-1500. Lane widths, stacking lane lengths, turning radii etc. were all coded as per the drawing above while traffic volumes were input as per the previous section.

The proposed signal staging is as per Figure 5 below.

Figure 5 – Proposed Signal Staging



The right turn lane on the R403 northbound has been modelled as having an indicative right turn arrow. This arrow would show with a general green for Stage 1 before turning off in Stage 2, with only the general green remaining on. This allows for right turns in gaps, increasing junction efficiency. A pedestrian only stage has been included in the analysis with a total stage length of 15s.

The junction was optimised to maximise capacity with the signal timings as per Figures 6 and 7 below.

Figure 6 – Proposed AM Signal Timings

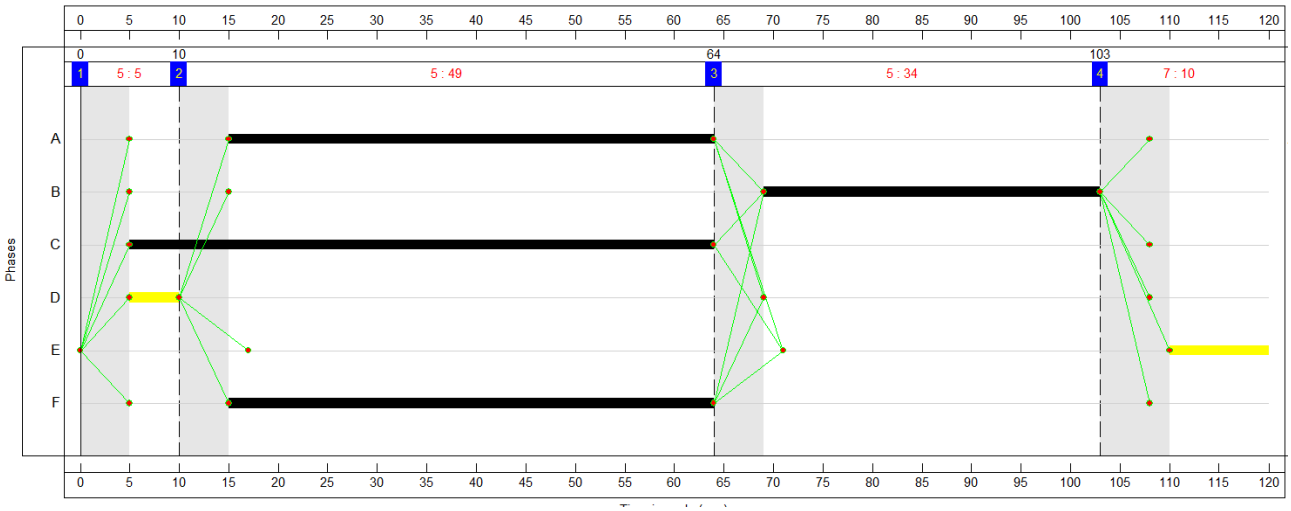
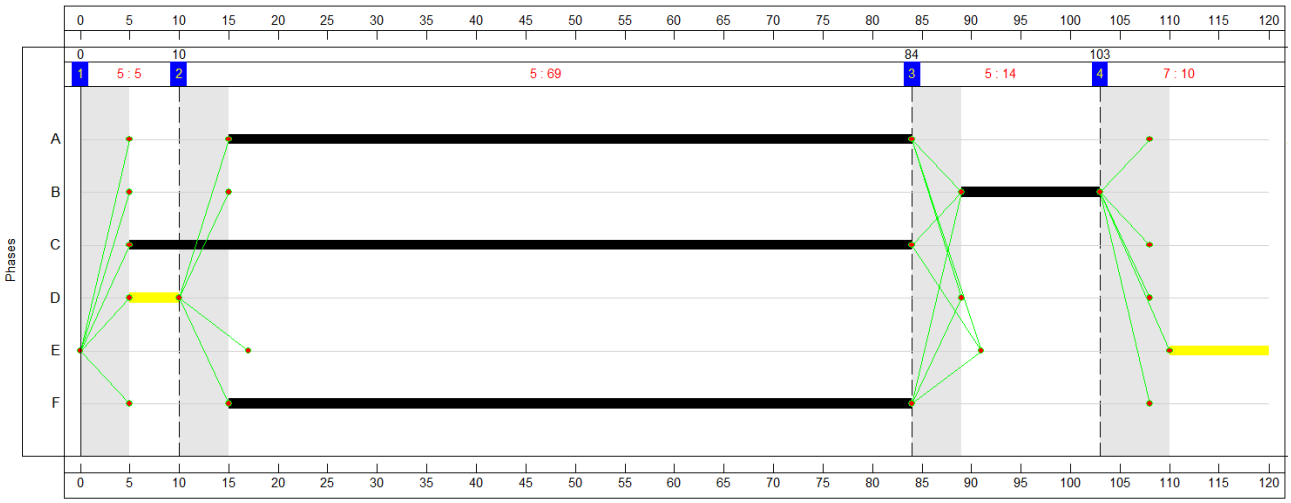


Figure 7 – Proposed PM Signal Timings



4.3. Junction Analysis Results

The results of the Linsig analysis of the junction for the design year are summarised in Table 5 below.

Table 5. Junction Analysis Summary

Results Per Lane	Degree of Saturation (%)		Mean Max Queue (pcu)		Delay (pcuHr)	
	AM	PM	AM	PM	AM	PM
R403 Northbound Right/Ahead	82.7%	63.6%	22.6	9.6	8.3	3.7
R403 Southbound Left/Ahead	75.0%	88.2%	15.6	26.2	6.7	9.2
Celbridge Link Road Right/Left	81.8%	84.4%	12.3	5.8	7.3	6.1
Overall Junction Results						
Cycle Time (s)					120	120
Total Demand (pcu)					2031	2077
PRC (%)					8.9%	2.1%
Total Delay (pcuHr)					22.3	19.0
Average Delay (s/pcu)					39.5	32.9

4.4. Summary

From the results above, the junction has adequate capacity to cater for the likely traffic volumes experienced in 2032 following completion of the entire Adamstown SDZ development.

The PM Peak hour has a lower practical reserve capacity than in the AM peak with 2.1% as opposed to 8.9%, however, the overall delay experienced at the junction is lower in the PM Peak.

The maximum degree of saturation experienced by any arm is 88.2% for the R403 southbound in the PM Peak. This is associated with the large number of left turning traffic accessing the Celbridge Link Road towards Adamstown.

While some queueing and delays are shown by the model, these are generally considered to be within acceptable limits. It is likely that the pedestrian stage will not be called in every cycle, given the location of the junction, which will improve junction efficiency further.

5. Conclusion

The proposed Celbridge Link Road will link to the existing R403 regional road by means of a new signalised junction. Traffic counts were carried out on the R403 at this location to determine the current volumes of traffic using this road. The number of trips generated by the proposed Adamstown SDZ developments were calculated and distributed to determine the volume of traffic using the Celbridge Link Road to access the Adamstown SDZ lands.

Using these traffic volumes, a Linsig model of the proposed junction was developed based on the geometry and layout on Pat O'Gorman & Associates Drawing 1772-1500. The Linsig model indicates that the proposed junction layout has adequate spare capacity for the anticipated traffic volumes in 2032, following construction of all developments within the Adamstown SDZ. Queueing and delays experienced at the junction are also within acceptable limits.