10.0 CLIMATE

10.1 Introduction

This chapter assesses the likely climate impacts associated with the proposed development at Back Road, Broomfield, Malahide, Co. Dublin. A full description of the development is available in Chapter 2.

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10.2 Methodology

10.2.1 Criteria for Rating of impacts

10.2.1.1 Climate Agreements

Ireland is party to both the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol. The Paris Agreement, which entered into force in 2016, is an important milestone in terms of international climate change agreements and includes an aim of limiting global temperature increases to no more than 2°C above pre-industrial levels with efforts to limit this rise to 1.5°C. The aim is to limit global GHG emissions to 40 gigatonnes as soon as possible whilst acknowledging that peaking of GHG emissions will take longer for developing countries. Contributions to GHG emissions will be based on Intended Nationally Determined Contributions (INDCs) which will form the foundation for climate action post 2020. Significant progress was also made in the Paris Agreement on elevating adaption onto the same level as action to cut and curb emissions.

In order to meet the commitments under the Paris Agreement, the EU enacted *Regulation (EU) 2018/842 on binding annual greenhouse gas emission reductions by Member States from 2021 to 2030 contributing to climate action to meet commitments under the Paris Agreement and amending Regulation (EU) No. 525/2013* (the Regulation). The Regulation aims to deliver, collectively by the EU in the most cost-effective manner possible, reductions in GHG emissions from the Emission Trading Scheme (ETS) and non-ETS sectors amounting to 43% and 30%, respectively, by 2030 compared to 2005. Ireland's obligation under the Regulation is a 30% reduction in non-ETS greenhouse gas emissions by 2030 relative to its 2005 levels.

In 2015, the Climate Action and Low Carbon Development Act 2015 (No. 46 of 2015) (Government of Ireland, 2015) was enacted (the Act). The purpose of the Act was to enable Ireland '*to pursue, and achieve, the transition to a low carbon, climate resilient and environmentally sustainable economy by the end of the year 2050*' (3.(1) of No. 46 of 2015). This is referred to in the Act as the '*national transition objective*'. The Act made provision for a national mitigation plan, and a national adaptation framework. In addition, the Act provided for the establishment of the Climate Change Advisory

Council with the function to advise and make recommendations on the preparation of the national mitigation and adaptation plans and compliance with existing climate obligations.

The first Climate Action Plan (CAP) was published by the Irish Government in June 2019 (Government of Ireland, 2019a). The Climate Action Plan 2019 outlined the current status across key sectors including Electricity, Transport, Built Environment, Industry and Agriculture and outlined the various broadscale measures required for each sector to achieve ambitious decarbonisation targets. The 2019 CAP also detailed the required governance arrangements for implementation including carbon-proofing of policies, establishment of carbon budgets, a strengthened Climate Change Advisory Council and greater accountability to the Oireachtas. The Government published the second Climate Action Plan in November 2021 (Government of Ireland, 2021a). The plan contains similar elements as the 2019 CAP and aims to set out how Ireland can reduce our greenhouse gas emissions by 51% by 2030 (compared to 2018 levels) which is in line with the EU ambitions, and a longer-term goal of to achieving net-zero emissions no later than 2050. The 2021 CAP outlines that emissions from the Built Environment sector must be reduced to 4 - 5 $MtCO_2e$ by 2030 in order to meet our climate targets. This will require further measures in addition to those committed to in the 2019 CAP. This will include phasing out the use of fossil fuels for the space and water heating of buildings, improving the fabric and energy of our buildings, and promoting the use of lower carbon alternatives in construction.

Following on from Ireland declaring a climate and biodiversity emergency in May 2019 and the European Parliament approving a resolution declaring a climate and environment emergency in Europe in November 2019, the Government approved the publication of the General Scheme in December 2019 followed by the publication of the Climate Action and Low Carbon Development (Amendment) Act 2021 in July 2021 (Government of Ireland, 2021b). The 2021 Climate Act was prepared for the purposes of giving statutory effect to the core objectives stated within the CAP.

The purpose of the 2021 Climate Act is to provide for the approval of plans '*for the purpose of pursuing the transition to a climate resilient, biodiversity rich and climate neutral economy by no later than the end of the year 2050*'. The 2021 Climate Act will also '*provide for carbon budgets and a decarbonisation target range for certain sectors of the economy'.* The 2021 Climate Act defines the carbon budget as '*the total amount of greenhouse gas emissions that are permitted during the budget period'.*

The 2021 Climate Act removes any reference to a national mitigation plan and instead refers to both the Climate Action Plan, as published in 2019, and a series of National Long Term Climate Action Strategies. In addition, the Environment Minister shall request each local authority to make a 'local authority climate action plan' lasting five years and to specify the mitigation measures and the adaptation measures to be adopted by the local authority.

The impact of the proposed development on climate has been assessed in relation to Ireland's commitments and obligations under the above policies and legislation.

10.2.2 Construction Stage

The impact of the construction phase of the development on climate was determined by a qualitative assessment of the nature and scale of greenhouse gas generating construction activities associated with the proposed development.

The UK Highways Agency has published an updated DMRB guidance document in relation to climate impact assessments *LA 114 Climate* (UK Highways Agency 2019). The following scoping criteria are used to determine whether a detailed climate assessment is required for a proposed project. If any of the road links impacted by the proposed development meet or exceed the below criteria, then further assessment is required.

- A change of more than 10% in AADT;
- A change of more than 10% to the number of heavy duty vehicles; and
- A change in daily average speed of more than 20 km/hr.

The construction phase traffic was reviewed against the above criteria and it was found that none of the road links will experience a change greater than the criteria above. Therefore, modelling of construction phase traffic emissions was not required as there is no potential for significant impacts to climate as a result of traffic emissions.

10.2.3 Operational Stage

Ireland has annual GHG targets which are set at an EU level and need to be complied with in order to reduce the impact of climate change. Impacts to climate as a result of GHG emissions are assessed against the targets set out by the EU under *Regulation (EU) 2018/842 on binding annual greenhouse gas emission reductions by Member States from 2021 to 2030 contributing to climate action to meet commitments under the Paris Agreement and amending Regulation (EU) No. 525/2013*. Which has set a target of a 30% reduction in non-ETS sector emissions by 2030 relative to 2005 levels.

As per the EU guidance document *Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment* (European Commission, 2013) the climate baseline is first established by reference to EPA data on annual GHG emissions (see Section 10.3.1). Thereafter the impact of the proposed development on climate is determined. Emissions from road traffic associated with the proposed development have the potential to emit carbon dioxide (CO_2) which will impact climate.

The operational phase traffic was reviewed in line with the DMRB screening criteria detailed in Section 10.2.2. There are a number of road links that will experience a change in AADT of over 10% and therefore a detailed climate assessment is required. The impact of the proposed development at a national / international level has been determined using the procedures given by Transport Infrastructure Ireland (2011) and the methodology provided in Annex D in the UK Design Manual for Roads and Bridges (UK Highways Agency, 2007). The assessment focused on determining the resulting change in emissions of carbon dioxide (CO_2). The Annex provides a method for the prediction of the regional impact of emissions of these pollutants from road schemes and can be applied to any development that causes a change in traffic. The inputs to the dispersion model consist of information on road link lengths, AADT movements and annual average traffic speeds (see Table 10.1).

The EU guidance (2013) also states indirect GHG emissions as a result of a development must be considered, this includes emissions associated with energy usage. The Building Lifecycle Report prepared by MCORM Architects in relation to the proposed development has been reviewed and used to inform the operational phase climate assessment. This report outlines a number of measures in

relation to building materials and energy usage from the proposed development primarily in relation to heat and electricity. A number of measures have been incorporated into the overall design of the development to reduce the impact to climate where possible.

Table 10-1. Traffic Data used in Climate Assessment

Road Name	Speed (kph)	% HGV	Base	Do Nothing		Do Something (Sensitivity)	
			2021	2026	2041	2026	2041
R107 Malahide Road (N)	60	2.15%	9,903	10,773	12,139	10,908	13,432
L2110 Kinsealy Lane	50	2.54%	2,333	2,598	2,920	2,926	3,288
Back Road (W)	60	2.90%	6,637	7,438	8,354	8,048	9,311
Broomfield LAP Access Road	30	8.55%	599	1,099	1,182	1,918	2,000
Back Road (W)	60	2.65%	5,940	6,784	7,604	7,421	8,528
L2110 Kinsealy Lane (N)	50	2.44%	2,029	2,270	2,550	2,603	2,943
Hazelbrook Access Road	30	6.52%	406	466	522	745	801
L2110 Kinsealy Lane (S)	50	1.86%	1,996	2,258	2,533	2,476	2,792

10.3 Receiving Environment

10.3.1 Climate Baseline

Anthropogenic emissions of greenhouse gases in Ireland included in the EU 2020 strategy are outlined in the most recent review by the EPA which details provisional emissions up to 2020 (EPA, 2021a). The data published in 2021 states that Ireland will exceed its 2020 annual limit set under the EU's Effort Sharing Decision (ESD), 406/2009/EC1 by an estimated 6.73 Mt. For 2021, total national greenhouse gas emissions are estimated to be 57.70 million tonnes carbon dioxide equivalent (Mt CO_2eq) with 44.38 MtCO_2eq of emissions associated with the ESD sectors for which compliance with the EU targets must be met. Agriculture is the largest contributor in 2021 at 37.1% of the total, with the transport sector accounting for 17.9% of emissions of CO_2.

GHG emissions for 2020 are estimated to be 3.6% lower than those recorded in 2019. Emission reductions have been recorded in 6 of the last 10 years. However, compliance with the annual EU targets has not been met for five years in a row. Emissions from 2016 – 2020 exceeded the annual EU targets by 0.29 MtCO_2eq, 2.94 MtCO_2eq, 5.57 MtCO_2eq,6.85 MtCO_2eq and 6.73 MtCO_2eq respectively. Agriculture is consistently the largest contributor to emissions with emissions from the transport and energy sectors being the second and third largest contributors respectively in recent years.

The EPA 2020 GHG Emissions Projections Report for 2020 – 2040 (EPA, 2021b) notes that there is a long-term projected decrease in greenhouse gas emissions as a result of inclusion of new climate mitigation policies and measures that formed part of the National Development Plan (NDP) which was published in 2018 and the Climate Action Plan published in 2019. Implementation of these are classed as a "*With Additional Measures scenario*" for future scenarios. A change from generating electricity using coal and peat to wind power and diesel vehicle engines to electric vehicle engines are envisaged under this scenario. While emissions are projected to decrease in these areas, emissions from

agriculture are projected to grow steadily due to an increase in animal numbers. However, over the period 2013 to 2020 Ireland is projected to cumulatively exceed its compliance obligations with the EU's Effort Sharing Decision (Decision No. 406/2009/EC) 2020 targets by approximately 12.2MtCO_2eq under the "With Existing Measures" scenario and under the "With Additional Measures" scenario. The projections indicate that Ireland can meet its non-ETS EU targets over the period 2021 – 2030 assuming full implementation of the 2019 Climate Action Plan and the use of the flexibilities available (EPA, 2021b).

10.4 Characteristics of the Proposed Development

The proposed development is located on lands at Back Road, Broomfield, Malahide, Co. Dublin. The proposed development will consist of the demolition of the former clubhouse building on site and the proposed construction of 415 no. residential units comprising 252 no. houses and associated car parking, 28 no. duplex units and 135 no. apartments Blocks A & B providing ancillary amenity facilities, all provided with private balconies/terraces and associated car parking and bicycle parking; 1 no. childcare facility; landscaping including play equipment; boundary treatments; public lighting; and all associated site infrastructure and engineering works necessary to facilitate the development including proposed connection to permitted upgrades to existing foul network along Kinsealy Lane. A full description of the development is available in Chapter 2.

Impacts to climate can occur during both the construction and operational stages of the development. During the construction stage emissions from construction vehicles and machinery have the potential to impact climate. The primary sources of climatic emissions in the operational context are deemed long term and will involve the change in traffic flows or congestion in the local areas which are associated with the development. The following describes the primary sources of potential climate impacts which have been assessed as part of this EIAR.

10.5 Potential Impacts

10.5.1 Construction Phase

There is the potential for a number of greenhouse gas emissions to atmosphere during the construction of the development. Construction vehicles, generators etc., may give rise to CO_2 and N_2O emissions. The Institute of Air Quality Management document *Guidance on the Assessment of Dust from Demolition and Construction* (IAQM, 2014) states that site traffic and plant is unlikely to make a significant impact on climate. In addition, the construction stage traffic has been screened out of a detailed climate assessment as it does not meet the DMRB screening criteria detailed in Section 10.2.2 of this guidance. Therefore, the impact on climate is considered to be neutral, imperceptible, and short term.

10.5.2 Operational Phase

Climate change has the potential to alter weather patterns and increase the frequency of rainfall in future years. As a result of this there is the potential for flooding related impacts on site in future years. However, adequate attenuation and drainage have been provided for to account for increased rainfall in future years as part of the design of this development. Therefore, the impact will be long-term, localised, neutral and imperceptible.

There is also the potential for increased traffic volumes to impact climate. The predicted concentrations of CO_2 for the future years of 2026 and 2041 are detailed in Table 10.2. These are significantly less than the 2026 and 2030 targets set out under EU legislation (targets beyond 2030 are not available). It is predicted that in 2026 the proposed development will increase CO_2 emissions by 0.00011% of the EU 2026 target. Similarly low increases in CO_2 emissions are predicted to occur in 2041 with emissions increasing by 0.00023% of the EU 2030 target. Therefore, the potential climate impact of the proposed development is considered negative, long-term and imperceptible.

The proposed development has been designed to reduce the impact to climate where possible. A number of measures have been incorporated into the design to ensure the operational phase emissions are minimised. These are outlined within the Building Lifecycle Report prepared by MCORM Architects and are summarised below.

The development will be a Nearly Zero Energy Building (NZEB) in accordance with the 2019 Part L requirements. Each building will have a Building Energy Rating (BER) of A2/A3. The construction materials chosen for the development will have a long-term durability and low maintenance requirement where possible which will lower the overall operational phase embodied carbon of the development as materials will not require replacement as frequently. LED lighting will be utilised where possible which is more energy efficient than traditional light bulbs. Condensing boilers are being investigated as they are more energy efficient than standard boilers and have a lower fuel consumption. Natural ventilation is being considered where possible, if mechanical ventilation is required a low energy system will be utilised. Renewable technologies are being considered where practicable in the form of PV solar panels. Electric vehicle charging points will be incorporated into the development to promote more sustainable modes of transport, bicycle parking will also be provided. In addition, the development is located within close proximity to a number of public transport routes including bus and rail which will also reduce the requirement for private vehicle use. Overall, these measures will aid in reducing the impact to climate during the operational phase of the proposed development.

Table 10-2. Climate Impact Assessment

Year	**Scenario**	**CO_2 (tonnes/annum)**
2026	Do Nothing	547
	Do Something	590
2041	Do Nothing	615
	Do Something	691
Increment in 2026		42.4 Tonnes
Increment in 2041		75.4 Tonnes
Emission Ceiling (kilo Tonnes) 2026		37,869 [Note 1]
Emission Ceiling (kilo Tonnes) 2030		33,381 [Note 1]

Impact in 2026 (%)	0.00011 %
Impact in 2041 (%)	0.00023 %

Note 1 Target under Commission Implementing Decision (EU) 2020/2126 of 16 December 2020 on setting out the annual emission allocations of the Member States for the period from 2021 to 2030 pursuant to Regulation (EU) 2018/842 of the European Parliament and of the Council

10.5.3 Do Nothing Scenario

Under the Do Nothing Scenario no construction works will take place and the previously identified impacts of emissions from equipment and machinery will not occur. Impacts from increased traffic volumes and associated air emissions will also not occur. GHG emissions will follow the predicted trends as outlined in Section 10.3.1. Therefore, this scenario can be considered neutral in terms of climate.

10.6 Mitigation Measures

10.6.1 Construction Phase

Construction stage impacts to climate are considered neutral, however, the following best practice measures are recommended to ensure no significant impacts occur.

- Prevent on-site or delivery vehicles from leaving engines idling, even over short periods.
- Ensure all plant and equipment are serviced regularly and well maintained.
- Minimising waste of materials due to poor timing or over ordering on site will aid to minimise the embodied carbon footprint of the site.

10.6.2 Operational Phase

No mitigation is proposed for the operation phase of the proposed development as it is predicted to have an imperceptible impact on climate. A number of measures have been incorporated into the overall design of the development to reduce impacts to climate during operation.

10.7 Residual Impacts

10.7.1 Construction Phase

According to the IAQM guidance (2014) site traffic and plant are unlikely to make a significant impact on climate during the construction phase. In addition, the construction stage traffic has been screened out of a detailed climate assessment as it does not meet the DMRB screening criteria detailed in Section 10.2.2. Therefore, the potential impact on climate is considered neutral, imperceptible and short-term.

10.7.2 Operational Phase

Modelling of operational phase CO_2 emissions as a result of the traffic associated with the proposed development was carried out to determine the impact to climate. It was found that emissions of CO_2 will increase by an imperceptible amount as a result of the proposed development and are significantly below the EU 2026 and 2030 GHG targets. The operational phase impact to climate is long-term, negative and imperceptible.

In addition, the proposed development has been designed to reduce the impact to climate where possible through incorporated design measures. Full details of all measures included are outlined within the Building Lifecycle Report submitted as part of this planning application.

10.7.3 Cumulative Impacts

10.7.3.1 Construction Phase

Due to the short-term duration of the construction phase and the low potential for significant CO_2 and N_2O emissions cumulative impacts to climate are considered neutral.

10.7.3.2 Operational Phase

The traffic data reviewed for the operational stage impacts to climate included the cumulative traffic associated with other existing and permitted developments in the local area including a potential masterplan residential development at Streamstown. Therefore, the cumulative impact is included within the operational stage impact for the proposed development. The impact is predicted to be long-term, negative and imperceptible with regards to climate.

10.8 Monitoring

No monitoring is recommended.

10.9 References

- Environmental Protection Agency (2021a) Ireland's Provisional Greenhouse Gas Emissions 1990 – 2020
- Environmental Protection Agency (2021b) GHG Emissions Projections Report - Ireland's Greenhouse Gas Emissions Projections 2020 - 2040
- European Commission (2013) Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment
- Government of Ireland (2015) Climate Action and Low Carbon Development Act
- Government of Ireland (2019) Climate Action Plan 2019
- Government of Ireland (2020) Draft General Scheme of the Climate Action (Amendment) Bill 2019
- Government of Ireland (2021a) Climate Action Plan 2020
- Government of Ireland (2021b) Climate Action and Low Carbon Development (Amendment) Act 2021
- UK Highways Agency (2019) UK Design Manual for Roads and Bridges (DMRB) Volume 11 Environmental Assessment, Section 3 Environmental Assessment Techniques, Part 14 LA 114 Climate

11.0 LANDSCAPE AND VISUAL IMPACT

11.1 Introduction

This section of the Environmental Impact Assessment Report (EIAR) has been prepared by Kevin Fitzpatrick Landscape Architects and provides an assessment of the impact that the proposed residential development of lands, over 2 sites, at Broomfield, Malahide, Co. Dublin, will have regarding landscape and visual impacts both during the construction and operation phases.

11.2 Study Methodology

This chapter has been prepared having regard to the following guidelines;

- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (Department of Housing, Planning & Local Government, 2018)
- Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report (European Commission, 2017);
- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports – Draft (EPA, 2017);
- Guidelines for Landscape and Visual Impact Assessment, 3rd Edition (Landscape Inst. + IEMA 2013)

The assessment was carried out by visiting the site and its surroundings in October 2021, by analysis of the proposals through photomontages, plans, aerial photographs, the tree survey by Charles McCorkell Arboricultural Associate Ltd., historic maps and by reference to the Fingal Development Plan 2017 – 2023.

11.2.1 Relevant Legislation and Guidance

The criteria as set out in the current EPA Guidelines on Information to be contained in Environmental Impact Assessment Reports (2017, Draft), Table 3.3 are used in the assessment of the likely impacts.

The subject lands are designated as having a 'Low Lying Character Type' in the Fingal Landscape Character Assessment. The character type is dominated by agricultural land with few protected views or prospects. This Landscape Character type would be considered to have low to medium sensitivity and in general to have a modest value. Principles for development in these LCAs can be summarised as the following:

- The skyline should be protected
- Retention and management of older stocks and belts of trees, retention and management of roadside hedging. Strong planting schemes using native species to integrate new development into the open landscape.

Within the Fingal Development Plan 2017 – 2023 there are no specific landscape objectives that apply to the subject lands. There are several objectives that apply to the general environs of the site and new development which may occur on subject lands listed below.

GIO20:

Require all new development to contribute to the protection and enhancement of existing green infrastructure and the delivery of new green infrastructure, as appropriate.

GIO27:

Provide a range of accessible new parks, open spaces and recreational facilities accommodating a wide variety of uses (both passive and active), use intensities and interests.

GIO36:

Ensure green infrastructure provision responds to and reflects landscape character including historic landscape character, conserving, enhancing and augmenting the existing landscapes and townscapes of Fingal which contribute to a distinctive sense of place.

NHO27:

Protect existing woodlands, trees and hedgerows which are of amenity or biodiversity value and/or contribute to landscape character and ensure that proper provision is made for their protection and management.

NHO34:

Ensure development reflects and, where possible, reinforces the distinctiveness and sense place of the landscape character types, including the retention of important features or characteristics, taking into account the various elements which contribute to their distinctiveness such as geology and landform, habitats, scenic quality, settlement pattern, historic heritage, local vernacular heritage, and-use and tranquillity.

11.3 Receiving Environment

11.3.1 Overview

The site is in the townland of Broomfield, on the outskirts of Malahide, North Dublin approximately 15 kilometres from the city centre and 3km from the Marina at Malahide. The site is located to the immediate South of the Malahide Castle grounds, separated only by Back Road, which connects the town of Malahide to the R107/Malahide Road. The shape of the site is large and irregular, being framed for the most part by low-density residential development to the East and West and existing agricultural land to the South.

The development site is divided into two distinct sections to the North and South, connected by existing roads associated with neighbouring residential developments. The site boundary traces the edges of these roads through 'Ashwood Hall' and 'Brookfield', both of which are permitted developments currently under construction. Due to the shape and location of the development site along with the complex site boundary, the existing boundary types vary significantly. They range from solid structural boundaries to having no physical demarcation at all in some cases.

Northern Section

The northern boundary is formed predominantly by existing vegetation in the form of native hedgerow, thick boundary hedging and existing trees, structural boundaries such as fences and walls associated with the neighbouring residences may also be present here, hidden and overgrown by the vegetation. There is no apparent structural boundary to the south, however there is a drop in level between the subject lands and the neighbouring agricultural field. The south-eastern portion of this earth bank contains emerging trees and scrub vegetation. A circa 2-3m high, green palisade fence defines the eastern site boundary, much of which is partially hidden by emerging native hedgerow and scrub vegetation. This is associated with the DART railway line to the east of the development. The western boundary is dominated by varying forms of existing vegetation such as native hedgerow, mature Leyland and Lawson Cypresses, mature trees such as Ash, Birch, Elm, Oak and Sweet Chestnut and groups of hybrid Poplars. The south-western site boundary is formed by existing vegetation and a partially constructed blockwork boundary wall associated with neighbouring 'Ashwood Hall' development.

Southern Section

There is no permanent structural boundary to the North, however the adjoining development is currently a construction site, therefore there is temporary construction fencing along this boundary. The development site at present is part of an existing agricultural field, as a result of this, there is no structural or vegetative boundary to the South or East. The western site boundary is formed by the boundary walls of the houses in neighbouring residential development 'Hazelbrook'.

11.3.2 Characteristics of the site and its environs

The character of the site and its environs has largely been determined by the following:

- the flat topography of the subject site and its surrounding environs
- a number of large trees along external roads and footpaths, in neighbouring developments and in local green space areas
- a number of large, mature moderate quality trees, native mixed hedgerows and naturally emerging growth on subject lands
- a number of low-density residential developments and individual suburban dwellings located in the immediate area
- close proximity to 'Malahide Castle' and effects of the associated landscape history in the local area
- flat, agricultural land in the immediate and wider area

In the wider environment, the landscape can be divided into residential, agricultural, and recreational green space areas. The area to the North of the subject lands is dominated by 'Malahide Castle' and its associated grounds which now make up a public park. The land-use would be considered recreational green space and is zoned as such in the County Development Plan. Also of importance here are the national heritage features, with the grounds containing a number of heritage monuments and protected trees. The area to the South of the subject lands consists of a large green belt which extends from the coast, north of Portmarnock across the city to Dublin Airport. The green belt as it relates to the subject lands consists predominantly of agricultural land with native hedgerow boundaries, typical of those found in the Irish rural landscape. The coastal suburbs of Malahide and

Portmarnock are located to the East of the subject lands, like any towns they have a mixed-use. The residential settlement here typifies that of suburban Dublin.

Figure 11.1 - Context Map

The site could be considered as consisting of a variety landscape types. Much of the overall site could be considered a transitional landscape, changing from the previous use, which in many cases is still observable, to a state of natural revegetation, where emerging saplings, scrub and noxious weeds are beginning to establish. The northern section of the site has a greater variety of landscape typologies, while the southern section would have only one.

Southern Section

This area is considered to have the typology of an agricultural field, typical of those to be found in many urban fringe and semi-rural parts of North County Dublin.

Northern Section

Here, there are a range of landscape typologies to be found, all of which are in a current state of transition. The remnants of a former GAA pitch are present in the eastern field beside the railway line. Goals, floodlights and a former clubhouse/changing room are all still present, but in a state of disrepair. This points to a former recreational/sports use on the subject lands and may also explain the presence of Leylandiis which have often been used in Irish landscapes to provide windbreaks.

Figure 11.2 – Subject Lands - Landscape Typologies

Figure 11.3 - Former Sports Field

Along the northern site boundary, evidence of residential settlement can be found. The houses are not on subject lands, however the gardens extend back to form a boundary with the proposed development site. Ornamental hedging species such as Beech and Laurel are present and, according to the arborists survey, have a maintained quality. Native hedgerow and emergent native trees such as Ash and Hawthorn are also present. This part of the site would be considered to have the character of a traditional rural residential landscape.

The area to the south can be characterised as a transitional landscape. There is evidence that the site has been used for construction waste and storage, with a large spoil heap located in the south-west corner and vehicular tracks traversing the site. This part of the site appears to have a particularly high

number of noxious weeds and emergent vegetation. There are also remnants of temporary construction fencing/hoarding and other waste dispersed around this region of the subject lands.

Figure 11.4 - Construction Waste and Storage

The western site boundary abuts the open space in the neighbouring development 'Ashwood Hall'. Although this area is not technically within the site boundary, it has an effect on the landscape typology for this part of the site. The existing hedgerow along the western boundary contains many mature trees with species such as Elm, Oak and Sweet Chestnut dominating, these trees would be considered typical parkland species. New trees have been planted as part of the 'Ashwood Hall' development, many of which would also be typically associated with parkland, such as Beech, Field

Maple, Oak and Pine. This part of the subject lands would be considered an emerging parkland landscape.

Figure 11.5 - Emerging Parkland

The site is relatively flat in nature, with the levels falling by circa. 9m across the site from a highest point of +20.00 in the north-east beside the railway line to the lowest point of +11.00 in the south-west beside 'Ashwood Hall'.

11.3.3 Trees and Vegetation

The trees and hedgerows on the subject lands have been surveyed by a qualified arborist (Charles McCorkell Arboricultural Consultancy Ltd) and the arborist's report forms part of this submission. In general, the trees and vegetation are of a mixed quality in terms of their amenity value, health and vigour. There are a total of 23 no. Category B trees with 2 no. Category B Tree Groups, the remainder of the trees, tree groups and hedgerows on site are predominantly Category C. The Category B trees consist of Beech, Birch, Oak, Sweet Chestnut and Sycamore.

Many of the Category B trees can be found along the northern and western site boundaries, while the remainder can be found in clusters within the site.

Each tree is assessed as to their quality and assigned a grading. The grading categories as defined in the Arborists report are listed as follows:

- Category U – Those trees in such a condition that any existing value would be lost within 10 years.
- 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 years life expectancy.
- Category C – Trees of low quality/value with a minimum of 10 years life expectancy.

11.3.4 Landscape Development and History

From an analysis of historic maps, the name 'Broomfield' dates back to the 6-inch maps from the 1830/40s and appears to have been a townland in the Malahide area. Malahide at this time was a much smaller town concentrated on the coast, while the surrounding land was dominated by farmland. The subject lands formed part of 'Broomfield' townland, which consisted of an estate house and cottage, this is now the site of Malahide Community School. The subject lands do not appear drastically different to what we see today. Some sections of the internal hedgerows have been removed; however, the majority still remain. Some of the existing vegetation found on site at present cannot be traced back to the historic maps. The railway line is present in both the 6-inch maps and 25-inch maps; however, it is noted as being 'In Progress', therefore it is unclear to what extent it was built. Malahide Castle is a dominant feature through the series of historic maps. In later 25-inch maps, the castle appears slightly more wooded, with existing woodland along 'Back Road' that we see today being prominent. Expansion of built structures around the castle is also evident.

From studying aerial photography from the last 20-30 years, some changes to the landscape are apparent. The southern field which currently holds spoil and construction detritus was formerly an agricultural field used for a form of crop production. The sports pitch referenced in Section 1.3.2 is visible. In images from the early 2000's the grass seems to be lusher and line markings can be made out, which would suggest more frequent use and maintenance. The residential dwellings formerly to the East of 'Ashwood Hall' and North-West of the subject lands, were present until recent years, most likely being demolished between 2017 to 2021, this area is currently utilised for construction storage. Another prominent change apparent from studying the aerial photography is the maturing of the boundary and internal hedgerows, tree lines and other vegetation on site.

11.3.5 Views and Visibility

In the assessment of the visibility of the subject lands within the site it is noted that that views of the lands from the surrounding lands are extremely limited to non-existent. The lack of vertical features and flat topography of the site contribute to the above, along with the lack of road frontage. The mature tree lines and hedgerows in addition to the extent of the surrounding built development prevents any long-distance views of the subject lands.

11.4 Characteristics of the Proposed Development

The proposed development consists of a total of 415 residential units, comprising 252 houses, 28 duplex units, and 135 apartments. The proposed development will also include the construction of a creche. The development includes all associated site works, boundary treatments, drainage, and additional service connections. The development will utilise the existing entrance from the Back Road that serves the Ashwood Hall development. Although not originally proposed, a secondary access, to the south site from Kinsealy Lane via The Hazelbrook residential development, as instructed by Fingal County Council.

11.4.1 Potential Impact of the Proposed Development

Construction Phase:

- Visual impacts due to the introduction of new structures, access roads, machinery, materials storage, associated earthworks, car parking, lighting and hoarding.
- Change of character due to the change in use.
- Visual impacts due to removal of trees and vegetation.
- Visual impacts as a result of change in ground level and earthworks.

Operational Phase:

- Visual impacts due to the introduction of new buildings and built structures.
- Visual impacts due to the introduction of new roads, infrastructure, parking and lighting.
- Change of character due to the change in use.
- Visual impact of landscape proposals – installation of new trees and vegetation, play spaces, boundaries, hard surfaces, paths, etc.

11.5 Potential Cumulative Impacts

There are no anticipated cumulative impacts arising from the proposed development, or any further development in the locality in relation to landscape and visual impact, other than those noted above.

11.6 Do Nothing Scenario

In the event of this scenario the lands would continue to lie idle and the areas discussed in Section 11.3.2 would continue to fall further into disrepair as scrubland becomes more dominant. As the area has a specific zoning for development it is likely that the site would be developed in the future in a similar scale and type as is currently proposed.

11.7 Mitigation Measures

This section of the report will discuss mitigation measures to reduce the impact of the proposed development on the surrounding water environments during the construction and operation phase.

11.7.1 Incorporated Design Mitigation

- Retention and enhancement of a number of moderate-quality existing trees and incorporation into the landscape design
- Significant level of proposed perimeter planting including native woodland, hedgerow, copses of native trees and formal hedging
- Significant level of proposed street, parkland and ornamental trees within the subject lands
- Significant level of proposed woodland planting

11.7.2 Construction Phase Mitigation

- The protection of existing trees and other vegetation to be retained to BS 5837:2012 standards with the Root Protection Area (RPA) securely protected by fencing for the duration of the construction process.

- Implementation and monitoring of a well-managed and organised construction site, with control of construction activity, traffic, materials storage and lighting with due consideration for neighbouring residences

11.7.3 Operational Phase Mitigation

- Implementation and monitoring of a landscape management plan for the full duration of the defects liability period to ensure successful establishment of all proposed trees and vegetation.
- Periodic tree surveys and implementation of a tree management plan for the mature trees on site to ensure their continuing sustainability.

11.8 Predicted Impacts of the Proposed Development

Landscape assessments measure the sensitivity of specific landscape types and features and describe the nature and significance of changes to that landscape occurring because of a proposed development. In general, it can be assumed that landscape and visual impacts are intrinsically linked however both types of impacts are assessed separately in this study where a development characteristic may result in a starkly different type, quality or magnitude of impact in landscape or visual terms. The assessment of likely significant impacts has been made on the basis that all incorporated design mitigation measures are included.

Character, for the purposes of this assessment refers to the interaction of elements in the landscape that combine to give the area its identity. In this context, impacts on character include the effect on existing land uses and responses that are felt towards the combined effects of the new development.

11.8.1 Construction Phase:

The change of use of the site from its current state to that of a construction site has the potential to result in the following impacts:

<u>Removal of vegetation</u>

As detailed in the Arborists package a number of the existing trees are to be removed due to both tree health and to accommodate the built development. The loss of any trees will normally result in a negative impact on the landscape character. The impact in this instance has been mitigated by design measures including the retention of the highest quality trees and their incorporation into the landscape design along with the planting of a significant amount of newly proposed trees and woodland. The impact would be considered **negative, short-term in duration and slight.**

<u>Change in use to a construction site</u>

The change of use of the site from its existing use to that of a construction site will result in an impact on the landscape character. The level of this impact will be somewhat mitigated by the retention of some of the larger trees and the sites' location away from major roads in the area. Similar construction activities in close proximity to the site and the current state of the subject lands in relation to the construction storage, waste and access would also lessen the impact. The impact would be a **negative and moderate** local impact; however, the impact would only be **short-term** in duration.

11.8.2 Operational Phase:

Impacts on landscape character due to change of landscape type

The character of the subject lands will be significantly changed from its current character to that of a residential scheme with all the associated facilities. As a result of land zoning, development trends in the local area are of both a similar scale and nature. In addition to this, the site is currently unused, overgrown and in disrepair. As described in section 1.3.2 of this report the current landscape has the character of a transitional landscape and therefore its current state is temporary. The proposed scheme includes a comprehensive landscape scheme which includes the retention of many of the highest quality trees on site along with a variety of soft and hard landscaping proposals. These design measures will mitigate the level of impact. The resulting impact would be considered **positive and slight in magnitude in the long-term.**

Landscape and visual impacts due to the introduction of a new landscape

The proposed scheme includes a comprehensive landscape scheme (refer to KFLA drawings 100 – 107 and accompanying reports) which includes the retention and enhancement of the highest quality tees on the subject lands along with a large amount of newly proposed landscape softworks. Included in the proposed landscape scheme are native and ornamental trees, street trees, amenity lawn, native shrubs and perennials, formal boundary hedging, native hedgerow, wildflower meadow, woodland planting and a range of pollinating plants with a complex planting palette. This scheme will significantly enhance local biodiversity, provide a range of high-quality amenity options to the new residents and integrate the proposed structures into the surrounding landscape and suburban context. The impact of the proposed landscape scheme would be considered **positive, long-term, and moderate** in magnitude.

Visual impacts due to the introduction of new buildings and built structures

The subject lands are surrounded by existing development and vegetation, due to its lack of public road frontage, visibility of the application site from the public realm is restricted by intervening development and trees.

The extent of potential visual impact of the proposed development on the built environment from 6 representative view locations around the proposed development and is discussed below. The view locations assessed are representative of locations from which it was suggested by mapping analysis that development might be visible. Photomontages, prepared by Digital Dimensions Ltd. and included in Appendix 11.1, from these locations are included with this submission as a separate A3 document.

Assessment of visual impacts from specific locations

Figure 11.6 - Proposed Viewpoints (Verified Views labelled 1-6)

The proposed development will not be visible from any of the view locations shown in Figure 11.6 above. Intervening development and existing trees and woodland between the viewpoints and the subject lands deter any views of the proposed development, hence there is no visual impact associated with these views. Refer to Appendix 11.1 for details.

11.9 Worst Case Scenario

The worst-case scenario in relation to landscape and visual impacts during both the construction and operation phases would be the failure to implement the mitigation measures outlined above. This may result in impacts on existing trees to be retained as part of the design scheme, which would have an adverse effect on the existing landscape character. Failure to implement a well-managed construction site would also likely increase negative visual impacts associated with the construction process.

11.10 Monitoring

Contracts will ensure good working practices to reduce any negative impacts arising from construction to the lowest possible level and to ensure that all machinery operates within clearly defined construction area. Storage areas will be so located to avoid impacting on sensitive views, trees, hedgerows, drainage patterns etc. and such areas will be fully re-instated prior to at the end of the construction contract. The works will also have continuous monitoring to ensure adequate protection of areas outside of the construction works.

11.11 Reinstatement

On completion of sections of the proposed scheme, any area of landscape will be restored to previous state or enhanced as part of the new landscape scheme.

11.12 Interactions

The main interactions relating to this EIAR Chapter are Population and Human Health, Biodiversity and Cultural Heritage.

Interactions between landscape and Population and Human Health have been considered. Landscape has the potential to impact greatly on human health by providing external spaces which provide for communities in various ways such as recreational use, visual enhancement of streets and external spaces, sports and play facilities and so on. The landscape mitigation measures include a significant amount of designed usable spaces for both future and existing residents which will have a long-term and moderate positive impact on Population and Human Health.

Interactions between landscape and biodiversity have been considered. An adverse impact to the biodiversity of the lands during either the construction or operational phases has the potential to negatively impact the landscape character. The landscape mitigation measures will ensure that where possible the existing trees on site are retained, and a new planting scheme is proposed that will improve and extend the area native planting area on the subject lands. Therefore, the measures proposed to mitigate impact on the landscape character will result in a positive impact on the biodiversity value of the lands. This impact would be considered moderate in magnitude and long-term in duration.

Interactions between landscape and cultural heritage have been considered. The proposed development has the potential to impact on cultural heritage in the local area. Landscape character, history and visual characteristics can be considered a part of cultural heritage. The proximity of the subject lands to historic landscape spaces, namely Malahide Castle and its associated parkland could all be considered to have a potential impact on cultural heritage. Furthermore, the landscape mitigation measures include their retention and incorporation into the landscape scheme which will have a positive impact on cultural heritage.

11.13 Difficulties Encountered

There were no particular difficulties encountered compiling the Water chapter of the EIAR.

11.14 References

- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (Department of Housing, Planning & Local Government, 2018)
- Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report (European Commission, 2017);
- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports – Draft (EPA, 2017);
- Guidelines for Landscape and Visual Impact Assessment, 3rd Edition (Landscape Inst. + IEMA 2013)

12.0 TRAFFIC AND TRANSPORT

12.1 Introduction

This chapter of the EIAR assesses the likely traffic and transportation impacts on the receiving environment during the construction and operational phases of the proposed development. The existing and proposed transport infrastructure in the area is described, and an assessment of the current and the future traffic environment is made. The impact of the development in terms of public transportation, pedestrian and cycle is also assessed.

The chapter describes: the methodology; the receiving environment at the application site and surroundings; the characteristics of the proposal in terms of physical infrastructure; the potential impact that proposals of this kind would be likely to produce; the predicted impact of the proposal examining the effects of the proposed development on the local road network; the remedial or reductive measures required to prevent, reduce or offset any significant adverse effects; and the monitoring.

12.2 Assessment Methodology

The following methodology has been adopted for this assessment:

- Review of relevant available information including, current Development Plan, existing traffic information and other relevant studies;
- Site visit to gain an understanding of the site access and observe the existing traffic situation;
- Consultations with Fingal County Council Road Department to agree the site access arrangements and determine the scope of the traffic analysis required to accompany a planning application;
- Detailed estimation of the transport demand that will be generated by the development. The morning and evening peak times will be addressed as well as an estimation of under-construction and potential future developments in the surrounding area.
- Assessment of the impact of traffic on local junctions, car parking requirements and accessibility of the site by sustainable modes including walking, cycling and public transport.

12.3 Receiving Environment

This section reviews the baseline conditions, providing backing information for the site in order to determine the significance of any traffic implications. It also considers the existing accessibility of the site by sustainable modes of transport.

12.3.1 Site Location

The subject site is located in Broomfield, Malahide, Co. Dublin. The development entrance is from Back Road, 0.55km east of the junction between Back Road and Kinsealy Lane.

The overall proposed development is divided into 2 sites, as shown in the Figure below.

The north site is located between the existing Ashwood Hall residential development to the west and the Dublin-Belfast rail line to the east, with agricultural land to the south and residential properties and Back Road to the north.

The southern site is bounded by the Hazelbrook development to the west, Brookfield Residential development to the north and agricultural lands to the south and east.

Figure 12.1 | Proposed Development Location

12.3.2 Local Road Network

The site is located 2.6km south-west of Malahide Town centre and is in close proximity to regional roads including the R107 Malahide Road, Back Road, Streamstown Lane, Careys Lane and Feltirim Road which serve the area with residential, commercial, and agricultural lands.

R107 (Malahide Road)

R107 Malahide Road is a regional road in north Dublin which runs for approximately 10.5km from Fairview to Malahide. The speed limit along the R107 adjacent to the site is 60kph. This road is approximately 700m in length from the priority-controlled junction with Back Road through to a signalised junction with R106 Swords Road. Along this section, R107 Malahide Road comprises a carriageway of c. 7.5m wide with a narrow footpath provided on the western side. No cycle lanes are provided.

Back Road

Back Road is a single carriageway road running west-east for approximately 1.8km from the priority junction with R107 Malahide Road through to a priority junction with R124 The Hill. This road, which crosses the railway line via an existing bridge, currently comprises a carriageway of approximately 7.30m with narrow footpaths running along both sides of the road for the majority of its length.

Kinsealy Lane

Kinsealy Lane is a local road running north-south for approximately 1.8km from a priority junction with Back Road through to a priority junction with Chaple Road. This road is currently comprising a carriageway of approximately 5.50m with no footpaths for the majority of the road.

The Hill Road

The Hill Road is a single carriageway road running north-south for approximately 3.2km from a priority junction with St. Margarets Park to a priority junction with the Chapel Road. This road currently comprises a carriageway of approximately 7.00m with narrow footpaths running along both sides of the road for the majority of its length.

12.3.2 Baseline Traffic data

In order to determine the volume of traffic movements at key points on the road network surrounding the subject site, traffic count data has been assessed for the following three junctions:

- **Junction 1**: R107 Malahide Road / Back Road
- **Junction 2**: Back Road / Kinsealy Lane
- **Junction 3**: Back Road / Broomfield Access Road
- **Junction 4**: Back Road / The Hill
- **Junction 5**: Kinsealy Lane / Hazelbrook

Figure 12.2 | Junctions Assessed

A summary of the baseline two-way flows and the two-way flow expected to be generated by the proposed + committed and potential future developments in the local area are presented below in Table 12.1 for Junction 1, Table 12.2 for Junction 2, Table 12.3 for Junction 3, Table 12.4 for Junction 4 and Table 12.5 for Junction 5.

Description	Total Junction Two Way Flow (Veh)	Proposed + Committed + Future Developments Two Way Flow (Veh)	% Traffic increase
AM Peak Hour (08:00 - 09:00)	1,098	108	10%
PM Peak Hour (18:00 - 19:00)	1,066	118	11%

Table 12.1 | Summary Results for Junction 1

Description	Total Junction Two Way Flow (Veh)	Proposed + Committed + Future Developments Two Way Flow (Veh)	% Traffic increase
AM Peak Hour (08:00 - 09:00)	738	113	15%
PM Peak Hour (18:00 - 19:00)	732	145	20%

Table 12.2 | Summary Results for Junction 2

Description	Total Junction Two Way Flow (Veh)	Proposed + Committed + Future Developments Two Way Flow (Veh)	% Traffic increase
AM Peak Hour (08:00 - 09:00)	534	156	29%
PM Peak Hour (18:00 - 19:00)	570	169	30%

Table 12.3 | Summary Results for Junction 3

Description	Total Junction Two Way Flow (Veh)	Proposed + Committed + Future Developments Two Way Flow (Veh)	% Traffic increase
AM Peak Hour (08:00 - 09:00)	1,109	59	5%
PM Peak Hour (18:00 - 19:00)	1,199	65	5%

Table 12.4 | Summary Results for Junction 4

Description	Total Junction Two Way Flow (Veh)	Proposed + Committed + Future Developments Two Way Flow (Veh)	% Traffic increase
AM Peak Hour (08:00 - 09:00)	259	66	25%
PM Peak Hour (18:00 - 19:00)	204	73	36%

Table 12.5 | Summary Results for Junction 5

Trip generation calculations for the proposed, committed, and potential future developments are presented later in this Chapter.

As recommended in the Transport Infrastructure Ireland (TII) Publication, 'Project Appraisal Guidelines Unit 16.1: Expansion Factors for Short Period Traffic Counts (October 2016)', the traffic count data has been converted to Annual Average Daily Traffic (AADT) data in order to provide a dataset representative of the annual traffic flow profile for the road network surrounding the proposed development.

The General Expansion Factor Method, as outlined in the TII Publication, was used to convert the surveyed flows for the 4 No. junctions into the Annual Average Daily Traffic (ADDT). The corresponding Factors for the Greater Dublin Region were used.

The traffic growth rate of 1.016 used to factor up the 2020 surveyed flows into 2021 is in accordance with the 'Table 6.1: Link-Based Growth Rates: Metropolitan Area Annual Growth Rates' within the TII Publications – Project Appraisal Guidelines for National Roads Unit 5.3 – Travel Demand Projections (May 2019). The ADDT flows are shown below in Tables 12.6, 12.7, 12.8, 12.9 and 12.10.

Hour Ending	Proportion of Daily Traffic	Existing Two-way Flows through Junction 1 (Vehicles)
07:00	0.037	681
08:00	0.077	1,098
09:00	0.081	949
16:00	0.069	1,108
17:00	0.083	1,139
18:00	0.088	1,068
Total	0.435	6,043

Table 12.6 | Junction 1 - R107 Malahide Rd/Back Rd

24 Hour Estimate = 6,043/0.435 = 13,891 vehicles

Weekly Average Daily Traffic (WADT) = 13,891 x 0.99 = 13,753 vehicles

Annual Average Daily Traffic (AADT) = 13,753 x 0.97 = 13,340 vehicles

Hour Ending	Proportion of Daily Traffic	Existing Two-way Flows through Junction 2 (Vehicles)
07:00	0.037	345
08:00	0.077	738
09:00	0.081	626
16:00	0.069	732
17:00	0.083	648
18:00	0.088	686
Total	0.435	3,775

Table 12.7 | Junction 2 – Back Road/Kinsealy Lane

24 Hour Estimate = 3,775/0.435 = 8,678 vehicles

Weekly Average Daily Traffic (WADT) = 8,678 x 0.99 = 8,591 vehicles

Annual Average Daily Traffic (AADT) = 8,591 x 0.97 = 8,334 vehicles

Hour Ending	Proportion of Daily Traffic	Existing Two-way Flows through Junction 3 (Vehicles)
07:00	0.037	283
08:00	0.077	574
09:00	0.081	438
16:00	0.069	508
17:00	0.083	570
18:00	0.088	495
Total	0.435	2,868

Table 12.8 | Junction 3 – Back Road / Broomfield Site Access Road

24 Hour Estimate = 2,868/0.435 = 6,593 vehicles

Weekly Average Daily Traffic (WADT) = 6,593 x 0.99 = 6,527 vehicles

Annual Average Daily Traffic (AADT) = 6,527 x 0.97 = 6,331 vehicles

Hour Ending	Proportion of Daily Traffic	Existing Two-way Flows through Junction 4 (Vehicles)
07:00	0.037	422
08:00	0.077	1,111
09:00	0.081	764
16:00	0.069	993
17:00	0.083	988
18:00	0.088	1,205
Total	0.435	5,483

Table 12.9 | Junction 4 – Back Road/The Hill

24 Hour Estimate = 5,483/0.435 = 12,605 vehicles

Weekly Average Daily Traffic (WADT) = 12,605 x 0.99 = 12,479 vehicles

Annual Average Daily Traffic (AADT) = 12,479 x 0.97 = 12,104 vehicles

Hour Ending	Proportion of Daily Traffic	Existing Two-way Flows through Junction 2 (Vehicles)
07:00	0.037	137
08:00	0.077	259
09:00	0.081	199
16:00	0.069	193
17:00	0.083	204
18:00	0.088	183
Total	0.435	1,175

Table 12.10 | Junction 5 – Kinsealy Lane/Hazelbrook

24 Hour Estimate = 1,175/0.435 = 2,701 vehicles

Weekly Average Daily Traffic (WADT) = 2,701 x 0.99 = 2,674 vehicles

Annual Average Daily Traffic (AADT) = 2,674 x 0.97 = 2,594 vehicles

Pedestrian and Cycling Facilities

The site is well located to provide non-car access for residents and visitors of the proposed development with good local walk-in access from the local catchment.

Proposals for the Greater Dublin Area Cycle Network Plan were published by the National Transport Authority in December 2013. The plan sets out a vision and a strategy for the construction and/or designation of a comprehensive network of cycling routes throughout the Greater Dublin Area (Counties Dublin, Meath, Kildare, and Wicklow). There are cycle routes available along the roads and through Malahide Castle ground connecting to Malahide Town Centre.

12.3.3 Public Transport Facilities

The assessment of the public transport and the surrounding existing roads, junctions and pathways is shown below. The proposed development has adequate capacity of current public transport infrastructure with access to Malahide Dart Station and several Dublin Bus routes.

Train Services Accessibility

The nearest train station to the subject site is the Malahide station, located approximately 1.6km from the northern site (c. 20-minute walk or c.6-minute cycle) and 2.7km north-east of the southern site (c.34-minute walk or c.10-minute cycle). It is also possible to take the 42 Bus to Malahide Train Station, which reduces the travel time from the northern site from c.20 minutes to c.14 minutes.

The route though Malahide Castle Gardens closes at certain times. The alternative route using The Hill Road is shown in Figure 3 below. It is approximately 1.8km (22-miinute walk or 7-minute cycle) from the proposed site entrance to Malahide Dart Station using this route.

The Malahide Station is served by Commuter Rail and DART services. The Commuter Rail service through Malahide Station serves all main stations from Dundalk through Dublin City Centre to Gorey. The service operates at 3 to 4 services per hour in both direction on weekdays.

The DART service through Malahide Station serves all stations from Malahide through Dublin City Centre to Bray and Greystones. On weekdays, this service operates at a 20-minute frequency in both directions.

Figure 12.3 | Walking Distance to Malahide Train Station

Bus Services Accessibility

The subject site is served by Dublin Bus Routes 42 and 142. Route 42 connects Sand's Hotel in Portmarnock to Talbot Street in Dublin City Centre, and Route 142 connects Portmarnock to UCD Belfield via the Port Tunnel.

The nearest bus stops to the subject site are located on either side of The Hill Road (R124), immediately south of the junction with Back Road. These stops are approximately 900m north-east of the subject site entrance. This equates to a c.9-minute walk from the northern site.

The walking distance to these bus stops from the southern site is longer, approximately 1.7km, which equates to a c.22-minute walk. Residents at the southern site also have the option of walking to bus stops on the Malahide Road (R107), immediately north of the junction with Back Road, which are

served by the 42 Bus Route. The walking route is via Hazelbrook and Kinsealy Lane, and is approximately 1.6km, which equates to a c.20-minute walk.

A summary of the Dublin Bus Route frequencies is presented in the Table below. Travel time on the 42 bus between Malahide and Talbot Street is approximately 42 minutes in either direction, while the travel time on the 142 between Malahide and UCD Belfield is approximately 60 minutes in either direction.

Route No.	From	To	AM Weekday Frequency	PM Weekday Frequency
			(07:00 to 09:00)	*(17:00 to 19:00)*
42	Sand's Hotel (Portmarnock)	Talbot Street	Every 20 minutes	Every 20 to 25 minutes
42	Talbot Street	Sand's Hotel (Portmarnock)	Every 15 to 30 minutes	Every 20 to 25 minutes
142	Portmarnock	UCD Belfield	Bus leaves terminus at: 07:10, 07:35, 07:55	*No evening buses*
142	UCD Belfield	Portmarnock	*No morning buses*	Bus leaves terminus at: 16:35, 17:05

Table 12.11 | Frequency of Dublin Bus Route 42

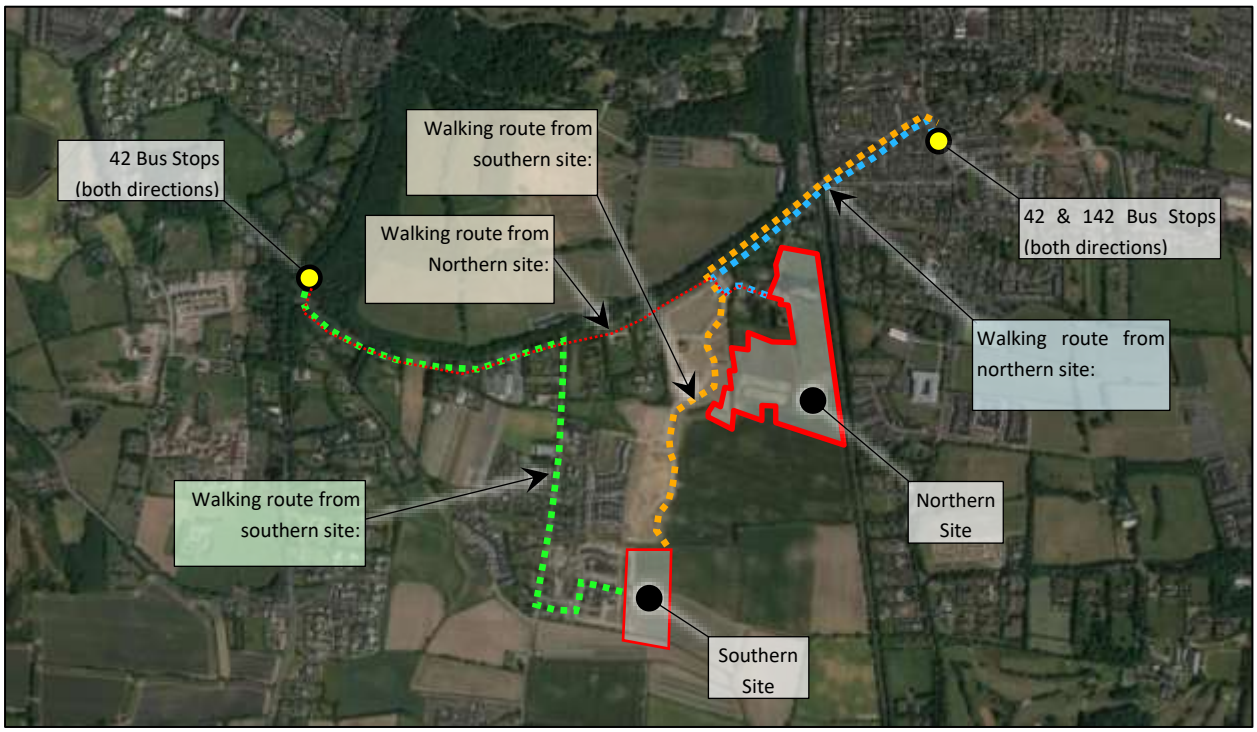

Figure 12.4 | Walking Distance to Nearest Bus Stops

12.4 Characteristics of the Proposal

12.4.1 Introduction

The proposed development consists of two sites. The northern site consists of 328 residential units and a creche approximately 476 sqm. The southern site will consist of 87 residential units. The combined total of proposed development is 415 residential units, comprising of 252 houses, 28 duplex units and 135 apartments, as set out in the Schedule of Accommodation below:

Description	1-bed	2-bed	3-bed	4-bed	5-bed	GFA (Sqm)	Total
Northern Site							
House	-	-	133	36	12	-	181
Duplex	-	6	6	-	-	-	12
Apartment	37	93	5	-	-	-	135
Creche	-	-	-	-	-	476 sqm	-
Northern Total	**37**	**99**	**144**	**36**	**12**	**476sqm**	**328 units 476 sqm**
Southern Site							
House	**-**	**-**	**59**	**12**	**-**	**-**	**71**
Duplex	**-**	**8**	**8**	**-**	**-**	**-**	**16**
Southern Total	**-**	**8**	**67**	**12**	**-**	**-**	**87**
Total Site	**37**	**107**	**211**	**48**	**12**	**476sqm**	**415 units 476 sqm**

Table 12.12 | Schedule of Accommodation

12.4.2 Broomfield Development Lands

Description

In the Fingal Development Plan 2017 – 2023, the Broomfield Development Lands falls within the zoning objective type of:

> *"RA – Residential Area: provide for new residential communities subject to the provision of the necessary social and physical infrastructure.*
>
> *Ensure the provision of high quality new residential environments with good layout and design, with adequate public transport and cycle links within walking distance of community facilities. Provide an appropriate mix of house sizes, types and tenures in order to meet household needs and to promote balanced communities."*

The location of the subject site within the Broomfield Development Lands is shown in the Figure below:

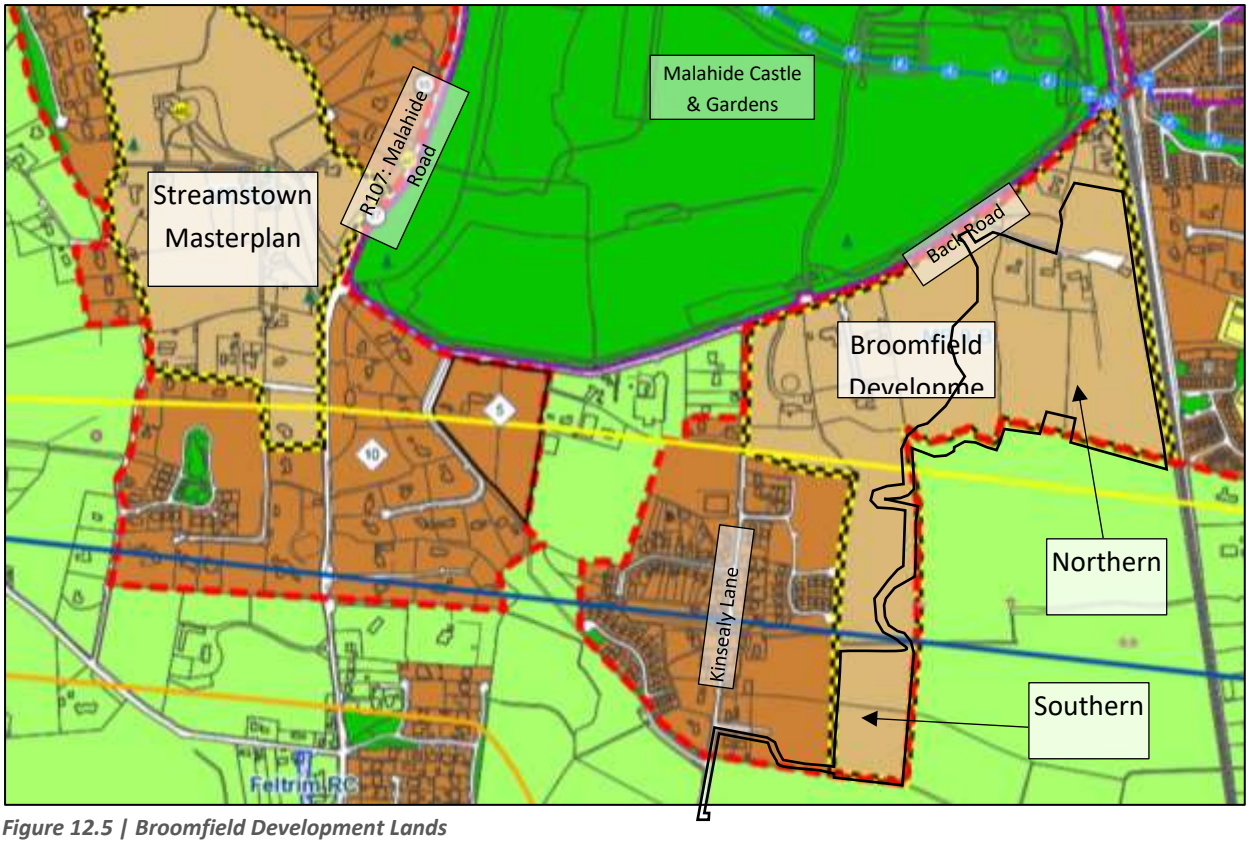

Figure 12.5 | Broomfield Development Lands

12.4.3 Ashwood Hall and Brookfield (Planning. Ref's. F13A/0459 and F13A/0460)

The under-construction Ashwood Hall and Brookfield development of Broomfield Development Lands will comprise a total of 149 residential units (61 dwelling under Planning Reference F13A/0459 and 88 dwellings under Planning Reference F13A/0460). It is expected that Ashwood Hall and Brookfield will be fully developed and occupied by 2023. Ashwood Hall and Brookfield of Broomfield has also been assessed with regards to trip generation/distribution and additional population.

The overall proposal of the approved development of Ashwood Hall and Brookfield (Planning Reference F13A/0459) also includes the upgrade of the existing priority-controlled T-junction between Back Road and Broomfield Access Road to accommodate a right turning lane to facilitate access for traffic travelling from the west on Back Road onto Broomfield lands.

12.4.4 Physical Infrastructure

Internal Road Layout

The proposed road layout incorporates a road hierarchy including link roads, side streets and homezones. Generally, the internal link and side streets are 6.0 m wide, and footpaths are 2.0 m wide. Various traffic calming measures such as the avoidance of long straight sections, raised tables, pedestrian friendly crossings and homezone areas, have been introduced to ensure a design speed of 30 km/h. Pedestrian crossing points are located at various points within the development such that unimpeded pedestrian movement is facilitated.

Site Access Points

Ashwood Hall and Brookfield of the Broomfield Development Plan includes a site access point to the north of the overall site connecting to Back Road and creating a priority T-Junction. The proposed development will connect to this site access point also.

Fingal County Council recommended additional vehicular access to the site is now proposed from Kinsealy Lane, via Hazelbrook during the SHD pre-planning process. This will benefit the southern site for vehicular, pedestrian and cycle access. Fingal County Council requested that a road connects between the north and south sites for Broomfield to increase the permeability of the area including Broomfield and the existing Hazelbrook residential area.

It is considered that the route between the site entrance from the Hazelbrook residential development to the site exit on the north on the Back Road, and vice versa, will not create a "rat-run" if there is any potential build-up of traffic at the Kinsealy Lane-Back Road junction. This is owning to the fact the layout of the proposed route is meandering, and has frequent interruptions such as raised tables, pedestrian crossings and low radii corners which will effectively enforce a slower vehicular speed as per DMURS guidelines discussed further in the reports accompanying this planning application.

Internal Pedestrian and Cyclist Facilities

Footpaths within the proposed development will be provided in accordance with Section 4.3.1 of the Design Manual for Urban Roads and Streets (DMURS) which suggests that a minimum 1.8m footpath should be provided. Crossing points are located at various points within the development such that unimpeded pedestrian movement is facilitated. Accordingly, the proposed development is consistent with the principles outlined in DMURS. A statement in respect of DMURS compliance has been prepared within the DMURS Report which accompanies this application under separate cover.

According to the Fingal County Council Development Plan 2017-2023, the proposed development is required to provide, 163 bicycle parking spaces for residents, 33 bicycle parking spaces for visitors and 2 bicycle parking spaces for the Creche.

When considering the Design Standard for New Apartments standard, the bicycle parking requirement for the proposed development is also 163 spaces for residents but increases to 82 for visitors (1 cycle parking space per bedroom plus 1 cycle space per every two residential units).

The proposed development will provide 227spaces on site. This is provision exceeds both the Fingal Development Plan 2017 – 2023 and the Design Standards for New Apartments requirements and is considered ideal to serve the proposed development. Cycle parking for the dwellings will be provided privately within each house.

Pedestrian Linkages to Surrounding Lands

Using the proposed development access point on Back Road, it is a 1.4km walk (17-minute walk) to the Malahide Town Centre. Along the route to Malahide, a narrow footpath, directly adjacent to the carriageway, is provided on both sides of Back Road. On The Hill Road, a wider footpath is provided along the western side of the carriageway and on both sides of the road until the Malahide. No cycle lanes are provided along the route.

Car Parking Provision

The number of car parking spaces projected to serve the proposed development is presented in Table 12.13 below

Description	No. of Units	Spaces per Unit	Total Spaces
Apartment Blocks A & B	110	1.25	138 (Includes 28 visitor spaces)
Apartment Block C	25	1.25	31 (Includes 6 visitor spaces)
Duplex Block D + creche	24	1.25	28 (Includes 10 visitor/staff parking spaces)
Duplex Block E	16	1.25	20 (Includes 4 visitor spaces)
Houses	252	2	504
Total	415	-	721

Table 12.13 | Proposed Car Parking

As seen from the above table, the proposed will be served with 725 car parking spaces, with 217 being provided for the apartment and Duplex units (1.25 car parking spaces per unit). In-curtilage parking is proposed for each of the houses. The creche includes 6 no. pickup and drop off spaces and 10 staff parking which also serve as visitor parking for Duplex Block D.

There are 8 disabled car parking spaces included in the Apartment/Duplex Blocks. This consists of 1 disabled car parking space per block except 4 disabled car parking spaces for Blocks A and B.

The reduced provision of car parking spaces per apartment reflects the location of the proposed development in relation to public transport services.

As per the Fingal Development 2017 – 2023, One space or more per 100 spaces should be reserved for electric vehicles with charging facilities. Therefore, as part of the proposed development, there will be 7 electric vehicle charging point within the Proposed Development.

12.4.5 Potential Future Developments

In order to provide a robust assessment of the transportation network in the local area, the following potential future developments have also been assessed with regards to trip generation and additional population. The location of these potential future development sites is illustrated in Figure 12.6 below.

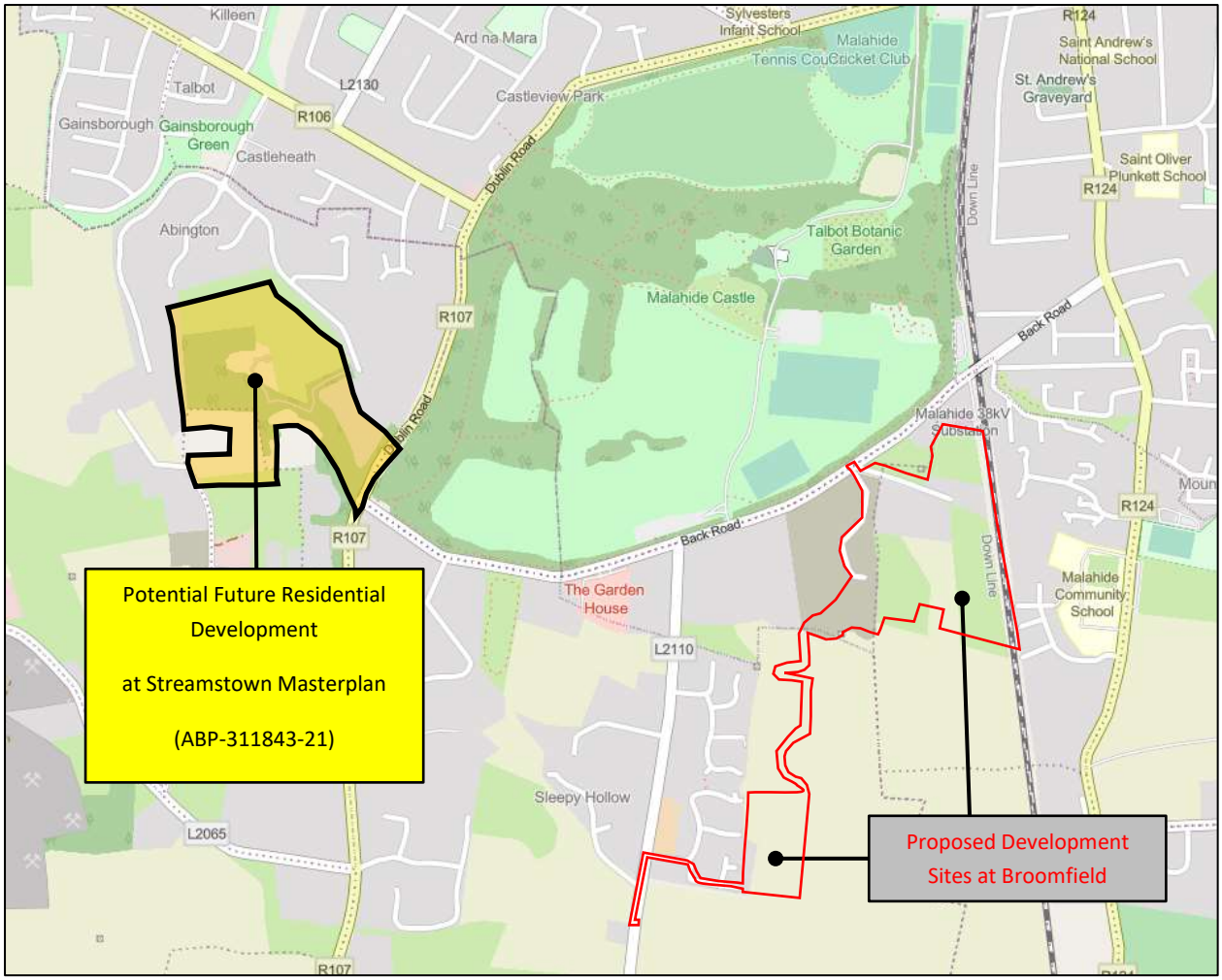

Figure 12.6 *| Location Map for Proposed Development and Potential Future Development Sites.*

Development at Streamstown Masterplan

The first main element of the Streamstown Masterplan as set out in the Fingal Development Plan 2017 - 2023 requires the provision of low-density residential developments reflective of the character of the area. At the time of writing in 2022, some low-density residential units are complete in the Streamstown Masterplan area.

Planning application for a further c. 369 residential units (88 no. houses, 239 no apartments and 42no. duplexes) within Streamstown Masterplan is currently pending, which would result in a population increase of c. 1,218 people when fully completed and occupied.

The planning application for Streamstown was rejected, however, the Streamstown Masterplan has been added to the Strategic Housing Development Plan and there is a potential future development at this location.

Sensitivity Analysis

Due to the additional potential developments in the area and the sensitivity of the road network a sensitivity analysis is include in the traffic and transport assessment. The sensitivity analysis will include the overall Broomfield site including the proposed development and the potential development at Streamstown.

The Sensitivity Analysis will be for the following years:

- Opening Year + 5 Years Forecast: 2031
- Opening Year + 15 Years Forecast: 2041

12.4.6 Trip Generation

In order to assess the likely impact of the traffic generation arising from the proposed development at Broomfield Development Lands Trip Rates were taken from TRICS Database.

TRICS is the national standard of trip generation and analysis in Ireland. It is a database system which allows users to identify representative trip rates and to establish potential levels of trip generation for a wide variety of developments.

TRICS trip rates have been used to estimated apartment trips and for house/duplex trips. These trip rates are shown in Table 12.14 below.

Full TRICS trip rates for apartments, which were sourced from the TRICS version 7.3.2, have been provided in Appendix B.

Use	CAR TRIP RATES				
	08:00 – 09:00		17:00 – 18:00		Source
	IN	OUT	IN	OUT	
Houses	0.147	0.380	0.380	0.194	(F13A/0459 Approved TIA)
Apartments	0.029	0.221	0.221	0.064	TRICS Consultation
Duplexes	0.147	0.380	0.380	0.194	(F13A/0459 Approved TIA)

Table 12.14 | TRICS Car Trip Rates.

Proposed Development

<u>Northern Site</u>

The proposed northern site will comprise a total of 328 no. residential units (181 no. houses, 135 no. apartments, 12 no. duplexes and a creche). The AM and PM peak hour trip generation to/from the proposed development, estimated after the trip rates presented in Table 12.15, is shown in Table 12.16 below.

The creche located in the Northern site is assumed to be used for internal use and therefore no trips will be generated except for staff for the creche.

Use	Units / No. of classrooms	PROPOSED Northern Site			
		08:00 – 09:00		**17:00 – 18:00**	
		IN	**OUT**	**IN**	**OUT**
Houses	181	27	72	69	41
Apartments	135	4	30	30	9
Duplexes	12	2	6	4	0
Creche	8 Classrooms	8	-	-	8
Total	**328 Units 8 No. Classrooms**	**41**	**108**	**103**	**58**

Table 12.15 | Trip Generation – Northern Site

As can be seen from the above, the northern site under the subject application is estimated to generate a total of 159 vehicle movements in the AM peak hour (41 arrivals and 108 departures) and a total of 161 vehicle movements in the PM peak hour (103 arrivals and 58 departures).

Southern Site

The proposed southern site will comprise a total of 89 no. residential units (73 no. houses and 16 no. duplexes). The AM and PM peak hour trip generation to/from the proposed development, estimated after the trip rates presented in Table 9.

Use	Units	PROPOSED Southern Site			
		08:00 – 09:00		**17:00 – 18:00**	
		IN	**OUT**	**IN**	**OUT**
Houses	73	11	29	28	16
Duplexes	16	2	6	6	4
Total	**89**	**13**	**35**	**34**	**20**

Table 12.16 | Trip Generation – Southern Site

As can be seen from the above, the southern site under the subject application is estimated to generate a total of 48 vehicle movements in the AM peak hour (13 arrivals and 35 departures) and a total of 54 vehicle movements in the PM peak hour (34 arrivals and 20 departures).

12.4.7 Trip Distribution

In order to determine the amount of new car trips expected to travel through each surveyed junction in the vicinity of the proposed development site, the calculated car trips for each assessed development have been distributed. These are presented below.

Proposed Development (Current Application)

The trip distribution for the proposed development was assumed based on a number of factors including the existing traffic survey and the location of existing schools, town centres and areas of employment. Based on the traffic survey the majority of traffic will travel south towards Dublin City Centre and this has been taken into account for creating the trip distribution.

Northern Site

The trip distribution for the peak hour generated traffic for the northern site is detailed in Figure 15 below. The northern site is assumed to have 90% of the trips using the northern access point on Back Road and 10% using the southern access point to travel south on Kinsealy Lane. Of the 95% of trips, 30% will travel to/from west on Back Road towards the Hill with 10% travelling to/from the north and 20% travelling to/from south. The other 65% will travel to/from west on Malahide Road with 15% travelling south to/from Kinselay Lane and the 50% continuing onto R107 Malahide Road with 35% travelling to/from south on Malahide Road and the remaining 15% travelling to/from north on Malahide Road.

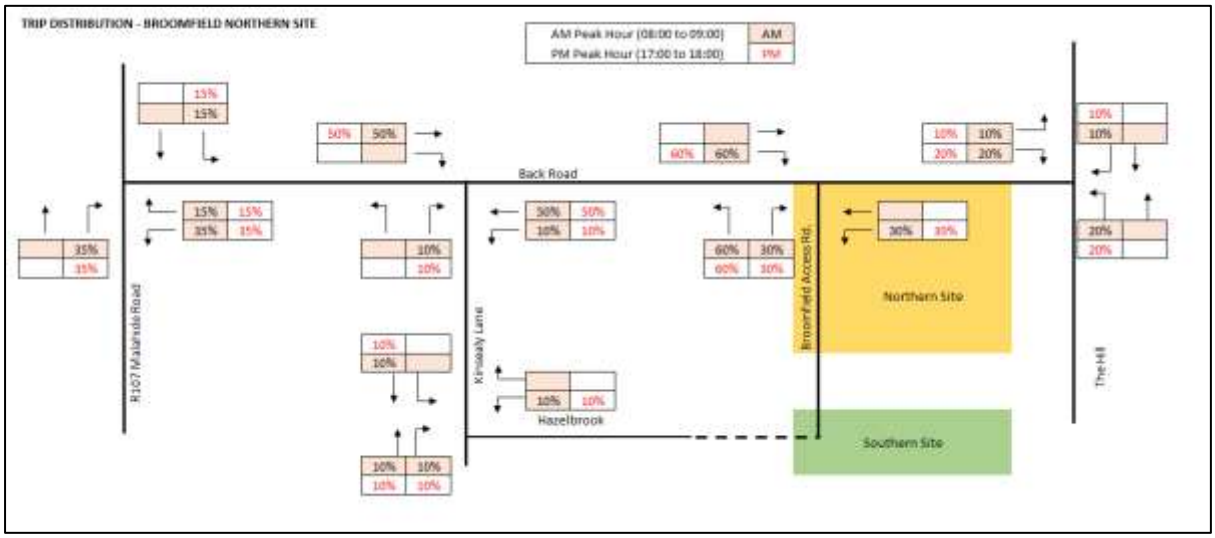

Figure 12.7 | Proposed development – Northern Site trip distribution

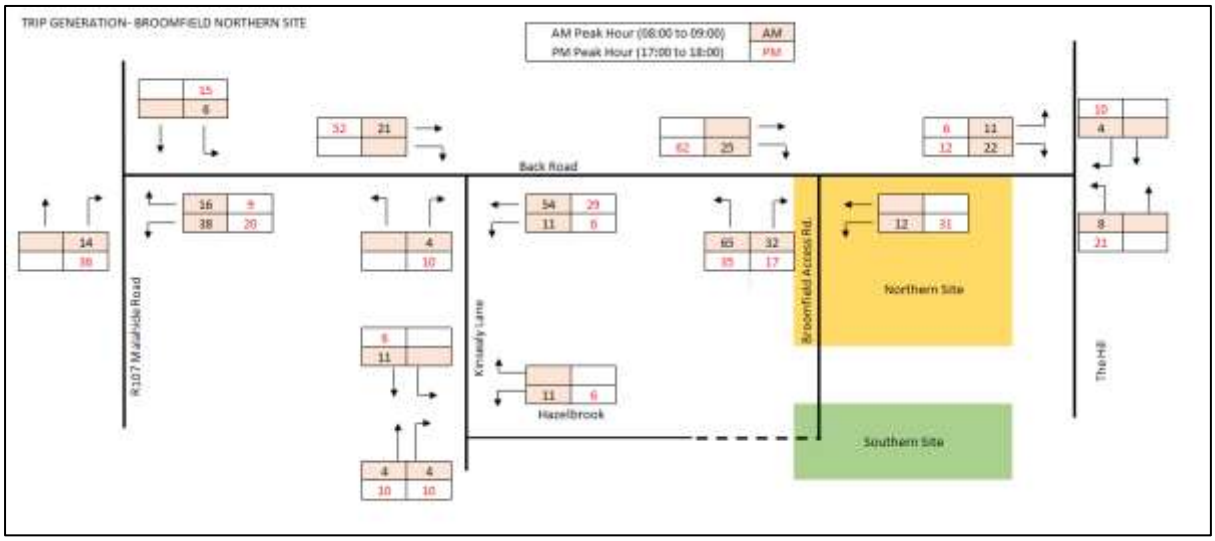

Figure 12.8 | Trip Generation – Proposed Development: Northern Site (Current Application).

Southern Site

The trip distribution for the peak hour generated traffic for the southern site is detailed in Figure 12.9 below. The southern site is assumed to have 90% of the trips using the site access road on Kinsealy Lane and 10% using the site access road on Back Road. Of the 90% of trips, 15% will travel to/from south on Kinsealy Lane and 75% to/from Back Road. On Back Road, 55% will travel west to/from Malahide Road with 40% travelling to/from south on Malahide Road and 15% travelling to/from north on Malahide Road. Of the trips travelling from the Kinsealy Road access point, 20% will travel east on Back Road, joining with the 10% of trips from the site access on Back Road to/from The Hill Road. On The Hill Road, 10% will travel to/from the north and 20% to/from the south.

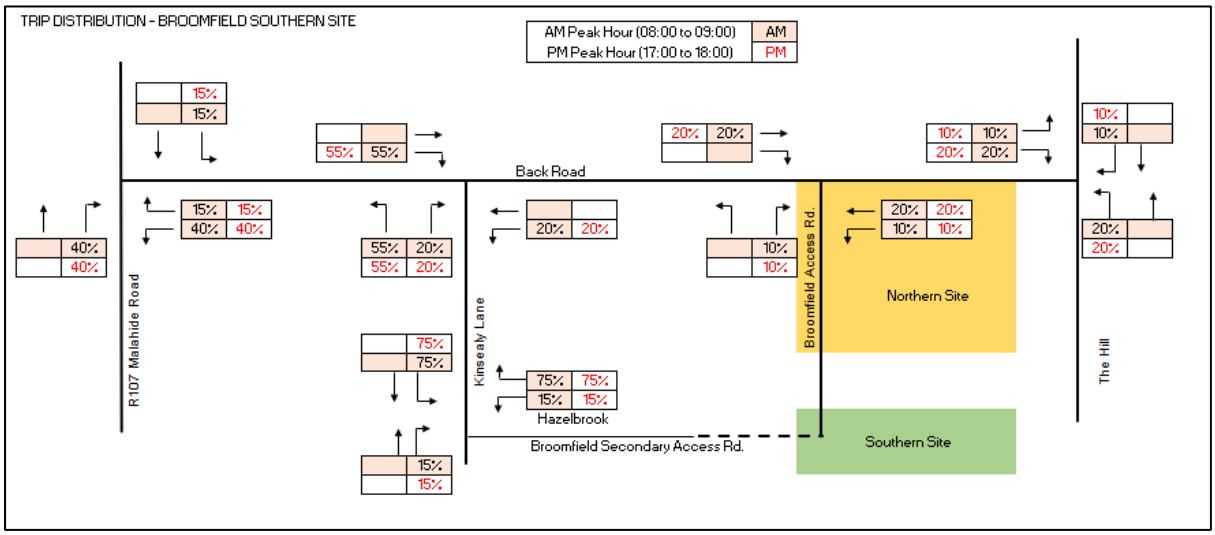

Figure 12.9 | Trip Distribution – Proposed Development: Southern Site (Current Application).

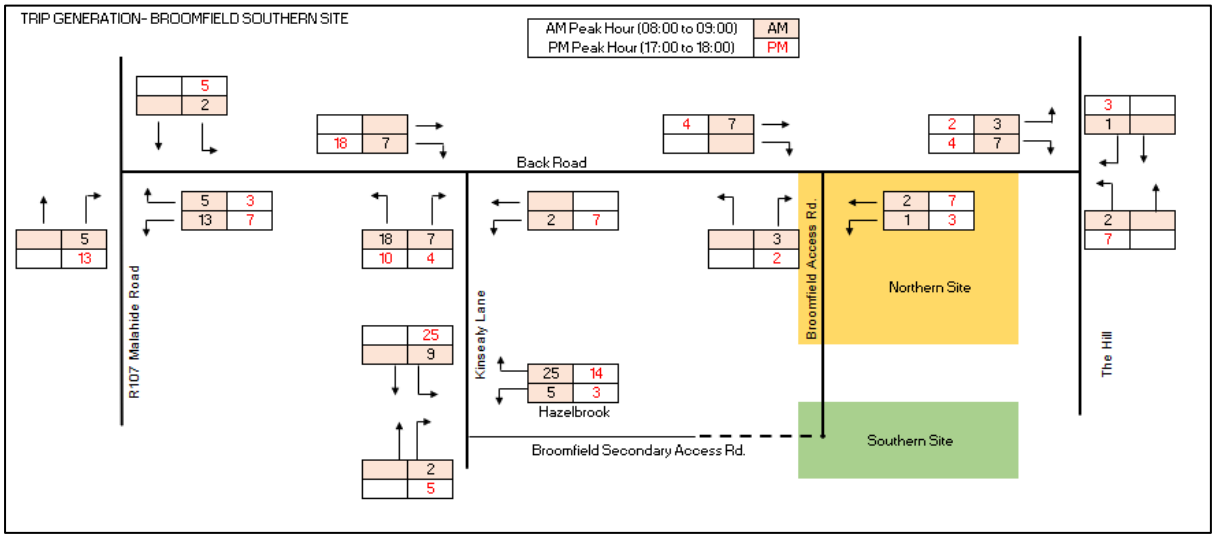

Figure 12.10 | Trip Generation – Proposed Development: Southern Site (Current Application).

12.5 Potential Impact of the Proposal

12.5.1 Introduction

The potential impacts of the proposed development from a traffic and transport perspective at both construction and operational stage are outlined in the following sections.

12.5.2 Traffic Impact

Construction Traffic

There is potential for construction traffic to impact from a noise and dust perspective in relation to the surrounding road network. Deliveries to and from the site by heavy good vehicles will impact on noise levels, whilst dust may result from vehicles travelling along gravel roads. There is also potential for traffic congestion, due to increased heavy good vehicles on the road network which may also perform turning movements, unloading, etc., in areas that impact on traffic. The potential for inappropriate parking whilst waiting for access to the site, may also impact local road users.

There is potential for construction traffic to have a moderate effect on the surrounding environment. However, the duration of this impact will be short-term (i.e., one to three years).

Operation Traffic

The proposed development will generate a number of trips by various modes of travel including vehicular, pedestrian, cycle, and public transport. These trips may have an impact on the surrounding road network and could contribute to increased congestion.

Traffic count data was obtained for the purposes of the planning application. The data surveyed is expected to reflect the peak traffic conditions on the local road network. An estimation of the traffic generation and distribution of the proposed development has been set out in the previous section. This will be compared to the background traffic counts in order to ascertain the impact the proposed development will have on the local road network.

12.5.3 Walking and Cycling Infrastructure

There is a potential of conflict between construction traffic and pedestrian/cyclists using the existing facilities on Back Road. There is also potential for conflicts and disruption to vehicular access, pedestrian and cyclists during the construction works of the proposed site access junction.

12.5.4 Do-Nothing Scenario

Should the proposed development not take place, the access roads and infrastructure will remain in their current state and there will be no change. Background traffic would be expected to grow over time. Given the location and zoning of the subject site, it is reasonable to assume that a similar development, with a potentially more intensive requirement for vehicular trips would be established on this site at some stage in the future.

12.6 Mitigating measures

12.6.1 Introduction

This section of the report discusses mitigation measures to reduce the impact of the proposed development on the surrounding area during the construction and operational phases.

12.6.2 Construction Phase

It is considered that a Construction Management Plan (CMP) will be prepared by the appointed contractor in order to minimise the potential impact of the construction phase of the proposed development on the safety and amenity of other users of the public road. The CMP will consider the following aspects:

- Dust and dirt control measures.
- Noise assessment and control measures
- Routes to be used by vehicles
- Working hours of the site
- Details of construction traffic forecasts
- Time when vehicle movements and deliveries will be made to the site
- Facilities for loading and unloading
- Facilities for parking cars and other vehicles

Further to the above, a detailed Traffic Management Plan (TMP) will be prepared by the main contractor. This document will outline proposals in relation to construction traffic and associated construction activities that impact the surrounding roads network. The document will be prepared in coordination and agreed with the local authority.

Care will be taken to ensure existing pedestrian and cycling routes are suitably maintained or appropriately diverted as necessary during the construction period, and temporary car parking is provided within the site for contractor's vehicles. It is likely that construction will have an imperceptible impact on pedestrian and cycle infrastructure.

Through the implementation of the CMP and TMP, it is anticipated that the effect of traffic during the construction phase will have a slight effect on the surrounding road network for short-term period.

12.6.3 Operational Phase

The proposed development is situated adjacent to suitable infrastructure and transport services for travel by sustainable modes. A key barrier to modal shift towards sustainable modes of travel is often a lack of information about potential alternatives to the car. As such, it is proposed that residents will be made aware of potential alternatives including information on walking, cycle routes and public transport.

Residents will be encouraged to avail of these facilities for travel to and from work. Provision of this information would be made during the sales process and will be included in the new homeowner's pack upon the sale of each unit, as this represents the best opportunity to make residents aware and to secure travel behaviour change. It is anticipated that this measure may help to reduce the level of

traffic at the proposed development, thus providing mitigation against any traffic and transport effects of the development.

A Travel Plan has been included in this application under separate cover. This Plan sets out a method to reduce the dependence on private car journeys and encourage residents within the development to avail of sustainable forms of transport such as walking, cycling and public transport.

12.7 Predicted Impact of the Proposal

12.7.1 Traffic

The predicted impacts of the proposed development from a traffic and transport perspective at both construction and operational phases are outlined in the following sections.

12.7.2 Construction Phase

Provided the above mitigation measures and management procedures outlined in the Construction Management Plan are incorporated during the Construction Phase, the residual impact upon the local receiving environment is predicted to be temporary in nature and slight in terms of effect.

12.7.3 Operational Phase

In order to assess the potential impact arising from the proposed development during the operational phase, a Traffic and Transport Assessment has been prepared and is included in the SHD application under a separate cover. The traffic modelling carried out as part of the Traffic and Transport Assessment includes the analysis of 5 no. Junctions of the surrounding network as set out below.

- **Junction 1**: R107 Malahide Road / Back Road
- **Junction 2**: Back Road / Kinsealy Lane
- **Junction 3**: Back Road / Broomfield Access Road
- **Junction 4**: The Hill / Back Road.
- **Junction 5**: Kinsealy Lane / Hazelbrook

Traffic Growth Factors

These junctions were assessed for the estimated the opening year of 2026 and future design years of 2031 (Opening Year +5 Years) and 2041 (Opening Year +15 Years). The background traffic growth factors used to factor up the baseline traffic movements are in accordance with the 'Table 6.1: Link-Based Growth Rates: Metropolitan Area Annual Growth Rates' within the TII Publications – Project Appraisal Guidelines for National Roads Unit 5.3 – Travel Demand Projections (May 2019). These are:

- 1.066 (Central Growth) growth factor from 2022 to 2026
- 1.143 (Central Growth) growth factor from 2022 to 2031.
- 1.202 (Central Growth) growth factor from 2022 to 2041

Committed and Potential Future Developments

The traffic modelling carried out as part of the Traffic and Transport Assessment also accounts for a committed (Under-construction Ashwood Hall and Brookfield), and a potential future development

located at Streamstown. In order to determine the cumulative impact of the subject development in conjunction with other developments in the vicinity of the site is assessed.

Ashwood Hall and Brookfield – Reg. Ref. F13A/0459 and Reg. Ref. F13A/0460

The Ashwood Hall and Brookfield developments in Broomfield Development Lands comprise a total of 149 residential units (61 dwelling under Ashwood Hall (Planning Reference F13A/0459) and 88 dwellings under Brookfield (Planning Reference F13A/0460)). It is expected that both developments will be fully developed and occupied by 2023. Ashwood hall and Brookfield has also been assessed with regards to trip generation/distribution and additional population.

The overall proposal of the approved development of Ashwood Hall (Planning Reference F13A/0459) also includes the upgrade of the existing priority-controlled T-junction between Back Road and Broomfield Access Road to accommodate a right turning lane to facilitate access for traffic traveling from west on Back Road onto Broomfield lands.

Under-construction Ashwood Hall and Brookfield

The permission for the under-construction Ashwood Hall and Brookfield of Broomfield Development Lands provided for the construction of a total of 149 no. houses (61 no. houses under Planning Reference F13A/0459 and 88 no. houses under Planning Reference F13A/0460).

The AM and PM peak hour trip generation to/from the under-construction Ashwood Hall and Brookfield development - extracted from the Traffic Impact Assessment approved under Planning Reference F13A/0459 is presented in Table 12.17 below.

Use	Units	ASHWOOD HALL AND BROOKFIELD			
		08:00 – 09:00		17:00 – 18:00	
		IN	OUT	IN	OUT
Houses (F13A/0459)	61	9	23	23	12
Houses (F13A/0460)	88	13	37	34	22
Total	**149**	**22**	**60**	**57**	**34**

Table 12.17 | Summary of Broomfield Peak Hour Car Trip Generation

As can be seen from the above, based on the TIA approved under Planning Ref. F13A/0459, the under-construction Ashwood Hall and Brookfield development (including both planning applications) is estimated to generate a total of 82 vehicle movements in the AM peak hour (22 arrivals and 60 departures) and a total of 91 vehicles movements in the PM peak hour (57 arrivals and 34 departures).

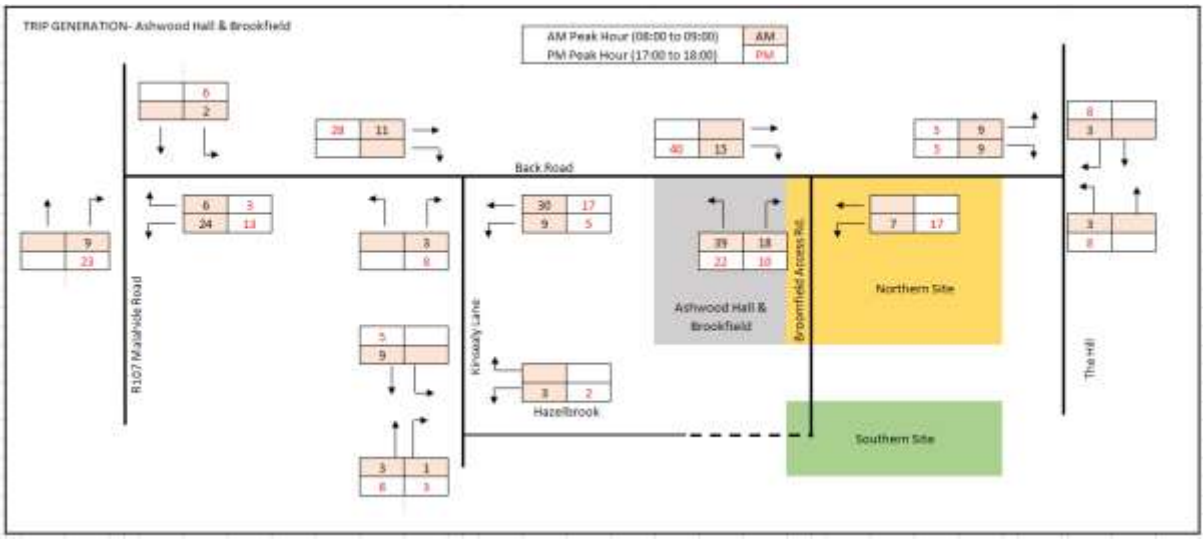

Figure 12.11 | Traffic to/from the Under-construction Ashwood Hall and Brookfield of Broomfield– 2026.

Potential Future Development at Streamstown

Trip generation for the potential future residential development at Streamstown Masterplan is presented in Table 12.18 below. It has been based on:

- 369 no. residential units (88 no. houses, 239 no. apartments and 42 no. duplexes).
- Car Trips for Table 7.

Use	Units	Potential Future Development at Streamstown			
		08:00 – 09:00		17:00 – 18:00	
		IN	OUT	IN	OUT
Houses	88	13	33	33	17
Apartments	239	7	53	53	15
Duplexes	42	6	16	16	8
Total	**369**	**26**	**102**	**102**	**40**

Table 12.18 | Car Trip Generation – Potential Future Residential Development at Streamstown Masterplan

As can be seen from the above, based on 369 no. residential units and the trip rates, the potential future development at Streamstown Masterplan is estimated to generate a total of 128 trips in the 08:00 – 09:00 peak hour (26 arrivals and 102 departures) and a total of 142 trips in the 17:00 – 18:00 peak hour (102 arrivals and 40 departures)

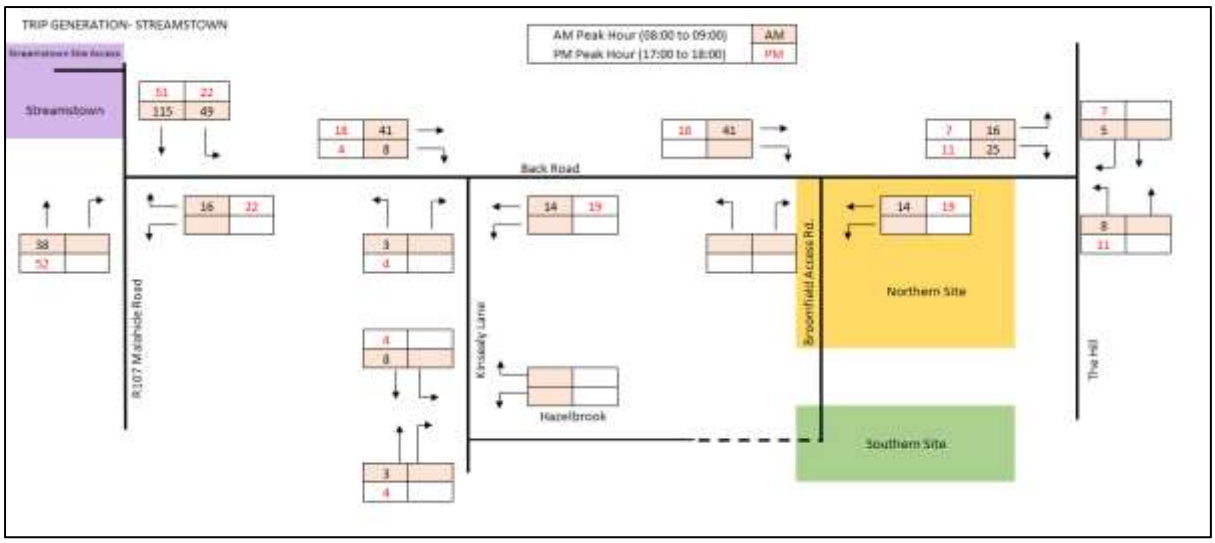

Figure 12.12 | Trip Generation – Potential Future Residential Development at Streamstown Masterplan.

Forecast Traffic 2041

The future traffic on the surrounding road network in 2041 is illustrated in Figure 12.13 below. It has been assumed within this TTA that the proposed development will be constructed over a period of approximately 3 years. Therefore, the assumed year of opening is 2026. As per methodology adopted in the 'Transport Assessment Guidelines (May 2014)', which the subject TTA is based on, the future design year (worst-case scenario) for junction assessment is 2041 (Opening year +15 years). It was assumed that, by the future year of 2041, Ashwood Hall and Brookfield, and the associated Junction 3 improvements will be fully constructed and occupied.

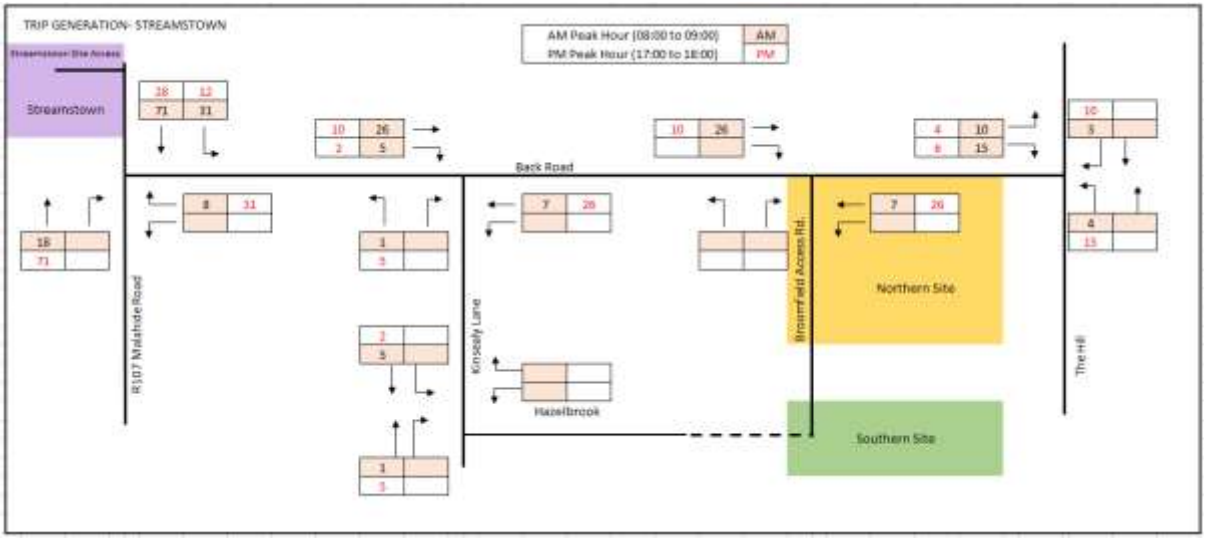

Figure 12.13 | Forecast Traffic 2041.

Assessment Scenarios

For the purposes of this TTA, several assessment scenarios were analysed for the proposed development, committed developments and the surrounding traffic network. A sensitivity analysis was also complete for the potential future developments in the area.

- **BASELINE SCENARIO 2022:** Baseline 2022 Traffic Survey Road Network
- **DO NOTHING 2026:** Baseline 2022 Road Network with traffic flows factored up + traffic to/from Ashwood Hall and Brookfield
- **DO NOTHING 2031:** Baseline 2022 Road Network with traffic flows factored up + traffic to/from Ashwood Hall and Brookfield
- **DO NOTHING 2041:** Baseline 2022 Road Network with traffic flows factored up + traffic to/from Ashwood Hall and Brookfield
- **DO SOMETHING 2026:** Baseline 2022 Road Network with traffic flows factored up + traffic to/from Ashwood Hall and Brookfield + traffic to/from the proposed development
- **DO SOMETHING 2031:** Baseline 2022 Road Network with traffic flows factored up + traffic to/from Ashwood Hall and Brookfield + traffic to/from the proposed development
- **DO SOMETHING 2041:** Baseline 2022 Road Network with traffic flows factored up + traffic to/from Ashwood Hall and Brookfield + traffic to/from the proposed development
- **SENSITIVETY ANALYSIS 2031:** Baseline 2022 Road Network with traffic flows factored up + traffic to/from Ashwood Hall and Brookfield + traffic to/from the proposed development + traffic to/from Potential Development at Streamstown
- **SENSITIVETY ANALYSIS 2041:** Baseline 2022 Road Network with traffic flows factored up + traffic to/from Ashwood Hall and Brookfield + traffic to/from the proposed development + traffic to/from Potential Development at Streamstown

Modelling Results

A summary of the results of the modelling carried out as part of the Traffic and Transport Assessment is provided below.

Junction 1 – R107 Malahide Road/Back Road (Existing Priority)

Junction 1 is currently a priority T-junction between primary road R107 Malahide Road and secondary road Back Road.

Figure 12.14 | Junction 1 - Malahide Road / Back Road

This junction has been modelled based on its current configuration and the PICADY analysis results are summarised in the table below. The arms of the junction were labelled as follows within the PICADY model:

- Arm A: R107 Malahide Road (N)
- Arm B: Back Road (E)
- Arm C: R107 Malahide Road (S)

2022 Baseline				
Stream	08:00 – 09:00		17:00 – 18:00	
	Queue (Veh.)	RFC	Queue (Veh.)	RFC
Stream B-C	0.4	0.30	0.2	0.19
Stream B-A	0.7	0.40	0.5	0.34
Stream C-AB	0.7	0.33	0.7	0.32
DO NOTHING 2026				
Stream	08:00 – 09:00		17:00 – 18:00	
	Queue (Veh.)	RFC	Queue (Veh.)	RFC
Stream B-C	0.6	0.39	0.3	0.23
Stream B-A	0.9	0.47	0.7	0.40
Stream C-AB	0.9	0.39	1.0	0.40
DO SOMETHING 2026				

Stream	08:00 – 09:00		17:00 – 18:00	
	Queue (Veh.)	RFC	Queue (Veh.)	RFC
Stream B-C	1.1	0.52	0.4	0.29
Stream B-A	1.3	0.56	0.8	0.45
Stream C-AB	1.0	0.43	1.6	0.52
DO NOTHING 2041				
Stream	08:00 – 09:00		17:00 – 18:00	
	Queue (Veh.)	RFC	Queue (Veh.)	RFC
Stream B-C	0.9	0.48	0.4	0.28
Stream B-A	1.3	0.57	0.9	0.48
Stream C-AB	1.1	0.45	1.3	0.47
DO SOMETHING 2041				
Stream	08:00 – 09:00		17:00 – 18:00	
	Queue (Veh.)	RFC	Queue (Veh.)	RFC
Stream B-C	1.9	0.66	0.5	0.35
Stream B-A	2.3	0.70	1.2	0.54
Stream C-AB	1.4	0.50	2.2	0.60
SENSITIVITY ANALYSIS 2041				
Stream	08:00 – 09:00		17:00 – 18:00	
	Queue (Veh.)	RFC	Queue (Veh.)	RFC
Stream B-C	9.8	0.95	0.7	0.42
Stream B-A	9.1	0.94	1.9	0.65
tream C-AB	1.7	0.55	2.7	0.64

Table 12.19 Junction 1 – DO NOTHING / DO SOMETHING PICADY Results

As shown in Table 12.19 above, the junction will remain under capacity for the scenario DO SOMETHING 2041 with the highest RFC of 0.70 and a corresponding queue of 2.3 vehicles in the AM peak hour and the highest RFC of 0.60 and a corresponding queue of 2.2 vehicles in the PM Peak hour.

For the Sensitivity Analysis 2041 the AM peak hour is over capacity with an RFC of 0.95 and a corresponding queue of 9.8 vehicles and under capacity in the PM peak hour with an RFC of 0.65 and a corresponding queue of 1.9 vehicles.

Junction 2 – Back Road / Kinsealy Lane (Priority Junction)

Junction 2 is an existing priority-controlled T-junction located west of the proposed development site.

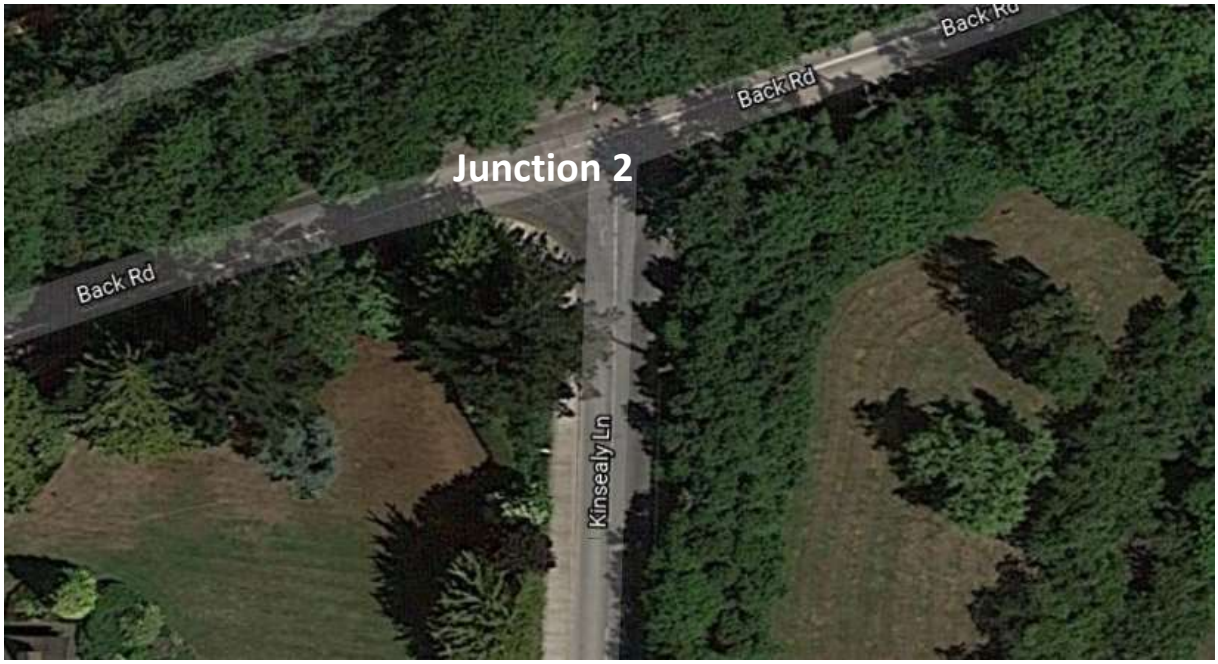

Figure 12.15 | Junction 2 – Back Road / Kinsealy Lane

This junction has been modelled based on its current configuration and the PICADY analysis results are summarised below. The arms of the junction were labelled as follows within the PICADY model:

- Arm A: Back Road (E).
- Arm B: Kinsealy Lane (S).
- Arm C: Back Road (W).

2022 Baseline				
Stream	08:00 – 09:00		17:00 – 18:00	
	Queue (Veh.)	RFC	Queue (Veh.)	RFC
Stream B-AC	0.5	0.34	0.4	0.29
Stream C-AB	0.2	0.14	0.2	0.09
DO NOTHING 2026				
Stream	08:00 – 09:00		17:00 – 18:00	
	Queue (Veh.)	RFC	Queue (Veh.)	RFC
Stream B-AC	0.6	0.39	0.5	0.35
Stream C-AB	0.3	0.16	0.2	0.10
DO SOMETHING 2026				
Stream	08:00 – 09:00		17:00 – 18:00	
	Queue (Veh.)	RFC	Queue (Veh.)	RFC
Stream B-AC	0.9	0.47	0.7	0.42

Stream C-AB	0.4	0.18	0.3	0.15
DO NOTHING 2041				
Stream	08:00 – 09:00		17:00 – 18:00	
	Queue (Veh.)	RFC	Queue (Veh.)	RFC
Stream B-AC	0.8	0.45	0.7	0.40
Stream C-AB	0.4	0.19	0.2	0.12
DO SOMETHING 2041				
Stream	08:00 – 09:00		17:00 – 18:00	
	Queue (Veh.)	RFC	Queue (Veh.)	RFC
Stream B-AC	1.2	0.54	0.9	0.48
Stream C-AB	0.4	0.21	0.4	0.17
SENSITIVITY ANALYSIS 2041				
Stream	08:00 – 09:00		17:00 – 18:00	
	Queue (Veh.)	RFC	Queue (Veh.)	RFC
Stream B-AC	1.2	0.56	1.0	0.50
Stream C-AB	0.5	0.24	0.4	0.18

Table 12.20 | Junction 2 - DO NOTHING / DO SOMETHING PICADY Results

As shown in Table 12.20 above, the junction will remain under capacity for the scenario DO SOMETHING 2041 with the highest RFC of 0.54 and a corresponding queue of 1.2 vehicles in the AM peak hour and the highest RFC of 0.48 and a corresponding queue of 0.9 vehicles in the PM Peak hour.

For the Sensitivity Analysis 2041 the AM peak hour is under capacity with an RFC of 0.56 and a corresponding queue of 1.2 vehicles and in the PM peak hour with an RFC of 0.50 and a corresponding queue of 1.0 vehicles.

Junction 3 – Back Road / Broomfield Access Road

Junction 3 is an existing priority-controlled T-junction located north of the proposed development site. As described earlier in Section 5.2, the overall proposal of the approved development of Ashwood Hall (Planning Reference F13A/0459) includes the upgrade of this junction to accommodate a right turning lane to facilitate access for traffic traveling from west on Back Road onto Broomfield lands. It is expected for the junction to be upgraded by 2023. Therefore, Junction 3 has been modelled based on its future configuration with a dedicated right turning lane for the DO NOTHING and DO SOMETHING scenarios and the PICADY analysis results are summarised in Table 13.21 below. The arms of the junction were labelled as follows within the PICADY model:

- Arm A: Back Road (E).
- Arm B: Broomfield Access Road (S).

- Arm C: Back Road (W).

Figure 12.16 | Junction 3 – Back Road / Broomfield Site Access Road

Baseline 2022				
Stream	08:00 – 09:00		17:00 – 18:00	
	Queue (Veh.)	RFC	Queue (Veh.)	RFC
Stream B-AC	0.1	0.06	0.1	0.06
Stream C-AB	0.0	0.02	0.0	0.02
DO NOTHING 2026				
Stream	08:00 – 09:00		17:00 – 18:00	
	Queue (Veh.)	RFC	Queue (Veh.)	RFC
Stream B-AC	0.2	0.19	0.2	0.13
Stream C-B	0.1	0.05	0.1	0.09
DO SOMETHING 2026				
Stream	08:00 – 09:00		17:00 – 18:00	
	Queue (Veh.)	RFC	Queue (Veh.)	RFC
Stream B-AC	0.7	0.42	0.4	0.27
Stream C-B	0.1	0.09	0.3	0.20
DO NOTHING 2041				

Stream	08:00 – 09:00		17:00 – 18:00	
	Queue (Veh.)	RFC	Queue (Veh.)	RFC
Stream B-AC	0.2	0.20	0.2	0.15
Stream C-B	0.1	0.05	0.1	0.09
DO SOMETHING 2041				
Stream	08:00 – 09:00		17:00 – 18:00	
	Queue (Veh.)	RFC	Queue (Veh.)	RFC
Stream B-AC	0.8	0.44	0.4	0.29
Stream C-B	0.1	0.10	0.3	0.21
SENSITIVITY ANALYSIS 2041				
Stream	08:00 – 09:00		17:00 – 18:00	
	Queue (Veh.)	RFC	Queue (Veh.)	RFC
Stream B-AC	0.8	0.45	0.4	0.29
Stream C-B	0.1	0.10	0.3	0.21

Table 12.21 | Junction 3 - DO NOTHING / DO SOMETHING PICADY Results

As shown in Table 12.21 above, the junction will remain under capacity for the scenario DO SOMETHING 2041 with the highest RFC of 0.44 and a corresponding queue of 0.8 vehicles in the AM peak hour and the highest RFC of 0.29 and a corresponding queue of 0.4 vehicles in the PM Peak hour.

For the Sensitivity Analysis 2041 the AM peak hour is under capacity with an RFC of 0.45 and a corresponding queue of 0.8 vehicles and in the PM peak hour with an RFC of 0.29 and a corresponding queue of 0.4 vehicles.

Junction 4 – Back Road / The Hill (Existing Priority)

Junction 4 is an existing priority-controlled T-junction located west of the proposed development site. This junction has been modelled based on its current configuration and the PICADY analysis results are summarised in Table 12.22 below. The arms of the junction were labelled as follows within the PICADY model:

- Arm A: The Hill (S)
- Arm B: Back Road
- Arm C: The Hill (N)

Figure 12.17 | Junction 4 – Back Road / The Hill

Baseline 2022				
Stream	08:00 – 09:00		17:00 – 18:00	
	Queue (Veh.)	RFC	Queue (Veh.)	RFC
Stream B-AC	2.0	0.68	7.3	0.92
Stream C-AB	0.5	0.21	0.8	0.32
DO NOTHING 2026				
Stream	08:00 – 09:00		17:00 – 18:00	
	Queue (Veh.)	RFC	Queue (Veh.)	RFC
Stream B-AC	3.8	0.81	19.7	1.07
Stream C-AB	0.6	0.24	1.0	0.38
DO SOMETHING 2026				
Stream	08:00 – 09:00		17:00 – 18:00	
	Queue (Veh.)	RFC	Queue (Veh.)	RFC
Stream B-AC	8.4	0.94	32.0	1.16
Stream C-AB	0.6	0.25	1.2	0.42
DO NOTHING 2041				
Stream	08:00 – 09:00		17:00 – 18:00	

	Queue (Veh.)	RFC	Queue (Veh.)	RFC
Stream B-AC	11.6	0.99	54.9	1.33
Stream C-AB	0.8	0.29	1.5	0.46
DO SOMETHING 2041				
Stream	08:00 – 09:00		17:00 – 18:00	
	Queue (Veh.)	RFC	Queue (Veh.)	RFC
Stream B-AC	27.4	1.13	68.9	1.41
Stream C-AB	0.8	0.30	1.7	0.50
SENSITIVITY ANALYSIS 2041				
Stream	08:00 – 09:00		17:00 – 18:00	
	Queue (Veh.)	RFC	Queue (Veh.)	RFC
Stream B-AC	56.0	1.32	96.2	1.56
Stream C-AB	0.9	0.33	2.1	0.55

Table 12.22 | Junction 4 - DO NOTHING / DO SOMETHING PICADY Results

As can been in Table 12.22 above the junction is over capacity for the DO NOTHING 2026 scenario in the PM Peak hour with an RFC of 1.07 and a corresponding queue of 19.7 vehicles. For the DO SOMETHING 2041 scenario, the junction has an RFC of 1.13 and a corresponding queue of 27.4 vehicles in the AM peak hour and an RFC of 1.41 and a corresponding queue of 68.9 vehicles. When compared with DO NOTHING 2041 the RFC increase in very small and while the junction is over capacity the proposed development has minimal impact on the junction.

Junction 5 – Kinsealy Lane / Hazelbrook (Existing Priority)

Junction 5 is an existing priority-controlled T-junction located west of the proposed development site. This junction has been modelled based on its current configuration and the PICADY analysis results are summarised in Table 12.23 below. The arms of the junction were labelled as follows within the PICADY model:

- Arm A: Kinsealy Lane (N)
- Arm B: Hazelbrook
- Arm C: Kinsealy Lane (S)

Figure 12.18 | Junction 5 – Kinsealy Lane / Hazelbrook

Baseline 2022				
Stream	08:00 – 09:00		17:00 – 18:00	
	ueue (Veh.)	RFC	ueue (Veh.)	RFC
tream B-AC	0.1	0.06	0.0	0.03
tream C-AB	0.0	0.01	0.0	0.02
DO NOTHING 2026				
Stream	08:00 – 09:00		17:00 – 18:00	
	ueue (Veh.)	RFC	ueue (Veh.)	RFC
tream B-AC	0.1	0.07	0.0	0.04
tream C-AB	0.0	0.02	0.0	0.03
DO SOMETHING 2026				
Stream	08:00 – 09:00		17:00 – 18:00	
	ueue (Veh.)	RFC	ueue (Veh.)	RFC
tream B-AC	0.2	0.14	0.1	0.07
tream C-AB	0.0	0.03	0.1	0.06

DO NOTHING 2041				
Stream	08:00 – 09:00		17:00 – 18:00	
	Queue (Veh.)	RFC	Queue (Veh.)	RFC
Stream B-AC	0.1	0.08	0.0	0.04
Stream C-AB	0.0	0.02	0.0	0.03
DO SOMETHING 2041				
Stream	08:00 – 09:00		17:00 – 18:00	
	Queue (Veh.)	RFC	Queue (Veh.)	RFC
Stream B-AC	0.2	0.15	0.1	0.08
Stream C-AB	0.0	0.03	0.1	0.06
SENSITIVITY ANALYSIS 2041				
Stream	08:00 – 09:00		17:00 – 18:00	
	Queue (Veh.)	RFC	Queue (Veh.)	RFC
Stream B-AC	0.2	0.15	0.1	0.08
Stream C-AB	0.0	0.03	0.1	0.06

Table 12.23 | Junction 5 - DO NOTHING / DO SOMETHING PICADY Results

As shown in Table 12.23 above, the junction will remain under capacity for the scenario DO SOMETHING 2041 with the highest RFC of 0.15 and a corresponding queue of 0.2 vehicles in the AM peak hour and the highest RFC of 0.08 and a corresponding queue of 0.1 vehicles in the PM Peak hour.

For the Sensitivity Analysis 2041 the AM peak hour is under capacity with an RFC of 0.15 and a corresponding queue of 0.2 vehicles and in the PM peak hour with an RFC of 0.08 and a corresponding queue of 0.1 vehicles.

Summary

All junction assessment above shows minimal impact from the proposed development. Junctions 1, 2, 3 and 5 will remain under capacity for the worst-case scenario DO SOMETHING 2041 and SENSITIVTY ANALYSIS 2041. Junction 4 is over capacity for DO NOTHING 2026, when comparing the junction with and without the development, the proposed development will have minimal impact on the overall junction with an increase of 5.67%.

The provision of linkages to public transport and adequate pedestrian and cyclist facilities as part of the proposed development will result in a positive effect on sustainable transport modes.

12.8 Monitoring and Reinstatement

12.8.1 Construction Phase

During the Construction Phase the following monitoring is advised. The specific compliance exercises to be undertaken in relation to the range of measures detailed in the final construction management plan will be agreed with the planning authority.

- Construction vehicles routes and parking
- Internal and external road conditions
- Construction activities hours of work

12.8.2 Operational Phase

The Travel Plan for the proposed development will be monitored and updated at regular intervals. This will enable tracking in terms of a reduction in the dependence on private car journeys and a shift towards sustainable transport options such as walking, cycling and the use of public transport such as buses and trains.

12.9 Interactions

There may be temporary negative impacts to human health during the Construction Phase caused by noise, dust, air quality and visual impacts which are covered in other chapters of this EIAR. There may also be interaction with the surrounding water bodies through surface water runoff during topsoil stripping and earthworks which will be required to construct the roads.

The effects of these will be mitigated through the implementation of the measures outlined in this Chapter and within the Construction Management Plan.

12.10 Difficulties in compiling Information

There were no difficulties encountered in compiling this Chapter.

12.11 References

- Dublin BusConnects Website: New Dublin Area Bus Network - BusConnects
- Design Manual for Urban Roads and Streets (DMURS), Department of Transport, Tourism and Sport
- Irish Rail Website: www.irishrail.ie
- Fingal County Council Development Plan 2017 – 2023
- NRA Guidelines, Traffic and Transportation Assessment Guidelines (2014), National Roads Authority
- Project Appraisal Guidelines for National Roads Unit 5.3 – Travel Demand Projections, (May 2019), Transport Infrastructure Ireland Publications
- Project Appraisal Guidelines for National Roads Unit 16.1 – Expansion Factors for Short Period Traffic Counts, (2016), Transport Infrastructure Ireland Publications
- Sustainable Urban Housing: Design Standards for New Apartments, (2020), Department of Housing, Planning and Local Government
- Transport for Ireland (TFI): www.transportforireland.ie

13.0 CULTURAL HERITAGE

13.1 Introduction

This chapter of the Environmental Impact Assessment Report has been prepared by Dermot Nelis Archaeology on behalf of Birchwell Developments Ltd. The chapter provides an assessment of the archaeological, architectural and cultural heritage background for a proposed development at Broomfield, Kinsaley and Malahide townlands, Malahide, County Dublin (figure 1; Ordnance Survey Sheets 012 and 015). The chapter includes an identification of potential significant impacts or effects which may arise and outlines mitigation measures, based on current information, which may be used to avoid, reduce or offset any potential adverse effects.

The key objectives of this chapter are to assess, as far as is reasonably possible from existing records, any effects the proposed development may have on the archaeological, architectural and cultural heritage resource. The following key issues are addressed:

- Direct and indirect construction phase effects on archaeological, architectural and cultural heritage features;
- Direct and indirect operational phase effects on archaeological, architectural and cultural heritage features; and
- Residual effects on archaeological, architectural and cultural heritage features.

13.1.1 Statement of Authority

Dermot Nelis BA ArchOxon AIFA MIAI

Dermot Nelis graduated from Queen's University Belfast, and after gaining extensive fieldwork experience undertook postgraduate studies at the University of Oxford in archaeological consultancy and project management.

Dermot has acted as Senior Archaeologist on several road schemes for various County Councils, and Directed large-scale multi-period excavations associated with those developments. He has completed over 180 licensed fieldwork programmes and over 250 archaeological, architectural, and cultural heritage desk-based reports and Environmental Impact Assessments.

13.2 Study Methodology

13.2.1 Desk Study

There is no professional standard for defining the extent of a study area when assessing potential impacts or effects on archaeological, architectural, or cultural heritage remains. A 1km study area has been imposed around the development site to assess the presence of Recorded Monuments, World Heritage Sites, sites included in the Tentative List as consideration for nomination to the World Heritage List, National Monuments, sites with Preservation Orders or Temporary Orders.

A 500m study area has been imposed around the development site to assess the presence of Protected Structures, Architectural Conservation Areas, structures, and historic gardens recorded on

the National Inventory of Architectural Heritage, or any additional archaeological, architectural, or cultural heritage features recorded in the *Fingal Development Plan* (2017).

The following sources were examined, and a list of sites and areas of archaeological, architectural, or cultural heritage potential was compiled:

- Record of Monuments and Places of County Dublin;
- Topographical Files of the National Museum of Ireland;
- Cartographic and documentary sources relating to the study area;
- Aerial photographs of Ordnance Survey Ireland and Bing aerial photography;
- Fingal Development Plan 2017 – 2023;
- National Inventory of Architectural Heritage; and
- Environmental Protection Agency.

Record of Monuments and Places (RMP) is a list of archaeological sites known to the National Monuments Service. Back-up files of the Sites and Monuments Record (SMR) provide details of documentary sources and field inspections where these have taken place.

Topographical Files of the National Museum of Ireland is the archive of all known finds recorded by the National Museum. This archive relates primarily to artefacts, but also includes references to monuments and unique records of previous excavations. The findspots of artefacts are important sources of information in the discovery of sites of archaeological significance.

Cartographic sources are important in tracing land use development within an area of land take, as well as providing important topographical information on sites and areas of archaeological potential. Cartographic analysis of relevant maps has been made to identify any topographical anomalies that may no longer remain within the landscape. **Documentary sources** were consulted to gain background information on the historical and archaeological landscape of the proposed development area.
Aerial photographic coverage is an important source of information regarding the precise location of sites and their extent. It also provides initial information on the terrain and its potential to contain previously unidentified archaeological remains.
Fingal Development Plan 2017 - 2023 contains Objectives on the preservation and management of archaeological, architectural and cultural heritage sites and features. It was consulted to obtain information on sites within the proposed development area and the 1km study area.

National Inventory of Architectural Heritage (NIAH) is a section within the Department of Housing, Local Government and Heritage. The work of NIAH involves identifying, recording and evaluating on a non-statutory basis the architectural heritage of Ireland from 1700 to the present day. The NIAH website also contains a non-statutory register of historic gardens and designed landscapes in County Dublin.

Environmental Protection Agency's *Guidelines on the Information to be Contained in Environmental Impact Statements* (2002) and *Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports* (2017).

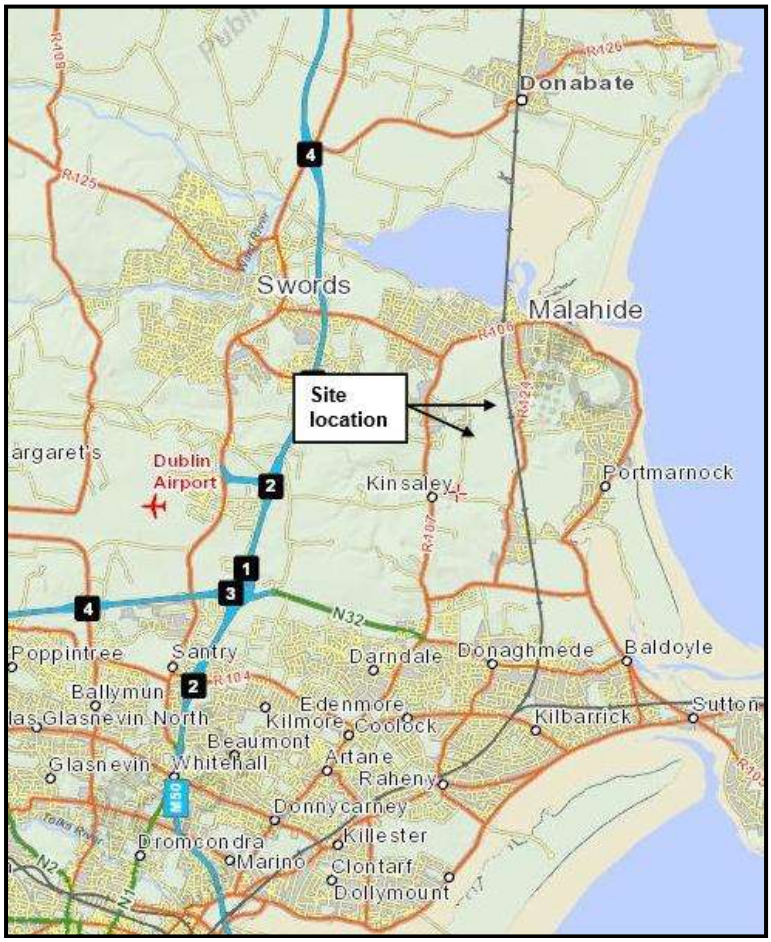

Figure 13-1. Site location

13.2.2 Legislation and Guidelines

Archaeological Resource

The National Monuments Acts, 1930 - 2014 and relevant provisions of the National Cultural Institutions Act, 1997 are the primary means of ensuring the satisfactory protection of archaeological remains, which includes all man-made structures of whatever form or date, except buildings habitually used for ecclesiastical purposes.

A number of mechanisms under the National Monuments Acts are applied to secure the protection of archaeological monuments. These include the Record of Monuments and Places, the Register of Historic Monuments, and placing Preservation Orders and Temporary Preservation Orders on endangered sites and National Monuments in the Ownership or Guardianship of the Minister for Housing, Local Government and Heritage or a Local Authority.

The Minister may acquire National Monuments by agreement or by compulsory order. The State or the Local Authority may assume guardianship of any National Monument (other than dwellings). The owners of National Monuments (other than dwellings) may also appoint the Minister or the Local Authority as Guardian of that monument if the State or Local Authority agrees. Once the site is in ownership or Guardianship of the State, it may not be interfered with without the written consent of the Minister.

Section 5 of the 1987 Act requires the Minister to establish and maintain a Register of Historic Monuments. Historic Monuments and archaeological areas present on the Register are afforded statutory protection under the 1987 Act. Any interference with sites recorded on the Register is illegal without the permission of the Minister. Two months' notice in writing is required prior to any work being undertaken on or in the vicinity of a Registered Monument. The Register also includes sites under Preservation Orders and Temporary Preservation Orders. All Registered Monuments are included in the Record of Monuments and Places.

Sites deemed to be in danger of injury or destruction can be allocated Preservation Orders under the 1930 Act. Preservation Orders make any interference with the site illegal. Temporary Preservation Orders can be attached under the 1954 Act. These perform the same function as a Preservation Order but have a time limit of six months, after which the situation must be reviewed. Work may only be undertaken on or in the vicinity of sites under Preservation Orders with the written consent, and at the discretion, of the Minister.

Section 12(1) of the 1994 Act requires the Minister to establish and maintain a Record of Monuments and Places where the Minister believes that such monuments exist. The Record comprises a list of monuments and relevant places and a map/s showing each monument and relevant place in respect of each county in the State. All sites recorded on the Record of Monuments and Places receive statutory protection under the National Monuments Act 1994.

Section 12(3) of the 1994 Act provides that:

> *"where the owner or occupier (other than the Minister for Arts, Heritage and the Gaeltacht) of a monument or place included in the Record, or any other person, proposes to carry out, or to cause or permit the carrying out of, any work at or in relation to such a monument or place, he or she shall give notice in writing to the Minister of Arts, Heritage and the Gaeltacht to carry out work and shall not, except in the case of urgent necessity and with the consent of the Minister, commence the work until two months after the giving of notice."* (www.archaeeology.ie).

Architectural and Built Heritage Resource

The main laws protecting the built heritage are the Architectural Heritage (National Inventory) and Historic Monuments (Miscellaneous Provisions) Act, 1999 and the Planning and Development Act 2000 (as amended). The Architectural Heritage Act requires the Minister to establish a survey to identify, record and assess the architectural heritage of the country. The National Inventory of Architectural Heritage records built heritage structures within all the counties of the State. As inclusion in the Inventory does not provide statutory protection, the document is used to advise Local Authorities on compilation of a Record of Protected Structures (RPS) as required by the Planning and Development Act 2000.

The Planning and Development Act 2000 requires Local Authorities to establish a Record of Protected Structures to be included in their County Development Plan. This Plan includes objectives designed to protect the archaeological, architectural and cultural heritage resource during the planning process. Buildings recorded in the RPS can include Recorded Monuments, structures listed in the NIAH, or buildings deemed to be of architectural, archaeological or artistic importance by the Minister. Sites, areas or structures of archaeological, architectural or artistic interest listed in the RPS receive statutory

protection from injury or demolition under the 2000 Act. Damage to or demolition of a site registered on the RPS is an offence. The RPS list is not always comprehensive in every county.

A Local Authority has the power to order conservation and restoration works to be undertaken by the owner of a Protected Structure if it considers the building in need of repair. An owner or developer must make a written request to a Local Authority to carry out any works on a Protected Structure and its environs, and this will be reviewed within 12 weeks of application. Failure to do so may result in prosecution.

Figure 13-2. Northern Area proposed site layout

Figure 13-3. Southern Area proposed site layout

13.2.3 Rating of Impacts

Impacts can be identified from detailed information about a project, the nature of the area affected and the range of archaeological resources potentially affected. The construction and use of housing developments can affect the archaeological, architectural and cultural heritage resource of a given landscape in a number of ways.

- Permanent and temporary land-take, associated structures, landscape mounding, and their construction may result in damage to or loss of archaeological remains and deposits, or physical loss to the setting of historic monuments and to the physical coherence of the landscape;

- Archaeological sites can be affected adversely in a number of ways: disturbance by excavation, topsoil stripping and the passage of heavy machinery; disturbance by vehicles working in unsuitable conditions; or burial of sites, limiting accessibility for future archaeological investigation;
- Hydrological changes in groundwater or surface water levels can result from construction activities such as de-watering and spoil disposal, or longer-term changes in drainage patterns. These may desiccate archaeological remains and associated deposits;
- Visual impacts on the historic landscape sometimes arise from construction traffic and facilities, built earthworks and structures, landscape mounding and planting, noise, fences and associated works. These features can impinge directly on historic monuments and historic landscape elements as well as their visual amenity value;
- Landscape measures, such as tree planting, can damage sub-surface archaeological features due to topsoil stripping and through the root action of trees and shrubs as they grow;
- Ground consolidation by construction activities or the weight of permanent embankments can cause damage to buried archaeological remains, especially in colluvium or peat deposits;
- Disruption due to construction also offers in general the potential for adversely affecting archaeological remains. This can include machinery, site offices, service trenches, etc; and
- Although not widely appreciated, positive effects can accrue from permitted developments. These can include positive resource management policies, improved maintenance and access to archaeological monuments, and the increased level of knowledge of a site or historic landscape as a result of archaeological assessment and fieldwork.

There is no standard scale against which the significance of effects on the archaeological and historic landscape may be judged. The severity of a given level of land take or visual intrusion varies with the type of monument, site or landscape features and its environment. Significance of effect can be judged taking the following into account:

- The proportion of the feature affected and how far physical characteristics fundamental to the understanding of the feature would be lost;
- Consideration of the type, date, survival/condition, fragility/vulnerability, rarity, potential and amenity value of the feature affected; and
- Assessment of the levels of noise, visual and hydrological impacts, either in general or site specific terms, as may be provided by other specialists.

For this assessment the significant effects criteria outlined in **Table 13.1** are used:

Table 13-1. Significance of Effects

Level of Impact	Significance Criteria
Imperceptible	An effect capable of measurement but without significant consequences
Not Significant	An effect which causes noticeable changes in the character of the environment but without significant consequences

Level of Impact	Significance Criteria
Slight Effects	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities
Moderate Effects	An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends
Significant Effects	An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment
Very Significant	An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment
Profound Effects	An effect which obliterates sensitive characteristics

Figure 13-4. Aerial photograph showing the Northern Area

Figure 13-5. Aerial photograph showing the Southern Area

13.3 Archaeological Heritage

13.3.1 Site-Specific Archaeological Background

During the Mesolithic period (*c*. 7000-4000 BC) people existed as hunters/gatherers, living on the coastline, along rivers and lakesides. They used flint and other stones to manufacture sharp tools, and locating scatters of discarded stone tools and debris from their manufacture can sometimes identify settlements. The native landscape consisted of woodland with hazel, oak, ash and Scot's pine as the primary species and Mesolithic hunting groups made no significant impact on the landscape.

Late Mesolithic and Neolithic fish traps were discovered during archaeological monitoring of development works on reclaimed land on the north bank of the River Liffey in 2004 (at depths of approximately -6m OD and -4m OD, respectively) (McQuade and O'Donnell 2007, 569-584). A Mesolithic shoreline was revealed and the remains of up to five wooden fish traps were excavated. The fish traps were constructed almost exclusively of hazel (*Corylus avellana*), and while fragmentary, were in a relatively good state of preservation, with tool marks in evidence. Radiocarbon determinations from five wood samples returned a date range of between 6,100 – 5,720 cal BC, suggesting that these are the earliest fish traps recorded in Ireland or Britain.

The population became more settled during the Neolithic period (*c*. 4000-2400 BC) with a subsistence economy based on crop growing and stock-raising. This period also saw changes in burial practices, and a tradition of burying the dead collectively and carrying out of cremations emerged. Neolithic monuments from County Dublin include portal, passage and wedge tombs.

By the 4th millennium BC a farming economy was developing that involved forest clearance. Archaeological and pollen records show an increasingly settled landscape with some fixed field boundaries for livestock and cereal production. While farming did spread throughout the country, the preference was for light soils and upland margins with free draining soils and light woodland cover. Extensive use of the productive though heavy soils of the poorly drained central lowlands was restricted by virtue of the limitations of available tools and technology.

The Bronze Age (*c*. 2400-600 BC) is characterised by the introduction of metalworking technology to Ireland and coincides with many changes in the archaeological record, both in terms of material culture as well as the nature of the sites and monuments themselves. Though this activity has markedly different characteristics to that of the preceding Neolithic period, including new structural forms and new artefacts, it also reflects a degree of continuity. During this period knowledge of metalworking was acquired resulting in changes in material culture such as the introduction of metal tools and artefacts, as well as the introduction of a highly decorated pottery called Beaker pottery. In addition to changes in material culture, there were changes in burial rite from communal megalithic tombs to single burial in cists.

Bronze Age monuments from County Dublin include standing stones, stone pairs, cairns, barrows and *fulachta fiadh,* which are one of the most numerous monument type in Ireland with over 4,500 examples recorded (Waddell 2005, 174).

RMP DU015-131 and DU015-132 are recorded as ring-ditches, and both are located approximately 920m south east of the Southern Area in Hazelbrook townland (figure 13.6). Both sites are recorded (www.archaeology.ie) as cropmarks on aerial photographs. (Cropmarks are earthworks that have been removed above-ground and due to subsoil conditions are revealed through aerial photography).

Ring-ditches are interpreted as being the likely remains of ploughed-out ring-barrows, especially when they occur in groups of two or more as ring-barrows sometimes do, forming small cemeteries. Ring-barrows are circular mounds of earth surrounded by a ditch with an external bank. The mounds were usually quite low and were often no higher than the surrounding bank (Waddell 2005, 365). Ring-barrows are widely distributed, and while they vary in size most seem to range in overall diameter from approximately 15m to 25m. The limited evidence of circular ring-barrows and ring-ditches

indicates cremation-type burials from the later centuries BC and early centuries AD, with the occasional deposition of small token deposits of bone (*ibid*., 368). There are 154 ring-ditches recorded in County Dublin (www.archaeology.ie).

During the Iron Age (*c*. 600 BC-400 AD) new influences came into Ireland which gradually introduced the knowledge and use of iron, although for several centuries bronze continued to be widely used. The Iron Age in Ireland however is problematic for archaeologists as few artefacts dating exclusively to this period have been found, and without extensive excavation it cannot be determined whether several monument types, such as ring-barrows or standing stones, date to the Bronze Age or Iron Age.

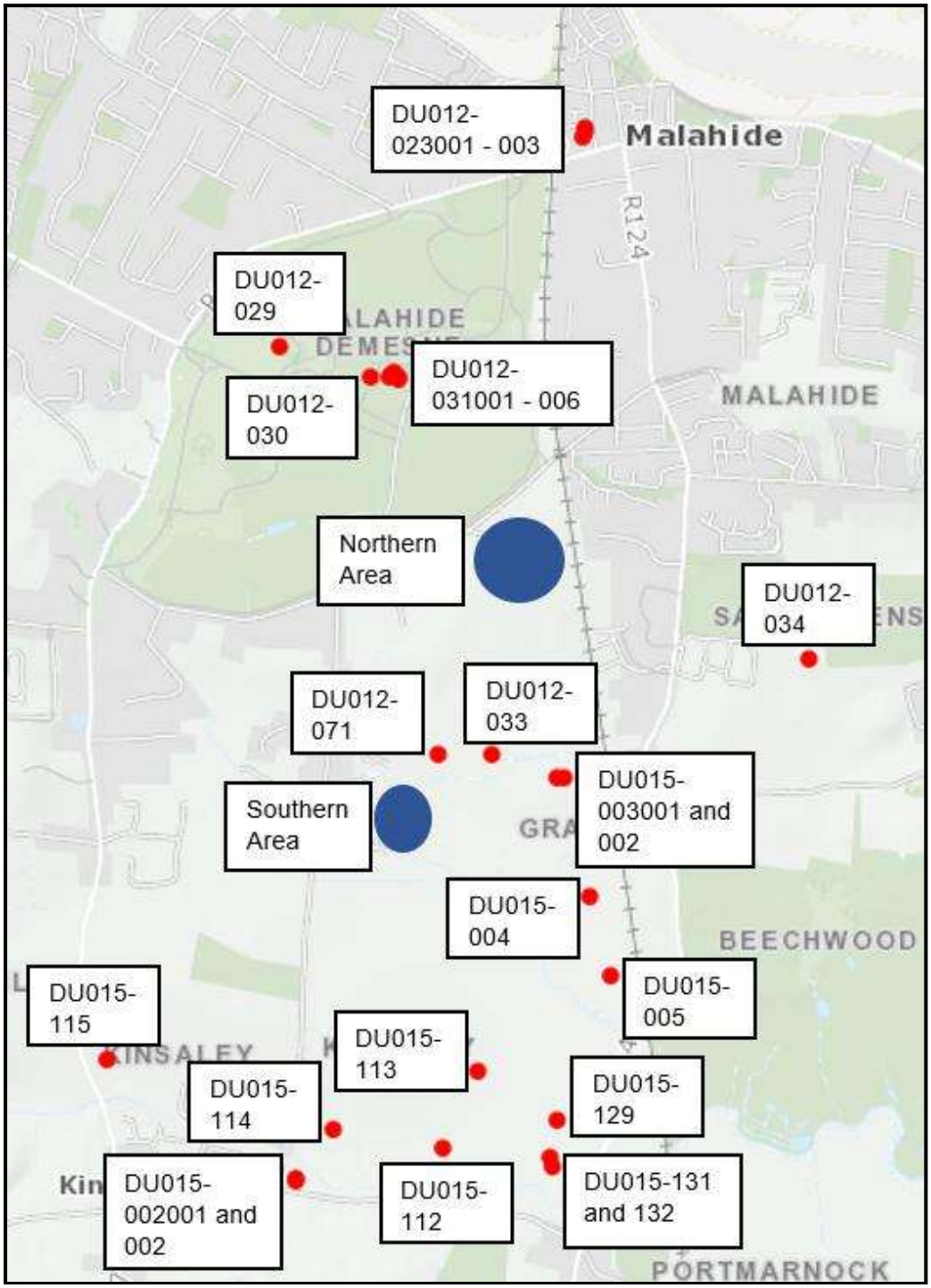

Figure 13-6. RMP sites within the 1km study area

The Early Medieval period (*c*. 400-1169 AD) is depicted in the surviving sources as entirely rural, characterised by the basic territorial unit known as *túath.* Walsh (2000, 30) estimates that there were at least 100, and perhaps as many as 150, kings in Ireland at any given time during this period, each ruling over his own *túath*.

Archer (1975, 7) equates the area of North Dublin with the ancient plain of Magh-Mhuireadha, within the sub-kingdom of Brega. Brega was under the control of the Saithne, a branch of the Cianachta tribe, whose seat was at Balrothery in north Dublin (Ryan 1949, 67). The Cianachta were said to have received these lands from the 3rd century High King Cormac MacArt, in return for services against Ulster (*ibid*.), suggesting their domination of the area was long-standing and undisputed. By the 8th century, both the Cianachta and the Gailenga were subject to the powerful sept of the Southern Uí Néill who had gained control of the kingdom of Brega (Ryan 1949, 67; Byrne 2001, 68-69).

One of the principal thoroughfares of Early Medieval Ireland – the *Slighe Cualann* – ran northwards from Dublin to the west of the general development area near Feltrim Hill, and a branch of this is said to have extended eastwards from Feltrim through the area of Malahide Demesne to Seamount Heights and southwards to Howth (Kennedy 1984, 49). The presence of a principal routeway, the proximity of the coast and the general fertile nature of the land would have made the area very attractive for settlement in the Early Medieval period.

During this turbulent period roughly circular defensive enclosures known as ringforts were constructed to protect farmsteads. They were enclosed by an earthen bank and exterior ditch, and ranged from approximately 25m to 50m in diameter. The smaller sized and single banked type (univallate) was more than likely home to the lower ranks of society, while larger examples with more than one bank (bivallate/trivallate) housed the more powerful kings and lords. They are regarded as defended family homesteads and the extant dating evidence suggests they were primarily built between the 7th and 9th centuries AD (Stout 1997, 22-31). Cashels are stone built and are generally situated in coastal or mountainous areas.

The ringfort is considered to be the most common indicator of settlement during the Early Medieval period. Detailed study (*ibid*., 53) has suggested that there is an approximate total of 45,119 potential ringforts or enclosure sites throughout Ireland.

There are four ringforts recorded within the 1km study area. RMP DU015-003001 and RMP DU015-003002 are located in Grange townland, approximately 300m east of the Southern Area (figure 13.6). RMP DU015-003001 is recorded (www.archaeology.ie) as the cropmark of a single-ditched enclosure, roughly circular in plan and measuring *c*. 45m in diameter. RMP DU015-003002 is also recorded as cropmark evidence for a sub-circular enclosure measuring approximately 55m east/west x 45m north/south. This feature is recorded on the First Edition (1844) Ordnance Survey map. Neither of these monuments are visible at ground level, and both are interpreted as the below-ground remains of ploughed-out ringforts. Local folklore identifies these ringforts as the stronghold of Hamund MacTorcaill, brother of the last Norse Earl or king of Dublin (Kennedy 1984, 55).

RMP DU015-004 is located in Grange townland, approximately 450m south east of the Southern Area (figure 13.6). It is recorded on the First Edition Ordnance Survey map (1844) as a univallate enclosure

with a centrally located internal feature which may have been a house site. It is interpreted as the remains of a ploughed-out ringfort and is not visible at ground level.

RMP DU015-005 is recorded approximately 600 south east of the Southern Area in Grange townland (figure 13.6). It is recorded (www.archaeology.ie) as a platform ringfort comprising a circular raised area with slight traces of a bank around the perimeter and an external ditch at the base. There is an entrance ramp in the south east corner.

Enclosure sites belong to a classification of monument whose precise nature is unclear. Often they may represent ringforts, which have either been damaged to a point where they cannot be positively recognised, or are smaller or more irregular in plan than the accepted range for a ringfort. An Early Medieval date is in general likely for this site type, though not a certainty.

There are six enclosures recorded within the 1km study area (figure 4). RMP DU012-071 is located in Kinsaley townland, approximately 60m north of the Southern Area (figure 13.6), and is recorded (www.archaeology.ie) as a circular enclosure visible as a cropmark which does not survive above-ground. A 1995 black and white aerial photograph (www.map.geohive.ie) shows it as measuring approximately 60m-70m in diameter east/west and with a minimum north/south measurement of approximately 50m. An east/west oriented band of differential growth is noted extending across the northern end of the enclosure on the 1995 aerial photograph, and this may be the remains of an associated field boundary. This feature is also clearly visible on more recent aerial photography (www.bing.com/maps).

RMP DU012-033 (figure 13.6) is located in Broomfield townland, approximately 160m north east of the Southern Area. A 1997 aerial photograph records the cropmark of a sub-circular enclosure measuring approximately 20m in diameter and with internal features. This feature does not survive above-ground (www.archaeology.ie).

RMP DU015-112 is located approximately 800m south of the Southern Area in Kinsaley townland (figure 13.6). It is recorded as a circular enclosure on an aerial photograph, and does not survive above-ground (www.archaeology.ie). It is located on a low east/west rise at a relatively low point compared to the surrounding landscape. It is noted (www.archaeology.ie) that other below-ground features are also visible on the aerial photograph, and that these might represent a field system (RMP DU015-113). (Field systems are a group or complex of fields which appear to form a coherent whole, and which may date to any period from the Neolithic (*c*. 4000-2400 BC) onwards. The enclosed land could have been used for stock-raising, plant husbandry and crop protection. The fields vary in size and it is possible that many of them are more extensive than currently thought. A wide range of monuments, such as barrows, ringforts, enclosures, souterrains, hut sites, ecclesiastical remains *etc*., can be found inside field systems).

RMP DU015-114 is located approximately 800m south of the Southern Area in Kinsaley townland (figure 13.6). Like RMP DU015-112 which is located 300m to the east, it is recorded (www.archaeology.ie) as a roughly circular enclosure visible as a cropmark on an aerial photograph. Again, it is located on a low east/west rise at a relatively low point compared to the surrounding landscape.

RMP DU015-115 is the fourth enclosure recorded within the study area on aerial photography in Kinsaley townland. It is located approximately 980m southwest of the Southern Area (figure 13.6), and no above-ground evidence for the site survives (www.archaeology.ie).

RMP DU015-129 is located approximately 810m southeast of the Southern Area in Hazelbrook townland (figure 13.6). It takes the form of a sub-circular enclosure visible as a crop mark on an aerial photograph, and is in the same field as RMP DU015-131 and RMP DU015-132 (ring-ditches) (www.archaeology.ie). It is located on a low east/west rise at a relatively low point compared to the surrounding landscape.

The classification of archaeological monuments is often made difficult by their condition, whether it be the result of deliberate destruction, trampling by livestock or natural weathering and erosion. The term "*earthwork*" is used to denote any monument or feature of artificial origin which cannot be further categorised without excavation. The term "*earthwork site*" indicates sites which were levelled before detailed archaeological inspection took place. The majority of such sites may be levelled or destroyed ringforts.

An earthwork (RMP DU012-029) is recorded approximately 820m northwest of the Northern Area in Malahide Demesne townland (figure 13.6). Formerly located within the ornamental grounds of Malahide Demesne, the site originally consisted of an earthen platform approximately 17m in diameter, enclosed by a 3m-4m wide ditch, a *c*. 2m wide bank and an outer ditch measuring 3m-4m in width and 1m deep (www.archaeology.ie).

The Early Medieval period is also characterised by the foundation of a large number of ecclesiastical sites throughout Ireland in the centuries following the introduction of Christianity in the 5th century AD. The early churches tended to be constructed of wood or post-and-wattle. Between the late 8th and 10th centuries mortared stone churches gradually replaced the earlier structures. Many of the sites, some of which were monastic foundations, were possibly originally defined by an enclosing wall or bank similar to that found at coeval secular sites. This enclosing feature was probably built more to define the sacred character of the area of the church than as a defence against aggression. An inner and outer enclosure can be seen at some of the more important sites; the inner enclosure surrounding the sacred area of church and burial ground and the outer enclosure providing a boundary around living quarters and craft areas. Where remains of an enclosure survive it is often the only evidence that the site was an early Christian foundation.

A church (RMP DU012-031001) is located in the grounds of Malahide Castle, approximately 500m northwest of the Northern Area in Malahide Demesne townland (figure 13.6). It contains a nave and chancel with a sacristy attached to the southeast corner. There are stepped battlements on the side walls of the nave. Built of coursed, well-mortared limestone masonry, there are buttresses against the west gable either side of the window and a batter or buttress in the southwest corner. The church is entered towards the west end of the nave through opposed doorways with pointed arches, chamfered jambs and a hood moulding. The interior is lit by a triple light, ogee-headed west window of 15th century date and two double-light tracery windows in the east end. Above the west gable is a triple bellcote with steps leading up to it. The chancel is entered through a pointed, segmental chancel arch. There are wide, flat-arched windows in the south wall. The east window is a large, limestone, triple-

light, tracery window. The sacristy is entered off the chancel into a vaulted ground floor with wall presses. There is an external stairs to first floor which contains a fireplace and wall presses in the east wall. A possible sheela-na-gig (RMP DU012-031003) is located at the exterior east gable wall of the Medieval church. Another sheela-na-gig (RMP DU012-031002) is built into a quoin at the north east angle of the chancel of the church. Both features are of sandstone and show evidence of having been worked to fit their present location (www.archaeology.ie).

A graveyard (RMP DU012-031006) is located in the grounds of Malahide Castle and surrounded by farm buildings. It is a relatively small sub-circular graveyard measuring approximately 45m north/south x 40m east/west and is enclosed by a battlemented wall. It is raised in the centre and dominated by the Medieval church (RMP DU012-031001). There are low headstones of 19th/20th century date (www.archaeology.ie).

The apex on the exterior of the south door of the Medieval church contains a carving of a "*mitred head*" (RMP DU012-031004). Located inside the church is an altar tomb (RMP DU012-031005) dedicated to Maud Plunkett (died 1494) with a recumbent effigy of a female figure in a horned cap (www.archaeology.ie).

A Medieval church (RMP DU015-002001) is located approximately 970m south of the Southern Area in Kinsaley townland (figure 13.6). It is recorded (www.archaeology.ie) as a plain, rectangular building, aligned east/west and built of random rubble masonry. Only the nave survives, and internal dimensions are 10.25m in length x 5.10m in width and the walls are 0.95m thick. There are opposed pointed segmental arched doorways in the west end of the nave. The interior is lit by narrow slit opes on the south wall and a tall round arched window at loft level in the west gable which contains a double bellcote. The chancel arch is all that survives of the chancel, and it is of pointed segmented type.

A rectangular walled graveyard (RMP DU015-002002) encloses the remains of the Medieval church. There is a kink in the wall along the southeast boundary which possibly indicates the former existence of an earlier enclosure. There are 19th and 20th century memorials within the graveyard (www.archaeology.ie).

A Medieval church (RMP DU012-023002) is reputed to have existed on the present site of St. Sylvester's Catholic church (www.archaeology.ie). The site is located approximately 1km north of the Northern Area (figure 13.6). Test trenching (Licence No. 10E0426), undertaken in advance of an extension to the modern church, revealed two Post-Medieval masonry walls which were interpreted as the remains of the early 19th century church building that previously occupied the site. A small undated pit/drainage gully and a silty deposit that may date from the Medieval period were also identified. No burial remains were uncovered. A second phase of test trenching on the site (Licence No. 11E0326) uncovered Medieval structural remains, a ditch, pits and 18th/19th century masonry walls.

RMP DU012-023001 is a holy well, traditionally called "*Sunday Well*" or "(*St.*) *Sylvester's Well*", located in a square at the rear of St. Sylvester's Church. The well is covered by a conical stone-built superstructure, and access is from a flight of steps. Pattern day is on August 15th. A modern stone

plaque at the foot of the well is inscribed: *"St Sylvester's well ca. AD 430, restored 2001"* (www.archaeology.ie).

Tradition also notes that an earthwork or mound (RMP DU012-023003) existed on the present site of St. Sylvester's Catholic church (www.archaeology.ie). The recovery of Medieval pottery form the site during the above-mentioned test trenching exercises is interpreted as some level of activity taking place on the site or in the vicinity during the 13th or 14th centuries. It is possible the pottery sherds could relate to activity associated with the mound that once stood on the site, perhaps suggesting it may have been a motte or ringfort that was occupied for a considerable period of time.

The commencement of Viking raids at the end of the 8th century and their subsequent settlement during the following two centuries marked the first ever foreign invasion of Ireland. Viking settlement evidence is scarce and has been found in Cork, Dublin and Waterford, however excavations there have revealed extensive remains of the Viking towns. Outside these towns, understanding of Viking settlement is largely drawn from documentary and place-name evidence. In addition to Cork, Dublin and Waterford, documentary sources provide evidence for the Viking foundation of the coastal towns of Limerick and Wexford (Edwards 2006, 179). Other indirect evidence which suggests Viking settlement, or at least a Norse influence in Ireland, is represented by upwards of 120 Viking-age coin hoards, possible votive offerings of Viking style objects and the assimilation of Scandinavian art styles into Irish designs. While the initial Viking raids would have been traumatic, the wealth and urban expansion brought into the country as a result of Viking trading would have benefited the Gaelic Irish and cultural assimilation in some parts would have been significant.

The late 8th and early 9th centuries saw the arrival of Viking raiders to the east coast of Ireland, with the islands and coastline of north Dublin among the earliest casualties. Annalistic sources record Viking raids on Howth and the coast of Brega in 821 and Lusk in 824, 825 and 854 (Ryan 1949, 68; Kennedy 1984, 46). Within a short time the raiders had occupied the lands of Malahide and Howth and had assumed possession of Dublin to the south (*ibid.*).

The arrival of Anglo-Normans in Ireland towards the end of the 12th century caused great changes during the following century. Large numbers of colonists arrived from England and Wales and established towns and villages. They brought with them new methods of agriculture which facilitated an intensification of production. Surplus foods were exported to markets all along Atlantic Europe which created great wealth and economic growth. Results of this wealth can be seen in the landscape in the form of stone castles, churches and monasteries.

The political structure of the Anglo-Normans centered itself around the establishment of shires, manors, castles, villages and churches. In the initial decades after the Anglo-Norman invasion a distinctive type of earth and timber fortification was constructed- the motte and bailey. Mottes were raised mounds of earth topped with a wooden or stone tower while the bailey was an enclosure, surrounded by an earthen ditch with a timber palisade, used to house ancillary structures, horses and livestock. There are six motte and baileys recorded in County Dublin (www.archaeology.ie).

A motte and bailey (RMP DU012-034) is located approximately 630m east of the Northern Area in Sainthelens townland (figure 13.6). Located in level pasture, it is a flat-topped elongated mound with a flat-bottomed ditch enclosing the north side. There are indications of an intervening berm 2m in

width. The ditch stops abruptly in the south where the ground is uneven, indicating the possible presence of a bailey (www.archaeology.ie).

In certain areas of Ireland Anglo-Norman settlers constructed square or rectangular enclosures, now termed moated sites. Their main defensive feature was a wide, often water-filled, fosse with an internal bank. As in the case of ringforts, these enclosures protected a house and outbuildings usually made of wood. They appear to have been constructed in the latter part of the 13th century though little precise information is available. There are six moated sites recorded in County Dublin (www.archaeology.ie).

More substantial stone castles followed the motte and bailey and moated sites in the 13th and 14th centuries. Tower houses are regarded as late types of castle and were erected from the 14th to early 17th centuries. Their primary function was defensive, with narrow windows and a tower often surrounded by a high stone wall (bawn). An Act of Parliament of 1429 gave a subsidy of £10 to "*liege*" men to build castles of a minimum size of 20ft in length, 16ft in breadth and 40ft in height (6m x 5m x 12m). By 1449 so many of these £10 castles had been built that a limit had to be placed on the number of grants being made available. The later tower houses were often smaller, with less bulky walls and no vaulting. There are 61 tower houses recorded in County Dublin (www.archaeology.ie).

Malahide Castle (RMP DU012-030) is located approximately 560m north west of the Northern Area in Malahide Demesne townland (figure 13.6). It is associated with the Talbot family who were granted these lands by Henry II in 1174 (www.archaeology.ie). The Late Medieval core of the castle is largely masked by a re-build dating to *c*. 1760, which involved the construction of a long symmetrical wing with corner towers that enclosed the earlier castle. The castle was re-roofed and renovated in the 19th century.

The 14th century throughout northwest Europe is generally regarded as having been a time of crisis, and Ireland was no exception. Although the Irish economy had been growing in the late 13th century, it was not growing quickly enough to support the rapidly expanding population, especially when Edward I was using the trade of Irish goods to finance his campaigns in Scotland and Wales. When the Great European Famine of 1315-1317 arrived in Ireland, brought about by lengthy periods of severe weather and climate change, its effects were exacerbated by the Bruce Invasion of 1315-1318. Manorial records which date to the early 14th century show that there was a noticeable decline in agricultural production. This economic instability and decline were further worsened with the onset of the Bubonic Plague in 1348.

Before the Tudors came to the throne the kings of England were also the kings of western France and so, during the 14th and 15th centuries, the various lords who ruled in Ireland were largely left to themselves. The Tudor conquest however brought a much greater interest in the affairs of Ireland. They wanted to put a stop to the raids of the Gaelic Irish on areas under English rule. To do this, they ruthlessly put down any rebellions and even quashed inter-tribal feuds. English settlers were then brought in to settle their lands. The first of these plantations occurred in the mid-16th century in what is now Laois and Offaly. After the Desmond rising in Munster in 1585 came another plantation, and parts of south-western Tipperary were planted at that time.

From 1593 until 1603 there was a countrywide war between the Gaelic Irish, who were supported by the French, and the Elizabethan English. The Irish were finally defeated and with the "*Flight of the Earls*" from Rathmullan, County Donegal in 1607 Ulster, which had previously been independent of English rule, was planted.

Austin Cooper writing in 1780 described Malahide as a "*very small Vile*" with a few cabins and a large strand at low tide (cited in Little 1948, 1-2). The Demesne was noted as having been recently "*modernised and improved*" (*ibid*.), suggesting expansion to its present limits, and the construction of Back Road may have already been completed. The incumbent Talbot at that time, Col. Richard Talbot, appears to have been an improving landlord, and is credited with the advance of industry in Malahide in the later 18th century (*ibid*., 13). This was primarily based on the manufacture of cotton, although it was short-lived as by the end of the century the market for cotton had collapsed, resulting in the abandonment of plans to expand the industry and to link Malahide and Swords via canal (*ibid*.; Lewis 1837, Vol. II, 234).

By the early 19th century silk manufacture was still carried on in the town, while the harbour continued to export meal and flour and import coal (*ibid*.). Malahide was also a fishing town and particularly noted for its oysters, with which it supplied the city of Dublin (*ibid*.). Lewis described the town as pleasing, with "*many handsome cottages*", although he noted a large number of these were only occupied seasonally as holiday homes (*ibid*.). Notwithstanding the arrival of the railway to Malahide in 1844 (Little 1948, 3), the town appears to have gone into decline in the later 19th century, and an account from 1912 describes it as "*a decayed watering-place which had attained an ephemeral popularity about sixty years ago*" (Joyce 1912, 280).

13.3.2 Toponyms

Townland names are important in understanding the archaeology, geology, land-use, ownership and cultural heritage of an area.

Broomfield means "*field of the broom*".

Kinsaley translates from the Irish *Cionn Sáile* as "*head of the salt water or brin*e".

Malahide translates from *Mullach Íde* as "*Íde's summit or hilltop*".

13.3.3 Topographical Files of the National Museum of Ireland

The discovery of a stone axe-head is recorded in the Topographical Files from a field beside a house at Kinsaley Lane, which is to the west of the proposed development area. No additional information is available, as the axe was retained by the finder and does not form part of the Museum's collections.

No other artefacts from Kinsaley townland are recorded in the Topographical Files.

A large quantity of flint artefacts was recovered from freshly ploughed fields in Broomfield townland in the 1960s. These appear as four separate collections from the years 1964, 1966 and 1968. NMI Ref. 1964:29-30 consists of 16 waste flakes, one blade and three cores, along with flint nodules, pebbles and a probable gunflint. These were recovered from an orchard in the northern part of the townland, most likely in the area of Ivy Grange, to the east of the railway line.

NMI Ref. 1966:42 is a fragment of a flint side-scraper, noted as a surface find. It was further noted that in the same area the sawn tooth of a sperm whale and a fragment of tortoiseshell were also recovered, although these were considered to be of relatively modern origin and were therefore not retained by the Museum.

There are two collections recorded from 1968. NMI Ref. 1968:151-171 includes two stone axeheads, along with 72 flint and chert artefacts and a small number of miscellaneous finds of uncertain date. The flint and chert artefacts included scrapers, blades, flakes and cores, while some 58 were later noted as "*waste flakes, cores and chips of flint*" (Lucas 1971), suggesting flint-working had occurred in the vicinity. These artefacts, along with those presented to the National Museum in 1964 and 1966, are part of a more extensive collection of flint artefacts from the Malahide area recovered by the antiquarian Noel Flanagan. It is likely the Broomfield finds were recovered from lands close to his home, in the north of the townland. Indeed, the provenance for most of these finds is recorded at the northern end of the townland, while two flint flakes (NMI Ref. 1968: 159-160) were found in the north west of the townland, to the west of the railway line.

The second collection acquired by the National Museum in 1968 (NMI Ref. 1968:174-184) consists of 91 flint artefacts recovered as surface finds within Broomfield townland. As with the first collection, a large number of these artefacts are considered to be waste material from flint-working, along with flint cores, flakes and scrapers. No find-spots within Broomfield townland were recorded for the second collection.

A number of finds have also been recovered from test trenches excavated within Malahide Demesne, including a polished stone axehead (NMI Ref. 2012:17), Medieval pottery (NMI Ref. 2012:19), a clay pipe stem (NMI Ref. 2012:20) and associated animal bone (NMI Refs. 2012:18 and 2012:21).

13.3.4 Cartographic Analysis

Ordnance Survey Map First Edition 1:10,560 1844 (figure 13.7)

Northern Area

The First Edition 1:10,560 Ordnance Survey map records the Northern Area as part of six fields, with part of the western and southern ends being shown as townland and parish boundaries. Research suggests that:

> *"hoards and single finds of Bronze Age weapons, shields, horns, cauldrons and gold personal objects can all be shown to occur on boundaries" (Kelly 2006, 28).*

The "*Dublin and Drogheda Railway in Progress*" is recorded as forming the eastern boundary of the proposed area of land take. The eastern-most area of land take is recorded as part of Broomfield House demesne on the First Edition 1:10,560 Ordnance Survey map.

Southern Area

The Southern Area is recorded as part of three fields, with a generally east/west oriented path extending across the proposed development area towards Kinsaley Lane.

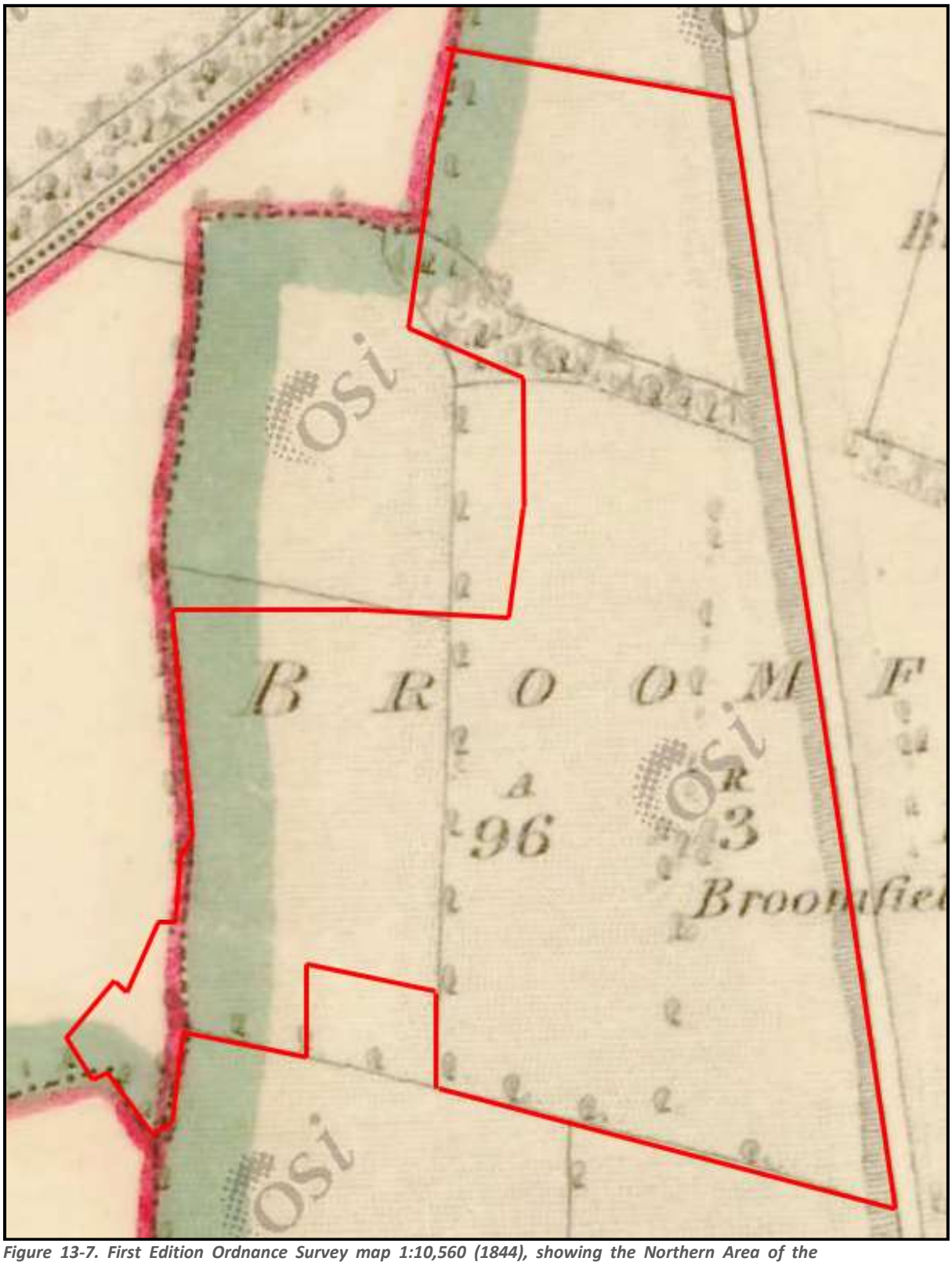

Figure 13-7. First Edition Ordnance Survey map 1:10,560 (1844), showing the Northern Area of the proposed development

There are no archaeological or architectural features recorded on the First Edition 1:10,560 Ordnance Survey map within the area of proposed land take.

Ordnance Survey Map First Edition 1:2,500 1863 (figure 13.8)

Northern Area

Broomfield House demesne is not recorded within the proposed development area on the First Edition 1:2,500 map. There are no other differences within the Northern Area between First Edition 1:10,560 map and the First Edition 1:2,500 map.

Southern Area

The generally east/west oriented path extending across the Southern Area shown on the First Edition 1:10,560 map is not recorded on the First Edition 1:2,500 map. Neither is a previously extant north/south field boundary recorded. The southern field boundary is recorded as a drain on the First Edition 1:2,500 map.

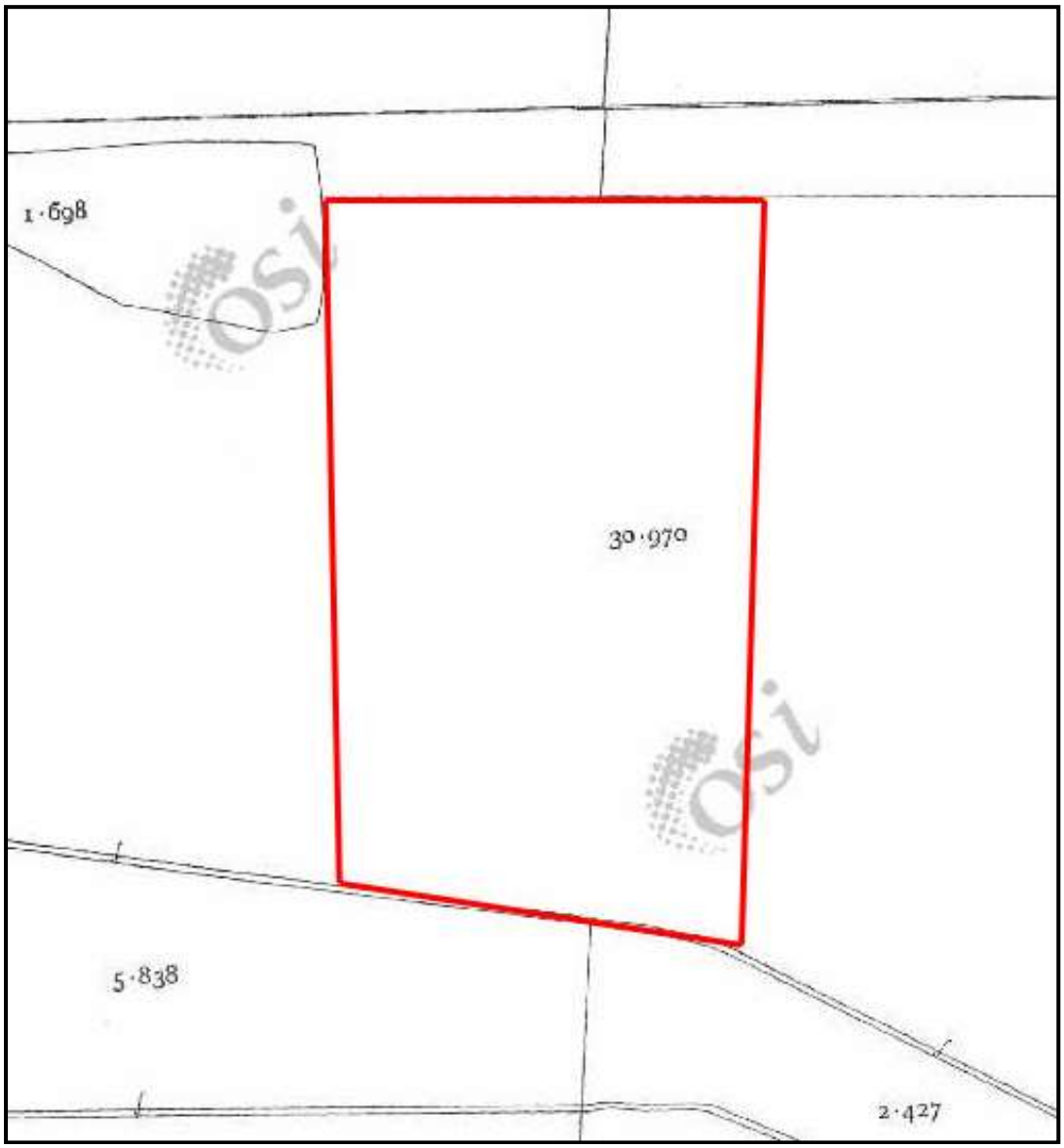

Figure 13-8. First Edition Ordnance Survey map 1:2,500 (1863), showing the Southern Area of the proposed development

There are no archaeological or architectural features recorded on the First Edition 1:2,500 Ordnance Survey map within the area of proposed land take.

Ordnance Survey Map Third Edition 1:10,560 1906 (figure 13.9)

There are no differences recorded within either the Northern Area or Southern Area between the First Edition 1:2,500 map and the Third Edition 1:10,560 map.

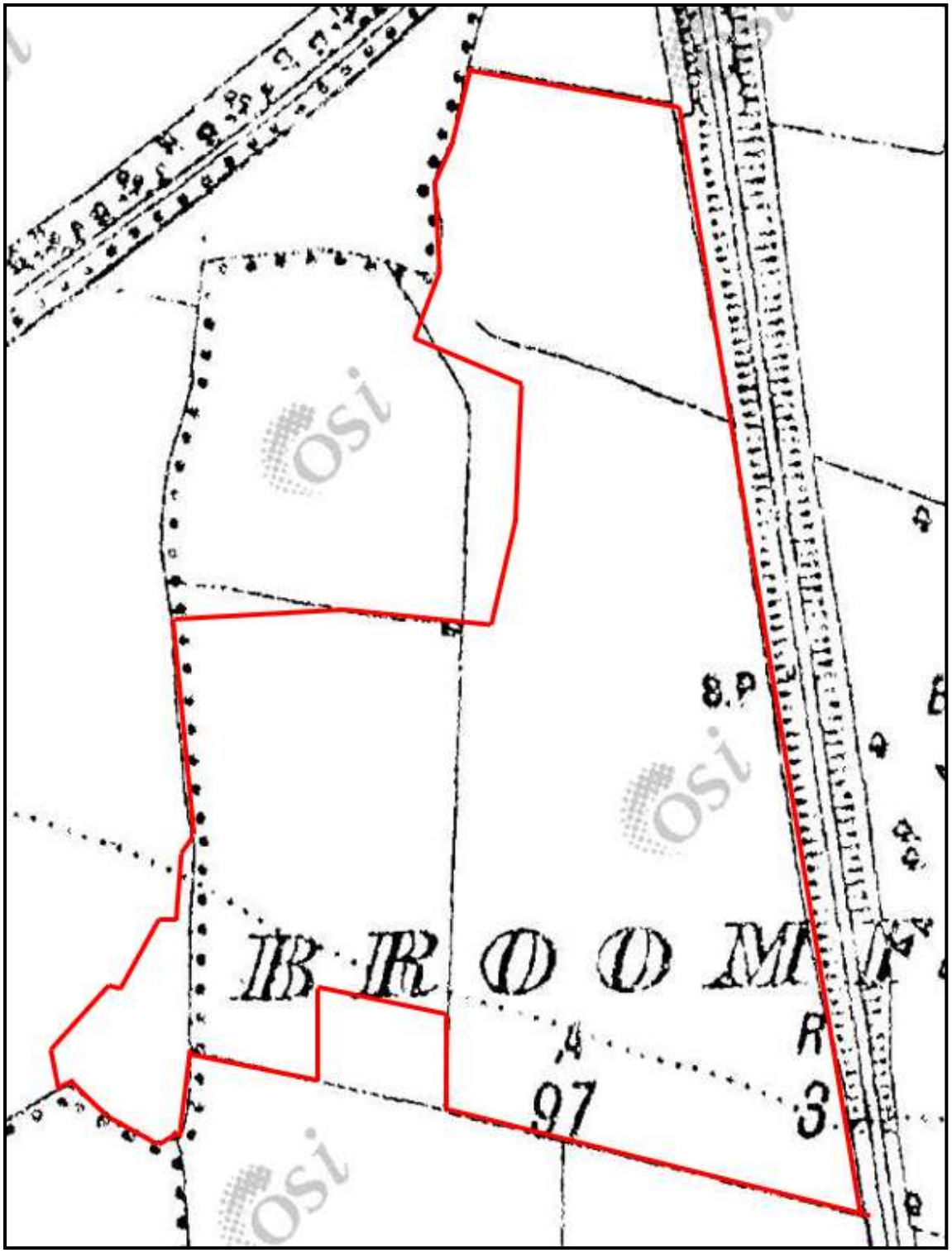

Figure 13-9. Third Edition Ordnance Survey map 1:10,560 (1906), showing the Northern Area of the proposed development

There are no archaeological or architectural features recorded on the Third Edition 1:10,560 Ordnance Survey map within the area of proposed land take.

13.3.5 Aerial Photographs

Aerial photographs held by Ordnance Survey Ireland (www.map.geohive.ie) were consulted to look for the presence of archaeological or architectural remains within the proposed development area.

The 1995, 2000 and 2005 photographs, along with more recent aerial photography (www.bing.com/maps), record a similar landscape to that which was noted during the test trenching programmes with generally large, enclosed fields being noted.

There was no evidence of any archaeological, architectural or cultural heritage features recorded on aerial photography within any areas of proposed land take.

13.3.6 Summary of Previous Fieldwork in the General Development Area

Reference to Summary Accounts of Archaeological Excavations in Ireland (www.excavations.ie) revealed that nine fieldwork programmes have been carried out in Broomfield, Kinsaley and Malahide townlands.

Test trenching (Licence Number 08E0529) was carried out in 2008 along the line of the Malahide Distributor Road. At Kinsaley, a 90m long trench and five offsets measuring 10m–13m were excavated on the summit of a hill and on its north-facing slope. A shallow pit, 1.33m x 0.8m, with a charcoal-rich fill was uncovered at the top of the hill. Another similarly sized pit was uncovered 27m further south where three field drains, at least two of which were Post-Medieval in date, were also uncovered. An *ex situ* sherd of prehistoric pottery was recovered towards the base of the hill.

Test trenching and monitoring were carried out by the writer (Licence Number 14E0009) towards the southern end of Kinsaley townland, as part of a Grant of Planning for a housing development. Testing revealed a possible small pit containing a sherd of Medieval pottery. No additional archaeological features or artefacts were revealed.

Test trenching was carried out by the writer (Licence Number 14E0165) in a field located immediately south west of the Northern Area and immediately north of the Southern Area. The excavation of 17 test trenches throughout the development area revealed 13 features of archaeological significance. An enclosure ditch (RMP DU012-071) was revealed to vary from 3.1m to 3.65m in width and from 1.1m to 1.3m in depth. In addition to the ditch, nine archaeological features in the form of spreads, linear features, a pit and a post-hole were revealed within the enclosure. No artefacts or environmental evidence were revealed by the hand-testing of these features. Subsequent monitoring of this area (Licence Number 18E0090) revealed the remains of a possible hearth.

Test trenching was carried out by the writer in 2014 (Licence Number 14E0162; Nelis 2014) in a field located immediately west of the Northern Area (**Section 13.5.2 Phase 1 Test Trenching**). Subsequent monitoring (Licence Number 17E0227; Nelis 2019) revealed four archaeological features in the middle/northern half of the development area. A radiocarbon determination for one of the features placed activity in the Late Neolithic/Early Bronze Age.

Test trenching was carried out in 2019 (Licence Number 19E0464) in an area straddling the townland boundary between Kinsaley and Broomfield, *i.e.* centered on a point approximately 70m south of the Northern Area. The excavation of nine trenches with a cumulative length of 810m failed to reveal any archaeological features or artefacts.

A ditched circular enclosure was excavated in Broomfield townland in 1985 (Licence Number 1985:23), and was noted as being one of three barely visible enclosures situated just below the south-facing brow of a low east/west ridge. Excavation revealed a flat circular area 14m in diameter, enclosed by a ditch 0.90m - 1.0m deep, with a slight internal bank (0.10m – 0.15m high x 1m - 1.5m wide) and 16 pits. Fifteen of the pits were contemporary with the enclosure, while one was earlier and sealed beneath the internal bank. This contained three sherds of Beaker pottery, charcoal and burnt earth. Around the entire circumference of the base of the ditch a line of 2" tile drains (*c.* 1800 - 1850) had been inserted, and a sod drain had been dug across the interior of the enclosure. The evidence points to the enclosure being the remains of a ploughed-out tree ring which had been erected in the 18th/19th century in an area of Early Bronze Age activity.

Reference to Summary Accounts of Archaeological Excavations in Ireland (www.excavations.ie) revealed that a number of fieldwork programmes have been carried out in townlands surrounding the proposed development area.

A landscape feature was excavated in 1980 in Auburn townland (Licence Number 1980-84:0093), but no further information is provided in the Summary Accounts of Archaeological Excavations in Ireland.

Monitoring of engineering pits in Malahide Demesne in 2004 (Licence Number 04E1528) in the grounds of Malahide Castle in the area of the Barbican Tower failed to reveal any archaeological features or artefacts.

Monitoring of topsoil stripping in 2006 (Licence Number 06E0661) associated with construction of a pavilion and car park within the demesne of Malahide Castle failed to reveal any features of archaeological significance.

Limited hand excavation at Malahide Castle in 2011 (Licence Numbers C451 and E4381) following a geophysical survey (Licence Number 10R070) revealed a series of linear ditches, curvilinear slot-trenches and pits producing evidence of possible structural remains, domestic occupation and agricultural/landscaping activity. The majority of the linear features were identified as drainage gullies and field boundaries of Post-Medieval date. Other features consisted of two curvilinear slots or gullies, a metalled surface and 10 widely dispersed pits, of varying form, containing charcoal-stained soils, Medieval pottery and possible prehistoric lithic material.

Various fieldwork exercises in Malahide dating from 1999 onwards have revealed worked flint from two fieldwalking programmes, Medieval pottery and Post-Medieval structural remains.

13.3.7 Fingal Development Plan 2017 - 2023

It is an Objective (CHO2) of Fingal County Council (Fingal Development Plan 2017, 346) to:

> *"Favour the preservation in situ or at a minimum preservation by record, of archaeological sites, monuments, features or objects in their settings. In securing such preservation the*

Council will have regard to the advice and recommendations of the National Monuments Service of the Department of the Arts, Heritage, Regional, Rural and Gaeltacht Affairs."

It is also an Objective (CHO3) of Fingal County Council (*ibid*.) to:

"Protect all archaeological sites and monuments, underwater archaeology, and archaeological objects, which are listed in the Record of Monuments and Places and all sites and features of archaeological and historic interest discovered subsequent to the publication of the Record of Monuments and Places, and to seek their preservation in situ (or at a minimum, preservation by record) through the planning process."

13.3.8 National Monuments

The Department of Housing, Local Government and Heritage maintains a database on a county basis of National Monuments in State Care: Ownership and Guardianship. The term National Monument is defined in Section 2 of the National Monuments Act (1930) as:

"a monument or the remains of a monument the preservation of which is a matter of national importance by reason of the historical, architectural, traditional, artistic or archaeological interest attaching thereto." (www.archaeology.ie).

There are no National Monuments in State Care within the proposed development area or the 1km study area.

There are no sites with Preservation Orders or Temporary Preservation Orders within the proposed development area or the 1km study area.

There are no World Heritage Sites or sites included in the Tentative List as consideration for nomination to the World Heritage List within the proposed development area or the 1km study area.

13.4 Architectural and Cultural Heritage

13.4.1 Fingal Development Plan 2017 - 2023

It is an Objective (CH20) of Fingal County Council (Fingal Development Plan 2017, 350) to:

"Ensure that any development, modification, alteration, or extension affecting a Protected Structure and/or its setting is sensitively sited and designed, is compatible with the special character, and is appropriate in terms of the proposed scale, mass, height, density, layout, materials, impact on architectural or historic features, and junction with the existing Protected Structure."

It is also an Objective (CH25) of Fingal County Council (*ibid*., 351) to:

"Ensure that proposals for large scale developments and infrastructure projects consider the impacts on the architectural heritage and seek to avoid them. The extent, route, services and signage for such projects should be sited at a distance from Protected Structures, outside the boundaries of historic designed landscapes, and not interrupt specifically designed vistas. Where this is not possible the visual impact must be minimised through appropriate mitigation measures such as high quality design and/or use of screen planting."

Appendix 2 of the Fingal Development Plan (*ibid*.) contains the Record of Protected Structures for Fingal.

There are no Protected Structures recorded in the Fingal Development Plan within the proposed development area or the 500m study area.

A number of Protected Structures are located within the wider landscape of the proposed development area. Given the intervening distance between the proposed development area and the Protected Structures, along with natural screening and the built-up urbanised environment of Malahide village, it is considered no significant visual impacts on any Protected Structures will occur.

An Architectural Conservation Area (ACA) is:

> "*a place, area, group of structures or townscape that is of special architectural, historical, archaeological, artistic, cultural, scientific, social or technical interest or value, or contributes to the appreciation of Protected Structures*." (*ibid*.).

Table 10.1 of the Fingal Development Plan (*ibid*., 352) contains a list of Architectural Conservation Areas in Fingal.

There are no Architectural Conservation Areas recorded in the Fingal Development Plan within the proposed development area.

There are two Architectural Conservation Areas recorded in the Fingal Development Plan within the 500m study area.

Table 13-2. Architectural Conservation Areas within the 500m Study Area

Architectural Conservation Area	Distance from Proposed Development Area
Malahide Castle Demesne	*c*. 40m (at its nearest point)
Malahide – The Bawn, Parnell Cottages and St. Sylvester's Villas	*c*. 145m (at its nearest point)

13.4.2 National Inventory of Architectural Heritage

Building Survey

The National Inventory of Archaeological Heritage (NIAH) maintains a non-statutory register of buildings, structures *etc*. recorded on a county basis (www.buildingsofireland.ie).

There are no structures recorded on the NIAH within the proposed development area.

There are four structures recorded on the NIAH within the 500m study area.

Table 13-3. NIAH structures within the 500m Study Area

Reg. No.	Structure Name	Description	Distance
11344020	Graveyard/cemetery	Graveyard with various cut stone grave markers. Ruined church with nave, chancel and sacristy to south. Late 15th	*c*. 490m

Reg. No.	Structure Name	Description	Distance
		century nave, 16th century chancel, possibly post-Reformation.	
11344021	Farmyard complex	Two-storey stable yard complex on a U-shaped plan, *c*. 1840, comprising gabled central block. Pairs of carriageway arches to north and south gables attached to flanking perpendicular blocks. Remodelled *c*. 1990 to accommodate workshops and retail outlets.	*c*. 475m
11344022	House	Detached three-bay two-storey house, *c*. 1860, retaining original features with single-bay two-storey return to rear.	*c*. 455m
11344026	Gate lodge	Detached three-bay single-storey former gate lodge, *c*. 1890, retaining original fenestration. Single-bay single-storey return to rear extended to east and to south, *c*. 1930. Now in use as detached house.	*c*. 300m

Garden Survey

The National Inventory of Archaeological Heritage maintains a non-statutory register of historic parks and gardens recorded on a county basis.

There is one historic park and garden recorded on the NIAH within the proposed development area.

Table 13-4. NIAH historic park and garden within the Proposed Development Area

Site ID	Name	Description	Distance
2522	Broomfield House	Eastern area of parkland covered by residential and industrial development. Western side arable farmed.	Within the proposed development area

The NIAH Survey Data for Broomfield House notes:

> *"Eastern area of parkland covered by residential and industrial development. Western side arable farmed." (www.buildingsofireland.ie).*

The NIAH Survey Data for Broomfield House notes that the site footprint is not visible, that "*Significant Development*" has taken place within the parkland, and that no architectural or landscape features, such as buildings, garden structures, avenues, woodland, parkland, formal garden, vistas or other features, survive.

Reference to the First Edition Ordnance Survey map (figure 13.7) shows that the area of proposed land take located within Broomfield demesne did not contain any architectural or landscape features associated with the parkland, other than regular field boundaries. Broomfield House and its associated landscaped grounds and gate lodge are all recorded east of the Dublin to Drogheda railway line on the First Edition Ordnance Survey map, and have therefore been historically severed from the area of proposed land take. Later edition cartographic sources (figure 13.9) confirm that the Broomfield

parkland area had been substantially reduced in the 19th and early 20th century, and that no associated features survive within the area of proposed land take.

The western side of the Northern Area is recorded as a townland and parish boundary, and forms the western extent of Broomfield demesne (**Section 13.4.4 Townland Boundary**).

There are an additional two historic parks and gardens recorded on the NIAH within the 500m study area.

Table 13-5. NIAH historic parks and gardens within the 500m Study Area

Site ID	Name	Description	Distance
2514	Malahide Demesne	Buildings and woodland indicated. Area labelled Malahide Demesne.	*c.* 40m (at its nearest point)
2529	Sainthelens	Buildings indicated. Area labelled Sainthelens.	*c.* 235m (at its nearest point)

There are no features recorded on the *Fingal Industrial Heritage Survey* (2011) within the proposed development area.

13.4.3 Cultural Heritage

The Fingal Development Plan (2017 - 2023) does not contain any designated lists or sites of cultural heritage importance or significance.

13.4.4 Townland Boundary

The western side and part of the southern side of the Northern Area is recorded as a townland and parish boundary on historic cartographic sources. Proposed access roads and footpaths will truncate the townland and parish boundary in six places.

13.5 Site-Specific Archaeological Fieldwork

13.5.1 Geophysical Survey

A geophysical survey (Licence 18R0101) was carried out by Joanna Leigh within the proposed development area in June 2018 (Leigh 2018). The survey was undertaken to locate and identify any potential archaeological responses within the area of land take.

Due to ground conditions it was not possible to carry out the geophysical survey in Fields 1, 2, 4, 7, 8 and 10 (figures 13.12 and 13.13).

In summary, the geophysical survey in the Northern Area revealed the presence of a possible plough-damaged enclosure measuring approximately 40m north east/south west x 35m in the north west corner of Field 5 (figure 13.10). Isolated responses within and in the vicinity of the possible enclosure may represent small pit-type features, although the geophysical survey report noted that this interpretation is speculative (*ibid*., 4).

A possible small plectrum-shaped enclosure measuring approximately 35m north/south x 25m east/west was noted in the eastern end of Field 5 (figure 13.10). Elsewhere in Field 5, four small separate faint curvilinear trends were noted towards the southern and eastern ends of the field (each referred to as "4" on figure 13.10). Although it is possible these isolated anomalies represent plough-damaged short ditch-type features, the geophysical survey report (*ibid*.) noted that such an interpretation is cautious as no clear archaeological pattern is discernible.

Linear responses were noted towards the middle of Field 3 (referred to as "6" on figure 13.10). The geophysical survey report (*ibid*.) noted that while they may be the remains of modern field divisions, it is possible that archaeological ditch-type features are represented in these areas.

A circular trend with a 5m diameter (referred to as "8" on figure 13.10) was detected towards the southern end of Field 3. This feature is interpreted in the geophysical survey report (*ibid*.) as being of possible archaeological potential.

In the Southern Area linear trends suggest probable former field divisions in Field 9, however isolated responses with a magnetic signature similar to archaeological features were also detected in this area (figure 13.11). No clear archaeological pattern was discernible however, and the geophysical survey report (*ibid*., 5) noted the responses may equally represent more deeply buried ferrous debris.

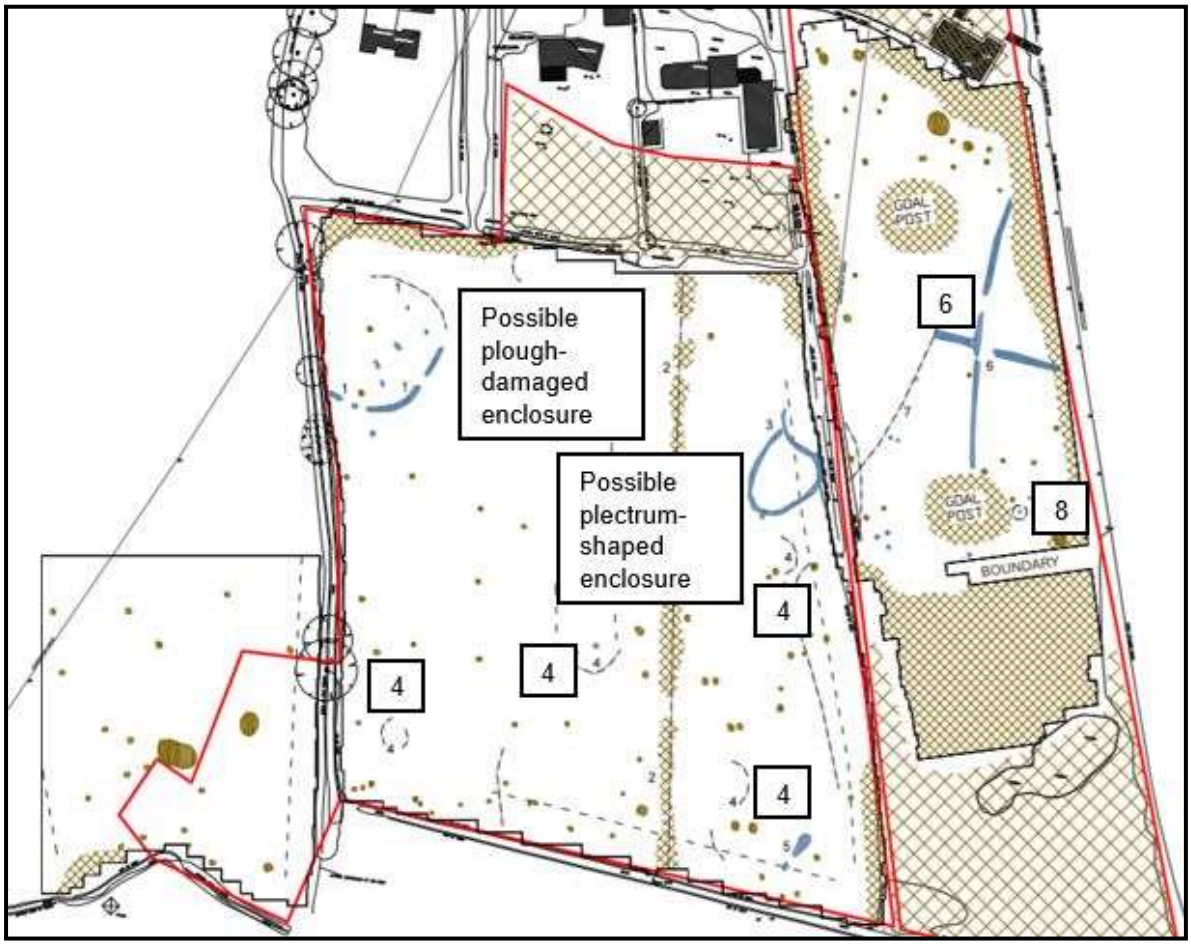

Figure 13-10. Results of the geophysical survey in the Northern Area

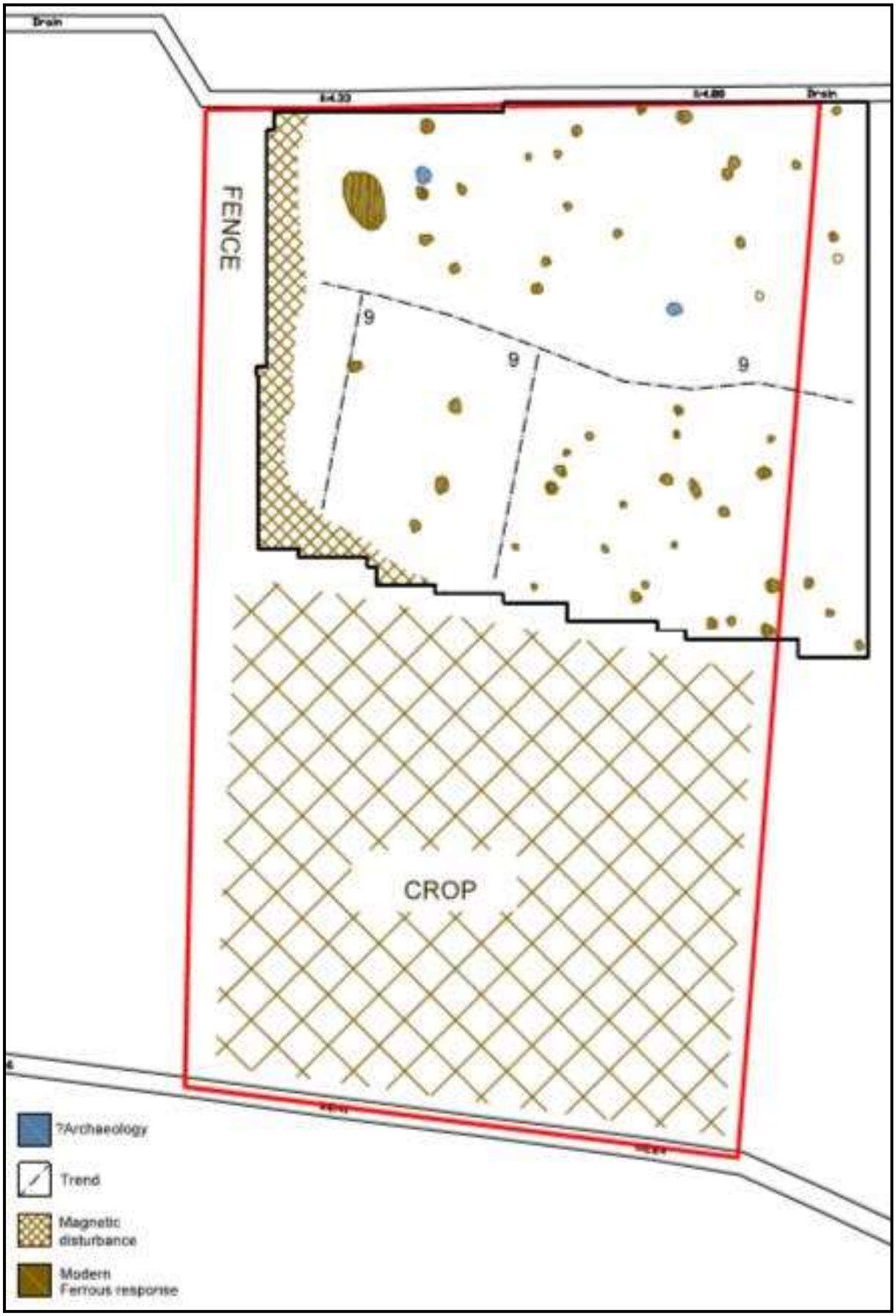

Figure 13-11. Results of the geophysical survey in the Southern Area

13.5.2 Phase 1 Test Trenching

Test trenching (Licence No: 14E0162) was carried out by Dermot Nelis Archaeology between 3rd and 6th June 2014 in a field located immediately west of the Northern Area (Nelis 2014). The excavation of 13 test trenches revealed four features of archaeological significance. Two of these features relate to the possible plough-damaged enclosure revealed in the geophysical survey in the northwest corner of Field 5 and which is located within the current development area (figure 13.10).

Testing in 2014 revealed the possible plough-damaged enclosure ditch located within the current development area to measure 1.75m wide. It extended beyond the test trench to both the east and west. A 0.40m wide hand-dug section revealed it to have a maximum depth of 0.60m. No artefacts or environmental evidence were revealed in the hand-dug section.

A sub-circular pit was revealed 0.17m north of the above-mentioned enclosure ditch, *i.e.* within the possible plough-damaged enclosure and within the current development area. It measured 0.98m east/west x 0.85m north/south x 0.25m deep, and extended beyond the trench to the west. It was revealed in the test trench as an obvious feature with burning, along with small amounts of animal bone on the surface. It was preserved *in situ*, and no artefacts or environmental evidence were revealed in the hand-dug section.

Phase 1 (2014) test trenching revealed an east/west oriented archaeological feature approximately 50m northwest of the proposed development area, *i.e.* outside the current development area. It measured 1.5m north/south x 0.30m deep maximum, and extended beyond the trench to the east and west. This feature has been preserved *in situ*.

Phase 1 (2014) test trenching also revealed an archaeological feature approximately 25m north of the proposed development area, *i.e.* outside the current development area. It took the form of a 0.38m north/south x 0.35m east/west x 8cm deep feature, revealed as a charcoal surface directly under topsoil. This feature was fully excavated at the time of Phase 1 test trenching.

13.5.3 Phase 2 Test Trenching

Phase 2 test trenching (Licence No: 20E0058) was carried out by Dermot Nelis Archaeology between 18th March and 1st July 2020, and in total took 18 days to complete (Nelis 2021). Test trenching revealed four possible archaeological features (a pit; a hearth/burnt pit; and two possible enclosure ditches) in two fields (Field 1 and Field 5; figure 13.12).

No archaeological features or artefacts were revealed in Fields 3, 4, 7, 8, 9 or 10.

The Phase 2 test trenching site visit carried out to facilitate submission of the Licence Application to National Monuments Service showed Field 2 (figure 13.12) to be overgrown and with large amounts of rubble, along with a large concrete hardstand. In addition, an overhead powerline was shown to extend across the middle of Field 2. As such, it was agreed in the Method Statement submitted to National Monuments Service that trenches would not be excavated in Field 2.

Field 6 (figure 13.12) was shown to have been previously topsoil stripped, and monitoring in this area (Nelis 2019) failed to reveal any archaeological features or artefacts. As such, Phase 2 test trenches were not excavated in Field 6.

Test trenching in Field 7 and Field 8 (figure 13.12) failed to reveal any archaeological features or artefacts. The location of Field 7 and Field 8 does not form part of the current development, but will instead be part of a future planning application. This area was assessed however as part of Phase 2 test trenching programme to provide information on the archaeological potential of the wider development area.

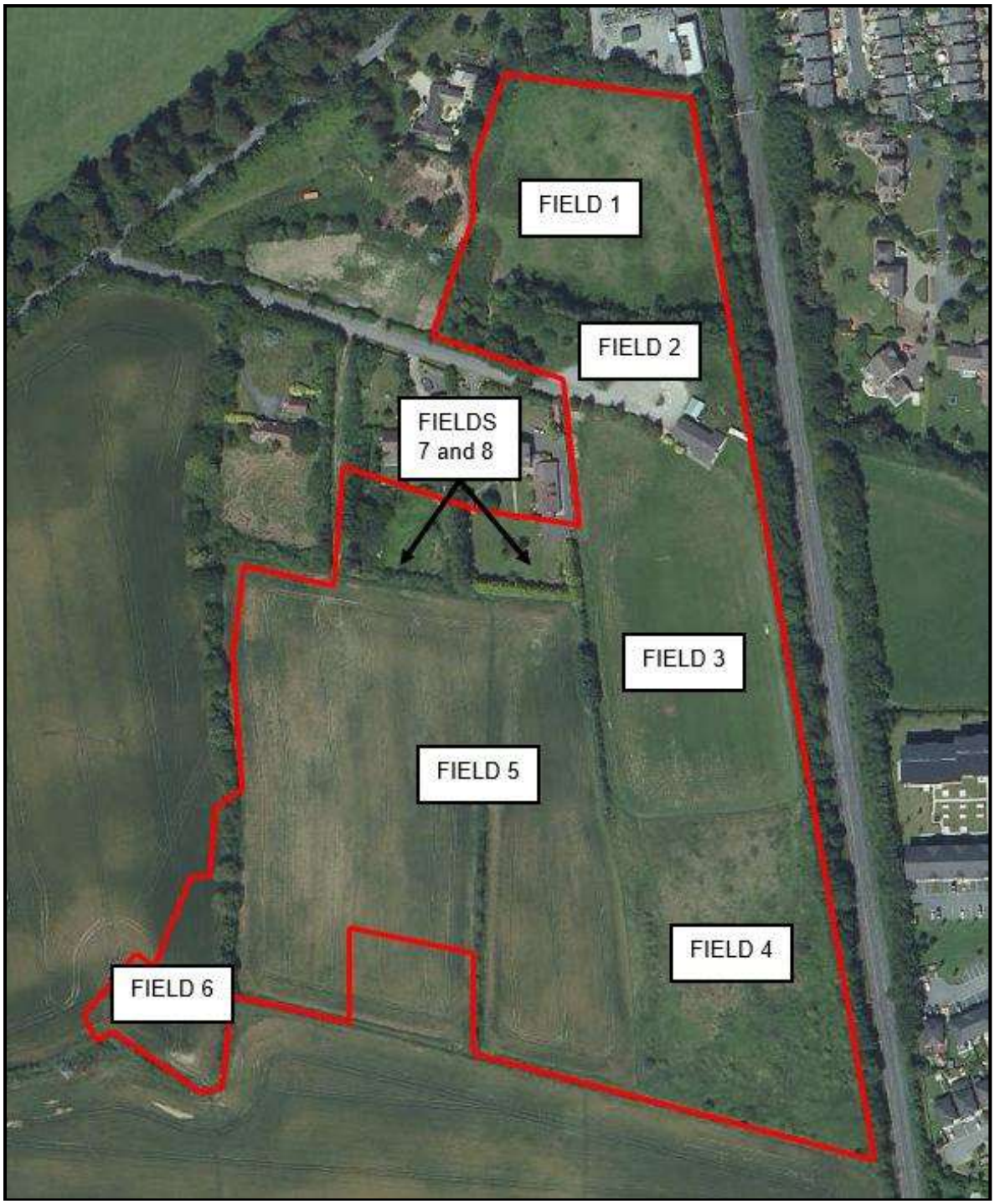

Figure 13-12. Location of Fields 1 – 8 in the Northern Area of the Phase 2 Test Trenching

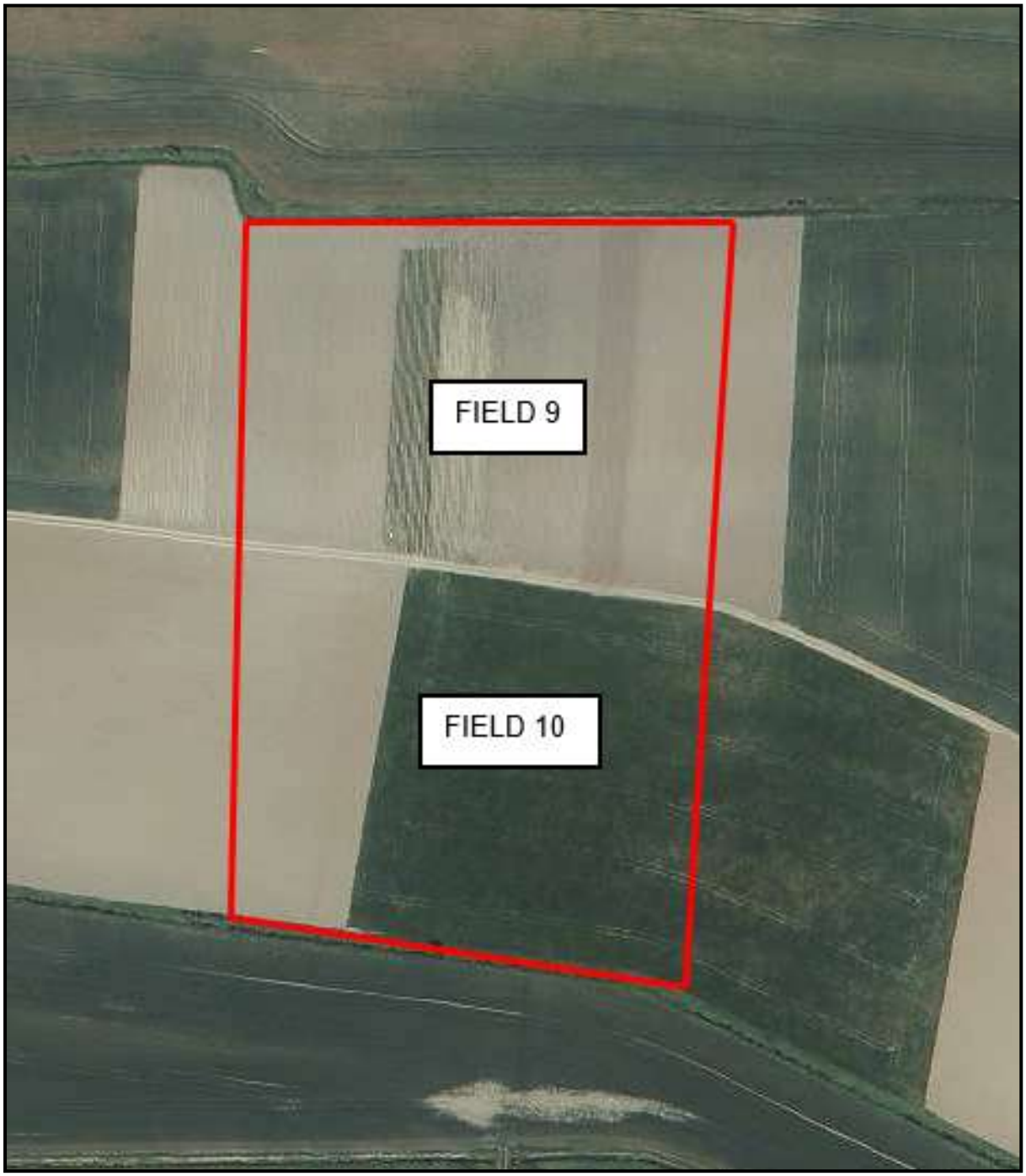

Figure 13-13. Location of Fields 9 and 10 in the Southern Area of the Phase 2 Test Trenching

A pit was identified towards the northern end of Field 1 (figure 13.14; plate 13.1). It was orientated roughly northwest/south east and measured 1.5m long x 1.1m wide. The fill was a friable charcoal-stained dark brown fine silt. The pit was fully preserved *in situ*, and no artefacts were revealed in association with the feature.

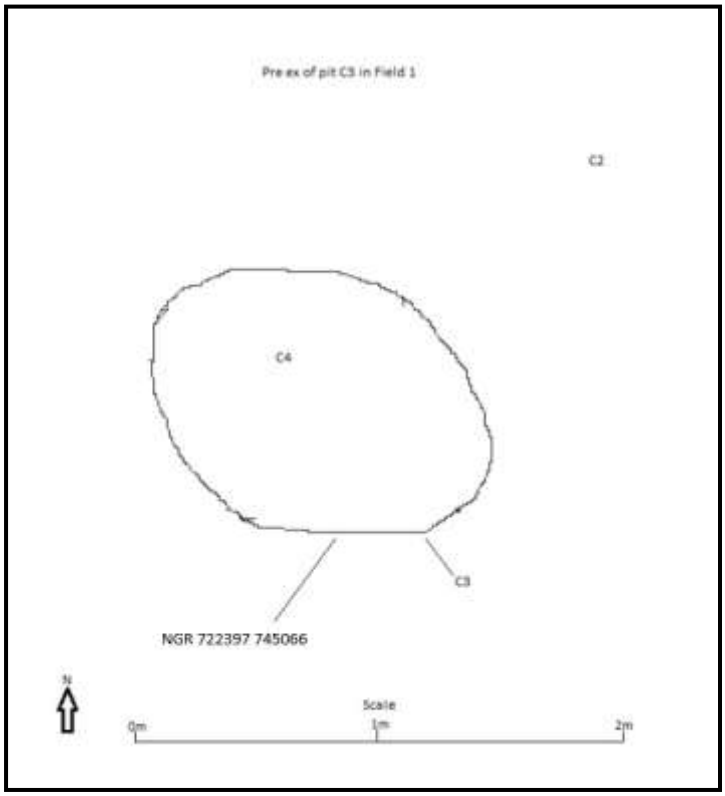

Figure 13-14. Plan of pit identified towards the northern end of Field 1

Figure 13-15. Pit identified towards the northern end of Field 1

A hearth/burnt pit was identified at the northern end of Field 5 (figure 13.15; plate 13.2). It was irregular in plan and measured 1.25m east/west x 0.6m north/south, although this feature appears to have been disturbed by ploughing activity. It was revealed as a spread of oxidized reddened silt with charcoal. No diagnostic artefacts were recovered from the fill, and the feature has been fully preserved *in situ*.

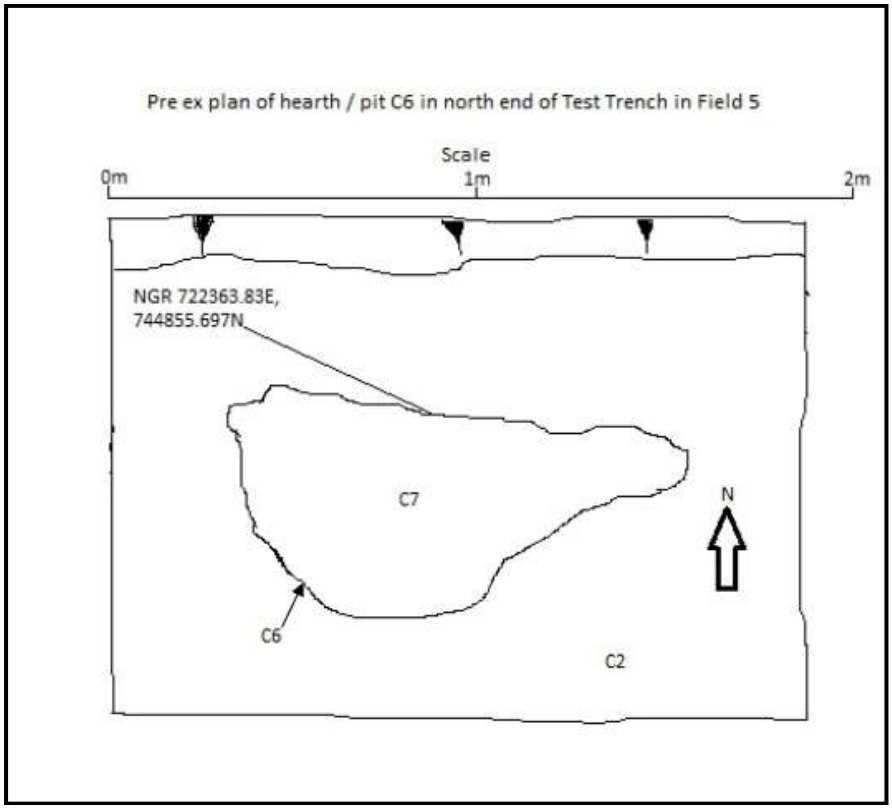

Figure 13-16. Plan of hearth/burnt pit identified at the northern end of Field 5

Figure 13-17. Hearth/burnt pit identified towards the northern end of Field 5

The geophysical survey indicated the presence of two previously unrecorded possible plough-damaged enclosures in Field 5 (figure 13.10). Four trenches (Trenches 1 – 4 on figure 13.16) were excavated as part of the Phase 2 test trenching programme to assess these geophysical anomalies.

Test Trenches 1 and 2 were excavated to assess the extent, character and condition of a possible plough-damaged enclosure located in the northwest corner of Field 5. Both trenches extended from within the probable enclosure and across the possible ditch, while also assessing internal isolated geophysical responses. Trench 1 measured 10m in length and assessed the ditch in the northern end of the possible enclosure. Trench 2 measured 20m in length and assessed the ditch in the southeast corner of the possible enclosure.

Pre-test trenching, the anomaly in Test Trench 1 was interpreted as possibly representing a badly plough-damaged enclosure ditch. Test trenching did not reveal any archaeological features associated with the geophysical anomaly in Test Trench 1, and it is suggested the ditch may have been removed through repeated ploughing in this location.

An archaeological feature was identified 3.5m from the south-eastern end of Test Trench 2, in the location of the geophysical anomaly (figure 13.17; plate 13.3). It took the form of a possible ditch with gently regular curving sides and a slightly rounded base. It measured approximately 1.1m wide north/south x approximately 0.3m deep, and continued beyond the trench to the northeast and southwest. The single fill was a loose mid brown silty clay with occasional small stone inclusions evenly distributed. No artefacts were recovered, and no additional archaeological features were identified in Geophysical Test Trench 2.

The possible enclosure ditch identified in Test Trench 2 is the same feature as that recorded in the Phase 1 (2014) test trenching programme (**Section 13.5.2 Phase 1 Test Trenching**).

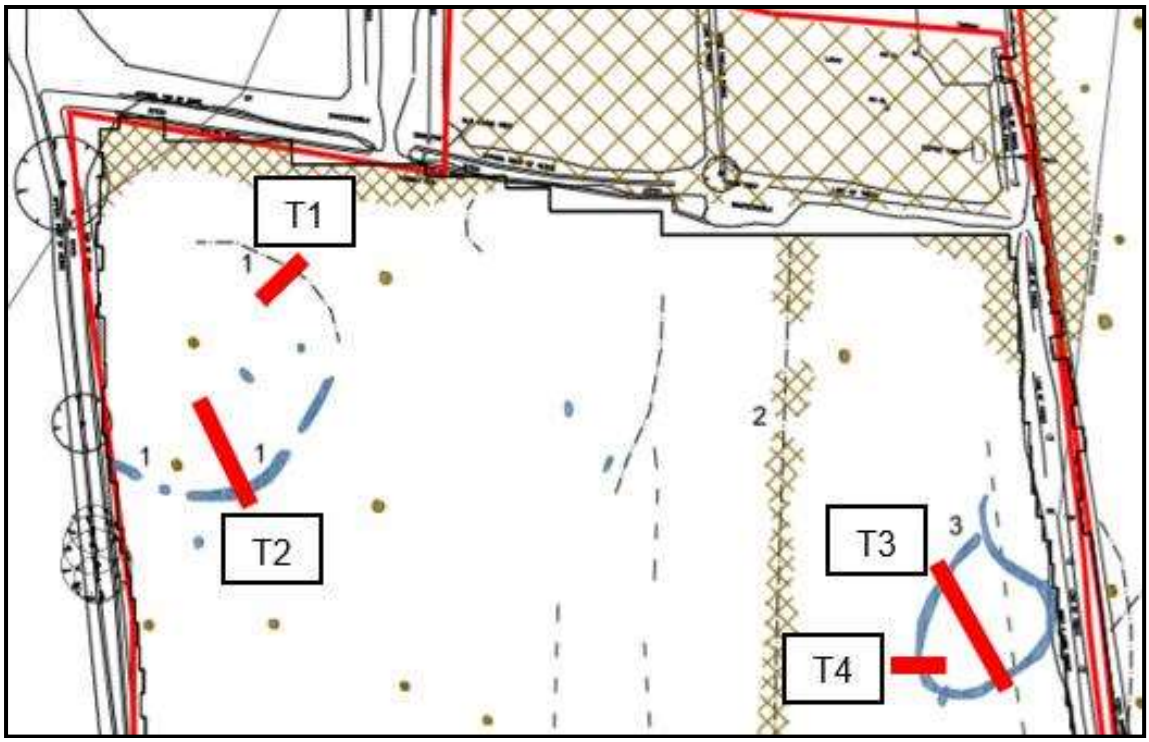

Figure 13-18. Location of Test Trenches 1 – 4 assessing geophysical anomalies in Field 5

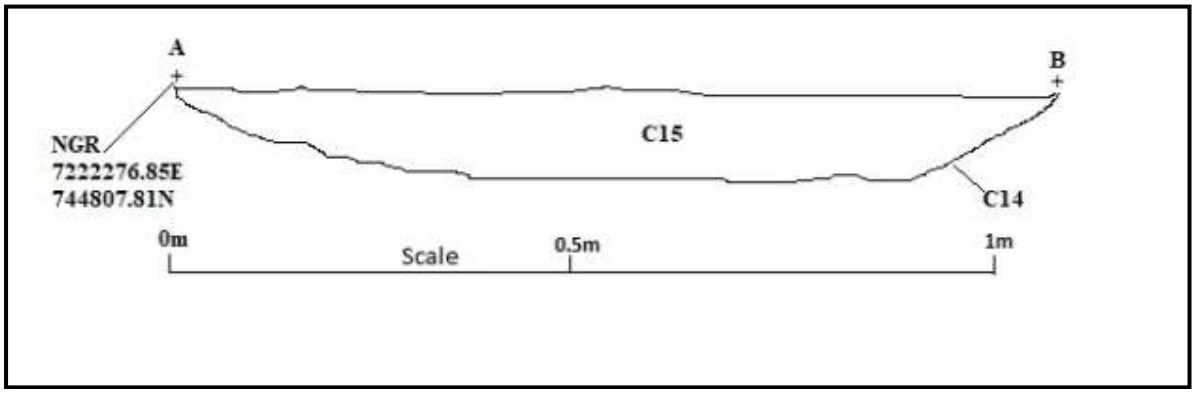

Figure 13-19. Section of possible enclosure ditch in Test Trench 2 Field 5

Figure 13-20. Possible enclosure ditch in Test Trench 2 Field 5

Test Trenches 3 and 4 (figure 13.16) were excavated to assess the extent, character and condition of a possible small enclosure located in the eastern end of Field 5 as revealed through the geophysical survey. Trench 3 extended across the possible enclosure in a northwest/southeast direction, thus assessing the potential ditch in two locations as well as any potential internal features. Trench 4 was excavated in an east/west direction and assessed the possible ditch in the southwest corner of the possible enclosure. Trench 3 measured 25m in length and Trench 4 measured 10m in length.

An archaeological feature was identified at the north-western end of Test Trench 3, in the location of the geophysical anomaly (figures 13.18 and 13.19; plate 13.4). It continued beyond the trench in a northeast/southwest direction and consisted of a narrow linear cut measuring 0.25m wide x 0.2m deep. It was V-shaped in profile, and the single fill was a greyish brown stony silt. Angular stones and

cobbles were present in the fill, and these resembled packing material. This tentatively suggests the feature may have functioned as a slot-trench which supported upright wooden posts. A small amount of animal bone was recovered from a hand-excavated section.

Pre-test trenching, the geophysical anomaly in the southeast corner of Test Trench 3 was interpreted as part of a possibly plough-damaged enclosure ditch. Test trenching did not reveal any archaeological features associated with the geophysical anomaly in this location, and it is suggested the ditch may have been removed through repeated ploughing in this area. No additional archaeological features or artefacts were identified in Test Trench 3.

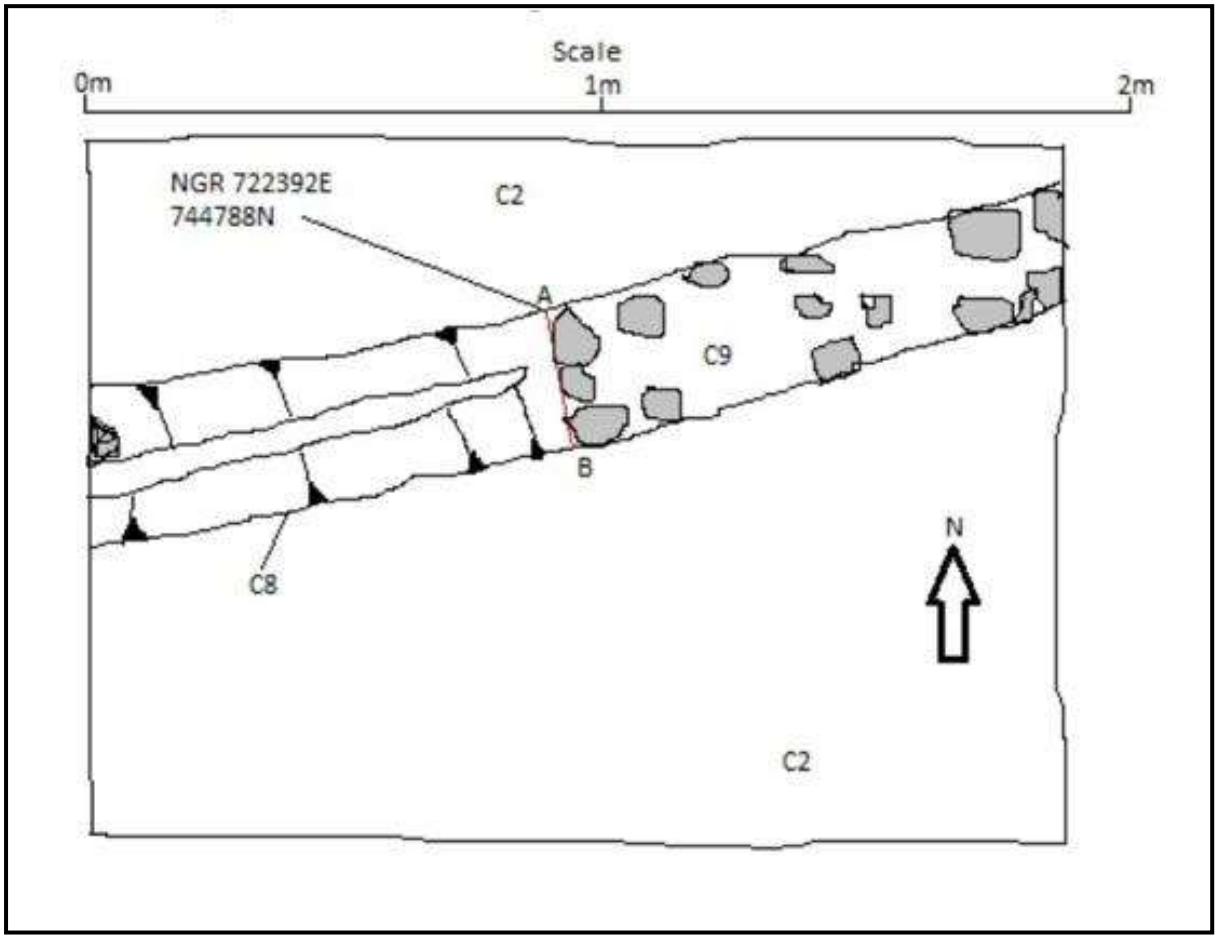

Figure 13-21. Plan of possible slot-trench in Test Trench 3 Field 5

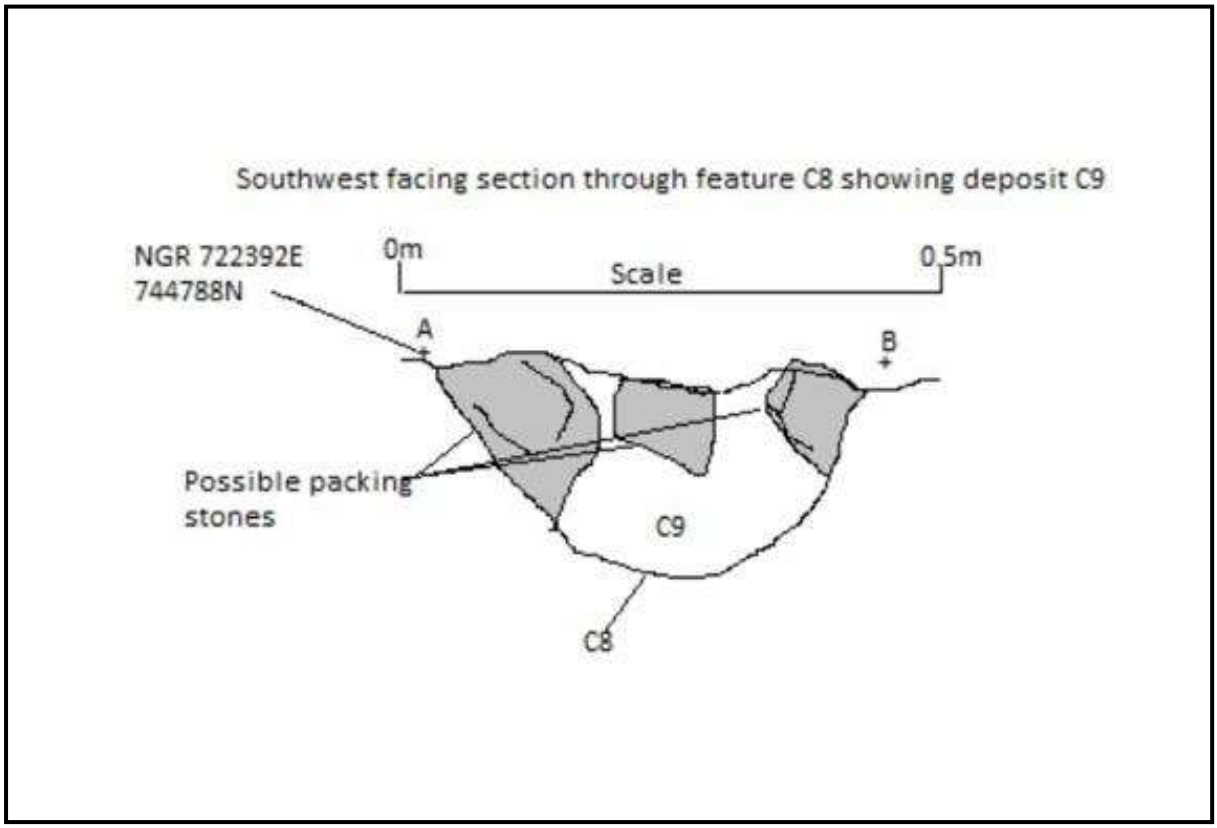

Figure 13-22. Section of possible slot-trench in Test Trench 3 Field 5

Figure 13-23. Possible slot-trench in Test Trench 3 Field 5

Test Trench 4 was oriented east/west, and was located a short distance west of Test Trench 3. A roughly north/south oriented linear feature was noted in the middle of the trench in the location of the geophysical anomaly, which took the form of a possible shallow ditch measuring 1.3m wide x 0.2m deep (plate 13.5). The single fill contained occasional small animal bone fragments and two sherds of 18th/19th century glazed red earthenware. The recovery of 18th/19th century pottery suggests the interpretation of this feature as an enclosure ditch is tentative. No additional archaeological features or artefacts were identified in Test Trench 4.

No environmental evidence was revealed during the Phase 2 test trenching exercise, and no additional archaeological features or artefacts were revealed as a result of carrying out the test trenching. With the exception of the hand-excavated sections discussed above, all archaeological features have been preserved *in situ*.

Figure 13-24. Linear feature in Test Trench 4 Field 5

13.6 Characteristics of the Proposed Development

The proposed development will be divided into two separate areas, the Northern Area and the Southern Area, and a Strategic Housing Development (SHD) consisting of 417 units is proposed for these lands. The overall site area measures 12.5 ha.

13.7 Potential Impact of the Proposed Development

13.7.1 Archaeological Heritage

Test trenching revealed the presence of four previously unrecorded below-ground archaeological features (a pit; a hearth/burnt pit; and two possible enclosure ditches) within the proposed development area.

Construction works will have a significant, permanent, direct impact on these previously unrecorded archaeological remains.

Construction works will have a significant, permanent, direct impact on any previously unrecorded archaeological remains that may exist within the development area, and which may be discovered during the construction phase.

There will be no indirect construction phase impact on the archaeological resource.

There will be no operational phase impact on the archaeological resource.

13.7.2 Architectural Heritage

There are no Protected Structures within the proposed development area or the 500m study area.

There are no Architectural Conservation Areas within the proposed development area. There are two Architectural Conservation Areas within the 500m study area.

There are no structures recorded on the NIAH within the proposed development area. There are four structures recorded on the NIAH within the 500m study area.

There are two historic parks and gardens recorded on the NIAH within the 500m study area.

It is assessed that there will be an imperceptible, permanent, visual impact on the above-mentioned architectural heritage features recorded within the 500m study area.

There is one historic park and garden (Broomfield House) recorded on the NIAH within the proposed development area (**Section 13.4.2 National Inventory of Architectural Heritage**). With the exception of the western boundary of the Northern Area, which formed the western extent of the parkland, there are no features associated with Broomfield demesne extant within the proposed development area. As a result, it is assessed that there will be no construction or operational phase impacts on Broomfield demesne.

The western side of the proposed development area is recorded as a townland and parish boundary, and is discussed below (**Section 13.7.3 Cultural Heritage**).

There will be no construction phase impact on the architectural resource.

There will be no indirect operational phase impact on the architectural resource.

13.7.3 Cultural Heritage

The western side and part of the southern side of the Northern Area is recorded as a townland and parish boundary. Proposed access roads and footpaths will truncate the townland and parish boundary in six places.

Construction works will have an imperceptible, permanent, direct impact on the townland and parish boundary.

There will be no indirect construction phase impact on the cultural heritage resource.

There will be no operational phase impact on the cultural heritage resource.

13.8 'Do Nothing' Impact

No 'Do Nothing' impact is predicted.

13.9 Avoidance, Remedial & Mitigation Measures

It is recommended that the four archaeological features (a pit; a hearth/burnt pit; and two possible enclosure ditches) revealed during the test trenching programmes be fully excavated and recorded well in advance of groundworks commencing on site. Excavation would be carried out under Licence to the Department of Housing, Local Government and Heritage and the National Museum of Ireland.

It is recommended that monitoring of all groundworks be undertaken in Fields 1, 2 and 5 (figure 13.12). Monitoring would be carried out under Licence to the Department of Housing, Local Government and Heritage and the National Museum of Ireland. Provision would be made for the full excavation and recording of any archaeological features or deposits that may be exposed during monitoring.

It is considered monitoring is not required in Fields 3, 4, 6, 7, 8, 9 and 10 (figures 13.12 and 13.13) as fieldwork failed to reveal any archaeological features or artefacts in these areas.

There are no mitigation measures available to offset the imperceptible, permanent, visual impact on the architectural heritage features recorded within the 500m study area.

It is recommended that written and photographic records be created, well in advance of groundworks commencing on site, where the proposed access roads and footpaths will truncate the townland and parish boundary.

13.10 Residual Impacts

There will be no residual impacts on the archaeological resource if the mitigation measures outlined in **Section 13.9 Avoidance, Remedial & Mitigation Measures** are implemented in full.

There will be no residual impacts on the cultural heritage resource if the mitigation measures outlined in **Section 13.9 Avoidance, Remedial & Mitigation Measures** are implemented in full.

It is assessed that there will be a residual imperceptible, permanent, visual impact on the architectural heritage features recorded within the 500m study area.

13.11 Monitoring

With the exception of the mitigation measures outlined in **Section 13.9 Avoidance, Remedial & Mitigation Measures**, there are no future monitoring requirements.

13.12 Reinstatement

No reinstatement will be required in relation to the proposed development.

13.13 Interactions

No interactions are predicted in relation to the proposed development.

13.14 Difficulties Encountered in Compiling

No difficulties were encountered in compiling this report.

13.15 References

13.15.1 References

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13.15.2 Cartographic Sources

Ordnance Survey	*1844, 1863 and 1906*

13.15.3 Internet Sources

www.archaeology.ie	*National Monuments Service*
www.bing.com/maps	*Bing Aerial Photography*
www.buildingsofireland.ie	*National Inventory of Architectural Heritage*
www.excavations.ie	*Database of Irish Excavation Reports*
www.fingal.ie	*Fingal County Council*
www.map.geohive.ie	*Ordnance Survey Ireland aerial*

14.0 MATERIAL ASSETS - UTILITIES & WASTE

14.1 Introduction

This Chapter has been prepared by Waterman Moylan Consulting Engineers and describes the material assets – Utilities & Waste, that are potentially impacted by the proposed Project at Broomfield. Material assets are resources that are valued and intrinsic to the site of the proposed Project and surrounding environs. Material assets may be of either natural or human origin and the value may arise for economic or cultural reasons.

This Chapter considers and assesses the effects of the proposed Project on the material assets, including major utilities within and around the site during the construction and operational phases such as built services (i.e. gas, electricity, telecommunications, etc.) and waste management. Water, Roads and Traffic are also counted as material assets and are assessed under separate chapters of this EIAR.

The EPA Guidelines (Draft 2017) state that:

> 'The meaning of this factor is less clear than others. In Directive 2011/92/EU it included architectural and archaeological heritage. Directive 2014/52/EU includes those heritage aspects as components of cultural heritage. Material assets can now be taken to mean built services and infrastructure. Traffic is included because in effect traffic consumes roads infrastructure. Sealing of agricultural land and effects on mining or quarrying potential come under the factors of land and soils.'

Given the importance of Archaeological and Cultural Heritage and noting established EIA best practice within Ireland, the Archaeological and Cultural Heritage has been comprehensively considered and assessed as a standalone chapter within this EIAR. Water, road infrastructure, and land/soil/geology have also been assessed by Waterman Moylan Consulting Engineers in Chapters 7, 13, and 6 of this report, respectively.

A preliminary Construction and Demolition Waste Management Plan (CDWMP) has been prepared by Waterman Moylan Consulting Engineers which may be used as a guide for the Main Contractor to prepare their Construction Waste Management Plan upon appointment, which will detail as to how the Contractor will address the issue of waste generation during the construction phase of the proposed Project and is included as part of the application packs. This document was prepared in accordance with best practice guidelines. Operational waste management will be managed by the management companies on site and the appointed licenced waste contractor which will ensure the sustainable management of domestic and commercial waste arising from the development in accordance with legislative requirements and best practice standards.

14.2 Study Methodology

14.2.1 Desk Study

The methodology followed for this Chapter is in accordance with the EPA's "Environmental Impact Assessment Reports. Draft Guidelines 2017". Information on built assets in the vicinity of the development lands was assembled from the following sources:

- A Desktop review of ESB, GNI, Eir and Virgin utility network maps.
- Site inspection/walkover.
- Review of the topographical survey map.

14.2.2 Rating of Impacts

Material assets are generally considered to be location sensitive. The likely significance of all impacts is determined in consideration of the magnitude of the impact and the baseline rating upon which the impact has an effect (i.e., the sensitivity or value of the material asset). Having assessed the magnitude of impact with respect to the sensitivity/value of the asset, the overall significance of the impact is then classified as imperceptible, slight, moderate, significant, or profound. The criteria for the assessment of impact significance are as per that set out in the relevant EPA Guidelines and in accordance with the EIA Directive.

14.3 Baseline Environment

14.3.1 Site Location and Context

The subject site is located at Broomfield, Malahide, Co. Dublin, as indicated in Figure 14.1, overleaf. The north site is bound to the west by Ashwood Hall residential development, to the east by the Dublin-Belfast rail line, the north by existing residential; units fronting Back Road, and to the south by agricultural land. The south site is bound to the west by Hazelbrook residential development, to the north by Brookfield residential development, to the east by agricultural land, and to the south by the Hazelbrook Stream.

The northern site will primarily be accessed via the existing junction to Back Road serving the Ashwood Hall residential development. The southern site was to be accessed from its northern boundary via the Brookfield residential development. Fingal County Council have requested as part of their Opinion Report to An Bord Pleanála, that an additional access will need to be provided for the southern site via the Hazelbrook residential development to connect to Kinsealy Lane. This instruction has been incorporated to the revised layout.

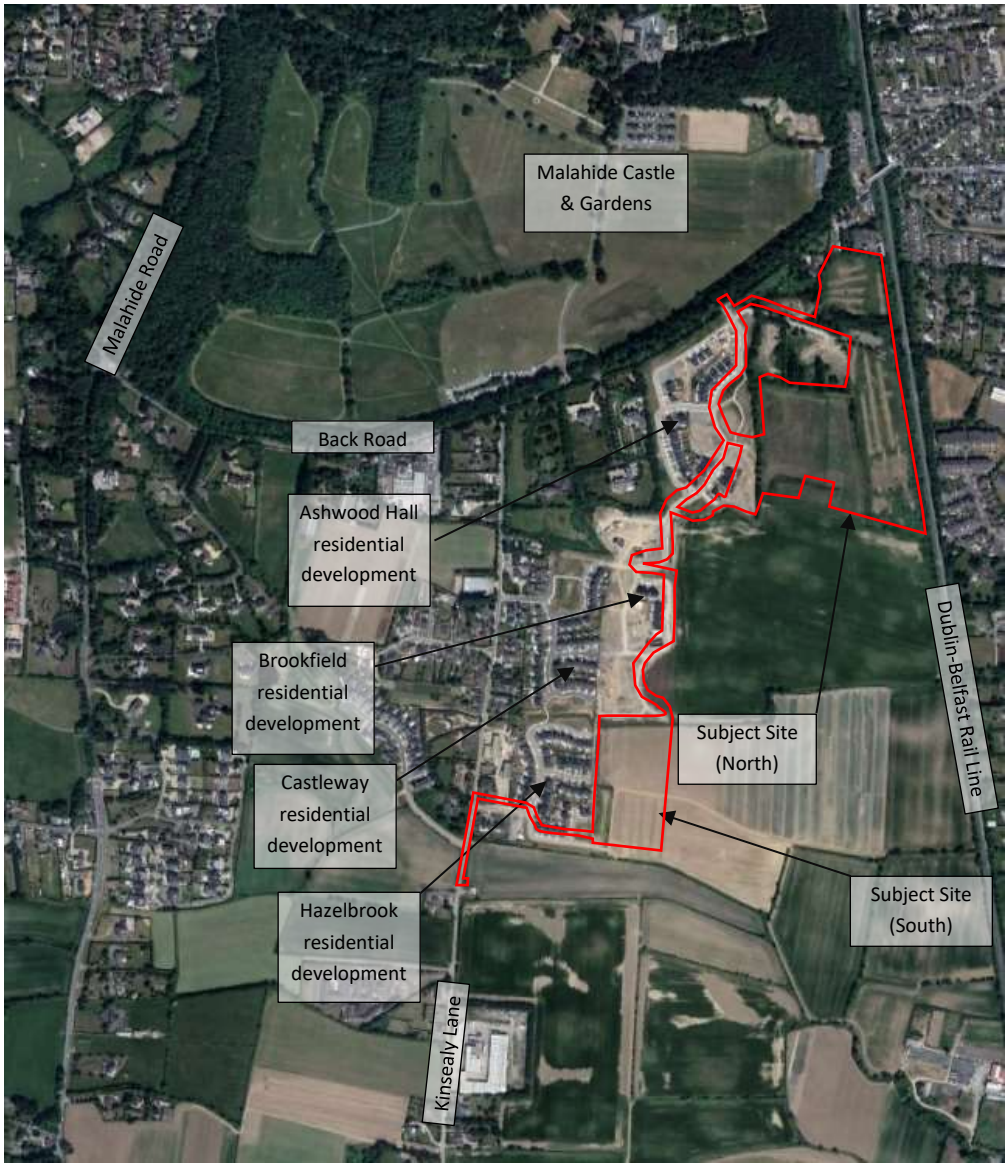

Fig. 14.1 – Site Location

14.3.2 Electricity, Gas and Telecommunications

There is currently electricity, gas, and telecommunications utilities available to the site.

Based on the information received from ESB Networks (ESBN), the subject lands are traversed by existing ESB cables with overhead lines. Underground networks have been constructed to the existing residential developments adjacent to the subject site. The undergrounding of the overhead networks will need to be agreed with ESB at the detailed design stage. There are no supply issues envisaged.

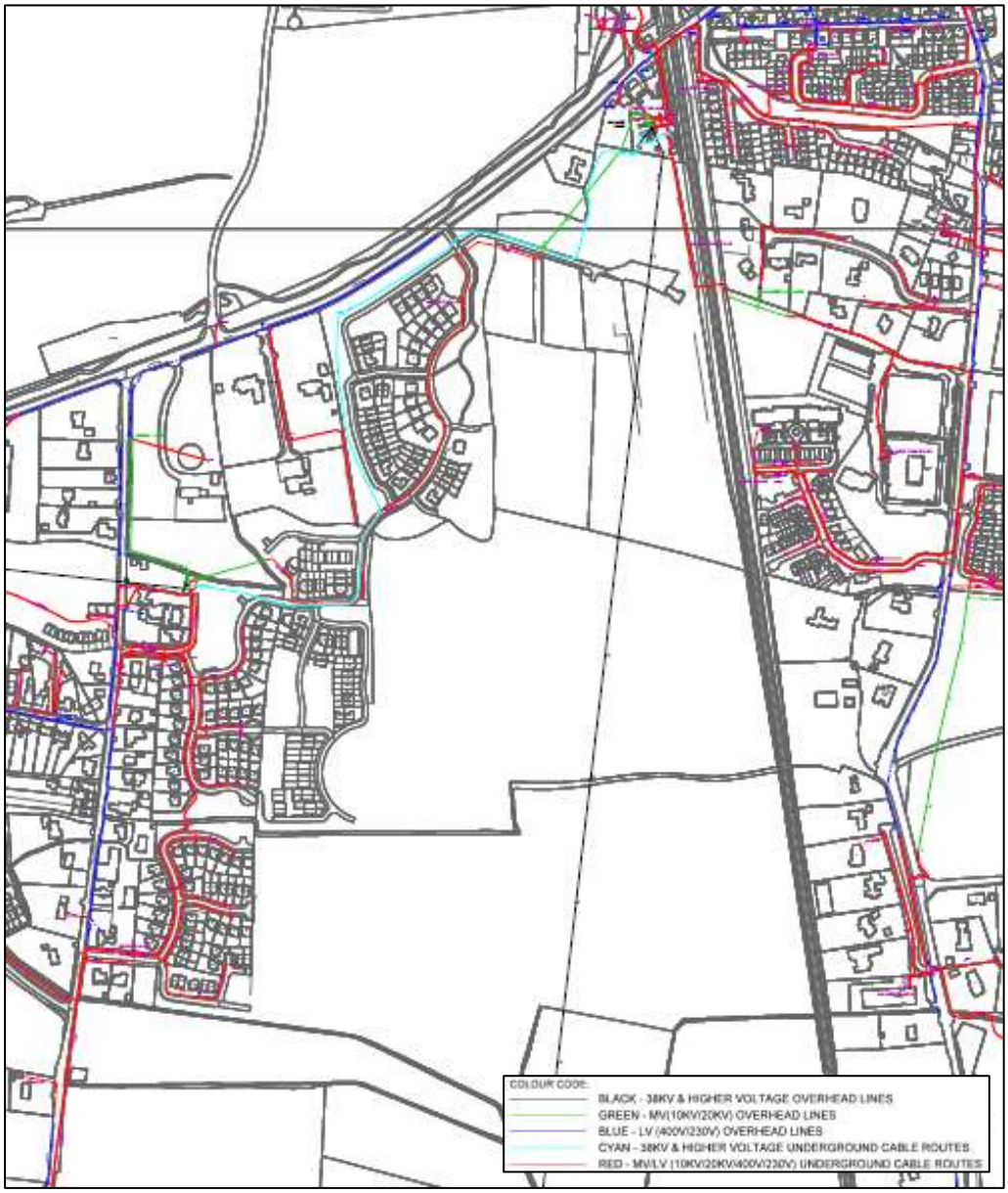

Fig. 14.2 – Existing ESB Network Layout

There is an existing Gas network in the adjacent sites. The gas network to the adjacent site is served via a connection across Kinsealy Lane to the Sleepy Hollow residential development.

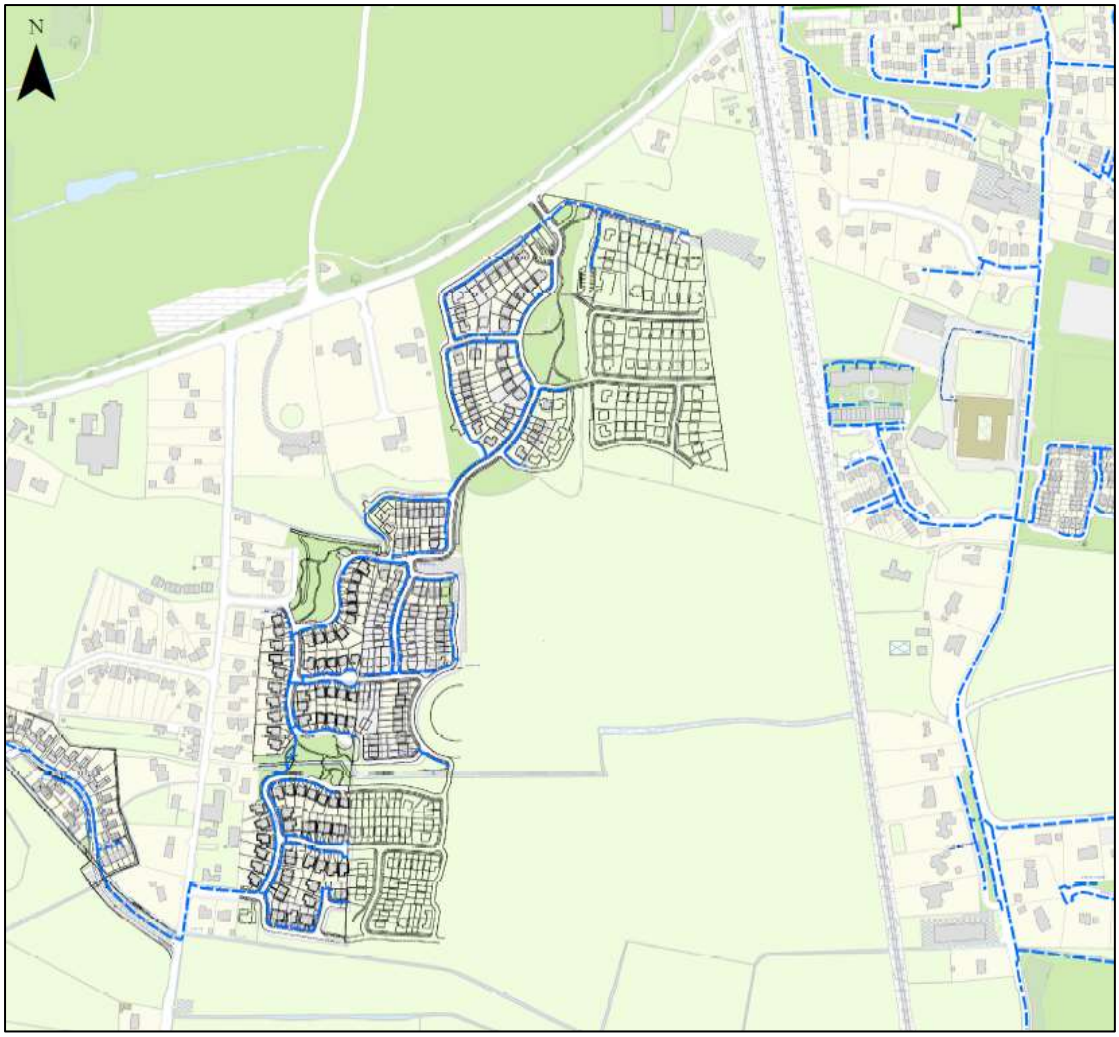

Fig. 14.3 – Existing Gas Network Layout

In terms of telecommunications, it is known from Eir E-Maps that there are existing networks in the adjacent residential development, Back Road and Kinsealy Lane.

Maps for the Virgin Media networks also inform of the same.

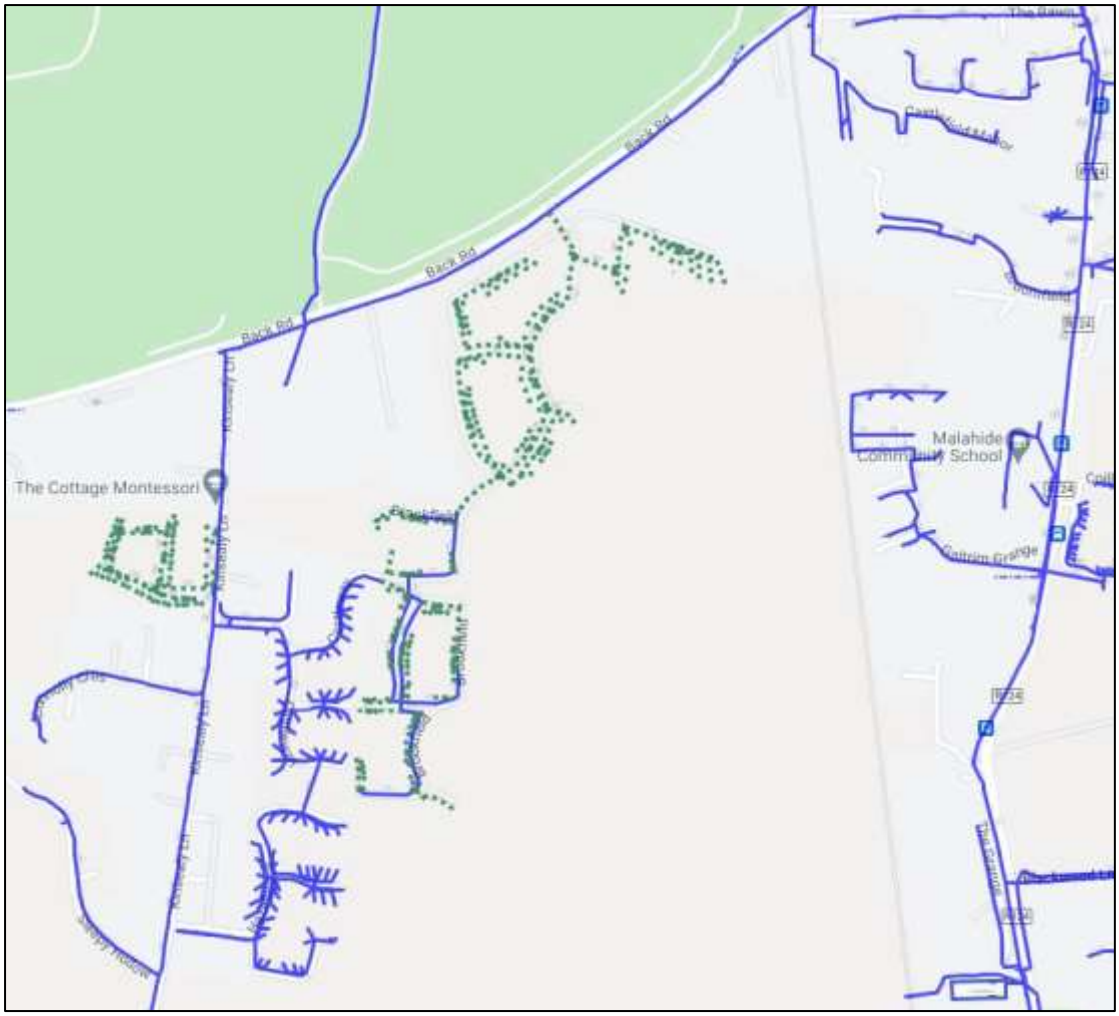

Fig. 14.4 – Existing Eir Telecommunications Network Layout

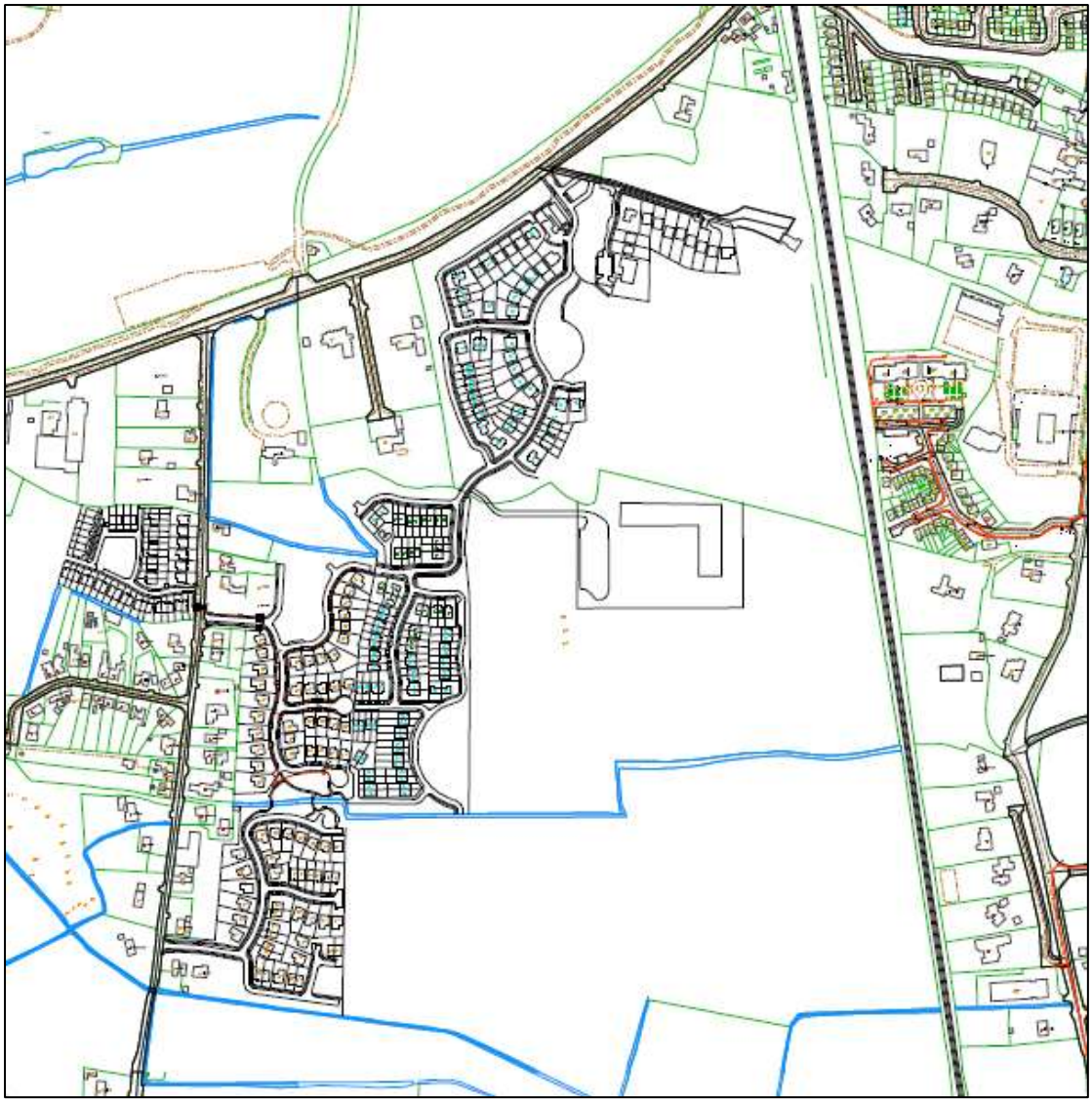

Fig. 14.5 – Existing Virgin Media Telecommunications Network Layout

14.3.3 Waste Management

In terms of waste management, the receiving environment is defined by Fingal County Council as the Local Authority with responsibility for setting standards and targets and for monitoring/regulating waste management activities in the area, as set out by the management plan for the region i.e., the EMRWMP 2015-2021. The Fingal County Development Plan 2017-2023 sets out these policies and objectives regarding waste management. In addition, waste operators already service the area as there are existing residential properties adjacent to the subject lands.

14.4 Potential Impact of the Proposed Project

This section provides a description of the potential impacts of the proposed Project may have during the Construction and Operational phases. The impact assessment addresses the *direct, indirect, cumulative, short, medium, and long term, permanent, temporary, positive and negative effects.*

14.4.1 Construction Phase

Site Location and Context

The Construction phase will likely have a temporary impact on the existing settlement in the vicinity of the subject lands. There may also be some slight and temporary impacts to the existing population which may arise during the construction phase, refer to the following EIAR Chapters: population and human health, air quality, noise and vibration, and climate for further information.

Access

During the construction phase, access will be affected by hoarding and security fencing required onto the site boundary. A detailed traffic management plan will be prepared and implemented by the Main Contractor and agreed with the Local Authority prior to commencing works. As a result, there will be a temporary disturbance to traffic in the surrounding area during construction.

The number of construction vehicle movements anticipated is low compared to the number of trips expected to be generated by the proposed development during the operational phase. It should be noted that the majority of such vehicle movements would be undertaken outside of the traditional peak hours, and it is not considered that this level of traffic would result in any operational problems.

It is estimated that 75% of construction traffic will come from M50 / Swords and 25% from city centre / Baldoyle direction. Delivery trucks will be instructed to access the site via the main site access from Back Road. Flag men shall operate to ensure safe access and egress of HGV's. It is likely that construction will have a negligible impact on pedestrian and cycle infrastructure. It is proposed that a Construction Management Plan (CMP) would be prepared by the appointed contractor in order to minimise the potential impact of the construction phase of the proposed development on the safety and amenity of other users of the public road.

The proposal will also involve the provision of a new foul water line along Kinsealy Lane, under the road, which is in the charge of Fingal County Council. This will involve a temporary dig of the road and result in some traffic restrictions on a temporary basis. The impact of this would be temporary and slight.

Electricity, Gas and Telecommunications

Electricity will be required during the construction phase. In conjunction with the ESB, the provision of a temporary builders' power supply will be provided. There is potential for temporary impacts to the local electricity supply network, by way of disruption in supply to the local area during electricity connection works for the proposed Project. However, this is a potential impact which is likely to be neutral, slight, and temporary.

The supply of gas will not be operational during the construction phase of the proposed Project. There is potential for temporary impacts to the local gas supply network, by way of disruption in gas supply to the local area. However, this is a potential impact which is likely to be neutral.

Telecommunications will not be operational during the construction phase of the proposed Project. There is potential for temporary impacts to local supply, by way of disruption during connections works. However, this is a potential impact which is likely to be neutral, slight, and temporary.

Waste Management

The proposed Project will generate a range of waste materials during the excavation and construction phase as outlined in the Construction and Demolition Waste Management Plan that is prepared under separate cover as part of the planning application. Typical municipal waste will also be generated by construction works on sites such as food waste. Waste materials will be stored temporarily on site until such time as collection takes place by a licenced waste contractor. Dedicated, easily accessible locations for collection will be clearly identified across the construction sites.

If waste is not managed or stored appropriately, it is likely to give rise to litter and/or pollution issues on the construction sites and surrounding area. In addition, if unauthorised waste contractors were used, waste materials could be incorrectly managed and disposed of illegally and result in negative environmental impacts or pollution. Thus, all waste generated must be managed in accordance with regional and national waste legislation and taken to suitably registered and licenced waste facilities for processing, segregation, reuse, recycling, recovery, or disposal, as deemed appropriate. There are numerous licensed waste facilities in the region which can accept waste generated. The potential effect of construction waste generated from the proposed Project is considered to be short-term, not significant, and neutral. For further information, please refer to the Construction and Demolition Waste Management Plan (C&DWMP).

14.4.2 Operational Phase

Site Location and Context

The proposed development consists of a total of 415 residential units, comprising 252 houses, 28 duplex units and 135 apartments. The proposed development will also include the construction of a creche. The development includes all associated site works, boundary treatments, drainage, and additional service connections.

Access

The operational phase of the proposed Project will result in increased traffic volumes to the local road network, primarily the Back Road. A Traffic and Transport Assessment has been prepared and is submitted as part of the planning applications for the proposed Project. Please also refer to the Chapter on transport, included in this document for further information.

Electricity, Gas and Telecommunications

Electricity will be required during the operational phase. In conjunction with the ESB, the provision of supply will be facilitated. This will result in increased demand for electricity in the area. The potential impact from the operational phase is likely to be slight and long term.

The supply of gas will be required during the operational phase. In conjunction with Gas Networks Ireland, the provision of supply will be facilitated. The proposed Project will result in increased demand for gas in the area. The potential impact from the operational phase is likely to be moderate and long term.

Telecommunications will be required during the operational phase of the proposed Project. The proposed Project will result in increased demand for telecommunications in the area. The potential impact from the operational phase is likely to be neutral, imperceptible, and long term.

A utilities layout drawing has been prepared as part of the planning application with the appropriate services being designed as part of the proposed development.

Waste Management

Given the nature of the proposed Project i.e. a residential development comprising 415 no. new residential units and 1 no. childcare facility, waste materials during the operational phase will be generated. As Malahide is an established suburb of Dublin City, an existing network of waste collection, treatment and disposal contractors and facilities serve the area.

If waste is not managed or stored appropriately, it is likely to give rise to litter and/or pollution issues. The implications of such are that vermin may be attracted to the immediate area as a result. In addition, if unauthorised waste contractors were used, waste materials could be incorrectly managed and disposed of illegally and result in negative environmental impacts or pollution. Thus, all waste generated must be managed in accordance with regional and national waste legislation and taken to suitably registered and licenced waste facilities for processing, segregation, reuse, recycling, recovery or disposal, as deemed appropriate. There are numerous licensed waste facilities in the region which can accept waste generated.

It is noted that appropriate waste storage areas have been incorporated into the design of the development with shared waste stores serving the apartments and duplex units while the houses will be provided with their own bin stores. The proposed development will also be managed by a Management Company ensuring that waste will be managed correctly.

Waste materials generated will be segregated on site, where it is practical. Where the on-site segregation of certain waste types is not practical, off-site segregation will be carried out. There will be bins and receptacles provided to facilitate segregation at source. The appointed waste contractor will collect and transfer the wastes to the licensed waste facility. Waste contractors will be required to service the development on a regular basis each week.

The potential effect of operational waste generated from the proposed Project is considered to be long-term, not significant and negative.

14.5 Avoidance, Remedial & Mitigation Measures

All possible precautions shall be taken to avoid unplanned disruptions to any services or utilities during the construction phase of the proposed Project. It should be noted that a number of mitigation measures proposed in other EIAR chapters are also of relevance to Material Assets and should be referred to when reading this EIAR.

The construction phase mitigation measures include, avoidance, reduction and remedy measures as set out within the Development Management Guidelines document. The design and construction of the necessary service infrastructure will be in accordance with relevant codes of practice and guidelines. As a result, this is likely to mitigate any potential impacts during the operational phase of

the proposed Project. However, routine maintenance of the site services will be required from time to time, as such any mitigation measures will be advised by the relevant service provider.

A site-specific Construction and Demolition Waste Management Plan (C&DWMP) has been prepared to deal with waste generation during the construction phase of the proposed Project and is included as part of the application packs. This document was prepared in accordance with best practice guidelines. Operational waste management will be managed by a designated management company on site and the appointed licenced waste contractor which will ensure the sustainable management of domestic and commercial waste arising from the development in accordance with legislative requirements and best practice standards.

14.6 Predicted Impacts

If unregulated, predicted impacts associated with the construction phase of the proposed Project would be expected to include potential disruption to local natural and human material assets resulting in both short-term and long-term impacts. The implementation of the mitigation measures set out in this chapter and other chapters of this EIAR would ensure that there is unlikely to be significant residual impacts during the construction phase. Therefore, impacts are likely to be temporary and neutral. During the operational phase, the impact to services and utilities is considered to be positive and permanent positive to all end users.

14.7 Monitoring

Prior to the operational phase of the proposed Project, all services/utility connections will be tested by a suitably qualified professional under the supervision of the service provider.

Any monitoring of the built services required during the operational phase of the proposed Project will be as advised by the relevant service provider.

The management of waste during the construction and operational phases of the proposed Project should be monitored to ensure compliance with best practice and relevant legislative requirements.

14.8 Reinstatement

No reinstatement will be required regarding Material Assets. Residual impacts on services and utilities are considered to be imperceptible.

14.9 Interactions

The main interactions relating to Material Assets are water, air quality, and population and human health.

During the operational phase, the water supply and wastewater services will have a potential interaction with the available water supply and the potential emissions to the water cycle.

14.10 Difficulties Encountered in Compiling

The exact location of existing service infrastructure is reliant upon the records obtained, where relevant. Overall, no difficulties were encountered in compiling this chapter.

14.11 Cumulative Impacts

The assessment has considered cumulative impacts of construction and operational phases of the proposed Project, in conjunction with surrounding developments.

Considering the minimal use of material assets during the construction phase, there is no likely impact.

Multiple sites under construction at the one time may result in cumulative impacts in terms of noise and vibration during the construction period. However, such impacts are short term and neutral.

During the operational phase of the development there will be similar existing and residential developments in proximity to the proposed Project, such as at Ashwood Hall, Brookfield and Hazelbrook, which will generate similar waste types. Authorised waste collectors will be required to collect segregated waste materials from multiple development which is likely to result in an improvement of efficiencies of waste collection and indeed is likely to result in an improvement in waste targets in line with national and local legislation. As such the long-term effect will be imperceptible and neutral.

14.12 'Do-Nothing' Impact

A 'do-nothing' scenario is not considered valid as the lands are currently zoned for development under the Fingal County Development Plan. However, if a do-nothing scenario were to occur, the lands would not be developed and therefore would be no adverse impacts to material assets. In the event that the proposed Project does not proceed, the lands would remain in its current condition in the short-term or until alternative development proposals are granted planning permission.

14.13 References

- Environmental Protection Agency (EPA), Guidelines on the information to be contained in Environmental Impact Statements (March 2002).
- Preliminary Construction and Demolition Waste Management Plan, Preliminary Construction Management Plan, and Traffic & transport Assessment Reports, prepared by Waterman Moylan Consulting Engineers.
- ESB Network Maps
- Virgin Media Network Maps
- GNI network Maps
- Eir online E-map Viewer

15.0 INTERACTIONS AND CUMULATIVE EFFECTS

15.1 Introduction

The matrix incorporated in Table 15.1 below, inter-relates Chapters 4.0 to 14.0 of the Environmental Impact Assessment Report to the various impacts referred to in the relevant Environmental Impact Assessment Regulations.

The EIAR has identified potential for interactions between a range of factors identified in Table 15.1. These interactions require the implementation of suitable mitigation measures to ameliorate the impact of the development on the environment. This EIAR has found that subject to the full implementation of the various mitigation measures specified by the EIAR team and summarised in Chapter 16, the development will have no significant negative impact on the environment.

15.2 Summary of Interactions

The following sub-sections seek provide an overview of the interactions identified within the EIAR chapters. Such interactions include the following:

No.	Heading	Population and Human Health	Biodiversity	Land, Soils & Geology	Water	Air Quality	Noise & Vibration	Climate	Landscape & Visual Impact	Transportation	Cultural Heritage	Utilities & Waste
4	Population and Human Health				X	X	X			X		
5	Biodiversity				X				X	X		
6	Land and Soils											
7	Water		X	X								X
8	Air Quality	X					X			X		
9	Noise & Vibration	X				X				X		
10	Climate	X				X	X			X		
11	Landscape	X	X								X	
12	Traffic and Transport					X	X		X			
13	Cultural Heritage											
14	Utilities & Waste	X			X	X						

Table 15.1 Interactions Identified in the EIAR

15.3 Population and Human Health (Chapter 4.0)

Interactions

The main interactions relating to population and human health are water, air quality, noise, and traffic during the construction phase.

Construction activities will have a temporary impact the landscape of the area by way of visual disturbance. These impacts are not considered to be significant.

During the operational phase, the main interactions relating to population and human health are water, air quality, noise, and traffic. These impacts are not considered to be significant. Please refer to the associated chapters for further information on these interactions.

Cumulative effects

The assessment has considered cumulative impacts of construction and operational phases of the proposed project, in conjunction with surrounding developments.

Multiple sites under construction at the one time may result in cumulative impacts in terms of noise and vibration during the construction period for human beings. However, such impacts are short-term, and the implementation of appropriate mitigation measures will ensure that noise and vibration impact is kept to a minimum. Please refer to Chapter 9.0 for further details in this regard.

During the operational phase of the development, there will be residential, recreational, and commercial developments in proximity to the proposed project which will generate a synergy of uses. This will increase population, increase employment opportunities, and increase community facilities such as childcare facilities, and as such the long-term effect will be a positive and permanent impact for Broomfield and the overall town.

15.4 Biodiversity (Chapter 5.0)

Interactive effects

The key environmental interactions with Biodiversity are Water, Landscaping and Transport. In respect of Water, there is interaction between hydrology and accidental spills of fuels/hydrocarbons and washing down into the drainage pipe network has the potential to impact on the receiving hydrogeology and ecology. A series of mitigation measures are proposed in the Water Chapter of this EIAR document to ensure the quality (pollution and sedimentation) and quantity (surface run-off and flooding) is of an appropriate standard. In respect of the Landscape, some of the nature features of the site are retained where possible and includes some positive planting proposals which will add some diversity to the site and favour some species. Finally, interactions exist between Traffic and Transport in relation to mortality from direct impact, the effects of which cannot be completely removed but will be reduced through mitigation.

Cumulative effects

A number of the identified environmental impacts can also act cumulatively with other impacts from similar developments in this area of Fingal. These arise through the urbanisation of habitat for wildlife and the increasing urbanisation of the local hinterland, on land of varying ecological sensitivity, as provided for by land-use zoning and include loss of habitats and species, particularly hedgerows, habitats and disturbance of species.

This proposed development can be viewed alongside the permitted construction of a series of residential developments in Broomfield. This project represents the completion of the zoned lands in

the Broomfield area so the ability to influence any future development beyond this application is limited. The development of the site is consistent with emerging baseline trends albeit with comprehensive ecological mitigation applied to the development which should be implemented.

15.5 Land and Soils (Chapter 6.0)

Interactions

No significant interactions are anticipated.

Cumulative effects

On completion of the construction phase and following replacement of topsoil and a planting programme, no further impacts on the soil environment are envisaged except for the possibility of contamination of soil from foul water effluent or oil/chemical spills

15.6 Water (Chapter 7.0)

Interactions

The main interactions relating to this EIAR Chapter are Land & Soils, Biodiversity and Utilities.

During the construction stage, the connection of wastewater services has the potential to impact groundwater and soils if wastewater were to leak from the network during the construction process. There are potential implications for the local populations if there is a disruption to utility services during the connection of the new services to the proposed development. The construction of the various services will also interact with construction traffic as outlined in the Traffic and Transport Chapter.

During the operation stage, the water supply and foul drainage services have a potential interaction with the available water supply and with potential pollution to natural water bodies.

In respect of Land & Soils, interaction between surface and groundwater and the bedrock geology is feasible. The implementation of the mitigation measures outlined in this chapter will reduce the potential of surface contaminants into the underlying geology.

In respect of Biodiversity, there is interaction between hydrology and the downstream habitats present along the Hazelbrook Stream & Sluice River. The mitigation measures ensure that surface water runoff is treated to the required standards so that downstream habitats are not negatively impacted.

Cumulative effects

There are no anticipated cumulative impacts arising from the proposed development, or any further development in the locality in relation to water, other than those noted above.

15.7 Air Quality (Chapter 8.0)

Interactive effects

Interactive effects may be felt with the disciplines of noise, climate, population and transport but none are anticipated in this case.

Cumulative effects

Construction Phase

According to the IAQM guidance (2014) should the construction phase of the proposed development coincide with the construction phase of any other development within 350m then there is the potential for cumulative construction dust impacts. However, a high level of dust control will be implemented across the site which will avoid significant dust emissions. Provided these mitigation measures are in place for the duration of the construction phase cumulative dust related impacts to nearby sensitive receptors are not predicted to be significant. Cumulative impacts to air quality will be short-term, localised, negative, and imperceptible.

Operational Phase

The traffic data reviewed for the operational stage impacts relating to air quality included the cumulative traffic associated with other existing and permitted developments in the local area including a potential masterplan residential development at Streamstown. Therefore, the cumulative impact is included within the operational stage impact for the proposed development. The impact is predicted to be long-term, negative, and imperceptible with regards to air quality.

15.8 Noise and Vibration (Chapter 9.0)

Interactive effects

Interactive effects may be felt with the disciplines of air quality, climate, population, and transport but none are anticipated in this case.

Cumulative effects

During the construction phase of the proposed development, construction noise on site will be localised and will therefore likely be the primary noise source at the nearest noise sensitive receivers. There are lands reserved for future development within the Masterplan site. Should construction of both sites occur simultaneously there is potential for cumulative noise impacts at noise-sensitive receivers equidistant from the sites.

In this scenario, it is recommended that liaison between construction sites is ongoing throughout the duration of the construction phase. Contractors should schedule work in a cooperative effort to limit the duration and magnitude of potential cumulative impacts on nearby sensitive receptors. Cumulative construction noise impacts have the potential to be negative, moderate to significant and short-term at times of high activity on both sites.

The contractor will be required to control noise impacts associated with the construction of this future development in line with the guidance levels included in Chapter 9, Table 9.1 and follow the best practice control measures within BS 5228 -1.

In the context of the operational phase, permitted developments are included in the traffic impact and therefore the potential for a cumulative impact has been assessed (and found to be negative, imperceptible to moderate, and long-term).

Any large-scale future projects that are not yet proposed or permitted would also need to be the subject of EIA in turn, to ensure that no significant impacts resulting from noise and vibration will occur as a result of those developments.

15.9 Climate (Chapter 10)

Interactive effects

Interactive effects may be felt with the disciplines of noise, air quality, population and transport but none are anticipated in this case.

Cumulative effects

Construction Phase

Due to the short-term duration of the construction phase and the low potential for significant CO_2 and N_2O emissions cumulative impacts to climate are considered neutral.

Operational Phase

The traffic data reviewed for the operational stage impacts to climate included the cumulative traffic associated with other existing and permitted developments in the local area including a potential masterplan residential development at Streamstown. Therefore, the cumulative impact is included within the operational stage impact for the proposed development. The impact is predicted to be long-term, neutral, and imperceptible with regards to climate.

15.10 Landscape and Visual Impact (Chapter 11)

Interactions

The main interactions relating to this EIAR Chapter are Population and Human Health, Biodiversity and Cultural Heritage.

Interactions between Landscape and Population and Human Health have been considered. The landscape has the potential to impact greatly on human health by providing external spaces which provide for communities in various ways such as recreational use, visual enhancement of streets and external spaces, sports and play facilities and so on. The landscape mitigation measures include a significant amount of designed usable spaces for both future and existing residents which will have a long-term and moderate positive impact on Population and Human Health.

Interactions between landscape and biodiversity have been considered. An adverse impact on the biodiversity of the lands during either the construction or operational phases has the potential to

negatively impact the landscape character. The landscape mitigation measures will ensure that where possible the existing trees on site are retained, and a new planting scheme is proposed that will improve and extend the area native planting area on the subject lands. Therefore, the measures proposed to mitigate the impact on the landscape character will result in a positive impact on the biodiversity value of the lands. This impact would be considered moderate in magnitude and long-term in duration.

Interactions between landscape and cultural heritage have been considered. The proposed development has the potential to impact on the cultural heritage in the local area. Landscape character, history and visual characteristics can be considered a part of cultural heritage. The proximity of the subject lands to historic landscape spaces, namely Malahide Castle and its associated parkland could all be considered to have a potential impact on cultural heritage. Furthermore, the landscape mitigation measures include their retention and incorporation into the landscape scheme which will have a positive impact on cultural heritage.

Cumulative effects

There are no anticipated cumulative impacts arising from the proposed development, or any further development in the locality in relation to landscape and visual impact, other than those noted above.

15.11 Traffic and Transport (Chapter 12)

Interactions

There may be temporary negative impacts to human health during the Construction Phase caused by noise, dust, air quality and visual impacts which are covered in other chapters of this EIAR. There may also be interaction with the surrounding water bodies through surface water runoff during topsoil stripping and earthworks which will be required to construct the roads.

The effects of these will be mitigated through the implementation of the measures outlined in this Chapter and within the Construction Management Plan.

Cumulative effects

The traffic modelling carried out as part of the Traffic and Transport Assessment also accounts for a committed (Under-construction Ashwood Hall and Brookfield), and a potential future development located at Streamstown. In order to determine the cumulative impact of the subject development in conjunction with other developments in the vicinity of the site is assessed. Further details are provided in Chapter 12.

15.12 Cultural Heritage (Chapter 13)

Interactions

No interactions are predicted in relation to the proposed development.

15.13 Utilities and Waste (Chapter 14)

Interactions

The main interactions relating to Material Assets are water, air quality, and population and human health.

During the operational phase, the water supply and wastewater services will have a potential interaction with the available water supply and the potential emissions to the water cycle.

Cumulative effects

The assessment has considered the cumulative impacts of construction and operational phases of the proposed development, in conjunction with surrounding developments.

Considering the minimal use of material assets during the construction phase, there is no likely impact.

Multiple sites under construction at one time may result in cumulative impacts in terms of noise and vibration during the construction period. However, such impacts are short term and neutral.

During the operational phase of the development there will be similar existing and residential developments in proximity to the proposed Project, such as at Ashwood Hall, Brookfield and Hazelbrook, which will generate similar waste types. Authorised waste collectors will be required to collect segregated waste materials from multiple development which is likely to result in an improvement of efficiencies of waste collection and indeed is likely to result in an improvement in waste targets in line with national and local legislation. As such the long-term effect will be imperceptible and neutral.

16.0 SUMMARY OF MITIGATION & MONITORING MEASURES

16.1 Mitigation and Monitoring Measures

The sections provided 1 below, contains the mitigation and monitoring measures proposed to ensure no significant residual, significant effects arise from the proposed development, which have been set out in Chapters 4.0 to 14.0 of the Environmental Impact Assessment Report to the various impacts referred to in the relevant Environmental Impact Assessment Regulations.

Listed below are the mitigation and monitoring measures proposed for the proposed development:

16.2 Population and Human Health

16.2.1 Mitigation Measures

Construction Phase

Measures to mitigate potential impacts arising from the construction phase of the proposed development such as noise, traffic and air quality are set out in relevant chapters of this EIAR.

Operational Phase

No mitigation measures are required in respect of human health during the operational phase of the development.

16.2.2 Monitoring Measures

In terms of population and human health, measures to avoid negative impacts have been a key consideration in the design evolution of the buildings and overall layout of the proposed project. Conditions will be attached to any grant of planning permission to ensure compliance in this regard. Building Regulations will also be adhered to during the construction phase to ensure a fully compliant development is constructed.

Health & Safety requirements, which are site specific to the proposed project, will be carried out by the Project Manager on site.

Impacts from Air Quality, Noise and Vibration, Climate, and Traffic and Transport and monitoring measures in this regard are addressed in the relevant chapters of this EIAR.

16.3 Biodiversity

16.3.1 Mitigation Measures

Mitigation by Avoidance

The principal mitigation that should be considered in any development is avoidance of impact. The site layout has been designed to avoid impacts on the adjoining Hazelbrook Stream and the boundary treelines and hedgerows surrounding the site.

Planting of Native Species

Native species appropriate to the area (such as hawthorn, elder, ash, alder, holly, hazel, willows, oak, dog rose, gorse and bramble) have been used within the landscaping plans for the development.

These will, as they mature, provide a food source, shelter and habitat for foraging bats, nesting habitat for birds and a food source for pollinators. All species used will be of certified native origin and sourced locally to ensure genetic provenance to the area – certified material is available from the forestry nurseries who supply the native woodland scheme.

All planting within gardens and public spaces within the scheme will be pollinator friendly as per the All Ireland Pollinator Plan – see https://pollinators.ie/wordpress/wp-content/uploads/2018/04/Gardens_actions-to-help-pollinators-2018-WEB.pdf

Protective Measures for Retained Treelines, Hedgerows & the Hazelbrook Stream

The Hazelbrook Stream, hedgerows and treelines, which form the existing site boundaries, are to be retained.

A 10 - 15-metre-wide riparian buffer strip has been retained along the Hazelbrook Stream in line with objective WQ5 in the Fingal County Development Plan 201 – 2023.

These retained treelines, hedgerows, drainage ditches & the Hazelbrook Stream will be given protection from accidental damage by machinery during site works prior to any works commencing in the development and as set out in the arboricultural impact statement. **These areas will be clearly delineated by fencing or other measures. Fences will be erected outside the drip-line or canopy of each tree in accordance with BS 5837 (2012) – Trees in Relation to Construction.** Please refer to the arboricultural tree protection drawings (**Chapter 5, Figures 5.8** and **5.9** below).

Chapter - Figure 5.8. Tree Protection Drawing (Northern lands).

Chapter 5 -Figure 5.9. Tree protection Drawing (Northern lands).

Invasive Species

An invasive species management plan for Phase I of the project was prepared to deal with the Japanese knotweed stands as shown on **Chapter 5**, **Figure 5.3**. Further information on the results of same is presented in **Chapter 5, Appendix 5.3**. The most recent surveys indicate that the plants would appear to have gone into dormancy with very small stems & leaves, no spread.

A detailed programme for the excavation and screening of soil into a container/large skips as the next step of eradication will be prepared with follow up monitoring by the specialist contractor Graeme Cahill who has been treating the population since 2018.

There is also potential for Japanese knotweed and other invasive species to spread/become established within the development site through poor site management or the import of contaminated topsoil so any material brought to site must be certified that it is free of invasive species.

Mitigation Measures for Badgers

An inactive badger sett is located at the southern end of the eastern boundary treeline (adjoining Ashwood Hall) within the site in the vicinity of O 22265 44683 and a disused sett is located in the treeline north of the rugby club building as shown on **Chapter 5, Figure 5.6** above.

Both of these setts have been the subject of regular examination to determine their use by badgers and suitable protective measures (southern sett)/appropriate methodology for their destruction (northern sett) for these setts will need to be implemented during the construction phase of the

Broomfield SHD lands. Although not in use at present they were previously used by badgers and could be again.

Badgers and their setts are protected under the provisions of the Wildlife Act, 1976, and the Wildlife Amendment Act, 2000. It is an offence to intentionally kill or injure a protected species or to wilfully interfere with or destroy the breeding site or resting place of a protected wild animal. Exclusion of badgers should only be considered where a development would unavoidably destroy a badger sett (or any part of its underground tunnel and chamber system), or its immediate surroundings, making it unsuitable for continued occupancy.

Construction works such as those proposed within the Broomfield SHD lands, which occur within the vicinity of a sett (albeit inactive/disused) may require a licence should the setts become active. It should be noted that all activity related to badger surveys, evacuation procedures and sett destruction should only be undertaken by personnel with recognised expertise in badger ecology.

In keeping with best practice measures to address potential effects on protected species such as badgers should firstly aim to avoid those impacts. If there are unavoidable impacts then mitigation should be designed to reduce those impacts.

Badger sett tunnels can extend 20m or more from the entrance holes and are typically located between 0.2m and several metres deep, depending on the soil and topography. Potential impacts include:

- damage and destruction of setts;
- disturbance from noise, lighting, vibration and other human disturbances such as fires and use of chemicals;
- loss of feeding areas;
- entrapment in works compounds, excavations, etc.

Southern Sett

The badger sett (at the southern end of the eastern boundary treeline (adjoining Ashwood Hall)) will not be directly impacted by the proposed Broomfield SHD and both it and the treeline in which it is located will be retained as part of the scheme. The proposed housing layout and internal access roads were redesigned during Phase 1 to ensure that these parts of the lands were retained as part of a wildlife corridor through the property and the sett was not directly impacted.

Both this treeline and inactive badger sett will be afforded protection as set out in the arborist's report and accompanying drawing (see **Chapter 5, Figure 5.10** below) to ensure that the retained trees, vegetation and sett are not damaged by the construction works. Any fencing measures deployed must incorporate access for mammals at the base – this should be a gap no smaller than 300mm high by 225mm wide. This will be inspected and signed off by the ecological clerk of works.

Chapter 5 - Figure 5.10. Badger protection zone – southern sett.

Badgers and other wildlife will continue to use established paths across a site even when construction work has started. Therefore during construction, any open trenches/excavations will incorporate facilities for badgers (and other wildlife, such as rabbits, foxes, hedgehogs etc.) to escape, by means of the following:

1. Gently sloping earth incline to be left at the end of each day's operation – at each end of open excavations/trenches.
2. Timber escape planks should be provided at c. 50m intervals along any deep excavations/trenches and these should be left in place at the end of each day's operations; these should usually be placed at right-angles to the excavation/trench.
3. Any temporarily exposed open pipe system should be capped in such a way as to prevent badgers gaining access as may happen when contractors are off site.

Continued access to lands to the west, east and south must be provided for badgers to ensure that any animals associated with this sett will have access to foraging areas.

The following provisions apply to all construction works within the Broomfield SHD lands:

- badger sett tunnel systems can extend up to c. 20m from sett entrances. Therefore, no heavy machinery should be used within 30m of badger setts (unless carried out under licence); lighter machinery (generally wheeled vehicles) should not be used within 20m of a sett entrance; light work, such as hand digging or scrub clearance should not take place within 10m of sett entrances.
- during the breeding season (December to June inclusive) none of the above works should be undertaken within 50m of active setts nor blasting or pile driving within 150m of active setts.

- following consultation with NPWS and badger experts, works near setts may take place during the breeding season provided appropriate mitigation measures are in place, e.g. sett screening, restricted working hours, etc.

During the construction phase of the development activities may pose a temporary threat to badgers or disturb them if they reuse that sett. This should be mitigated by adopting the following practices.

- The use of noisy plant and machinery in the vicinity of the protection zone of the sett should cease at least two hours before sunset.
- Security lighting should be directed away from the sett and treeline to avoid impacts on badgers and foraging bats.
- Chemicals should be stored as far away from the sett and areas adjoining the retained treeline as possible.
- Trenches must be covered at the end of each working day, or include a means of escape for any animal falling in.

In order to comply with the above constraints:

- all affected setts should be clearly marked and the extent of bounds prohibited for vehicles clearly marked by fencing or adequate physical boundary. Hazard tape is often insufficient and prone to deterioration and damage by wind or cattle etc.
- all contractors/operators on site should be made fully aware of the procedures pertaining to the sett on site.
- construction activities within the vicinity of affected setts may commence once the current status of this sett has been determined, and the if active the sett has been evacuated and destroyed under licence from NPWS. .
- in almost all circumstances, works close to badger setts may only be conducted under the supervision of a qualified expert under licence from NPWS.

Additional mitigation measures include:

- Topsoil from areas likely to have constituted good badger foraging habitat (rich in earthworms) will be retained on site and used in the creation of worm-rich amenity or other grassland habitats.
- The use of noisy plant and machinery in the vicinity of the protection zone will cease at least two hours before sunset.
- Security lighting should be directed away from the sett.
- Chemicals will be stored as far away from the sett as possible.
- Trenches must be covered at the end of each working day, or include a means of escape for any animal falling in. (Badgers will continue to use established paths across a site even when construction work has started).
- Any temporarily exposed open pipe system should be capped in such a way as to prevent badgers gaining access as may happen when contractors are off site.
- Badger gates may need to be installed in perimeter fencing. If so, specialist advice should be sought.
- Water sources (for badgers) should always be safeguarded.

Northern Sett

The sett located to the north of the rugby club building has been the subject of ongoing monitoring to determine activity and to see if an exclusion license is required. The results of the current surveys would indicate that a license is not required but this will be informed by ongoing monitoring in order to determine if a licence could become a requirement.

Scrub Clearance

The area of scrub south of the rugby club building could not be fully surveyed for mammal activity and site clearance in this area will be supervised by an ecologist to ensure protection of same.

Mitigation Measures for Bats

The rugby club building was confirmed as a roost for 2-3 common pipistrelle and soprano pipistrelle bats during surveys in 2018.

A bat derogation licence was previously provided in 2018 for the proposed demolition work of the rugby club building - see **Chapter 5, Appendix 5.1**.

A new bat derogation licence was therefore sought from National Parks and Wildlife Service and granted – see **Chapter 5, Appendix 5.2.**

The grounds on which the bat derogation licence was sought for the demolition of this bat roost are:

'In the interests of public health and public safety, or for other imperative reasons of overriding public interest, including those of a social or economic nature and beneficial consequences of primary importance for the environment'.

The lands are zoned for development and the project design and density of housing required under the SHD process does not allow for the retention of the rugby clubhouse building.

A number of mitigation measures are proposed to accommodate any bats that previously roosted in the rugby club building within the development. These include the erection of bat boxes on trees and integrated bat boxes within the building fabric. The retention and enhancement of the riparian corridor along the Hazelbrook Stream and the retention of the site boundary hedgerows coupled with sensitive lighting design also ensures that suitable habitat for bats remains within the site.

These have been demonstrated to work on a number of previous projects including the M11 Rathnew to Arklow motorway (bat boxes), Rockingham House, Glenamuck Road, Co. Dublin.

The loss of a minor roost for common and soprano pipistrelle bats in the rugby club building will not have a detrimental effect on the local bat population given the rich habitat and roosting potential in Malahide Castle and Demesne adjoining the site and the provision of roosting alternatives for the bats. The loss of this roost is highly unlikely to affect the conservation status of either of these species which is currently 'Favourable' at a national level.

Building Resurvey

Given that some time may have lapsed between approval of planning permission and commencement of construction it is recommended that the rugby club building scheduled for demolition is resurveyed for bats prior to any proposed demolition works. Although the building has been the subject of an arson attack bats have been observed returning to a burnt structure to roost in should suitable locations prevail demonstrating the site fidelity of bats to a roost site (F. Wilson, pers. obs.).

A precautionary approach to the demolition of the building can then be prepared whereby any remaining potential roosting location for bats are manually removed. This work will be supervised by a licensed bat specialist who can deal with any bats present and will be done during the winter months.

Provision of Bat Boxes

Fifteen bat boxes shall be erected on suitable buildings or trees (i.e. not illuminated and above 3 metres height and close to green areas) within the development. The most successful box types are "woodcrete" boxes made by Schwegler and available from www.alanaecology.com. Several designs are available including some of which can be incorporated into the walls and the surface fabric of new buildings.

Vegetation Retention and Protection

The other main protective measure for bats is in the retention of boundary hedgerows, treelines, watercourses and drainage ditches within the site and protective measures will be put in place for these features. The use of native species in the landscaping proposals for the site will also assist in ensuring that bats continue to forage and remain in the area.

Lighting Design

Sensitivity in the provision of lighting is also important to ensure that bats continue to use the site. The retained hedgerows, treelines, watercourse and drainage ditches and newly created areas of planted vegetation will be retained as dark zones and the amount of lighting shining on such areas limited.

Design recommendations from the BCT (2010) for wildlife-friendly lighting include:

1. Do not "over" light. This is a major cause of obtrusive light and is a waste of energy. Use only the minimum amount of light needed for safety. There are published standards for most lighting tasks, adherence to which will help minimise upward reflected light.
2. Eliminate any bare bulbs and any light pointing upwards. The spread of light should be kept near to or below the horizontal.
3. Use narrow spectrum bulbs to lower the range of species affected by lighting.
4. Use light sources that emit minimal ultra-violet light. Insects are attracted to light sources that emit ultra-violet radiation.
5. Reduce light-spill so that light reaches only areas needing illumination. Shielding or cutting light can be achieved through the design of the luminaire or with accessories, such as hoods, cowls, louvers and shields to direct the light.

6. Reduce the height of lighting columns. Light at a low level reduces ecological impact. However, higher mounting heights allow lower main beam angles, which can assist in reducing glare.
7. For pedestrian lighting, use low level lighting that is directional as possible and below 3 lux at ground level.
8. Limit the times that lights are on to provide some dark periods for wildlife.
9. Use lighting design computer programs and professional lighting designers to predict where light spill will occur.
10. In general, any lighting used in the development should not overspill onto adjoining trees, hedgerows, and watercourses thereby ensuring that a dark corridor for foraging and commuting bats and movement for other wildlife is maintained.

In addition:

11. Luminaires will be dimmable LED (light emitting diode) fittings with High performance optics to provide high visual comfort.
12. Luminaires will be selected to ensure that when installed there shall be zero direct upward light emitted to the sky (all output shall be at or below 90º to the horizontal to help prevent sky glow from light pollution of the night sky).
13. Luminaires will be selected to ensure that there is no light spill from the proposed development onto the retained areas of linear vegetation and boundary features.
14. The light emitted from these fittings shall have no photo biological risk and shall be categorised as “Exempt Group” in relation to emissions of Blue light, Infrared and Ultra Violet Radiation in accordance with EN 62741:2008.
15. All luminaires shall have a Luminous intensity Classification of between G4 and G6 to IS EN 13201-2:2003(E) / BS 5489-1:2013.
16. The recommendations of the Institution of Lighting Professionals and Bat Conservation Trust “Bats and Lighting in the UK” documentation and Bat Conversation Ireland Guidance Notes for planners, engineers, architects and developers December 2010 will be met.

Further detailed information on lighting design for bats and other wildlife is presented in the document prepared by the Bat Conservation Trust and the Institute of Lighting Professionals ‘BCT (2018). Guidance Note 08/18 - Bats and artificial lighting in the UK. Bats and the Built Environment series’ and the EUROBATS Guidance available from:

https://cdn.bats.org.uk/pdf/Resources/ilp-guidance-note-8-bats-and-artificial-lighting-compressed.pdf?mtime=20181113114229&focal=none and

https://cdn.bats.org.uk/pdf/Resources/EUROBATSguidelines8_lightpollution.pdf?mtime=20181113114256&focal=none

These guidelines have been implemented in the previous phases of the developments at Broomfield and in the project lighting design as set out in Chapter 5, Figure 5.11 below.

Chapter 5 Figure 5.11. Project lighting design.

Chapter 5, Plate 34. Dark corridor for foraging bats and other wildlife maintained along the shared boundary treeline with Ashwood Hall.

Felling of Potential Bat Roosts in trees

All trees proposed for removal will be subject to appropriate felling measures as detailed in NRA Guidelines for the Treatment of Bats during the Construction of National Road Schemes (National Roads Authority 2006). The felling/clearance of trees will be scheduled for the autumn months of September/October when bats are less likely to be using trees. This also avoids the bird breeding season.

Prior to tree felling works the trees will be inspected by a licensed bat specialist in the presence of the tree surgeons and an appropriate felling methodology agreed.

The felling of those trees, which have been identified as potential bat roosts, must be supervised by a bat specialist holding a bat handling licence issued by the National Parks and Wildlife Service, (Department of Environment, Heritage and Local Government). If bats are encountered they should be removed by the licence holder to a bat box, to be sited on a nearby tree and the NPWS notified.

Identified trees must be felled carefully. Specific advice in relation to individual trees will be given on site by a bat specialist. Gradual dismantling of some mature trees may be necessary to ensure the safety of any bats which may be roosting within significant sized boughs or in the trunk. The tree will be inspected by a bat specialist, and depending on the structure of the tree they may need to be left intact on the ground for 24 hours to allow any bats within them to escape prior to processing.

16.1.1 Mitigation Measures for Birds

As detailed in the arboricultural impact assessment the proposed development will require the removal of 46 individually recorded trees, 12 groups of trees/hedgerows, and the partial removal of five groups of trees/hedgerows. Of the 63 survey entries proposed to be removed or partially removed, six trees are of moderate quality and value (B Category), 42 trees and groups of trees/hedgerows are of low quality and value (C Category), and 15 trees are of poor quality (U Category).

No clearance of vegetation shall be carried out from March 1st to August 31st (except in circumstances of immediate danger to the public). This will protect nesting birds, eggs and nestlings from injury or death. No clearance of vegetation suitable for nesting birds within the site (shrubs, bramble tangles, etc.) will take place during this period. Should such clearance be required than the area proposed for clearance should be inspected by an ecologist to ascertain if any nesting birds are present.

Provision of Bird Boxes

Forty bird boxes of varying designs will be erected on suitable buildings or trees within the development. Several designs are available including some which can be incorporated into the walls and the surface fabric of the new buildings. These include integrated designs for swift, house sparrow, swallows, starling, etc. Suitable locations for these will be agreed by the project ecologist with the architect and set out for the contractor on detailed drawings.

16.1.2 Watercourse Restoration

It is proposed to naturalise the Hazelbrook Stream along the southern boundary of the site and to enhance it for wildlife through suitable planting.

A buffer of 10-15m has been retained along this watercourse in line with the Fingal County Development Plan 2017 – 2023, p.330), which states:

"Establish riparian corridors free from new development along all significant watercourses in the County. Ensure a 10 to 15 metre wide riparian buffer strip measured from top of bank either side of all watercourses, except in respect of the Liffey, Tolka, Pinkeen, Mayne, Sluice, Ward, Broadmeadow, Corduff, Matt and Delvin where a 30m wide riparian buffer strip from top of bank to either side of all watercourses outside urban centres is required."

Excellent guidance on watercourse rehabilitation is provided in the Inland Fisheries Ireland document 'Planning For Watercourses In The Urban Environment A Guide to the protection of Watercourses through the use of Buffer Zones, Sustainable Drainage Systems, Instream Rehabilitation, Climate / Flood Risk and Recreational Planning *Including one-off developments'.

Suitable species for planting along this watercourse have been specified by the project ecologist to the landscape designer.

Care should be taken when purchasing aquatic plants from nurseries as many species have the potential to become invasive. Attention is drawn to the invasive species listed under the Birds and Natural Habitats Regulations 2011.

16.1.3 Sediment Control

Sediment control practices are used on building sites to prevent sand, soil, cement and other building materials from reaching watercourses such as the Hazelbrook Stream and water dependent habitats such as the reedbeds and saltmarshes downstream. Even a small amount of pollution from a site can cause significant environmental damage by killing aquatic life, silting up streams and blocking storm water pipes. Storm water can contain many pollutants which can enter our local drainage ditches, streams, rivers and marine systems, causing harm to native animals, plants, fish breeding habitats and recreational areas.

Soil erosion, sediment and litter from building sites can be major sources of storm water pollution, and can cause:

- significant harm to the environment e.g. loss of valuable foraging areas in adjoining mudflats for wintering birds
- weed infestation of waterways caused by sediment settling on the creek beds and transporting nutrients
- loss of valuable topsoil
- significant public safety problems when washed onto roads and intersections
- blocked drains creating flooding and increased maintenance costs
- damage to recreational and commercial fishing.

Sediment control usually requires little effort and results in:

- Cleaner waterways and healthier aquatic life.
- Improved site conditions.
- Improved wet weather working conditions.

- Reduced wet weather construction delays.
- Reduced losses from material stockpiles.
- Fewer mud and dust problems.

Good site management in relation to sediment control during the construction phase should prevent this from occurring and possible mitigation measures for consideration are outlined below. Other measures to be implemented on site include briefing of all site contractors regarding the sensitivity of the adjoining watercourse and the need for strict site management in relation to potential run off.

Minimising site disturbance:

Prevention is better than cure. Careful design and an efficient construction sequence will minimise disturbance to the site. This will save money and reduce environmental impact.

Design to avoid excessive cut and fill, unnecessary clearing of vegetation and to preserve existing site drainage patterns. Clear only those areas necessary for building work to occur. Preserve grassed areas and vegetation where possible. This helps filter sediment from storm water runoff before it reaches the watercourse and stops rain turning exposed soil into mud. Delay removing vegetation or commencing earthworks until just before building activities start. Avoid building activities that involve soil disturbance during periods of expected heavy or lengthy rainfall.

Implement sediment control:

Install sediment control measures before commencing any excavation or earth moving. Regularly maintain them until construction is complete and the site is stabilised.

Prevent sediment-contaminated water leaving the site

Use barriers to trap coarse sediment at all points where storm water leaves the site, before it can wash into the watercourse and down to the Natura 2000 site downstream. Relocate sediment on site or dispose of it suitably. Remove accidental spills of soil or other material immediately. Maintain vegetation on the site in the vicinity of watercourses as in a healthy state as it can function as an additional filter for sediment. Cut brick, tile or masonry on a pervious surface such as grass or loosened soil within the property boundary. The same applies when cleaning equipment. Waste concrete, paint and other solutions used on site should be properly disposed of so they do not contaminate storm water.

Protection Measures for Fisheries

Various measures will be required to ensure that there is no deterioration in water quality in the Hazelbrook Stream along the southern boundary of the site arising from the development.

These relate mainly to the control of silt and sediment runoff during construction and the installation of hydrocarbon/petrol interceptors on surface water drainage systems leaving the development.

For any instream works the guidelines presented in the Eastern Regional Fisheries Board 'Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites' should be reviewed and followed where applicable and the contractor informed of the sensitivity of the catchment. This and other guidance is available from:

http://www.fisheriesireland.ie/fisheries-management-1/86-planning-for-watercourses-in-the-urban-environment-1/file

http://www.fisheriesireland.ie/fisheries-management-1/90-requirements-for-the-protection-of-fisheries-habitat-during-construction-and-development-works-at-ri-1/file

Contractor Briefing

All site contractors should be briefed regarding the biodiversity value of the retained watercourse, trees and vegetation to ensure that there are no accidental or unintentional actions conducted during the project construction that could lead to a reduction in water quality/damage to same. Such matters often arise through ignorance or by accident rather than as a result of an intentional action.

Soil Handling

Soil should be handled with care as it is a living entity. The topsoil and subsoil layers will be stripped, stored and maintained separately. Topsoil will be temporarily stored upon geotextile such as Terram 1000 (www.terram.com). The contractor should submit proposals for supplier and product, which should be a nonwoven geotextile manufactured from UV stabilised, high tenacity, virgin polypropylene fibres that have been both mechanically and thermally bonded with a minimum of 5 years lifespan in all soil conditions. Note that soil levels within the root spread of those trees that are to be retained should not be raised. From this temporary storage heap the topsoil should be distributed as required for landscaping purposes. In general, the topsoil should not be firmed, consolidated or compacted when laying. Tipping and grading to approximate levels should be done in one operation with minimum of trafficking by plant.

The topsoil, which is to be retained and reused should not be mixed with: subsoil, stone, hardcore, rubbish or material from demolition work, or the other grades of topsoil, including those contaminated with non-native invasive species. The topsoil should be handled in the driest condition possible. Topsoil should not be handled during or after heavy rainfall or when it is wetter than the plastic limit less 3%, to BS 1377-2.

Depending on how long the construction period is expected to last it might be necessary to seed the stored topsoil to prevent weed establishment. A recommended mixture is: 35% Chewings fescue, 35% Slender red fescue, 20% Smooth stalked meadow grass and 10% Brown top bent. This should be applied to the manufacturer's recommendations (min. 15g/m2) and the following wildflower mix @ 5g/m2 added:

- Native Origin Irish Wildflower Seed Mixture - Product Code/Name: MM12 Wild Flora for Raw Impoverished Sub Soil
- Supplier: Design by Nature www.wildflowers.ie
- Species List: Bird’s-foot Trefoil, Black Medick, Corn Marigold, Corn Pansy, Corn Poppy, Corncockle, Cornflower, Cowslip, Devil's Bit Scabious, Eyebright, Meadow Buttercup, Fleabane, Greater Trefoil, Lesser Knapweed, Scented Mayweed, Meadowsweet, Ox-eye Daisy, Purple Loosestrife, Ragged Robin, Red Rattle, Red Bartsia, Red Clover, Ribwort Plantain, Rough Hawksbit, Sorrel, St. John’s-wort, White Campion, Wild Angelica, Wild Carrot, Yarrow, Yellow Rattle, Lady's Smock, Yellow Clover.

SUDS Measures

The drainage system has been designed with the aim of providing a sustainable drainage solution ensuring, in so far as feasible, that the development has a minimal impact on the existing public surface water sewer system. The proposed development has been designed to incorporate best drainage practice.

It is proposed to incorporate a Storm Water Management Plan through the use of various SuDS techniques to treat and minimise surface water runoff from the site. This has been designed by Waterman Moylan Consulting engineers (see the Engineering Assessment Report).

It is proposed to construct a SW drainage network that will service and attenuate the development internally before discharging at the current greenfield (or allowable) rates to the local natural ditch systems. Surface drainage layout and attenuation strategy can be reviewed on drawing numbers 18-091-P201, P202 & P203. The location and extent of SuDS devices proposed for the development can be viewed on drawing 18-091-P233.

Storm water from each catchment will be attenuated and discharge at a controlled rate, limited to the greenfield equivalent runoff or 2 l/s (whichever is greater), to ultimately outfall to the existing ditch system on the site, south catchment 2 however, will outfall directly to the Hazelbrook Stream. The proposed development will be designed to incorporate best drainage practice.

Potential negative impacts could arise should untreated surface water enter the Hazelbrook Stream from the proposed development. These impacts have been addressed through careful consideration of the ground conditions within the site and the installation of silt traps and hydro-carbon traps as outlined in the Engineering Assessment Report and accompanying drawings prepared by Waterman Moylan Consulting Engineers, which will ensure that all surface water leaving the site is treated before it ultimately enters the Baldoyle Bay SAC/SPA.

Ecological Clerk of Works

An ecological clerk of works will be appointed to oversee the project and sign off on the above mitigation measures.

Monitoring Measures

Monitoring Measures for Badgers

Given that some time may have lapsed between approval of planning permission and commencement of construction the activity at these setts will be the subject of ongoing monitoring in order to determine if a licence could become a requirement.

16.4 Land and Soils

16.4.1 Mitigation

Construction

A competent person/company will be assigned to pre-treat (kill-off) the Japanese Knotweed prior to excavation. It is generally recommended that a 3m depth of soil and an area encompassing a 7m offset

distance are treated and excavated for disposal for this invasive species. The competent professional should also be present during excavation to ensure there are no living rhizomes (root structures) present when being excavated. The dead Japanese knotweed plant, root system and surrounding soil will need to be disposed of, by prior arrangement, to an authorised deep-fill landfill. These works are to be undertaken in accordance with the "Environmental Agency guidelines on Japanese Knotweed", Landfill operator permitting, and industry best practices & guidelines as appropriate.

Environmental Laboratory chemical analysis has indicated that the historic in-fill constituents are non-hazardous. Excavated material from this location should be continuously monitored/inspected for signs of hazardous material contamination during excavation. Should there be any indication of hazardous material contamination, it may be required to be further sampled and analysed to confirm its chemical properties and waste category classification.

To reduce the quantity of soil to be removed from or imported to the site, the finished floor levels of the proposed buildings and the road levels are designed to match existing levels and minimise the cut and fill volumetric balance. The number of vehicle movements will be minimised by this optimisation. For the area of historic in-fill, levels here have been designed based on the calculated ground levels post excavation and disposal of the historic in-fill material. Surplus subsoil and rock may be relocated to approved areas of the site that may require in-fill, or if required to be removed from site, will be deposited in approved fill areas off-site (Article 27 notification to the EPA required) or to an approved waste disposal facility.

In the case of topsoil careful planning and on-site storage can ensure that this resource is reused on-site as much as possible. Any surplus soil not used can be transferred elsewhere subject to submission of an Article 27 notification to the EPA. However, topsoil is quite sensitive and can be rendered useless if not stored and cared for properly. It is therefore important that topsoil is kept completely separate from all other construction waste and stored material and heaped (stored) appropriately.

It is important to ensure that topsoil is protected from all kinds of vehicle damage and kept away from site-tracks, delivery vehicle turning areas and site plant and vehicle storage areas. If topsoil is stored in piles of greater than 2m in height the soil matrix (internal structure) can be damaged beyond repair. It should also be kept as dry as possible and used as soon as possible to reduce any deterioration through lengthy storage and excess movements around the site.

Records of topsoil storage, movements and transfers will be kept by the C&D Waste Manager.

Silt traps, silt fences and tailing ponds will also need to be provided by the contractor where necessary to prevent silts and soils being washed away by heavy rains during the course of the construction phase.

The provision of wheel wash areas at the exit to the development as necessary will minimise the amount of soil deposited on the surrounding road network. The adjoining road network will be cleaned on a regular basis. All trucks on the public road will carry a maximum of 10 cubic metres of material to prevent spillage and damage to the surrounding road network.

Dampening down measures with water sprays will be implemented during periods of dry weather to reduce dust levels arising from the development works.

Appropriate storage and bunding measures will be implemented throughout the construction stage to prevent contamination of the soil and groundwater from oil and petrol leakage from site plant. Refuelling will be restricted to allocated re-fuelling areas. This is to be an impermeable bunded area, designed to contain 110% of the volume of fuel stored. Emergency fuel spill kits are to be stored on-site with designated staff familiar with their usage.

If groundwater is encountered during excavations, mechanical pumps will be required to remove that groundwater from sumps. Sumps should be carefully located and constructed to ensure that groundwater is efficiently removed from excavations and trenches.

Waterman Moylan's accompanying Preliminary Construction Demolition and Waste Management Plan and Preliminary Construction Management Plan will be implemented by the contractor during the construction phase to mitigate and control the above remedial measures.

Operational

On completion of the construction phase and following replacement of topsoil, a planting programme will commence to prevent soil erosion.

SuDS and filtration devices are proposed to be provided as part of the development. These will help to remove pollutants from rainwater runoff. They will require periodic inspection and maintenance as per their installation manuals.

16.4.2 Monitoring Measures

Monitoring during the construction phase is recommended, in particular to the following items:

- Excavation of area of Japanese Knotweed.
- Excavation of the historic in-fill material.
- Adequate protection of topsoil stockpiled for reuse.
- Adequate protection from contamination of soils for removal.
- Monitoring of surface water discharging to existing watercourses, ditches, and the existing surface water drainage system.
- Monitoring cleanliness of the adjoining road network.
- Monitoring measures for prevention of oil and petrol spillages.
- Dust control by dampening down measures, when required due to dry weather conditions.

During the operation phase, the surface water network (drains, gullies, manholes. AJs, SuDS Devices, attenuation systems etc.) will need to be regularly maintained and where required cleaned out. A suitable maintenance regime of inspecting and cleaning should be incorporated into the safety file/maintenance manual for the development.

16.5 Water

16.5.1 Mitigation Measures

Construction stage

A Preliminary Construction Management Plan (PCMP) has been prepared for this application and is included under a separate cover. It is considered that the PCMP will be updated by the appointed contractor. In order to minimise the potential impact of the construction phase of the proposed development on the surrounding surface water and groundwater environs, the following construction stage mitigation measures are to be included in the plan and be implemented in full.

- The contractor will appoint a suitably qualified person to oversee the implementation of measures for the prevention of pollution to the receiving surface water environment.
- To minimise the adverse effects, the prevailing weather conditions and time of year is to be taken into account when the site development manager is planning the stripping back of the site.
- Site stripping will be minimised as far as practicable.
- Settlement ponds/silt traps will be provided to prevent silt runoff into the existing sewers/watercourses during the drainage works.
- Regular testing of surface water discharges will be undertaken at the outfall from the subject lands. The location for testing and trigger levels for halting works will be agreed between the project ecologist and the site foreman at the commencement of works.
- Where silt control measures are noted to be failing or not working adequately, works will cease in the relevant area. The project ecologist will review and agree alternative pollution control measures, such as deepening or redirecting trenches as appropriate, before works may recommence.
- All fuels and chemicals will be bunded, and where applicable, stored within double skinned tanks/containers with the capacity to hold 110% of the volume of chemicals and fuels contents. Bunds will be located on flat ground a suitable distance from any watercourse or other water conducting features, including the cut off trenches.
- Foul and surface water pipes will be carefully laid so as to minimise the potential for cross connections which may result in contamination of receiving watercourses.
- Site personnel inductions are to be conducted such that all site personnel are made aware of the procedures the best practice in relation to the management of surface water runoff and ground water protection.
- Where possible, precast concrete units are to be used to avoid on-site “wet” mix concrete usage. In-situ concrete pours are to be managed in accordance with best practice to avoid overspills
- Concrete truck and wheel wash down facilities are to be provided in designated areas. Discharge from these areas is to be directed into the settlement ponds/silt traps.
- Topsoil for landscaping will be located in such a manner as to reduce the risk of washing away into local drainage or watercourses.
- A method statement setting out in detail the procedure to be used when working in the vicinity of existing watermains will be produced by the contractor for any construction works within the vicinity of watermains and for roads and or services crossing watermains.

- All watermains will be cleaned and tested in accordance with Irish Water guidelines prior to connection to the public watermain.
- All connections to the public watermain will be carried out and tested by or under the supervision of Irish Water or the design engineer.
- Details for the construction methods of the outfall head walls to mitigate against pollution of the natural surface water networks are set out in the Preliminary Construction Demolition & Waste Management Plan.
- In order to reduce the risk of defective or leaking foul sewers, the following measures will be implemented:
- All new foul sewers will be tested by means of an approved air test during the construction phase in accordance with Irish Waters Code of Practice and Standard Details.
- All private drainage will be inspected and signed off by the design Engineer in accordance with the Building Regulations Part H and BCAR requirements.
- Foul sewers will be surveyed by CCTV to identify possible physical defects.
- The connection of the new foul sewers to the public sewer will be carried out under the supervision of Irish Water and will be checked prior to commissioning.
- Prior to commencement of excavations in public areas, all utilities and public services will be identified and checked, to ensure that adequate protection measures are implemented during the construction phase.

Potential negative impacts during construction phase will be short term only.

Operational Phase:

The implementation of the following operation stage mitigation measures will minimise the impact on the hydrology and hydrogeology aspects of the development lands.

- The surface water drainage network has been designed in accordance with the CIRIA SUDS Manual and the Greater Dublin Strategic Drainage Scheme. The appropriate interception mechanisms and treatment train process has been incorporated into the design.
- Surface water outflow will be restricted to the equivalent greenfield runoff rate from the proposed attenuation tanks.
- Flow restrictors with attenuation storage will be used to slowdown and store surface water runoff from discharging above green field rates to the local ditches/Hazelbrook Stream.
- Sustainable urban drainage measures, including green roofs, permeable paving, and filter strips/swales will be provided to improve water quality.
- A petrol interceptor will be installed to prevent hydrocarbons entering the local drainage system at all outfalls.
- Regular inspection and maintenance of the drainage network, including petrol interceptors.
- Water metering via district meters will be installed to Irish Water requirements. Monitoring of the telemetry data will indicate any excessive water usage which may indicate the potential for a leak in the watermain network. Early identification of potential leaks will lead a faster response in determining the exact location of leaks and completion of remedial works.

It is not envisaged that any further remedial or reductive measures will be necessary upon completion.

16.5.2 Monitoring Measures

Construction Stage

Implementation of the Construction Management Plan is required to protect the hydrology and groundwater elements of the subject lands during construction stage. Maintenance of the mitigation measures and monitoring of the management processed is required to ensure best practice.

The monitoring measures to be implemented include:

- Monitoring of the management and storage of dangerous chemicals and fuel.
- Monitoring and maintenance of the wheel wash facilities.
- Regular maintenance and monitoring of the sediment control measures.
- Monitoring and maintenance of the SUDS features, road gullies and, attenuation ponds during the construction phase of the development.

Operational Stage

Monitoring and maintenance of the water metering telemetry, SUDS features, road gullies, attenuation and flow control devices are imperative during the operation phase of the development

16.6 Air Quality

16.6.1 Mitigation Measures

Construction Phase

A detailed dust minimisation plan associated with a high level of dust control is outlined in Appendix 8.3. This plan draws on best practice mitigation measures from Ireland, the UK and the USA in order to ensure the highest level of mitigation possible.

In summary the measures which will be implemented will include: -

- Drop heights from conveyors, loading shovels, hoppers and other loading equipment should be minimised, if necessary fine water sprays should be employed.
- Hard surface roads will be swept to remove mud and aggregate materials from their surface while any un-surfaced roads will be restricted to essential site traffic.
- Any road that has the potential to give rise to fugitive dust will be regularly watered, as appropriate, during dry and/or windy conditions.
- Vehicles exiting the site shall make use of a wheel wash facility where appropriate, prior to entering onto public roads.
- Vehicles using site roads will have their speed restricted, and this speed restriction will be enforced rigidly. On any un-surfaced site road, this will be 20 kph, and on hard surfaced roads as site management dictates.
- Public roads and footpaths outside the site will be regularly inspected for cleanliness and cleaned as necessary. If sweeping using a road sweeper is not possible due to the nature of the surrounding area then a suitable smaller scale street cleaning vacuum will be used.

- Material handling systems and site stockpiling of materials will be designed and laid out to minimise exposure to wind. Water misting or sprays will be used as required if particularly dusty activities are necessary during dry or windy periods.
- During movement of materials both on and off-site, trucks will be stringently covered with tarpaulin at all times. Before entrance onto public roads, trucks will be adequately inspected to ensure no potential for dust emissions.
- Hoarding or screens shall be erected around works areas to reduce visual impact. This will also have an added benefit of preventing larger particles of dust from travelling off-site and impacting receptors.

At all times, these procedures will be strictly monitored and assessed. In the event of dust nuisance occurring outside the site boundary, movements of materials likely to raise dust would be curtailed and satisfactory procedures implemented to rectify the problem before the resumption of construction operations.

Operational Phase

No mitigation is proposed for the operation phase of the proposed development as it is predicted to have an imperceptible impact on air quality.

16.6.2 Monitoring Measures

Construction Phase

Monitoring of construction dust deposition along the site boundary to nearby sensitive receptors during the construction phase of the proposed development is recommended to ensure mitigation measures are working satisfactorily. This can be carried out using the Bergerhoff method in accordance with the requirements of the German Standard VDI 2119. The Bergerhoff Gauge consists of a collecting vessel and a stand with a protecting gauge. The collecting vessel is secured to the stand with the opening of the collecting vessel located approximately 2m above ground level. The TA Luft limit value is 350 mg/(m^2*day) during the monitoring period between 28 - 32 days.

Operational Phase

There is no monitoring recommended for the operational phase of the development as impacts to air quality are predicted to be imperceptible.

16.7 Noise and Vibration

16.7.1 Mitigation Measures

Construction Stage - Noise

With regard to construction activities, best practice control measures for noise and vibration from construction sites are found within BS 5228 (2009 +A1 2014) *Code of Practice for Noise and Vibration Control on Construction and Open Sites* Parts 1 and 2. Whist construction noise and vibration impacts are expected to vary during the construction phase depending on the distance between the activities and noise sensitive buildings, the contractor will ensure that all best practice noise and vibration

control methods will be used, as necessary in order to ensure impacts at off-site noise sensitive locations are minimised.

The best practice measures set out in BS 5228 (2009) Parts 1 and 2 includes guidance on several aspects of construction site mitigation measures, including, but not limited to:

- selection of quiet plant;
- noise control at source;
- screening;
- liaison with the public, and;
- monitoring.

Detailed comment is offered on these items in the following paragraphs. Noise control measures that will be considered include the selection of quiet plant, enclosures and screens around noise sources, limiting the hours of work and noise and vibration monitoring, where required.

Selection of Quiet Plant

This practice is recommended in relation to static plant such as compressors and generators. It is recommended that these units be supplied with manufacturers' proprietary acoustic enclosures. The potential for any item of plant to generate noise will be assessed prior to the item being brought onto the site. The least noisy item should be selected wherever possible. Should a particular item of plant already on the site be found to generate high noise levels, the first action should be to identify whether or not said item can be replaced with a quieter alternative.

Noise Control at Source

If replacing a noisy item of plant is not a viable or practical option, consideration will be given to noise control "at source". This refers to the modification of an item of plant or the application of improved sound reduction methods in consultation with the supplier. For example, resonance effects in panel work or cover plates can be reduced through stiffening or application of damping compounds; rattling and grinding noises can often be controlled by fixing resilient materials in between the surfaces in contact.

Referring to the potential noise generating sources for the works under consideration, the following best practice migration measures should be considered:

- Site compounds will be located in excess of 30m from noise sensitive receptors within the site constraints. The use lifting bulky items, dropping and loading of materials within these areas should be restricted to normal working hours.
- For mobile plant items such as dump trucks, excavators and loaders, the installation of an acoustic exhaust and or maintaining enclosure panels closed during operation can reduce noise levels by up to 10 dB. Mobile plant should be switched off when not in use and not left idling.
- For concrete mixers, control measures should be employed during cleaning to ensure no impulsive hammering is undertaken at the mixer drum.
- For all materials handling ensure that materials are not dropped from excessive heights, lining drops chutes and dump trucks with resilient materials.

- For compressors, generators and pumps, these can be surrounded by acoustic lagging or enclosed within acoustic enclosures providing air ventilation.
- Demountable enclosures can also be used to screen operatives using hand tools and will be moved around site as necessary.
- All items of plant should be subject to regular maintenance. Such maintenance can prevent unnecessary increases in plant noise and can serve to prolong the effectiveness of noise control measures.

Screening

Screening is an effective method of reducing the noise level at a receiver location and can be used successfully as an additional measure to all other forms of noise control. Construction site hoarding will be constructed around the site boundaries as standard. The hoarding will be constructed of a material with a mass per unit of surface area greater than 7 kg/m2 to provide adequate sound attenuation.

In addition, careful planning of the site layout will also be considered. The placement of site buildings such as offices and stores will be used, where feasible, to provide noise screening when placed between the source and the receiver.

Liaison with the Public

A designated environmental liaison officer will be appointed to site during construction works. Any noise complaints should be logged and followed up in a prompt fashion by the liaison officer. In addition, where a particularly noisy construction activity is planned or other works with the potential to generate high levels of noise, or where noisy works are expected to operate outside of normal working hours etc., the liaison officer will inform the nearest noise sensitive locations of the time and expected duration of the noisy works.

Project Programme

The phasing programme will be arranged so as to control the amount of disturbance in noise and vibration sensitive areas at times that are considered of greatest sensitivity. During excavation/ piling or other high noise generating works are in progress on a site at the same time as other works of construction that themselves may generate significant noise and vibration, the working programme will be phased so as to prevent unacceptable disturbance at any time.

Construction Stage - Vibration

The vibration from construction activities will be limited to the values set out in Section 9.2. Magnitudes of vibration slightly greater than those in the table are normally unlikely to cause cosmetic damage, but construction work creating such magnitudes should proceed with caution. Limit values have been provided for soundly constructed residential and commercial properties.

Operation Stage

Additional Traffic on Adjacent Roads

During the operational phase of the development, noise mitigation measures with respect to the outward impact of traffic from the development are not deemed necessary.

Mechanical Services Plant

Taking into account that sensitive receivers within the development are much closer than off-site sensitive receivers, once the relevant noise criteria are achieved within the development it is expected that there will be no negative impact at sensitive receivers off site, and therefore no further mitigation required.

Inward Noise

As is the case in most buildings, the glazed elements and ventilation paths of the building envelope are typically the weakest element from a sound insulation perspective. In general, all wall constructions (i.e. block work or concrete and spandrel elements) offer a high degree of sound insulation, much greater than that offered by the glazing systems. Therefore, noise intrusion via the wall construction will be minimal.

Table 16-1. Sound Insulation Performance Requirements for Glazing, SRI (dB)

Mark-up	Octave Band Centre Frequency (Hz)						R_w
	125	250	500	1000	2000	4000	
BLUE	26	27	34	40	38	46	37

The overall R_w and $D_{ne,w}$ outlined in this section are provided for information purposes only. The over-riding requirement is the Octave Band sound insulation performance values which may also be achieved using alternative glazing and ventilation configurations. Any selected system will be required to provide the same level of sound insulation performance set out in Table 9.24 and Table 9.25 or greater.

The following performance requirements apply to all ventilation paths from outside the building. This can be achieved by passive acoustic wall or window vents or via mechanical ventilation systems. Ventilators in the facades of dual aspect living/dining spaces in areas designated 'BLUE' should provide increased performance as outlined below.

Table 9.25: Sound Insulation Performance Requirements for Ventilation, Dn,e,w (dB)

Mark-up	Octave Band Centre Frequency (Hz)						$D_{n,e,w}$
	125	250	500	1000	2000	4000	
BLUE	35	34	33	38	49	45	39

Figure 16-9. Façade Sound Insulation Specification

16.7.2 Monitoring Measures

Where required, construction noise monitoring will be undertaken at periodic sample periods at the nearest noise sensitive locations to the development works to check compliance with the construction noise criterion.

Noise monitoring should be conducted in accordance with the International Standard ISO 1996: 2017: Acoustics – Description, measurement and assessment of environmental noise.

16.8 Climate

16.8.1 Mitigation Measures

<u>Construction Stage</u>

Construction stage impacts to climate are considered neutral, however, the following best practice measures are recommended to ensure no significant impacts occur.

- Prevent on-site or delivery vehicles from leaving engines idling, even over short periods.
- Ensure all plant and equipment are serviced regularly and well maintained.
- Minimising waste of materials due to poor timing or over ordering on site will aid to minimise the embodied carbon footprint of the site

Operation Stage

No mitigation is proposed for the operation phase of the proposed development as it is predicted to have an imperceptible impact on climate. A number of measures have been incorporated into the overall design of the development to reduce impacts to climate during operation.

16.8.2 Monitoring Measures

No monitoring is recommended.

16.9 Landscape and Visual Impact

16.9.1 Mitigation Measures

This section of the report will discuss mitigation measures to reduce the impact of the proposed development on the surrounding water environments during the construction and operation phase.

Incorporated Design

- Retention and enhancement of a number of moderate-quality existing trees and incorporation into the landscape design
- Significant level of proposed perimeter planting including native woodland, hedgerow, copses of native trees and formal hedging
- Significant level of proposed street, parkland and ornamental trees within the subject lands
- Significant level of proposed woodland planting

Construction Phase

- The protection of existing trees and other vegetation to be retained to BS 5837:2012 standards with the Root Protection Area (RPA) securely protected by fencing for the duration of the construction process.
- Implementation and monitoring of a well-managed and organised construction site, with control of construction activity, traffic, materials storage and lighting with due consideration for neighbouring residences

Operational Phase

- Implementation and monitoring of a landscape management plan for the full duration of the defects liability period to ensure successful establishment of all proposed trees and vegetation.
- Periodic tree surveys and implementation of a tree management plan for the mature trees on site to ensure their continuing sustainability.

16.9.2 Monitoring Measures

Contracts will ensure good working practices to reduce any negative impacts arising from construction to the lowest possible level and to ensure that all machinery operates within clearly defined construction area. Storage areas will be so located to avoid impacting on sensitive views, trees, hedgerows, drainage patterns etc. and such areas will be fully re-instated prior to at the end of the

construction contract. The works will also have continuous monitoring to ensure adequate protection of areas outside of the construction works.

16.10 Traffic and Transport

16.10.1 Mitigation Measures

This section of the report discusses mitigation measures to reduce the impact the proposed development on the surrounding area during the construction and operational phases.

Construction Phase

It is considered that a Construction Management Plan (CMP) will be prepared by the appointed contractor in order to minimise the potential impact of the construction phase of the proposed development on the safety and amenity of other users of the public road. The CMP will consider the following aspects:

- Dust and dirt control measures.
- Noise assessment and control measures
- Routes to be used by vehicles
- Working hours of the site
- Details of construction traffic forecasts
- Time when vehicle movements and deliveries will be made to the site
- Facilities for loading and unloading
- Facilities for parking cars and other vehicles

Further to the above, a detailed Traffic Management Plan (TMP) will be prepared by the main contractor. This document will outline proposals in relation to construction traffic and associated construction activities that impact the surrounding roads network. The document will be prepared in coordination and agreed with the local authority.

Care will be taken to ensure existing pedestrian and cycling routes are suitably maintained or appropriately diverted as necessary during the construction period, and temporary car parking is provided within the site for contractor's vehicles. It is likely that construction will have an imperceptible impact on pedestrian and cycle infrastructure.

Through the implementation of the CMP and TMP, it is anticipated that the effect of traffic during the construction phase will have a slight effect on the surrounding road network for short-term period.

Operational Phase

The proposed development is situated adjacent to suitable infrastructure and transport services for travel by sustainable modes. A key barrier to modal shift towards sustainable modes of travel is often a lack of information about potential alternatives to the car. As such, it is proposed that residents will be made aware of potential alternatives including information on walking, cycle routes and public transport.

Residents will be encouraged to avail of these facilities for travel to and from work. Provision of this information would be made during the sales process and will be included in the new homeowner's

pack upon the sale of each unit, as this represents the best opportunity to make residents aware and to secure travel behaviour change. It is anticipated that this measure may help to reduce the level of traffic at the proposed development, thus providing mitigation against any traffic and transport effects of the development.

A Travel Plan has been included in this application under separate cover. This Plan sets out a method to reduce the dependence on private car journeys and encourage residents within the development to avail of sustainable forms of transport such as walking, cycling and public transport.

16.10.2 Monitoring Measures

Construction Phase

During the Construction Phase the following monitoring is advised. The specific compliance exercises to be undertaken in relation to the range of measures detailed in the final construction management plan will be agreed with the planning authority.

- Construction vehicles routes and parking
- Internal and external road conditions
- Construction activities hours of work

Operational Phase

The Travel Plan for the proposed development will be monitored and updated at regular intervals. This will enable tracking in terms of a reduction in the dependence on private car journeys and a shift towards sustainable transport options such as walking, cycling and the use of public transport such as buses and trains.

16.11 Cultural Heritage

16.11.1 Mitigation Measures

It is recommended that the four archaeological features (a pit; a hearth/burnt pit; and two possible enclosure ditches) revealed during the test trenching programmes be fully excavated and recorded well in advance of groundworks commencing on site. Excavation would be carried out under Licence to the Department of Housing, Local Government and Heritage and the National Museum of Ireland.

It is recommended that monitoring of all groundworks be undertaken in Fields 1, 2 and 5 (figure 13.12). Monitoring would be carried out under Licence to the Department of Housing, Local Government and Heritage and the National Museum of Ireland. Provision would be made for the full excavation and recording of any archaeological features or deposits that may be exposed during monitoring.

It is considered monitoring is not required in Fields 3, 4, 6, 7, 8, 9 and 10 (figures 13.12 and 13.13) as fieldwork failed to reveal any archaeological features or artefacts in these areas.

There are no mitigation measures available to offset the imperceptible, permanent, visual impact on the architectural heritage features recorded within the 500m study area.

It is recommended that written and photographic records be created, well in advance of groundworks commencing on site, where the proposed access roads and footpaths will truncate the townland and parish boundary.

16.11.2 Monitoring Measures

With the exception of the mitigation measures outlined in Section 13.9 Avoidance, Remedial & Mitigation Measures, there are no future monitoring requirements.

16.12 Utilities and Waste

16.12.1 Mitigation Measures

All possible precautions shall be taken to avoid unplanned disruptions to any services or utilities during the construction phase of the proposed Project. It should be noted that a number of mitigation measures proposed in other EIAR chapters are also of relevance to Material Assets and should be referred to when reading this EIAR.

The construction phase mitigation measures include, avoidance, reduction and remedy measures as set out within the Development Management Guidelines document. The design and construction of the necessary service infrastructure will be in accordance with relevant codes of practice and guidelines. As a result, this is likely to mitigate any potential impacts during the operational phase of the proposed Project. However, routine maintenance of the site services will be required from time to time, as such any mitigation measures will be advised by the relevant service provider.

A site-specific Construction and Demolition Waste Management Plan (C&DWMP) has been prepared to deal with waste generation during the construction phase of the proposed Project and is included as part of the application packs. This document was prepared in accordance with best practice guidelines. Operational waste management will be managed by a designated management company on site and the appointed licenced waste contractor which will ensure the sustainable management of domestic and commercial waste arising from the development in accordance with legislative requirements and best practice standards.

16.12.2 Monitoring Measures

Prior to the operational phase of the proposed Project, all services/utility connections will be tested by a suitably qualified professional under the supervision of the service provider.

Any monitoring of the built services required during the operational phase of the proposed Project will be as advised by the relevant service provider.

The management of waste during the construction and operational phases of the proposed Project should be monitored to ensure compliance with best practice and relevant legislative requirements.