DOWNEY

ENVIRONMENTAL IMPACT ASSESSMENT REPORT (EIAR)

OLDTOWN SHD

Proposed Strategic Housing Development

on Lands at Oldtown, Swords, Co. Dublin

Applicant: Gerard Gannon Properties

April 2022

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NON-TECHNICAL SUMMARY

1.0 INTRODUCTION

Gerard Gannon Properties (the applicant) is applying to An Bord Pleanála for planning permission for 377 no. dwellings and a creche (the development) on 10.223ha of land north of Rathbeale Road and to the west of and north of Miller's Avenue and Glen Ellan Road, Oldtown, Swords, Co. Dublin (the application site). The planning application is made to An Bord Pleanála as a Strategic Housing Development (SHD) application.

The application site of 10.223 hectares falls in what can be considered a built-up area. On this basis, the proposal is environmental impact assessment (EIA) development under Part 2 of Schedule 5 (Annex II) of the EIA Regulations 2018. Additionally, the site forms part of the wider Oldtown-Mooretown zoned land under terms including the Oldtown-Mooretown LAP 2010-2016 (as extended to July 2020 and since expired).

This Environmental Impact Assessment Report (EIAR) has been prepared under the following assessment chapters

1. Introduction
2. Description of Project & Alternatives Considered
3. Planning and Development Context
4. Population and Human Health
5. Biodiversity
6. Land and Soils
7. Water
8. Air Quality
9. Noise and Vibration
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11. Landscape and Visual Impact
12. Material Assets - Traffic and Transport
13. Cultural Heritage
14. Material Assets - Utilities and Waste
15. Interactions and Cumulative effects
16. Summary of Mitigation & Monitoring Measures

This EIAR has been prepared by an experienced and suitably qualified team of consultants, as described in the following table:

Name	Role
Downey Planning John Downey, Planning Consultant, BA (Hons), MRUP, MBA, MIPI, MRTPI – 25 years' experience & Eva Bridgeman, Planning Consultant BA (Hons), MRUP, MIPI – 10 years' experience	EIAR Project Managers & Planning Consultants Preparation of the following EIAR chapters: ▪ *Chapter 1: Introduction* ▪ *Chapter 2: Description of Project & Alternatives Considered* ▪ *Chapter 3: Planning and Development Context* ▪ *Chapter 4: Population & Human Health* ▪ *Chapter 15: Interactions* ▪ *Chapter 16: Summary of Mitigation & Monitoring Measures* ▪ *Compilation of EIAR and NTS*
CCK Architects Pamela Gill, Director, MRIAI	Preparation of the following EIAR chapters: ▪ *Chapter 2: Description of Project & Alternatives Considered* ▪ *Chapter 16: Summary of Mitigation & Monitoring*

Name	Role
	Measures
Waterman Moylan Consulting Engineers Mark Duignan, Associate Director, Engineer, MA BAI CEng MIEI	Preparation of the following EIAR chapters: ▪ *Chapter 6: Land and Soils* ▪ *Chapter 7: Water* ▪ *Chapter 12: Traffic & Transport* ▪ *Chapter 14: Utilities & Waste* ▪ *Chapter 16: Summary of Mitigation & Monitoring Measures*
Doyle & O'Troithigh Landscape Architects Linda Doyle, Director, MILI	Preparation of the following EIAR chapters: ▪ *Chapter 11: Landscape and Visual Impact Assessment* ▪ *Chapter 16: Summary of Mitigation & Monitoring Measures*
Courtney Deery Heritage Consultancy Ltd. Siobhán Deery BA, MA, H-Dip (Ed.), Dip Planning & Env. Law, MIAI, Director	Preparation of the following EIAR chapters: ▪ *Chapter 13: Cultural Heritage* ▪ *Chapter 16: Summary of Mitigation & Monitoring Measures*
OPENFIELD Ecological Services **(Padraic Fogarty, Ecologist, MSc in EcIA)**	Preparation of the following EIAR chapters: ▪ *Chapter 5: Biodiversity* ▪ *Chapter 16: Summary of Mitigation & Monitoring Measures*
DKP International Ltd Gerard Van Deventer C.ENG., BE. (Mech)., H. Dip. CIOB., MCIBSE	Preparation of the following EIAR chapters: ▪ *Chapter 8: Air Quality* ▪ *Chapter 9: Noise & Vibration* ▪ *Chapter 10: Climate* ▪ *Chapter 16: Summary of Mitigation & Monitoring Measures*

Further information on the basis for the EIAR and project team is provided in Chapter 1 of this EIAR.

2.0 DESCRIPTION OF PROJECT & ALTERNATIVES CONSIDERED

2.1 The Site

The application site extends to approximately 10.223ha and is located on the western edge of Swords, Fingal, Co. Dublin, approximately 3.5km from Swords town centre and County Hall, 5km from the M1 interchange at Lissenhall and just under 10km to Dublin Airport. It is accessed from Glen Ellan Road and Rathbeale Road, and from Miller's Avenue and the internal street network of the adjacent completed developments. The lands are zoned RA in the Fingal Development Plan 2017-2023 and form the western edge of urban development for Swords.

Further information on the application site is provided in Chapter 2 of this EIAR.

2.2 The Baseline Scenario

The baseline scenario including a description of the current receiving environment has been considered as part of this EIAR through the collection and collation of data through tests, site visits, desktop reviews, etc, including analytical data for traffic, noise levels, surface water quality, etc. A description of the existing environment is presented in each relevant section for the various environmental chapters.

The application lands are located at Oldtown, Swords, in the northern periphery of Dublin and within the administrative boundaries of Fingal County Council. The surrounding land uses are generally residential with Swords Regional Park located to the north of the lands. Miller's Glen is a master-planned new urban village with a distinctive character that is unique from the surrounding older neighbourhoods of Castleview, Ashton Broc, and Bunbury Gate.

The proposed development is the final phase of Miller's Glen and the last in a series of "primary" character areas that have comprised the village centre (Miller's Square), Miller's Glen, Longview, Meadowbank and Westmill (under construction). Whereas the earliest phases of Miller's Glen were of low to mid-density cells, and predominantly comprised picturesque gable-fronted two storey houses, the proposed development is much denser, taller, and considerably more contemporary.

Further information on the baseline scenario is provided in Chapter 2 of this EIAR and each of the technical chapters (Chapter 4 to Chapter 14).

2.3 The Development

The proposed development, as per the description contained within the statutory planning notices, provides for:

"We, Gerard Gannon Properties, intend to apply to An Bord Pleanála for permission for a strategic housing development at lands to the north of Rathbeale Road and to the west of and north of Miller's Avenue and Glen Ellan Road, Oldtown, Swords, Co. Dublin, with associated engineering works on lands locally known as the Celestica/Motorola site, junction of Glen Ellan Road and Balheary Road, and at/on Balheary Road, Swords, Co. Dublin.

The development will consist of the removal of the temporary site office/site compound structures on site and the construction of a total of 377 no. residential units (173 no. houses, 134 no. apartments, and 70 no. duplex units [comprising 35 no. duplex 'house' units and 35 no. duplex 'apartment' units]), and 1 no. childcare facility, all of which will be provided as follows:

- *173 no. residential houses (9 no. 2 bed houses, 147 no. 3 bed houses, and 17 no. 4 bed houses) in semi-detached, end-terraced, and mid-terraced houses ranging from two to three storey in height;*
- *Duplex Block A containing a total of 18 no. units comprising of 9 no. 1 bed units, 8 no. 2 bed units, and 1 no. 3 bed unit, in a building three storeys in height, and all units provided with private balconies/terraces; car parking and bicycle spaces, and bin stores;*
- *Duplex Block B containing a total of 8 no. units comprising of 4 no. 1 bed units and 4 no. 2 bed units, in a building three storeys in height, and all units provided with private balconies/terraces; car parking and bicycle spaces, and bin stores;*
- *Duplex Block C containing a total of 8 no. units comprising of 4 no. 1 bed units and 4 no. 2 bed units, in a building three storeys in height, and all units provided with private balconies/terraces; car parking and bicycle spaces, and bin stores;*
- *Duplex Block D containing a total of 20 no. units comprising of 10 no. 1 bed units, 9 no. 2 bed units, and 1 no. 3 bed unit, in a building three storeys in height, and all units provided with private balconies/terraces; car parking and bicycle spaces, and bin stores;*

- *Duplex Block E containing a total of 8 no. units comprising of 4 no. 1 bed units and 4 no. 2 bed units, in a building three storeys in height, and all units provided with private balconies/terraces; car parking and bicycle spaces, and bin stores;*
- *Duplex Block F containing a total of 8 no. units comprising of 4 no. 1 bed units and 4 no. 2 bed units, in a building three storeys in height, and all units provided with private balconies/terraces; car parking and bicycle spaces, and bin stores;*
- *Apartment Block A containing a total of 48 no. units comprising of 18 no. 1 bed units and 30 no. 2 bed units with all units provided with private balconies/terraces, in a building four to five storeys in height, with internal bicycle stores, bin stores and plant rooms at ground floor level; car parking within the parking court, the undercroft and on-street, and bicycle parking;*
- *Apartment Block B1 containing a total of 32 no. units comprising of 17 no. 1 bed units and 15 no. 2 bed units with all units provided with private balconies/terraces, in a building four to five storeys in height, with internal bicycle stores, bin stores and plant rooms at ground floor level; car parking within the parking court, the undercroft and on-street, and bicycle parking;*
- *Apartment Block B2 containing a total of 32 no. units comprising of 17 no. 1 bed units and 15 no. 2 bed units with all units provided with private balconies/terraces, in a building four to five storeys in height, with internal bicycle stores, bin stores and plant rooms at ground floor level; car parking within the parking court, the undercroft and on-street, and bicycle parking;*
- *Apartment Block C containing a total of 22 no. units comprising of 11 no. 1 bed units and 11 no. 2 bed units with all units provided with private balconies/terraces, in a building four to five storeys in height, with internal bicycle stores, bin stores and plant rooms at ground floor level; car parking within the parking court, the undercroft and on-street, and bicycle parking;*
- *1 no. childcare facility in a one to two storey building, with associated outdoor play area, car parking and drop-off/visitor parking, bicycle parking, and bin stores.*

The development will provide for a total of 600 no. car parking spaces within the scheme; a total of 440 no. bicycle spaces serving the apartments, duplexes and childcare facility; the completion of Meadowbank Road adjoining Park Avenue; new vehicular accesses onto Miller's Avenue; proposed upgrades to public realm including footpaths, landscaping including play equipment, boundary treatments, and public lighting; and all associated engineering and site works necessary to facilitate the development including the proposed stormwater storage tank and overflow outfall gravity sewer to the Broadmeadow River with associated manholes on lands locally known as the Celestica/Motorola site, junction of Glen Ellan Road and Balheary Road, and at/on Balheary Road, along with the proposed vehicular/service access onto Balheary Road, Swords.

The application contains a statement setting out how the proposal will be consistent with the objectives of the Fingal Development Plan 2017-2023.The application contains a statement indicating why permission should be granted for the proposed development, having regard to a consideration specified in section 37(2)(b) of the Planning and Development Act, 2000, as amended, notwithstanding that the proposed development materially contravenes a relevant development plan or local area plan other than in relation to the zoning of the land.

An Environmental Impact Assessment Report (EIAR) and a Natura Impact Statement (NIS) have been prepared in respect of the proposed development."

Further information on the proposed development is provided in Chapter 2 of this EIAR.

2.4 Alternatives Considered

This EIAR has considered the following alternatives to the development proposal:

1. **Do Nothing Scenario:** The application site, if left undeveloped, would revert to agricultural use but the remainder would be an eyesore, having accommodated temporary prefabs and construction compounds retained without use. Miller's Avenue (WDLR) would be a single-sided road for quite a long section, the regional park in the west would not be overlooked and secured by passive surveillance, and there would be no direct access from the avenue or the permitted and completed developments across the subject lands. The level of demand for housing within the development boundary of the Swords area, based on the future population growth predictions, would not be met, resulting in downstream impacts including housing needs and affordability. A "Do Nothing" scenario would also be inconsistent with the RA land-use zoning pertaining to the lands and the objectives of the Development Plan to facilitate a new residential development on the subject lands as part of a wider development of Oldtown lands, and Swords. Furthermore, not developing these zoned and serviced lands would be inconsistent with national planning policy as set out in the National Planning Framework, Regional Spatial Economic Strategy and Urban Development and Building Height Guidelines.
2. **Alternative Locations:** The consideration of alternatives locations for the development has, in a significant number of cases, already been addressed and decided at strategic planning level during the preparation and adoption of the Fingal Development Plan 2017-2023. This plan establishes a housing need for the district which is required to be accommodated during the plan period and assesses all available land in the district, including the subject site and all available alternatives. This Plan will have been subject to Strategic Environmental Assessment which takes into account the environmental considerations associated with, for example, the cumulative impact of an area zoned for industry on a sensitive landscape. The EIA Guidelines also state that the statutory development plans can establish project-level objectives or other mitigation that a subsequent site project and its EIAR should be cognisant of.
3. **Local Area Plan Layout:** Whilst the LAP has since expired, the LAP indicative plan layout for the subject site area depicts a medium-density residential development with an indicative building line to the WDLR and the regional park. There is one indicative access point from Miller's Avenue shown and three pedestrian and cycle connections between this link road and the park. A green buffer strip is indicated around the park boundary, there is a small open space shown in the northern half of the site, and existing trees and hedges have been identified. The trunk watermain that runs beside and under the line of the road is also shown. The Local Area Plan formed the basis for the design strategy of the overall Oldtown lands, which in turn formed the basis for the proposed site layout. The diagrammatic nature of the LAP layout designed at a high level to support the plan-making process demands a refinement at the level of detailed design. This is particularly the case for the inner road and pedestrian connections as those shown are not compatible with the pattern of development designed to masterplan level, nor would they make legible connections with the earlier built phases. The location and quantity of open space was another item that required further consideration in the course of pre-planning consultation with the Local Authority. This being the case, the LAP layout is considered to reflect earlier, high-level iteration of the development design that had since been subject to detailed revision

supported by specialist inputs from the expert EIAR study team listed in the EIAR Chapter 1, Table 1.

4. **Alternative Designs and Layouts:** The alternatives to the proposed development considered during the preparation of this EIAR were related to the overall layout and internal roads pertaining to the proposed scheme. The design of the proposed project has evolved throughout the pre-application consultation process, resulting in alterations to the proposal. It is worth noting that the proposal may continue to develop following the application submission and continued consultation with relevant stakeholders, bringing the proposed development through detailed construction design and implementation.

Further information on the alternatives considered as part of this EIAR is provided in Chapter 2 of this EIAR.

3.0 PLANNING AND DEVELOPMENT CONTEXT

Chapter 3 of this EIAR considers in detail the planning policy and legislative context of the site, development proposal and this EIA at European, national, regional, and local levels. This chapter of the EIAR also considers the planning history of the scheme and the surrounding area. For the purposes of this Non-Technical Summary, this section will consider the site's zoning policy contained in the Fingal County Council Development Plan (2017 to 2023). Under this Plan, the site is zoned *"RA – Residential Area"* which seeks:

> *"Provide for new residential communities subject to the provision of the necessary social and physical infrastructure."*

The vision for the *"RA – Residential Area"* seeks to:

> *"Ensure the provision of high quality new residential environments with good layout and design, with adequate public transport and cycle links and within walking distance of community facilities. Provide an appropriate mix of house sizes, types, and tenures to meet household needs and to promote balanced communities."*

The uses proposed as part of this development are permitted under the zoning objectives.

The Class 1 open space lands to the north are zoned OS-Open Space – *"to preserve and provide for open space and recreational amenities".* The proposed open space in this area is therefore permitted in principle under this zoning designation.

The proposed storage tank site is zoned ME-Metro Economic Corridor – *"to facilitate opportunities for high-density mixed-use employment generating activity and commercial development and support the provision of an appropriate quantum of residential development within the Metro Economic Corridor".* The tank can be considered essential infrastructure and has been designed in conjunction with Irish Water. It will not only facilitate the connection requirement of this subject application but will also have the capacity to allow for continued development in the Oldtown/Mooretown catchment.

The proposed development is in accordance with relevant national, regional, and local planning policy documents.

4.0 POPULATION AND HUMAN HEALTH

This section of the EIAR has been prepared by Downey. The site and proposed development were examined having regard to their impact on the human environment in the general area. The proposed development will have a positive impact on the population and will cater for the predicted future increase in population for the Swords area.

4.1 Methodology

The assessment was carried out by way of site visits and desktop research of the demographic profile of the area, assessment of community and social infrastructure facilities, employment, and educational and commercial facilities in the area.

4.2 Receiving Environment

The baseline assessment has found that the population of the Swords-Lissenhall and Swords-Glasmore ED's, where the subject site is located within, has increased considerably over the Census period 2011-2016 by approximately 4.3% (up to 743 persons). This is submitted to be in line with general population growth in the wider area and County. The Land use and settlement pattern consists of predominately residential developments and community amenities with a mix of house types all of which have resulted in varying building heights and forms within the area.

4.3 Potential Impact of Proposal

4.3.1 Construction Phase

The construction of this project, like any project, has the potential to give rise to an impact on the health and safety of human beings if construction activities are not managed appropriately or impact mitigated.

4.3.2 Operation Phase

The proposed development will see an increase in population from the operation phase of the development. This will support an increase in economic activity in the area and employment. This will take place close to people's homes and public transportation. This is seen as a positive impact. The development will generate an increase in traffic and noise, which will have a slight and permanent impact on human health, if not mitigated.

4.4 Remedial/Mitigation Measures

4.4.1 Construction Phase

Measures to address such health and safety considerations will be addressed in the Construction Management Plan, including the Construction Traffic Management Plan for the development, which shall be agreed upon with the Planning Authority pending a grant of permission.

4.4.2 Operation Phase

No mitigation or remedial measures are required about population or human health during the operational phase of the development.

4.5 Predicated Impact of Proposal

4.5.1 Construction Phase

The development will have a positive and temporary impact on employment during the construction phase, providing significant construction sector and related employment over the construction period of the development.

4.5.2 Operation Phase

The proposed development will have a significant positive impact on the local community and will positively contribute to the vitality and viability of the local area, through:

1) The influx of a new resident population using existing local businesses and services;
2) The provision of a new creche as a community facility for the use of new residents and the local community; and
3) The provision of open space for the use of the local community

4.6 Monitoring

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 development to include the provision of a creche, public open space and facilitates to support healthy choices, such as cycle parking. Conditions will be attached to any grant of planning permission to ensure that these facilities are provided and 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.

5.0 BIODIVERSITY

A review of the biodiversity of the site was carried out by OPENFIELD Ecological Services and this included a study of existing information from the area. Previous phases involved consultation with the Department of Culture, Heritage, and the Gaeltacht. Site visits were carried out on the 17th of May 2018, August 27th, 2020, and October 21st, 2021. May and August are within the optimal season for general habitat surveys and surveying breeding birds. A detector-based bat survey was carried out in 2011 and this informed the current study. Since this time, land has been cleared for development under existing permissions.

It was found that the site is not within or adjacent to any area that is designated for nature conservation at a national or international level. There are no plants recorded from the site that are listed as rare or of conservation value. There are no habitats that are examples of those listed in Annex I of the Habitats Directive. There are no alien invasive species.

The site can be described as agricultural lands with some traditional field boundaries. The Saucerstown Stream runs close to the northern boundary, and this is a tributary of the Broadmeadow River. Treeline boundaries and accompanying drainage ditches were assessed as being of high local value to biodiversity. There was evidence of Yellowhammer on adjacent lands, which is a farmland bird of high conservation value. The Saucerstown stream is of some fisheries value. It drains to the Broadmeadow and enters the Irish Sea at Malahide Estuary. Malahide Estuary is an internationally recognised location for wintering birds and wetland habitats. Because it is designated under EU law for these features a separate 'screening report for Appropriate Assessment' and Natura Impact Statement was spared. The site contains no suitable roost locations for Bats although they are likely to use the field boundaries for foraging and/or commuting. There was no evidence of Badgers using the site.

No treeline habitat is to be removed while a 10m buffer zone is to be retained along the Saucerstown Stream, in accordance with requirements from IFI. Good site management practices will ensure that pollution to water courses does not occur during the construction phase. An open attenuation area has been created under a previous planning permission to hold and attenuate surface water running off the site. This will also create new habitat for wetland amphibians and invertebrates. A new surface water holding tank and overflow pipe to the river Broadmeadow are proposed which will reduce the frequency and intensity of existing combined overflows to The River Ward. This aspect of the project will contribute to improvements in water quality status in the Malahide Estuary.

Additional landscaping will compensate for the loss of habitat that will occur. The wider landscaping plan incorporates areas of meadow grassland which are to be planted with high-seed mixtures. With the suggested mitigation in place, the ecological impacts of this proposed development will be neutral. Monitoring is recommended to determine the success of this mitigation.

6.0 LAND AND SOILS

This chapter has been prepared by Waterman Moylan Consulting Engineers.

This section of the Environmental Impact Assessment Report has been prepared by Waterman Moylan Consulting Engineers and provides a Non-Technical Summary of the assessment of the impact of the proposed residential development at Oldtown Phase 5, Swords, Co. Dublin, and the associated proposed stormwater storage tank on the foul network at Balheary Road, in terms of bedrock geology and drift geology.

The impact of the proposed development on the soils and geology of the subject site is assessed, and mitigation measures where necessary are proposed to reduce the impact of any development.

6.1 Assessment Methodology

In determining the impact of the proposed development on the prevailing geological conditions, key sources of information were consulted, including the Map of the Bedrock Geology of Ireland, produced by the Geological Survey of Ireland available on www.gsi.ie. Guidance on relevant assessment methods is obtained from "Geology in Environmental Impact Statements – a guide", September 2002, published by the Institute of Geologists of Ireland.

An extensive site investigation (SI) was carried out within the proposed development site. The purpose of the site investigation was to investigate subsurface conditions utilising different methodologies. The results of the site investigation have been compiled in a report prepared by Site Investigations Ltd (S.I. Ltd), (Contract Number: 5599).

The details of the review of these documents have formed the basis for the identification of potential issues and mitigation/remedial measures, which are discussed in the following sections in a non-technical manner.

6.2 Characteristics of the Proposed Development

6.2.1 Existing conditions & Location

The Oldtown-Mooretown lands are located at the western development edge of Swords, within the catchment of the Broadmeadow River. The LAP lands cover an area of approximately 111 hectares.

The Oldtown–Mooretown lands are divided by the Rathbeale Road, with Oldtown lands to the north (c. 50 Ha) and Mooretown to the south (c. 61 Ha). This subject Application (c. 10.223 ha), which forms the final phase of the Oldtown development, is located in the northwest quarter of the Oldtown Lands.

The subject site was previously used for agricultural purposes and a temporary school, which is now used as the Oldtown construction site compound. There are newly completed houses within the site's southern boundary. The Oldtown lands generally fall from a high point of approximately 33.0m OD Malin on Rathbeale Road to approximately 9.0m OD Malin at the Broadmeadow River to the northeast of the subject lands. The Oldtown Phase 5 site is bounded on the south-east by the Swords Western Distributor Link Road (SWDLR), to the west by agricultural lands.

The proposed site for the stormwater storage tank that forms part of the application, is located at the junction of Glen Ellan Road and Balheary Road, Swords, Co. Dublin. The site is 1.4km north of swords, 1.1km west of the M1 motorway and 300m south of the Broadmeadow River. The site is owned by The Applicant and is locally referred to as the Celestica/Motorola site.

6.2.2 Proposed Development

The proposed development consists of 377 units, a childcare facility, with associated parking and ancillaries (including the stormwater storage tank), on a site area of 10.223ha.

The developer will construct all associated infrastructure to service the development including a network of foul water and surface water drains, water main, access roads and footpaths.

The proposed development of the site will incorporate the following works which will be likely to have an impact on the soils and geology:

- Cutting and filling of subsoil and rock to form finished floor levels and development roads
- Excavations for utilities and services
- Potential importation of suitable material
- Reinstatement of excavations and topsoil
- Potential removal off-site of unsuitable and surplus material.

It is intended that any surplus of materials generated on the site will be minimised.

6.3 Potential Impact of the Proposed Development

Prior to the commencement of any construction works, the topsoil on the site will be stripped and removed to stockpiles in designated areas within the site boundary for re-spreading on completion of the works where possible.

The removal of topsoil and the earthworks will expose subsoil to weathering and may result in some minor erosion of the soils during the short construction period, in particular following extreme dry and sunny, or prolonged wet weather conditions. The lack of topsoil is likely to give rise to dust from the subsurface during dry periods.

Construction traffic movements involved in the construction of the proposed development and access roads may result in local compaction of the subsoil along haulage routes, but this will be a very limited area.

During the construction phase, there is a risk for construction traffic to damage the structure of some of the adjoining road networks and increase the amount of mud and dust on the roads providing access to the site. A dilapidation survey should be undertaken to mitigate the risk of damage exposure to the client. There will also be a temporary increase in traffic volumes due to deliveries of fill materials and removal of surplus unsuitable cut materials.

During adverse weather conditions surface water runoff across the exposed sub-soil could result in increased levels of silt being deposited in the public sewer.

Some minor local contamination of subsoils may occur should chemicals or fuels used during the construction phase spill.

Upon completion of the construction phase and following the 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.

6.4 Potential Cumulative Impacts

It is not anticipated that potential cumulative impacts will be generated on land, soils and geology during the construction or operation phases or in the event of future developments adjacent to the site should they implement the appropriate mitigation measures, discussed in Section 6.7.

6.5 Do Nothing Scenario

The Ground conditions will remain as they currently are.

6.6 Risks to Human Health

A potential risk to human health due to the associated works during construction is the direct contact, ingestion, or inhalation of receptors (i.e., construction workers), with any soils which may potentially contain low-level hydrocarbon concentrations from site activities (potential minor leaks, oils, and paint). No human health risks associated with long term exposure to contaminants (via. direct contact, ingestion, or inhalation), resulting from the proposed development are anticipated.

6.7 Mitigation Measures

6.2.3 Construction Stage

The provision of wheel wash facilities at the construction entrance to the development will minimise the amount of soil deposited on the surrounding road network. The adjoining road network will be cleaned regularly, if required, to prevent the build-up of soils from the development site on the existing blacktop roads.

Measures will be implemented throughout the construction stage to prevent contamination of the soil and adjacent watercourses from oil and petrol leakages and significant siltation. Suitable bunded areas will be installed for oil and petrol storage tanks. Designated fuel filling points will be put in place with appropriate oil and petrol interceptors to protect from accidental spills. Spill kits will be provided by the Contractor to cater for any other spills.

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

Noise attenuation will be used on rock breakers to reduce noise levels.

After implementation of the above measures the proposed development will not give rise to any significant long-term adverse impact. Negative impacts during the construction phase will be short term only in duration.

Within the development, landscape areas will be top soiled and planted by the proposed landscaping plan. Following completion of these reinstatement works, no significant adverse impacts on the soils and geology of the subject lands are envisaged.

A comprehensive drainage network will be constructed to ensure that the lands drain effectively following their reshaping / re-profiling. The drainage system shall incorporate sustainable urban drainage methods to clean flows before discharge. The proposed stormwater tank will be located underground with the soil above to be reseeded thus, there is no requirement for a surface water drainage network at this location.

6.8 Predicted Residual Impacts of the Proposed Development

Due to the implementation of the mitigation measures outlined above, the proposed development will not give rise to any significant long-term adverse impact. Negative impacts during the construction phase will not be significant once the appropriate mitigation measures are adopted and will be only short term in duration.

No significant long-term impacts on soil, geology, or hydrogeology, resulting from the proposed development are predicted.

6.9 Monitoring

Monitoring as outlined below, during the construction phase will be undertaken; -

- Adequate protection of the topsoil stockpiled for reuse.
- Monitoring of surface water discharged to existing sewers.
- Monitoring cleanliness of the adjoining road network.
- Monitoring measures for prevention of oil and petrol spillages.
- Dampening down measures close to the boundaries of the site in dry weather.

No operational stage / post-development monitoring will be required.

6.10 Reinstatement

Reinstatement measures about soils consist primarily of the re-soiling of open areas/landscaping and the replanting of these areas. No post-development reinstatement works will be required.

6.11 Interactions

Any potential rock breaking will generate noise and excavations on site will give rise to dust. From a review of the ground investigations discussed in section 6.3, it is not anticipated that rock breaking will be necessary.

6.12 Difficulties Encountered

There were no difficulties encountered.

7.0 WATER

This section of the Environmental Impact Assessment Report has been prepared by Waterman Moylan Consulting Engineers and provides a Non-Technical Summary of the assessment of the impact of the proposed development on the surrounding hydrological (surface water), hydrogeological (groundwater), foul water, water supply, and flood risk both during the construction and operation phases.

The impact of the proposed development of the subject site is assessed and mitigation measures, where necessary are proposed to reduce the impact of the development.

7.1 Assessment Methodology

The following information sources were used in the assessment of the local hydrology and hydrogeological aspects of the proposed development site.

- Geological Survey of Ireland (GSI) Website
- Environmental Protection Agency
- Office of Public Works (OPW) National Flood Hazard Mapping
- OPW Catchment Flood Risk and Management Studies
- FCC Drainage Record Maps
- Ordnance Survey Mapping
- Topographical Survey
- Site investigation reports and soakaway testing
- Irish Water confirmation of feasibility letter

7.2 Characteristics of the Proposed Development

7.2.1 Existing conditions & Location

The Oldtown-Mooretown LAP lands are located at the western development edge of Swords, within the catchment of the Broadmeadow River. The LAP lands cover an area of approximately 111 hectares.

The Oldtown–Mooretown lands are divided by the Rathbeale Road, with Oldtown lands to the north (c. 50 Ha) and Mooretown to the south (c. 61 Ha). This subject Application (c. 10.233Ha), which forms Phase 5 of the Oldtown development, is located in the northwest quarter of the Oldtown Lands. The subject site was previously used for agricultural purposes and a temporary school, which is now used as the Oldtown site compound.

The Oldtown lands generally fall from a high point of approximately 33.0m OD Malin on Rathbeale Road down to approximately 9.0m OD Malin at the Broadmeadow River to the northeast of the subject lands. The Oldtown Phase 5 site is bounded on the south-east by the Swords Western Distributor Link Road (SWDLR), to the west by agricultural lands.

The proposed site for the stormwater storage tank that forms part of the subject application is located at the junction of Glen Ellan Road and Balheary Road, Swords, Co. Dublin. The site is 1.4km north of swords, 1.1km west of the M1 motorway and 300m south of the Broadmeadow River. The site is owned by The Applicant and is locally referred to as the Celestica/Motorola site.

7.2.2 Proposed Development

The proposed development consists of 377 units, comprised of houses, apartments and duplex units with associate parking and ancillary structures, on a site area of 10.223ha.

The developer will construct all associated infrastructure to service the development including a network of foul water and surface water drains, stormwater storage tank on the public foul network, water main, access roads and footpaths.

It is proposed that the foul water network to serve the site will drain to the adjacent existing Phase 4 development, which will in turn flow to the existing foul sewer located in Glen Ellan Road. These networks have been designed and constructed in anticipation of the future requirement of a connection from this potential Phase 5 development.

The requirement for the stormwater storage tank on the public foul network is to alleviate constraints within the public foul network during times of heavy rainfall events, whereby stormwater enters the public foul network temporarily reducing available capacity. The proposed stormwater storage tank has been designed in conjunction with Irish Water and will not only facilitate the connection requirement of this subject application but will also have the capacity to allow for continued development in the Oldtown/Mooretown catchment.

It is proposed that the surface water run-off from the development will drain via gravity to the existing surface water sewer in Oldtown Phase 4 development. The Oldtown Phase 4 development drains to the east of the Oldtown attenuation area. Both the Oldtown Phase 4 & Oldtown attenuation area has been sized accordingly, in anticipation of the surface water drainage network being connected to the proposed Oldtown Phase 5 development. The Oldtown attenuation ponds will release the surface water flows at the greenfield rate to the Broadmeadow River.

The proposed stormwater storage tank is to be located underground, with the ground above being permeable and will not require a stormwater drainage network.

SuDS will be utilised on-site for water quality protection, however, as discussed above the attenuation element has already been constructed at the Oldtown attenuation ponds. Water quality will be achieved by using a Sustainable drainage network of Green Roofs, Swales and Permeable Paving all discharging the treated water to the surface water network. The stormwater system will be designed to cater for the 1 in 100-year storm plus a 20% allowance for climate change.

7.3 Potential Impact of the Proposed Development

The potential impacts of the proposed development from both a hydrology (surface water) and hydrogeology (groundwater) perspective at the construction and operational stages are outlined as follows:

Significant amounts of site stripping and excavation will be required to construct the development. When the site has been stripped layers of sub-soil will be exposed to weathering and there will be potential for erosion due to rainfall and subsequent runoff. The erosion of soil can lead to sediments being washed into the receiving watercourses /sewers at higher rates of runoff.

There is also potential during the development's construction stage that contaminants from cement/concrete to be washed into the receiving watercourses/sewers.

There is a risk of pollution of groundwater/watercourses/soils by accidental spillage of oils/diesel from temporary storage areas or were maintaining construction equipment.

Foul water could be connected to the surface water drainage network resulting in the contamination of the receiving watercourses. Furthermore, if there is damage to any foul pipes, there is potential for contaminants to seep into the groundwater.

The construction of the proposed development has the potential to cause a slight, adverse, temporary, residual impact on receiving watercourses/groundwater.

The proposed development will result in increased impermeable areas and there is potential for an increase in the risk of higher rates of surface water runoff leading to increased downstream flooding.

There is a potential impact for the discharge of contaminants from the proposed development and road surfaces to the surrounding drainage sewers. These would include particulates, oil, soluble extracts from the bitumen binder etc. The quality of runoff from the site would be dependent on the time of year, weather, particulate deposition from the atmosphere and any gritting or salting conducted by the Local Authority. The time of year has a major bearing on the quality of stormwater run-off - in particular the first rains after a prolonged dry period where accumulated deposits of rubber, particulates, oils, etc. are washed away.

There is potential for leaks in the foul network to result in contamination of the groundwater.

Accidental spills of fuels/hydrocarbons and washing down into the drainage pipe network has the potential to impact the receiving hydrogeology.

The operation of the proposed development has the potential to cause a slight, adverse, temporary, residual impact on receiving watercourses/groundwater.

There is a potential for Watermain leaks which would increase the volume of water permeating through the underground soil strata.

The proposed stormwater storage tank will have an overflow outfall to the Broadmeadow River. This overflow outfall pipe will only function when the storage tank surcharges beyond the proposed 2,250m^3 capacity of the tank. Flood mapping undertaken by the OPW indicates that during a 1 in the 10-year event at a node point circa 200m upstream of the proposed outfall location will have a flow rate in excess of 36m^3/second (refer to accompanying Flood Risk Assessment Report, Section 3), ensuring that any overflow outfall from the tank beyond a 1 in the 5-year event will be discharging to a fast moving heavily diluted/surcharged river. The outfall waters (largely surface water) from the tank will result in a vast betterment when compared with the existing arrangement of uncontrolled discharge to the Ward and in turn Broadmeadow Rivers. In this regard, we refer you to the assimilative capacity technical note by Hydro-G and AWN, supplied under a separate cover.

Mitigation measures are discussed in section 7.8 of this chapter.

7.4 Potential Cumulative Impacts

There are no anticipated cumulative impacts arising from the existing Oldtown Development in relation to water other than those noted in section 7.5 above.

7.5 Do Nothing Scenario

In this scenario, surface water runoff would continue to be discharged at existing un-restricted discharge rates. The existing arrangement of uncontrolled surcharges from the public foul water network will remain unchanged. The receiving watercourses and groundwater aquifers would remain in their current state and there would be no change.

7.6 Risks to Human Health

There is a risk to Human Health should the groundwater or the existing water supply become contaminated during the construction or operational stages, and the water be consumed. In order to mitigate these risks, the measures outlined below will be adopted.

7.7 Mitigation Measures

7.7.1 Construction Stage

A Construction Management Plan has been prepared for this application and is included under a separate cover. It is considered that the Construction Management Plan (CMP) 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 upon 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 on 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 at 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 to minimise the potential for cross-connections which results in contamination of receiving watercourses.
- Site personnel inductions are to be conducted such that all site personnel are made aware of the procedures and best practices for the management of surface water runoff and groundwater 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.
- Details of the headwall outfall construction methods, to prevent pollution of the Broadmeadow River during construction, are included in the Preliminary Construction Environmental and Waste Management Plan, which has been submitted under a separate cover.

7.7.2 Operational Stage

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-waterer outflow will be restricted to the equivalent greenfield runoff rate from the existing Oldtown attenuation ponds.
- Flow restrictors with attenuation storage will be used to slow down and store surface water runoff from discharging above greenfield rates to the Broadmeadow River.
- 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.
- Regular inspection and maintenance of the drainage network, including the petrol interceptor.
- 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 water main network. Early identification of potential leaks will lead to faster response in determining the exact location of leaks and completion of remedial works.
- The outfall headwall to the Broadmeadow River will be fitted with a tide-flex (or similar approved) non-return valve to ensure surcharge from the Broadmeadow River will not backfill into the proposed pipe and tank during extreme weather events.
- The outfall volumes from the stormwater storage tank to the Broadmeadow River shall be metered to record the frequency and duration/volumes of overflows.

7.8 Predicted Impacts of the Proposed Development

Due to the proposed mitigation measures outlined above, and the implementation of a Construction Management Plan, the impact during the construction stage on the hydrology and hydrogeological aspects of the lands is not significant.

Due to the proposed mitigation measures outlined above many of the potential impacts will not arise during the operational phase of the proposed development on surface water and groundwater quality.

Surface water discharge from the site will be restricted by means of attenuation, therefore, no adverse impact in respect of flooding downstream will arise from the proposed development.

The installation of a Sustainable Urban Drainage System will ensure surface water runoff will be of high quality before discharge to the Proposed Phase 5 public surface water sewer. The proposed Phase 5 surface water sewer will flow via gravity to the existing Oldtown attenuation ponds via the existing Oldtown Phase 4 surface water sewer and will not have an impact on the receiving waters downstream of the development.

The impact following the operational phase mitigation measures outlined above is imperceptible.

7.9 Worst Case Scenario

The worst-case scenario in relation to hydrology and hydrogeology during the construction phase would be the failure to implement the mitigation measures outlined above. This may result in the contamination of the receiving surface water network and/or groundwater.

In relation to the operation stage, the worst case would be the flooding of the surface water drainage network. In this regard, the network has been designed to accommodate a 20% increase in inflows due to climate change. Finished floor levels have also been set with appropriate freeboard and an overland flood route through the site has been provided.

Implementation of the mitigation measures outlined in this document will reduce the risk of the worst-case scenario occurring, making this unlikely.

7.10 Monitoring

Implementation of the Construction Management Plan is required to protect the hydrology and groundwater elements of the subject lands during the 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 water main telemetry, SUDS features, road gullies and, attenuation ponds during the construction phase of the development.
- Monitoring of the frequency and volume/duration of overflows from the proposed storage tank.
- Monitoring and maintenance of the SUDS features, road gullies, attenuation and flow control devices are imperative during the operation phase of the development.

7.11 Reinstatement

No reinstatement is anticipated on site with respect to the Water environment.

7.12 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 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, the interaction between surface and groundwater and the bedrock geology is feasible. Any impact will be negligible as the aquifer is at low risk and is not considered to be regionally important. 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 an interaction between hydrology and the downstream habitats present along the Broadmeadow River. The mitigation measures ensure that surface water runoff is treated to the required standards so that downstream habitats are not negatively impacted.

7.13 Difficulties Encountered

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

8.0 AIR QUALITY

The assessment identified the existing air quality baseline levels in the area of the proposed development by an evaluation of EPA monitoring data. The EPA data of current and previous years establish air quality parameters are all well below national and EU ambient air quality standards. The existing baseline air quality at the site locality can be characterised as being good with no exceedances of the National Air Quality Standards Regulations limit values. The air quality impact was considered for each distinct stage, construction phase and operational phase.

The impact on air quality during the construction phase is predicted to be from construction dust emissions. The impact at neighbouring sensitive receptors was determined by a theoretic assessment of dust soiling. Standard mitigation measures outlined in Section 8.5 along with the dust management plan outlined in Appendix ## would be implemented to control emissions during construction. With mitigation measures in place impacts of the proposed development on air quality for the construction phase is likely to be short-term and imperceptible.

The impact on air quality during the operational phase was determined by an assessment using the DMRB air quality model predicting pollutant concentrations over a period of time and is in line with what would be expected from a modern residential development. Results showed an expected small increase in annual NO2, PM10, benzene and CO but each parameter would still remain well below the limit values for EU regulations. This predicted increase above the existing environment results in a negligible impact and would not result in a perceptible change in the existing local air quality environment.

9.0 NOISE AND VIBRATION

The impact or increase in noise levels, mainly by increased traffic noise at the Rathbeale Road junction and at the proposed site's Millers Avenue junction are at worse case deemed a 'slight' impact based on the predicted calculation methodology of BS 5228-1:2009+A1: 2014 and are in line with general noise impacts of new developments.

However, in actual terms when the new government's climate action plan is implemented, the noise levels including the new proposed development will reduce over the current background noise levels due to the fact that petrol & diesel cars will be phased out and replaced by more quiet electrical cars over the next decade during which the development will be constructed. It is anticipated that construction vibration levels will only have minor temporary increases and that any increase in operational vibration due to the new development is deemed not to have any noticeable impacts on the overall development.

10.0 CLIMATE

The climate impact chapter analysis the effects the proposed project will have or contribute to the global environment in terms of carbon dioxide (CO2) emissions as the main contributors to greenhouses gasses or climate change. CO2 in this project is emitted in the construction phase and in the operational phase. The construction phase is a relative short phase and its impact on CO2 is limited when compared with the operational phase. The operational phase is based on the life cycle of a building or dwelling covering a 60-year period. Construction emissions represent approximately 5% to 10% of the Operational emissions in a standard specification building or dwelling.

Construction phase: CO2 in the construction phase is emitted by construction vehicles, machinery, and equipment but also by CO2 attributed to construction materials representing the amount of CO2 it takes to manufacture and deliver a material to site known as a material's "embodied carbon dioxide". Therefore, selecting materials for the construction of buildings/dwellings which have a low embodied carbon factor like wood, local stone rather than steel, zinc, aluminium or other metallics which have high carbon factors would be beneficial to global CO2 emissions. A number of CO2 reduction measures have been applied on construction methodology, vehicles, machinery and together with selecting construction materials with low embodied carbon factors a reduction of +/- 20% in CO2 emissions in the construction phase was achieved over current standard or average emissions.

Operational phase: CO2 in the operational phase is emitted mainly by passenger vehicles and energy required for the building's heating/hot water needs. The operational phase taken over the buildings 60-year life cycle would be the dominating contributor to CO2 emissions and any reductions applied here are very effective as a result of the length of the life cycle. For this project a number of CO2 reduction measures have been applied by using more electric vehicles, encourage the use of public transport and cycling achieving a reduction of +/- 12.5% but the bulk of the reductions at +/- 65% is achieved in the building energy element applying the current Part L standards giving a total combined reduction of +/- 77.5% which is a significant saving.

11.0 LANDSCAPE AND VISUAL IMPACT

This Landscape & Visual Impact Assessment (LVIA) was complied to assess the impact of the proposed development on the existing landscape of the site and the visual impact of the proposals on adjoining receptors. The site at Oldtown, Swords, Co. Dublin is the 5th Phase of the wider Millers Glen development, and the earlier phases are now complete and occupied or nearing completion. The proposed development will comprise a residential neighbourhood of 377 dwellings made up of houses, duplex units, apartments and a childcare facility.

The LVIA Report reviewed the existing landscape with respect to existing designations, views and prospects, landscape character, presence of National Monuments, location with respect to existing adjoining residential development and impacts of the proposed development on the existing landscape setting and features.

The site lands are part of a former agricultural landscape with which now comprise open land with site compounds and soil storage. Millers Glen Phase 4 and a sports facility lie to the north of the site with Phases 1 to 3 to the east. The R125 Ratoath Road is to the south and there is open farmland to the west which will form part of a regional park. A listed National Monument enclosure feature is on the north-eastern section of the site and will be incorporated into a landscaped open space area. The lands are visually unremarkable and are not valued for their quality and the existing landscape character is of low quality.

A set of 4 No. photomontages were created to show the visual impact of the proposals from around the adjoining area. Visual analysis of the photomontages showed that while there would be moderate negative visual impacts from the proposals at the construction stage, the impacts would be classified as slight negative tending to imperceptible in the operational stage.

The LVIA Report concludes that the development would be in accordance with the various landscape and visual objectives, policies and land use zonings as set out in the Oldtown – Mooretown LAP 2010 (expired) and the Fingal Development Plan 2017-2023. The proposed development, and particularly in terms of its open space establishment is considered to have a neutral to positive impact on the landscape planning context.

12.0 TRAFFIC AND TRANSPORT

This section of the Environmental Impact Assessment Report has been prepared by Waterman Moylan Consulting Engineers and provides a Non-Technical Summary of the assessment of the impact of the proposed development on the surrounding traffic and transport and presents an assessment of the receiving environment for the construction and operation phases of the proposed development.

12.1 Assessment Methodology

Research for this section included a review of the Air Quality Standards Regulations (S.I. 180 of 2011) The following methodology has been adopted for this assessment:

- Review of relevant available information including where available Development Plans, 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 to agree on 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 the construction stage traffic; and
- Assessment of the percentage impact of traffic on local junctions, car parking requirements and accessibility of the site by sustainable modes including walking, cycling and public transport.

12.2 Characteristics of the Proposed Development

12.2.1 Existing conditions & Location

The area of the Oldtown-Moore LAP lands is approximately 111 hectares. The lands are located at the western development edge of Swords, within the catchment of the Broadmeadow River.

The Oldtown-Mooretown lands are divided by Rathbeale Road, with Oldtown lands to the north (Circa 50 ha) and Mooretown to the south (circa 61 ha). The subject application (circa 10.223 ha.), which forms Planning 5 of the Oldtown development, is located in the northwest quarter of the Oldtown Lands. The surface water storage tank and drainage outfall line, that forms part of this planning application, are located at the junction of Glen Ellan Road and Balheary Road.

12.2.2 Local Road Network

The main existing roads currently serving the Oldtown-Mooretown LAP lands are R125 Rathbeale Road and Glen Ellan Road.

R125 Rathbeale Road bisects the Oldtown Mooretown LAP lands and forms the southern boundary of the Oldtown lands. This road connects Swords with Ashbourne to the west. The road links to the R135 Old Dublin Road just south of Ashbourne to the N2 at Interchange No 3, Fleenstown Little. R125 Rathbeale Road also provides a direct link from Oldtown towards the east to Swords Main Street, at the junction between Bridge Street and Main Street. Improvements works including new cycle lanes and dedicated pedestrian facilities were recently completed on R125 Rathbeale Road fronting the Oldtown/Mooretown LAP lands.

Glen Ellan Road is a 7.5m wide single carriageway road that is subject to a speed limit of 50kph with cycle lanes and footpaths running along both sides. Travelling in the easterly direction from the subject site, Glen Ellan Road terminates at a four-armed signal-controlled junction with Balheray Road.

12.2.3 Pedestrian and Cyclist facilities

The existing pedestrian facilities in the surrounding area comprise an interconnected network of footways linking the various neighbourhoods to each other, to the existing schools, to the local bus stops and to the surrounding public network.

Cyclists can benefit from the provision of dedicated cycle lanes along both sides of the carriageway on Glen Ellan Road (and extension) for the entirety of its length. These cycle lanes are generally separate from the carriageway by a grass verge, except for a small portion of the road extension which comprises a cycle track immediately adjacent to the carriageway along the northern side.

As part of the development works that are now complete on the R125 Rathbeale Road within the Oldtown-Mooretown LAP lands, cycle lanes have been installed along both sides of the carriageway from the new signal-controlled junction with Western Distributor Link Road to the eastern edge of the LAP lands. These road upgrade works were subject to a Part 8 planning application by FCC which were subject to LIHAF funding. The planning application for this development works received approval in 2017. Works were approved for LIHAF funding and are now complete and open to the public.

All the existing pedestrian and cycle facilities make the subject site highly accessible by a wide variety of transportation options which will facilitate a modal shift away from private vehicle usage.

12.2.4 Public Transport

The Oldtown LAP lands are currently served by various bus services which serve a number of bus stops distributed across the vicinity area. The closest bus stops in relation to the subject development site (Oldtown Planning 5) are located on R125 Rathbeale Road approximately 100m west of the south-western edge of the subject site. The subject bus stops are currently served by 2 No. bus routes, being the Dublin Bus Route 41B and Go-Ahead Bus Route 197. (The stormwater storage tank, submitted as part of the planning application is not considered as requiring any demand for public transport.) A summary of the weekday frequencies of these routes is presented in Table 12.1.

Approximately 700 metres east of the subject development site, there are two additional bus stops on Glen Ellan Road which are currently served by two Swords Express bus *routes*, Route 506 – operating from Edan Quay in Dublin only two times a day, both during the PM peak period (from 17:00 to 19:00), and Route 506X – operating from Broadmeadow, Miller's Glen to Dublin Eden Quay only three times a day, all during the AM peak period (from 07:00 to 09:00).

In addition to the above-cited bus stops, there are two other bus stops on Glen Ellan Road which are served by a number of additional bus routes. These are:

- **Dublin Bus Route 41:** from/to Lower Abbey Street in Dublin City Centre, this route operates every 15 to 20 minutes during the AM (07:00 to 09:00) and PM (17:00 to 19:00) peak periods.
- **Dublin Bus Route 41C:** from/to Abbey Street in Dublin City Centre, this route operates every 10 to 20 minutes during the AM and PM peak periods.
- **Swords Express Route 500:** to/from Edan Quay in Dublin City Centre, this route operates nine times during the AM peak period and six times during the PM peak period. This equates to approximately a bus running every 13 minutes in the morning and a bus running every 20 minutes in the evening.
- **Swords Express Route 503:** this route operates five times per day, three times in the AM peak period towards Marion Square in Dublin City Centre and two times in the PM peak period in the opposite direction – from Marion Square.

- **Swords Express Route 507**: this route operates three times per day, two times in the AM peak period (07:00 to 09:00) towards Eden Quay in Dublin City Centre and one time in the PM peak (17:00 to 19:00) in the opposite direction.
- **Swords Express Route 500X:** this route operates three times in the AM peak period (07:00 to 09:00) towards Eden Quay in Dublin City Centre and four times in the PM peak (17:00 to 19:00) in the opposite direction.

12.3 Transportation Improvements

12.3.1 Oldtown-Mooretown LAP Road Improvements

The road improvements required as part of the Oldtown-Mooretown LAP, both within and outside the LAP boundaries, include:

- Development of a number of new road/road links – in particular, provision of the Western Distributor Link Road (WDLR) and the Inner Ward River Valley Crossing:
- Enhancement of existing junctions and roads external to the lands:
- Redesign of Glen Ellan Road as a main urban street within the lands and design of a main street within Mooretown lands:
- Provision of a quality bus route to transport those living in northwest Swords into the Town Centre:
- Provision of pedestrian and cyclist networks associated with green corridors both within and into adjoining areas.

The WDLR is substantially complete within the Oldtown lands. These development works were undertaken as part of the previous phases of Oldtown lands.

The road upgrades along the R125 Rathbeale Road, both within and outside the LAP boundaries, were recently completed and opened to the public. The upgrades included dedicated pedestrian and cyclist facilities.

The Glen Ellan Road Extension works are substantially complete as part of the previous phases of Oldtown lands.

The scope, extent and timing of the works related to the Swords Quality Bus Corridor are to be agreed upon with Fingal County Council.

12.3.2 MetroLink

MetroLink is a proposed high-capacity, high-frequency rail line running from Swords through Dublin Airport and Dublin City Centre to Charlemont. MetroLink will carry up to 50 million passengers annually, cutting journey times from Swords to the city centre to 25 minutes. The preferred route for MetroLink is currently undergoing consultation and an application for planning approval for the MetroLink Scheme is expected to be made to An Bord Pleanala in Q2, 2022. Once a Railway Order has been granted, work can commence on site. According to MetroLink, the construction work will take between 6-and 8 years to complete.

The Estuary Park and Ride station, which is also the terminus of MetroLink is located approximately 2.5km east of the proposed site. It will comprise a multi-storey park-and-ride facility with a total of

3,000 car parking spaces. It is envisaged that the introduction of the MetroLink will see a significant modal shift towards public transport resulting in lower dependence on the private car.

12.3.3 BusConnects

The Bus Connects project currently being promoted by the National Transport Authority aims to deliver a much-enhanced bus service to the Greater Dublin Area (GDA). The routes proposed to directly serve the proposed development site are City Bound Route 82 and Local Route 197.

The additional routes are:

Branch Route A4: will operate every 10 to 15 minutes from Brackenstown Road via the City Centre towards Dundrum.

Local Route 197: will operate every 120 minutes from Airside to Finglas.

Peak-time Route 82: will operate from Glen Ellan Road via the City Centre towards UCD 3 times during the AM (07:00 0 08:00) and 3 times during the PM (17:00 – 18:00) peak hours.

Peak-time Route 384: will operate from Knocksedan via Swords Manor and the City Centre towards UCD 3 times during the AM (07:00 – 08:00) and 3 times during the PM (17:00 – 18:00) peak hours.

12.4 Characteristics of the Proposed Development

12.4.1 Overview

The proposed Planning development forms part of the Oldtown lands, northwest of Swords, which are subject to the Oldtown-Mooretown Local Area Plan (LAP) adopted by the Fingal County Council in October 2010.

The subject application will comprise a total of 377 residential units and is the eighth planning application in Oldtown-Mooretown LAP lands.

The proposed site for the stormwater storage tank that also forms part of this application is located at the junction of Glen Ellan Road and Balheary Road, Swords, Co. Dublin. The site is 1.4km north of swords, 1.1km west of the M1 motorway and 300m south of the Broadmeadow River. The site is owned by The Applicant and is locally referred to as the Celestica/Motorola site.

The development of Oldtown-Mooretown LAP lands commenced in 2011 and is expected to be complete by 2030.

The overall Oldtown Mooretown LAP development will comprise approximately 2,300 dwellings units, 7,510 sqm of commercial floorspace and a 1,624-pupil primary and post-primary school on a 111 hectares site.

The proposed development consists of the construction of 377 units comprising of houses, apartments, Duplex units and a 519 sqm Creche on a total area of c. 10.223 Ha.

The development includes all associated site works and infrastructure, including internal roads, paths, cycle paths, public lighting, utilities, foul and surface water drainage, and landscaped open space.

12.5 Potential Impact of the Proposed Development During Construction Stage

There is potential for construction traffic to impact from a noise and dust perspective about 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 and from general earthwork activities. 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).

12.6 Potential Impact of the Proposed Development During Operational Stage

In order to assess the potential impact of the proposed development a detailed traffic and transport assessment has been prepared and is included as part of the subject application under a separate cover. Details of this assessment are set out below.

Separately, it is noted that the proposed stormwater storage tank site that forms part of this application is not anticipated to generate traffic trips, aside from infrequent maintenance vehicles, and as such does not warrant trip generation assessment. It is considered that the storage tank traffic impact on the local network during the operation stage is negligible.

12.7 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.

12.8 Mitigation Measures

In order to eliminate or reduce the potential impacts described above, remedial and mitigation measures will be implemented as set out below and in the Construction Management Plan included under a separate cover with this application.

Construction Stage

- Adequate signposting will be located on site to ensure the safety of all road users and construction workers.
- Due to the proximity of the proposed site along well-serviced bus routes and being well served by cycle lanes, it is intended to limit construction staff parking and to encourage the use of public transport. A limited number of car parking spaces may be provided for senior construction managers within the development site. Suitable locations in the surrounding area may be identified where staff can park and link to public transportation.

- The main contractor as part of their site set-up arrangements, shall appoint a Coordinator responsible for the implementation of a Construction Stage Mobility Management Plan and shall carry out the following tasks as part of their role:
  - Provide an extensive information service for public transport options and routes at a public location(s) within the development for construction workers;
  - Update the public transport information adjacent to the development on an ongoing basis; and
  - Advise company staff of tax incentives for public transport and bicycles.
- For those wishing to cycle to and from the development, dedicated cycle parking will be provided for the duration of the works within the site. Shower facilities and lockers will also be provided.
- A dedicated "construction site"' access/egress system will be implemented during the construction phases.
- Hoarding will be set up around the perimeter to prevent pedestrian access.
- Dedicated construction haul routes will be identified and agreed upon with the local authority before the commencement of constructions activities onsite.
- A material storage zone will also be provided in the Construction Compound area. This storage zone will include material recycling areas and facilities.
- A detailed Construction and Traffic Management Plan will be prepared by the contractor and agreed upon with the Local Authority before commencing works on site.

Operational Stage

- To reduce traffic impact and to promote more sustainable modes of transport a Mobility Management Plan will be prepared for the development
- A management company will be appointed by the developer to manage the development. A senior member of staff from the management company who supports the philosophy of the Plan will be appointed as the coordinator. The coordinator will be responsible for:
  - Implementation and maintenance of the Plan;
  - Monitoring the progress of the Plan;
  - Liaison with public transport operators and officers of the Planning and Highway Authorities;
  - Production of information reports for the Developer, the occupier(s) and the Planning and Highway Authorities; and
  - Ongoing assessment of the objectives of the Plan.
- Up to date local bus timetables will be maintained within the tenant amenity area and other fixed points within the buildings on the site. Residents will be advised of their location. In addition, internet access to travel information will be provided. The developer will provide all new residents with a travel pack showing alternative modes of travel to the development. Where possible, the developer will advise visitors to the site of alternative modes of travel to that of the car.
- Secure parking facilities will be provided for residents, visitors and Creche users. Local cycle route information will be provided in the tenant amenity area and at other fixed points within the development and residents will be advised of their location. Details of cycle parking

provided are included in the Traffic and Transport Assessment provided with the planning submission.

- 2 No go Car spaces will be initially provided and details of how to join the scheme will be provided to all residents when they move into their apartments. Information will also be displayed within the resident amenity area and updated when required.
- The coordinator will be responsible for the management of inappropriate parking within the development. This parking management will ensure that spaces are reserved for those who have rented the space and will be accessible only to those users.

12.9 Predicted Impacts of the Proposed Development

Construction Stage

Due to the proposed mitigation measures outlined above, the impact of the proposed development will be temporary and minimised during the construction stage.

Operational Stage

- There will be an increase in the use of the road network by private vehicles. A mobility management plan will promote more sustainable forms of transport.

There will be an increase in the number of pedestrians and cyclists in the surroundings of the development. However, footpaths and cycling paths are provided as part of the proposed development and the overall Oldtown area, thus, the impact should be minimal.

12.10 Monitoring

Construction Stage

Traffic management and deliveries will be carefully monitored during the construction stage as part of the Construction Management Plan. The appointed contractor will monitor their mobility management plan to ensure that is operating effectively. Residents will be kept fully informed of construction activities through mailshots, email, and site notices.

Operational Stage

During the operational stage, the Mobility Management Plan will be monitored by the Co-ordinator. The travel survey will establish the initial modal split of travel by residents.

The Co-ordinator, in consultation with the Developer, the Occupiers, and the Local Authority or its agents, will agree on annual targets, following completion and analysis of the travel survey, for increasing the percentage of non-car modes.

The Co-ordinator will:

- Meet with officers of the Local Authorities or its agents within 6 months following the occupation of the building(s) and thereafter every 12 months to assess and review the progress of the Plan and agree on objectives for the next 12 months, and
- Prepare and submit to senior management of the Developer, the Occupier(s) and the Local Authorities or its agents, an Annual Monitoring Report.

12.11 Interactions

Construction Stage

Temporary negative impacts on human health may be likely during the Construction Phase due to noise, dust, air quality and visual impacts which are discussed in the relevant chapters of this EIAR. Temporary traffic management will be required to facilitate connections to existing utilities on the existing roads.

The traffic impacts, which would be temporary in duration are not considered to be significant due to the implementation of the mitigation measures identified in Section 13.10.

Operational Stage

Noise generated by increased traffic flows has been assessed in the Air and Noise Chapters of the EIAR.

12.12 Difficulties Encountered

There were no difficulties encountered.

13.0 CULTURAL HERITAGE

The cultural heritage Impact Assessment has been prepared by Courtney Deery Heritage Consultancy as part of the pre-planning of Strategic Housing Development (SHD). The report assesses the impact of the proposed development on the cultural, archaeological, and archaeological heritage environment and proposes measures to safeguard any monuments, features, finds of antiquity or features of architectural or cultural heritage merit. The proposed development, Phase 5, is located within the northwestern section of the Oldtown Mooretown Local Area Plan (LAP) lands. One registered archaeological monument (RMP/SMR site); a large-ditched enclosure, was identified through a programme of archaeological testing in 2013 and is situated in the northeast of the Phase 5 application lands (RMP no: DU011-150). It is being preserved in situ within an open green space. Two additional sites, a probable cereal drying kiln and a pit were discovered within the application lands during archaeological testing in 2017 and additional features were identified during monitoring of topsoil stripping of the area in 2018. These features were all subsequently excavated under licence (17E0446).

The southern portion of the application area has been considerably disturbed due to the construction of a temporary school in that location. It was concluded after the geophysical survey of this area that the archaeological potential of the anomalies it identified was limited and given the shallow depth of topsoil in the test trenches to the north of the school, it is unlikely that archaeological features or material will have survived the construction activity. There are, however, some areas that may remain undisturbed by the construction and given the proximity of subsurface enclosure DU011-135 and the additional archaeological features identified during monitoring to the north of the school, this will require remedial measures.

It is recommended that topsoil removal within the southern portion of the Phase 5 lands be monitored by a suitably qualified archaeologist. After the removal of the existing amenities in this

area, the archaeologist will determine if it is necessary to monitor further groundworks. In the event of any archaeological features remaining beneath these structures and surfaces, the area will be cordoned off and protected until the archaeologist has decided on how best to deal with the remains in consultation with the DHL.

It is recommended that the removal of the Oldtown / Rathbeal townland boundary within the proposed development area be monitored by a suitably qualified archaeologist with the provision that in the event of any further archaeological remains being identified, the area is cordoned off and protected until the archaeologist has decided on how best to deal with the remains in consultation with the DHLGH.

It is further recommended that heavy machinery movements related to this phase of development not encroach on the recorded archaeological monuments in the adjacent field to the west and that if construction activities, including soil movements and storage, are to take place in the field to the west, the archaeological monuments should be fenced off for their protection.

There are no structures of architectural heritage merit within the application area or in its environs.

14.0 UTILITIES AND WASTE

Waterman Moylan Consulting Engineers has been commissioned to assess the likely impact of the proposed development on the material assets serving the subject lands relating to water supply, foul sewerage, electricity, gas, and telecommunications.

14.1 Assessment Methodology

The methodology followed for this section is in accordance with the EPA "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 Irish Water Utility Plans, ESB Networks Utility Plans, Gas Networks Ireland Service Plans, Eir E-Maps and Virgin Media Maps;
- Consultation with Irish Water and Fingal County Council;
- Submission of a Pre-Connection Enquiry Application to Irish Water;
- Review of ESB Network Utility Plans & Site meetings with ESB Network
- Review of Gas Networks Ireland exiting network maps;
- Review of EIR Telecommunications exiting network maps;
- Site Inspection / Walkover;

As part of assessing the likely impact of the proposed development, surface water runoff, foul drainage discharge and water usage calculations were conducted in accordance with the following guidelines:

- Greater Dublin Strategic Drainage Study (GDSDS);
- IS EN752, "Drain and Sewer Systems Outside Buildings";
- Irish Water's Code of Practice (water demand and foul water loading);

14.2 Characteristics of the Proposed Development

The proposed development consists of 377 units, comprised of 173 houses, 134 apartments and 70 apartment/duplex units with associate parking and ancillary structures, on a site area of 10.223ha.

The developer will construct all associated infrastructure to service the development including a network of foul water and surface water drains, water main, access roads and footpaths.

It is similarly proposed to install a storage tank on the public foul network is to alleviate constraints within the public foul network during times of heavy rainfall events, whereby stormwater enters the public foul network temporarily reducing available capacity. The proposed stormwater storage tank has been designed in conjunction with Irish Water and will not only facilitate the connection requirement of this subject application but will also have the capacity to allow for continued development in the Oldtown/Mooretown catchment. The storage tank is proposed to be located at the junction of Glen Ellan Road and Balheary Road.

The Swords area, including the subject lands, is supplied from Leixlip Water Treatment Plant. There is an 800mm diameter ductile iron trunk water main crossing the lands. A pre-Connection Enquiry form was submitted to Irish Water which outlined our proposals for the provision of water supply and the response stated that they can facilitate a connection to serve the proposed development from the existing infrastructure. Water demand will increase as a result of the proposed development. However, there is sufficient capacity available in the public water supply network to cater for the increased demand.

There is an existing 450mm diameter foul water sewer in the northeast of the Oldtown lands which was constructed as part of the adjacent Ashton development to the east of the site. The sewer was constructed to facilitate the development of the Oldtown lands. This system discharges to the Swords Wastewater Treatment Plant. As part of the Oldtown Phases 1, 3 and 4 developments, a series of 225mm and 300mm diameter outfall sewers were constructed along Millers Avenue, outfalling to the 450mm outfall sewer. Suitably sized spurs have been made available from the existing outfall sewers located along Millers Avenue to facilitate connections to the Phase 5 development and the adjacent Phase 4 development. A Pre-Connection Enquiry form was submitted to Irish Water and a response has been received stating that to accommodate the proposed connection to the Irish Water network at the premises, a storage tank will be required in the future to manage the impacts of excessive rainfall in the sewer network downstream of the development. In this regard, following consultation with Irish Water, it is proposed to include as part of this application a Stormwater Storage Tank. The proposed tank will be located at the junction of Glen Ellan Road and Balheary Road, Swords, Co. Dublin, approximately 280m east of the development. The proposed tank will alleviate constraints within the Irish Water foul water system, which occur during times of heavy or prolonged rainfall, resulting from surface water and foul water infiltration.

Gas Networks Ireland maps show that there are existing gas pipes adjacent to Millers Avenue and Planning 4, to facilitate Oldtown Phase 5. There are no existing services with the footprint of the proposed site.

If gas is adopted as the fuel source of choice for the heating systems in the scheme, a new gas connection be made to the existing network. The exact extent and location of these connections will be agreed upon with Gas Networks Ireland during the design stage of the project.

ESB Network maps show that there are existing ESB exists adjacent to Millers Avenue and Planning 4, to facilitate Oldtown Phase 5. There are no existing services with the footprint of the proposed site

There is an extensive Eir Network in the roads surrounding the site, the most significant of which is a ducted service in Planning 4 adjacent and further ducts that are proposed as part of Planning 2. There are also existing Virgin Media services in the residential schemes to the west and south of the proposed site. New connections will be made to the existing Eir and Virgin Media networks at the boundary of the site and services will be distributed throughout the site as required. The exact extent and location of these connections will be agreed upon with Eir and Virgin Media during the design stage of the project.

14.3 Potential Impact of the Proposed Development

There is a risk to all services during the construction phase of the project. Appropriate mitigation measures such as scanning for all services during excavation to prevent a strike of services must be implemented during the construction stage.

The main sources of construction waste arising from this project will be:

- Topsoil and subsoil
- Packaging and general waste from construction activities
- General site clearance of waste, roots, etc.

It is practical that as much as possible topsoil and subsoil generated remains on-site and are used for landscaping and engineering purposes as appropriate.

14.4 Potential Cumulative Impacts

In the event of future development adjacent to the proposed development, there are no predicted cumulative impacts arising from the construction or operation phase related to the material assets – built services provided that the other developments implement appropriate mitigation measures.

14.5 Do Nothing Scenario

No change of use of the greenfield lands and therefore no further impact on the material assets.

14.6 Mitigation Measures - Construction & Operational Phase

14.6.1 Surface Water

- 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.
- Regular testing of surface water discharges will be undertaken at the outfall from the subject site.
- Where silt control measures are noted to be failing or not working adequately, works will cease in the relevant area. The system is cleaned and starts working again.

- 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 at a minimum distance of 50 m from any watercourse or other water-conducting features, including the cut-off trenches.
- All existing services will be located using service records, GPR surveys and slit trenches to ensure that their position is accurately identified before excavation works commence.
- Surface Water pipes will be carefully laid to minimise the potential for cross-connections.

14.6.2 Foul Water

- All existing services will be located using service records, GPR surveys and slit trenches to ensure that their position is accurately identified before excavation works commence.
- Foul water pipes to be laid with sufficient falls to ensure self-cleansing velocity
- Foul pipes will be carefully laid to minimise the potential for cross-connections.

14.6.3 Water Supply

- All existing services will be located using service records, GPR surveys and slit trenches to ensure that their position is accurately identified before excavation works commence.
- All water mains will be cleaned, sterilised, and tested to the satisfaction of the Irish Water/Local Authority before connection to the public water main.
- All connections to the public water main will be carried out under the supervision of the Irish Water/Local Authority.

14.6.4 ESB Network

Where possible backup network supply to any services will be provided should the need for relocation or diversion of existing services be required otherwise, relocation or diversion works will be planned with the service provider to incur minimal impact, with users notified in advance of any works.

14.6.5 Gas

- Where possible backup network supply to any services will be provided should the need for relocation or diversion of existing services be required, otherwise relocation or diversion works will be planned with the service provider to incur minimal impact, with users notified in advance of any works.
- Connections to the existing gas networks will be coordinated with the relevant utility provider and carried out by approved contractors.

14.6.6 Telecommunications - Eir

- Where possible backup network supply to any services will be provided should the need for relocation or diversion of existing services be required, otherwise relocation or diversion works will be planned with the service provider to incur minimal impact, with users notified in advance of any works.
- Connections to the existing telecommunications networks will be coordinated with the relevant utility provider and carried out by approved contractors.

A C&D Waste Manager shall be appointed from the Contractor's Staff and have overall responsibility for the implementation of the project Waste Management Plan (WMP) during the construction phase. The C&D Waste Manager will be appropriately trained and assigned the authority to instruct all site personnel to comply with the specific provisions of the WMP.

During the operational stage, there will be an increased demand for all the services which can be accommodated by the service provider.

It is the duty of the C&D Waste Manager to ensure that necessary licenses have been obtained as needed. Each consignment of C&D waste taken from the site will be subject to documentation along with Transportation Dockets to ensure full traceability of the material to its final destination.

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 existing Oldtown attenuation ponds.
- Flow restrictors with attenuation storage will be used to slowdown and store surface water runoff from discharging above green field rates to the Broadmeadow River.
- 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.
- Regular inspection and maintenance of the drainage network, including petrol interceptor.
- 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.
- The outfall headwall to the Broadmeadow River will be fitted with a tide-flex (or similar approved) non-return valve to ensure surcharge from the Broadmeadow River will not backfill into the proposed pipe and tank during extreme weather events.
- The outfall volumes from the stormwater storage tank to the Broadmeadow River shall be metered to record the frequency and duration/volumes of overflows.

14.6.7 Foul Water

The foul network will be inspected annually and maintained.

14.6.8 Water Supply

It is not envisaged that any other remedial or reductive measures will be necessary upon the completion of the development.

14.6.9 ESB Network

On completion of the construction phase, no further mitigation measures are proposed in relation to the electrical infrastructure.

14.6.10 Gas

On completion of the construction phase, no further mitigation measures are proposed in relation to the gas infrastructure.

14.6.11 Telecommunications - Eir

On completion of the construction phase, no further mitigation measures are proposed in relation to the telecommunications infrastructure.

14.7 Predicted Impacts of the Proposed Development

Due to the proposed mitigation measures in both construction and operational phase, the impact on the utilities and construction and demolition waste is considered not significant.

14.8 Monitoring and Reinstatement

The proposed monitoring of the various built services during the operation stage will include:

- Surface water drainage and SUDS features will be monitored and maintained by the Developer.
- The water usage within the proposed development will be monitored via the bulk water meters. Records will be maintained by Irish Water to ensure any excess usage is identified and investigated as necessary.
- Irish Water will monitor the operation of the foul drainage network including the receiving environment.
- The construction and waste management plans will be adhered to.
- The provision of utility services including electricity, gas and broadband will be monitored by the relevant utility provider.

14.9 Interactions

The main interactions relating to this EIAR Chapter are Water (Hydrology and Hydrogeology), Population and Human Health, and Traffic and Transport.

14.10 Difficulties Encountered

There were no particular difficulties encountered compiling the Material Assets –Utilities chapter of the EIAR.

15.0 INTERACTIVE AND CUMULATIVE EFFECTS

The interaction of impacts, as considered in the EIAR, and their relationship to the information requirements outlined in the European Communities (Environmental Impacts Assessment) Regulations, are summarised as the following:

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

16.0 SUMMARY OF MITIGATION & MONITORING MEASURES

The Environmental Impact Assessment Report has assessed the characteristics of the proposal for significant environmental impacts. Each topic was examined and the resultant environmental impact, if any, was noted and mitigation or reductive measures have been put in place. Accordingly, the proposed development will result in no significant negative long-term impacts on the environment as a result of the mitigation measures proposed as part of the design and at the operation stage. Positive environmental effects exist for landscape and visual and population and human health.

1.0 INTRODUCTION

1.1 Purpose of This Report

This Environmental Impact Assessment Report (EIAR) has been prepared in parallel with the preparation and formulation of a proposed Strategic Housing Development (SHD) at lands to the north of Rathbeale Road and to the west of and north of Miller's Avenue and Glen Ellan Road, Oldtown, Swords, Co. Dublin, with associated engineering works on lands locally known as the Celestica/Motorola site, junction of Glen Ellan Road and Balheary Road, and at/on Balheary Road, Swords, Co. Dublin (the application site).

The subject lands extend to approximately 10.223 hectares and are located approximately 3.5km from the town centre and County Hall of Swords, 5 km from the M1 interchange at Lissenhall and just under 10km to Dublin Airport. The lands are located in the administrative area of Fingal County Council.

The lands form part of a larger landholding known as the 'Oldtown – Mooretown Lands' within the ownership of Gerard Gannon Properties (the applicant), which have been substantially developed since 2013 having been zoned for development. A combined total of 967 no. dwellings, 5 no. crèches, and 1,537 sq. m of retail uses have been granted planning permission. Of these, 647 no. dwellings are completed and 207 no. dwellings are under construction. The subject site is the final plot of zoned lands in Oldtown.

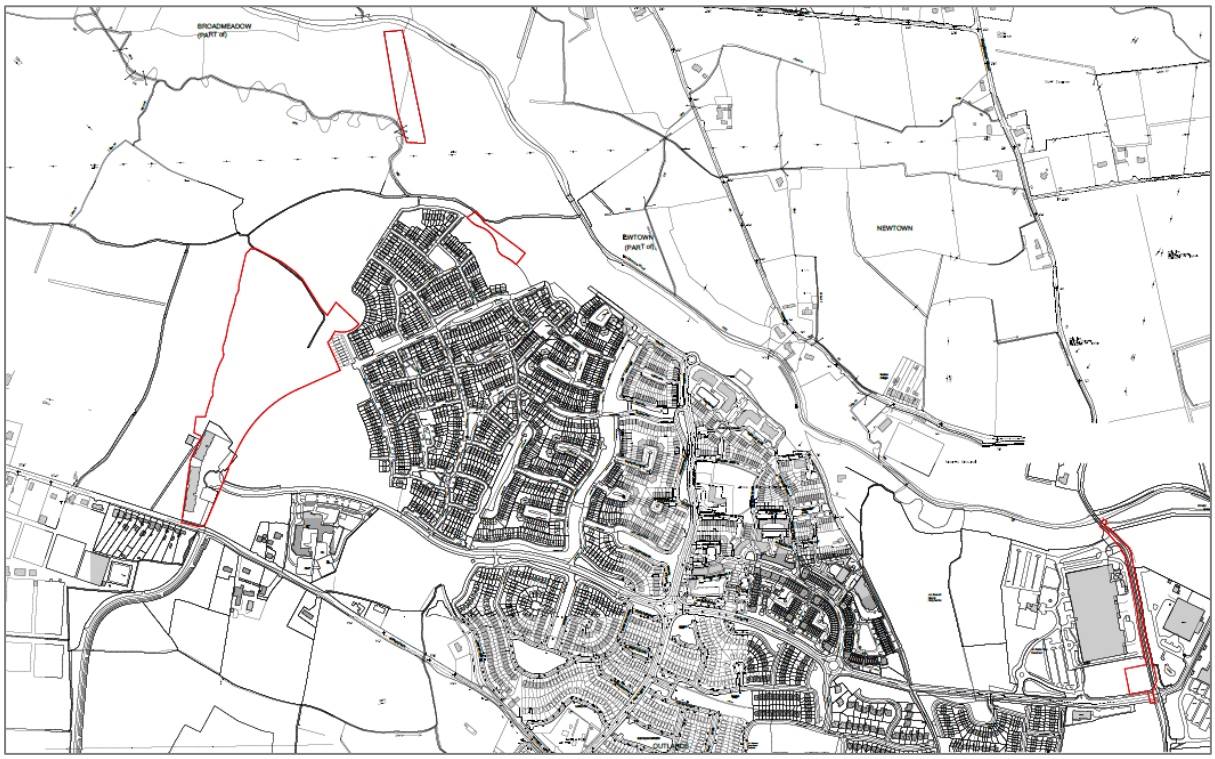

Figure 1.1. Site Location Map (full extent of application site outlined in red)

The proposed development (the project) subject to this SHD application and EIAR provides for the removal of the temporary site office/site compound structures on site and the construction of 377 no.

residential dwellings, comprising of 173 no. houses, 134 no. apartments, and 70 no. duplex units (35 no. duplex 'house' units and 35 no. duplex 'apartment' units).

The proposed development also provides for 1 no. childcare facility along with public open space, including outdoor play area and playgrounds, car parking, bicycle parking and all associated engineering and site works necessary to facilitate the development.

Access to the site is from Glen Ellan Road and Rathbeale Road, and from Miller's Avenue and the internal street network of the adjacent completed developments. The lands are zoned RA and form the western edge of urban development for Swords.

Figure 1.2. Outline of Site Boundary and Aerial View [Note: red line developable site area indicatively shown – Class 1 Open Space to the north and the storage tank works site not shown]

1.2 Nature and Extent of Proposed Development

Gerard Gannon Properties, the applicant, is applying to An Bord Pleanála for planning permission for the following development which is the development (the project) that is the subject of this EIAR. This is described in the planning notices as follows:

"We, Gerard Gannon Properties, intend to apply to An Bord Pleanála for permission for a strategic housing development at lands to the north of Rathbeale Road and to the west of and north of Miller's Avenue and Glen Ellan Road, Oldtown, Swords, Co. Dublin, with associated engineering works on lands locally known as the Celestica/Motorola site, junction of Glen Ellan Road and Balheary Road, and at/on Balheary Road, Swords, Co. Dublin.

The development will consist of the removal of the temporary site office/site compound structures on site and the construction of a total of 377 no. residential units (173 no. houses, 134 no. apartments, and 70 no. duplex units [comprising 35 no. duplex 'house' units and 35 no. duplex 'apartment' units]), and 1 no. childcare facility, all of which will be provided as follows:

- *173 no. residential houses (9 no. 2 bed houses, 147 no. 3 bed houses, and 17 no. 4 bed houses) in semi-detached, end-terraced, and mid-terraced houses ranging from two to three storey in height;*
- *Duplex Block A containing a total of 18 no. units comprising of 9 no. 1 bed units, 8 no. 2 bed units, and 1 no. 3 bed unit, in a building three storeys in height, and all units provided with private balconies/terraces; car parking and bicycle spaces, and bin stores;*
- *Duplex Block B containing a total of 8 no. units comprising of 4 no. 1 bed units and 4 no. 2 bed units, in a building three storeys in height, and all units provided with private balconies/terraces; car parking and bicycle spaces, and bin stores;*
- *Duplex Block C containing a total of 8 no. units comprising of 4 no. 1 bed units and 4 no. 2 bed units, in a building three storeys in height, and all units provided with private balconies/terraces; car parking and bicycle spaces, and bin stores;*
- *Duplex Block D containing a total of 20 no. units comprising of 10 no. 1 bed units, 9 no. 2 bed units, and 1 no. 3 bed unit, in a building three storeys in height, and all units provided with private balconies/terraces; car parking and bicycle spaces, and bin stores;*
- *Duplex Block E containing a total of 8 no. units comprising of 4 no. 1 bed units and 4 no. 2 bed units, in a building three storeys in height, and all units provided with private balconies/terraces; car parking and bicycle spaces, and bin stores;*
- *Duplex Block F containing a total of 8 no. units comprising of 4 no. 1 bed units and 4 no. 2 bed units, in a building three storeys in height, and all units provided with private balconies/terraces; car parking and bicycle spaces, and bin stores;*
- *Apartment Block A containing a total of 48 no. units comprising of 18 no. 1 bed units and 30 no. 2 bed units with all units provided with private balconies/terraces, in a building four to five storeys in height, with internal bicycle stores, bin stores and plant rooms at ground floor level; car parking within the parking court, the undercroft and on-street, and bicycle parking;*
- *Apartment Block B1 containing a total of 32 no. units comprising of 17 no. 1 bed units and 15 no. 2 bed units with all units provided with private balconies/terraces, in a building four to five storeys in height, with internal bicycle stores, bin stores and plant rooms at ground floor level; car parking within the parking court, the undercroft and on-street, and bicycle parking;*
- *Apartment Block B2 containing a total of 32 no. units comprising of 17 no. 1 bed units and 15 no. 2 bed units with all units provided with private balconies/terraces, in a building four to five storeys in height, with internal bicycle stores, bin stores and plant rooms at ground floor level; car parking within the parking court, the undercroft and on-street, and bicycle parking;*
- *Apartment Block C containing a total of 22 no. units comprising of 11 no. 1 bed units and 11 no. 2 bed units with all units provided with private balconies/terraces, in a building four to five storeys in height, with internal bicycle stores, bin stores and plant rooms at ground floor level; car parking within the parking court, the undercroft and on-street, and bicycle parking;*
- *1 no. childcare facility in a one to two storey building, with associated outdoor play area, car parking and drop-off/visitor parking, bicycle parking, and bin stores.*

The development will provide for a total of 600 no. car parking spaces within the scheme; a total of 440 no. bicycle spaces serving the apartments, duplexes and childcare facility; the completion of Meadowbank Road adjoining Park Avenue; new vehicular accesses onto Miller's Avenue; proposed upgrades to public realm including footpaths, landscaping including play equipment, boundary treatments, and public lighting; and all associated engineering and site works necessary to facilitate

the development including the proposed stormwater storage tank and overflow outfall gravity sewer to the Broadmeadow River with associated manholes on lands locally known as the Celestica/Motorola site, junction of Glen Ellan Road and Balheary Road, and at/on Balheary Road, along with the proposed vehicular/service access onto Balheary Road, Swords.

The application contains a statement setting out how the proposal will be consistent with the objectives of the Fingal Development Plan 2017-2023. The application contains a statement indicating why permission should be granted for the proposed development, having regard to a consideration specified in section 37(2)(b) of the Planning and Development Act, 2000, as amended, notwithstanding that the proposed development materially contravenes a relevant development plan or local area plan other than in relation to the zoning of the land. An Environmental Impact Assessment Report (EIAR) and a Natura Impact Statement (NIS) have been prepared in respect of the proposed development."

1.3 EIA Process

The requirements for an Environmental Impact Assessment (EIA) of development proposals (projects) are governed by Directive 2014/52/EU, which amends the previous EIA Directive (Directive 2011/92/EU). The primary purpose of an EIA is to ensure that certain projects that are likely to have significant effects on the environment are subjected to an assessment of their likely environmental impacts. The EIA process itself forms part of the planning consenting process and is carried out by the Competent Authority (An Bord Pleanála in this instance).

An EIAR is prepared by and on behalf of an applicant/developer in respect of development proposal / project that they are seeking planning consent/permission. Therefore, the EIAR becomes a central element that informs the Competent Authority's determination of the planning permission.

The 2014 Directive introduced strict requirements in respect of the competency of experts responsible for the preparation of the EIAR. It is possible to summarise the EIA process as follows:

1. Screening - Is EIA required?
2. Scoping - If EIA is required, what aspects of the Environment should be considered?
3. Preparation of EIAR.
4. EIAR informs EIA (as part of the consent process).

1.4 The Need for an Environmental Impact Assessment Report

The EIA Directive was transposed into Irish Planning legislation on 1st September 2018. Section 172(1) of the Planning and Development Act 2000 (as amended) sets out the requirement for EIA. The proposed development that is the subject of this EIAR has been screened for EIA in accordance with the European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018).

The EIA Directives list those projects for which an EIA is mandatory (Annex I) and those projects for which an EIA may be required (Annex II). Annex I projects are listed in Part 1 of Schedule 5 of the Planning and Development Regulations 2001 (as amended, 'the Regulations'). The Project is not listed within Part 1 of Schedule 5 of the Regulations and therefore mandatory EIA is not required under

Annex 1. With respect to Part 2 of Schedule 5 (Annex II) Projects, the relevant thresholds relating to the subject proposal are outlined below:

- **"Class 10(b)(i) "Construction of more than 500 dwelling units.":** This project comprises a residential development including the provision of 377 no. new residential dwelling units. Therefore, the project (the proposed development) falls below the stated threshold and an EIA is not required on this basis.

- **"Class 10(b)(ii): "Construction of a car-park providing more than 400 spaces, other than a car-park provided as part of, and incidental to the primary purpose of a development."** The project (the proposed development) does not include a car park providing 400 no. spaces or more. Furthermore, all car parking being provided within the project is incidental to the primary purpose of the residential development. Therefore, the car parking element of the project does not fall within this Class of Regulations. An EIA is not required on this basis

- **"Class 10(b)(iv): "Urban development which would involve an area greater than 2 hectares in the case of a business district, 10 hectares in the case of other parts of a built-up area and 20 hectares elsewhere":** In this instance, the application site extends to c. 10.223 hectares within what can be considered a built-up area. Therefore, the project exceeds, albeit by 2230 sqm, the stated threshold, and an EIA is therefore required on this basis.

Additionally, the requirement for an EIAR in this instance was triggered by the legacy of the Oldtown-Mooretown LAP 2010-2016 (extended up to July 2020 and expired since) which pertained to the subject lands. The LAP contained two statements, which had implications for the requirement of an EIAR. The LAP referred to an E.I.S. which is what an EIAR was formerly known as. The first statement in question, referred to in Section 4 of the plan relating to phasing and implementation was as follows:

> *"An E.I.S for the developments shall be prepared and submitted, as determined by the Planning Authority. The EIS shall be submitted with every planning application".*

The second statement of interest is set out in Section 4.1 of the LAP, provided guidance on the phasing programme for development of the LAP, as follows:

> *"No one application for residential development shall be greater than 250 units".*

Furthermore, due to the location of the subject lands adjoining the Regional Park, the on-going delivery on the Oldtown-Mooretown lands and the potential cumulative impact it can have, an EIA is required, and thus an Environmental Impact Assessment Report has been prepared to accompany this planning application.

This EIAR has been prepared in accordance with the requirements of the following statutory documents:

- *The European Community Directive on Environmental Impact Assessment (No 85/337/EEC);*
- *The European Community Directive (97/11/EC) amending Directive 85/337/EEC on the assessment of the effects of certain public and private projects on the environment;*

- *The Planning and Development Act, 2000 (as amended);*
- *The Planning and Development Regulations 2000 (as amended) ;*
- *European Commission, Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions (May 1999);*
- *European Commission, Guidance on EIA Screening (June 2001);*
- *European Commission, Guidance on EIA Scoping (June 2001);*
- *Environmental Protection Agency (EPA), Guidelines on the information to be contained in Environmental Impact Statements (March 2002);*
- *EPA, Advice Notes on Current Practice (in the preparation of Environmental Impact Statements) (September 2003);*
- *EPA, Guidelines on the Information to be contained in Environmental Impact Assessment Reports (August 2017);*
- *EPA, Advice notes for preparing Environmental Impact Statements Draft (September 2015);*
- *European Commission, Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment (April 2013)*
- *Circular Letter Pl 1/2017: Implementation of Directive 2014/52/EU on the effects of certain public and private projects on the environment (EIA Directive)*
- *The European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 (S.I. No. 296 of 2018); and,*
- *The Guidelines for Planning Authorities and An Bord Pleanála on Carrying Out Environmental Impact Assessment (August 2018).*

The European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 (S.I. No. 296 of 2018) transposed the requirements of the 2014 EIA Directive into Irish Planning Law. On 1st September 2018, the provisions of the Regulations came into effect. This EIAR has been prepared in light of these EIAR Regulations and has also had specific regard to the *'Guidelines for Planning Authorities and An Bord Pleanála on Carrying Out Environmental Impact Assessment'* which were published in August 2018.

1.5 Scope of Environmental Impact Assessment Report

The scope of this EIAR has had regard to the following:

- Guidelines on the recommended information to be contained in EIAR, which have been published by the EPA (March 2022, September 2003, September 2015, and August 2017);
- The requirements of Part X of the Planning and Development Act, 2000 (as amended) and also Part 10 of the Planning and Development Regulations, 2001-2015;
- The requirements of the Fingal County Council Development Plan 2017-2023;
- The location, scale, and nature of the proposed development;

- The receiving environment and any vulnerable or sensitive local features and current uses;
- Previous planning applications that have been submitted on lands adjoining the subject site;
- The likely and significant impacts (including interactive effects, indirect and cumulative effects) of the proposed development on the environment; and,
- Available mitigation measures (including mitigation embedded in the project design) for reducing or eliminating any potential undesirable impacts.

Other assessments made pursuant to EU legislation have been considered for this EIAR, however, these have been ruled out as irrelevant for this chapter, which include, the Environmental Noise Directive (2002/49/EC) and the Strategic Environmental Assessment Directive (2001/42/EC).

1.6 Structure of Environmental Impact Assessment Report

An EIAR is a process of examining and assessing the environment in tandem with a proposed development in a series of loops and flow systems to ensure that all potential environmental impacts are documented and taken into consideration in the overall formulation of the proposed development inter alia through the design process. This process allows for the creation of a series of steps in the assessment of potential impacts on various elements of the environment.

The overall structuring of this EIAR has regard to the information requirements of the Directives and Irish Statutory Law and Regulations. In accordance with the statutory regulations, a Non-Technical Summary has been prepared and is included as part of this EIAR. The structure used in this report is a grouped format structure in the form of chapters that examine the broadened scope of environmental considerations introduced by the 2014 Directive.

The structure of this EIAR is based on the requirement to provide a detailed and systematic analysis of the environment at the subject lands and the potential impacts of the development; proposed mitigation measures and future monitoring of environmental indicators.

1.7 The EIAR Study Team

This EIAR has been prepared by an experienced and suitably qualified team of consultants led by Downey Planning. The table below provides information on the members of the EIAR study team and their respective inputs within the report.

Table 1. The EIAR Study Team

Name	Role
Downey Planning John Downey, Planning Consultant, BA (Hons), MRUP, MBA, MIPI, MRTPI – 25 years' experience & Eva Bridgeman, Planning Consultant BA (Hons), MRUP, MIPI – 10 years' experience	EIAR Project Managers & Planning Consultants Preparation of the following EIAR chapters: ▪ *Chapter 1: Introduction* ▪ *Chapter 2: Description of Project & Alternatives Considered* ▪ *Chapter 3: Planning and Development Context* ▪ *Chapter 4: Population & Human Health* ▪ *Chapter 15: Interactions* ▪ *Chapter 16: Summary of Mitigation & Monitoring Measures* ▪ *Compilation of EIAR and NTS*
CCK Architects Pamela Gill, Director, MRIAI	Preparation of the following EIAR chapters: ▪ *Chapter 2: Description of Project & Alternatives Considered* ▪ *Chapter 16: Summary of Mitigation & Monitoring Measures*
Waterman Moylan Consulting Engineers Mark Duignan, Associate Director, Engineer, MA BAI CEng MIEI	Preparation of the following EIAR chapters: ▪ *Chapter 6: Land and Soils* ▪ *Chapter 7: Water* ▪ *Chapter 12: Traffic & Transport* ▪ *Chapter 14: Utilities & Waste* ▪ *Chapter 16: Summary of Mitigation & Monitoring Measures*
Doyle & O'Troithigh Landscape Architects Linda Doyle, Director, MILI	Preparation of the following EIAR chapters: ▪ *Chapter 11: Landscape and Visual Impact Assessment* ▪ *Chapter 16: Summary of Mitigation & Monitoring Measures*
Courtney Deery Heritage Consultancy Ltd. Siobhán Deery BA, MA, H-Dip (Ed.), Dip Planning & Env. Law, MIAI, Director	Preparation of the following EIAR chapters: ▪ *Chapter 13: Cultural Heritage* ▪ *Chapter 16: Summary of Mitigation & Monitoring Measures*
OPENFIELD Ecological Services **(Padraic Fogarty, Ecologist, MSc in EcIA)**	Preparation of the following EIAR chapters: ▪ *Chapter 5: Biodiversity* ▪ *Chapter 16: Summary of Mitigation & Monitoring Measures*
DKP International Ltd Gerard Van Deventer C.ENG., BE. (Mech)., H. Dip. CIOB., MCIBSE	Preparation of the following EIAR chapters: ▪ *Chapter 8: Air Quality* ▪ *Chapter 9: Noise & Vibration* ▪ *Chapter 10: Climate* ▪ *Chapter 16: Summary of Mitigation & Monitoring Measures*

The development is being proposed by Gerard Gannon Properties, Kinvara House, 52 Northumberland Road, Ballsbridge, Dublin 4 (the applicant).

1.8 Impartiality

This EIAR has been prepared in reference to a standardised methodology that is accepted and acknowledged universally. Competently qualified and experienced specialists have been used throughout the EIA process in order to ensure that this document is robust, subjective, and impartial.

1.9 Statement of Difficulties Encountered

No exceptional difficulties were experienced in compiling this EIAR. However, where difficulties and limitations have been encountered by the study team, this shall be stated within the relevant section(s) of the EIAR.

1.10 Errors

Every effort has been made to ensure that the EIAR is error-free and accurate. However, there may be instances within the document where typographical errors or minor errors may occur. When minor in nature, any such cases are unlikely to have any material impact on the overall and final findings contained in the EIAR.

1.11 References

A reference list detailing the sources used for the descriptions and assessment has been included with each chapter, where necessary.

2.0 DESCRIPTION OF PROJECT & ALTERNATIVES CONSIDERED

2.1 Site Location

The application site is located on the western edge of Swords, Fingal, Co. Dublin, approximately 3.5km from Swords town centre and County Hall, 5km from the M1 interchange at Lissenhall and just under 10km to Dublin Airport. It is accessed from Glen Ellan Road and Rathbeale Road, and from Miller's Avenue and the internal street network of the adjacent completed developments. The lands are zoned RA in the Fingal Development Plan 2017-2023 and form the western edge of urban development for Swords.

2.2 Site Description

The application site has been in constant agricultural arable use until part of the site was recently developed as described below. The site forms part of a 70-acre field that was once known as the 'big potato field'. The lands slope from +33.246 OD in the south to +15.5 OD in the north, levelling out to a relatively flat area. Long distance views exist to the rural lands in the north and the lines of mature trees along the Broadmeadow and Saucerstown streams.

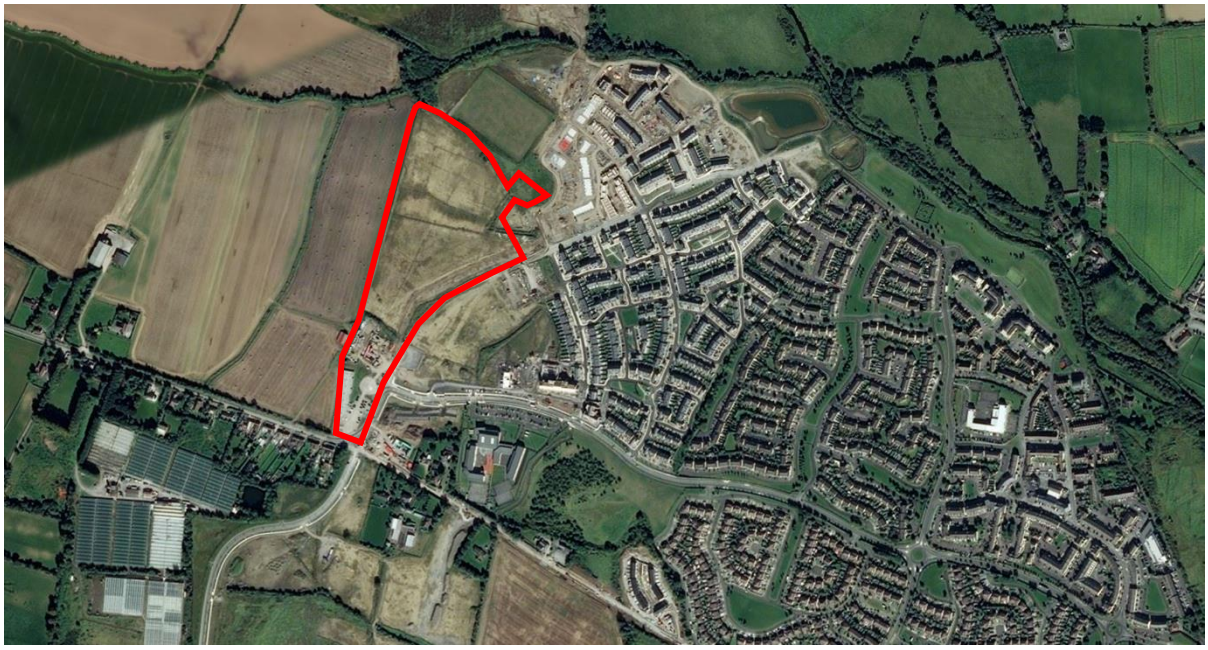

Figure 2-1. Aerial View of the Subject Site [Note: redline developable site area indicatively shown only]

There are no existing hedges or mature trees of note on the site. An historic townland boundary crosses the northeast of the site and continues as the natural boundary between the development lands and the regional park. The ditch and hedge that demarcated the townland boundary in this part of the Oldtown site were removed some time ago to facilitate underground ESB cables.

It is proposed that this section of townland boundary is reinstated by new hedgerow planting for the greater part, and recorded by its integration into the site layout and street pattern for the short stretch that occurs in the urban plan.

There are no existing permanent structures or other features on the site. There is a large red barn adjacent to the western boundary and there are newly completed houses on the northeast boundary (Meadowbank Phase 4D Reg. Ref. F18A/0750). There are several temporary prefabricated structures on the site that housed Swords Educate Together and Scoil Bhrian Boroimhe primary schools before their permanent buildings were completed on Glen Ellan Road. The temporary structures are currently being used as temporary site office/site compound structures by the Contractor of the ongoing construction of the adjoining lands and will be removed from the site in order to facilitate the proposed development.

A playing pitch constructed as part of Class 1 open space for the first planning phases is located to the north. The Swords Regional Park wraps around the north and western boundaries. Development is under construction on the lands east of the site, Reg. Ref. F18A/0412, and planning has been granted for the plot to the southeast, F19A/0101, which gives the proposed development an urban context along its eastern boundary.

Miller's Avenue [Western Distributor Link Road] (WDLR, described in context below) has been constructed for its entire length within the Oldtown lands and will be completed and opened in tandem with this phase. Short sections of this road to the north are already open to the public. Upgrade works to Rathbeale Road, including the southernmost leg of Miller's Avenue connecting Glen Ellan Road and the Rathbeale Road crossroads are complete.

2.3 Wider Site Context

As shown in Figure 2-2 below, Oldtown is a townland on the western edge of Swords, north of Glen Ellan Road, south of the Broadmeadow River and bounded to the east by the housing estates of Castleview and Ashton (built in the early 2000s). The lands to the west and north of the site are agricultural, mostly arable farmland. The site is accessed from Glen Ellan Road and from Miller's Avenue, a partly completed link road that is also known as the WDLR to the south which will ultimately connect Brackenstown Road in the south to Lissenhall in the north of Swords.

Substantial development of the Oldtown zoned lands has occurred since 2013. To date, 647 dwellings have been constructed and completed to the east of the site, comprising the smaller neighbourhoods of "Miller's Glen" (Reg. Ref. F11A/0436), "Longview" (Reg. Ref. F13A/0185), and "Meadowbank" (Reg. Ref. F17A/0735, F17A/0666 and F17A/0687). The current construction phase is "Westmill" located to the northeast of the site, (Reg. Ref. F11A/0473), and the first 32 of 140 dwellings in this new character area are ready for occupation. There is an existing school campus on Glen Ellan Road, comprising two primary schools (Swords Educate Together and Gaelscoil Bhrian Boroimhe) and a community hall, which forms the southern edge of the new village centre. The civic square, "Miller's Square", and two of three separate mixed-use apartment buildings on the square are complete. A large convenience store has recently opened, and a two storey creche has been constructed to shell and core, ready for a tenant.

To the north and immediately adjacent to the subject site is a new playing pitch, changing rooms (under construction), a MUGA (mixed-use games area), landscaped open spaces, walking routes, and calisthenics equipment and two playgrounds (also under construction). This is an 8.6 ha public park that is the first phase of the future Swords Regional Park and is programmed for completion in April

2022. The park will open to the public in tandem with a second significant public park, the Rathbeale Archaeology Park, which is a 3.5 ha park to the east of the school campus.

Figure 2-2. Aerial View of the location of the Subject Site [Note: Redline developable site area and approximate storage tank and associated works area indicatively shown]

The lands to the south of the subject site and Rathbeale Road are the Mooretown zoned lands which are also undergoing significant development, including Phases 1, 2 and 3 shown in Figure 2-2. This is the Mooretown townland and planning permission has been granted for a large new school campus, 489 dwellings and two creches. The school campus is open and comprises a large secondary school, Swords Community College and a primary school, Broadmeadow Community School. The residential element of Mooretown is under construction and is called 'Cronan's Well'.

2.4 Description of the Design

It was determined that in addition to the Fingal County Council zoning objectives pertaining to the subject site, the design of the development was guided by the relevant national, regional, and local policy documents and guidelines. Furthermore, the design brief for the development proposal was set to create an exemplar of sustainable design in harmony with the earlier phases of Oldtown to ensure all new development can be delivered in a manner that protects and enhances the biodiversity of the

local environment, mitigates climate change, and delivers high energy efficiency in accordance with NZEB strategies in all typologies.

2.5 Description of Proposed Development

Miller's Glen (adjoining the site to the east) is a master-planned new urban village with a distinctive character that is unique from the surrounding older neighbourhoods of Castleview, Ashton Broc, and Bunbury Gate.

The proposed development is the final phase of Miller's Glen and the last in a series of "primary" character areas that have comprised the village centre (Miller's Square), Miller's Glen, Longview, Meadowbank and Westmill (under construction). Whereas the earliest phases of Miller's Glen were low to mid-density housing, and predominantly comprised picturesque gable-fronted 2-storey houses, the proposed development is much denser, taller, and considerably more contemporary.

The proposed development comprises 3-character areas: South Parkside, Mid-Parkside, and North Parkside. The urban form of each development responds to the immediate site constraints and features, the first in many layers of subtle differences and design considerations.

The urban pattern is designed to be legible and easily navigated. Landmark buildings on key corners and nodal points provide markers or "way-finders" for visitors. Streets have wide pavements with continuous and active frontages, and a high percentage of own-door dwellings ensuring excellent passive surveillance and safety. The continuous frontage to the regional park makes this neighbourhood an attractive and desirable place to live.

All public open space is overlooked by residential development and forms an integral part of the local housing character. The public realm hierarchy for streets and open space is also designed to be mutually supportive. Streets are places in themselves and form spatial sequences framing views within and through the development.

There is a clear definition of open space as public and communal, as distinct from private, and the organization of pocket parks define sub-character places within the scheme. Formal play equipment is provided where appropriate and where it shouldn't be a nuisance in terms of noise for the closest houses.

The regional park has continuous active frontage with increased overlooking and passive surveillance from a five-storey landmark building on the northernmost point. Where the subject site narrows to the south, a landscaped walkway linking Rathbeale Road to the development and the regional park is overlooked by 3 no. five-storey apartment blocks and a 3-storey duplex block.

A summary of the accommodation schedule for the proposed development is summarised in Table 2-1 below.

Table 2-1. Schedule of Accommodation

1-Bed Dwellings	2-Bed Dwellings	3-Bed Dwellings	4-Bed Dwellings	Total
98	113	149	17	377

2.6 Characteristics of the Proposed Development

The following provides a detailed overview of the characteristics of the proposed development.

2.6.1 Site Location

The proposed development is located on lands north of Rathbeale Road and to the west of and north of Glen Ellan Road, Oldtown, Swords, Co. Dublin, within the administrative area of Fingal County Council.

2.6.2 Site Area

The site subject to this SHD application extends to approximately 10.223 hectares which also includes the Class 1 open space lands and the proposed stormwater storage tank and associated works, however, the quantum of developable land for the provision for housing and directly associated uses stands at 7.80 hectares.

Figure 2-3. Application Site Boundaries within the Overall Landholding Context (source: CCK Architects)

2.6.3 Density of Development

As outlined earlier, the site subject to this SHD application extends to approximately 10.223 hectares, however, the quantum of developable land for the provision of housing and directly associated uses stands at 7.8 hectares.

The initial concept, subject to this SHD application, comprised 339 dwellings, providing for a net density of c. 42.4 units per hectare. However, as it is acknowledged that the view expressed in An Bord Pleanála Pre-Application Consultation Opinion on this SHD, *"particular regard should be had to need to develop at a sufficiently high density to provide for an acceptable efficiency in serviceable land usage given the location of the site and its proximity to the Key Town of Swords and with its established social and community services."*

Therefore, the Opinion of An Bord Pleanála has been considered and the scheme has been revised to now provide for 377 dwellings comprising of 173 no. houses, 134 no. apartments, and 70 no. duplex units (35 no. duplex 'house' units and 35 no. duplex 'apartment' units) and a creche, on a developable site area of 7.8 hectares, and a net density of 48.3 units per hectare would be achieved.

This is consistent with the Development Plan and Section 28 Guidelines and has been calculated as per the guidance in Appendix A of the "*Sustainable Residential Development in Urban Areas and Best Practice Urban Design Guidelines (2009)"* as follows.

- Overall Site Area Subject to this SHD Application: 10.223 ha
- Net Site Area: 7.8 ha
- Net Density: 377 units ÷ 7.8 ha = 48.3 uph

The Guidelines for Planning Authorities on Sustainable Residential Development in Urban Areas (May 2009) recommends a net density of 35-50 dwellings per hectare on 'Outer Suburban/Greenfield' sites, the proposed development falls comfortably within the higher end of the suggested range. The residential density of the proposed development is therefore in keeping with the decision of An Bord Pleanála in their Pre-Application Consultation Opinion and is consistent with the DEHLG Guidelines on "*Sustainable Residential Development in Urban Areas and Best Practice Urban Design Guidelines (2009)"* and accompanying Design Manual (Best Practice Urban Design Manual, May 2009).

In light of the objectives and constraints associated with the development site, it is considered that the density proposed represents an optimum design solution and an efficient use of the site.

2.6.4 Detailed Description of Proposed Development

The proposed development, as per the description contained within the statutory planning notices, provides for:

"We, Gerard Gannon Properties, intend to apply to An Bord Pleanála for permission for a strategic housing development at lands to the north of Rathbeale Road and to the west of and north of Miller's Avenue and Glen Ellan Road, Oldtown, Swords, Co. Dublin, with associated engineering works on lands locally known as the Celestica/Motorola site, junction of Glen Ellan Road and Balheary Road, and at/on Balheary Road, Swords, Co. Dublin.

The development will consist of the removal of the temporary site office/site compound structures on site and the construction of a total of 377 no. residential units (173 no. houses, 134 no. apartments, and 70 no. duplex units [comprising 35 no. duplex 'house' units and 35 no. duplex 'apartment' units]), and 1 no. childcare facility, all of which will be provided as follows:

- *173 no. residential houses (9 no. 2 bed houses, 147 no. 3 bed houses, and 17 no. 4 bed houses) in semi-detached, end-terraced, and mid-terraced houses ranging from two to three storey in height;*
- *Duplex Block A containing a total of 18 no. units comprising of 9 no. 1 bed units, 8 no. 2 bed units, and 1 no. 3 bed unit, in a building three storeys in height, and all units provided with private balconies/terraces; car parking and bicycle spaces, and bin stores;*
- *Duplex Block B containing a total of 8 no. units comprising of 4 no. 1 bed units and 4 no. 2 bed units, in a building three storeys in height, and all units provided with private balconies/terraces; car parking and bicycle spaces, and bin stores;*
- *Duplex Block C containing a total of 8 no. units comprising of 4 no. 1 bed units and 4 no. 2 bed units, in a building three storeys in height, and all units provided with private balconies/terraces; car parking and bicycle spaces, and bin stores;*
- *Duplex Block D containing a total of 20 no. units comprising of 10 no. 1 bed units, 9 no. 2 bed units, and 1 no. 3 bed unit, in a building three storeys in height, and all units provided with private balconies/terraces; car parking and bicycle spaces, and bin stores;*
- *Duplex Block E containing a total of 8 no. units comprising of 4 no. 1 bed units and 4 no. 2 bed units, in a building three storeys in height, and all units provided with private balconies/terraces; car parking and bicycle spaces, and bin stores;*
- *Duplex Block F containing a total of 8 no. units comprising of 4 no. 1 bed units and 4 no. 2 bed units, in a building three storeys in height, and all units provided with private balconies/terraces; car parking and bicycle spaces, and bin stores;*
- *Apartment Block A containing a total of 48 no. units comprising of 18 no. 1 bed units and 30 no. 2 bed units with all units provided with private balconies/terraces, in a building four to five storeys in height, with internal bicycle stores, bin stores and plant rooms at ground floor level; car parking within the parking court, the undercroft and on-street, and bicycle parking;*
- *Apartment Block B1 containing a total of 32 no. units comprising of 17 no. 1 bed units and 15 no. 2 bed units with all units provided with private balconies/terraces, in a building four to five storeys in height, with internal bicycle stores, bin stores and plant rooms at ground floor level; car parking within the parking court, the undercroft and on-street, and bicycle parking;*
- *Apartment Block B2 containing a total of 32 no. units comprising of 17 no. 1 bed units and 15 no. 2 bed units with all units provided with private balconies/terraces, in a building four to five storeys in height, with internal bicycle stores, bin stores and plant rooms at ground floor level; car parking within the parking court, the undercroft and on-street, and bicycle parking;*
- *Apartment Block C containing a total of 22 no. units comprising of 11 no. 1 bed units and 11 no. 2 bed units with all units provided with private balconies/terraces, in a building four to five storeys in height, with internal bicycle stores, bin stores and plant rooms at ground floor level; car parking within the parking court, the undercroft and on-street, and bicycle parking;*
- *1 no. childcare facility in a one to two storey building, with associated outdoor play area, car parking and drop-off/visitor parking, bicycle parking, and bin stores.*

The development will provide for a total of 600 no. car parking spaces within the scheme; a total of 440 no. bicycle spaces serving the apartments, duplexes and childcare facility; the completion of Meadowbank Road adjoining Park Avenue; new vehicular accesses onto Miller's Avenue; proposed upgrades to public realm including footpaths, landscaping including play equipment, boundary treatments, and public lighting; and all associated engineering and site works necessary to facilitate

the development including the proposed stormwater storage tank and overflow outfall gravity sewer to the Broadmeadow River with associated manholes on lands locally known as the Celestica/Motorola site, junction of Glen Ellan Road and Balheary Road, and at/on Balheary Road, along with the proposed vehicular/service access onto Balheary Road, Swords.

The application contains a statement setting out how the proposal will be consistent with the objectives of the Fingal Development Plan 2017-2023.The application contains a statement indicating why permission should be granted for the proposed development, having regard to a consideration specified in section 37(2)(b) of the Planning and Development Act, 2000, as amended, notwithstanding that the proposed development materially contravenes a relevant development plan or local area plan other than in relation to the zoning of the land.

An Environmental Impact Assessment Report (EIAR) and a Natura Impact Statement (NIS) have been prepared in respect of the proposed development."

2.6.5 Demolition Works

There are no existing permanent structures or other features on the site that require to be demolished as part of the development. There is a large red barn adjacent to the western boundary and there are newly completed houses on the northeast boundary (Meadowbank Phase 4D Reg. Ref. F18A/0750). There are several temporary prefabricated structures on the site that housed Swords Educate Together and Scoil Bhrian Boroimhe primary schools before their permanent buildings were completed on Glen Ellan Road. The temporary structures are currently being used as temporary site office/site compound structures by the contractor of the ongoing construction works on the adjoining lands and will be removed from the site in order to facilitate the proposed development.

2.6.6 General Layout

The proposed site plan (Figure 2-4) provides a permeable, legible, and connected network of streets and spaces radiating from Miller's Avenue that runs diagonally through the Oldtown lands, providing for the scheme to appear as a gateway to Swords on the western approach. Short streets and small residential blocks frame views from Miller's Avenue of the park that wraps around the west and north boundaries. The southern section of the SHD development is a narrow tapering shape and has restricted access and movement onto Miller's Avenue and Rathbeale Road. Higher density apartment blocks are proposed to contain and overlook these busy streets. To the rear of these blocks is a large managed communal open space for residents and a generous 'buffer' between their curtilage and the regional park in the west. The 'buffer' is designed as a public walkway that will link Rathbeale Road to the proposed development and the regional park. The walkway entrance on Rathbeale Road is marked by a large brick archway spanning from the development boundary to Block C.

The central section of the development steps back from Miller's Avenue. This is because of a wide trunk watermain that cuts into the site, and on which no structures can be built. The space between the stepped-back building edge and Miller's Avenue is held or book-ended by a 4+ penthouse apartment block to the south (Apartment Block B1) and by the 3-storey houses and Duplex Type D in the north, after which the building line is at liberty to step back to the road edge. A generous and lush

verge of hazel and juneberry is proposed to be planted along this section of slip road which will support biodiversity and will provide visual interest and character.[1]

The northern section of the site has a more organic and informal street pattern that takes its cues from the historic line of the townland boundary. Unfortunately, the hedge and ditch marking this feature were removed to facilitate the under-grounding of an ESB cable some time ago, but a good length of it along the northern boundary is proposed to be re-planted. Its sharp zigzag has been integrated into the street pattern and will be developed as a small, shared surface space (Roads 1.1 and 2.1). Southern sections of the same townland boundary have been integrated into the street pattern and pocket park of the adjacent phase under construction (Phase 2, Westmill). Internal streets are designed for regular and sustainable planting of street trees: generally, one side of the street will have streetlights and the opposite pavement will be widened to 3.7m to accommodate services and a large structural tree pit. This allows for a continuous run of good-sized trees rather than a hit-and-miss approach of trees weaving around lamp posts.

Figure 2-4. Proposed Site Layout Plan (Redline boundary around residential development area)

[1] *Irish Water does not permit trees to be planted on wayleaves, so the planting is provided outside of this boundary.*

Continuous and active edges provide the enclosure and passive surveillance. All residential buildings 'turn the corner' with specially designed end units that present a public face to both sides, and blank garden walls are kept to a minimum, especially by the 'backless' wide-fronted houses that can have shorter rear gardens. There are a number of pocket parks within the development, and one is particularly big and central. This park opens up towards the regional park and will be a focal point for active play, especially amongst primary school children. All of the public open spaces are overlooked by residential buildings, and a mix of on and off-street car parking will create regular footfall between public paths and building entrances.

2.6.7 Building Height and Form

The development is essentially a mid-rise scheme appropriate to its setting on the outskirts of Swords. For the most part, principal streets, edges and open spaces are defined by taller blocks of three to five storeys, with the highest buildings located at the Rathbeale crossroads and village centre, and on the northernmost point where a taller landmark is befitting.

There is good variation in building height across the proposed development site, and the pattern proposed in this development is compatible with the pattern established in the permitted and existing development. The change in level falling from south to north will result in stepped terraces, adding another layer of interest and variety to the scheme's roofscape.

It is noted that the heights being proposed are suggested to be consistent with national planning guidelines, particularly the '*Urban Development and Building Heights Guidelines for Planning Authorities (December 2018)'.*

2.6.8 Communal and Public Open Space

Public open space is to be provided in accordance with the Fingal Development Plan 2017 to 2023 at a rate of 25 sq. m per bedspace. The total number of bed spaces is calculated at 897.5 and the total area of public open space required is 22,437.5 sqm. Of the 22,437.5 sqm of public open space required, 8,715 sqm is to be provided within the proposed scheme. This is 11% of the net development lands, calculated at 7.8 hectares. The balance of 13,722.5 sqm is to be provided on OS zoned lands as part of the regional park. The open space requirement is described in Table 2-2 as follows:

Table 2-2. Open Space Requirement

Units	No. of Each	x Bedspaces	Total Bedspaces	x area	Open Space Required
1 & 2 Bed	211	x 1.5	316.5	x 25 sqm	7,912.5 sqm
3 & 4 Bed	166	x 3.5	581	x 25 sqm	14,525 sqm
Total	377	-	897.5	x 25 sqm	22,437.5 sqm

Private open space for houses is provided in accordance with the Fingal Development Plan, i.e., a minimum of 60 sqm for a 2-3-bedroom house and a minimum of 75sqm for a >4-bedroom house. Private open space for apartments and duplex units is provided in accordance with the government guidance document Design Standards for New Apartments (2020).

Communal open space for duplex units and apartments is also provided in accordance with these 2020 guidelines. These shared spaces generally are to the rear of blocks where they are protected and

overlooked by the residents they serve. These spaces will be privately managed and are not proposed to be taken-in-charge by the Local Authority, Fingal County Council.

2.6.9 Car & Bicycle Parking

The proposed development provides for a total of 600 no. car parking spaces. The Fingal Development Plan requires that each dwelling be provided with 2 no. car parking spaces which are being provided within the proposed development. The car parking for apartments and duplex units, however, is provided at a reduced rate. The reduced car parking provision in relation to the parking required under the Fingal Development Plan reflects the location of the development in relation to public transport services and is in line with the Design Standard for New Apartments. Thus, the overall car parking provision may be considered to potentially material contravention of the Fingal Development Plan 2017-2023.

However, the proposed scheme can be seen to adhere to national and regional policy guidance in terms of car parking provision which reflects the prime location of the development in relation to its connectivity and access to R125 (Rathbeale Road) and public transport services. The Oldtown lands are situated in an accessible location within 3km distance from Swords town centre, which are served by Dublin Bus and Swords Express services where slightly reduced car parking provision is appropriate.

The lands are also accessed via Glen Ellan Road and Miller's Avenue, a partly completed link road. Moreover, there is access to the site through Miller's Glen development, to which the proposed scheme is an extension. The excellent connectivity of the subject site, in line with the national and regional policy guidance, would allow for a reduced quantum of car parking space which consequently promotes green modes of transport as well.

The proposed development also provides for an overall total of 440 no. bicycle parking spaces in high quality, safe and accessible locations throughout the scheme. These parking spaces are to be provided in accordance with Section 4.15 of the 2020 government guidelines Design Standards for Apartments. Houses are proposed to secure and store their bicycles on their own private property and all duplex and apartment buildings will have a secure, accessible, and sheltered purpose-built store. These are integrated into the ground floors of the larger apartment blocks and are provided as individual external storage buildings for duplex units.

Please refer to the enclosed Statement of Material Contravention prepared by Downey, the Traffic and Transport report prepared by Waterman Moylan Consulting Engineers, and the Urban Design and Architectural Statement prepared by CCK Architects which is submitted with this planning application and provides further details in this regard.

2.6.10 Drainage Infrastructure

Proposed Foul Water

A pre-connection enquiry was submitted to Irish Water, the subsequent confirmation of feasibility letter from Irish Water advises that there is sufficient available capacity in the Wastewater Treatment Plan (Swords WWTP), to serve the development but that network upgrades are required to facilitate

the development. The stormwater tank on the public foul network, that forms part of this application is proposed to alleviate this issue.

There is an existing 450mm diameter foul water sewer in the northeast of the Oldtown lands which was constructed as part of the adjacent Ashton development to the east of the site. The sewer was constructed to facilitate the development of the Oldtown lands. This system discharges to the Swords Wastewater Treatment Plant.

As part of the Oldtown Phases 1, 3 and 4 developments, a series of 225mm and 300mm diameter outfall sewers were constructed along Millers Avenue, outfalling to the 450mm outfall sewer. It is proposed to drain the proposed development to the series of 225mm and 300mm diameter outfall sewers that were constructed as part of the Planning 1, 3 and 4 developments. Suitably sized spurs have been made available from the existing outfall sewers located along Miller's Avenue to facilitate connections to the Phase 5 development and the adjacent Phase 4 development.

It is similarly proposed to install a storage tank on the public foul network is to alleviate constraints within the public foul network during times of heavy rainfall events, whereby stormwater enters the public foul network temporarily reducing available capacity. The proposed stormwater storage tank has been designed in conjunction with Irish Water and will not only facilitate the connection requirement of this subject application but will also have the capacity to allow for continued development in the Oldtown/Mooretown catchment. The storage tank is proposed to be located at the junction of Glen Ellan Road and Balheary Road.

The proposed internal foul drainage network has been designed and sized in accordance with the Irish Water code of Practice for Wastewater Infrastructure and Standard Details. It is noted that a Statement of Design Acceptance has been issued by Irish Water, which is provided in the Appendix of the Engineering Assessment report prepared by Waterman Moylan Consulting Engineers as part of the planning application.

Proposed Surface Water

The subject lands are in the catchment of the Broadmeadow River which discharges to the Broadmeadow (Malahide) estuary. It is proposed to discharge the Phase 5 surface water network to the trunk surface water outfall sewers which were constructed under Planning 3, and which ultimately discharge to the Broadmeadow River via the attenuation ponds.

The requirement for the stormwater storage tank on the public foul network is to alleviate constraints within the public foul network during times of heavy or prolonged rainfall events, whereby stormwater enters the public foul network temporarily reducing available capacity. The proposed stormwater storage tank has been designed in conjunction with Irish Water and will not only facilitate the connection requirement of this subject application but will also have the capacity to allow for the continued development in the Oldtown/Mooretown catchment. The proposed stormwater storage tank is to be located underground, with the surfacing above to be permeable and will not require a stormwater drainage network.

SuDS will be utilised on-site for water quality protection, however, as discussed above the attenuation element has already been constructed at the Oldtown attenuation ponds. Water quality will be

achieved by using a Sustainable drainage network of Green Roofs, Swales and Permeable Paving all discharging the treated water to the surface water network. The stormwater system will be designed to cater for the 1 in 100-year flood event plus a 20% allowance for climate change.

For further details and information in this regard, please refer to the Engineering Assessment Report prepared by Waterman Moylan Consulting Engineers and provided as part of this planning application. It is noted that a Statement of Design Acceptance has been issued by Irish Water, which is provided in the Appendices of the foregoing report.

Potable Water

Consumption of potable water for the development will be supplied by a water main network connected to the Irish Water public water supply. The Irish Water confirmation of feasibility letter has not identified any issues with this arrangement.

The Swords area, including the subject lands, is supplied from Leixlip Water Treatment Plant.

There is an 800mm diameter ductile iron trunk water main crossing the lands. This main connects Kingston to Lissenhall. The trunk main has a 16-metre wayleave through the lands which have been incorporated into Oldtown Avenue, the main spine road of the development, in accordance with the LAP. A spur has been provided from the 800mm diameter water main to serve the Oldtown/Mooretown LAP lands, located just south of Glen Ellan Road.

A series of 100/150/200mm trunk mains were constructed as part of Phase 1 and Phase 3 developments that connect to the boundary of the Phase 5 development.

The proposed development will be served by the aforementioned connections that ultimately connect to the existing 800mm diameter trunk main. As part of the Planning 1 development, a connection was provided from the 800mm trunk main to the 250mm Glen Ellan water main. Fingal County Council shut down the supply from the 250mm Glen Ellan watermain and the Oldtown development is now served from the 800mm connection

For further details and information in this regard, please refer to the Engineering Assessment Report prepared by Waterman Moylan Consulting Engineers and provided with this planning application.

Construction and operational activities for foul, potable, and surface water

Construction activities with a possible impact on surface water and groundwater features will include the following:

- Excavation of soil, sub-soil, and vegetation.
- Infilling and landscaping will be undertaken.
- Construction of the outfall headwall from the stormwater storage tank to the Broadmeadow River.
- Temporary storage/use of fuel/oils on-site will be required for construction machinery.

Operational Activities will include the following:

- The total hardstanding area will be increased. It is expected that the surface water will be treated via SuDS and then discharged to the public surface water network. The public surface water sewer will flow from the proposed Phase 5 development, through the existing Phase 4 development and then outfall to the existing Oldtown attenuation ponds.
- Consumption of potable water for the development will be supplied by a watermain network connected to the Irish Water public water supply. The Irish Water confirmation of feasibility letter has not identified any issues with this arrangement.
- Foul water drainage for the development will be provided via a foul network which will connect to the public foul network and flow to Swords WWTP. Irish Water has advised that upgrade works to the network are required to be completed before the connection of the proposed development to the public foul network. The stormwater tank on the public foul network that forms part of the application, is proposed to alleviate this issue.

For further details and information in this regard, please refer to the enclosed Engineering Assessment Report prepared by Waterman Moylan Consulting Engineers and provided with this planning application.

2.7 Construction and Phasing

The Oldtown lands are zoned RA (new residential communities subject to the provision of the necessary social and physical infrastructure) under the Fingal County Development Plan 2017-2023 and were subject to the Oldtown-Mooretown Local Area Plan 2010 before it expired in July 2020. Planning permissions for development on the lands broadly followed the phasing plan in the Local Area Plan, and this is the final planning application for development on the lands.

A combined total of 967 dwellings, 5 crèches and 1,537 sqm of retail uses have been granted planning permission. Of these, 647 dwellings are complete, and 207 dwellings are under construction. The current proposal will provide another 377 dwellings.

Table 2-3. Schedule of Planning Permissions and Status

Reg. Ref.	Description	Status
F11A/0436 'Miller's Glen'	'Phase 1' Parent Permission: 245 units, amended by subsequent permissions to 243 units	243 units complete
F11A/0473 'Westmill'	'Phase 2' Parent Permission: 224 units and the village centre, amended by subsequent permissions to 249 units	Civic Square, 1372sqm commercial uses, 48 dwellings and creche complete. 108 dwellings under construction
F13A/0185 'Longview'	'Phase 3' Parent Permission 246 units, amended by both planning conditions and subsequent permissions to 181 units.	161 units complete
F17A/0666 'Meadowbank'	'Phase 4A' Parent Permission: 96 units amended by condition to 95 units	41 units complete 54 units under construction
F17A/0735 'Meadowbank'	'Phase 4B' Parent Permission: 98 units granted	53 units complete 45 units under construction

F17A/0687 'Meadowbank'	'Phase 4C' Parent Permission: 92 units, amended by subsequent permission to 101 units.	101 units complete

Being the last phase of Miller's Glen, the proposed development will immediately benefit from new and recently completed civic, social, educational, and physical infrastructure serving the overall zoned lands.

2.7.1 Existing/Completed

- Two primary schools within minutes' walk of the proposed development: Gaelscoil Bhriain Boroimhe and Swords Educate Together
- Applewood Community Centre: indoor sports, fitness, dance, and children's activities
- New primary school in Mooretown: Broadmeadow Community National School
- New secondary school in Mooretown: Swords Community College
- High-quality civic square & meeting place: Miller's Square
- Local convenience shop
- Small shop units: built to shell and core and ready for fit-out
- Creche: built to shell and core and ready for fit-out
- Coffee shop: built to shell and core and ready for fit-out
- Pocket parks within completed phases
- Full size playing pitch

2.7.2 Under Construction

- Changing rooms & car park
- Playgrounds: large-scale within regional park, smaller play in pocket parks
- Mixed-Use Games Area
- Passive and informal open space within the regional park
- Passive and natural play within the Rathbeale Archaeology Park

It is proposed that the proposed development final phase will be constructed over 2-3 years from the grant of planning permission, working from the northern boundary to the south of the site, 'backing out' of the contractor compounds on the site, and leaving pockets or blocks of development complete and occupied in an orderly manner. The anticipated construction timeframes of the proposed development are set out as follows:

- Baseline assessment year: Spring 2022
- Start of construction: Spring 2023
- Completed / implemented development: Spring 2025

2.8 Construction Phase: Emissions and Waste

Please refer to Chapter 7.0 (Water), 8.0 (Air Quality) and Chapter 10.0 (Climate) of this EIAR for a full assessment of the impact of the proposed development on emissions and waste arising in relation to air and water quality, and climate. All spoil and waste material will be removed to an approved location

and storage of construction materials in public areas will be minimised. Excavated material may be temporarily stored on site, with excess material to be removed off-site. All oil/diesel stored on site will be in suitable containers which will be located in a purpose-built bunded area, which will provide containment in the event of accidental spills. Such waste will be handled and/or off appropriately in line with Waste Legislation. Construction processes will be managed through a Construction Management Plan and/or through reasonable planning condition(s).

2.9 Description of Reasonable Alternatives

This section of the EIAR focuses on alternatives that were considered the preparation of this EIAR and planning application. It has been carried out by Part 1(d) of Schedule 6 of the Regulations which requires: *"An outline of the main alternatives studied by the developer and an indication of the main reasons for his or her choice, taking into account the effects on the environment."* It also has close regard to the Guidelines for Planning Authorities and An Bord Pleanála on Carrying out Environmental Impact Assessment (2018) which states:

> *"The Directive requires that information provided by the developer in an EIAR shall include a description of the reasonable alternatives studied by the developer. These are reasonable alternatives, which are relevant to the project and its specific characteristics. The developer must also indicate the main reasons for the option chosen taking into account the effects of the project on the environment. Reasonable alternatives may relate to matters such as project design, technology, location, size, and scale."*

This section of the EIAR sets out an outline of the main alternatives that have been examined through the design and consultation stages of the planning process with the following headings:

- Alternative Locations
- Do-Nothing Scenario
- Alternative Uses
- Alternative Processes
- Alternative Designs/Layouts

2.9.1 Alternative Locations

The consideration of alternatives locations for the development has, in a significant number of cases, already been addressed and decided at strategic planning level during the preparation and adoption of the Fingal Development Plan 2017-2023. This plan establishes a housing need for the district which is required to be accommodated during the plan period and assesses all available land in the district, including the subject site and all available alternatives. This Plan will have been subject to Strategic Environmental Assessment which takes into account the environmental considerations associated with, for example, the cumulative impact of an area zoned for industry on a sensitive landscape. The EIA Guidelines also state that the statutory development plans can establish project-level objectives or other mitigation that a subsequent site project and its EIAR should be cognisant of.

Having regard to the above, Downey note that the lands subject to this application and EIAR are located within the Fingal County Council administrative area and the subject site is zoned *"RA – Residential Area"*. Outlined in the Development Plan, this zoning objective seeks the following:

- *"**RA - Residential Area Zoning Objective:** To provide for new residential communities subject to the provision of the necessary social and physical infrastructure."*

As this site is mainly zoned for residential development within an established urban area, it was not considered necessary to consider other sites outside of those already considered as part of the plan-making process. Furthermore, the site forms a natural extension to the existing developments currently occupied and/or under construction by the same applicant, namely Miller's Glen, Longview, and Meadowbank to the east of the lands.

2.9.2 Do Nothing Scenario

The application site, if left undeveloped, would revert to agricultural use but the remainder would be an eyesore, having accommodated temporary prefabs and construction compounds retained without use. Miller's Avenue (WDLR) would be a single-sided road for quite a long section, the regional park in the west would not be overlooked and secured by passive surveillance, and there would be no direct access from the avenue or the permitted and completed developments across the subject lands. The level of demand for housing within the development boundary of the Swords area, based on the future population growth predictions, would not be met, resulting in downstream impacts including housing needs and affordability.

A "Do Nothing" scenario would also be inconsistent with the RA land-use zoning pertaining to the lands and the objectives of the Development Plan to facilitate a new residential development on the subject lands as part of a wider development of Oldtown lands, and Swords. Given the subject site's location within Swords as well as access to public transport and mobility, failure to these lands would significantly impair the quality of the urban landscape and viability for a mix of sustainable uses and amenities for existing and future residents. As such, it is considered that the "Do Nothing" scenario is not a suitable alternative option for the subject lands.

Furthermore, not developing these zoned and serviced lands would be inconsistent with national planning policy as set out in the National Planning Framework, Regional Spatial Economic Strategy and Urban Development and Building Height Guidelines.

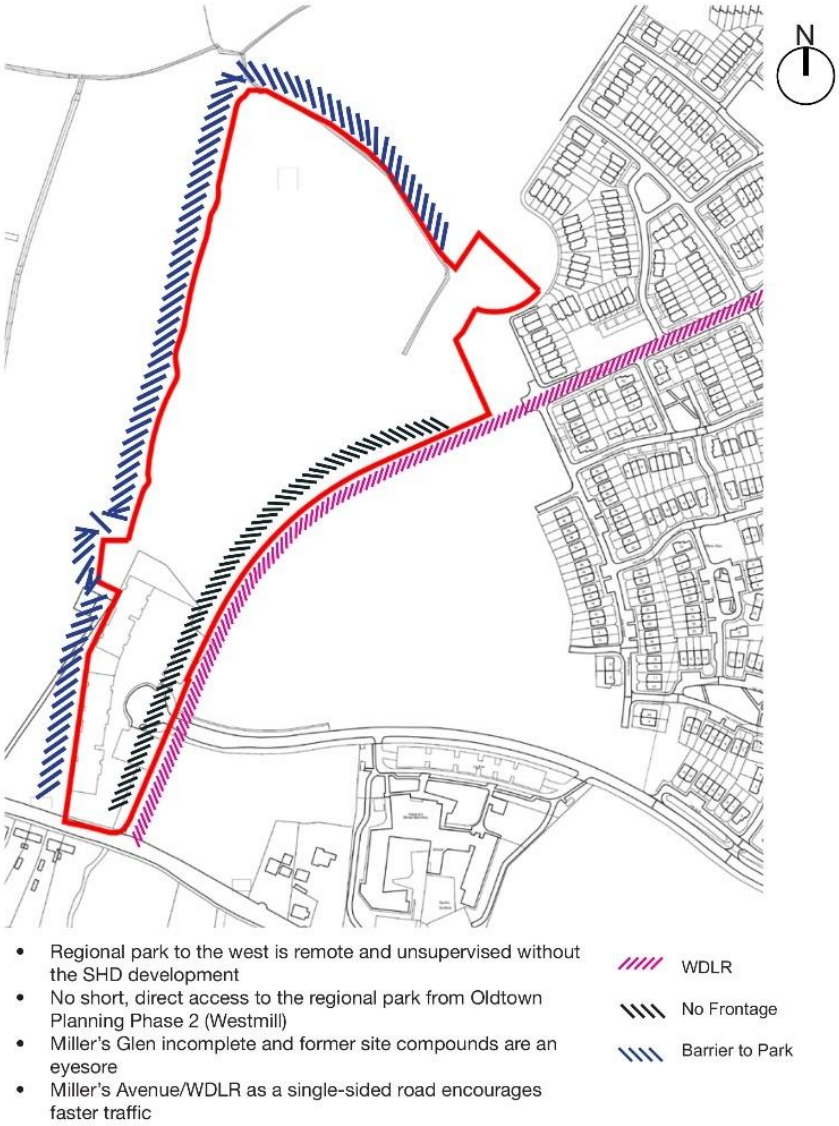

Figure 2-5. 'Do Nothing' Scenario. Image taken from Architects SWOT Analysis

2.9.3 Local Area Plan Layout (LAP since expired)

Whilst the LAP has since expired, the LAP indicative plan layout for the subject site area depicts a medium-density residential development with an indicative building line to the WDLR and the regional park. There is one indicative access point from Miller's Avenue shown and three pedestrian and cycle connections between this link road and the park. A green buffer strip is indicated around the park boundary, there is a small open space shown in the northern half of the site, and existing trees and hedges have been identified. The trunk watermain that runs beside and under the line of the road is also shown.

The Local Area Plan formed the basis for the design strategy of the overall Oldtown lands, which in turn formed the basis for the proposed site layout. The diagrammatic nature of the LAP layout designed at a high level to support the plan-making process demands a refinement at the level of detailed design. This is particularly the case for the inner road and pedestrian connections as those shown are not compatible with the pattern of development designed to masterplan level, nor would they make legible connections with the earlier built phases. The location and quantity of open space

was another item that required further consideration in the course of pre-planning consultation with the Local Authority. This being the case, the LAP layout is considered to reflect earlier, high-level iteration of the development design that had since been subject to detailed revision supported by specialist inputs from the expert EIAR study team listed in the EIAR Chapter 1, Table 1.

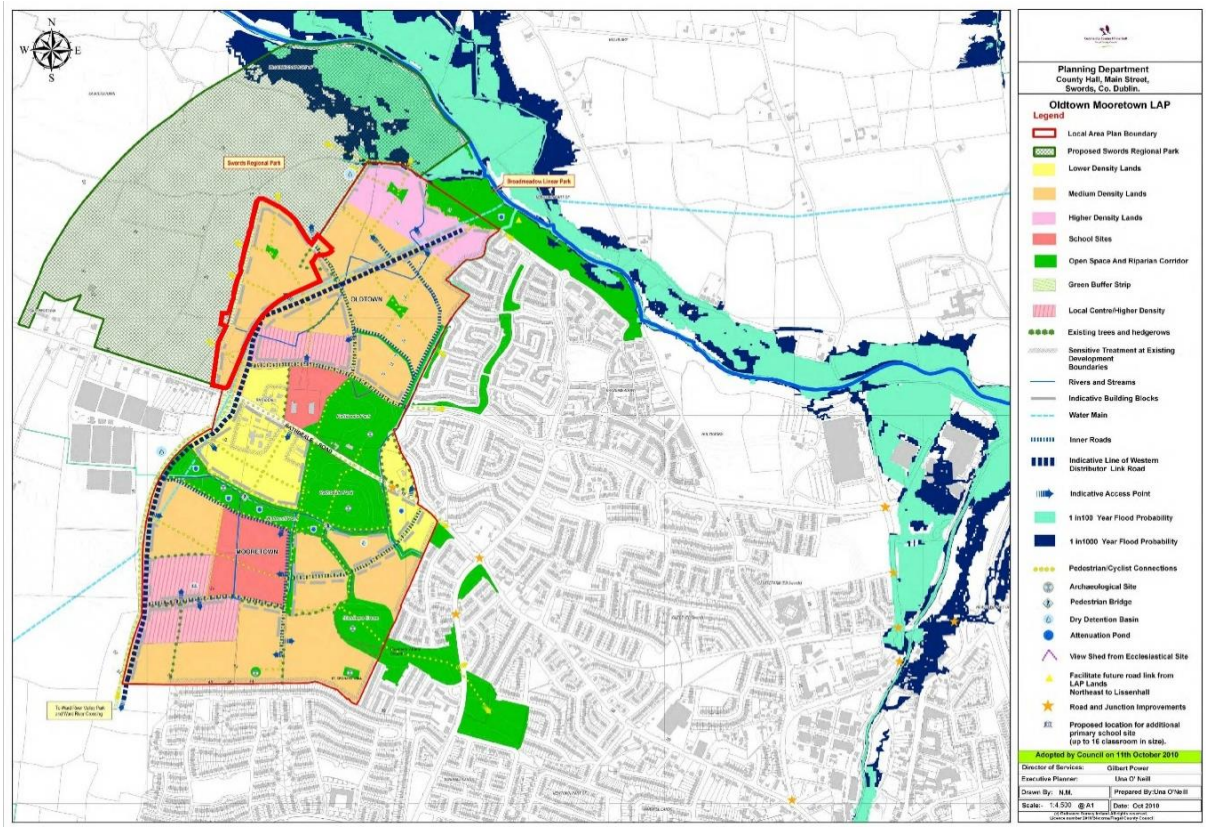

Figure 2-6. Local Area Plan Layout (subject site outlined in red)

2.9.4 Alternative Designs and Layouts

It must be noted that given the extensive ownership of the applicant of the entire landholding subject to this project, the existing, under construction, and planned infrastructure/development in place, and the zoning of the lands, there were no major alternative uses or processes that were considered reasonable. The alternatives to the proposed development considered during the preparation of this EIAR were related to the overall layout and internal roads pertaining to the proposed scheme. The design of the proposed project has evolved throughout the pre-application consultation process, resulting in alterations to the proposal. It is worth noting that the proposal may continue to develop following the application submission and continued consultation with relevant stakeholders, bringing the proposed development through detailed construction design and implementation.

The alternatives that have been considered as part of the design development are listed as follows:

Alternative 1: Applicant's Alternative 1

The Oldtown-Mooretown Local Area Plan 2010-2016 (expired July 2020) and the non-statutory Oldtown Masterplan (2012) were the "blueprint" documents for the proposed development and included detailed specific objectives for density, building height, connections, open space, village centre and unit mix. The preliminary layout proposed for the development in 2018 was compliant with

the LAP and Masterplan and provided for 339 dwellings, of which there were 202 houses, 151 apartments and a creche. Commercial and retail development was not required due to the close proximity of the village centre.

This proposal was presented to the Local Authority which requested amendments to the location and size of the central area of open space, the scale, form, and height of the apartment blocks in the northwest corner, and a green or buffer zone between the apartments in the southern sector of the site and the lands zoned for the regional park to the west.

Figure 2-7. Alternative 1 (source: CCK Architects)

Alternative 2: Application Layout

The current proposal reflects the development strategy and design issues required to be considered and addressed by the Applicant as per the Opinion of An Bord Pleanála, issued on foot of the Section 5 Pre-Consultation (Tripartite Meeting). The issues that were required to be considered as listed as follows:

> *"1. Design and Layout*
>
> *(a) Justification of the documents as they relate to the layout of the proposed development and in particular to the 12 criteria set out in the Urban Design Manual.*
>
> *Arrangement and hierarchy of streets, the configuration of the layout, connectivity with adjoining lands, provision of the hierarchy of open space and the creation of character areas.*
>
> *(b) Consideration/justification of the extent of surface parking and arrangement of same, and impact on the vitality of streetscape.*
>
> *(c) Consideration of the elevational treatment/expression of the materials/finishes of the proposed development to make a positive contribution to the character of the area over the long term.*
>
> *2. Height and Density*
>
> *Further consideration to height and density of the proposed development, about guidance in relation to height and sufficiently high density to provide for an acceptable efficiency in serviceable land usage given the location of the site to the Key Town of Swords and its established social and community uses."*

It is considered that the current proposed development is compliant with current planning and urban design guidelines, it has been tested as the most robust layout having regard to the environmental effects set out in this EIAR and that it is the most appropriate, efficient, and sustainable use of the lands that meets the recommendations posed by the Local Authority and An Bord Pleanála. The final application design for the site proposes a legible, permeable, and coherent extension to the earlier built phases. This layout allows for the development of the lands zoned for residential development in the Fingal Development Plan to continue in an orderly manner and unbuilt gaps between existing and new to be avoided.

Figure 2-8. Application Site Layout Plan

2.10 Consideration of Cumulative Effects with Other Projects

The assessment in each EIAR Chapter (Nos. 5 to 14) has considered the cumulative impacts of construction and operational phases of the proposed development, in conjunction with surrounding developments completed, under construction, and those to be commenced.

As it stands, the proposed development forms the fifth and final phase of the zoned Oldtown lands, located in a context with ongoing developments in the adjoining areas. Additional planning applications in the wider vicinity of the lands include the earlier phases of the zoned Oldtown-Mooretown lands, most of which are now under construction. Other planning applications in the wider area include revisions and alterations to existing buildings or small proposals or permissions which have since expired. Such applications have no material consideration to the proposed development noting the minor nature of same. The aforementioned applications and developments have all been taken into consideration as part of this EIAR.

As per this EIAR, it is submitted that such applications are expected to have no material consideration to the proposed development, save for a betterment resulting from the combined landscape and visual effect (Chapter 11) by providing the final phase of development in this tranche of lands which would complete the residential development in this area which is moderate and positive in nature.

2.11 Risk of Major Accidents and/or Disasters

The surrounding environment of the proposed project consists of a mix of low to mid-rise residential, commercial, and educational facilities. The Fingal Development Plan 2017-2023 identifies Seveso sites within the Fingal area and specific distances for each ranging from 300-1000m, all of which are identified in Table 12.13 of the Development Plan and on the relevant zoning maps for the county. There is one SEVESO II Directive site (96/82/EC & 2003/105/EC) within 1km of the proposed project located within Swords, approximately 0.8km from the proposed tank site that forms part of the application site. Given the nature of the proposed development at this part of the application site, no people will be residing/working/occupying this portion of the application site for long periods as it is a stormwater storage tank piece of infrastructure. Therefore, there is no risk of a major accident or disaster in relation to a major chemical accident.

In terms of the risk of a major accident and disaster, the vulnerability of the scheme is considered to be low given the location of the proposed scheme and the existing built environment surrounding the site. Therefore, the potential risk posed by a major accident and or disaster has been considered based on a low vulnerability of same. The overall risk is considered to be low.

3.0 PLANNING & DEVELOPMENT CONTEXT

3.1 Introduction

The subject site is located within the administrative area of Fingal County Council and is governed by the Fingal County Council Development Plan 2017-2023 and relevant national, regional, and local objectives and planning policies. The foregoing represents the relevant plans, guidelines, frameworks, and legislation for the Assessment in line with recital 32 and Article 4(4) of the EIA Directive and Article 299(1)(b)(ii)(II)(C) of the Planning and Development Regulations 2001 (as amended).

National Planning Policy and Legislation

- Project Ireland 2040: National Planning Framework
- Project Ireland 2040: National Development Plan 2021-2030
- Rebuilding Ireland, An Action Plan for Housing and Homelessness (2016)
- Housing for All: A New Housing Plan for Ireland
- Affordable Housing Act 2021 & Housing Circular 28/2021
- The Housing Agency Statement of Strategy 2022-2024
- Residential Densities in Towns and Villages (Circular Letter: NRUP 02/2021)
- Sustainable Residential Development in Urban Areas and Best Practice Urban Design Guidelines (2009)
- Delivering Homes, Sustaining Communities: Statement on Housing Policy (2007)
- Quality Homes for Sustainable Communities (2007)
- Sustainable Urban Housing: Design Standards for New Apartments (Dec 2020)
- Urban Development and Building Heights Guidelines for Planning Authorities (Dec 2018)
- Childcare Facilities: Guidelines for Planning Authorities (2001)
- Childcare Facilities operating under the ECCE Scheme (Circular Letter: PL 3/2016)
- Smarter Travel: A Sustainable Transport Future
- Design Manual for Urban Roads and Streets (DMURS)
- National Cycle Manual (June 2011)
- EIA Directive 2014/52/EU
- Bird and Habitats Directive - Appropriate Assessment
- The Planning System and Flood Risk Guidelines (2009)
- All-Ireland Pollinator Plan 2021-2025
- National Adaptation Framework: Planning for a Climate Resilient Ireland
- Climate Action Plan 2019

Regional Planning Policy

- Regional Spatial & Economic Strategy for the Eastern & Midland Region
- Transport Strategy for the Greater Dublin Area 2016-2035

Local Planning Policy

- Fingal Council Development Plan 2017-2023
- Oldtown-Mooretown Local Area Plan 2010-2016 (extended July 2020 and expired since)

This chapter outlines the planning and development context for the proposed development with reference to the aforementioned principal planning policy documents. This chapter also sets out the development context and the planning history within which the proposed development should be considered and provides the policies, principles, and objectives within which the proposed development should be assessed. It is important to note that a full Statement of Consistency with Planning Policy has been prepared by Downey Planning and is submitted under separate cover as part of the planning application. That report sets out a detailed analysis of the project's consistency with the relevant planning objectives as they pertain to the area and project.

3.2 National Planning Context

3.2.1 Project Ireland 2040: National Planning Framework

The National Planning Framework is "*the Governments high-level strategic plan for shaping the future growth and development of our country out to the year 2040*". It is a Framework to guide public and private investment, to create and promote opportunities for our people, and to protect and enhance our environment - from our villages to our cities and everything in between. It is stated within the National Planning Framework that, "*a major new policy emphasis on renewing and developing existing settlements will be required, rather than continual expansion and sprawl of cities and towns out into the countryside, at the expense of town centres and smaller villages*".

It is also stated that there will be an ongoing shift in population and jobs to the east and to the counties around Dublin in particular. The NPF will support the future growth and success of Dublin as Ireland's leading global city of scale, by better managing Dublin's growth to ensure that more of it can be accommodated within and close to the city. According to the National Planning Framework, Dublin needs to accommodate a greater proportion of the growth it generates within its metropolitan boundaries and to offer improved housing choice, transport mobility and quality of life. Dublin's continued performance is critical to Ireland's competitiveness.

The NPF states that, "*the long-term vision for Ireland's housing future aims to balance the provision of good quality housing that meets the needs of a diverse population, in a way that makes our cities, towns, villages and rural areas good places to live now and in the future.*" It is outlined within the Plan that future homes are required to be located where people have the best opportunities to access a high standard quality of life. In Ireland, the location of housing has taken on a dispersed and fragmented character which has led to people living further away from their jobs and often being at a sizeable remove from important services such as education and healthcare. It is stated that it is important to "*prioritise the location of new housing provision in existing settlements as a means to maximising a better quality of life for people through accessing services, ensuring a more efficient use of land and allowing for greater integration with existing infrastructure*."

The NPF has a number of national policy objectives which are relevant to this application, which include: National Policy Objective 3a, 4, 6, 11, 13, 33 and 35 which seek to deliver the majority of housing within the built-up area of existing settlements, particularly towns that can support sustainable growth and achieve an increase in residential density set within the context of a high-quality development. Furthermore, the NPF adds that "*apartments made up 12% of all occupied households in Ireland and 35% of occupied households in the Dublin City Council area in 2016 (census*

data)". It is stated within the Project Ireland 2040 plan that, *"in many European countries it is normal to see 40-60% of households living in apartments*."

The proposed development will provide for a high-quality residential development that forms part of the overall Moortown-Oldtown zoned lands achieving a net density of 48.3 units per hectare (7.8h developable land) set in the context of a high-quality design. It is submitted to be in line with Government guidance and evolving trends for sustainable developments in urban areas. It is evident that apartment developments are required in urban areas to meet the current demand for housing, particularly in Dublin. It is therefore considered that the provision of 173 no. houses, and 204 no. apartment/duplex units on the subject site will assist in achieving the objectives of the NPF.

3.2.2 Project Ireland 2040: National Development Plan 2021-2030

Project Ireland 2040 National Planning Framework (NPF), which sets the overarching spatial strategy for the next twenty years, includes the National Development Plan, which sets out the ten-year investment strategy. The NPF housing supply target has been refined to reflect recent (2020) ESRI research based on NPF population growth, taking into account both existing demand and a legacy of undersupply to date. There is now a need to accommodate around 600,000 new households by 2040, with the Department of Housing planning to deliver an average of 33,000 homes per annum to 2030 including an average of 10,000 new social homes each year and an average of 6,000 affordable homes each year.

Set out in the NDP, public capital investment must, as a top priority, support the delivery and location of the homes that society will need over the next decade and beyond, while also ensuring that in the future the pattern of housing development underpins the development of more compact higher-density cities, towns, and other areas. It is also a priority to enable infill development, with up to 50% of future housing in our cities and major urban centres and 30% elsewhere to be provided within existing built-up areas serviced by existing facilities and along high-capacity public transport corridors.

The proposed development will provide for a sustainable residential development on appropriately zoned lands, which forms part of the overall Oldtown/Mooretown scheme as the fifth and final phase of the Oldtown lands. It is therefore considered that the provision 377 no. residential units with 1 no. childcare facility on the subject site will assist in achieving the objectives of the National Development Plan 2021-2030. The proposed development will benefit from the built environment already established within Oldtown-Mooretown lands and surrounding areas of Swords including the network of local streets, public spaces and in particular natural open spaces. The proposed development will also be close to several schools, health services and childcare facilities which will cater for the influx of population arising from the proposed development. In light of the above, it is submitted that the proposed development is consistent with the National Development Plan in this instance.

3.2.3 Rebuilding Ireland, An Action Plan for Housing and Homelessness (2016)

'*Rebuilding Ireland, an Action Plan for Housing and Homelessness*', provides a multi-stranded, action-oriented approach to achieving many of the Government's key housing objectives. The overarching aim of the Plan is to ramp up delivery of housing from its current undersupply across all tenures to help individuals and families meet their housing needs, and to help those who are currently housed to remain in their homes or be provided with appropriate options of alternative accommodation

especially those families in emergency accommodation. The provision of 377 no. residential units on the subject site will help the Government to achieve the objectives of the Housing Action Plan. Therefore, it is submitted that the proposed development is consistent with the policy in this regard.

3.2.4 Housing for All: A New Housing Plan for Ireland

The Housing for All: A New Housing Plan for Ireland states that Ireland's housing system is not meeting the needs of enough of our people, and therefore, it needs to increase new housing supply to an average of at least 33,000 new units per year over the next decade. This will include over 10,000 social homes each year over the next five years, with 9,500 of these being new-builds, and an average of 6,000 affordable homes for purchase or rent.

Housing for All provides four pathways to achieving four overarching objectives: (1) Supporting Homeownership and Increasing Affordability; (2) Eradicating Homelessness, (3) Increasing Social Housing Delivery and Supporting Social Inclusion; Increasing New Housing Supply; and (4) Addressing Vacancy and Efficient Use of Existing Stock. Outlined in the Plan, the State must act decisively to increase supply of both private and public housing. An average of 33,000 homes must be provided every year between now and 2030. Increased housing output is needed in all sectors - private, affordable, and social - to meet the needs of people in a wide variety of circumstances.

It is submitted that provision of 377 no. residential units on the subject site will help the Government to achieve the objectives of the Housing for All Plan in increasing the housing output. Therefore, it is considered that the proposed development is consistent with the development framework in this regard.

3.2.5 Affordable Housing Act 2021 & Housing Circular 28/2021

In July 2021, the Affordable Housing Act 2021 was published, aiming to address problems associated with the high cost of housing for the portion of the population that do not qualify for social housing. Coming to effect from 3rd September 2021, the Housing Circular 28/2021, amends Part V of the Planning and Development Act 2000. The Programme for Government contained commitments in relation to expanding Part V to encompass affordable purchase and cost rental units and introducing affordable homes requirements to Part V. Part 6 of the Affordable Housing Act 2021, which was enacted on 21 July 2021, gives effect to this commitment. The principal change to Part V made by these amendments is to increase the Part V contribution for new housing developments from 10% social housing to a mandatory 20% requirement, at least half of which must be applied to social housing provision and up to half of which may be applied to affordable and cost rental housing.

It is considered that the proposed development is consistent with the Affordable Housing Act 2021, Housing Circular 28/2021, and the requirements under Part V of the Act as it is proposed to provide 20% of the housing units for social and affordable housing. For further details, please refer to the enclosed Part V Validation Letter from Fingal County Council with associated indicative costings and layout.

3.2.6 The Housing Agency Statement of Strategy 2022-2024

Launched in late January 2022, the Housing Agency's Statement of Strategy, outlines how more affordable housing, increasing the supply of social and private homes and addressing social inclusion issues such as homelessness and ageing will be the priorities for the work of The Housing Agency over 2022-2024. The Statement of Strategy frames the work of The Housing Agency under three broad themes: (1) being a centre for housing knowledge; (2) bridging housing supply and demand; (3) building capacity for housing. It also outlines how, over the coming years, the Housing Agency will use research, informed policy insights and data to work *"to achieve a housing system that meets the housing needs of the nation and promotes viable, sustainable communities"*.

It is submitted that the provision of 377 no. residential units on appropriately zoned land under the Fingal Development Plan 2017-2023 would help utilise an existing capacity within the built-up area of Oldtown-Mooretown, Swords, and facilitate meeting the housing target for the area and the overall County. Therefore, it is considered that the proposed development is consistent with the foregoing Strategy in this regard.

3.2.7 Residential Densities in Towns and Villages (Circular Letter: NRUP 02/2021)

The purpose of this Circular, issued on 21st April 2021, is to provide clarity in relation to the interpretation and application of current statutory guidelines, in advance of issuing updated Section 28 guidelines that will address sustainable residential development in urban areas. It is considered important to address this matter in the context of both the need for significantly increased and more sustainable housing supply throughout Ireland, and national recovery from the Covid-19 pandemic.

Outlined in the Circular, while the *Sustainable Residential Development Guidelines* clearly encourage net densities in the 35-50 dwellings per hectare range within cities and larger towns, net densities of 30-35 dwellings per hectare may be regarded as acceptable in certain large town contexts and net densities of less than 30 dwellings per hectare, although generally discouraged, are not precluded in large town locations.

Considering that the Census 2016 recorded a population of 39,248 people for Swords, the town stands within the larger towns category, contributing to the consolidation of the Dublin Metropolitan Area. Accordingly, the proposed development of the subject lands is submitted to strengthen the urban role of Swords and reinforcing the vital role of Swords in the settlement's hierarchy of the County, and therefore, is considered to be consistent with the foregoing Circular.

3.2.8 Sustainable Residential Development in Urban Areas and Best Practice Urban Design Guidelines (2009)

The main objective of the '*Sustainable Residential Development in Urban Areas Guidelines*' is to produce high-quality sustainable developments through providing (a) quality homes and neighbourhoods; (b) places where people actually want to live, to work and raise families; (c) places that work – and will continue to work – not just for us, but for our children and for our children's children. These are set out in a number of principles as follows:

1) The Guidelines set out the key planning principles which should be reflected in development plans and local area plans including Section 2.3 which promote a sequential approach to the zoning of residential lands. In this regard, the subject site is zoned for new residential development under the "RA – Residential Area" zoning designation of the Fingal Development Plan 2017-2023, where both residential and childcare facilities are a permitted in principle land use. The subject site is located on appropriately zoned lands to the west of Swords. The site is contiguous to existing residential developments at Oldtown lands to the north and east of the site, and Mooretown lands to the south of the site. In light of this, the zoning and future development of the subject site is in accordance with these Guidelines.

2) The Guidelines also support increased residential densities particularly for sites located in *'*Outer Suburban/Greenfield' sites, particularly for such sites on the periphery of cities or larger towns, requiring as it states: *"35-50 dwellings per hectare"* and that *"development at net densities less than 30 dwellings per hectare should generally be discouraged."* The application site will achieve an overall net density of c. 48.3 dwellings per hectare. It is considered that the site is classified as an outer suburban/greenfield site appearing as a natural urban extension connected to the existing town of Swords at its western development boundary, situated within an accessible location on appropriately zoned lands.

3) In terms of planning for sustainable neighbourhoods, the document outlines the importance of the provision of schools, community centres, healthcare facilities and district/neighbourhood centres use to the sustainability of communities. The subject site is located within the Oldtown part of the Oldtown-Mooretown lands and is an extension of Millers Glen, overall development of which includes a cumulative total of 967 no. dwellings, 5 no. crèches and the commercial centre. Thus, this proposed scheme is contributing to the completion of the Oldtown lands, proposing 377 no. residential units, a childcare facility of 519 sqm, and amenity space spread across the lands with the remaining to be developed on the OS zoned lands to the north of the site.

4) In relation to amenity/quality of life issues, the guidance states that: "*Well-designed open space is even more important in higher density residential developments*". The proposed development provides for 8,715 sqm of amenity space (including Class 2 open space) within Phase 5 of the overall residential scheme whilst being in close proximity to Broadmeadow Park, the future Regional Park, alongside the Rathbeale Archaeological Park to serve the residents of Oldtown and the wider area.

5) The design of the proposed development has placed considerable emphasis on the context of the site and location as well as the surrounding built environment. The proposed development successfully incorporates the criteria of the '*Urban Design Manual - A Best Practice Guide'* and its 12 criteria, including: *Context, Connections, Inclusivity, Variety, Efficiency, Distinctiveness, Layout, Public Realm, Adaptability, Privacy/Amenity, Parking*, and *Detailed Design*, of which Planning Authorities are recommended to assess planning applications. It is evident that the form, layout, and architectural and landscaping design of the proposed development have been informed by the development's place and time. Well-designed homes in the right locations are fundamental to building strong, sustainable communities. Such communities will ensure Ireland's continued success in attracting and generating investment and improving the quality of life for residents. Downey are of the considered opinion that the proposed development represents a development that has been carefully and appropriately designed, giving full consideration to its neighbouring

properties and will integrate successfully with its environs. The proposed development has had regard to the surrounding environment and carefully assesses the proposal in light of same. The development positively contributes to the character and identity of the surrounding neighbourhood. The proposed scheme is also considered to be of an appropriate density which will help to support efficient public transport.

It is submitted that the proposed development would be a positive addition to the surrounding built environment of Oldtown and to the identity of the locality. Furthermore, it is considered that the proposed buildings will meet the aspirations of a range of people and the design and layout of such allows easy access by all. For further information on the proposed development's consistency with the '*Urban Design Manual*', please refer to the Architectural Design Statement (Architects Report) prepared by CCK Architects.

3.2.9 Delivering Homes, Sustaining Communities: Statement on Housing Policy (2007)

The "*Delivering Homes, Sustaining Communities"* policy statement is accompanied by Best Practice Guidelines entitled "*Quality Housing for Sustainable Communities*". The purpose of these Guidelines is to promote high standards in the design and construction and the provision of residential units and services in new housing developments. Best use of land is encouraged and optimal utilisation of services and infrastructure in the provision of new housing; point the way to cost effective options for housing design that go beyond minimum codes and standards; promote higher standards of environmental performance and durability in housing construction; seek to ensure that residents of a new housing scheme enjoy the benefits of first-rate living conditions in a healthy, accessible and visually attractive environment; and provide homes and communities that may be easily managed and maintained.

This planning application is accompanied by an Architectural Design Statement (Architects Report) and a Housing Quality Assessment (HQA) document prepared by CCK Architects, which demonstrate that the proposed development is compliant with the relevant standards in the '*Quality Housing for Sustainable Communities*' document and the Fingal Development Plan 2017-2023.

3.2.10 Sustainable Urban Housing: Design Standards for New Apartments (Dec 2020)

The "*Sustainable Urban Housing: Design Standards for New Apartments*" provides guidance on design quality safeguards such as internal space standards for apartments, internal storage and amenity space. The Guidelines state that Ireland is a long way behind European averages in terms of the numbers of households living in apartments, especially in our cities and larger towns. It seeks to encourage greater provision, particularly in townland development such as the application site. It is defined as an "*(2) Intermediate Urban Locations"* suitable for a net density of 48 units.

The Guidelines also have specific planning policy requirements (SPPRS) and objectives, which include:

1) **Specific Planning Policy Requirement 1**: *"Apartment developments may include up to 50% one-bedroom or studio type units (with no more than 20-25% of the total proposed development as studios) and there shall be no minimum requirement for apartments with three or more bedrooms. Statutory development plans may specify a mix for apartment and other housing developments, but only further to an evidence-based Housing Need and Demand Assessment*

(HNDA)." In this regard, the proposed development at Oldtown (subject to this application) provides for 173 no. houses (9 no. 2 beds, 147 no. 3 beds, and 17 no. 4 beds), 204 no. apartment/duplex units (98 no. 1 beds, 104 no. 2 beds, and 2 no. 3 beds), all with associated car and bicycle parking spaces, areas of amenity space, and 1 no. childcare facility.

2) **Specific Planning Policy Requirement 3**: *"Minimum Apartment Floor Areas: Studio apartment (1 person) 37 sq. m; 1-bedroom apartment (2 persons) 45 sq. m; 2-bedroom apartment (4 persons) 73 sqm; 3-bedroom apartment (5 persons) 90 sqm"* This SHD application also includes a Housing Quality Assessment (HQA) and Building Lifecycle report prepared by CCK Architects, and a detailed Daylight, Sunlight, and Internal Light Analysis Report prepared by DK Partnership International, and submitted in accordance with Chapter 6 of the Guidelines. The proposed development will help to meet the current demand for apartment type developments. For further information in this regard, please refer to the enclosed architectural drawings and detailed HQA schedules prepared by CCK Architects, which provide confirmation that the proposed development is consistent with the design standards of these Guidelines.

3) **Specific Planning Policy Requirement 4** *"In relation to the minimum number of dual aspect apartments that may be provided in any single apartment scheme, the following shall apply…in suburban or intermediate locations, it is an objective that there shall generally be a minimum of 50% dual aspect apartments in a single scheme. "* The proposed development in this instance is located in a suburban location on appropriately zoned lands in an accessible location to the western development boundaries of Swords. In this regard, the minimum requirement for dual aspect units is 50%. The proposed development provides for a minimum of 60% dual aspect units and therefore accords with the aforementioned Guidelines.

4) In terms of Children's Play areas, the Guidelines state: "*Children's play needs around the apartment building should be catered for: within the private open space associated with individual apartments; within small play spaces (about 85-100 sqm) for the specific needs of toddlers and children up to the age of six, with suitable play equipment, seating for parents/guardians, and within sight of the apartment building, in a scheme that includes 25 or more units with two or more bedrooms; and, within play areas (200-400 sqm) for older children and young teenagers, in a scheme that includes 100 or more apartments with two or more bedrooms."* The proposed development comprises a range of green open spaces, including 3 no. featured green spaces providing for more than 0.8ha of open space across the lands, in addition to the provision of the Class 1 open space lands to the north which are included as part of this application.

As such, it is submitted that the proposed development is consistent with the Guidelines in this instance. For further details, please refer to the enclosed landscape drawings prepared by Doyle O'Troithigh Landscape Architecture and Urban Design and Architectural Statement prepared by CCK Architects.

3.2.11 Urban Development and Building Heights Guidelines for Planning Authorities (Dec 2018)

The "*Urban Development and Building Heights, Guidelines for Planning Authorities"* are intended to set out national planning policy guidelines on building heights in relation to urban areas, to provide greater build heights and more compact forms of development. The guidelines go on to further state that *"newer housing developments outside city and town centres and inner suburbs, i.e., the suburban edges of towns and cities, typically now include town-houses (2-3 storeys), duplexes (3-4 storeys) and*

apartments (4 storeys upwards). Such developments deliver medium densities, in the range of 35-50 dwellings per hectare net".

The Guidelines identify types of locations that may be suitable for apartment developments. In this regard, it is considered that the proposed development falls within "*(2) Intermediate Urban Locations"* as it meets the criteria for this location in that the site is located approximately within circa 5km of Swords Town Centre and is located within the town's development boundary and as such is suitable for a net density of 48 units per hectare.

The following Special Planning Policy Requirements are contained within the Guidelines and are relevant to the proposed development:

1) **SPPR1:** *"In accordance with Government policy to support increased building height and density in locations with good public transport accessibility, particularly town/city cores, planning authorities shall explicitly identify, through their statutory plans, areas where increased building height will be actively pursued for both redevelopment, regeneration and infill development."* The proposed development is situated within the wider Oldtown-Mooretown lands and comprises the final phase of a wider residential scheme within Oldtown immediately adjoining the R125 regional road and is capable of supporting taller buildings and increased density.
2) **SPPR2:** *"In driving general increases in building heights, planning authorities shall also ensure appropriate mixtures of uses, such as housing and commercial or employment development, are provided for in statutory plan policy…enabling urban redevelopment to proceed in a way that comprehensively meets contemporary economic and social needs, such as for housing, offices, social and community infrastructure, including leisure facilities."* The proposed development seeks to provide for a residential development that is surrounded by a wide range of uses. As part of the scheme, a childcare facility is also proposed. There are numerous retails, health, community, and commercial facilities within the vicinity of the subject site, as well as a number of recreational/leisure amenities including parks and sports clubs. A Community and Social Infrastructure Audit has been prepared by Downey, enclosed with this SHD application, which provides an overview and assessment of existing social infrastructure and facilities within Oldtown that ensures compliance with the aforementioned specific planning policy.
3) **SPPR3:** *"It is a specific planning policy requirement that where; 1. An applicant for planning permission sets out how a development proposal complies with the criteria above, and 2. the assessment of the planning authority concurs, taking account of the wider strategic and national policy parameters set out in the National Planning Framework and these guidelines; Then the planning authority may approve such development, even where specific objectives of the relevant development plan or local area plan may indicate otherwise."* It is submitted that this SHD application contains sufficient reports, documentation, plans and justification to support the proposed development and outlines how the development is in accordance with the relevant planning policies and guidelines pertaining to the area. Such documents include architectural plans and elevations, Urban Design Statement (Architects Report), DMURS statements, Traffic Assessment, EIAR, planning reports, and engineering reports.
4) **SPPR4:** *"It is a specific planning policy requirement that in planning the future development of greenfield or edge of city/town locations for housing purposes, planning authorities must secure: (1) The minimum densities for such locations set out in the Guidelines issued by the Minister under Section 28 of the Planning and Development Act, 2000 (as amended), titled "Sustainable*

Residential Development in Urban Areas (2007)" or any amending or replacement Guidelines; (2) A greater mix of building heights and typologies in planning for the future development of suburban locations; and (3) Avoid mono-type building typologies (e.g. two storey or own-door houses only), particularly, but not exclusively so in any one development of 100 units or more." The proposed development provides for 173 no. houses (9 no. 2 beds, 147 no. 3 beds, and 17 no. 4 beds), and 204 no. apartment/duplex units (98 no. 1 beds, 104 no. 2 beds, and 2 no. 3 beds). This provides for a net density of 48 units per hectare for the proposed scheme (377 units on 7.8 hectares of developable lands on the application site), which is in accordance with relevant local and national policy guidelines. Additionally, there is an appropriate mix of housing typologies and heights ranging from two to three storey houses, three storey duplexes to five storey apartments. The development is therefore in accordance with SPPR 4 of these Guidelines and is consistent with the aforementioned Guidelines.

In relation to bicycle and car parking requirements, the proposed development subject to this SHD application provides a total of 600 no. car parking spaces comprising on-street, on-curtilage, and undercroft parking, and a total of 440 no. bicycle spaces, in high quality, safe and accessible locations throughout the scheme. This is considered to be acceptable and in accordance with the requirements of the Guidelines.

In light of the above, it is considered that the proposed development is consistent with the requirements of these guidelines on building heights for urban developments.

3.2.12 Childcare Facilities: Guidelines for Planning Authorities (2001)

Government policy on childcare is to increase the number of childcare places and facilities available and to improve the quality of childcare services for the community. These Guidelines for Planning Authorities on Childcare Facilities provide a framework to guide both local authorities in preparing development plans and assessing applications for planning permission, and developers and childcare providers in formulating development proposals.

For housing schemes, the Guidelines provide a benchmark provision of 1 no. 20 space childcare facility per 75 dwellings. The threshold for provision should be established having regard to existing location of facilities and the emerging demography of the area where new housing is proposed. The recommendations provided within the Guidelines must be considered in the context of the '*Sustainable Urban Housing: Design Standards for New Apartments*' (2018), which state that: *"Notwithstanding the Department's Planning Guidelines for Childcare Facilities, which are currently subject to review and recommend the provision of one childcare facility (equivalent to a minimum of 20 child places) for every 75 dwelling units."* It is worth noting that as stated within the apartment guidelines, "*one-bedroom or studio type units should not generally be considered to contribute to a requirement for any childcare provision and subject to location, this may also apply in part or whole, to units with two or more bedrooms*".

As recommended in the Guidelines, a maximum of 5 no. childcare facilities providing for 100 no. childcare spaces would be required as part of the development. Excluding the 1-bedroom apartment/duplex units from the overall provision for 377 no. residential units, this leaves a total of 279 no. units that can be deemed to accommodate families and therefore may generate demand for

childcare places. With respect to the foregoing and as per the following calculations, the proposed scheme would require c. 74 childcare places. (279 ÷ 75) × 20 = 74.4 childcare places. In light of the above, it is submitted that the proposed development is consistent with the Childcare Facilities Guidelines. For further details and information in this regard, please refer to the Childcare Provision Assessment report prepared by Downey under a separate cover.

3.2.13 Childcare facilities operating under the Early Childhood Care and Education (ECCE) Scheme (Circular Letter: PL 3/2016)

The purpose of this Circular, issued on 31st March 2016, is to revise the Childcare Facilities Guidelines for Planning Authorities 2001. Planning authorities are requested to: (a) Expedite all pre-planning application consultation requests from Childcare facility providers in relation to proposals to extend opening hours, to increase capacity or to provide new facilities. (b) Expedite, insofar as is possible, consideration of all planning applications or Section 5 declaration submissions in respect of childcare facilities in order to facilitate the expansion of required capacity as appropriate.

It is submitted that the scheme would bring the proposed childcare facility to the southern portion of the application site, facing onto the provisioned one-way access route separated from the Miller's Avenue by a verge of green space, providing for full accessibility of this facility. The childcare would also benefit from an approximately 210 sqm playground designed to the back of the building. The neighbouring houses and duplex block will also enhance activity within the surrounding public realm, which would also contribute positively to achieve a safe and dynamic bounding public realm for the childcare facility. It is submitted that the proposed childcare facility provides for adequate capacity to cater for the influx of population arising from the proposed development. Therefore, it is suggested that the proposed development is consistent with Circular PL 3/2016.

3.2.14 Smarter Travel: A Sustainable Transport Future

In summary, '*Smarter Travel: A Sustainable Transport Future*' states that, "*to achieve the vision of a sustainable transport system, individual lifestyles will have to change and collectively we will have to work progressively on a range of solutions which deal with apparently conflicting goals: economic growth, reduced emissions, less use of motorised transport and better accessibility.*" The 5 key goals of this transport policy are include improving quality of life; economic competitiveness; minimising the negative impacts of transport; reducing travel demand and improving energy supply security.

It is considered that the proposed scheme complies with '*Smarter Travel: A Sustainable Transport Future'*. The Oldtown lands are currently served by various bus services which serve a number of bus stops distributed across the area. The subject site is located approximately 100 metres from R125 Rathbeale Road and closest bus stops (currently served by Dublin Bus Route 41B and Go-Ahead Bus Route 197). Additionally, there are 2 no. bus stops on Glen Ellan Road c. 700m east of the subject site (currently served by Swords Express bus routes 506 and 506X). These routes provide direct access to Dublin City Centre from the proposed development. The proposed development also provides considerable secure bicycle parking for future residents and visitors to again encourage use of sustainable modes of transportation. It is considered that the proposed development is consistent with this national transport policy and will assist in its implementation. Further details are provided in enclosed Traffic and Transport Assessment prepared by Waterman Moylan Engineering Consultants.

3.2.15 Design Manual for Urban Roads and Streets (DMURS)

The '*Design Manual for Urban Roads and Streets*' (DMURS) 2013 and as updated in 2019, sets out design guidance and standards for constructing new and reconfigured existing urban roads and streets. It also sets out practical design measures to encourage more sustainable travel patterns in urban areas. The engineering assessment report prepared by Waterman Moylan Engineering Consultants provide further details in respect of the compliance of the proposed development with the provision of DMURS. Please refer to the pertaining documents prepared by Waterman Moylan Engineering Consultants for further information in this regard.

3.2.16 National Cycle Manual (June 2011)

The *'National Cycle Manual'* 2011 embraces the Principles of Sustainable Safety as this will offer a safe traffic environment for all road users including cyclists. The Manual also gives guidance on the minimum number of spaces which should be provided initially at new private and public facilities in urban areas. For housing developments, this is stated to be: 1 no. private secure bicycle space per bed space, minimum 2 spaces; and 1 visitor bicycle space per two housing units. Cycle parking should also be designed for convivence with shared facilities suitable for multiple dwellings.

It is submitted that connections in the proposed development have been addressed by provision of high standard and prioritised cycle infrastructure along Rathbeale Road, Glen Ellan Road, key roads on the network, and the northern extension of the Swords Western Distributor Road. Additionally, a new feeder route is proposed to link Oldtown-Mooretown with Swords Main Street. Please refer to the enclosed Traffic and Transport drawings and documentation prepared by Waterman Moylan Engineering Consultants for further details in this regard.

3.2.17 EIA Directive

The EIA Directive 85/337 EEC, as amended, is the key legislation in EU Environmental Policy. The EIA Directive aims to determine the likely significant effects of a project on the environment. Screening is the first stage in the EIA process required by Article 4 of the EIA Directive and this process determines whether an EIA is required for a specific project. The Directive outlines in Article 4(1) 24 Annex 1 projects that require a mandatory EIA. Article 4(2) outlines Annex 2 projects that require consideration for EIA further to a case-by-case examination or through thresholds and criteria set out by Member States. In an Irish context, projects requiring a mandatory EIA or consideration for EIA further to a case-by-case examination or thresholds are listed in Schedule 5 of the Planning and Development Regulations.

Development projects requiring an Environmental Impact Assessment Report (EIAR) are set out in Schedule Five of the Planning and Development Regulations, 2001 (as amended). Part 1 of this schedule lists those projects that require a mandatory EIA irrespective of size in any EU Member State whereas Part II identifies the threshold limits for projects that require a mandatory EIA in Ireland. Article 10(b)(i) of Part II 'Infrastructure Projects' indicates that an EIA is required for the construction of more than 500 dwellings. Another threshold is the size of the development site and in this regard, Article 10(b)(iv) requires that an EIAR be prepared for urban developments which would involve an area greater than 2 hectares in the case of a business district, 10 hectares in the case of other parts of

a built-up area and 20 hectares elsewhere. In this instance, the application site extends to c. 10.223 hectares within what can be considered a built-up area. Therefore, the project exceeds the stated threshold, and an EIA is therefore required on this basis.

3.2.18 Bird and Habitats Directive - AA Screening & Natura Impact Statement

The proposed development has been screened for Appropriate Assessment in accordance with the requirements of Article 6(3) of the EU Habitats Directive (92/32/EEC). OPENFIELD Ecological Services has prepared a report for Screening for Appropriate Assessment for the proposed development. This screening report has evaluated the proposed development on lands at Oldtown to determine whether or not significant negative impacts on Natura 2000 sites are likely to arise by virtue of its construction and use. Hydrological pathways exist to the Malahide Estuary; at this stage significant effects cannot be ruled out to the following areas: Malahide Estuary SAC and Malahide Estuary SPA.

It is considered that the potential for large quantities of sediment to be washed into the Estuary, due to the proximity of works to the River Broadmeadow, means that significant effects to habitats within the SAC, and species within the SPA, cannot be ruled out at this stage. A full AA is required following on from a full design review of the development. No significant effects are likely to arise to any Natura 2000 site from the proposed stormwater overflow which will substantially reduce current volumes of undertreated effluent entering the River Ward and the Malahide Estuary. OPENFIELD Ecological Services has prepared a Natura Impact Statement for the proposed development. This report contains an analysis of the proposed project and its relationship with areas designated under the Habitats and Birds Directives. Pathways exist between the development site and two such areas and these have been described in detail in the AA Screening Report. Following this analysis, it was concluded that significant effects to the Malahide Estuary SAC and SPA could not be ruled out. Specifically, this may arise from the impact to intertidal habitats and species from pollution during the construction phase. Arising from this assessment, mitigation has been proposed. With the implementation of these measures, adverse effects to the integrity of the Malahide Estuary SAC and SPA will not occur. This conclusion is based on best scientific knowledge. For further information in this regard, please refer to the Appropriate Assessment Screening Report and NIS prepared by OPENFIELD Ecological Services.

3.2.19 The Planning System and Flood Risk Guidelines (2009)

These Guidelines require the planning system at all levels to avoid developments in areas at risk of flooding, particularly floodplains, except where there are no suitable alternative sites available in areas at lower risk that are consistent with the objectives of proper planning and sustainable development. Where such development has to take place, in the case of urban regeneration for example, the type of development has to be carefully considered and the risks should be mitigated and managed through location, layout and design of the development to reduce flood risk to an acceptable level. Applicants are advised to carefully examine their development proposals to ensure consistency with the requirements of these Guidelines including carefully researching whether there have been instances of flooding or there is the potential for flooding on specific sites and to carry out a site-specific flood risk assessment.

In accordance with these Guidelines, Waterman Moylan Engineering Consultants have carried out a flood risk assessment of the subject site. The site has been assessed in accordance with the Flood Risk

Management Guidelines, with appropriate mitigation measures proposed such as SuDs design, attenuation ponds, overland flood routing, appropriate floor levels, and regular inspections. Therefore, it is considered that the proposed development is consistent with the requirements of this national flood risk management policy. For further information in this regard, please refer to the enclosed Flood Risk Assessment prepared by Waterman Moylan Engineering Consultants.

3.2.20 All-Ireland Pollinator Plan 2021-2025

The All-Ireland Pollinator Plan is a shared plan of action which is to bring about a landscape where pollinators can flourish over 2021-2025. To achieve this, the Plan sets out six objectives; (1) Making farmland pollinator friendly, (2) Making public land pollinator friendly, (3) Making private land pollinator friendly, (4) All-Ireland Honeybee Strategy, (5) Conserving rare pollinators, and (6) Strategic coordination of the Plan.

With respect to the aforementioned, the proposed development has taken into consideration the All-Ireland Pollinator Plan along with the Pollinator-friendly Planting Code, all considered in detail as part of the specific plant section of trees, shrub, hedging and herbaceous species. A diverse range has been chosen, along with a high percentage of native species in order to provide for pollinators from early spring through to late autumn. Please refer to the Landscape Design Report prepared by Doyle & O'Troithigh Landscape - Architecture for further details on inclusion of the Plan guidelines within the proposed landscape of the scheme.

3.2.21 National Adaptation Framework: Planning for a Climate Resilient Ireland

In accordance with the '*Climate Action and Low Carbon Development Act 2015*', this National Adaptation Framework (NAF) specifies the national strategy for the application of adaptation measures in different sectors and by local authorities in their administrative areas in order to reduce the vulnerability of the State to the negative effects of climate change and to avail of any positive effects that may occur.

The 'Built Environment and Spatial Planning' section within this Framework recognises that, "*climate change considerations need to be taken into account as a matter of course in planning-related decision making processes and that the deepening of adaptation considerations in the planning and building standards processes is considered the most appropriate way of increasing the resilience of the built environment*". Furthermore, "*effective planning reduces vulnerability to the negative effects of climate change by integrating climate considerations into decision making in order to avoid inappropriate forms of development in vulnerable areas and promoting compact development in less vulnerable areas*". It is important to mention that this Framework envisions 'flood resilience' and 'access to wildlife and green space' as no-regret benefits of effective adaptation which would continue to be worthwhile regardless of future climate scenarios.

As such, the proposed development has taken into consideration the context of the site and it can be noted that an assessment of Flood Risk has been prepared by Waterman Moylan Engineering Consultants, with appropriate mitigation measures proposed such as SuDs design, attenuation ponds, overland flood routing, etc. Thus, the proposed development with access to high-quality green communal space and introduction of best practice energy efficiency measures as required to meet the

Energy Strategy and Building Regulations and promoting a compact urban form for 'less vulnerable areas' is consistent with this national framework.

3.2.22 Climate Action Plan 2019

Climate disruption is already having diverse and wide-ranging impacts on Ireland's environment, society, economic and natural resources. The Climate Action Plan 2019 sets out an ambitious course of action over the coming years to address this issue.

The Plan notes that the built environment accounted for 12.7% of Ireland's greenhouse gases in 2017.Our buildings are 70% reliant on fossil fuels, including oil fired boilers; over 80% of our homes and other buildings assessed for their BER have a rating of C or worse; and the current annual retrofit activity for existing stock is far too limited (approximately 23,000, mainly shallow, retrofits). A hierarchy of the most cost-effective investments underpin this, including improving the fabric of buildings, district heating, heat pumps and new building standards.

As such, the proposed development has taken into consideration the Climate Action Plan and measures have been included within the design of the development to reduce carbon emissions in line with the requirements of the Action Plan.

3.3 REGIONAL POLICY AND GUIDELINES

3.3.1 Regional Spatial & Economic Strategy for the Eastern & Midland Region

The Regional Spatial and Economic Strategy (RSES) was published by the Eastern and Midland Regional Assembly. The RSES outlines the long-term regional level strategic planning and economic framework in support of the National Planning Framework for the period 2019-2031. The RSES identifies regional assets, opportunities, pressures and constraints and provides a framework for investment to better manage spatial planning and economic development throughout the Eastern & Midland Region.

In conjunction with the NPF, the RSES predicts Dublin City and Suburbs to experience continued population growth over the period 2019-2031 with a predicted increase of 220,000. The NPF targets 50% of all housing to be provided within or contiguous to the built-up area of Dublin city and suburbs. In order to combat and provide for compact residential development, the RSES outlines a number of key Regional Policy Objectives that pertain to the NPF targets. The key Regional Policy Objectives applicable to the development proposal is the following:

Regional Policy Objective (RPO) 5.4 – *"Future development of strategic residential development areas within the Dublin Metropolitan area shall provide for higher densities and qualitative standards as set out in the 'Sustainable Residential Development in Urban Areas', 'Sustainable Urban Housing; Design Standards for New Apartments' Guidelines, and 'Urban Development and Building Heights Guidelines for Planning Authorities'."*

Regional Policy Objective (RPO) 5.5 – *"Future residential development supporting the right housing and tenure mix within the Dublin Metropolitan Area shall follow a clear sequential approach, with a primary focus on the consolidation of Dublin and suburbs, and the development of Key Metropolitan Towns, as set out in the Metropolitan Area Strategic Plan (MASP) and in line with the overall*

Settlement Strategy for the RSES. Identification of suitable residential development sites shall be supported by a quality site selection process that addresses environmental concerns."

The RSES seek to deliver strategic development areas identified in the MASP, located within existing settlement development boundaries including locations where there an excellent provision of public transport services. The proposed development at Oldtown is located on already serviced zoned lands, comprises the final phase (Phase 5) of a wider residential scheme for the area, and provides for a residential development in close proximity to a wide range of services and amenities. It is submitted that the provision of a high-quality residential development consisting of 377 no. units comprising dwellings, duplexes and apartments as proposed within this SHD application at Oldtown, Swords, will assist in achieving the aforementioned objectives and it also complies with the pertaining policies and standards. For further details on how the proposed development is in accordance with these policies, please refer to the Housing Quality Assessment (HQA) and Urban Design and Architectural Statement (Architects Report) prepared by CCK Architects submitted as part of the architectural planning packs.

In relation to Settlement Strategies, Regional Policy Objectives (RPO) 4.1 and 4.2 of the RSES set out the rationale and basis for preparing these strategies. RPO 4.1 states: *"In preparing Core Strategies for development Plans, Local Authorities shall determine the hierarchy of settlements in accordance with the hierarchy, guiding principles and typology of settlements in the RSES, within the population projections set out in the National Planning Framework to ensure that towns grow at a sustainable and appropriate level, by setting out a rationale for land proposed to be zoned for residential, employment and mixed-use development across the Region. Core strategies shall also be developed having regard to the infill/brownfield targets set out in the National Planning Framework, National Policy Objectives 3a-3c."*

RPO 4.2 states: *"Infrastructure investment and priorities shall be aligned with the spatial planning strategy of the RSES. All residential and employment developments should be planned on a phased basis in collaboration with infrastructure providers so as to ensure adequate capacity for services (e.g. water supply, wastewater, transport, broadband) is available to match projected demand for services and that the assimilative capacity of the receiving environment is not exceeded."*

It is submitted that the proposed development on existing zoned, serviced lands within Swords will adhere with the policies and objectives of the Regional Spatial and Economic Strategy for the Eastern & Midland Regional Assembly area and will contribute to providing additional housing units and employment opportunities within the existing envelop of Dublin Metropolitan Area.

3.3.2 Transport Strategy for the Greater Dublin Area 2016-2035

This transport strategy provides a framework for the planning and delivery of transport infrastructure and services in the Greater Dublin Area (GDA). The purpose of the Strategy is: *"To contribute to the economic, social and cultural progress of the Greater Dublin Area by providing for the efficient, effective and sustainable movement of people and goods."* The core of the strategy seeks the better integration of land use planning and transport planning. This can be achieved through the consolidation of development into higher-order centres. In terms of the provision of housing, the strategy seeks to directly enable the sustainable development of strategically important residential sites, particularly in Metropolitan Dublin, where demand is highest.

The proposed development at Oldtown, Swords seeks to develop on appropriately zoned lands and in order to complete the overall Oldtown residential scheme. The application site is located to the north of R125 (Rathbeale Road), as the main route serving the Swords Northwest area, enjoying a frequently-serviced bus route within accessible distances of several bus stops along this road. It is therefore, considered that the proposed scheme will represent an appropriate form of development in the context of supporting the vision and objectives of the Transport Strategy for the Greater Dublin Area 2016-2035.

3.4 LOCAL PLANNING POLICY

This section of the report provides an account of the relevant local planning policy framework pertaining to the application site and proposed development, all of which is contained within the Fingal Development Plan 2017-2023.

3.4.1 Fingal Development Plan 2017-2023

3.4.1.1 Overarching Considerations

The subject site is located within the functional area of Fingal County Council. The development of the site is therefore informed by the policies and objectives of the Fingal County Council Development Plan. The policies and objectives of the Development Plan are underpinned by the following vision:

"Within the next 25 to 30 years, Dublin will have an established international reputation as one of Europe's most sustainable, dynamic and resourceful city regions. Dublin, through the shared vision of its citizens and civic leaders, will be a beautiful, compact city, with a distinct character, a vibrant culture and a diverse, smart, green, innovation-based economy. It will be a socially inclusive city of urban neighbourhoods, all connected by an exemplary public transport, cycling and walking system and interwoven with a quality bio-diverse green space network. In short, the vision is for a capital city where people will seek to live, work, experience, invest and socialise, as a matter of choice".

3.4.1.2 Core Strategy & Housing Strategy

Fingal Development Plan 2017-2023

Swords is identified as a Metropolitan Consolidation Town in the Fingal Development Plan. The County Plan notes that the town benefits from its close proximity to Dublin Airport and has a strong industrial base which underpins its role as an important centre for employment in the County.

The vision of the Fingal Development Plan is to grow the county in a long-term sustainable way as it enters a period of economic and population growth. The plan states that, "*the emphasis of this Plan is to continue to consolidate the existing zoned lands and to maximise the efficient use of existing and proposed infrastructure. In this way the Council can ensure an integrated land use and transport strategy in line with national and regional policy. […] The development of larger areas of residential or mixed-use lands will only take place subject to the necessary infrastructure being available and to this end will be subject to a Local Area Plan. It is through the LAP process that, within the towns and villages, the detailed phasing and distribution of housing will be determined in line with the population and housing targets established at a strategic level."*

In this instance, the subject site forms part of the Oldtown and Mooretown lands in Swords which were previously subject to the Oldtown-Mooretown LAP 2010-2016 (extended to July 2020 and since expired). However, this final phase of the Oldtown lands has been designed and proposed within the spirit of the Plan. The proposed development also forms part of a wider residential scheme for the Oldtown lands granted under Reg. Ref. F11A/0436, Reg. Ref. F11A/0473, Reg. Ref. F15A/0390, Reg. Ref. F17A/0666, Reg. Ref. F17A/0735 and Reg. Ref. F17A/0687, in various phases. The proposed scheme comprises the final phase (Phase 5) of the overall development for the Oldtown lands. The expired LAP estimates that Oldtown-Mooretown LAP lands has the potential to accommodate 3,400 units, at a net density of 35-50 dwellings per hectare, resulting in a population of c. 10,000 on these lands.

Applications made to date on the Oldtown-Mooretown lands are to supply c. 1,327 no. residential dwellings on the lands. The proposed development provides for an overall total of 377 no. units, which is in addition to what is constructed/under construction/in the pipeline. This is submitted to be within the envisaged housing target on the lands in the expired LAP and the Core Strategy for Swords in the current Development Plan. Moreover, considering that the quantum of developable lands on the application site stands at 7.8 hectares, the scheme would provide for a net density of c. 48 units per hectare, which is also submitted to be within the spirit of the expired Local Area Plan, and in line with the current Development Plan and national policy guidance.

With regards to the housing strategy as set out within the Development Plan, there are three core principles with inform and guide the core strategy which are as follows:

- *"To ensure Fingal County Council provides for the development of sufficient housing to meet its obligations as set out in the Regional Planning Guidelines.*
- *To identify the existing and likely future need for housing in the area of the Development Plan.*
- *To ensure that sufficient zoned lands are provided to meet the needs of the different categories of households."*

It is submitted that the proposed development at Oldtown is consistent with the housing strategy as it will assist in the delivery of housing, of a sustainable density, within a wider residential scheme granted under Reg. Ref. F11A/0436, Reg. Ref. F11A/0473, Reg. Ref. F15A/0390, Reg. Ref. F17A/0666, Reg. Ref. F17A/0735 and Reg. Ref. F17A/0687, immediately adjoining a public transport corridor, whilst providing a variety of unit types and mixed tenures for all, in a high-quality, vibrant community setting.

Fingal County Development Plan 2017-2023 Variation no. 2

This Variation No. 2 (adopted) to the Fingal Development Plan 2017-2023 seeks to respond to the changes in National and Regional planning policy, namely the publication of the National Planning Framework (NPF) in 2018 and the Eastern and Midland Regional Assembly (EMRA) Regional Spatial and Economic Strategy (RSES) in 2019. The NPF includes a National Strategic Outcome (NSO) to achieve compact growth and consolidation of Ireland's cities as a top priority.

Outlined in the adopted variation, Swords is listed as a 'Key Town' in the Metropolitan Area with a development strategy of consolidation, active land management, employment generation and residential transport in the form of Metrolink and Bus-connects. Under the adopted variation, Swords

has a remaining capacity of 14,799 residential units from the overall 34,806 units envisaged for the county. The document goes on the state that having regard to the status of the Key Town designation and the ongoing delivery of housing within Swords, a 15% increase in population is appropriate.

Furthermore, the key tenet of the overall Settlement Strategy is the continued promotion of sustainable development through positively encouraging consolidation and densification of the existing urban built form - and thereby maximising efficiencies from already established physical and social infrastructure.

Town/Village	Remaining Capacity (hectares)	Remaining Residential Units	Metropolitan Core % Land	Metropolitan-Core % Units
Metropolitan Area				
Key Town				
Swords	481	14,799		
Dublin City and Suburbs				
Blanchardstown	260	9,306		

Figure 3-1. Residential Capacity under Fingal Development Plan 2017-2023, updated as of September 2019

Set out under **Objective SS02** of the Fingal Development Plan, Fingal County Council seeks to:

"Ensure that all proposals for residential development accord with the County's Settlement Strategy and are consistent with Fingal's identified hierarchy of settlement centres."

The variation notes that, *"The key towns function as part of the Dublin Metropolitan Area and will continue to perform the role of the County's primary development centres during the Plan period."* As a Key Town, Swords has been identified as the administrative capital of the County and a key location for housing, enterprise, and retail development, which will continue to perform the role of a primary development centre for the County during the Plan period.

Objective SS12 of the Fingal Development Plan, Fingal County Council seeks to: *"Promote the Key Town of Swords and the Metropolitan Area of Blanchardstown, respectively, as Fingal's primary growth centres for residential development in line with the County's Settlement Hierarchy."*

Also, **Objective SS14** of the Fingal Development Plan, Fingal County Council seeks to: *"Promote the continued sustainable development of Swords and Blanchardstown as core economic areas for enterprise in partnership with relevant State agencies."*

As stated in the adopted variation, *"Swords is a large economically active county town that provides employment for the surrounding areas and with existing and proposed high-quality transport links and the capacity to act as a growth driver to complement the Regional Growth Centres. In order to fulfil this role and in light of the emerging role that settlements such as Swords will be required to play in maintaining the success of the Metropolitan Area, a long term, adequately planned vision is necessary. In this regard, the long-term strategic vision for Swords is to create a sustainable city with a commensurate level of jobs, services and infrastructure to support a potential population of 100,000. In endeavouring to achieve this vision of an emerging green city with a thriving economy it is critical that adequate lands are zoned in the future to accommodate the full range of needs of the city's*

residential population, business community and visitors. Within the current development envelope of Swords, even allowing for the introduction of possible new intensive mixed use zonings along the Metro line, Swords would have the capacity only to reach a population of circa 65-70,000."

It is submitted that the proposed development of 377 units complies with the objectives of the variation to promote sustainable development through completion of the development of the Oldtown-Mooretown LAP lands. The proposed scheme also seeks to ensure the objectives for the LAP lands and Swords as a Key Town are achieved and do not exceed the remaining capacity of 14,799 units as set out in the Adopted Variation No. 2 to Fingal County Development Plan 2017-2023.

3.4.1.3 Sustainable Neighbourhoods and Communities

In terms of sustainable communities and urban design in residential developments, the Development Plan states that, "*successful areas are places where people want to live, work and visit*". The Development Plan emphasises several characteristics that attractive places have in common:

- *"Include a range of facilities focused in a consolidated area with a critical mass of attractions and make best use of the already established investment in the built environment; these attractions include a mix of shops as well as a wide range of financial, professional and government services together with cultural, entertainment and leisure facilities.*
- *Include a thriving local residential population which adds to the vitality and vibrancy of the area as it ensures activity outside of standard retail and office opening hours.*
- *Are easily accessible by a range of transport modes including cycling and walking, have sufficient good quality short stay car parking close to the core area, have good transport linkages within the centre, and have efficient arrangements for delivery of goods.*
- *Present an attractive amenity in terms of the built environment and streetscape, streets and public spaces which are considered clean and safe, and have a sense of local identity and character, all of which greatly enhances the attraction of the centre.*
- *Have the vision and mechanisms in place to build on these existing assets, can overcome problems, adapt to both market and consumer needs and can secure appropriate and necessary improvements where required.*
- *Encourage and facilitate sustainable lifestyles and livelihoods."*

It is submitted that the proposed development at Oldtown is consistent with these criteria. The proposed residential development which incorporates 1 no. childcare facility that is located in an area which benefits from ease of access to a range of transport modes (including bus) with cycling and walking also taken as a key consideration of the proposed scheme. The influx of population arising from the proposed development will increase the critical mass required to further support public transport infrastructure. There is a range of facilities in the immediate vicinity of the subject lands including community facilities, sports clubs, etc. and within the wider Swords area. A Community and Social Infrastructure Audit, prepared by Downey, also accompanies this SHD application which provides detailed information and assessment of the existing services currently supply the Oldtown lands. The design of the proposed development provides for an attractive development with a sense of character and place that will integrate the proposed development with the surrounding area and assist in the completion of the wider residential scheme for the LAP lands.

3.4.1.4 Movement and Transport

In relation to movement and infrastructure, the Development Plan states that a safe, efficient, effective, and sustainable transportation system is essential to the future economic, social and physical development of Fingal. The Development Plan seeks to:

- *"Promote and facilitate movement to, from, and within the County of Fingal, by integrating land use with a high quality, sustainable transport system that prioritises walking, cycling and public transport.*
- *Provide an appropriate level of safe road infrastructure and traffic management, in particular to support commercial and industrial activity and new development.*
- *Work with all relevant stakeholders to seek a reduction in greenhouse gas emissions from transport."*

Some of the policies and objectives in this regard include:

- ***Objective MT01** – "Support National and Regional transport policies as they apply to Fingal. In particular, the Council supports the Government's commitment to the proposed new Metro North and DART expansion included in Building on Recovery: Infrastructure and Capital Investment 2016-2021. The Council also supports the implementation of sustainable transport solutions."*
- ***Objective MT02** – "Support the recommendations of the National Transport Authority's Transport Strategy for the Greater Dublin Area 2016-2035 to facilitate the future sustainable growth of Fingal."*
- ***Objective MT03** – "Implement Smarter Travel – A Sustainable Travel Future policy and work to achieve the Key Goals set out in this policy."*
- ***Objective MT04** – "At locations where higher density development is being provided, encourage the development of car-free neighbourhoods, where non-motorised transport is allowed and motorised vehicles have access only for deliveries but must park outside the neighbourhood, creating a much better quality public realm with green infrastructure, public health, economic and community benefits."*

It is submitted that the proposed development at Oldtown is consistent with the foregoing policies and objectives. This additional development in Oldtown will ensure walking and cycling are viable options for the community, with the area also served by existing public transport infrastructure (Dublin Bus Stop located within close proximity to the application site), all of which will ensure that the future population utilise sustainable public transport and active travel options rather than car transport.

The Plan notes that the integration of land-use and transport involves locating trip intensive land uses (such as high-density housing, offices, and comparison retail) near high-capacity public transport (such as DART, Metro, Luas, and Bus Rapid Transit). It benefits the land uses by providing high quality public transport for the greatest number of residents and employees. It benefits public transport by providing sufficient customers within its catchment to sustain the high cost of public transport infrastructure and services. Allowing higher density development to occur along public transport corridors increases the number of people within the walking catchment of the public transport service,

which in turn increases the patronage of the service, and leads to an increase in its financial and economic viability and positive environmental impact. In this context, the following objectives apply:

- **Objective MT05:** *"Integrate land use with transportation by allowing higher density development along higher capacity public transport corridors."*
- ***Objective MT08:*** *"Control on-street parking in the interests of the viability, vitality and amenity of commercial centres by maximising the supply of short stay parking for shoppers, while providing appropriate levels of long-term parking within a reasonable distance for employees."*
- ***Objective MT13:*** *"Promote walking and cycling as efficient, healthy, and environmentally friendly modes of transport by securing the development of a network of direct, comfortable, convenient and safe cycle routes and footpaths, particularly in urban areas."*
- ***Objective MT19****: "Design roads and promote the design of roads, including cycle infrastructure, in line with the Principals of Sustainable Safety in a manner consistent with the National Cycle Manual and the Design Manual for Urban Roads and Streets."*
- ***Objective MT22:*** *"Improve pedestrian and cycle connectivity to stations and other public transport interchanges."*
- ***Objective MT37****: "Implement traffic calming on particular roads and in appropriate areas of the County, especially residential areas, to reduce vehicle speeds in the interests of road safety and residential amenity. Ensure that where appropriate, traffic calming is included as a pre-condition as part of the development of all new estates or extensions to existing estates."*

It is submitted that the proposed development at Oldtown is consistent with these policies and objectives. The completion of this area of the Oldtown-Mooretown lands and wider area will ensure walking and cycling are viable options for the community, with the area also very well served by existing public transport infrastructure all of which will ensure that the future population utilise sustainable public transport and active travel options rather than car transport. This is outlined further in the enclosed Traffic and Transport Assessment prepared by Waterman Moylan Engineering Consultants.

3.4.1.5 Land Use Zoning

Under the Fingal Development Plan 2017-2023, the developable subject site is zoned *"RA - Residential Area"* and therefore aims to: *"Provide for new residential communities subject to the provision of the necessary social and physical infrastructure."*

The vision for this objective seeks to: *"Ensure the provision of high quality new residential environments with good layout and design, with adequate public transport and cycle links and 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 lands are also subject to the LAP designation, LAP 8.C, Oldtown-Mooretown Local Area Plan. In July 2015, Fingal County Council extended the life of the Oldtown-Mooretown Local Area Plan 2010-2016, for a further period of 5 years from the 13th July 2015 up to the 12th July 2020. Thus, the LAP has since expired during the lifetime of the current Development Plan, however, the lands are still designated as lands subject to an LAP.

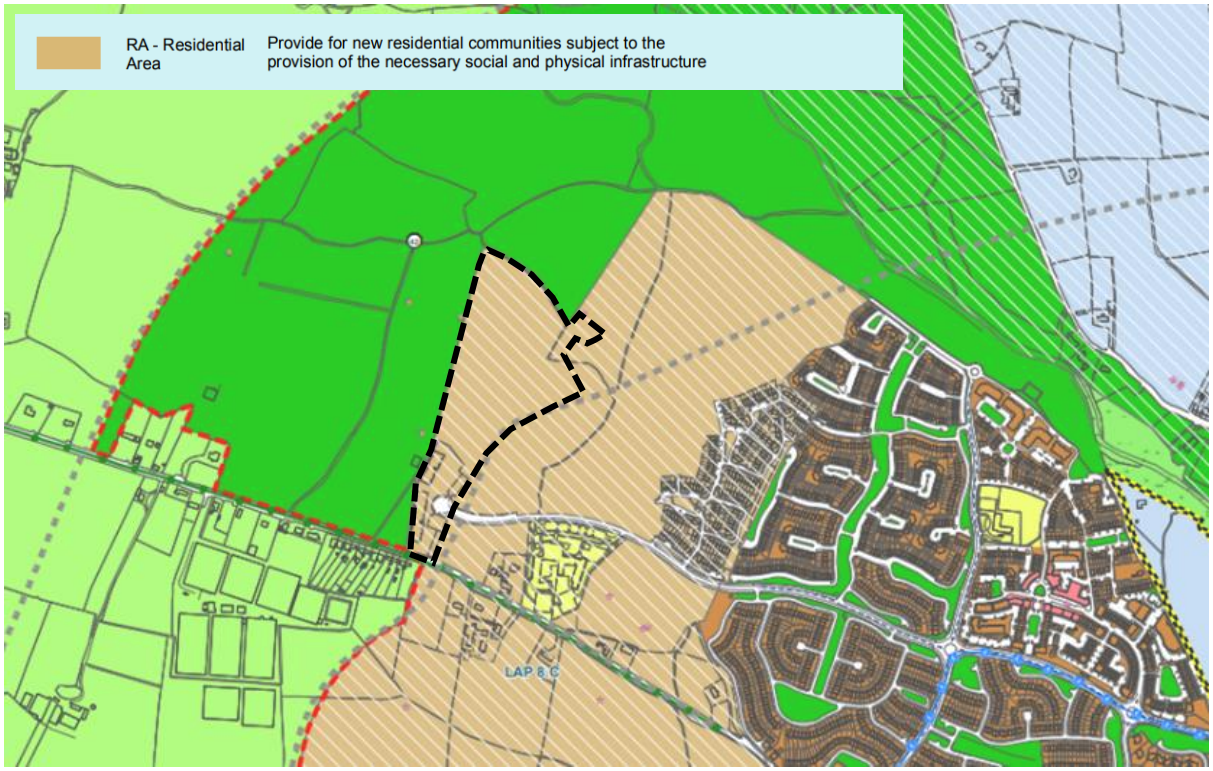

Figure 3-2. Land Use Zoning Map Extracted from the County Development Plan (application site outlined in black)

Under the RA zoning, the following uses are permitted in principle.

Uses Permitted in Principle under the RA Land Use Zoning
Amusement Arcade[9]; Bed and Breakfast; Betting Office[9]; Childcare Facilities; Community Facility; Education; Funeral Home/Mortuary[9]; Guest House; Health Centre; Health Practitioner; Hospital; Office Ancillary to Permitted Use; Office ≤ 100sqm[9]; Office>100sq.m. and, 1,000sqm[11]; Open Space; Place of Worship; Public House[9]; Public Transport Station; Recreational Facility/Sports Club; Residential; Residential Care Home/Retirement Home; Restaurant/Cafe[9]; Retail-Local < 150 sqm nfa; Retail – Convenience ≤ 500 sqm nfa[9]; Retail – Comparison ≤ 500 sqm nfa[9]; Retail – Supermarket ≤ 2,500 sqm nfa[9]; Retirement Village; Sheltered Accommodation; Sustainable Energy Installation; Taxi Office; Traveller Community Accommodation; Utility Installations; Veterinary Clinic.

[9] In a local centre only
[11] Only located in a local centre and of a scale appropriate to that centre

Table 3-1. Permitted Uses under the RA Land Use Zoning

Therefore, the proposed development of residential units and 1 no. childcare facility are permitted in principle under the zoning objectives pertaining to the subject lands. The Class 1 open space lands to the north are zoned OS-Open Space – *"to preserve and provide for open space and recreational amenities".* The proposed open space in this area is therefore permitted in principle under this zoning designation. The proposed storage tank site is zoned ME-Metro Economic Corridor – *"to facilitate opportunities for high-density mixed-use employment generating activity and commercial development and support the provision of an appropriate quantum of residential development within the Metro Economic Corridor".* The tank can be considered essential infrastructure and has been designed in conjunction with Irish Water. It will not only facilitate the connection requirement of this subject application but will also have the capacity to allow for continued development in the Oldtown/Mooretown catchment.

3.4.1.6 Development Standards

Chapter 12 of the Fingal County Development Plan sets out development standards and criteria that from the policies and objectives of the Development Plan to ensure that development occurs in an orderly and efficient manner and that it is in accordance with proper planning and sustainable development. The following section assesses the main set of standards and criteria required for high-quality, sustainable development:

Table 3-2. Compliance with Chapter 12 - Development Management Standards

Criteria	Compliance
12.1 Background	
Pre-Planning	On 12/12/2019, the applicant and the design team engaged in a Section 247 pre-application consultation meeting with representatives of Fingal County Council regarding the proposed Strategic Housing Development on lands at Oldtown, Swords, County Dublin. On 30/11/2020, Downey and the applicant engaged in a Section 5 pre-application consultation meeting with representatives of An Bord Pleanála and Fingal County Council regarding the proposed development as part of a Stage 2 consultation meeting. On 16/12/2020, An Bord Pleanála issued the notice of pre-application consultation opinion for the proposed development, under case reference ABP-307498-20. For the detailed response to this opinion and to source the requested information within the application documentation, please refer to the "Statement of Response to An Bord Pleanála's Pre-Application Consultation Opinion" prepared by Downey.
12.2 Common Principles for all Planning Applications	
Access for All	It is noted that the design of the proposed development has taken cognisance of people with reduced mobility through the provision of universally accessible dwelling units as well as readily adaptable dwellings. It is submitted that inclusivity and access have fully influenced the design of the scheme, as follows: - The development will be fully Part M compliant with easy access. Physical and visual barriers have been avoided and full passive surveillance has been designed into overlook all public realm areas. Street layouts, footpath arrangements, street and verge planting combine to allow pedestrians and cyclists easily navigate the scheme through the different character areas proposed and connecting into the adjacent Oldtown schemes currently constructed and occupied. - The provision of 1 to 4-bed units in a proportioned mix will include a wide diversity of households in line with the earlier phases of development at Oldtown-Mooretown lands, which would bring an inclusive community at Swords. - An adequate compliance with Part V, delivering 20% of affordable and social apartments and houses. Please refer to architectural drawings for further detail on the Part V plan. - The proposed development is also submitted to be designed in accordance with the recommendations of 'Buildings for Everyone' 2002 published by the National

	Disability Authority and Technical Guidance Document M Access and Use of the Building Regulations 2010. For further details in this regard, please refer to Universal Access Statement prepared by CCK Architects and submitted as part of this application.
Green Infrastructure	The proposed development provides for an overall of c. 0.8ha public open space, comprising of Class 2 public open spaces, as specified within the Fingal Development Plan. With respect to the developable site area of 7.8ha, this would provide for 11% public open space provision which exceeds the threshold envisaged in the Development Plan. Class 1 open space is also being provided to the north of the proposed scheme. It is noted that the earlier phases of the developing Oldtown-Mooretown provide for an overall of approximately 22.4ha Class 1 public open space, including 2 regional parks. The proposed scheme would also benefit from green infrastructure conceived for earlier phases of development at Oldtown-Mooretown lands, with intuitive and clear connections to the future Swords Regional Park. For further information in this regard, please refer to the detailed landscaping proposals prepared by Doyle O'Troithigh Landscape Architecture.
Sustainable Design	Efficiency through design has been achieved in the macro scale in terms of layout and site configuration with good attention to detailing of the individual dwelling plan forms providing energy efficiency and reduced lifetime running costs of the overall scheme. Efficient planning and design have also been brought into the layouts of the individual dwelling units planned, along with apartments and duplex units. The design brief was set to create an exemplar of sustainable design to ensure all new development can be delivered in a manner that protects and enhances the biodiversity of the local environment, mitigates climate change, and delivers high energy efficiency in accordance with NZEB strategies.
Environmental Impact Assessment	Given that 377 no. units are proposed and indeed noting that the application site extends to an overall of c. 10.22 hectares within what can be considered a built-up area, an Environmental Impact Assessment Report is required and has been prepared as part of the proposed application. Please refer to the enclosed EIAR which assesses the overall development and is enclosed with this SHD application for the consideration of the Board.
Screening for Appropriate Assessment	An Appropriate Assessment Screening report has been carried out by OPENFIELD Ecological Services as part of this SHD application which indicate pathways do exist to a number of these areas. A Natura Impact Statement has also been prepared with mitigation measures proposed. An assessment of the aspects of this project has shown that significant negative effects are not likely to occur to these areas either alone or in combination with other plans and projects provided that the mitigation measures outlined are upheld. Please refer to the enclosed Screening Report for Appropriate Assessment and Natura Impact Statement prepared by OPENFIELD Ecological Services for further details.
12.3 Design Criteria for Urban Development	
High Quality Urban Design	The Development Plan defines several objectives to support high quality urban design. It will allow the creation of accessible places where people want to live, work, and spend time. It is the policy of the Council to ensure all development is of a high-quality design and promotes the achievement of accessible, safe, and

	sustainable built and natural environments, which reflect the special character and heritage of the County and its varied townscapes and landscapes. Design principles are based on the '*Sustainable Residential Development in Urban Areas – Guidelines for Planning Authorities*' and '*Best Practice Urban Design Manual*'. Which contains twelve design principles to be applied to all developments with **Objective DMS03** requiring: *"Submit a detailed design statement for developments in excess of 5 residential units or 300 sqm of retail/commercial/office development in urban areas. The design statement is required to:* ▪ *Explain the design principles and design concept.* ▪ *Demonstrate how the twelve urban design criteria (as per the 'Urban Design Manual - A Best Practice Guide') have been taken into account when designing schemes in urban areas. Each of the twelve criteria is of equal importance and has to be considered in an integrated manner.* ▪ *Outline how the development meets the Development Plan Objectives, and the objectives of any Local Area Plan, Masterplan, Urban Centre Strategy, Framework Plan, or other similar Plan affecting the site.* ▪ *Include photographs of the site and its surroundings.* ▪ *Include other illustrations such as photomontages, perspectives, sketches.* ▪ *Outline detailed proposals for open space and ensure the provision of open space is designed in from the beginning when designing a new scheme.* ▪ *Outline a detailed high-quality open space and landscape design plan including specifications, prepared by suitably qualified professionals.* • *Outline how Green Infrastructure integrates into the scheme."* In accordance with the aforementioned, an Urban Design and Architectural Statement has been prepared by CCK Architects which sets out the proposed development's compliance with the 12 Urban Design criteria and how the proposed development accords with the requirements of Objective DMS03. Please refer to the enclosed Urban Design and Architectural Statement and associated drawings prepared by CCK Architects for further information in this regard. Please also refer to the detailed landscaping proposals prepared by Doyle O'Troithigh Landscape Architecture.
12.4 Design Criteria for Residential Development	
Residential Zoning	Under the current Fingal County Council Development Plan, the developable subject site is zoned "RA – Residential Area" which seeks: *"Provide for new residential communities subject to the provision of the necessary social and physical infrastructure."* It is also submitted that the proposed development of residential units and 1 no. childcare facility are permitted in principle under the zoning objectives pertaining to the subject lands. It is noted that the subject site forms part of the Oldtown and Mooretown lands in Swords, which were previously informed by the Oldtown-Mooretown Local Area Plan 2010-2016. The LAP had also been extended for a further five years from 13th

	July 2015 up to 12th July 2020. Despite expiration of the LAP since, this final phase of the Oldtown lands has been designed and proposed within the spirit of the Plan. The Class 1 open space lands to the north are zoned OS-Open Space – "to preserve and provide for open space and recreational amenities". The proposed open space in this area is therefore permitted in principle under this zoning designation. The proposed storage tank site is zoned ME-Metro Economic Corridor – "to facilitate opportunities for high-density mixed-use employment generating activity and commercial development and support the provision of an appropriate quantum of residential development within the Metro Economic Corridor". The tank can be considered essential infrastructure and has been designed in conjunction with Irish Water. It will not only facilitate the connection requirement of this subject application but will also have the capacity to allow for continued development in the area.
Mix of Dwelling Types	The Development Plan states that the dwelling mix in any residential scheme should provide a balanced range of dwelling types and sizes to support a variety of household types. In this regard, the proposed development provides for 377 no. residential units with 1 no. childcare facility. The proposal provides for a variety of unit types encompassing a mix of one, two and three bed apartments, two, three, and four bed houses, two and three bed duplex units, all of which provide for a mix and variety of unit types in accordance with the Development Plan and indeed the mix requirements as set out within the '*Design Standards for New Apartments Guidelines for Planning Authorities*' and the *'Delivering Homes, Sustaining Communities: Statement on Housing Policy'.* Whilst there are different apartment unit types and different house unit types provided, in terms of bedroom provision, it is also important to note that within these units, there is a significant amount of diversity in terms of size, layout, storage, aspect, room dimensions, etc. This ensures that the proposed scheme provides for the various needs of potential future residents and that it is a sustainable form of residential development which can cater for all age demographics and is adaptable and flexible for their future needs, be it, single professionals, young couples, small young families, older families, the elderly, those looking to downsize, etc.
Residential Density & Height	The Development Plan provides that the number of dwellings to be provided on a site should be determined with reference to the '*Sustainable Residential Development in Urban Areas – Guidelines for Planning Authorities*' (2009). As a general principle and to promote sustainable forms of development, higher residential densities will be promoted within walking distance of town and district centres and high-capacity public transport facilities. In this regard, the proposed development provides for a sustainable development with an overall net density of c. 48.3 dwellings per hectare (net developable area is 7.8 ha), on appropriately zoned lands, in an accessible location within the development boundaries of Swords and therefore accords with the density requirements of both the Development Plan and national guidelines. It is also noted that the proposed density is in line with the earlier phases of the Oldtown lands, and within the spirit of the expired Oldtown-Mooretown Local Area Plan 2010-2020 (July).
Apartment Development	The '*Design Standards for New Apartments Guidelines for Planning Authorities*' have superseded the design standards for apartments as set out in the Development Plan. With regards to Dual Aspect the proposed development

	provides for 60% dual aspect units within the proposed apartment units in accordance with Objective DMS20 of the Development Plan. The apartment floor areas are also in accordance with the '*Design Standards for New Apartments Guidelines for Planning Authorities'* as set out in the enclosed Urban Design and Architectural Statement and Housing Quality Assessment (HQA) prepared by CCK Architects. Please refer to the enclosed report for full details on the proposed development's compliance with standards for apartment developments.
Quantitative Standards	The development proposal adheres with the *"Quality Housing for Sustainable Communities; Best Practice Guidelines for Delivering Homes and Sustaining Communities (DEHLG, 2007)"* and *"Sustainable Urban Housing: Design Standards for New Apartments Guidelines for Planning Authorities (DEHLG, 2018)"* when assessing proposals for apartment development. Please refer to the HQA and Urban Design and Architectural Statement prepared by CCK Architects for compliance in this regard.
Separation Distances	Appropriate separation distances between dwellings have been provided. Furthermore, sufficient separation between side gables has also been provided for in accordance with Objective DMS28 & DMS29 of the Development Plan.
Daylight, Sunlight and Overshadowing	Objective DMS30 of the Development Plan requires that all new residential units comply with the recommendations of '*Site Layout Planning for Daylight and Sunlight: A Guide to Good Practice*' (B.R.209, 2011) and B.S. 8206 '*Lighting for Buildings, Part 2 2008: Code of Practice for Daylighting*' or other updated relevant documents. For further details in this regard, please refer to the Daylight & Sunlight Assessment as provided by DKPI Environmental.
Acoustic Privacy	Objective DMS31 of the Fingal County Development Plan requires that sound transmission levels in semi-detached, terraced, apartments and duplex units comply as a minimum with the 2014 Building Regulations Technical Guidance Document Part E or any updated standards. It is submitted that the proposed development will comply with Objective DMS31 of the Development Plan in this regard. For further details in this regard, please refer to the Noise Chapter of EIAR prepared by DKPI Environmental.
Open Plan Estates	The removal of the exempted development rights is subject to agreement with the Planning Authority and An Bord Pleanála as part of a condition to the granting planning permission.
Gated Communities	Objective DMS32 of the Fingal County Development Plan prohibits proposals that would create a gated community for any new residential developments. It is viewed that the proposed development is not a 'gated community' and will adhere with Objective DMS32 of the Development Plan in this instance.
Management Companies and Facilities for Apartment Developments	Outlined in the Development Plan, higher-density apartment type development will require a management company to maintain communal areas. It is a specific objective to adhere with the following: - ***Objective DMS33*** *- Require properly constituted management companies in apartment type schemes are set up and necessary management structures are put in place for the benefit of the residents.*

	Objective DMS34 *- Provide in high density apartment type schemes in excess of 100 units facilities for the communal use of residents as deemed appropriate by the Council.* ***Objective DMS35*** *- Require the provision of communal laundry rooms and storage facilities in high density apartment type developments where deemed appropriate.* The proposed apartment/duplex units within the scheme will be privately managed by the establishment of a management company. This management company will be responsible for maintaining the external appearance of the apartments, maintaining the internal and external communal spaces, bins management, etc. It is also important to note that the public parks and main roads are proposed to be taken in charge by Fingal County Council. For information in this regard, please see the enclosed pertaining drawing prepared by CCK Architects.
Refuse Storage and Bins	The proposed development provides for convenient and well-designed proposals for the storage of refuse. For further details, please refer to the Housing Quality Assessment (HQA), and Urban Design and Architectural Statement prepared by CCK Architects. Please also refer to the Operational Waste Management Plan prepared by Enviroguide Consulting.
12.7 Open Space	
Public Open Space	The proposed development provides for an overall of c. 0.8ha Class 2 public open space. This includes outdoor play opportunities for children which are accessible to all within the scheme and the wider community. With respect to the developable site area of 7.8ha, this would provide for 11% public open space provision. It is noted that the Class 1 open space for the proposed scheme is to be provided on OS zoned lands within and forming part of the Swords Regional Park. The proposed scheme would also benefit from green infrastructure conceived for the earlier phases of development at Oldtown. It is submitted that given the proximity of the application site to Swords Regional Park and Broadmeadow Linear Park there is an excellent provision of public open space facilities in the locality. Also, when the Metro is constructed, the Estuary stop will be c.3km from Miller's Glen via the Broadmeadow Linear Park, which is a comfortable distance for cyclists, taking c.10 minutes travel time.
Private Open Space	In accordance with national policy and particularly the Urban Design Manual and new Apartment Guidelines, the proposed development has achieved appropriate separation distances to maintain privacy and protect residential amenity, with design solutions and appropriate landscaping also proposed to protect privacy for residents. It is noted that each residential unit benefits from the provision of adequately sized private open space in the form of gardens, balconies, or patios/terraces (designed in accordance with quantitative and qualitative standards), with the units at ground floor level provided with appropriate boundary treatments to ensure privacy and security whilst also providing visual interest and distinction between spaces. For further information on the private open space proposed as part of this SHD application, please refer to the Urban Design and Architectural Statement prepared by CCK Architects, and the landscaping pack prepared by Doyle O'Troithigh Landscape Architecture.

12.8 Community Infrastructure, Facilities and Services	
Childcare Facilities	All childcare facilities shall be provided in accordance with the *'Childcare Facilities: Guidelines for Planning Authorities' (DEHLG)*. The proposed SHD development will provide for a purpose-built childcare facility with a gross floor area of 519 sqm to accommodate approximately 102 children within the site with appropriate outdoor play space, drop off facilities, etc. For further details in this regard, refer to the Childcare Provision Assessment prepared by Downey and enclosed as part of this SHD application.
12.10 Movement and Infrastructure	
Car Parking Standards	Set out under Chapter 12 of the Fingal Development Plan 2017-2023, the car parking standards based on land use provision are as follows: -

Table 12.8 - Car Parking Standards

Land Use	Criterion	Proposed	Notes	Category	Norm or Max
House - urban/suburban 1 or 2 bedrooms	Unit	1-2	Within curtilage	Residential	Norm
House - urban/suburban 3 or more bedrooms	Unit	2	Within curtilage	Residential	Norm
House - rural	Unit	2-3	Within curtilage	Residential	Norm
Apartment, townhouse 1 bedroom	Unit	1	Plus 1 visitor space per 5 units	Residential	Norm
Apartment, townhouse 2 bedrooms	Unit	1.5	Plus 1 visitor space per 5 units	Residential	Norm
Apartment, townhouse 3+ bedrooms	Unit	2	Plus 1 visitor space per 5 units	Residential	Norm
Sheltered housing	Unit	0.5	Plus 1 visitor space per 5 units	Residential	Norm
Caravan / mobile home park	Stand	1		Residential	Norm
Hotel, Motel, Motor Inn, Guest House	Bedroom	1		Residential	Norm
Pre-school facilities / creche	Classroom	0.5		Education	Maximum

Figure 3-3. Car Parking Standards extracted from the Development Plan

The Development Plan requires that each dwelling to be provided with 2 no. car parking spaces which is being provided within this scheme. The car parking for apartments and duplex units, however, is provided at a reduced rate per unit. Thus, the overall car parking provision may be considered to potentially materially contravene the Fingal Development Plan 2017-2023.

However, adherence of the proposed scheme to the national and regional policy guidance in terms of car parking provision reflects the prime location of the development in relation to its connectivity and access to R125 (Rathbeale Road) and public transport services. The Oldtown lands are situated in an accessible location within 3km distance from Swords town centre, which are served by Dublin Bus and Swords Express services. The lands are also accessed via the Glen Ellan Road and Miller's Avenue, a partly completed link road that is also known as the Western Distributor Link Road (WDLR). Moreover, there is access to the site through Miller's Glen development, to which the proposed scheme is an extension. The excellent connectivity of the subject site, in line with the national and regional policy

	guidance, would allow for a reduced quantum of car parking space which consequently promote green modes of transport as well. Please refer to the enclosed Statement of Material Contravention prepared by Downey, Traffic and Transport report prepared by Waterman Moylan Consulting Engineers, and the Urban Design and Architectural Statement prepared by CCK Architects for further details in this regard.
Bicycle Parking Standards	The proposed development provides considerable secure, covered bicycle parking for the apartment and duplex units as part of the development proposal (440 no. spaces in total). This ensures that future residents and visitors are encouraged to use sustainable modes of transportation. It is considered that the bicycle parking provision as part of the proposed development is consistent with Table 12.9 - Bicycle Parking Standards of the Development Plan, and Section 4.15 of the 2020 guidelines Design Standards for Apartments. Houses are proposed to secure and store their bicycles on their own private property, and all duplex and apartment buildings will have a secure, accessible and sheltered purpose-built store. These are integrated into ground floors of the larger apartment blocks and are provided as individual external storage buildings for duplex units. For further information on the bicycle parking, please refer to the Traffic and Transport report prepared by Waterman Moylan Consulting Engineers, and Housing Quality Assessment (HQA), and Urban Design and Architectural Statement and associated drawings prepared by CCK Architects.

3.4.2 Oldtown-Mooretown Local Area Plan 2010-2016 (extended to July 2020, since expired)

The subject site forms part of the Oldtown and Mooretown lands in Swords, which were previously informed by the Oldtown-Mooretown Local Area Plan 2010-2016. The LAP had also been extended for a further five years from 13th July 2015 up to 12th July 2020 but has now since expired. This final phase of the Oldtown lands has been designed and proposed within the spirit of the Plan. As such, the proposed scheme is considered to comply with the vision and aims of the since expired LAP and pertaining planning guidelines for the application site in the context of the wider Oldtown-Mooretown lands.

3.5 Planning History Context

Downey have carried out a comprehensive examination of the planning history pertaining to the subject site and its broader Oldtown-Mooretown lands, which determined that there have been a number of planning applications made on these lands. This is set out as follows:

3.5.1 Planning Applications pertaining to the Subject Site

As summarised below, there are 3 no. planning applications made on the subject lands, all primarily focused on the southern sections of the site:

- **Reg. Ref. F08A/0146 -** By order dated 9th May 2008, Fingal County Council granted permission to Gaelscoil Bhrian Boroimhe for construction of two single storey prefabricated extensions to existing schools. The National school extension will consist of 2 no. classrooms and associated bathrooms, 4 no. resource rooms, storage, and library (total area c. 390sqm). The Gaelscoil

extension includes 4 no. classrooms and associated bathrooms (total area 385sqm). Both extensions will be the same design and finishes as per existing and connected to site services.

- **Reg. Ref. F07A/1683** - By order dated 1st August 2008, Fingal County Council granted permission to Gerry Gannon for the erection of a single-storey prefabricated school. The school will consist of 8 no. classrooms with associated WCs, 3 no. resource rooms, administration, staff room, storage/utility and multi-purpose room, inter-connected by a roof lit corridor (total are 970m.sq). The school will be accessed off an extended distributor road, footpath, and services from Applewood Village.
- **Reg. Ref. F05A/1778** - By order dated 7th June 2006, Fingal County Council granted permission to Gerry Gannon on behalf of Swords Educate Together NS & Gaelscoil Bhrian Boroimhe for a temporary planning permission for a period of three years, for the erection of two single storey prefabricated schools. This is a part of the decanting phase for the permanent School & Community Campus. The National school will consist of 12 no. classrooms, 3 no resource rooms, admin/staff room, storage/plant, and multi-purpose room (total area c. 1535 sqm). The Gaelscoil includes 9 no. classrooms, 2 no. resource rooms, admin/staff room, storage/plant, and multi-purpose room (total area c. 1185 sqm) Both schools will be accessed off an extended distributor road, footpath, and services from Applewood Village/Oldtown.

- **Reg. Ref. F21A/0476:** Planning permission is sought by Gerard Gannon Properties for development on lands locally known as the Celestica/Motorola site, junction of Glen Ellan Road and Balheary Road, and at/on Balheary Road, Swords, Co. Dublin. The proposed development will consist of a proposed stormwater storage tank and overflow outfall gravity sewer to the Broadmeadow River with associated manholes, proposed vehicular/service access onto Balheary Road; landscaping; boundary treatments; and all associated engineering and site works necessary to facilitate the development. A Natura Impact Statement (NIS) has been prepared and is submitted to the planning authority with the application.

  The aforementioned application is currently a live planning application on the proposed tank site, is at Additional Information stage of the process and due for decision in mid-April 2022 (current status at the time of writing this report). Thus, it was deemed appropriate to propose the tank and the associated works as part of this SHD application.

3.5.2 Planning Applications pertaining to the Oldtown and Mooretown lands

A number of applications have been made on the Oldtown-Mooretown lands, the applications for large development are provided below:

- **Phase 1 (Reg. Ref. F11A/0436)** - Parent Permission for 245 dwellings and a creche, amended by subsequent permissions and subsequently changed to 242 dwellings and an additional creche. This phase is largely complete and occupied.

- **Phase 2 (Reg. Ref. F11A/0473) -** Parent Permission for 224 dwellings, 1 no. creche, and the commercial centre. Amending permissions have been granted to alter the internal site layout and change the house type, and the overall total is currently 252 units. The anchor commercial block (mini-market, shops, café and 14 apartments) due for completion June/July 2020.

- **Phase 3 (Reg. Ref. F15A/0390) -** Parent Permission for 246 dwellings and a crèche. Amending permission has been granted to alter the internal site layout and change the house type, and the overall total is currently at 255 units. 147 residential units complete and occupied.
- **Phase 4A (Reg. Ref. F17A/0666) -** Parent Permission for 41 houses and 54 apartments. Houses complete and being occupied, apartments to commence in 2020/early 2021.
- **Phase 4B (Reg. Ref. F17A/0735) -** Parent Permission for 53 houses and 45 apartments. Houses largely complete and occupied, apartments to commence in 2020/early 2021.
- **Phase 4C (Reg. Ref. F17A/0687)** - Parent Permission for 92 houses. Amending permission has been granted to alter the internal site layout and change the house type, and the overall total is currently at 101 units. Under construction

4.0 POPULATION AND HUMAN HEALTH

4.1 Introduction

This section of the Environmental Impact Assessment Report assesses the impact of the proposed development on the population, human health, and human environment in the general area of the application site on lands at Oldtown, Swords, Co. Dublin, and within the administrative area of Fingal County Council. Specific aspects that will be examined include population levels, human health, residential amenity, impact on employment, commercial activity, land-use, community infrastructure and social facilities. Insofar as possible, this assessment has also considered impacts on the future residents, workers, and visitors to the subject lands.

4.2 Research Methodology

The following assessment of the predicted impacts on population and human health was undertaken based on local population information from the Central Statistics Office's (CSO) Census of Population reports and databank, the Regional Spatial and Economic Strategy 2019-2031, and the Fingal County Council Development Plan 2017-2023. It is important to note that given the location of the subject site situated within the Swords-Lissenhall ED and appearing as an extension to the Swords-Glasmore ED, the catchment area for demographic investigation of this study was defined as follows:

1. Swords-Lissenhall ED (04038)
2. Swords-Glasmore ED (04037)

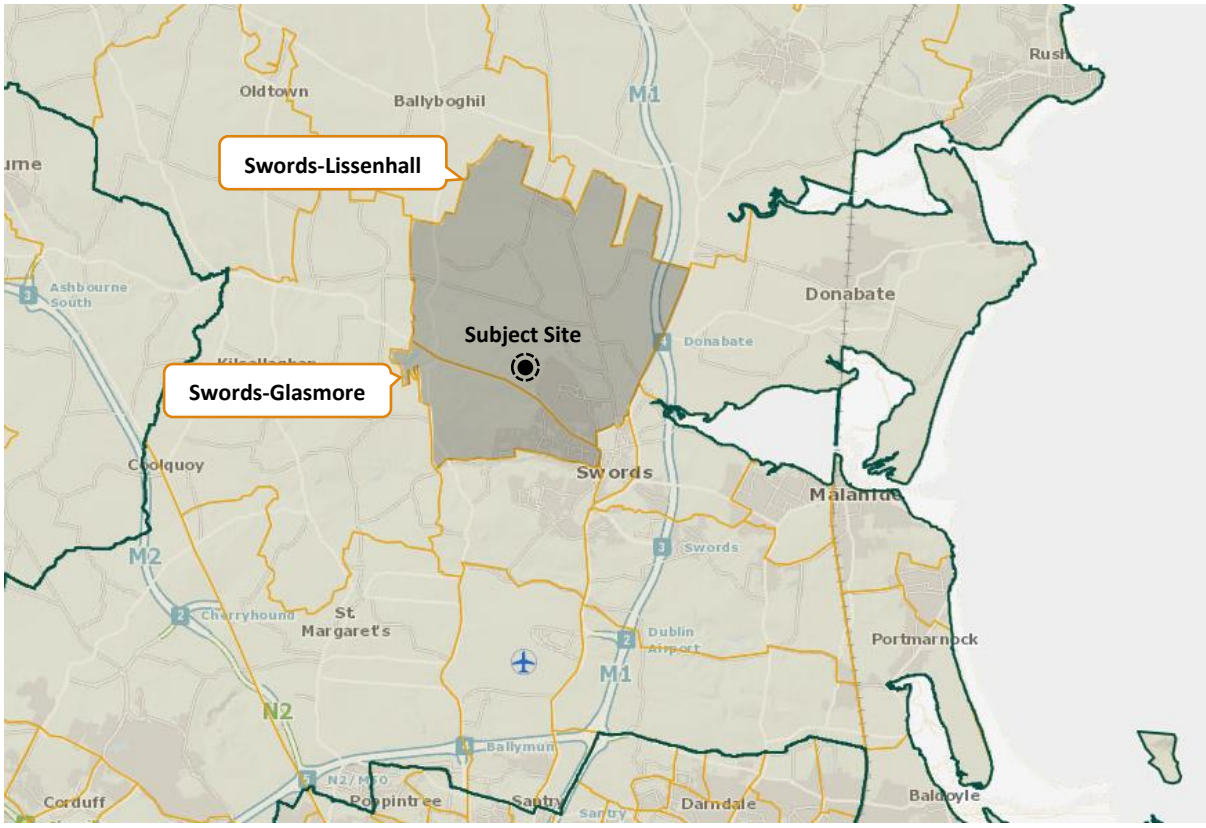

Figure 4-1. Spatial Scope of Demographic Studies (subject site location marked with in black)

It is important to note that given the nature and scale of the proposed development, it was considered that an assessment of amenities within a 2km radius of the development was appropriate. The same approach was taken for the Community and Social Infrastructure Audit, School Demand Assessment, and Childcare Provision Assessment, and as such provides for greater consistency between these reports and the EIAR.

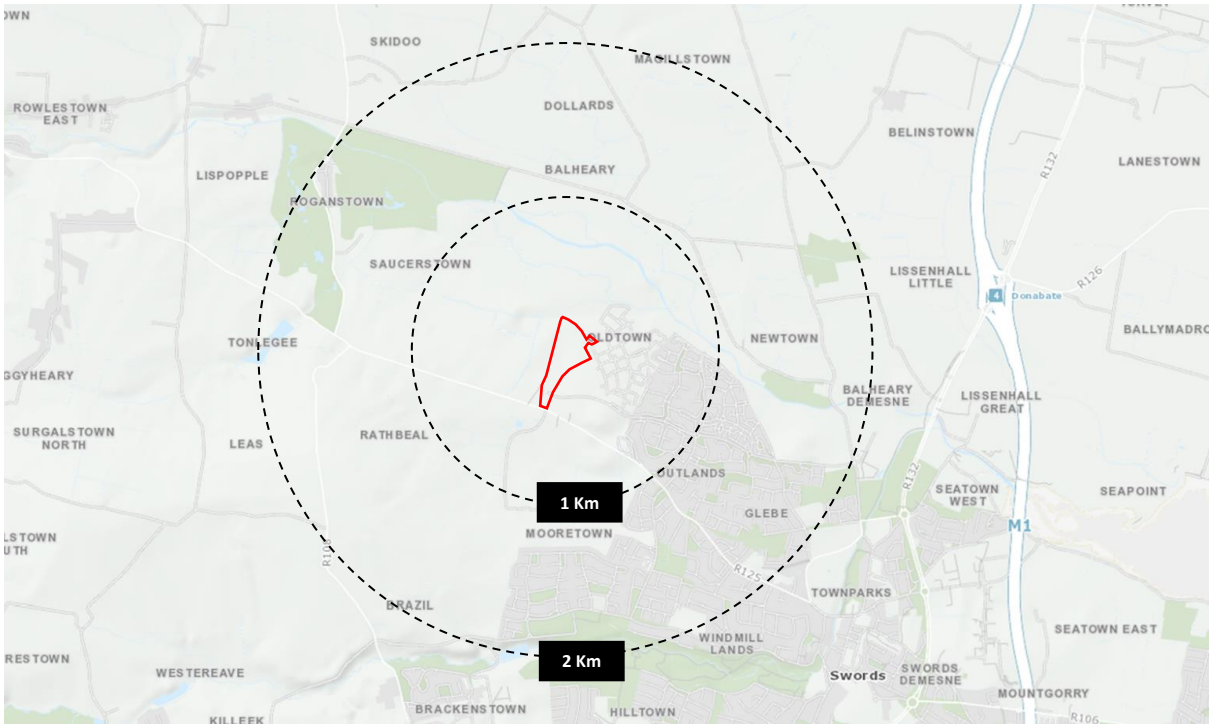

Figure 4-2. Spatial Scope of the Community and Social Infrastructure Audits [Note: Red line developable site area indicatively shown]

A site visit and a Community and Social Infrastructure Audit was also undertaken to appraise the location, the existing infrastructure and services in the area and any likely and significant potential impact upon human receptors. This also accompanies a School Demand Assessment and a Childcare Provision Assessment to further investigate the future demand for these facilities with respect to the flux of population arising from the proposed scheme.

The employment context was set out drawing principally on the most recently available statistics for the total number of persons at work, unemployment levels and employment categorised according to social group. Therefore, information on the economic performance of the area and the wider Dublin region is derived primarily from the 2016 Census results and statistics obtained from the ESRI.

The following assessment of land-use was undertaken based on a site visit appraisal and a review of the zoning objectives of the Fingal County Council Development Plan 2017-2023. The assessment was carried out in accordance with the following guidance documents and aligned accordingly based on Downey's professional experience and judgement:

- EPA (2017), Guidelines on the Information to be Contained in Environmental Impact Statements.
- The Guidelines for Planning Authorities and An Bord Pleanála on Carrying Out Environmental Impact Assessment (August 2018).
- EPA (2015), Advice Notes on Current Practice in the Preparation of Environmental Impact Statements.

4.3 Baseline Environment

The subject lands are located on the western edge of Swords, Fingal, Co. Dublin, approximately 3.5km from the town centre and County Hall, 5km from the M1 interchange at Lissenhall and just under 10km to Dublin Airport. It is accessed from Glen Ellan Road and Rathbeale Road, and from Miller's Avenue and the internal street network of the adjacent completed development. The lands are zoned RA in the Fingal Development Plan, and with an approximate area of 10.22 ha, are situated to the north of Rathbeale Road and within the existing built-up area of Oldtown-Mooretown lands to the western development boundaries of Swords. Access to the site is currently via Glen Ellan Road and Miller's Avenue, a partly completed link road that is also known as the Western Distributor Link Road (WDLR). There is also access to the site through Miller's Glen estate, to which the proposed scheme is an extension. The subject site is bounded by Miller's Avenue to the east, Phase 4C of the overall residential scheme on the Oldtown lands (Reg. Ref. F17A/0687) to the northeast, agricultural lands zoned for the Swords Regional Park to the west, and the Rathbeale Road to the south.

4.4 Characteristics of the Proposed Development

The proposed development subject to this Strategic Housing Development (SHD) Napplication provides for the construction of a total of 377 no. residential dwellings, comprising 173 no. houses (9 no. 2 beds, 147 no. 3 beds, and 17 no. 4 beds), 204 no. apartment/duplex units (98 no. 1 beds, 104 no. 2 beds, and 2 no. 3 beds), with 1 no. childcare facility and associated car parking and bicycle parking, landscaping, boundary treatments, and all associated engineering and site development works necessary to facilitate the development including the proposed stormwater storage tank and overflow outfall gravity sewer to the Broadmeadow River with associated manholes on lands locally known as the Celestica/Motorola site, junction of Glen Ellan Road and Balheary Road, and at/on Balheary Road, along with the proposed vehicular/service access onto Balheary Road.

4.5 Demographic Trends

4.5.1 Population

The latest Census results show that Ireland's population stood at 4,761,865 in April 2016, an increase of 173,613 (3.8%) since April 2011. This trend has been represented in the Dublin region with a greater growth rate, increasing by 5.9% to 1,347,359 over the intercensal period. As illustrated in the table below, the population growth of County Fingal followed the same pattern as the Region but with an even greater growth rate, increasing by 8% to 296,020 in 2016. This recorded the County of Fingal as the most dynamic county in the Region in terms of population change over 2011-2016.

Table 4-1. Population Change Across the Dublin Region over 2011-2016

Area	2011	2016	Actual Change	% Change
Dublin City	527,312	554,554	+27,242	5.2
Dun Laoghaire - Rathdown	206,261	218,018	+11,757	5.7
South Dublin	265,205	278,767	+13,562	5.1
Fingal	273,991	296,020	+22,029	8.0

Source: CSO StatBank

The proposed development is located within the Swords-Lissenhall ED, appearing as an extension to the Swords-Glasmore ED. Table 4-2 below shows the population change within these Electoral Divisions (ED's) defined as the catchment area of this assessment. In this regard, the 'catchment area' refers to the area surrounding the subject lands which bound the lands and may be affected by the proposed development. Coincidentally, the catchment area also refers to the population which will be served by the proposed development.

Table 4-2. Population Change in the Catchment Area over 2011-2016

Area	2011	2016	Actual Change	% Change
Swords-Lissenhall ED	9,667	10,447	780	8.1%
Swords-Glasmore ED	7,748	7,711	-37	-0.5%
Total	17,415	18,158	743	4.3%

Source: CSO StatBank

4.5.2 Average Household Size

With an average household size of 3.1, there were 5,831 private households in the catchment area of the assessment in 2016. As shown in Table 4-3 below, nearly 60% of the households residing in this area in 2016 were small-sized households ranging from 1- to 3-person households (4,835 households). It is noted that the average household size in the catchment area of the assessment slightly increased from 3.0 in 2011 to 3.1 in 2016. The same pattern of change in the average household size in Swords-Lissenhall ED, where the subject lands fall under, can be observed, i.e., the figures slightly increased from 2.9 in 2011 to 3.0 in 2016 during the intercensal period.

Table 4-3. Private Households in the Assessment Area by Household Size, 2016

Size of household	Swords-Lissenhall ED	Swords-Glasmore ED	Total	%
1-person Households	495	335	830	14.2%
2-person Households	841	614	1,455	25.0%
3-person Households	708	454	1,162	19.9%
4-persons Households	817	571	1,388	23.8%
5-person and over Households	540	456	996	17.1%
Total	3,401	2,430	5,831	-

Source: CSO StatBank

4.5.3 Average Age

CSO 2016 statistics indicate that the average age for the study area has increased by almost two years since the last census period in 2011, increasing from 31.8 to 33.6 years old. Also, while the average age has increased within the study area, it stands well below the national average (37.4) for both Swords-Lissenhall and Swords-Glasmore ED's, characterised by a younger population.

Table 4-4. Average Age within the Assessment Area

Area	Avg. Age (years)		Avg. Change (%)
	2011	2016	2011-2016
Swords-Lissenhall ED	29.9	31.3	4.7%
Swords-Glasmore ED	33.7	35.9	6.5%

Source: CSO StatBank

Investigating the age profile of the area as per Census 2016 indicates that younger age cohorts still form the greatest share of the population residing in the Swords Area, however, as shown on the Figure 4-3, this is more notable in the Swords-Lissenhall ED.

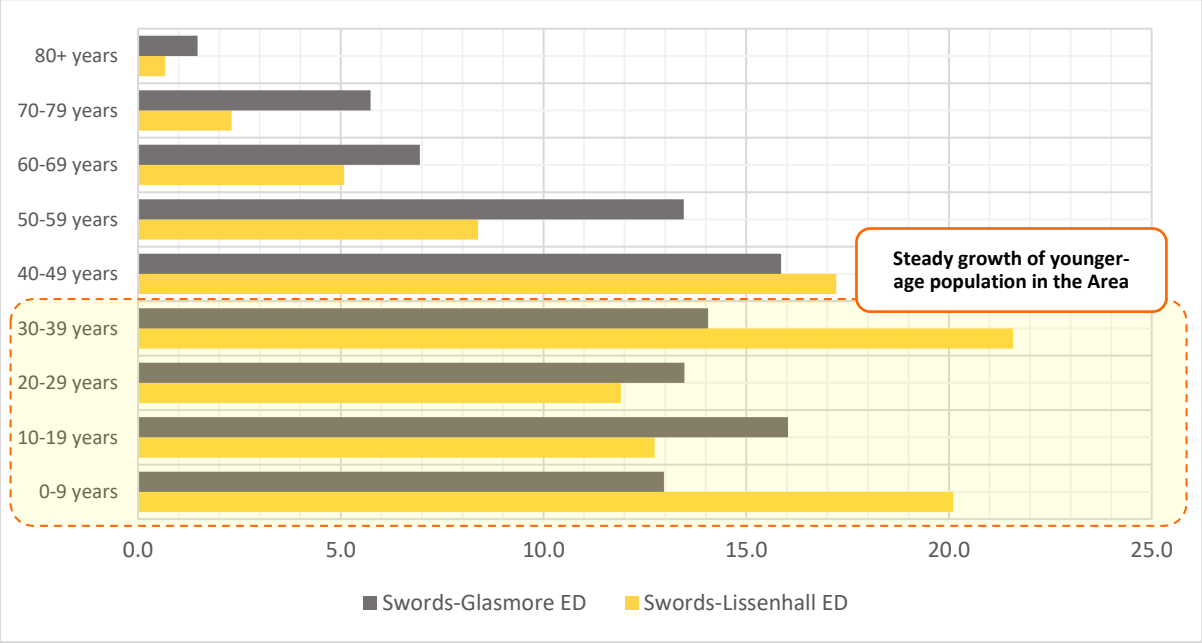

Figure 4-3. Population Age Cohorts in Swords Area across the ED's, 2016

The population pyramid below (Figure 4-4) shows the age distribution in the area with more detail. A peak of births in 1980's shows up in the 30-39 age category, and another peak in the number of births occurred in 2000's and shows up in the 0-9 age category. Overall, the age pyramid indicates a young population residing in the town, which is expected to grow in the coming years.

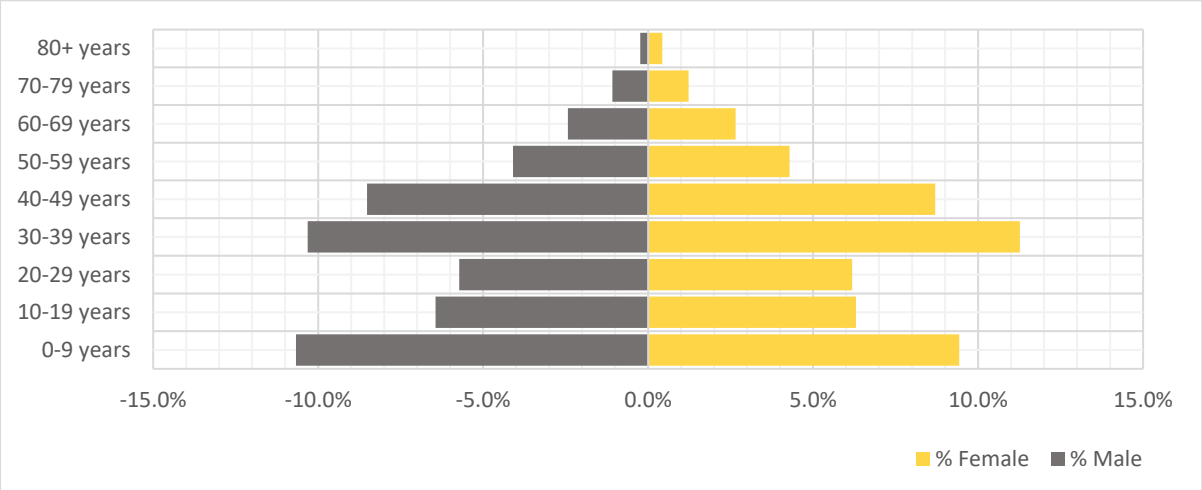

Figure 4-4. Population Age Pyramid of Swords Area, 2016

The factors outlined above have a knock-on implication on the provision of housing and the associated facilities required to cater for the consequential increase in population in the local area. The factors above would indicate that with a relatively small household size and an average age in the house-buying age, that there would be a need for the proposed development within this area.

4.5.4 Potential Impact of the Proposed Development

4.5.4.1 Construction Phase

The construction phase of the proposed development should not have any direct impact on the population of the area or the subject lands. It is expected that the work force will generally travel to the development site rather than take up residence in the immediate vicinity. However, the construction of any project has potential to give rise to an impact on health and safety of human beings if construction activities are not managed appropriately. Measures to address such health and safety considerations will be addressed in a Construction Management Plan for the development for implementation during the construction phase, in accordance with best practice.

4.5.4.2 Operational Phase

The operational phase of the proposed development will result in the provision of 377 no. new residential units. The average household size in Fingal is currently 3.02 persons, which is based on the 2016 census of population and for the development's catchment area translates into 3.1 persons. Based on this figure, it is anticipated that the proposed development to accommodate a maximum of 1,169 persons. It is noted that within the proposed mix of unit types, there is also one-bedroom apartment/duplex units. Excluding the 1-bedroom apartment/duplex units, this leaves a total of 279 no. units that can be deemed to accommodate families. Applying the average household size to 279 apartment/duplex units capable of accommodating families would generate 865 total residents in total within these units. Applying a maximum household size of 2 to the one-bedroom apartments would generate 196 total residents in these units. This would provide for an overall of 1,061 persons. Therefore, the proposed scheme is expected to accommodate a maximum of 1,061 to 1,169 persons.

4.5.5 Remedial and Reductive Measures

No remedial or reductive measures are proposed with reference to population.

4.5.6 Predicted Impact of the Proposed Development

4.5.6.1 Construction Phase

The construction phase of the development will have a negligible or neutral impact on population.

4.5.6.2 Operational Phase

The population analysis above suggests that the population of the area will continue to rise in the medium term. The population increase predicted as a result of the operational stage of the proposed development ties in with broader trends in the area and the development will provide for this increase, therefore resulting in a positive impact on population.

4.5.6.3 Monitoring

There is no requirement for population monitoring.

4.6 Employment

CSO 2016 statistics confirm an employment level of 2,006,641 persons for the catchment and an unemployment level of 297,396 persons for the State. The employment level is increased from 199,281 since 2011 and the unemployment level is down significantly from the previous figure of 424,843 people, this was mainly due to the impact of the recession on employment levels during the census period. County Fingal as a whole experienced an increase in employment between the period of 2011-2016, and the same trend was followed within the study area with Swords-Lissenhall and Swords-Glasmore ED's recording a notable increase in the rate of employment as summarised in the Table 4-5 below.

Table 4-5. Total Number of Persons aged +15 years at Work in the County and Study Area, 2011-2016

	Persons at Work		% Change
Area	**2011**	**2016**	**2011-2016**
County Fingal	119,276	133,971	12.3%
Swords-Lissenhall ED	4,658	5,046	8.3%
Swords-Glasmore ED	3,228	3,542	9.7%

Source: CSO StatBank

The Labour Force Survey Q3 2021, which was published by the CSO in November 2021, contains the labour market statistics for Ireland. Due to the impact of COVID-19 in the global economy the CSO has compiled standard methodology and separate COVID-19 adjusted estimates (as stated in their Information Note on Implications of COVID-19 on the Labour Force Survey), which stated:

> *"As the Central Statistics Office (CSO) is obliged to follow standard definitions and methodology when calculating official estimates from the Labour Force Survey (LFS), it has been decided to compile the Quarter 1 2020 LFS Estimates in the usual way and provide separate COVID-19 Adjusted Estimates. This approach preserves the methodology of the LFS while at the same time providing transparency around the current impact of COVID-19 on the Labour Market within Ireland.*
>
> *The CSO has produced a supplementary measure of Monthly Unemployment in parallel with the routine Monthly Unemployment Estimate methodology, which incorporates those in receipt of the Pandemic Unemployment Payment into the calculation to produce a COVID-19 Adjusted Measure of Monthly Unemployment. This new measure was published as part of the Monthly Unemployment Estimates (MUE) release for March 2020 and April 2020 and will continue to be made available for as long as deemed necessary by the CSO."*

Accordingly, there were 2,471,200 people aged 15-89 years in employment in Q3 2021, giving an employment rate of 72.2% for those aged 15-64, based on the International Labour Organisation (ILO) criteria. The number of persons in employment was up 9.8% (221,200) from 2,250,000 over the year while the employment rate was up from 66.4% in Q3 2020.

The COVID-19 Adjusted Measure of Employment, or the lower bound for the number of employed persons aged 15 - 89 years, rose from 2,369,731 to 2,393,394 persons between the end of September 2021 and the end of October 2021. This was accompanied by an increase from 69.1% in September

2021 to 69.8% in October 2021 in the associated COVID-19 Adjusted Employment Rate for those persons aged 15-64.

Table 4-6. Summary of Labour Force Survey (Q3 2021)

	Standard LFS Methodology (ILO)	COVID-19 Adjusted Estimates September 2021
Indicator	**Q3 2021**	**end of Q3 2021**
Employed persons aged 15-89 years	2,471,200	2,369,731
Employment rate for those aged 15-64 years	72.2%	69.1%
Unemployed persons aged 15-74 years	149,100	232,866
Unemployment rate for those aged 15-74 years	5.7%	8.9%
In labour force	2,620,300	-
Not in labour force	1,407,700	-

Source: CSO StatBank

There were 149,100 unemployed persons aged 15-74 years in the catchment in Q3 2021 based on ILO methodology. In Q3 2021, the unemployment rate was 5.7% for those aged 15-74 years with a rate of 12.1% for those aged 15-24 years, these rates are down from 7.4% and 20.9% respectively in Q3 2020. The COVID-19 Adjusted Measure of Monthly Unemployment published as part of the Monthly Unemployment release for October 2021, was 232,866 for September 2021 (end of Q3 2021), this estimate is an upper bound and adds all those on the Pandemic Unemployment Payment (PUP) to the standard Monthly Unemployment Estimate. Furthermore, the COVID-19 Adjusted Measure of Unemployment fell to 205,246 in October 2021. The associated COVID-19 Adjusted Unemployment Rate fell from 8.9% in September 2021 to 7.9% in October 2021.

4.6.1 Potential Impact of the Proposed Development

4.6.1.1 Construction Phase

The proposed development will provide significant construction sector and related employment over the construction period of the development. It can be difficult to determine the exact numbers that may be employed directly on site during the construction phase as workers may only be employed on a temporary basis as sub-contractors and may also work on other sites during the period. Should An Bord Pleanála grant planning permission for this proposed development, then it will be constructed over a phased basis, in accordance with the indicative proposed construction phasing plan for the proposed project and in agreement with the Planning Authority. Aside from the benefits of direct employment, it is anticipated that builder suppliers and other related services will indirectly benefit from the construction phase of the proposed development. The construction phase therefore will be beneficial to the local economy due to the additional income and expenditure that will arise. This is considered to be a positive impact arising from the development.

4.6.1.2 Operational Phase

The proposed development will attract visitors to the area on a temporary basis, possibly sustaining and increasing the demand for local services, including shops, public houses, restaurants, etc. In addition to the residential component of the development, the application also proposes 1 no. childcare facility, which will deliver new local employment opportunities, both full time and part time

positions which will become available for the resident population with an overall positive impact on employment.

4.6.2 Remedial and Reductive Measures

No adverse impacts on employment are predicted during the construction or operational phase of the development. No remedial or mitigation measures are considered necessary.

4.6.3 Predicted Impact of the Proposed Development

The predicted impact of the proposed development will be the same as that set out for potential impacts.

4.6.4 Monitoring

There is no requirement for economic monitoring.

4.7 Land-Use

Under the Fingal Development Plan 2017-2023, the subject site is zoned *"RA - Residential Area"* and therefore aims to:

"Provide for new residential communities subject to the provision of the necessary social and physical infrastructure."

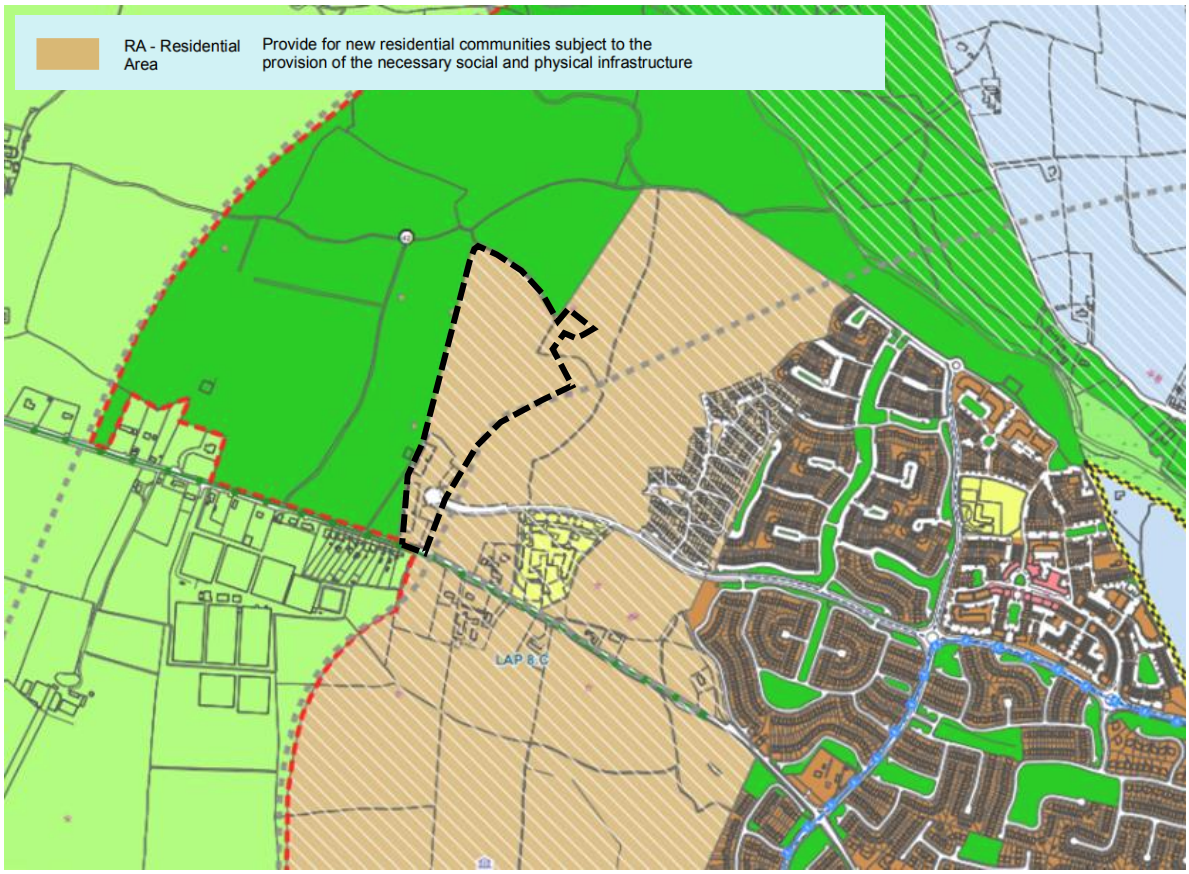

Figure 4-5. Land Use Zoning Map Extracted from the County Development Plan [Note: Red line developable site area indicatively shown]

The vision for this objective seeks to:

> *"Ensure the provision of high quality new residential environments with good layout and design, with adequate public transport and cycle links and 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."*

Under the RA zoning, the following uses are permitted in principle.

Uses Permitted in Principle under the RA Land Use Zoning
Amusement Arcade[9]; Bed and Breakfast; Betting Office[9]; **Childcare Facilities**; Community Facility; Education; Funeral Home/Mortuary[9]; Guest House; Health Centre; Health Practitioner; Hospital; Office Ancillary to Permitted Use; Office ≤ 100sqm[9]; Office>100sq.m. and, 1,000sqm[11]; Open Space; Place of Worship; Public House[9]; Public Transport Station; Recreational Facility/Sports Club; **Residential**; Residential Care Home/Retirement Home; Restaurant/Cafe[9]; Retail-Local < 150 sqm nfa; Retail – Convenience ≤ 500 sqm nfa[9]; Retail – Comparison ≤ 500 sqm nfa[9]; Retail – Supermarket ≤ 2,500 sqm nfa[9]; Retirement Village; Sheltered Accommodation; Sustainable Energy Installation; Taxi Office; Traveller Community Accommodation; Utility Installations; Veterinary Clinic.

[9] In a local centre only
[11] Only located in a local centre and of a scale appropriate to that centre

Table 4-7. Permitted Uses under the RA Land Use Zoning

Therefore, the proposed development of residential units and 1 no. childcare facility are permitted in principle under the zoning objectives pertaining to the subject lands. The Class 1 open space lands to the north are zoned OS-Open Space – *"to preserve and provide for open space and recreational amenities".* The proposed open space in this area is therefore permitted in principle under this zoning designation. The proposed storage tank site is zoned ME-Metro Economic Corridor – *"to facilitate opportunities for high-density mixed-use employment generating activity and commercial development and support the provision of an appropriate quantum of residential development within the Metro Economic Corridor".* The tank can be considered essential infrastructure and has been designed in conjunction with Irish Water. It will not only facilitate the connection requirement of this subject application but will also have the capacity to allow for continued development in the Oldtown/Mooretown catchment.

4.7.1 Potential Impact of the Proposed Development

4.7.1.1 Construction Phase

The construction phase of the development involves a change in land-use of the majority of the site from a current greenfield site, which has no current activity to use as a temporary active construction site. The site is considered suitable for construction activities to provide a development that will cater for the planned population at western edge of Swords development boundaries through provision of new homes. With recommended construction mitigation measures in place as set out within this EIAR, the subject lands and surrounding area have the capacity to accommodate the construction of the proposed development without any significant risk of impact upon existing land-uses.

4.7.1.2 Operational Phase

The proposed development will result in a permanent change in land-use of the site from a current greenfield site, which has no current activity to a residential development and supporting community uses, comprising 1 no. childcare facility. The total proposed net development area comprises c. 7.80 hectares set within an overall gross site area of 10.223 hectares. This is considered to be a permanent positive impact on an area of land that has no current active use. The surrounding land-uses (primarily residential, recreation and commercial uses) will continue during the operational phase of the proposed development. The impact of the proposed site is negligible as the site will have a positive impact on the surrounding area through the provision of a new resident community. Therefore, while the proposed development will result in a permanent change in land-use from an undeveloped land to a mix of residential and residential amenity use, this change is consistent with the zoning objectives for the lands as per Fingal County Council Development Plan 2017-2023.

4.7.2 Remedial and Reductive Measures

No remedial or reductive measures are proposed with reference to land-use.

4.7.3 Predicted Impact of the Proposed Development

4.7.3.1 Construction Phase

The predicted impacts of the construction phase of the development are the same as that set out under the potential impacts of the construction phase of the development and are not anticipated to be significant. Furthermore, all impacts will be temporary in nature.

4.7.3.2 Operational Phase

The predicted impact is the same as that set out under the potential impacts of the operational phase of the development.

4.7.4 Monitoring

There is no requirement for land-use monitoring.

4.8 Community Infrastructure and Social Facilities

Community infrastructure can generally be defined as services and facilities that are available to the residents of any given area. These include early childcare and educational facilities, open spaces, recreational, and sporting facilities, community centres and halls, retail provision, healthcare facilities, and religious buildings. The current situation in relation to these facilities in the subject area is set out in the following sections and is also subject to a separate report prepared by Downey, which forms part of the planning application documentation submitted with the EIAR.

4.8.1 Early Childcare & Educational Facilities

4.8.1.1 Childcare Facilities

As seen on the TUSLA map below, there are a number of registered childcare providers in the area and Downey have contacted them to determine their current capacity. The details of these childcare

facilities are outlined in the table on the next page. It is important to note that not all the childcare facilities decided to participate in the assessment, however the information obtained from our efforts indicates that most childcares are working at full capacity for the time-being with 1 no. expecting to increase its capacity for next year (the Little Learner's Corner creche).

It is important to note that the earlier phases of development at Oldtown-Mooretown LAP lands are to provide for 5 no. childcare facilities with a gross floor area of more than 1,400 sq. m (Reg. Ref. 11A/0473, Reg. Ref. F11A/0436, Reg. Ref. F16A/0091, Reg. Ref. 15A/0390, and Reg. Ref. F18A/0701). These services are anticipated to cater for over 200 pre-school children.

This is further supported by the proposed childcare facility of 519 sq. m capable of accommodating circa 102 children. This is submitted to be 39 no. spaces over what was initially projected to serve the proposed scheme when incorporating demographic trends of the area within the estimations. Also, this is submitted to be 28 no. spaces in excess of the requirements of '*Guidelines for Planning Authorities on Childcare Facilities'* providing a benchmark provision of 1 no. 20 space childcare facility per 75 dwellings. For further information, please refer to the *Childcare Provision Assessment Report* prepared by Downey. It is noted that currently an overall of 30 no. spare after-school spaces are available to serve the proposed scheme and the wider area.

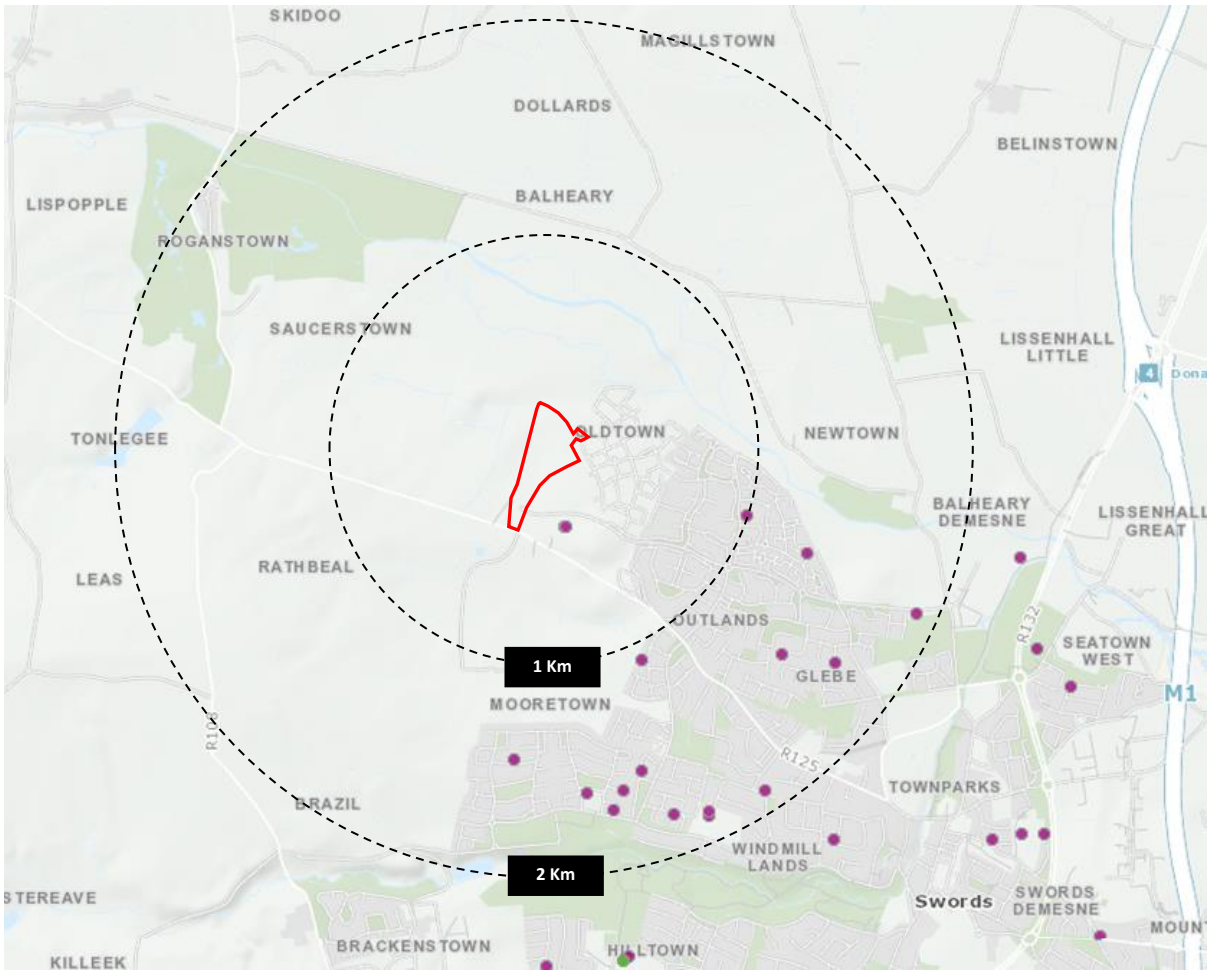

Figure 4-6. Location of Childcare Facilities within 1-2km of the Subject Lands (approximate boundaries of the lands outlined in red) (Source: pobal.ie) [Note: Red line developable site area indicatively shown only]

Therefore, Downey is of the considered opinion that while there is a significant number of childcare facilities within the area, the quantum of units being proposed as part of this development would justify the provision of a new childcare facility which forms part of this proposed development, and this new childcare would cater for both the residents of the application site and its wider community.

Table 4-8. Childcare Facilities within 1-2km Radius of the Subject Lands (source: Tulsa.ie)

	Name	Address	Max Capacity	Type of Service Age Profile
Within 1 Km Radius of the Subject Lands	**Appleseed's Pre-school**	Applewood Community Centre, Applewood, Swords, Co. Dublin	33 children	Sessional (2-6 years)
	Appleseed's Afterschool	Applewood Community Centre, Castleview Lawn, Bunbury Gate Ave, Swords, Co. Dublin	32 children	Afterschool Standalone Service (4-10 years)
	Sherpa Kids Thornleigh Educate Together	Thornleigh Educate Together National School, Applewood Village, Swords, Co. Dublin	39 children	Afterschool Combined Service (4-12 years)
Within 2 Km Radius of the Subject Lands	**Little Apples Creche & Montessori**	Applewood Lane, Applewood Village, Swords, Co. Dublin	105 children	Full Day/Sessional (0-6 years)
	ABC Playschool	21 Glen Ellan Crescent, Swords, Co. Dublin	16 children	Sessional (2-6 years)
	Play & Learn Playschool	68 Cianlea, Swords, Co. Dublin	22 children	Full Day/Part Time/Sessional (2-6 years)
	The Montessori Way	27 Berwick Way, Swords, Co. Dublin	16 children	Sessional (2-6 years)
	The Little Learners Corner	Swords Manor, Brackenstown Road, Swords, Co. Dublin	40 children	Full Day/Part Time/Sessional (0-6 years)
	St Brigid's Montessori School	5 Swords Manor Grove, Swords, Co. Dublin	15 children	Sessional (3-6 years)
	Little Friends Playgroup	23 Swords Manor Way, Swords, Co. Dublin	15 children	Sessional (2-6 years)
	Little Valley Preschool	9 Valley View, Swords, Co. Dublin	11 children	Sessional (2-6 years)
	Bright Stars Childcare	1 St Cronan's View, Swords, Co. Dublin	54 children	Part Time/Sessional (2-6 years)
	Sunshine Playschool	The Scouts Den, Brackenstown Road, Swords, Co. Dublin	33 children	Full Day/Part Time/Sessional (2-6 years)
	Kids Care	B.A.S.E. St Cronan's School Grounds, Brackenstown Road, Swords, Co. Dublin	41 children 30 spare after-school places	Part Time/Sessional (2-6 years)

	Name	Address	Max Capacity	Type of Service Age Profile
	Kid- E-Winks Montessori	147 Glasmore Park, Swords, Co. Dublin	20 children	Sessional (2-6 years)
	Mighty Oaks Preschool	St. Colmcille's GFC, Holybank, Glen Ellan Road, Swords, Co. Dublin	22 children	Sessional (2-6 years)

4.8.1.2 Primary Schools

There are three primary schools within one kilometre radius, and three primary schools within two kilometres radius of the subject site. Downey attempted to contact the schools with regard to their available capacity, however, the level of feedback was low. The feedback received did not indicate exact numbers, but it was suggested there is some spare capacity within the schools in the vicinity of the site.

Figure 4-7. Location of Primary Schools [Note: Red line developable site area indicatively shown]

Table 4-9. Primary Schools within 1-2km Radius of the Subject Lands (source: DoES & Schooldays.ie)

	Roll No.	Name	Address	Enrolments 2021-22
Within 2 Km Radius of the Subject Lands	**20145O**	**Swords Educate Together National School**	Applewood, Swords, Co. Dublin	Boys: 249 Girls: 189
	20095C	**Gaelscoil Brian Boroimhe**	Seanbhaile Bothar, Chill Dheaglain, Sord Contae Atha Cliath, Co. Dublin	Boys: 240 Girls: 220
	20529J	**Broadmeadow Community National School**	Mooretown, Swords, Co. Dublin	Boys: 13 Girls: 17

	Roll No.	Name	Address	Enrolments 2021-22
	19456B	St. Cronan's Junior National School	Brackenstown, Swords, Co. Dublin	Boys: 275 Girls: 237
	19535U	St. Cronan's Senior National School	Brackenstown, Swords, Co. Dublin	Boys: 321 Girls: 265
	20302E	Thornleigh Educate Together National School	Applewood Village, Swords, Co. Dublin	Boys: 153 Girls: 189

Therefore, Downey is of the considered opinion that there is suitable capacity within and close proximity to the area at a National School level to accommodate the proposed development. For further details in this regard, please refer to the School Demand Assessment prepared by Downey and submitted under a separate cover as part of this application.

4.8.1.3 Post-Primary Schools

As illustrated below, there is one post-primary school within one kilometre radius, and one within two kilometres radius of the subject site. Also, a further three schools are located within c. 3-3.5 km distance from the subject site, which considering that secondary students would travel further distances, it is suggested that theses secondary schools would cater for the scheme as well. Downey attempted to contact the schools with regard to their available capacity, however, the level of feedback was low. The feedback received did not indicate exact numbers, but it was suggested there is some spare capacity within the secondary schools in the vicinity of the site.

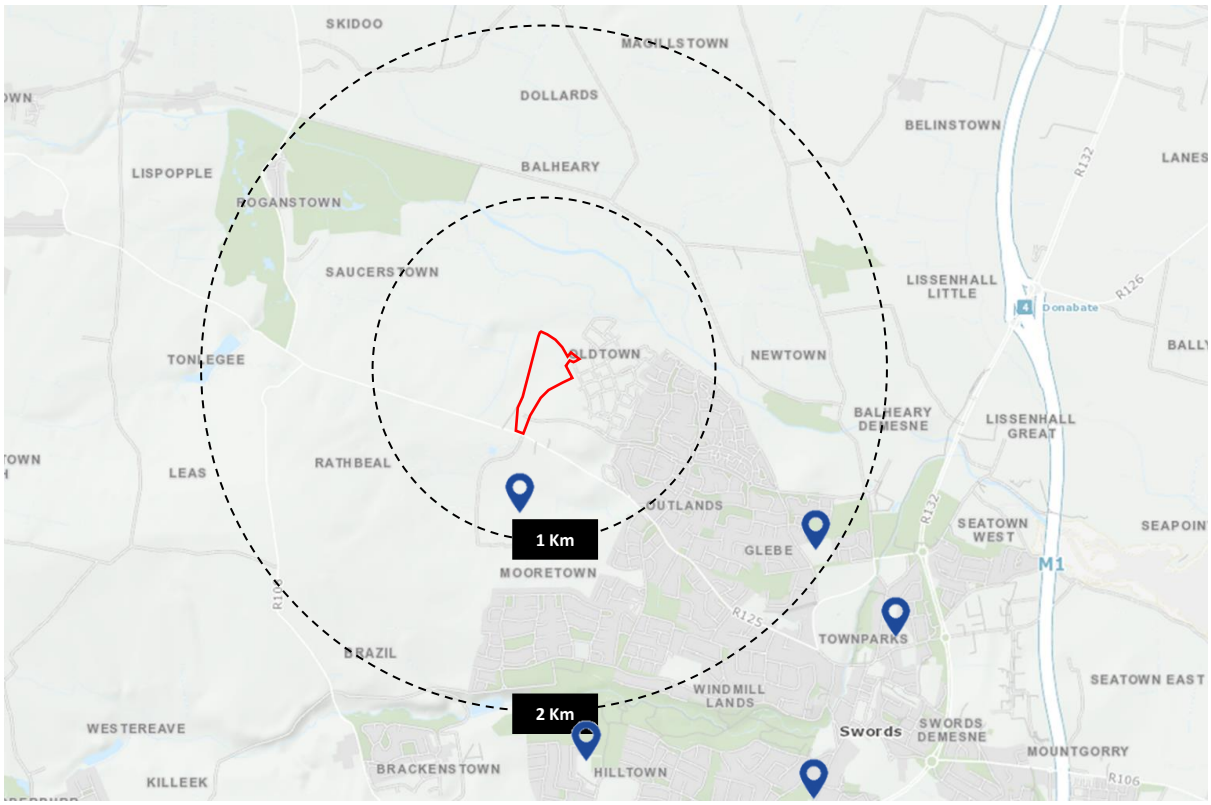

Figure 4-8. Location of Post-primary Schools [Note: Red line developable site area indicatively shown only]

Table 4-10. Post-Primary Schools within Proximity of Subject Lands (source: Schooldays.ie)

	Roll No.	Name	Address	Enrolments 2021-22
Within 2Km Radius of the Subject Lands	70120F	St Finian's Community College	St Finian's Community College, Swords, Co. Dublin	Boys: 315 Girls: 327
	76475D	Swords Community College	Rathbeale Rd, Mooretown, Swords, Co. Dublin	Boys: 334 Girls: 245
Out of 2Km Radius of the Subject Lands	70121H	Fingal Community College	Seatown Road, Swords, Co. Dublin	Boys: 469 Girls: 407
	60810B	Loreto College (all-girls secondary school)	River Valley, Swords, Co. Dublin	Boys: N/A Girls: 621
	60383I	Colaiste Choilm (all-boys secondary school)	Dublin Roadd, Miltonsfields, Swords, Co. Dublin	Boys: 504 Girls: N/A

Therefore, Downey are is the considered opinion that there is suitable capacity within the area at a secondary school level to accommodate the proposed development.

4.8.2 Recreational Facilities

This part of the audit assesses the number and location of existing recreational facilities that are within 1-2km radius of the subject lands. It will include parks, playing fields, community centres and gyms, etc. categorised as indoor and outdoor recreational facilities.

4.8.2.1 Indoor Leisure & Recreational Facilities

It can be seen in the Figure 4-9 below that there are a number of sport centres and fitness facilities, a library, and several community-related facilities within 1-2km radius of the proposed development.

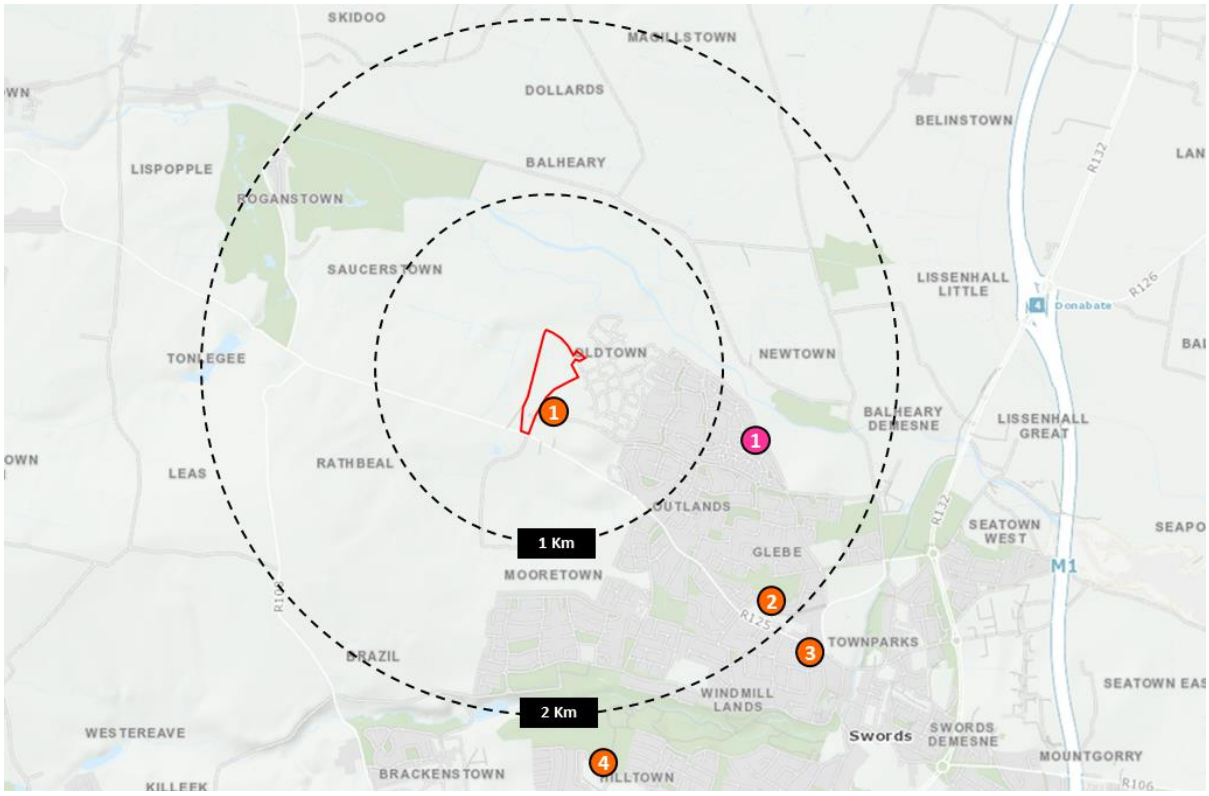

Figure 4-9. Location of Indoor Recreational Facilities [Note: Red line developable site area indicatively shown only]

Accordingly, there are a number of sport centres, community centres, a library within a convenient distance of the proposed development. Interestingly, the sport centres cover a considerable range of services for different age groups, including swimming pools, spa facilities, studios, specialist equipment or service areas for beauty and health treatments. In addition, the Applewood Community Centre at Castleview Lawns with 3 no. sport halls, a childcare, a dance studio, 3 no. meeting rooms supports a wide range of activities including, sports and fitness, dance classes, Irish language classes, social clubs, and all community-related activities for different age groups. The relevant details on these facilities are outlined in the table below.

Table 7-11. Indoor Leisure & Recreational Facilities within 1-2km Radius of the Subject Lands

	No.	Name	Location	Type
Gyms and Leisure Facilities	**1**	**Gym Plus Swords**	Applewood, Swords, Co. Dublin	Gym
Community Facilities	**1**	**Applewood Community Centre**	Castleview Lawns, Bunbury Gate Ave, Oldtown, Swords, Co. Dublin	Community Centre
	2	**Swords Library**	Rathbeale Rd, Commons West, Swords, Co. Dublin	Public Library
	3	**Islamic Cultural Centre Swords**	Islamic Cultural Centre, Rathbeale Rd, Swords Glebe, Swords, Co. Dublin	Mosque

	4	**Rivervalley & Rathingle Community Centre**	Rivervalley Community Centre, Rivervalley, Hilltown, Swords, Co. Dublin	Sports Club

Figure 4-10. Applewood Community Centre Supporting a Wide Range of Activities

4.8.2.2 Outdoor Leisure & Recreational Facilities

There is a huge range of outdoor recreational facilities within the 1-2 km radius of the subject site and its wider area. This includes GAA football clubs, a tennis club, playing pitches, a skateboard park, golf courses, and a variety of open green spaces (Figure 4-11). The location of Oldtown is approximately half-way between the Broadmeadow River Park and the Ward River Valley. This not only indicates a good level of site accessibility to quality green open spaces, but also a notable opportunity to linking these two linear parks and creating a green arc or necklace of open green spaces and woodland walks around the western edge of Swords. The relevant details of these amenities are outlined in Table 4-12.

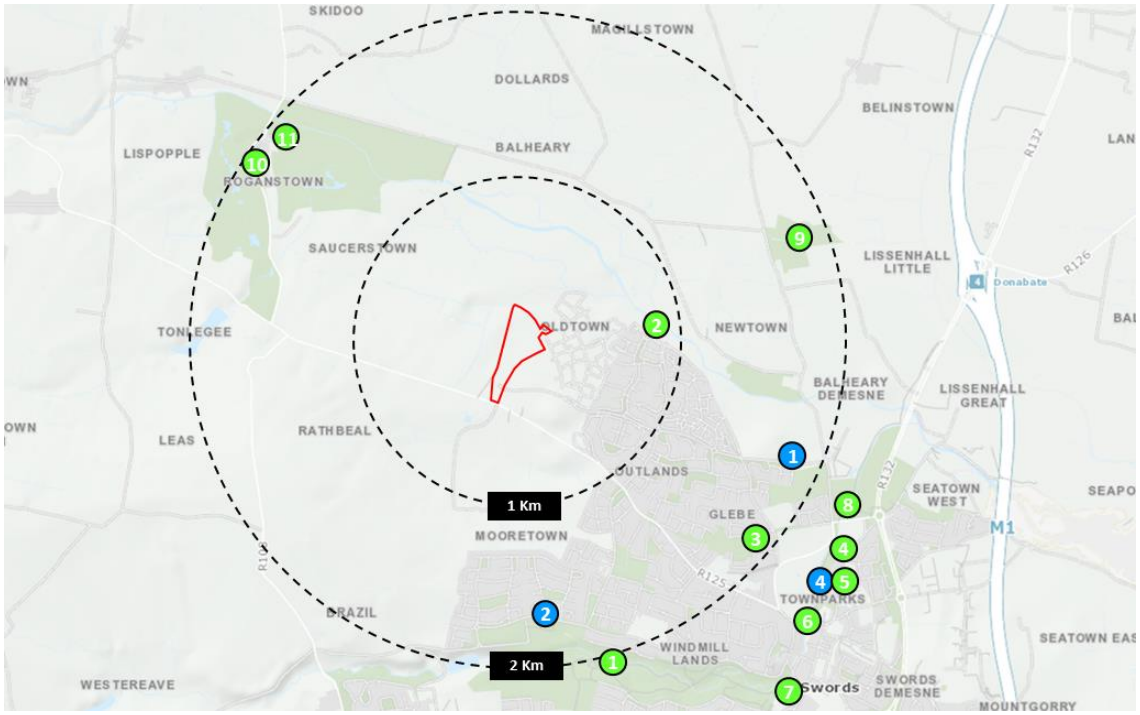

Figure 4-11. Location of Outdoor Recreational Facilities [Note: Red line developable site area indicatively shown]

The Broadmeadow Linear Park extends to 8.5 ha and consists of a 0.6-mile (1,500-step) route with generous parkland, recreational walks, a community garden, and playing pitch. The Ward River Valley extends to 89 ha and consists of a 1.8-mile (4,000-step) route with several viewing points, picnic sites and sports pitches, and Swords Town Park. Swords Town Park itself provides for a playground and tennis courts with Swords Castle forming part of this park.

Figure 4-12. Parks and Playgrounds in Swords

It is important to note that the subject site is located adjacent to the future Swords Regional Park. The design of the proposed development has taken cognisance of the proximity and has created links throughout the lands for improved accessibility to the Regional Park, in keeping with the vision of the Oldtown-Mooretown LAP (expired).

Figure 4-13. Masterplan of Swords Regional Park (extracted from An Open Space Strategy for Fingal)

Furthermore, as part of the overall scheme for the subject lands, the proposed development enjoys several small pockets parks, shared green spaces, and communal/public open space throughout the Oldtown lands interlinked with a network of green spaces in its setting.

Table 4-12. Outdoor Leisure & Recreational Facilities within 1-2km Radius of the Subject Lands

	No.	Name	Location	Type
Sport Clubs	1	**St. Colmcille's GAA Club**	Holybanks, Swords, Co. Dublin	Football Club
	2	**Swords Manor Football Club**	Ward River Valley, Brackenstown Road, Swords, Co. Dublin	Football Club
	3	**St Finians GAA**	Hilltown, Swords, Co. Dublin	Sports Club
	4	**Swords Lawn Tennis Club**	Swords Castle Grounds, Townparks, Swords, Co. Dublin	Tennis Club
Outdoor Recreational & Park Facilities	1	**Rivervalley Park Swords**	Windmill Lands, Co. Dublin	Park
	2	**Broadmeadow Community Garden**	Broadmeadow Linear Park, Ashton Rise, Swords, Co. Dublin	Park
	3	**Hamilberg Park**	Castlefarm, Swords, Co. Dublin	Park
	4	**Swords Town Park**	Townparks, Swords, Co. Dublin	National Park
	5	**Swords Community Park**	4 Bridge St, Townparks, Swords, Co. Dublin	Park

	6	**Townpark**	Townparks, Swords, Co. Dublin	Park
	7	**Ward River Valley Park**	Moatview Court, Priorswood, Dublin	Park
	8	**Balheary Skatepark**	Castlefarm, Swords, Co. Dublin	Skateboard Park
	9	**Forrest Little Golf Club**	Forrest Little, Swords, Co. Dublin	Golf Course
	10	**Swords Open Golf Course**	Naul Rd, Roganstown, Swords, Co. Dublin	Golf Course
	11	**Roganstown Hotel & Country Club**	Naul Rd, Roganstown, Swords, Co. Dublin	Leisure Centre

Therefore, Downey is of the considered opinion that there is suitable capacity within the area for the recreational and leisure facilities to accommodate the proposed development. This would be complemented by the proposed range of open green spaces within the development.

4.8.3 Retail Provision

The Audit will now look further into the subject site within the retail hierarchy in its wider area and Swords, providing details on the number and location of retail provision within proximity of the subject site. These provide an important factor in the overall quality of life for the future residents of the proposed development. In this regard, it is noted that the retail provision ranges from large convenience food supermarkets to comparable good facilities within 1-2km of the subject site and its wider area. Further details are outlined in Table 4-13.

Figure 4-14. Miller's Glen Retail Centre

As part of Phase 1 development of Oldtown, a new anchor building was proposed, which is now open and operating. This includes a convenience store, retail shops and a café, as well as the creche and plaza pertaining to the 'Village Centre' character area of the Oldtown LAP lands.

Furthermore, two local centres of Applewood and Rathbeale are located within 2km radius of the subject lands. As per the planning policy on level 4 of retail provision, this is to "*provide for one supermarket ranging in size from 1,000-2,500 sqm with a limited range of supporting shops (low order comparison), supporting services, community facilities or health clinics grouped together to create a focus for the local population. This level of centre should meet the everyday needs of the local population and surrounding catchment.*"

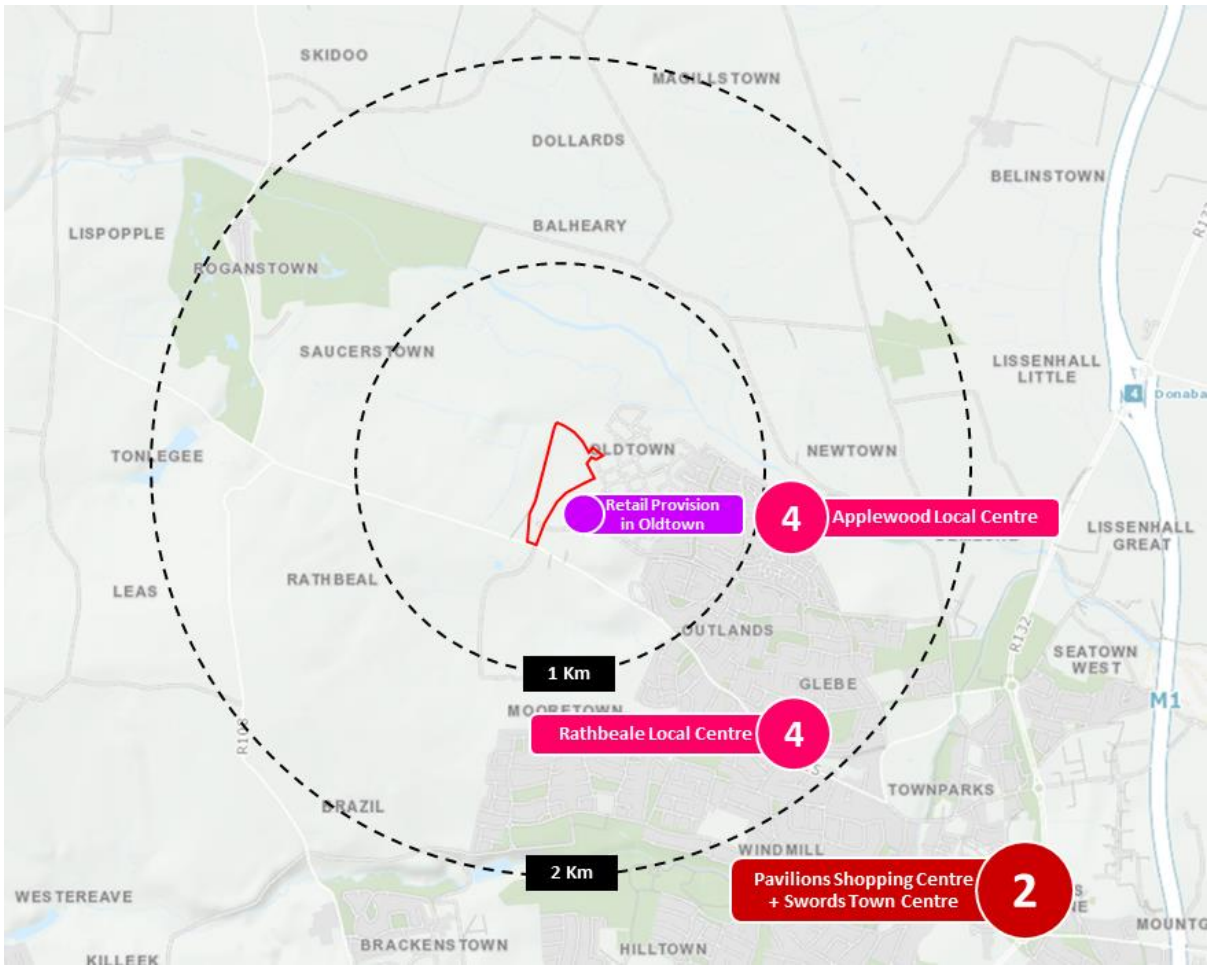

Figure 4-15. Subject Site within Retail Hierarchy of Swords [Note: Red line developable site area indicatively shown]

There are a number of retail offerings along Applewood Main Street, including local convenience shops, pharmacy, hair studios, dry cleaners, bookmakers, restaurants /take-aways, etc. Therefore, the existing shops cater for the daily necessities of the residents and have the capacity to cater for the influx of population arising from the proposed development.

Figure 4-16. Retail offerings along Applewood Main Street

There are also a number of retail offerings along Rathbeale Road (R125), including supermarkets, a department store, a pharmacy, a news-agency, a florist, and a library. The existing shops cater for the daily necessities of the residents and the wider area. Therefore, the injection of new population into

this area will enable the local shops to thrive and will also have the population to support the sustainable growth of the area.

Figure 4-17. Retail offerings along Rathbeale Road (R125)

Table 4-13. List of Retail Facilities in Proximity of the Subject Site

Name	Location	Type
Applewood Main Street	Applewood Main St, Applewood, Swords, Co. Dublin	Restaurants, take-aways, café, range of local convenience shops, hair salon, retail units, dry cleaners, bookmakers, pharmacy
EUROSPAR	Applewood Main St, Applewood, Swords, Co. Dublin	Convenience Store
Swords Shopping Centre	Swords Shopping Centre, Rathbeale Rd, Commons West, Swords, Co. Dublin	Dunnes Stores, JC's Supermarket, shopping centre offerings, barber shop
Lidl	Rathbeale Rd, Swords, Co. Dublin	Supermarket
Applegreen	North St, Townparks, Swords, Co. Dublin	Petrol station, Convenience Store
Centra Miller's Glen	1 Miller's Square, Oldtown, Swords, Co. Dublin	Convenience Store, retail units, and creche faciality

4.8.4 Healthcare Facilities

As shown on Figure 4-18, there is a wide range of healthcare facilities within 2km radius of the subject site and its wider area. This includes GP clinics, health centres, pharmacies, dental practice, nursing home, and out of hours GP's. The relevant details on the healthcare provision in the area is listed in Table 4-14.

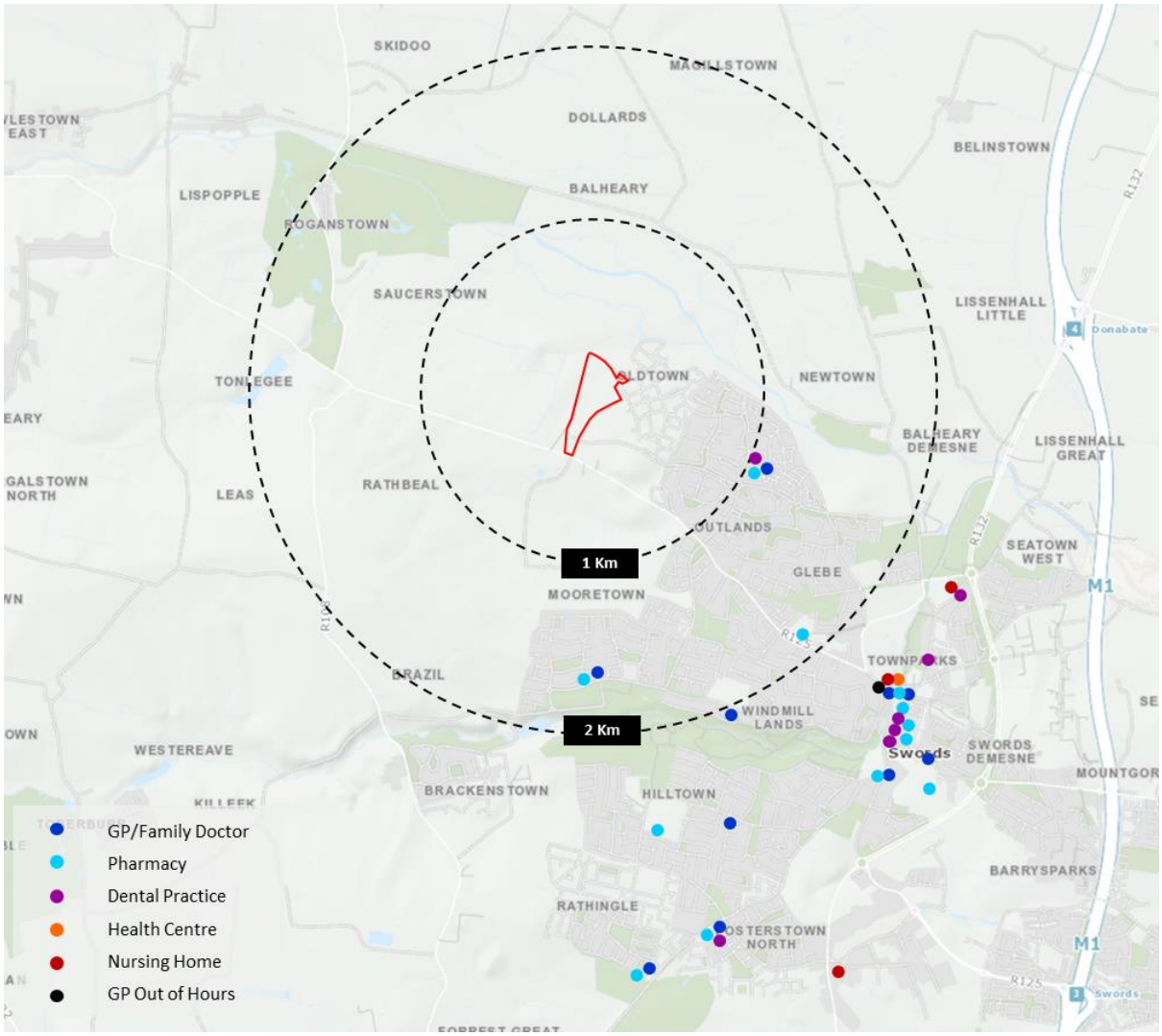

Figure 4-18. Location of Healthcare Facilities within 1-2km Radius of the Subject Site and its Wider Area [Note: Red line developable site area indicatively shown]

Table 4-14. List of Healthcare Facilities in Proximity of the Subject Site

	Name	Location	Type
	Manor Hall Medical Centre	Manor Mall Shopping Centre, Brackenstown Road, Swords, Co. Dublin	Family Practice
	Applewood Medical Centre	Applewood Village, Swords, Co. Dublin	Family Practice
	Dr Rosaleen O'Kelly, Margaret McGrory, Declan O'Malley, Rosaleen Marie O'Kelly	28 Brackenstown Village, Swords, Co. Dublin	Family Practice
	Forest Medical Practice	108 Forrest Fields Road, Swords, Co. Dublin	Family Practice
	Centric Health - Boroimhe Medical Centre	Boroimhe Shopping Centre, Boroimhe, Swords, Co. Dublin	Family Practice
	Ridgewood Medical Centre	Ridgewood Grove, Ridgewood, Swords, Co. Dublin	Family Practice
	Swords Family Practice	Castle Shopping Centre, Bridge Street, Swords, Co. Dublin	Family Practice
	The Plaza Clinic	17 Main Street, Swords, Co. Dublin	Family Practice

	Name	Location	Type
	Adrewendomed Medical Ltd	14 Main Street, Swords, Co. Dublin	Family Practice
	Dr Niall Moore	Rath Mhuire Health Centre, 9 Malahide Road, Swords, Co. Dublin	Family Practice
	Primehealth Medical Centre	91 Main Street, Swords, Co. Dublin	Family Practice
	Salus Medical Clinic	Unit 2 Albany House, Main Street, Swords, Co. Dublin	Family Practice
	Foleys Pharmacy	7 Applewood Village Green, Applewood, Swords, Co. Dublin	Pharmacy
	McNally Pharmacy	Unit 1, Manor Mall Shopping Centre, Brackenstown, Swords, Co. Dublin	Pharmacy
	McCabes Pharmacy	Swords Shopping Centre, Rathbeale Road, Swords, Co. Dublin	Pharmacy
	Swords Pharmacy	Castle Shopping Centre, Bridge Street, Swords, Co. Dublin	Pharmacy
	Life MacNamara's Pharmacy	30 Main Street, Swords, Co. Dublin	Pharmacy
	Gilsenan's Allcare Pharmacy	Unit 1/2 Swords Town Centre, Main Street, Swords, Co. Dublin	Pharmacy
	Plaza Pharmacy	The Plaza, Main Street, Swords, Co. Dublin	Pharmacy
	MacNamara's Pharmacy	Dublin Road, Swords, Co. Dublin	Pharmacy
	Applewood Dental Centre	6 Applewood Village Green, Applewood, Swords, Co. Dublin	Dental Practice
	Swords Dentist	Saint Brendan's, Seatown West, Swords, Co. Dublin	Dental Practice
	Dublin Orthodontics	29/31 North Street, Swords, Co. Dublin	Dental Practice
	Swords Orthodontic Practice	17 Main Street, Swords, Co. Dublin	Dental Practice
	Dental Practice	40/42 Main Street, Swords, Co. Dublin	Dental Practice
	Swords Dental Clinic	66 Main Street, Swords, Co. Dublin	Dental Practice
	Dr. Eoin O'Neill & Associates	58 Main Street, Swords, Co. Dublin	Dental Practice
	Boroimhe Dental Practice	Boroimhe Shopping Centre, Boroimhe, Swords, Co. Dublin	Dental Practice
	Swords Health Centre	Bridge Street, Swords, Co. Dublin	Health Centre
	Fingal House Nursing Home	Fingal House Nursing Home, Seatown West, Swords, Co. Dublin	Nursing Home
	Carechoice Swords	Carechoice Nursing Home, Bridge Street, Swords, Co. Dublin	Nursing Home
	Tara Winthrop Private Clinic	Tara Winthrop Private Clinic, Nevinstown Lane, Swords, Co. Dublin	Nursing Home
	DDOC	Swords Health Centre, Bridge Street, Swords, Co. Dublin	GP Out of Hours

Furthermore, Beaumont Hospital is located within approximately 14 km of the subject lands, and this is a c. 25-minute driving distance via M1.

4.8.5 Religious and Community Provision

There are several religious centres in the area including Catholic, Protestant and Anglican churches, in addition to Mosques and Islamic Centre. Taking into consideration the scale of the proposal, and the influx of new population into the area, the existing facilities prove to be sufficient and meet the needs of the proposed development.

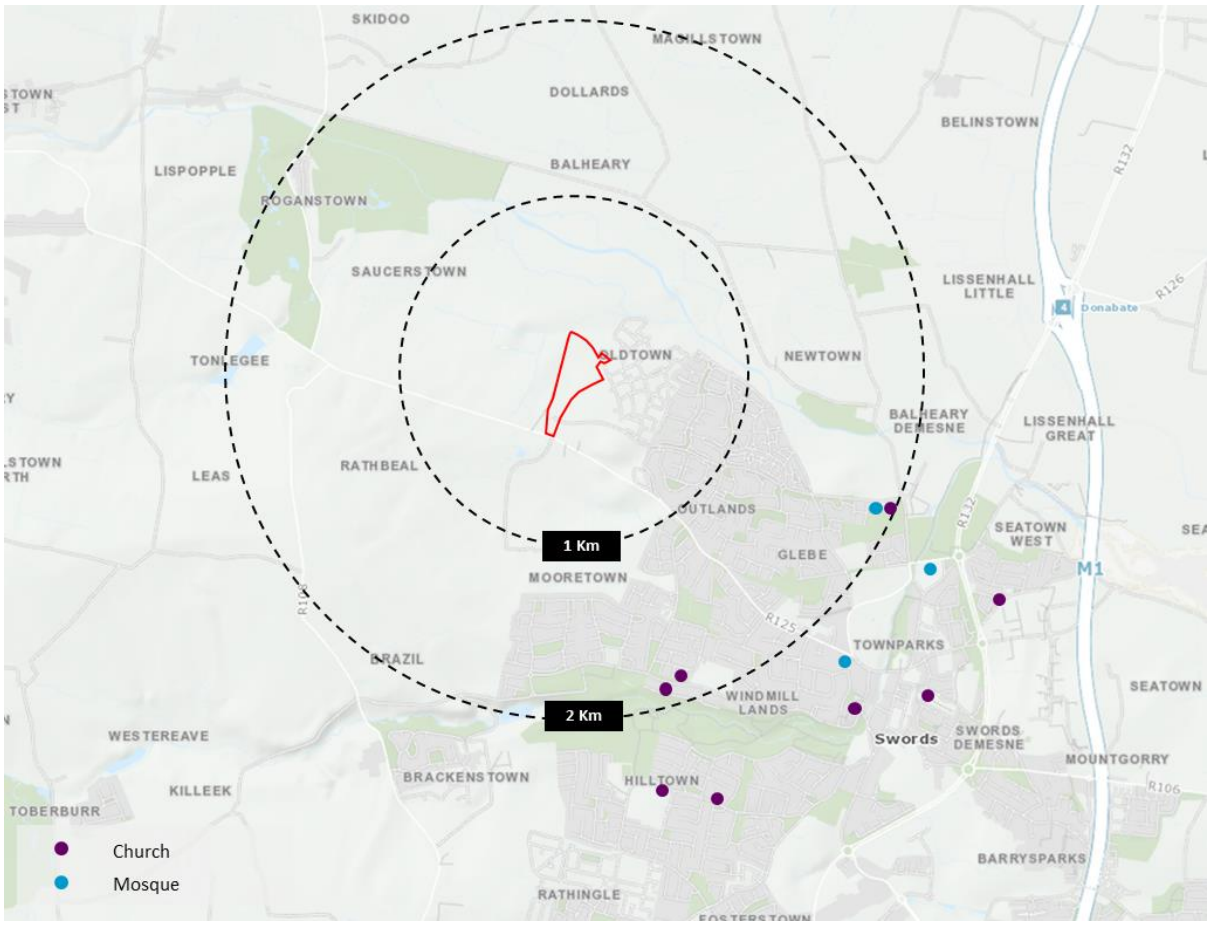

Figure 4-19. Location of Religious & Community Facilities within 1-2km Radius of the Subject Site and its Wider Area [Note: Red line developable site area indicatively shown]

Table 4-15. List of Religious & Community Facilities in Proximity of the Subject Site

	Name	Location	Type
	Swords Elim Church	St. Colmcille's GAA, Glen Ellan Road, Holybanks, Swords, Co. Dublin	Christian Church
	St. Cronan's Catholic Church	Brackenstown Village, Windmill Lands, Swords, Co. Dublin	Catholic Church
	Brackenstown Parish	Brackenstown Rd, Windmill Lands, Swords, Co. Dublin	Catholic Church
	St. Columba's Church	Church Rd, Swords Glebe, Swords, Co. Dublin	Catholic Church
	St Colmcille's Catholic Church	Chapel Ln, Swords Demesne, Swords, Co. Fingal	Catholic Church

	Name	Location	Type
	Church of the Immaculate Conception	Seatown Cottages Road, Swords, Co. Dublin	Catholic Church
	St. Finian's Church	2 River Valley Heights, Forestfields, Swords, Co. Dublin	Church
	St. Finian's Catholic Church	St. Finian's Church, River Valley Parish, Swords, Co. Dublin	Catholic Church
	Islamic Centre Swords	St. Colmcille's GAA Club, Glen Ellan Rd, Swords, Co. Dublin	Mosque
	Swords Mosque	North Street Business Park, 2 North St, Townparks, Swords, Co. Dublin	Mosque
	Islamic Cultural Centre Swords	Islamic Cultural Centre, Rathbeale Rd, Swords Glebe, Swords, Co. Dublin	Mosque

4.8.6 Demographic Profile

The following provides a study of population distribution and movement in Swords as the context area to the subject lands, also providing further details on demographic profile of the Swords-Lissenhall ED, which the subject lands for the proposed development fall under (see Figure below).

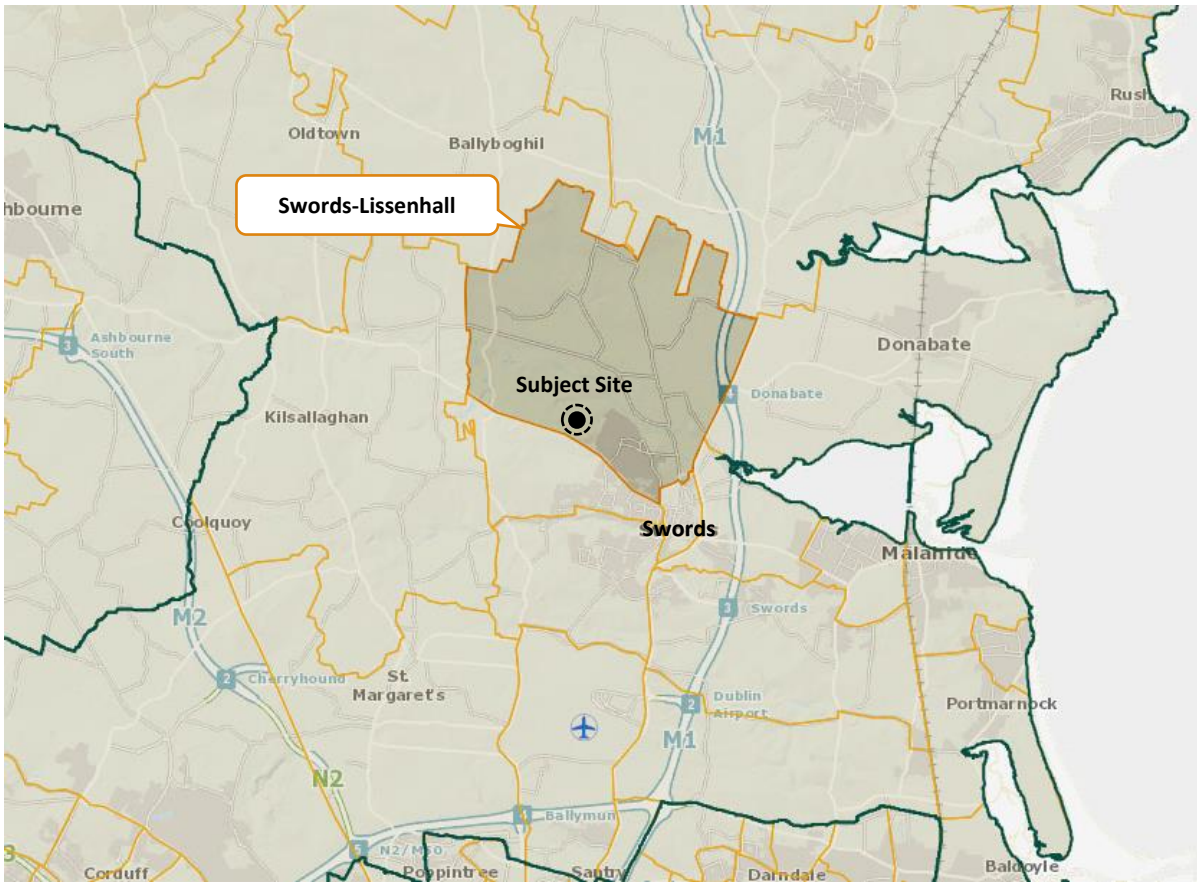

Figure 4-20. Location of the Subject Site within Swords-Lissenhall ED

4.8.6.1 Demographic of Swords

Census 2016 results show that Swords population stood at 39,248 in April 2016. This also indicates an increase of 2,324 (6.3%) since the last Census in 2011. With an average household size of 3, there were 12,896 private households in Swords in 2016. As shown in the table below, more than 60% of the households residing in Swords in 2016 were small sized households (8,021 households).

Table 4-16. Private Households in Swords by Household Size, 2016

Size of Household	Households	%
1-person Household	1,876	14.5
2-person Households	3,428	26.6
3-person Households	2,717	21.1
4-person Households	2,948	22.9
5-person and over Households	1,927	14.9
Total	12,896	-

Source: CSO StatBank

Investigating the age profile of the town over the Census 2011-2016 indicates that the younger age cohorts still form the greatest share of the population residing in Swords, however, there was a notable drop in cohort aged 20-29, which can partially be an outcome of housing market failing to meet the growing demand. The greatest share of the population growth however, occurred in 50-59 age cohort followed by 40-49 years old.

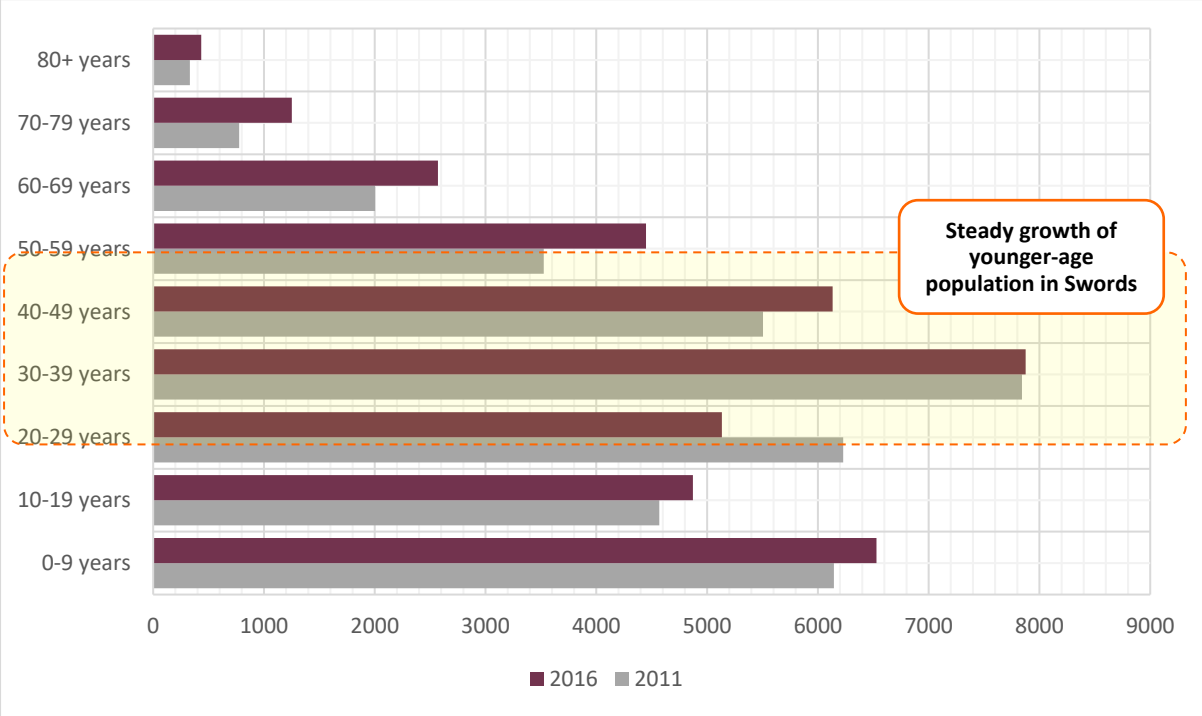

Figure 4-21. Population Change by Age Cohort in Swords over 2011-2016

The population pyramid below (Figure 4-4) shows the town age distribution in more detail. A peak of births in the 1980's shows up in the 30-39 age category, and another peak in the number of births

occurred in 2000's and shows up in the 0-9 age category. Overall, the age pyramid indicates a young population residing in the town, which is expected to grow in the coming years.

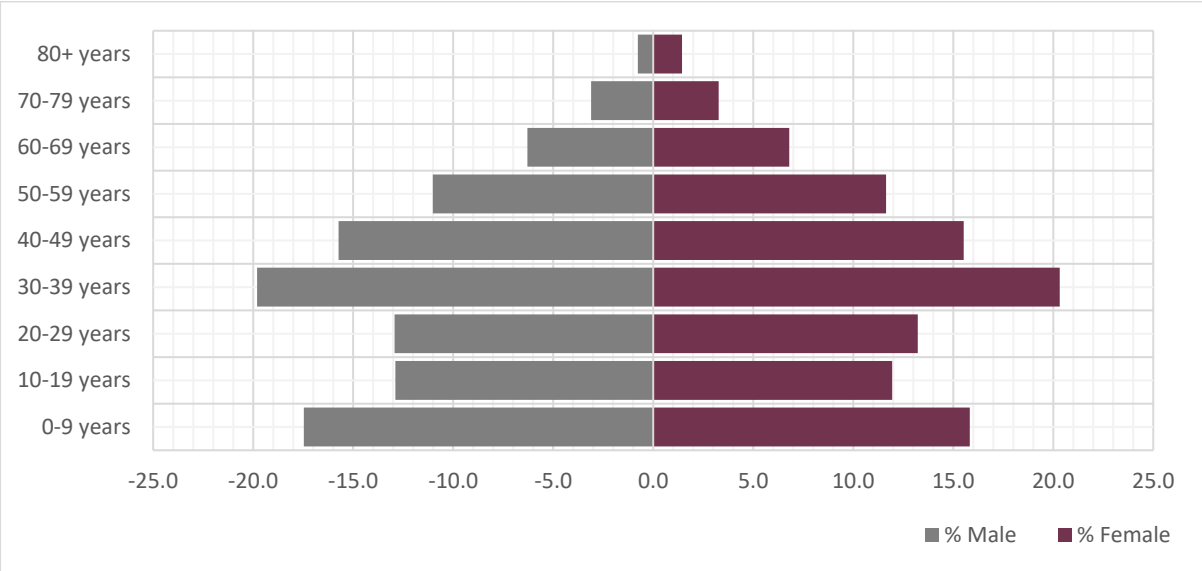

Figure 4-22. Population Age Pyramid of Swords, 2016

As it is mapped on the Figure below, the overall distribution of population in Census 2016 indicates that there are significant variances in population trends within ED's throughout the town. However, the highest concentration of the total population in Swords is clearly to the western ED's and towards the lands on Oldtown-Mooretown.

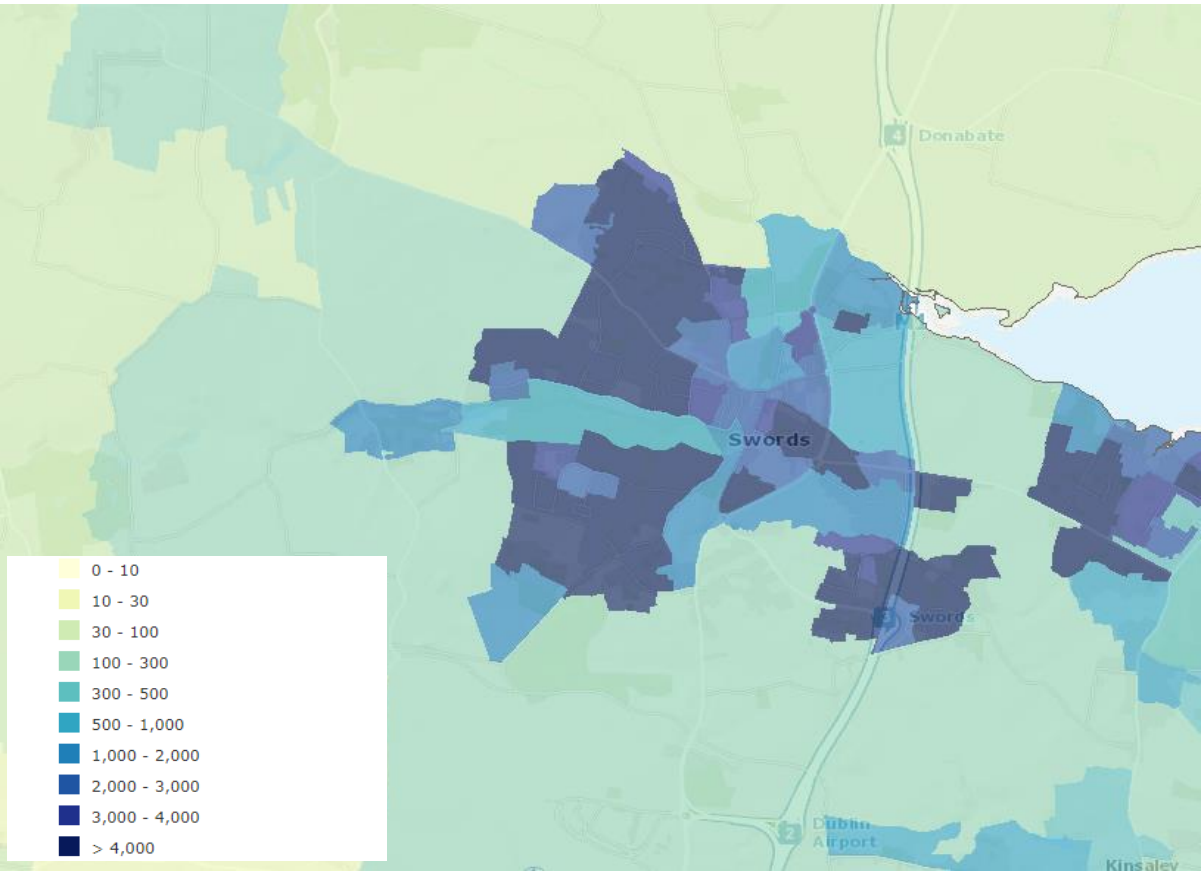

Figure 4-23. Spatial Distribution of Population Density per Km² in Swords, 2016

4.8.6.2 Population Distribution and Movement

Census 2016 results show that Swords-Lissenhall ED's population stood at 10,447 persons in April 2016, which is approximately 27 percent of Swords population. There has been a population growth in the area, increasing by +780 persons, from 9,667 persons in 2011, i.e., a growth rate of 8% over the intercensal period.

Table 4-17. Private Households in Swords-Lissenhall by Household Size, 2016

Size of Household	Household	%
1-person Household	495	14.6
2-person Household	841	24.7
3-person Household	708	20.8
4-person Households	817	24.0
5-person and over Households	540	15.9
Total	3,401	-

Source: CSO StatBank

Investigating the age profile of the Swords-Lissenhall ED as per Census 2016 indicates that the greatest share of the population living in this area are from cohort aged 30-39, followed by 40-49 years age group. There is also a growing young population at the 0-9 years age cohort. This clearly demonstrates that the demographic of the area is characterised by young age groups and small sized households, which would then give rise to a growing housing market in the area.

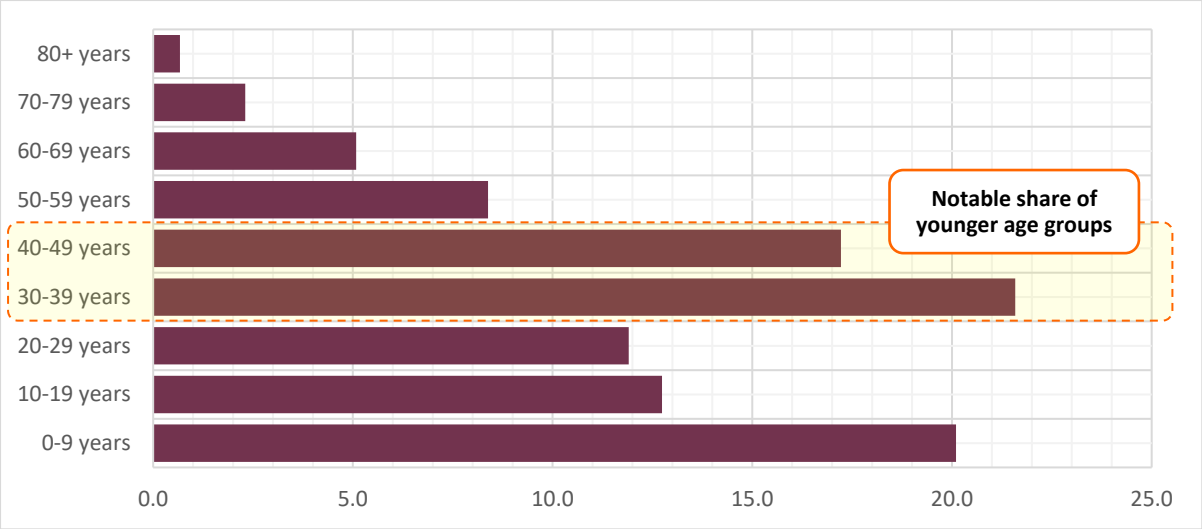

Figure 4-24. Population Residing in Swords-Lissenhall by Age Cohort, 2016

Based on the aforementioned results, Swords is expected to have a steady population growth with the greatest share of the population residing in the western side of the town. This population is characterised with young age profile and smaller sized households. The same pattern can be observed in Swords-Lissenhall ED, which the proposed development falls under. The growing young population mostly comprising of smaller households residing in the area demonstrates an emerging market for housing. This is further supported by the existing infrastructure and community facilities and amenities assessed in the Audit.

On the other hand, the influx of population arising from the proposed development will benefit the Swords-Lissenhall ED as well as Fingal, since this will offer the social support needed for further improvements to the accessibility and connectivity of Oldtown-Mooretown, even favouring the use of public transport. Oldtown is surrounded by numerous employment areas, i.e., Dublin Airport, Dublin City, Swords, which have good transport and connectivity links, with Dublin City being approximately 45min away by bus or a 30min drive.

The new consumers the proposed development will bring to the area will also benefit the retail activity and other shops in the vicinity creating more business opportunities for the existing offerings, thus facilitating the future growth and sustainable development of Oldtown.

4.9 Potential Impact of the Proposed Development

4.9.1 Construction Phase

Construction impacts are expected to be short term and temporary in nature, but some potential adverse local impacts can be expected during construction of the development related to impacts on residential amenity. This is likely to be associated with construction traffic and any possible nuisance with such movements, for example an increase in daytime noise levels.

The resident community in adjoining housing developments are most likely to be affected by these short-term temporary impacts. Corresponding mitigation measures are set out in Chapter 16 which will reduce these impacts to a level which is not significance. Noting the inclusion of this mitigation plan, any further assessment in relation to noise impact was not considered relevant.

The development may also have some positive impacts on passive retail facilities within the area with additional revenue being derived from the use of these facilities by the construction workers. Impacts to the local population are considered to be neutral, imperceptible, temporary in nature and therefore not considered significant.

4.9.2 Operational Phase

The proposed development could have the following potential operational impacts:

1) An increase in traffic levels.
2) Additional demand on local community services.
3) An impact on the landscape and appearance in the area.
4) Increased demands on services infrastructure.

The predicted population increase arising from the proposed development will generate additional traffic loads in the area, although according to the Transportation Chapter of this EIAR, will be within the capacity of the road network. The impacts in this regard are set out in detail in Chapter 12.0 Traffic and Transport.

The resident community will benefit from the additional passive amenity areas, to be provided as part of the proposed development. There is a hierarchy of open spaces being put forward as part of the proposed development, in particular areas of public open space containing play equipment for

children that will be available for future residents and the wider community, which will add to recreational amenity of the area and will have a positive impact on health for the overall area.

4.9.3 Remedial and Reductive Measures

4.9.3.1 Construction Phase

Measures to mitigate potential impacts arising from the construction phase of the proposed development such as noise, transport and air quality are set out in relevant chapters of this EIAR and summarised in Chapter 16.

4.9.3.2 Operational Phase

No mitigation measures are necessary for the operational phase of the development.

4.9.4 Predicted Impact of the Proposed Development

4.9.4.1 Construction Phase

Through the implementation of remedial and reductive measures that have been set out above, the impacts of the construction phase of the development are not anticipated to be significant. Furthermore, all impacts will be temporary in nature.

4.9.4.2 Operational Phase

The proposed development will have a significant positive impact on the local community and will positively contribute to the vitality and viability of the local area, through:

1) The influx of a new resident population using existing local businesses and services;
2) The provision of a new creche as a community facility for the use of new residents and the local community; and
3) The provision of open space for the use of the local community

4.9.5 Monitoring

There is no requirement for monitoring to mitigate the impact of the development.

4.10 Human Health

The subject lands are located at North of Rathbeale Road and to the west of and north of Miller's Avenue and Glen Ellan Road, Oldtown, Swords, Co. Dublin. With an irregular shape and approximate area of 10.22 ha, the subject site is situated within existing built-up area of Oldtown-Mooretown lands to the western development boundaries of Swords. The subject site is bounded by Miller's Avenue to the east, Phase 4C of the overall residential scheme on the Oldtown lands (Reg. Ref. F17A/0687) to the northeast, agricultural lands zoned for the Swords Regional Park to the west, and the Rathbeale Road to the south; while the surrounding land uses are predominately characterised by residential development, the lands are adjoining the Swords Regional Park from the western boundary. The existing and/or ongoing developments are characterised by a variety of apartment/duplex units and two storey dwellings with associated on-curtilage parking in a mix of unit types.

The proposed development will provide for the fifth and final phase of the Oldtown land by providing for a predominately residential scheme that will be well-integrated with the surrounding area. The proposed scheme will make a positive contribution to the existing community by creating new places/spaces that are accessible not only to the residents of the scheme, but also to members of the public. It is submitted that the completion of the proposed scheme will not have an adverse impact on human health including mental health or wellbeing. Furthermore, there will be no adverse impacts on social, economic, or environmental living conditions as a result of the development.

4.10.1 Potential Impact of the Proposed Development

4.10.1.1 Construction Phase

Construction impacts are expected to be short term, but some potential adverse local impacts can be expected due to the actual construction of the development. These impacts are likely to be associated with construction traffic movements and any possible nuisance with such movements, for example an increase in daytime noise levels, migration of surface contaminants and dust. The resident community in adjoining housing estates are most likely to be affected by these short-term, temporary impacts. Corresponding mitigation measures are set out in Chapters 8.0 and 9.0 which will reduce these impacts to an insignificant level. Noting the minor nature of these impacts, any further assessment in this regard was not considered relevant. The development may also have some positive impacts on passive recreational facilities within the area with additional revenue being derived from the use of these facilities by the construction workers.

4.10.1.2 Operational Phase

The proposed development could have the following potential operational impacts as a result of an increase in population levels:

1) An increase in traffic levels.
2) Additional demand on local community services.
3) An impact on the landscape and appearance in the area.
4) Increased demands on services infrastructure.

The impacts in regard to additional traffic loads in the area generated by the predicted population increase are set out in detail in the Transportation Chapter of this EIAR.

In relation to potential impacts on human health and safety during the operational phase are unlikely to result in any significant adverse impacts once the development is completed and operational. Environmental impacts of the proposed development and their relationship to human health is dealt with under the relevant noise and vibration, air and climate and traffic sections of the EIAR. There will not be significant impacts on human health as a result of the operation of the proposed development.

4.10.2 Remedial and Reductive Measures

4.10.2.1 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.

4.10.2.2 Operational Phase

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

4.10.3 Predicted Impact of the Proposed Development

4.10.3.1 Construction Phase

Through the implementation of remedial and reductive measures that have been set out above, the impacts of the construction phase of the development are not anticipated to be significant. Furthermore, all impacts will be temporary in nature.

4.10.3.2 Operational Phase

The proposed development will provide a development that will be integrated with the surrounding area and existing and future transport infrastructure, including green infrastructure. The proposed development will make a positive contribution to the existing community by creating new places and spaces as well as improved permeability that are accessible not only to the residents of the scheme, but also to members of the public.

It is submitted that the proposed development at Oldtown, Swords will not have an adverse impact on human health including mental health or wellbeing. Furthermore, there will be no adverse impacts on social, economic, or environmental living conditions as a result of the proposed scheme.

4.11 Monitoring

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 development to include the provision of a creche, public open space and facilities to support healthy choices, such as cycle parking. Conditions will be attached to any grant of planning permission to ensure that these facilities are provided. 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.

4.12 Reinstatement

No reinstatement will be required specifically for population and human health.

4.13 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 on 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.

4.14 Difficulties Encountered in Compiling

Overall, no difficulties were encountered in compiling this chapter.

4.15 Cumulative Impacts

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 the overall town.

4.16 "Do Nothing" Impact

A "Do Nothing" scenario is not considered appropriate as the lands are currently zoned for residential under the Fingal Development Plan 2017-2023. However, if a do-nothing scenario were to occur, the lands would not be developed and therefore there would be no beneficial or adverse impacts to population and human health. 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.

4.17 References

- Central Statistics Office [CSO] (Census data results and analysis from 2011 and 2016)
- CSO (2021). Quarterly Labour Force Survey Q1 2021
- Economic and Social Research Institute [ESRI] (data results and analysis)
- Eastern and Midland Regional Assembly (2019), Regional Spatial and Economic Strategy 2019-2031
- Fingal County Council, Fingal County Council Development Plan 2017-2023

5.0 BIODIVERSITY

5.1 Introduction

This biodiversity chapter has been prepared by Padraic Fogarty of OPENFIELD Ecological Services. Pádraic Fogarty has worked for over 25 years in the environmental field and in 2007 was awarded an MSc from Sligo Institute of Technology for research into Ecological Impact Assessment (EcIA) in Ireland. OPENFIELD is a full member of the Institute of Environmental Management and Assessment (IEMA).

Under the EIA Directive as well as best practice methodology from the EPA, the analysis of impacts to biodiversity is an essential component of the EIA process, and so is a required chapter in any EIAR.

Under Article 6(3) of the Habitats Directive an 'appropriate assessment' of projects must be carried out to determine if significant effects are likely to arise to the integrity of Natura 2000 sites. An Appropriate Assessment Screening Report and Natura Impact Statement have been prepared as a separate stand-alone report.

5.2 Research Methodology

The assessment was carried out in accordance with the following best practice methodology: 'Guidelines for Ecological Impact Assessment in the United Kingdom and Ireland' by the Institute of Ecology and Environmental Management (IEEM, 2018) and 'Guidelines on the information to be contained in Environmental Impact Assessment Reports' by the Environmental Protection Agency (EPA, 2017).

Site visits were carried out on the 17th of May 2018, August 27th 2020 and October 21st 2021. The site was surveyed in accordance with the Heritage Council's Best Practice Guidance for Habitat Survey and Mapping (Smith et al., 2010). Habitats were identified in accordance with Fossitt's Guide to Habitats in Ireland (Fossitt, 2000).

The nomenclature for vascular plants is taken from The New Flora of the British Isles (Stace, 2010) and for mosses and liverworts A Checklist and Census Catalogue of British and Irish Bryophytes (Hill et al., 2009).

Both May and August lie within the optimal survey period for general habitat surveys (Smith et al., 2010) and so a full classification of all habitats was possible. May is also within the season for breeding birds, Badgers, Otters, bats and amphibians. August is within the bird breeding season but is suboptimal. OPENFIELD carries out bi-monthly site visits, which include some of the application lands, and these observations have been used to supplement the data in this analysis. It was possible to classify all habitats on the site to Fossitt level 3.

5.3 Receiving Environment

Best practice guidance suggests that an initial zone of influence be set at a radius of 2km for non-linear projects (IEA, 1995). However, some impacts are not limited to this distance and so sensitive receptors further from the project footprint may need to be considered as this assessment progresses. This is shown in Figure 5.1.

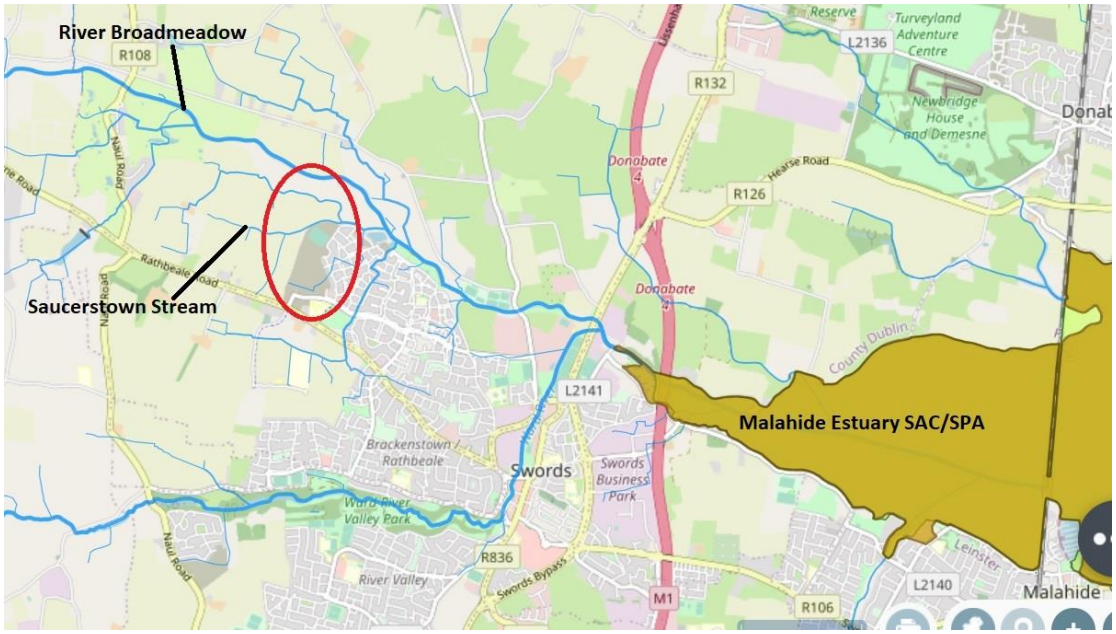

Figure 5.1 – Site location. There is one area designated for nature conservation within this zone (from www.epa.ie)

5.3.1 Literature Review

There are a number of designations for nature conservation in Ireland including National Park, National Nature Reserve, RAMSAR site, UNESCO Biosphere reserves, Special Protection Areas (SPA – Birds Directive), Special Areas of Conservation (SAC – Habitats Directive); and Natural Heritage Areas. The mechanism for these designations is through national or international legislation. Proposed NHAs (pNHA) are areas that have yet to gain full legislative protection. They are generally protected through the relevant County Development Plan. There is no system in Ireland for the designation of sites at a local, or county level. Within the vicinity of the site there is one area, the Malahide Estuary, which is designated as a SPA, SAC and a pNHA. Malahide Estuary is also internationally recognised as a Ramsar wetland site.

Malahide Estuary SAC (code: 0205)

The estuary is designated for its intertidal habitats and important wintering bird population.

In addition to its Natura 2000 designations, it is also a Ramsar site (Broadmeadow estuary no. 833), a proposed Natural Heritage Area (site code: 0205) and a Marine Protected Area under the OSPAR Convention (site code: O-IE-0002967).

The qualifying interests for the SAC (the reasons why the site is of European value) are detailed in table 5.1 while the Special Conservation Interests (analogous to qualifying interests for SPAs) for the SPA are given in Table 5.2.

Table 5-1: Site qualifying interests for the Malahide estuary SAC

Aspect	Level of Protection	Status[1]
Fixed coastal dunes with herbaceous vegetation (grey dunes) (code: 2130)	Habitats Directive Annex I priority habitat	Bad
Shifting dunes along the shoreline with Ammophila arenaria ('white dunes') (code: 2120)	Habitats Directive Annex I	Inadequate
Salicornia and other annuals colonizing mud and sand (code: 1310)		Favourable
Mediterranean salt meadows (code: 1410)		Inadequate
Atlantic salt meadows (code: 1330)		Inadequate
Mudflats and sandflats not covered by seawater at low tide (code: 1140)		Inadequate

- Tidal mudflats (1140). This is an intertidal habitat characterised by fine silt and sediment. The overall status of the habitat is inadequate and declining due to pollution from agriculture, forestry, wastewater sources and marine aquaculture.Salicornia mudflats (1310): This is a pioneer saltmarsh community and so is associated with intertidal areas. It is dependent upon a supply of fresh, bare mud and can be promoted by damage to other salt marsh habitats. It is chiefly threatened by the advance of the alien invasive Cordgrass Spartina anglica. Erosion can be destructive but in many cases, this is a natural process.
- Atlantic and Mediterranean salt meadows (1330 & 1410): these are intertidal habitats that differ somewhat in their vegetation composition. They are dynamic habitats that depend upon processes of erosion, sedimentation and colonisation by a typical suite of salt-tolerant organisms. The main pressures are invasion by the non-native Spartina anglica and overgrazing by cattle and sheep.
- Shifting dunes along the shoreline with Ammophila arenaria (white dunes) (2120). These are the second stage in dune formation and depend upon the stabilising effects of Marram Grass. The presence of the grass traps additional sand, thus growing the dunes. They are threatened by erosion, climate change, coastal flooding and built development.
- Fixed coastal dunes with herbaceous vegetation (grey dunes) (2130 – priority habitat). These are more stable dune systems, typically located on the landward side of the mobile dunes. They have a more or less permanent, and complete covering of vegetation, the quality of which depends on local hydrology and grazing regimes. They are the most endangered of the dune habitat types and are under pressure from built developments such as golf courses and caravan parks, over-grazing, under-grazing and invasive species.

[1] 2019. The Status of EU Protected Habitats and Species in Ireland. Department of Culture, Heritage and the Gaeltacht.

Malahide Estuary SPA (code: 4025)

The boundary of the SPA is largely coincident with that of the Malahide Estuary SAC. The qualifying interests of the SPA are given in Table 5-2.

Table 5-2: Qualifying Interests for Malahide Estuary SPA

Species	National Status2
Anas acuta Pintail	Amber (Wintering)
Branta bernicula Light-bellied brent goose	Amber (Wintering)
Bucephala clangula Goldeneye	Red (Wintering)
Calidris alpina Dunlin	Red (Breeding & Wintering)
Calidris canutus Knot	Red (Wintering)
Haematopus ostralegus Oystercatcher	Red (Breeding & Wintering)
Limosa lapponica Bar-tailed godwit	Red (Wintering)
Limosa limosa Black-tailed godwit	Red (Wintering)
Mergus serrator Red-breasted Merganser	Amber (Breeding & Wintering)
Pluvialis apricaria Golden Plover	Red (Breeding & Wintering)
Pluvialis squatarola Grey Plover	Red (Wintering)
Podiceps cristatus Great-crested Grebe	Amber (Breeding & Wintering)
Tadorna tadorna Shelduck	Amber (Breeding & Wintering)
Tringa totanus Redshank	Red (Breeding & Wintering)
Wetlands & Waterbirds	

- Pintail. Dabbling duck wintering on grazing marshes, river floodplains, sheltered coasts and estuaries. It is a localised species and has suffered a small decline in distribution in Ireland for unknown reasons.
- Light-bellied Brent Goose. There has been a 67% increase in the distribution of this goose which winters throughout the Irish coast. The light-bellied subspecies found in Ireland breeds predominantly in the Canadian Arctic.
- Goldeneye. This duck wintering throughout Ireland on suitable coastal areas, river valleys and wetlands. There has been an 11% contraction in its Irish wintering range since the early 1980s and a 37% decline in abundance since the 1990s.

[2] Birds of Conservation Concern in Ireland. Gilbert et al., 2021

- Dunlin. Although widespread and stable in number during the winter season, the Irish breeding population has collapsed by nearly 70% in 40 years. Breeding is now confined to just seven sites in the north and west as habitat in former nesting areas has been degraded.
- Knot. These small wading birds do not breed in Ireland but gather in coastal wetlands in winter. Their numbers have increased dramatically since the mid-1990s although the reasons for this are unclear.
- Oystercatcher. Predominantly coastal in habit Oystercatchers are resident birds whose numbers continue to expand in Ireland.
- Bar-tailed Godwit. These wetland wading birds do not breed in Ireland but are found throughout the littoral zone during winter months. They prefer estuaries where there are areas of soft mud and sediments on which to feed.
- Black-tailed Godwit. Breeding in Iceland these waders' winter in selected sites around the Irish coast, but predominantly to the east and southern halves. Their range here has increased substantially of late.
- Red-breasted Merganser. A widely distributed duck. In winter Red-breasted Mergansers also breed in Ireland at certain coastal and inland's locations to the north and west. They have suffered small declines in both their wintering and breeding ranges and possible reasons have been cited as predation by American Mink and shooting.
- Golden Plover. In winter these birds are recorded across the midlands and coastal regions. They breed only in suitable upland habitats in the north-west. Wintering abundance in Ireland has changed little in recent years although it is estimated that half of its breeding range has been lost in the last 40 years.
- Grey Plover. These birds do not breed in Ireland but winter throughout coastal estuaries and wetlands. Its population and distribution is considered to be stable.
- Great-crested Grebe. These birds breed predominantly on freshwater sites north of The River Shannon while coastal areas along the east and south are used for wintering. Numbers in Ireland have decline by over 30% since the 1990s.
- Shelduck. The largest of our ducks, Shelduck both breed and winter around the coasts with some isolated stations inland. Its population and range are considered stable.
- Redshank. Once common breeders throughout the peatlands and wet grasslands of the midlands Redshanks have undergone a 55% decline in distribution in the past 40 years. Agricultural intensification, drainage of wetlands and predation are the chief drivers of this change.

Table 5.3 – Known records of protected species from the O14 square (from www.npws.ie)

Species	*Habitat3 4*	*Current status5*
Galeopsis angustifolia *Red Hemp-nettle*	*Calcareous gravels*	*Record pre-1970*
Hordeum secalinum *Meadow Barley*	*Upper parts of brackish marshes, chiefly near the sea*	*Record pre-1970*
Hypericum hirsutum *Hairy St. John's-wort*	*Woods and shady places*	*Current, record from Santry Court*
Viola hirta *Hairy Violet*	*Sand dunes, grasslands, limestone rocks*	*Current, record from Santry Demesne*

As can be seen there are two current records of protected plants from this 10km square. The record of Hairy St. John's-wort is noted as the "east side of Santry woods" in the Flora of County Dublin while this reference gives the location of the Hairy Violet as coastal locations near Donabate and Portrane (Doogue et al., 1998).

The site is within the Oldtown-Mooretown Local Area Plan 2010 area and as part of the production of this plan the lands were subjected to a Strategic Environmental Assessment (SEA) and an Appropriate Assessment (AA). These assessments confirmed that there were no areas designated for nature conservation within, or directly adjacent to the subject lands. The AA also determined that the implementation of the plan would not result in significant effects to areas designated under European law, i.e. SACs or SPAs. The SEA stated: "The ground cover was deemed to be rough grassland with an area of disturbed grassland by the Rathbeale Road […] Unlike the Mooretown lands, there are no significant hedgerows with a minor hedgerow crossing the south-western corner of the lands. Similarly to Mooretown, there are no mature trees and the hedgerows are poorly developed."

Water quality in rivers is monitored on an on-going basis by the Environmental Protection Agency (EPA). It assesses the pollution status of a stretch of water by analysing the invertebrates living in the substrate as different species show varying sensitivities to pollution. They arrive at a 'Q-Value' where Q1 = grossly polluted and Q5 = pristine quality (Toner et al., 2005). The Oldtown site is within the catchment of the Broadmeadow River, which drains a portion of north County Dublin and discharges into the Malahide Estuary. The River Broadmeadow and the Saucerstown Stream pass close to the subject lands. The EPA website shows the Newtown Stream running further to the east of the subject lands. This stream now runs through a culverted pipe before discharging to the Broadmeadow. The nearest EPA monitoring point is along the main channel of the Broadmeadow and here Q3-4, or 'moderate pollution', was most recently recorded (2020). This is an improvement on previous

[3] Parnell et al., 2012
[4] Hayden & Harrington, 2001
[5] Preston et al., 2002

measurements in this location. The main channel of the Broadmeadow, as well as all of the Saucerstown Stream, were assessed as 'poor' for the 2013-2018 WFD monitoring period. These data are taken from the mapping tool on www.epa.ie.

An EIS was carried out for these lands in 2011, in preparation for the initial phases of this development, and this included field surveys for flora and fauna and a detector-based bat study. This was carried out in September of that year and so was within the optimal season for bats and general habitat survey. It assessed the treelines on the site as being of local importance (higher value); the agricultural lands as lower importance (lower value); the Saucerstown Stream as local importance (higher value); and The River Broadmeadow as of county importance. It found no evidence of bat roosts on the Oldtown lands and assessed the potential for foraging as sub-optimal. While the bat survey carried was hampered due to high winds and low temperatures it did record a single Leisler's Bat foraging along treelines. No badger sett was recorded from the wider Oldtown lands. Otter spraint was recorded at two locations along The River Broadmeadow, outside the boundary of the phase 5&6 lands.

Since this study was carried, a number of development permissions have been granted and the nature of the habitats has been considerably altered. Phases 1-4 at Oldtown are either completed and occupied, or under construction.

5.3.2 Stakeholder Consultation

At the time of the original EIS consultation was carried out with the National Parks and Wildlife Service, Inland Fisheries Ireland Eastern Division, Bat Conservation Ireland (BCI) and Fingal County Council Heritage & Biodiversity Officers.

The Development Applications Unit (DAU) of the Department of Arts, Heritage and the Gaeltacht does not respond to requests for nature conservation for projects that have already entered the planning system and so additional consultation was not undertaken for the Phase 5 lands.

5.3.3 Plans or policies relating to natural heritage

Convention on Biological Diversity (CBD)

The protection of biodiversity is enshrined in the CBD to which Ireland is a signatory. As part of its commitment to this international treaty Ireland, as part of a wider European Union initiative, was committed to the halt in loss of biodiversity by the year 2010. This target was not met but in 2010 in Nagoya, Japan, governments from around the world set about redoubling their efforts and issued a strategy for 2020 called 'Living in Harmony with Nature'. In 2011 the Irish Government incorporated the goals set out in this strategy, along with its commitments to conservation biodiversity under national and EU law, in the second national biodiversity action plan (Dept. of Arts, Heritage and the Gaeltacht, 2011). A third plan was published in 2017.

Fingal Development Plan 2017 – 2023

Chapter 8 of this plan relates to Green Infrastructure. Objective GI06 is to "Resist development that would fragment or prejudice the County's strategic green infrastructure network" while GI20 requires

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

Chapter 9 relates to Natural Heritage and highlights how all plans or projects should be subject to Appropriate Assessment.

Oldtown Mooretown Local Area Plan (LAP) 2010

The subject lands are within the aforementioned LAP lands. The importance of the Broadmeadow River is highlighted along with its connection to internationally important areas designated for nature conservation downstream (i.e. Malahide Estuary). The plan was subject to an Appropriate Assessment and a Natura Impact Statement was prepared for this purpose. It acknowledged that development of the area could not proceed without upgrading works at the Swords wastewater treatment plant (works which have since been completed). It concluded that no significant effects would arise to the integrity of the Natura 2000 network from the implementation of the plan.

River Basin Management Plan

Under the Water Framework Directive (Directive 2000/60/EC) all Irish waters must achieve 'good ecological status' by 2015 or, with exemptions, by 2027 at the latest. A second River Basin Management Plan was published in 2018 and identified 190 'priority areas for action' where resources are to be focussed over the 2018-2021 period. The Ashbourne sub-catchment is among these areas and improvements to the water status here will lead to improvements throughout the Broadmeadow. The EPA website has assessed the Broadmeadow catchment as being of 'poor' status. A third cycle of the River Basin Management Plan is due for publication in 2022.

5.3.4 Site Survey

Aerial photography and historic mapping from the OSI show that while this region had been in agricultural use since historic times, since 2000 land use has increasingly changed from open agricultural land to urban uses and built development. This can be seen in the context of the expansion of Swords town. Lands to the east are now predominantly characterised by residential development while new transport infrastructure has also been built. Since the original EIS was carried out on these lands in 2011 agricultural activities have ceased while construction on Phase 1 lands is now complete. A feeder road on the Mooretown lands has been granted permission (reference no.: F12A/0270) as well as Phase 1 and 4C of the development at Oldtown is now complete, while Phases 2, 3, 4A and 4B are underway.

5.3.4.1 Flora

The Phase 5 lands are predominantly composed of a field of former arable crops but which is now mostly **bare ground – ED2**. Since the cessation of farming ruderal and opportunistic plants have begun to colonise however disturbance means that overall vegetation cover is low. Annual plants are present in low levels of abundance, e.g. Annual Meadow-grass Poa annua, Groundsel Senecio vulgaris, Wild Oat Avena fatua, and Fumatory Fumaria sp.

Elsewhere, land has been disturbed as part of adjacent site works and land is **buildings and artificial surfaces – BL3 or recolonising bare ground – ED3**.

The remaining patch of open land can be described as a **dry meadow – GS2** with rough grasses, Docks Rumex sp., Clovers Trifolium sp. and Vetches Vicia sp.

Distinct areas to the north and east are labelled A, B and C. Areas A & B are within fields **of improved agricultural grassland – GA1**. Area A is bisected by a **hedgerow – WL1** which is composed of Elder Sambucus nigra, Hawthorn Crataegus nigra, Blackthorn Prunus spinosa with Nettles Urtica dioica and rough grasses. There is no water course along this stetch, e.g. drainage ditch. To the north, the hedgerow structure is characterised by mature Hawthorn. Area C is entirely composed of bare soil – ED2. Areas A, B and C are to be developed as open space.

The location of the proposed storage tank lies within an area of **dry meadow – GS2** with Dandelions Taraxacum sp., Thistles Cirsium sp., Docks Rumex sp., Cock's-foot Dactylis glomerata, Ribwort Plantain Plantago lanceolata and patches of Brambles Rubus fruticosus agg.

The route of the proposed outfall pipe passes an area of **amenity grassland – GA2** with a line of mid-aged Ash Fraxinus excelsior and Maple Acer sp. trees. However the pipe itself will be installed under the existing road.

The route then passes through an area of amenity grassland at the riparian zone of the River Broadmeadow. The river in this location is a **lowland river – FW2** with grassy banks and is close to a bridge/road crossing. There are no trees or natural riparian vegetation in this location. The riverbank at the location of the proposed outfall pipe is composed of granite boulders installed to prevent erosion. The water at the time of survey was shallow and the river substrate was characterised by cobbles and stones with growths of the green algae Cladophora sp.

There are no alien invasive species growing on the site. No plants which are considered rare or protected were recorded during the site survey or during previous surveys. There are no historic records of such plants. All habitats described are shown as a habitat map in figure 5.3.

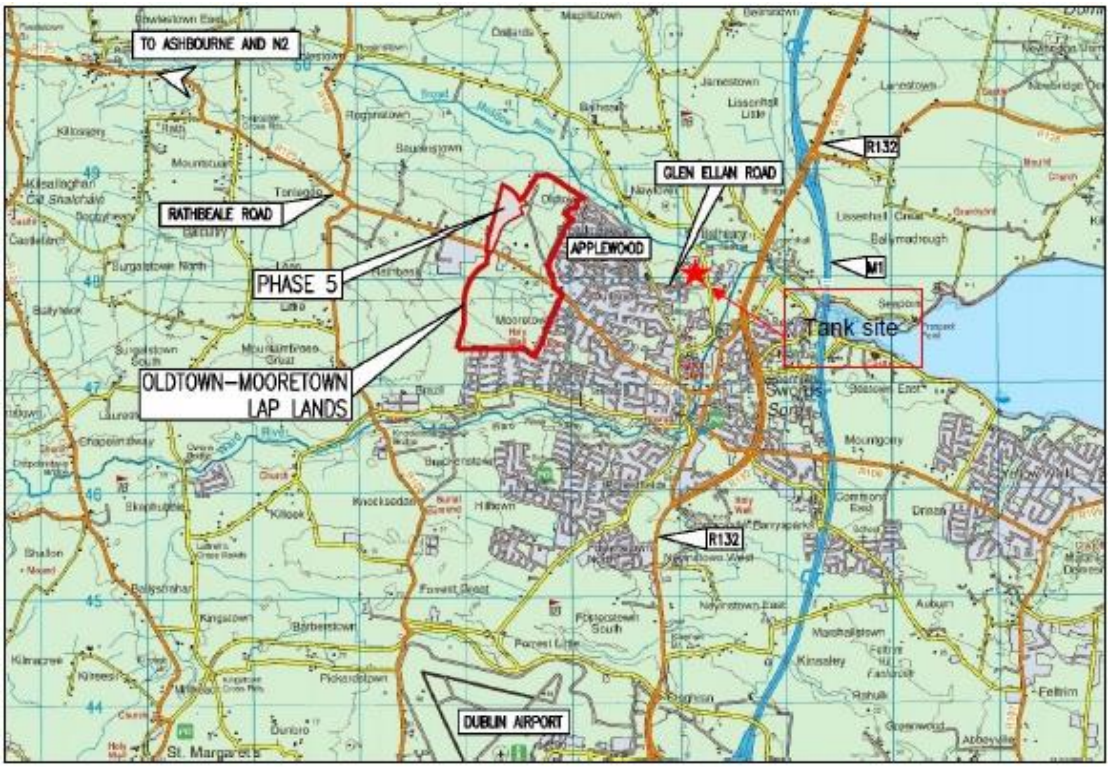

Figure 5.2 – development site location including stormwater tank

Figure 5.3 – Habitat map of Oldtown Phase 5 lands

5.3.4.2 Fauna

The site survey included incidental sightings or proxy signs (prints, scats etc.) of faunal activity, while the presence of certain species can be concluded where there is suitable habitat within the known range of that species. Table 5.4 details those mammals that are protected under national or international legislation in Ireland.

Table 5.4 – Protected mammals in Ireland and their known status within the zone of influence (Harris & Yalden, 2008)[6] Those that are greyed out indicate either that suitable habitat is not present or that there are no records of the species from the National Biodiversity Date Centre.

Species	Level of Protection	Habitat[7]	Red List Status[8]
Otter *Lutra lutra*	Annex II & IV Habitats Directive; Wildlife (Amendment) Act, 2000	Rivers and wetlands	Near Threatened
Lesser horseshoe bat *Rhinolophus hipposideros*		Disused, undisturbed old buildings, caves and mines	Least Concern
Grey seal *Halichoerus grypus*	Annex II & V Habitats Directive; Wildlife (Amendment) Act, 2000	Coastal habitats	-
Common seal *Phocaena phocaena*			-
Whiskered bat *Myotis mystacinus*	Annex IV Habitats Directive; Wildlife (Amendment) Act, 2000	Gardens, parks and riparian habitats	Least Concern
Natterer's bat *Myotis nattereri*		Woodland	Least Concern
Leisler's bat *Nyctalus leisleri*		Open areas roosting in attics	Near Threatened
Brown long-eared bat *Plecotus auritus*		Woodland	Least Concern
Common pipistrelle *Pipistrellus pipistrellus*		Farmland, woodland and urban areas	Least Concern

[6] Excludes marine mammals
[7] Harris & Yalden, 2008
[8] Marnell et al., 2009

Soprano pipistrelle *Pipistrellus pygmaeus*		Rivers, lakes & riparian woodland	Least Concern
Daubenton's bat *Myotis daubentonii*		Woodlands and bridges associated with open water	Least Concern
Nathusius' pipistrelle *Pipistrellus nathusii*		Parkland, mixed and pine forests, riparian habitats	Least Concern
Irish hare *Lepus timidus hibernicus*	Annex V Habitats Directive; Wildlife (Amendment) Act, 2000	Wide range of habitats	Least Concern
Pine Marten *Martes martes*		Broad-leaved and coniferous forest	Least Concern
Hedgehog *Erinaceus europaeus*	Wildlife (Amendment) Act, 2000	Woodlands and hedgerows	Least Concern
Pygmy shrew *Sorex minutus*		Woodlands, heathland, and wetlands	Least Concern
Red squirrel *Sciurus vulgaris*		Woodlands	Near Threatened
Irish stoat *Mustela erminea hibernica*		Wide range of habitats	Least Concern
Badger *Meles meles*		Farmland, woodland and urban areas	Least Concern
Red deer *Cervus elaphus*		Woodland and open moorland	Least Concern
Fallow deer *Dama dama*		Mixed woodland but feeding in open habitat	Least Concern
Sika deer *Cervus nippon*		Coniferous woodland and adjacent heaths	-

Irish Hare was noted from the former arable field. No other direct evidence of mammals was recorded. Field signs of Fox Vulpes vulpes have been noted in the past however it is not subject to any legal protection or other conservation measures.

While limited data are available on the distribution of Hedgehog, Pygmy Shrew and Irish Stoat, they are considered ubiquitous in the Irish countryside and suitable habitat is available for them (Hayden & Harrington, 2001).

Features on the site are considered to be of low value to roosting Bats (Hundt, 2012) with no suitable buildings or veteran trees with holes, cracks etc. A detector survey was carried out in 2011 and confirmed that there are no roosts on this site. Linear woodland features do however provide foraging opportunities and it can be presumed that Bats are present for this purpose. The 2011 survey found that foraging activity on the subject lands was confined to Leisler's Bat.

No evidence of Badger activity was found in any area of the site. The phase 5 lands are sub-optimal for sett construction, particularly as drainage ditches accompany the treelines (Byrne et al., 2012). Bi-monthly site inspections carried out by Openfield since 2013 have failed to find conclusive evidence of badger presence since this time. No badger activity was recorded during survey work for the original EIS. There are no records from this locality of Badgers from the National Biodiversity Data Centre.

Otter activity is recorded from along the Broadmeadow and Ward Rivers in Swords on the database of the National Biodiversity Data Centre. Otters are strictly protected under Annex IV of the Habitats Directive. Evidence of Otter was recorded along the Broadmeadow River for the original EIS and are known from this area (Bailey & Rochford, 2006). There are no records of Otter shown for the Oldtown vicinity of from the National Biodiversity Data Centre. The Saucerstown Stream was surveyed for Otter activity and none was found. No holts were recorded. The stream is sub-optimal Otter habitat due to its small size but is connected with the Broadmeadow River and may be used for foraging from time to time.

The stretch of the Broadmeadow River at the proposed outfall point from the stormwater overflow pipe was surveyed during each visit and no evidence, in the form of spraints, tracks or holt sites, was found. This is not evidence of absence however, and it can be assumed that Otters are present along this part of the river. The point of the proposed stormwater tank/foul overflow pipe is composed of an artificial embankment of granite boulders and this is not suitable for an Otter holt (den). The location of the proposed stormwater outfall pipe from the development was inspected and no holt sites are located in this vicinity.

There is very little suitable habitat for breeding birds within the phase 5 lands. The short stretch of hedgerow to the north does provide some suitable nesting habitat for generalist countryside birds. Species recorded from August 2020 were Robin Erithacus rubecula and Wood Pigeon Columba palumbus. In October 2021 (outside the nesting season) Blackbird Turdus merula and Snipe Gallinago gallinago were recorded.

Of those species listed by BirdWatch Ireland as being of high conservation concern (Colhoun & Cummins, 2013) Grey Partridge Perdix perdix, Corncrake Crex crex, Barn Owl Tyto alba, and Yellowhammer Emberiza citrinella were recorded as breeding in North Dublin during the 2007-11 Bird Atlas project (Balmer et al., 2013). There is no suitable breeding habitat for Barn Owl on the subject

lands while records for Corncrake and Grey Partridge date from pre-1972. Yellowhammer had been recorded from the Oldtown lands in the past. They were not recorded in the hedgerow as shown in figure 5.3 however.

A series of wintering bird surveys was carried out between November 2021 and March 2022 by Hugh Delaney, a freelance Ecologist. On ten dates surveys were undertaken from sunrise to sunset, recording all bird behaviour. No wetland, wading, wintering birds which are qualifying interests of the Malahide Estuary were recorded at any stage.

Common Frog Rana temporaria and Common Lizard Lacerta vivipara are protected under the Wildlife Act 1976 and are likely to be present on this site. Suitable habitat for spawning Frogs is present within drainage ditches however no spawn was noted in 2018. Smooth Newts Lissotriton vulgaris are to be found in Dublin but there are no permanent ponds on this site in which they are likely to be breeding.

Monitoring by Inland Fisheries Ireland, from 2011, indicated that the Broadmeadow holds populations of Brown Trout Salmo trutta, European Eel Anguilla anguilla, Minnow Phoxinus phoxinus, Nine-spined Stickleback Pungitius pungitius, and Three-spined Stickleback Gasterosteus aculaetus (this list is an agglomeration from all three sampling points along the Broadmeadow9). These fish may also be present along the Saucerstown. Further surveys in 2017 recorded Brown Trout, European Eel, Flounder (at the transitional waters), Minnow, Nine-spined Stickleback, Three-spined Stickleback and Stone Loach (Matson et al., 2018).Most habitats, even highly altered ones, are likely to harbour a wide diversity of invertebrates. In Ireland only one insect is protected by law, the Marsh Fritillary butterfly Euphydryas aurinia, and this is not to be found on farmland. Other protected invertebrates are confined to freshwater and wetland habitats and so are not present on this site.

5.3.4.3 Overall Evaluation of the Context, Character, Significance and Sensitivity of the Proposed Development Site

In summary it has been seen that the application site is not within, or adjacent to, any area that has been designated for nature conservation at a national or international level. There are no examples of habitats listed on Annex I of the Habitats Directive or records of rare or protected plants. There are no alien invasive species.

Significance criteria are available from guidance published by the National Roads Authority (NRA, 2009). These are reproduced in table 5.5. From this an evaluation of the various habitats and ecological features on the site has been made and this is shown in Table 5.6.

[9] From www.wfdfish.ie

Table 5.5 Site evaluation scheme taken from NRA guidance 2009

Site Rating	***Qualifying criteria***
A - International importance	SAC, SPA or site qualifying as such. Sites containing 'best examples' of Annex I priority habitats (Habitats Directive). Resident or regularly occurring populations of species listed under Annex II (Habitats Directive); Annex I (Birds Directive); the Bonn or Berne Conventions. RAMSAR site; UNESCO biosphere reserve; Designated Salmonid water
B - National importance	NHA. Statutory Nature Reserves. Refuge for Flora and Fauna. National Park. Resident or regularly occurring populations of species listed in the Wildlife Act or Red Data List 'Viable' examples of habitats listed in Annex I of the Habitats Directive
C - County importance	Area of Special Amenity, Tree Protection Orders, high amenity (designated under a County Development Plan) Resident or regularly occurring populations (important at a county level, defined as >1% of the county population) of European, Wildlife Act or Red Data Book species Sites containing semi-natural habitat types with high biodiversity in a county context, and a high degree of naturalness, or populations of species that are uncommon in the county
D - Local importance, higher value	Sites containing semi-natural habitat types with high biodiversity in a county context, and a high degree of naturalness, or populations of species that are uncommon in the locality

	Sites or features containing common or lower value habitats, including naturalised species that are nevertheless essential in maintaining links and ecological corridors between features of higher ecological value.
E - Local importance, lower value	Sites containing small areas of semi-natural habitat that are of some local importance for wildlife; Sites or features containing non-native species that are of some importance in maintaining habitat links.

Table 5.6 Evaluation of the importance of habitats and species on the Oldtown site

Hedgerow – WL1	***Local Importance (Lower Value). Small areas of semi-natural habitat that are of some local importance for wildlife***
Bare soil – ED2 ***Buildings and artificial surfaces – BL3*** ***Improved agricultural grassland – GA1***	***Negligible ecological value***

5.4 Characteristics of the Proposed Development

The current application is for development on the section of these lands referred to as Phase 5.

5.5 Potential Impact of the Proposed Development

This section provides a description of the potential impacts that the proposed development may have on biodiversity in the absence of mitigation. Methodology for determining the significance of an impact has been published by the NRA. This is reproduced in table 5.7 and is based on the valuation of the ecological feature in question (table 5.5) and the scale of the predicted impact.

5.5.1 Construction Phase

The following potential impacts are likely to occur during the construction phase in the absence of mitigation:

1. The removal of habitats: bare soil, artificial surfaces and agricultural grassland. The stretch of hedgerow to the north is to be retained. No loss of trees is to occur.

This impact is neutral, imperceptible, likely and long-term.

2. The direct mortality of species during land clearance. This impact is most acute during the bird breeding season which can be assumed to last from March to August inclusive. In this instance

there is minimal habitat available for bird nesting and no hedgerow or scrub vegetation to be removed.

This impact is neutral, imperceptible, likely and short-term.

3. Pollution of water courses through the ingress of silt, oils and other toxic substances. A surface water attenuation pond has been constructed for this project under the parent planning permission and in consultation with Inland Fisheries Ireland. This passes to the River Broadmeadow and the outfall headwall has been constructed. Run-off from this area is currently passing to this pond, which will trap sediment and attenuate other likely pollutants.

Nevertheless, there is a risk that sediment and other construction pollutants could enter water courses due to the proximity of works to the Saucerstown Stream and the Broadmeadow River. These waterways lead to the Malahide Estuary SAC and SPA and for these reasons a precautionary approach should be adopted.

This impact is negative, significant, likely and short-term.

5.5.2 Operation Phase

The following potential impacts are likely to occur during the operation phase in the absence of mitigation:

4. Impacts to species through the disruption of ecological corridors. No ecological corridors are to be fragmented as a result of this development. Irish Hare and other protected mammals species are widespread and are assessed as of 'least concern' in conservation assessments.

This impact is neutral, imperceptible, unlikely and long-term.

5. Pollution of water from foul wastewater arising from the development. Wastewater will be sent to the municipal treatment plant at Swords. The Annual Environmental Report for the plant for 2020 showed that the discharge was fully compliant with emission limit standards. Monitoring of the receiving environment suggested that the outflow was not having an 'observable negative effect' on water quality. The Swords plant discharges into the Broadmeadow River which in turn enters the sea at Malahide estuary. The estuary is subject to a number of designations under the Birds and Habitats Directives. A separate screening report for Appropriate Assessment specifically examines the impacts of this project on these Natura 2000 areas in Malahide estuary however there is little evidence that water quality issues are having negative effects to features of high ecological value (e.g., wading birds or intertidal habitats). There is sufficient capacity at this plant to treat the likely effluent volume from the proposed development to a high standard.

The project will include the construction of a stormwater storage tank on the junction of the Glen Ellan Road and the Balheary Road and overflow pipe. The route of the pipe will follow the existing road before crossing an area of dry meadow and outfalling to The River Broadmeadow. This aspect of the development will reduce the frequency and intensity of uncontrolled storm overflows currently entering The River Ward, as well as reducing stormwater flow to the Swords wastewater treatment plant. A significant source of pollution to the catchment will therefore be removed.

This impact is positive, moderate, unlikely, and permanent.

6. Pollution of water from surface water run-off. The Greater Dublin Strategic Drainage Study (2005) identified issues of urban expansion leading to an increased risk of flooding in the city and a deterioration of water quality. This arises where soil and natural vegetation, which is permeable to rainwater and slows its flow, is replaced with impermeable hard surfaces. Various SUDS features have been incorporated into the proposed development as part of the sustainable urban drainage design. These measures will assist in improving the water quality of the surface water runoff from these areas and will also assist in attenuating flows during periods of exceptional heavy rainfall.

Surface water from the development will drain to an attenuation pond that has been constructed as part of the Phase 1 works. This connects to the Broadmeadow River and is to be landscaped with native wetland plants including Common Reed Phragmites australis, Bulrush Typha sp., and Water Mint Mentha aquatica. This is a form of Sustainable Drainage System (SuDS) that is expected to remove pollutants such as sediment and hydrocarbons as well as moderating the flow into the receiving water. The cessation of agriculture on these lands will remove a source of sediment (from tilling).

This impact is positive, slight, likely, and permanent.

7. Disturbance to species from increased human activity (including vehicle traffic, noise, artificial light, pets etc.). This effect must be considered in the context of the existing environment, which is already close to high density residential areas and transport infrastructure, which are either existing or underway. This brings with it noise and light pollution which will both increase with this development. Artificial lighting is known to have impacts on animal activity through both attractive and repellent forces. The effects are species and location specific, for instance some Bats are attracted to lights as prey items become concentrated around light sources (Rich & Longcore, 2006 eds). However other species may be deterred. Impacts are also related to the type of lighting used and so the ultimate impact is dependent on the species of Bat that may be present within the zone of influence and the final design of lighting for the project. Brown Long-eared Bat, Whiskered bat, Natterer's bat, Daubenton's bat and Lesser Horseshoe Bat are considered by Bat Conservation Ireland as being most susceptible to lighting effects. The bat survey that was carried out in 2011 found that none of these species is believed to be regularly occurring in the vicinity of the subject lands (see table 5.2). The details of lighting will only be provided post-planning. Mitigation has therefore been recommended to address this impact.

There has been little study meanwhile on the effects of noise on terrestrial animals however it is believed that many species can adapt to elevated ambient noise levels.

8. The introduction of household pets, particularly cats, has been a cause of concern given the degree to which they prey on wild mammals and birds. There is no known research on this issue from Ireland. However the UK's Royal Society for the Protection of Birds states on its website that "despite the large numbers of birds killed [estimated at up to 55 million per

annum in the UK], there is no scientific evidence that predation by cats in gardens is having any impact on bird populations UK-wide."[10]

The impact from disturbance, principally artificial lighting, is negative, moderate, likely and permanent.

9. Creation of landscaped areas to include additional planting. This will consist of native species and non-native species (but will avoid any that are considered alien invasive[11)] and will create additional habitat for birds and invertebrates. The linear park has been designed particularly with biodiversity in mind and the attenuation pond will create a new wetland habitat that is likely to attract associated species of amphibian and invertebrates. Included in the grassland areas is the inclusion of meadow grass areas with a high seed mix. It is hoped that this will provide a source of food for seed-eating birds, particularly Yellowhammer, post-construction. Refer to the landscaping report for full details of species to be used. The landscaping masterplan is reproduced from this in Figure 5.5.

This impact is positive, moderate, likely, and permanent

Table 5.7: Significance level of likely impacts in the absence of mitigation

Impact		***Significance***
Construction phase		
1	***Habitat loss of features of negligible value: artificial surfaces, bare soil and improved agricultural grassland***	***neutral, imperceptible, likely and long-term***
2	***Mortality to animals during construction***	***neutral, imperceptible, likely and short-term***
3	***Pollution of water during construction phase***	***negative, significant, likely and short-term***
4	***Ecological corridors***	***neutral, imperceptible, unlikely and long-term***
5	***Wastewater pollution***	***positive, moderate, unlikely and permanent***
6	***Surface water pollution***	***positive, slight, likely and permanent***
7	***Disturbance to species from human disturbance***	***negative, moderate, likely and permanent***
8	***Landscaping***	***positive, moderate, likely and permanent***

[10] http://www.rspb.org.uk/advice/gardening/unwantedvisitors/cats/birddeclines.aspx
[11] Listed on Schedule 3 of S.I. 477 of 2011 or as 'most unwanted' by Invasive Species Ireland

Overall, it can be seen one significant negative impact is predicted to occur as a result of this project in the absence of mitigation.

5.5.3 Do Nothing Impact

The subject lands are currently highly modified in preparation for construction works. Should this project not go ahead it would likely revert to agricultural land.

Water quality may improve throughout the Broadmeadow catchment with the implementation of the Water Framework Directive however its target of 'good ecological status' for all water bodies by 2015 has not be met. Under the second River Basin Management Plan actions were planned within the Broadmeadow catchment which are expected to see some improvements by 2021.

5.6 Remedial and Reductive Measures

These measures include avoidance, reduction and constructive mitigation measures as set out in Section 4.7 of the Development Management Guidelines. Under the EIA Directive, where significant negative effects are predicted to arise from a project then mitigation measures are required.

This report has identified a number of impacts that were assessed as 'moderate negative' and therefore mitigation is needed to reduce the severity of these potential effects, which are summarised below.

Construction Phase

1. Pollution during construction

5.6.1 Mitigation Measures

The following mitigation measures are proposed for the development

Construction Phase

Mitigation measure 1: **Mortality to animals during construction**

Construction will follow guidance from Inland Fisheries Ireland (IFI, 2016) for the protection of fish habitat. This will include the erection of a robust silt curtain (or similar barrier) along the northern boundary to prevent the ingress of silt to The River Broadmeadow. Water leaving the site will pass through an appropriately-sized silt trap or settlement pond so that only silt-free run-off will leave the site.

The surface water outfall headwall will be constructed behind a temporary coffer dam so that works will be undertaken 'in the dry'.

Dangerous substances, such as oils, fuels etc., will be stored in a bunded zone. Emergency contact numbers for the Local Authority Environment Section, Inland Fisheries Ireland, the Environmental Protection Agency and the National Parks and Wildlife Service will be displayed in a prominent position within the site compound. These agencies will be notified immediately in the event of a pollution incident.

Site personnel will be trained in the importance of preventing pollution and the mitigation measures described here to ensure same.

The site manager will be responsible for the implementation of these measures. They will be inspected on at least a daily basis for the duration of works, and a record of these inspections will be maintained. A specification brochure is included as an addendum to this report.

These measures have been incorporated into a preliminary Construction Environmental Management Plan (CEMP). This includes the following site specific measures:

Construction runoff is heavily laden with silt which can block road gullies and reduce the hydraulic capacity in pipes and rivers, contributing to ponding and flooding. Continued development without appropriate controls will ultimately keep maintenance costs elevated, whether that be in cleaning gullies, jetting pipes, or dredging. Sediment control plans can be implanted on site to mitigate these issues.

Sediment basins and traps should be installed before any major site grading takes place. Additional sediment traps and silt fences should be installed as grading takes place to keep sediment contained on site at appropriate locations.

Key runoff-control measures should be located in conjunction with sediment traps to divert water from planned undisturbed areas away from the traps and sediment-laden water into the traps. Diversions should be installed above the areas to be disturbed before any grading operations. Any perimeter drains should be installed with stable outlets before opening major areas for development. Any additional facilities needed for runoff control should be installed as grading takes place.

During grading operations temporary diversions, slope drains, and inlet and outlet protection installed in a timely manner can be very effective in controlling erosion and sediment build up.

The main run-off conveyance system with inlet and outlet protection measures should be installed early and used to convey stormwater run-off through the development site without creating gullies or channels. Install inlet protection for storm drains as soon as the drain is functional to trap sediment on site in shallow pools and to allow the flood flows to enter the storm drainage system safely. Install outlet protection at the same time as the conveyance system to prevent damage to the Broadmeadow River.

[…]

Sediment entrapment facilities are necessary to reduce sediment discharges to downstream properties and receiving waters. All run-off leaving a disturbed area should pass through a sediment entrapment facility before it exits the site and flows downstream.

- Straw Bales: Straw bales can be placed at the base of a slope to act as a sediment barrier. These are not recommended for use within a swale or channel. Straw bales are temporary in nature and may perform for only a period of weeks or months. Proper installation and maintenance are necessary to ensure their performance.
- Silt Fencing: A silt fence is made of a woven synthetic material, geotextile, and acts to filter run-off. Silt fencing can be placed as a temporary barrier along the contour at the base of a disturbed

area but is not recommended for use in a channel or swale. The material is durable and will last for more than one season if properly installed and maintained. Silt fencing is not intended to be used as a perimeter fence or in area of concentrated flow. If concentrated flow conditions exist, a more robust filter should be considered.

- Silt Barriers: Silt barriers can also be temporarily installed in any road gullies of partially constructed roads to prevent sediment movement into downstream drainage systems or SUDS components. When the catchment area is greater than that allowed for straw bale barriers or silt fences, runoff
- should be collected in diversion drains and routed through temporary sediment basins.
- Diversion Drains: Diversion drains are simple linear ditches, often with an earth bund, for channelling water to a desired location. If the drains are being eroded, they can be lined with geotextile fabric or large stones or boulders.

5.7 Predicted Impact of the Proposed Development

This section allows for a qualitative description of the resultant specific direct, indirect, secondary, cumulative, short, medium and long-term permanent, temporary, positive and negative effects as well as impact interactions which the proposed development may have, assuming all mitigation measures are fully and successfully applied.

Construction Phase

There will be some temporary residual impacts to biodiversity arising from this project.

1. Ensuring that pollution prevention measures are constantly monitored and maintained will be necessary to avoid any residual negative effects to water quality and biodiversity.

5.8 Interactions and Cumulative Impacts

A number of the identified impacts can also act cumulatively with other impacts from similar developments in this area of Dublin. These primarily arise through the urbanisation of the city's hinterland as provided for by land use zoning and include: loss of habitats and species, particularly hedgerows; pollution from surface water run-off and pollution from wastewater generation.

This proposed development can be viewed alongside the permitted construction of a series of project phases in Oldtown and the likely future development of all the lands at Mooretown, not far to the south. This will see the conversion of all these lands from agricultural to a combination of built and amenity space. In this case the lands for development are of negligible biodiversity value.

The key environmental interactions with Biodiversity is water and landscaping. 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.

5.9 Monitoring

Monitoring is required where the success of mitigation measures is uncertain or where residual impacts may in themselves be significant. Section 5.7 summaries the likely impacts arising from this

project. Uncertainly regarding the success of proposed mitigation for Yellowhammers has been highlighted.

Ecology monitoring has been carried out on these lands by Openfield since November 2013 and are on-going on a bi-monthly basis. This includes surveillance for protected species, water quality issues, protection of features to be retained and consultation with relevant stakeholders where required. Daily monitoring is also carried by site personnel in relation to water quality, storage of dangerous substances etc. Records are maintained at the site office for inspection.

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6.0 LAND AND SOILS

6.1 Introduction

This chapter has been prepared by Waterman Moylan Consulting Engineers.

This section of the EIAR describes the natural characteristics of the proposed residential development at Oldtown Phase 5, Swords, Co. Dublin, and the associated proposed stormwater storage tank on the foul network at Balheary Road, in terms of bedrock geology and drift geology.

The impact of the proposed development on the soils and geology of the subject site is assessed, and mitigation measures where necessary are proposed to reduce the impact of any development.

6.2 Study Methodology

In determining the impact of the proposed development on the prevailing geological conditions, key sources of information were consulted, including the Map of the Bedrock Geology of Ireland, produced by the Geological Survey of Ireland available on www.gsi.ie. Guidance on relevant assessment methods is obtained from "*Geology in Environmental Impact Statements – a guide*", September 2002, published by the Institute of Geologists of Ireland.

An extensive site investigation (SI) was carried out within the proposed development site. The purpose of the site investigation was to investigate subsurface conditions utilising different methodologies. The results of the site investigation have been compiled in a report prepared by Site Investigations Ltd (S.I. Ltd), (Contract Number: 5599). This site investigation report is provided at Appendix 6.1 (Site Investigation Report) to this document.

6.3 The Existing Receiving Environment (Baseline)

This section describes the land, soils and geology in the subject site and its surroundings. It also confirms the historic land use of the subject site.

6.3.1 Site Development

The Oldtown-Mooretown lands are located at the western development edge of Swords, within the catchment of the Broadmeadow River. The overall lands cover an area of approximately 111 hectares.

The Oldtown–Mooretown lands are divided by the Rathbeale Road, with Oldtown lands to the north (c. 50 Ha) and Mooretown to the south (c. 61 Ha). This subject application (c. 10.23 Ha), which forms the final phase of the Oldtown development, is located in the north-west quarter of the Oldtown Lands.

The subject site was previously used for agricultural purposes and a temporary school, which is now used as the Oldtown construction site compound. There are newly completed houses within the site's southern boundary.

The Oldtown lands generally fall from a high point of approximately 33.0m OD Malin on Rathbeale Road to approximately 9.0m OD Malin at the Broadmeadow River to the north-east of the subject lands.

The subject site is bounded on the south-east by the Western Distributor Link Road (WDLR), to the west by agricultural lands.

The site is accessed primarily from Miller's Avenue (WDLR) but may also be accessed to the northwest by Meadowbank Road, which has been constructed as Part of the Oldtown Phase 4 development.

The proposed site for the stormwater storage tank that forms part of the subject application, is located on the junction of Glen Ellan Road and Balheary Road, Swords, Co. Dublin. The site is 1.4km north of swords, 1.1km west of the M1 motorway and 300m south of the Broadmeadow River. The site is owned by The Applicant and is locally referred to as the Celestica/Motorola site.

6.3.2 Historic Land use

The Ordnance Survey of Ireland (OSI) has been consulted to review historic maps and aerial photographs. The subject site has historically been an agricultural site.

The location of the proposed stormwater storage tank is on the grounds of an industrial site but the exact location itself is greenfield in nature. It is located adjacent to a gravel overflow carpark which serves the industrial unit.

6.3.3 Ground Investigation

An extensive site investigation (SI) was carried out within the proposed development site. The purpose of the site investigation was to investigate subsurface conditions utilising different methods. SI comprised the following scope of work:

- 13 No. cable percussive boreholes
- 41 No. trial pits with dynamic probes
- 6 No. soakaway tests
- 37 No. California Bearing Ratio tests
- Geotechnical & Environmental Laboratory testing.

Refer to Figure 6.1 for the location of Trial Pits, CBRs and Boreholes.

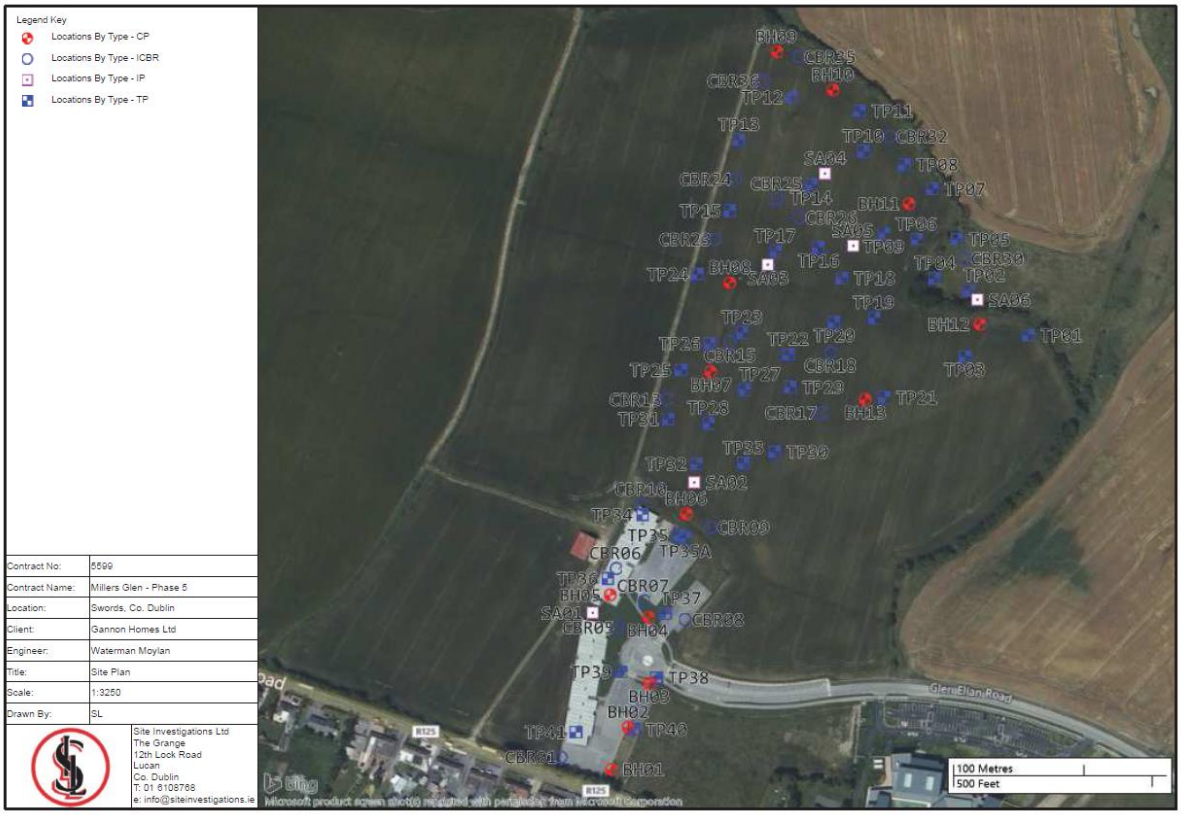


Figure 6.1 - Site Location Plan including location of trail pits, CBRs and boreholes

Laboratory testing was undertaken on selected soil samples collected during the investigation. Testing focused on mechanical properties primarily, with some samples also tested for chemical properties. The results indicated that the soils tested would generally be able to be treated as inert waste. However, the fluoride, sulphate, total dissolved solids, and total monohydric phenols results were slightly elevated above the Inert threshold and therefore, these results should be sent to the individual landfill to ensure that the material can be accepted prior to excavation.

The ground conditions encountered during the investigation are summarised below with reference to in situ and laboratory results:

- TOPSOIL.
- Brown sandy slightly gravelly silty CLAY with low cobble content.
- Firm grey, brown sandy slightly gravelly silty CLAY with low cobble content.
- Stiff becoming very stiff black slightly sandy gravelly silty CLAY with low cobble content.

MADE GROUND was encountered in 8 No. boreholes and in 8 No. trial pits and extended to a maximum depth of 2.50mbgl at TP27. The locations are generally around the area of the site previously used as a compound for the previous phases of the development and mainly consist of cohesive clay soils with construction waste fragments.

The natural soils consist of over-consolidated lodgement till which is encountered across the North Dublin region with several papers discussing the engineering characteristics of the soil. The brown soils are the weathered surface of the underlying black clays, and the gravel and cobbles are generally rounded to subangular and predominantly limestone in origin. The boundary between the brown soil

and the black soil in the boreholes is between 1.60mbgl (BH09) and 3.50mbgl (BH12). The SPT N-values show an increase in blow counts when the black soils are encountered, and this also increases steadily with depth. The laboratory testing of the soils recorded moisture contents between 10.4% and 15.4% with low plasticity index results between 10 and 14, which indicates CLAY soils with low and intermediate plasticity. The grading curves show poorly graded straight-line profiles with 18% to 36% fines content.

6.3.4 Geology

The Bedrock Geology Map of Ireland produced by the Geological Survey of Ireland (GSI), describes the prevalent geology of the area. The proposed development spans an area predominantly underlain by a single geological formation:

- Type ML, Malahide Formation argillaceous bioclastic limestone, shale. This type of formation is located over the majority of the site.

To the northern end of the site, the development clips the edge of the Tober Colleen Formation, Type TC. The Tober Colleen Formation is a calcareous shale, limestone conglomerate. The location of the stormwater storage tank is geologically identically to the Type ML formation as discussed above. An extract from the GSI map showing the area of the proposed development is shown in Figure 6.2 overleaf.

Figure 6.2 Extract from GSI Bedrock Map

6.3.5 Soils

According to the Teagasc Soils website datasets (www.gis.teagasc.ie) indicate the site is underlain by limestone till, confirming the site investigation results. The location of the proposed stormwater storage tank is identified as made ground. Figure 6.3 below sets out the Teagasc Soil Mapping.

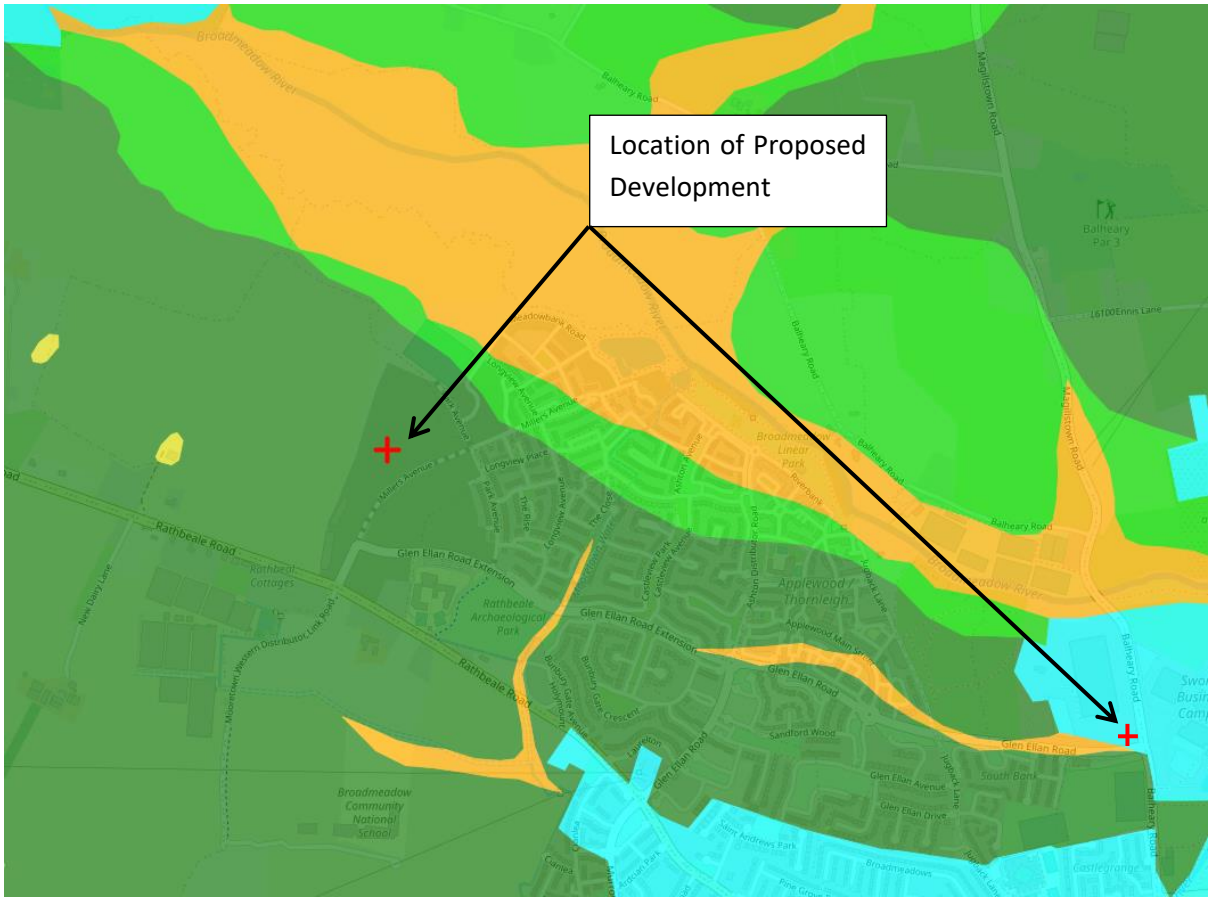


Figure 6.3 - Teagasc Soil Mapping

6.4 Characteristics of the Proposed Development

The proposed development consists of 377 units, comprised of 173 houses, 169 apartments and 35 duplex units with associated parking and ancillaries, on a site area of 10.223ha.

The developer will construct all associated infrastructure to service the development including a network of foul water and surface water drains, a stormwater storage tank and outfall, a watermain, access roads and footpaths.

The proposed development of the site will incorporate the following works which will be likely to have an impact on the soils and geology:

- Cutting and filling of subsoil and rock to form finished floor levels and development roads.
- Excavations for utilities and services.
- Potential importation of suitable material.
- Reinstatement of excavations and topsoil.
- Potential removal off-site of unsuitable and surplus material.

It is intended that any surplus of materials generated on the site will be minimized.

6.5 Potential Impact of the Proposed Development during Construction Phase

Prior to the commencement of any construction works, the topsoil on the site will be stripped and removed to stockpiles in designated areas within the site boundary for re-spreading on completion of the works where possible.

The removal of topsoil and the earthworks will expose subsoil to weathering and may result in some minor erosion of the soils during the short construction period, in particular following extreme dry and sunny, or prolonged wet weather conditions. The lack of topsoil is likely to give rise to dust from the subsurface during dry periods.

The main source of earthworks for the project will be excavations for foundations, roads, and utility networks. The excavation volume for the stormwater storage tank and overflow network has been calculated to be a volume of C. 3,660m^3, refer to the Preliminary Construction, Environmental and Waste Management Plan provided with this planning application for further details.

The soil excavated from the location of the stormwater tank will be chemically analysed to assess its suitability for reuse on-site. If the soil is to be reused off-site it will be subject to a prior Article 27 notification to the EPA. Should the chemical analysis determine that the soil is polluted, it will be disposed of to a waste facility that can accept it as a waste based on the contamination type and concentration.

Construction traffic movements involved in the construction of the proposed development and access roads, may result in local compaction of the subsoil along haulage routes, but this will be a very limited area.

During the construction phase there is a risk for construction traffic to damage the structure of some of the adjoining road network and to increase the amount of mud and dust on the roads providing access to the site. A dilapidation survey should be undertaken to mitigate the risk of damage exposure to the client. There will also be a temporary increase in traffic volumes due to deliveries of fill materials and removal of surplus unsuitable cut materials.

During adverse weather conditions surface water runoff across the exposed sub-soil could result in increased levels of silt being deposited in the public sewer.

Some minor local contamination of subsoils may occur should chemicals or fuels used during the construction phase spill.

6.6 Potential Impact of the Proposed Development during Operational Phase

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.

6.7 Potential Cumulative Impacts

It is not anticipated that potential cumulative impacts will be generated on land, soils and geology during the construction or operation phases or in the event of future developments adjacent to the site should they implement the appropriate mitigation measures.

6.7.1 Existing Oldtown Development

There are no anticipated cumulative impacts arising from the existing Oldtown Development in relation to lands, soils, and geology other than those noted in section 6.5 above.

6.7.2 Future Development

The applicant is in control of the adjacent Oldtown & Mooretown lands to provide a consolidated development in North Swords. This current application relates to Phase 5 of the Oldtown lands north of Rathbeale Road. This Phase is the final Phase of Masterplan development within the Oldtown lands. There has been a carefully considered design approach to development to ensure that the subject application can be delivered to enhance and improve upon existing amenity.

The Oldtown Masterplan development successfully integrates and enhances the existing built fabric in north Swords.

There are no additional impacts to those noted in section 6.5 above.

6.8 Do Nothing Scenario

The Ground conditions will remain as they currently are.

6.9 Risks to Human Health

A potential risk to human health due to the associated works during construction is the direct contact, ingestion or inhalation of receptors (i.e., construction workers) with any soils which may potentially contain low-level hydrocarbon concentrations from Site activities (potential minor leaks, oils and paint).

No human health risks associated with long term exposure to contaminants (via. direct contact, ingestion, or inhalation) resulting from the proposed development are anticipated.

6.10 Mitigation Measures

6.10.1 Construction Stage

The provision of wheel wash facilities at the construction entrance to the development will minimise the amount of soil deposited on the surrounding road network. The adjoining road network will be cleaned on a regular basis, if required, to prevent the build-up of soils from the development site on the existing blacktop roads.

Measures will be implemented throughout the construction stage to prevent contamination of the soil and adjacent watercourses from oil and petrol leakages and significant siltation. Suitable bunded

areas will be installed for oil and petrol storage tanks. Designated fuel filling points will be put in place with appropriate oil and petrol interceptors to provide protection from accidental spills. Spill kits will be provided by the Contractor to cater for any other spills.

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

Noise attenuation will be used on rock breakers to reduce noise levels.

After implementation of the above measures the proposed development will not give rise to any significant long-term adverse impact. Negative impacts during the construction phase will be short term only in duration.

6.10.2 Operational Stage

Within the development, landscape areas will be topsoiled and planted in accordance with the proposed landscaping plan. Following completion of these reinstatement works, no significant adverse impacts on the soils and geology of the subject lands are envisaged.

A comprehensive drainage network will be constructed to ensure that the lands drain effectively following their reshaping / re-profiling. The drainage system shall incorporate sustainable urban drainage methods to clean flows prior to discharge.

6.11 Predicted Residual Impacts of the Proposed Development

6.11.1 Construction Stage

Due to the implementation of the mitigation measures outlined above, the proposed development will not give rise to any significant long-term adverse impact. Negative impacts during the construction phase will not be significant once the appropriate mitigation measures are adopted and will be only short term in duration.

6.11.2 Operational Stage

No significant long-term impacts on soil, geology, or hydrogeology, resulting from the proposed development are predicted.

6.12 Monitoring

6.12.1 Construction Stage

Monitoring as outlined below, during the construction phase will be undertaken; -

- Adequate protection of the topsoil stockpiled for reuse.
- Monitoring of surface water discharged to existing sewers.
- Monitoring cleanliness of the adjoining road network.
- Monitoring measures for prevention of oil and petrol spillages.
- Dampening down measures close to the boundaries of the site in dry weather.

6.12.2 Operational Stage

No operational stage / post-development monitoring will be required.

6.13 Reinstatement

Reinstatement measures in relation to soils consist primarily of the re-soiling of open areas / landscaping and the replanting of these areas. No post development reinstatement works will be required.

6.14 Interactions

Any potential rock breaking will generate noise and excavations on site will give rise to dust. From review of the ground investigations discussed in section 6.3, it is not anticipated that rock breaking will be necessary.

6.15 Difficulties Encountered

There were no difficulties encountered.

6.16 References

- Geological Survey of Ireland 1:100,000 scale bedrock maps.
- Google maps, 2021.
- Site Investigations Ltd (S.I. Ltd), (Contract Number: 5599).
- Ordinance Survey of Ireland historical map. www.osi.ie
- Subsoils datasets Teagasc (www.gis.teagasc.ie)
- Site walkover visits.

7.0 WATER

7.1 Introduction

This chapter has been prepared by Waterman Moylan Consulting Engineers.

This chapter has been prepared by Waterman Moylan Consulting Engineers in order to describe the impact of the proposed development on the surrounding hydrological (surface water), hydrogeological (groundwater), foul water, water supply, and flood risk both during the construction and operation phases. The interaction between the surface water drainage proposal as part of the development will also be assessed in this chapter.

7.2 Study Methodology

The methodology followed for this section is in accordance with the EPA "Environmental Impact Assessment Reports, Draft Guidelines 2017".

The following information sources were used in the assessment of the local hydrology and hydrogeological aspects of the proposed development site.

- Geological Survey of Ireland (GSI) Website
- Environmental Protection Agency.
- Office of Public Works (OPW) National Flood Hazard Mapping.
- OPW Catchment Flood Risk and Management Studies.
- FCC Drainage Record Maps.
- Ordinance Survey Mapping.
- Topographical Survey.
- Site investigation reports and soakaway testing.

The following methodology has been adopted for this assessment:

- Review of relevant information including where available, Development Plans, existing drainage information, and other relevant studies as outlined above; and
- Consultations with Fingal County Council to agree the drainage strategy.
- Irish Water confirmation of feasibility letter.

7.3 The Existing Receiving Environment (Baseline)

The subject site area (c. 10.223 Ha) is located north of Glen Ellan Road within the Oldtown lands and forms the final phase of the Oldtown–Mooretown Masterplan.

The proposed site for the stormwater storage tank that forms part of the subject application, is located on the junction of Glen Ellan Road and Balheary Road, Swords, Co. Dublin. The site is 1.4km north of swords, 1.1km west of the M1 motorway and 300m south of the Broadmeadow River. The site is owned by The Applicant and is locally referred to as the Celestica/Motorola site.

7.3.1 Hydrology (Surface Water)

The subject site generally slopes from south-west to north-east. The site has a high point of c. 33m OD Malin in the south-west corner, down to c. 16m OD Malin in the north of the site. The attenuation ponds have been designed to attenuate all the Oldtown development lands, including the subject site development. The ponds discharge to the Broadmeadow River at a level of 7.76m OD Malin, at an outfall located immediately to the north of the ponds along the northern boundary of the Oldtown lands.

The Broadmeadow River traverses the northern boundary with a predicted FEM FRAM 1 in 1000-year flood level of 11.55m OD Malin at a node located immediately upstream of the development.

7.3.2 Hydrology (Groundwater)

A review of the Environmental Protection Agency (EPA) website database at https://gis.epa.ie/EPAMaps/ classifies the groundwater risk on the subject lands as 'Not at Risk'. The groundwater risk looks at the current water quality and trends and is used to highlight waterbodies that are at risk of deteriorating or being at less than good status in the future.

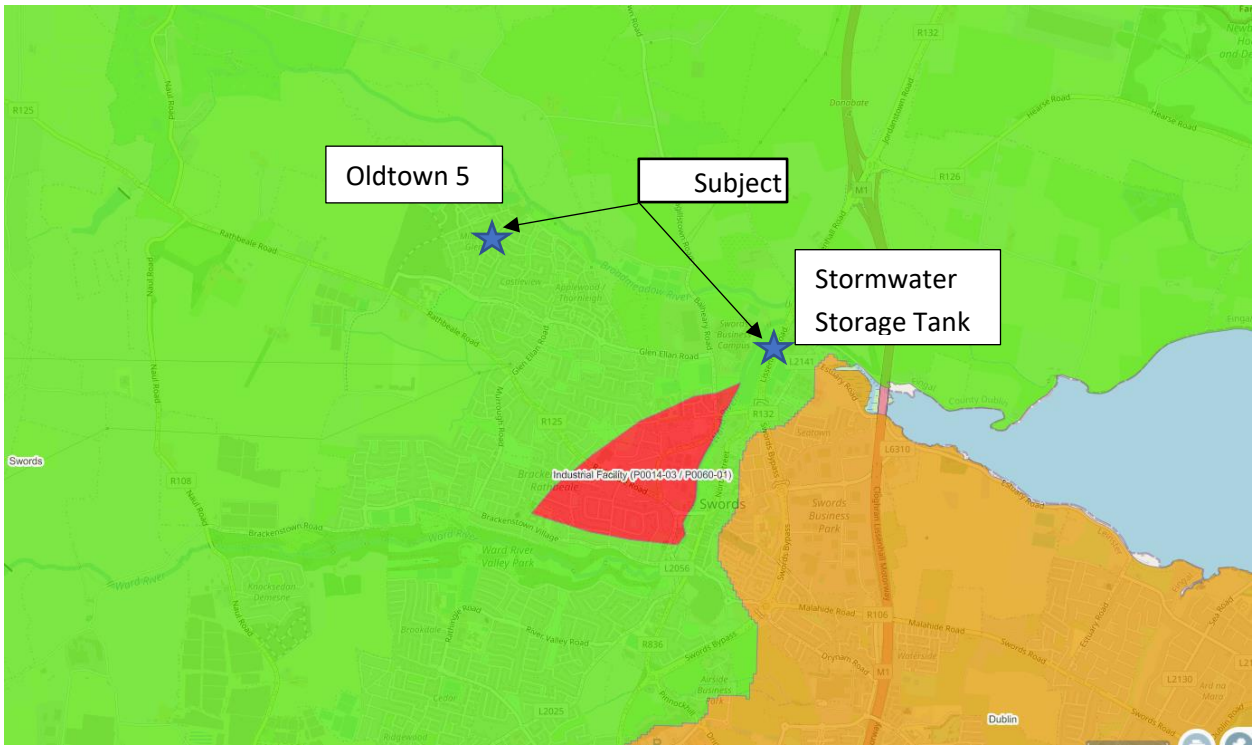


Figure 7.1 - Groundwater Risk (EPA)

GSI's aquifer classes are divided into three main groups based on their resource potential, and further sub-divided based on the type of openings through which groundwater flows. A review of the GSI database revealed that the aquifer below the subject lands is classified as LI, Locally Important Aquifer – Bedrock which is Moderately Productive only in Local Zones.

Figure 7.2 - GSI Aquifer

7.3.3 Flood Risk Assessment

A Flood Risk Assessment has been prepared by Waterman Moylan Engineers and is available under separate cover. This Flood Risk Assessment has been carried out in accordance with the DEHLG/OPW Guidelines on the Planning Process and Flood Risk Management published in November 2009. The assessment identifies and sets out possible mitigation measures against potential risks of flooding from various sources. Sources of possible flooding include coastal, fluvial (river), pluvial (direct heavy rain) and groundwater.

The subject site is located within the Broadmeadow River catchment. The Broadmeadow River traverses the lands to the north of the site. Figure 7.3 below is an extract from the Flood Studies carried out by Fingal County Council as part of their strategic flood risk assessment for the draft Fingal Development Plan 2017-2023. The map shows that the subject site is outside of the 0.1% Annual Exceedance Probability (AEP) flood plain.

There is no known history of ground water / springs seeping through the ground in this area. However, it is possible for ground water to rise and cause potential flooding on site during prolonged wet periods. Groundwater vulnerability maps indicate that the site is located between a moderate and high vulnerability location. And thus, can be considered to have a moderate to high likelihood.

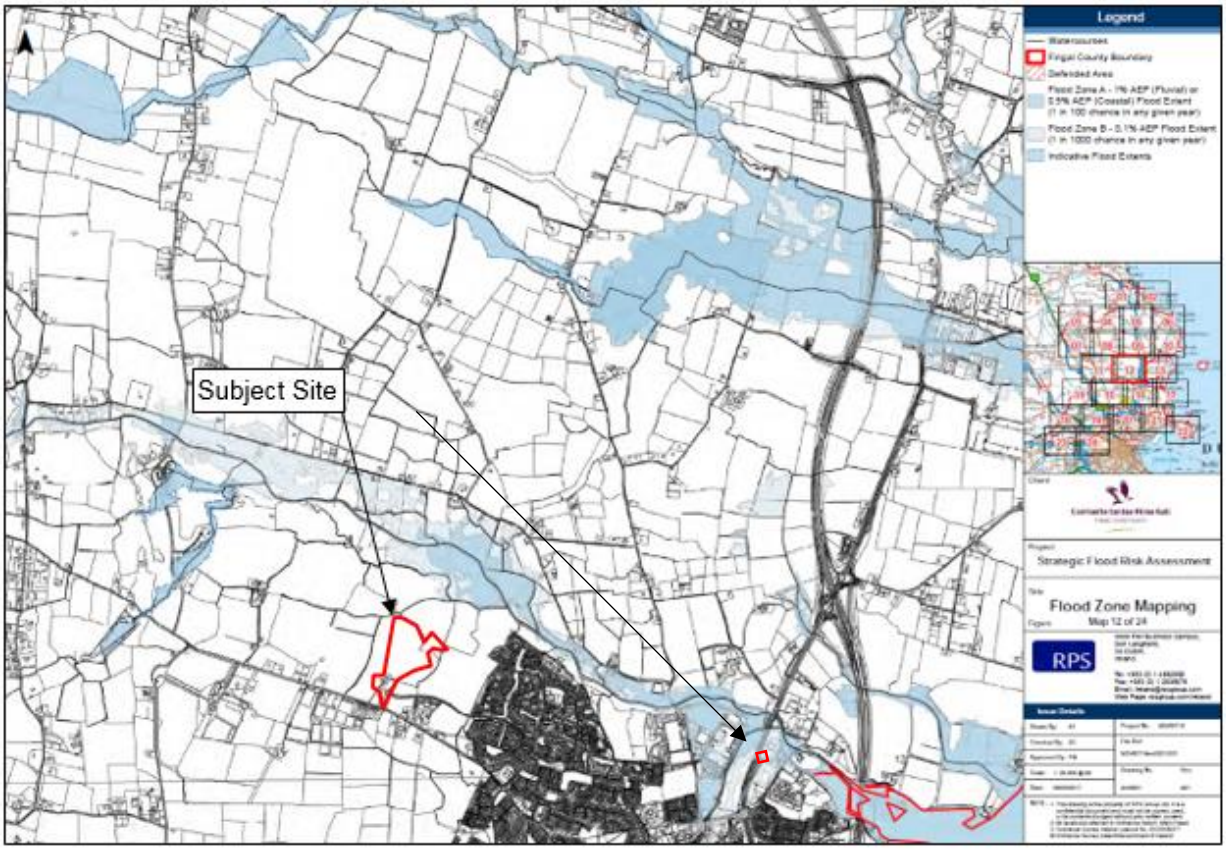


Figure 7.3 - Broadmeadow River Flood Extent Map - Up to 1 in 1,000 Year Return Period [Note: Red line developable site area indicatively shown] A summary of flood risk can be seen in **Table 7.1**.

Source	Pathway	Receptor	Likelihood	Consequence	Risk	Mitigation Measure	Residual Risk
Tidal	*None*	*Proposed Development*	*Low*	*None*	*Negligible*	*None*	Extremely Low
Fluvial	*Broadmeadow River*	*Proposed Development*	*Low*	*None*	*Very Low*	*None*	Very Low
Pluvial	*Private and Public Drainage Network*	*Proposed Development*	*High*	*Moderate Flooding of the proposed properties and roads.*	*High likelihood of minor to severe damage to houses.*	*Appropriate drainage design, over land flood routing, additional upstream attenuation and setting of floor levels.*	Low
Ground Water	*Ground*	*Proposed Development*	*Moderate to high*	*Moderate Saturation of the surrounding grounds during long rainfall periods.*	*Moderate to high likelihood of minor saturation of area around the development*	*Appropriate drainage design, over land flood routing and setting of floor levels.*	Low

Human/ Mechanical Error	*Drainage network*	*Proposed Development*	*High*	*Moderate Surcharging of surface water network resulting in flooding of the property.*	*High likelihood of minor damage to houses.*	*Over land flood routing, additional upstream attenuation, setting of floor levels and inspection of SW network.*	Low

Table 7.1 Summary of the Flood Risks from each flooding type

7.3.4 AA Screening

Indirect impacts from foul and surface flows are discussed in the AA Screening and NIS commentary and are addressed in the Biodiversity Chapter of this EIAR.

7.3.5 Water Supply

A pre-connection enquiry was submitted to Irish Water, the subsequent confirmation of feasibility letter from Irish Water advises that there are no constraints to the water supply network and the addition of this development does not pose any issues.

7.3.6 Foul Water Network

A pre-connection enquiry was submitted to Irish Water, the subsequent confirmation of feasibility letter from Irish Water advises that there is sufficient available capacity in the Wastewater Treatment Plan (Swords WWTP), to serve the development but that network upgrades are required to facilitate the development. The stormwater tank on the public foul network, that forms part of this application is proposed in order to alleviate this issue.

7.4 Characteristics of the Proposed Development

The proposed development consists of 377 units, comprised of 173 no. houses, 134 no. apartments, and 70 no. duplex units [comprising 35 no. duplex 'house' units and 35 no. duplex 'apartment' units], with associated parking and ancillary structures, on a site area of 10.22 ha.

The developer will construct all associated infrastructure to service the development including a network of foul water and surface water drains, a stormwater storage tank on the public foul network, watermain, access roads and footpaths.

It is proposed that the foul water network to serve the site will drain to the adjacent existing Phase 4 development, which will in turn flow to the existing foul sewer located in Glen Ellan Road. These networks have been designed and constructed in anticipation of the future requirement of a connection from the proposed development.

It is proposed that the surface water run-off from the development will drain via gravity to the existing surface water sewer in Oldtown Phase 4 development. The Oldtown Phase 4 development drains to the east to the Oldtown attenuation area. Both the Oldtown Phase 4 surface drainage network &

Oldtown attenuation area have been sized accordingly, in anticipation of the surface water drainage network being connected from the proposed development. The Oldtown attenuation ponds will release the surface water flows at the greenfield rate to the Broadmeadow River.

The requirement for the stormwater storage tank on the public foul network is to alleviate constraints within the public foul network during times of heavy rainfall events, whereby stormwater enters the public foul network temporarily reducing available capacity. The proposed stormwater storage tank has been designed in conjunction with Irish Water and will not only facilitate the connection requirement of this subject application but will also have capacity to allow for the continued development in the Oldtown/Mooretown catchment.

The proposed stormwater storage tank is to be located underground, with the surfacing above to be permeable and will not require a stormwater drainage network.

SuDS will be utilised on site for water quality protection, however as discussed above the attenuation element has already been constructed at the Oldtown attenuation ponds. Water quality will be achieved by using a Sustainable drainage network of Green Roofs, Swales and Permeable Paving all discharging the treated water to the surface water network. The storm water system will be designed to cater for the 1 in 100-year storm plus a 20% allowance for climate change.

Construction activities with a possible impact to surface water and groundwater features will include the following:

- Excavation of soil, sub-soil, and vegetation.
- Infilling and landscaping will be undertaken.
- Construction of the outfall headwall from the stormwater storage tank to the Broadmeadow River.
- Temporary storage/use of fuel/oils on site will be required for construction machinery.

Operational Activities will include the following:

- The total hardstanding area will be increased. It is expected that the surface water will be treated via SuDS and then discharged to the public surface water network. The public surface water sewer will flow from the proposed Phase 5 development, through the existing Phase 4 development and then outfall to the existing Oldtown attenuation ponds.
- Consumption of potable water for the development will be supplied by a watermain network connected to the Irish Water public water supply. The Irish Water confirmation of feasibility letter has not identified any issues with this arrangement.
- Foul water drainage for the development will be provided via a foul network which will connect to the public foul network and flow to Swords WWTP. Irish water has advised that upgrade works to the network are required to be completed prior to the connection of the proposed development to the public foul network. The stormwater tank on the public foul network that forms part of the application, is proposed to alleviate this issue.

7.5 Potential Impact of the Proposed Development

The potential impacts of the proposed development from both a hydrology (surface water), and hydrogeology (groundwater) perspective at the construction and operational stages are outlined in the following sections.

7.5.1 Construction Stage

Significant amounts of site stripping and excavation will be required in order to construct the development. When the site has been stripped layers of sub-soil will be exposed to weathering and there will be potential for erosion due to rainfall and subsequent runoff. The erosion of soil can lead to sediments being washed into the receiving watercourses /sewers at higher rates of runoff.

There is also potential during the development's construction stage that contaminants from cement/concrete be washed into the receiving watercourses / sewers.

There is a risk of pollution of groundwater / watercourses / soils by accidental spillage of oils / diesel from temporary storage areas or where maintaining construction equipment.

Foul water could be connected to the surface water drainage network resulting in the contamination of the receiving watercourses. Furthermore, if there is damage to any foul pipes, there is potential for contaminants to seep into the groundwater.

The construction of the proposed development has potential to cause a slight, adverse, temporary, residual impact on receiving watercourses/groundwater.

7.5.2 Operational Stage

The proposed development will result in increased impermeable areas and there is potential for an increase in risk of higher rates of surface water runoff leading to increased downstream flooding.

There is a potential impact for the discharge of contaminants from the proposed development and road surfaces to the surrounding drainage sewers. These would include particulates, oil, soluble extracts from the bitumen binder etc. The quality of runoff from the site would be dependent on the time of year, weather, particulate deposition from the atmosphere and any gritting or salting carried out by the Local Authority. The time of year has a major bearing on the quality of storm water run-off - in particular the first rains after a prolonged dry period where accumulated deposits of rubber, particulates, oils, etc. are, washed away.

There is potential for leaks in the foul network to result in contamination of the groundwater.

Accidental spills of fuels/hydrocarbons and washing down into the drainage pipe network has the potential to impact on the receiving hydrogeology.

The operation of the proposed development has the potential to cause a slight, adverse, temporary, residual impact on receiving watercourses/groundwater.

There is a potential for Watermain leaks which would increase the volume of water permeating through the underground soil strata.

The proposed stormwater storage tank will have an overflow outfall to the Broadmeadow River. This overflow outfall pipe will only function when the storage tank surcharges beyond the proposed 2,250m³ capacity of the tank. Flood mapping undertake by the OPW indicate that during a 1 in 10-year event at a node point circa 200m upstream if the proposed outfall location will have a flow rate if in excess of 36m³/second (refer to accompanying Flood Risk Assessment Report, Section 3), ensuring that any overflow outfall from the tank beyond a 1 in 5-year event will be discharging to a fast moving heavily diluted/surcharged river. The outfall waters (largely surface water) from the tank will result in a vast betterment when compared with the existing arrangement of uncontrolled discharge to the Ward and in turn Broadmeadow Rivers. In this regard, we refer you to the assimilation simulation evaluation reports prepared by Hydro-G and AWN, supplied under a separate cover, who respectively note:

- *"Based on assimilation capacity simulations, it can be concluded that the discharge is feasible, justifiable and defensible in the context of the objectives of EC Environmental Objectives (Surface Waters) Regulations Statutory Instrument S.I. No. 272 of 2009, as amended 2012, 2015, 2019. This conclusion is made because the simulations have been carried out to evaluate whether the proposed development would aid or hinder catchment efforts to improve the Status from the assigned Poor Status to the Regulatory requirement that is Good Status. Simulated resultant concentrations suggest potential for improvement in Status class as a result of the proposed infrastructure improvements."*
- *"As a stormwater storage tank, the projected tank will store stormwater that would otherwise be discharged unimpeded to the Ward River. The function of the storage tank activates when the current Irish Water foul water system overflows during heavy rainfall events and surface/storm water and foul water infiltration occurs. The tank therefore will capture the surface/storm water and foul waters that are generated during heavy rainfall events, stopping these mixed, deleterious waters from discharging directly to the river, and thereby reducing the potential for contaminants present in the mixed storm/foul water to enter the stream. In this way, the tank will improve the capacity of the network to prevent the discharge of pollutant material to the Broadmeadow river, and by extension, the Malahide Estuary SAC/SPA/pNHA.*
- *….. the Malahide Estuary SAC/SPA/pNHA is also not expected to be affected by the operation of the tank."*

Mitigation measures are discussed in detail in section 7.9 of this chapter.

7.6 Potential Cumulative Impacts

7.6.1 Existing Oldtown Development

There are no anticipated cumulative impacts arising from the existing Oldtown Development in relation to water other than those noted in section 7.5 above.

7.6.2 Future Development

The applicant is in control of the adjacent Oldtown & Mooretown lands to provide a consolidated development in north Swords. This current application relates to Phase 5 of the Oldtown lands north of Rathbeale Road. This Phase is the final Phase of Masterplan development within the Oldtown lands. There has been a carefully considered design approach to development to ensure that the subject application can be delivered to enhance and improve upon existing amenity.

The Oldtown Masterplan development successfully integrates and enhances the existing built fabric in north Swords.

There are no additional impacts to those noted in Section 7.5 above.

7.7 Do Nothing Scenario

In this scenario, surface water runoff would continue to be discharged at existing un-restricted discharge rates. The existing arrangement of uncontrolled surcharges from the public foul water network will remained unchanged. The receiving watercourses and groundwater aquifers would remain in their current state and there would be no change.

7.8 Risks to Human Health

There is a risk to Human Health should the ground water or the existing water supply become contaminated during the construction or operational stages, and the water is consumed. In order to mitigate these risks the measures outlined below will be adopted.

7.9 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.

7.9.1 Construction Stage

A Construction Management Plan has been prepared for this application and is included under a separate cover. It is considered that the Construction Management Plan (CMP) 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 results in contamination of receiving watercourses.
- Site personnel inductions are to be conducted such that all site personnel are made aware of the procedures and 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.
- Details of the headwall outfall construction methods, to prevent pollution of the Broadmeadow River during construction, are included in the Preliminary Construction Environmental and Waste Management Plan, which has been submitted under a separate cover.

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

All works will be undertaken with reference to the following guidelines:

- CIRIA C532: Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors (Masters-Williams et al., 2001).
- CIRIA C692: Environmental Good Practice on Site, (Audus et al., 2010)
- BPGCS005: Oil Storage Guidelines.
- CIRIA C648: Control of Water Pollution from Linear Construction Projects: Technical Guidance (Murnane et al., 2006a)
- CIRIA C648: Control of Water Pollution from Linear Construction Projects: Site Guide (Murnane et al., 2006a)
- Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters (IFI 2016)
- Guidelines for Planning Authorities – Architectural Heritage Protection – Guidance on Part IV of the Planning and Development Act 2000. (Part 2, Chapter 7) and ICOMOS Principles.

The schedule of mitigation presented within Table 7.5 summarises measures that will be undertaken in order to reduce impacts on ecological receptors within the zone of influence of the proposed development.

No.	Risk	Possible Impact	Mitigation	Result of Mitigation
1	Hydrocarbons from carparking area entering the watercourse.	Water quality impacts Reduction in habitat quality Mortality of aquatic key ecological receptors/qualifying interests	Designated parking at least 50m from any watercourse.	Ensures no soil disturbance or hydrocarbons leak near aquatic zone
2	Pollutants from site compound areas entering the watercourse.	Water quality impacts Reduction in habitat quality Mortality of aquatic key ecological receptors/qualifying interests	The site compound will be located at least 50m from any watercourse.	Prevents pollution of the aquatic zone from toxic pollutants
3	Pollutants from material storage areas entering the watercourse.	Water quality impacts Reduction in habitat quality Mortality of aquatic key ecological receptors/qualifying interests	Fuels, oils, greases and other potentially polluting chemicals will be stored in bunded compounds at the Contractor's compound or at a location at least 50m from any body of water. Bunds are to be provided with 110% capacity of storage container. Spill kits will be kept on site at all times and all staff trained in their appropriate use. Method statements for dealing with accidental spillages will be provided the Contractor for review by the Employer's Representative.	Prevents contamination of aquatic zone by toxic pollutants
4	Concrete/cementitious materials entering the watercourse from washdown.	Water quality impacts Reduction in habitat quality Mortality of aquatic key ecological receptors/qualifying interests	A designated wash down area within the Contractor's compound will be used for cleaning of any equipment or plant, with the safe disposal of any contaminated water.	Prevents contamination of aquatic zone by suspended solids or pollutants, ensures invasive species material is not transported off site
5	Concrete/cementitious materials entering the watercourse from concrete pours.	Water quality impacts Reduction in habitat quality Mortality of aquatic key ecological receptors/qualifying interests	Pouring of cementitious materials will be carried out in the dry.	Prevents contamination of aquatic zone by suspended solids or pollutants, ensures invasive species material is not transported off site

6	Leaching of contaminated soil into groundwater.	Water quality impacts Reduction in habitat quality Mortality of aquatic key ecological receptors/qualifying interests	Spill kits will contain 10 hr terrestrial oil booms (80mm diameter x 1000mm) and a plastic sheet, upon which contaminated soil can be placed to prevent leaching to ground water	Prevents contamination of aquatic zone by petrochemicals
7	Pollutants from equipment storage/refuelling area entering the watercourse.	Water quality impacts Reduction in habitat quality Mortality of aquatic key ecological receptors/qualifying interests	Any refuelling and maintenance of equipment will be done at designated bunded areas with full attendance of plant operative(s) within contained areas at least 50m from any watercourse	Prevents contamination of aquatic zone by petrochemicals
8	Runoff from exposed work areas and excavated material storage areas entering the watercourse.	Water quality impacts Reduction in habitat quality Mortality of aquatic key ecological receptors/qualifying interests	Contractor to prepare a site plan showing the location of all surface water drainage lines and proposed discharge points to the sewer. The plan will include the location of all surface water protection measures, including monitoring points and treatment facilities.	Prevents contamination of aquatic zone by suspended solids or pollutants.

Table 7.2 Measures to reduce impact on ecological receptors

7.9.2 Operational Stage

The implementation of the following operation stage mitigation measures will minimise the impact on the hydrology and hydrogeology aspects of the development lands, Oldtown Phase 5 .

- 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 existing Oldtown attenuation ponds.
- Flow restrictors with attenuation storage will be used to slowdown and store surface water runoff from discharging above green field rates to the Broadmeadow River.
- 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.
- Regular inspection and maintenance of the drainage network, including petrol interceptor.
- 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.
- The outfall from the stormwater storage tank headwall to the Broadmeadow River will be fitted with a tide-flex (or similar approved) non-return valve to ensure surcharge from the Broadmeadow River will not backfill into the proposed pipe and tank during extreme weather events.

- The outfall volumes from the stormwater storage tank to the Broadmeadow River shall be metered to record the frequency and duration/volumes of overflows.

7.10 Predicted Impacts of the Proposed Development

7.10.1 Construction Stage

Due to the proposed mitigation measures outlined above, and the implementation of a Construction Management Plan, the impact during construction stage on the hydrology and hydrogeological aspects of the lands is not significant.

7.10.2 Operational Stage

Due to the proposed mitigation measures outlined above many of the potential impacts will not arise during the operational phase of the proposed development on surface water and groundwater quality.

Surface water discharge from the Phase 5 site will be restricted by means of attenuation, therefore, no adverse impact in respect of flooding downstream will arise from the proposed development.

The installation of a Sustainable Urban Drainage System will ensure surface water runoff will be of high quality before discharge to the Proposed Phase 5 public surface water sewer. The proposed Phase 5 surface water sewer will flow via gravity to the existing Oldtown attenuation ponds via the existing Oldtown Phase 4 surface water sewer and will not have an impact on the receiving waters downstream of the development.

The impact following the operational phase mitigation measures outlined above is imperceptible.

The proposed stormwater storage tank will have an overflow outfall to the Broadmeadow River. This overflow outfall pipe will only function when the storage tank surcharges beyond the proposed 2,250m³ capacity of the tank. Flood mapping undertake by the OPW indicate that during a 1 in 10-year event at a node point circa 200m upstream if the proposed outfall location will have a flow rate if in excess of 36m³/second (refer to accompanying Flood Risk Assessment Report, Section 3), ensuring that any overflow outfall from the tank beyond a 1 in 5-year event will be discharging to a fast moving heavily diluted/surcharged river. The outfall waters (largely surface water) from the tank will result in a vast betterment when compared with the existing arrangement of uncontrolled discharge to the Ward and in turn Broadmeadow Rivers. In this regard, we refer you to the assimilation simulation evaluation reports prepared by Hydro-G and AWN, supplied under a separate cover, who respectively note:

- *"Based on assimilation capacity simulations, it can be concluded that the discharge is feasible, justifiable and defensible in the context of the objectives of EC Environmental Objectives (Surface Waters) Regulations Statutory Instrument S.I. No. 272 of 2009, as amended 2012, 2015, 2019. This conclusion is made because the simulations have been carried out to evaluate whether the proposed development would aid or hinder catchment efforts to improve the Status from the assigned Poor Status to the Regulatory requirement that is Good Status. Simulated resultant*

concentrations suggest potential for improvement in Status class as a result of the proposed infrastructure improvements."

- *"As a stormwater storage tank, the projected tank will store stormwater that would otherwise be discharged unimpeded to the Ward River. The function of the storage tank activates when the current Irish Water foul water system overflows during heavy rainfall events and surface/storm water and foul water infiltration occurs. The tank therefore will capture the surface/storm water and foul waters that are generated during heavy rainfall events, stopping these mixed, deleterious waters from discharging directly to the river, and thereby reducing the potential for contaminants present in the mixed storm/foul water to enter the stream. In this way, the tank will improve the capacity of the network to prevent the discharge of pollutant material to the Broadmeadow river, and by extension, the Malahide Estuary SAC/SPA/pNHA.*
- *….. the Malahide Estuary SAC/SPA/pNHA is also not expected to be affected by the operation of the tank."*

The impact following the operational phase mitigation measures outlined above facilitates the potential for improvement in Status class as a result of the proposed infrastructure improvements.

7.11 Worst Case Scenario

The worst-case scenario in relation to hydrology and hydrogeology during the construction phase would be the failure to implement the mitigation measures outlined above. This may result in the contamination of the receiving surface water network and / or groundwater.

In relation to the operation stage, the worst case would be the flooding of the surface water drainage network. In this regard, the network has been designed to accommodate a 20% increase in flows due to climate change. Finished floor levels have also been set with appropriate freeboard and an overland flood route through the site has been provided.

Implementation of the mitigation measures outlined in this document will reduce the risk of the worst-case scenario occurring, making this unlikely.

7.12 Monitoring

7.12.1 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 watermain telemetry, SUDS features, road gullies and, attenuation ponds during the construction phase of the development.

With this mitigation in place, the development will not result in significant adverse effects on the water environment during the construction phase of the development.

7.12.2 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.

Monitoring of the frequency and volume/duration of overflows from the proposed storage tank.

With this mitigation in place, the development will not result in significant adverse effects on the water environment during the construction phase of the development.

7.13 Reinstatement

No reinstatement is anticipated on site with respect to the Water environment.

7.14 Interactions

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

During construction stage, the connection of wastewater services has the potential to impact ground water 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 ground water and the bedrock geology is feasible. Any impact will be negligible as the aquifer is at low risk and is not considered to be regionally important. 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 Broadmeadow River. The mitigation measures ensure that surface water runoff is treated to the required standards so that downstream habitats are not negatively impacted.

7.15 Difficulties Encountered

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

7.16 References

- Environmental Impact Assessment Reports – Draft Guidelines, (2017), Environmental Protection Agency
- Environmental Protection Agency available at http://gis.epa.ie/EPAMaps/
- Geological datasets available at www.gsi.ie

- Greater Dublin Strategic Drainage Study (GDSDS), (2015), Dublin Drainage
- OPW Eastern CFRAM study
- OPW Flood Hazard Mapping

8.0 AIR QUALITY

8.1 Introduction

Chapter 8 of this Environmental Impact Assessment has been prepared by DKP Environmental (DKP_{EV}) and assesses the air quality impacts associated with the proposed development at Oldtown, Swords, Co. Dublin. The proposed residential development consists of 377 residential housing units, duplex and apartment blocks. This chapter examines the existing air quality in the vicinity of the development site and the potential impact of the proposed development during the construction phase and operational phase. The assessment includes recommended mitigation measures to control and minimise the impact that the development may have on local air quality. This assessment has been prepared in accordance with the EIA Directive 2014/52/EC and current Environmental Protection Agency (EPA) guidelines. This section should be read in conjunction with the site layout plans and project description sections of this EIAR.

8.2 Methodology

Research for this section included a review of the Air Quality Standards Regulations (S.I. 180 of 2011) and the EPA annual reports on air quality in Ireland. Predicted air quality emissions for the main traffic-derived pollutants have been modelled using the screening air quality assessment from the U.K Highway Agency Design Manual for Roads and Bridges (DMRB) and data from the transport Assessment undertaken for the residential development at Oldtown. Analysis for this chapter included a review of the following guidelines and recommendations:

- 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).
- Advice Note on Preparing Environmental Impact Statements – Draft (EPA, 2015).
- Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment 2013.
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment August 2018.
- Guidance on the Assessment of Dust from Demolition and Construction Version 1.1 (Institute of Air Quality Management (IAQM), 2014).

8.2.1 Legislation and guidelines

To reduce the risk of poor air quality impacts, National and European statutory bodies have set limit values in ambient air for a range of air pollutants. EU directives set baseline standards for monitoring air quality and reducing emissions. The applicable standards in Ireland include the Air Quality Standards Regulations 2011, which incorporate EU Directive 2008/50/EC, which has set limit values for a number of pollutants. These limits are for the protection of human health and are presented in Table 8.1. Air quality significance criteria are assessed on the basis of compliance with the standards.

Table 8-1. Air quality standards regulations (S.I.180)

Pollutant	Limit Value Objective	Averaging Period	Value Limit (µg/m^3)
Nitrogen Dioxide (NO_2)	Protection of Human Health	Calendar year	40
		1 hour	200
Benzene **Carbon Monoxide (CO)**	Protection of human health	Calendar year	5
	Protection of human health	Calendar year	10,000
Lead	Protection of human health	Calendar year	0.5
Sulphur Dioxide (SO_2)	Protection of human health	1 hour	350
Particulate Matter (PM_{10})	Protection of human health	24 hours	125
		24 hours	50
		Calendar year	40
Particulate Matter (PM_{25})	Protection of human health	Calendar year	25

8.2.2 National air quality network

The EPA is the authority with responsibility for ambient air quality monitoring in Ireland and measures the levels of a number of atmospheric pollutants. Ambient air quality monitoring is carried out in accordance with the requirements of the CAFE Directive which has been transposed into Irish national legislation by the Air Quality Standards Regulations 2011. For the purposes of detailing ambient air quality in Ireland, it is divided into four zones: Zone A: Dublin, Zone B: Cork, Zone C: Other cities and large towns, Zone D: Rural Ireland. In Ireland, the network is managed by the EPA in partnership with Local Authorities and other public/semi-state bodies. A series of monitoring stations are located across the country, these stations collect air quality data for public information.

The proposed development site is located within Zone A, Dublin. The EPA monitor at local sites and national sites. The nearest local EPA air quality monitoring station from the development site is Swords Council Depot, Co. Dublin. These local monitoring stations give people a rapid and up-to-date indication only, of air quality in their locality.

8.2.3 Dust deposition guidelines

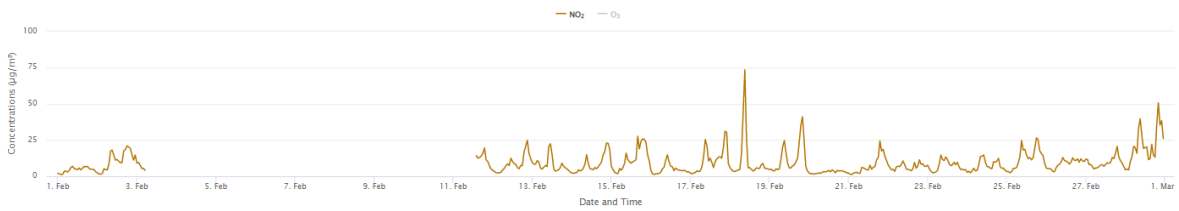
The concern from a health perspective is focussed on particles of dust which are less than 10 microns (PM10) and less than 2.5 microns (PM2.5) and the EU ambient air quality standards outlined in Table 9.1 have set ambient air quality limit values for PM10 and PM2.5. With regards to larger dust particles that can give rise to nuisance dust, there are no statutory guidelines regarding the maximum dust deposition levels that may be generated during the construction phase of a development in Ireland. Furthermore, no specific criteria have been stipulated for nuisance dust. With regard to dust deposition, there are currently no national or European Union air quality standards with which levels of dust deposition can be compared. To measure dust deposition a figure of 350 mg/m2/day (as measured using Bergerhoff type dust deposit gauges as per German Standard Method for determination of dust deposition rate, VDI 2129) can be applied to ensure that no nuisance effects will result. The IAQM guidelines outline an assessment method for predicting the impact of dust emissions from construction activities based on the scale and nature of the works and the sensitivity of the area to dust impacts.

8.3 Receiving Environment at Oldtown, Swords, Applewood

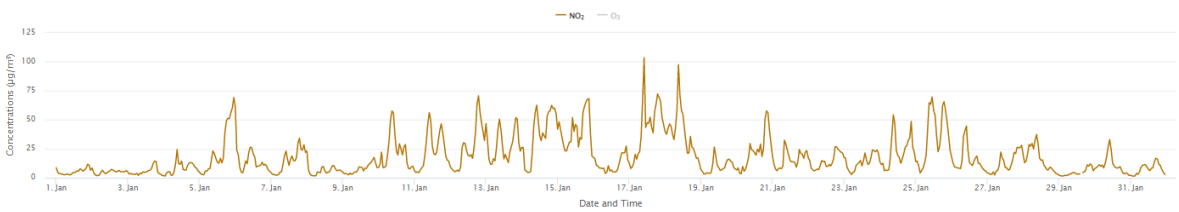
Swords is a large suburban town on the east coast of Ireland, situated circa 10km north of Dublin city centre and Applewood is located north-west of the centre of Swords. The Glen Ellan Distributor Road is the main road providing access into the area. The proposed development site borders existing residential estates to the east and south with Applewood community school located further south. Located west and north is existing agricultural open fields. The development area is located within an area which includes sources of transportation related air emissions principally from the R125 Rathbeale Road and local sources of domestic heating from nearby residential housing estates. There are currently no business activities which exceed EPA emission thresholds requiring an industrial IED or IPC license. The site is not in any immediate location of facilities that generate industrial emissions on a large scale. This means there are no existing industrial emissions of concern that would have an adverse impact on future resident's air quality at the proposed development.

8.3.1 EPA air quality monitoring results

The EPA publish annual reports on air quality in Ireland. These reports can be accessed via the EPA website at www.epa.ie. The most current EPA report 'Air Quality in Ireland 2020' has been examined in order to describe the existing air quality conditions and to provide information on background concentrations. The ambient air quality data collected and reviewed for the purpose of this study focused on the principal substances (NO2 and PM emissions) which may be released from the site during the construction and operation phases, and which may exert an influence on local air quality. The proposed Phase 5 residential development site is located within Zone A, the Dublin conurbation. The EPA monitor locally and nationally. The nearest local and national EPA air quality monitoring station from the development site is Swords Council Depot, Co. Dublin, approximately 3km away. Local monitoring stations give people a rapid and up-to-date indication only, of air quality in their locality. Local monitoring data for PM and NO2 can only be obtained up to a couple of months previous. The previous 4 months graphs for NO2 local emissions are illustrated below:

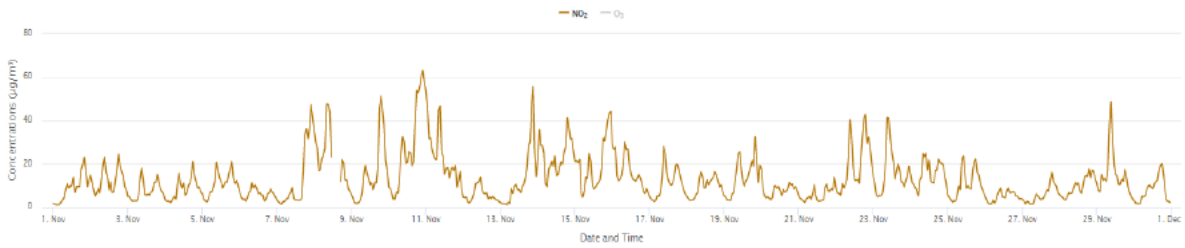


1st Feb – 28th Feb 2022 monitoring data. Copyright EPA



1st Jan – 31th Jan 2022 monitoring data. Copyright EPA

1st December - 31st December 2021 monitoring data. Copyright EPA



1st November - 30th November 2021 monitoring data. Copyright EPA

The national EPA air quality annual mean value concentrations measured at this monitoring site for 2020, 2019, 2018 and 2017 are shown in Table 8.2.

Table 8-2. Summary of data from the EPA ambient air monitoring report 2019, 2018 and 2017

Pollutant	2020 mean concentration (µg/m3)	2019 mean concentration (µg/m3)	2018 mean concentration (µg/m3)	2017 mean concentration (µg/m3)	4-year Average	Annual Limit for Protection of Human Health (µg/m3)
Sulphur Dioxide (SO2)	2.98 *	1.50 *	2.10 *	1.66 *	2.06	20
Particulate Matter (PM10) (With a diameter <10 microns)	13.10 *	14.5 *	14.10 *	12.40 *	13.53	40
Particulate Matter (PM2.5) (With a diameter <2.5 microns)	7.60 *	9.20 *	8.55 *	7.50 *	8.21	20
Nitrogen Dioxide (NO_2)	11.0	15.0	16.0	14.2	14.05	40
Carbon Monoxide (CO) (mg/m^3)	0.30 *	0.30 *	0.20 *	0.28 *	0.27	10
Benzene	0.52 *	0.16 *	0.30 *	0.92 *	0.46	5
Lead (Pb)	0.04 *	0.07 *	0.06 *	0.05 *	0.06	0.5
Ozone (O3)	53.0	53.0	54.0	51.7	52.3	120

* Swords monitoring station does not record all ambient air quality parameters outlined in the Directive. Therefore, air quality in the receiving environment was assessed using the average annual mean value concentrations from all measured monitoring stations in Zone A for that year.

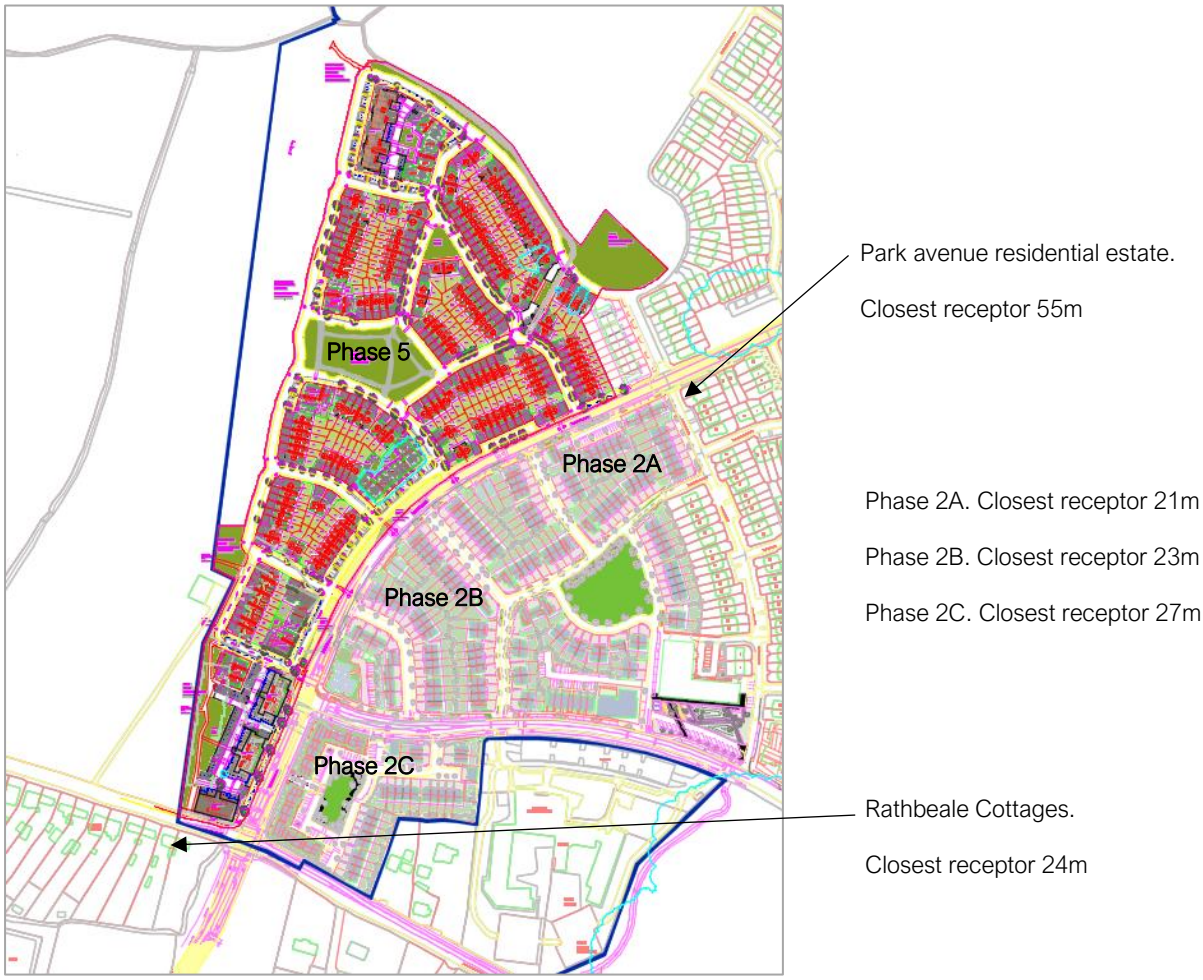
8.3.2 Significance of EPA results and receptors

The EPA data of 2020 (and pre lockdown levels in 2019) pollutants show air quality parameters are all below the air quality limit values. It can be seen that the existing baseline air quality at the site locality can be characterised as being good with no exceedances of the National Air Quality Standards Regulations limit values of individual pollutants. The quality of existing air quality at the subject site must be maintained and/or improved where possible.

8.3.3 Sensitive receptors

The principal local receptors, see image 8.1, that may be impacted by the development are existing residential dwellings to the east, Park Avenue residential estate, along Miller's Avenue Road located at a distance of 55m (closest dwelling). The existing residential dwellings located south, Rathbeale Cottages. The closest cottage located at a distance of 24m. Phase 2A, 2B and 2C are currently under construction.

Image 8-1. Principal local receptors



8.4 Impact Assessment

The proposed development is described in Section 2 of this EIAR. When considering a development of this nature, the potential impact must be considered for each distinct stage:

- the short-term impact of the construction phase and
- the longer-term impact of the operational phase.

During the construction stage the main source of air quality impacts will be as a result of fugitive dust emissions from site activities. The primary sources of air emissions in the operational phase are considered long term and will involve the change in traffic flows or congestion in the local areas which are associated with the development.

8.4.1 Predicted impact of the proposed development

8.4.1.1 Construction phase

The construction phase of the development has the potential to generate short term dust emissions and may have the potential to impact air quality in the short term. Dust emissions can lead to elevated PM10 and PM2.5 concentrations and may also cause dust soiling. The potential for dust to be emitted depends on the type of construction activity being conducted in conjunction with ambient conditions, including rainfall, wind speed and the distance to potentially sensitive locations. The majority of any dust produced during the construction phase may be deposited close therefore any potential impacts from dust deposition will typically be close to the source. There is a risk that dust can cause an impact at previously chosen sensitive receptors that are in close proximity to the source of the generated dust. It is not easy to accurately quantify dust emissions arising from construction activities. A semi-quantitative approach is recommended by the National Roads Authority (NRA) Guidelines 2011 to determine the likelihood of a significant impact. The construction assessment guidelines reproduced from the NRA guidance, are set out in Table 8.3

Table 8-3. Assessment criteria for the impact of dust from construction activities with standard mitigation in place (NRA 2011)

	Source	**Potential Distance for Significant Effects (distance from source)**		
Scale	Description	Soiling	PM10	Vegetation Effects
Major	Large Construction sites, with high use of haul routes.	100m	25m	25m
Moderate	Moderate Construction sites, with moderate use of haul routes.	50m	15m	15m
Minor	Minor Construction sites, with minor use of haul routes.	25m	10m	10m

While dust from construction activities tends to be deposited within 200m of a construction site, the majority of the deposition occurs within the first 50m. Some of the Phase 2A-2C dwellings, along Miller's Avenue are found within a distance range of 21-50m. Likewise, four of the Rathbeale Cottages, south is located within 50m of the site. Where dust impacts are likely, avoidance and mitigation measures will be put in place to reduce the impact levels such as wind breaks, barriers and frequent cleaning and watering of the construction site roads, further detailed mitigation measures discussed in section 8.6. Provided the dust minimisation measures outlined in the plan are adhered to, the air quality impacts during the construction phase will not be significant.

The significance of impacts due to vehicle emissions during the construction phase will be dependent on the number of additional vehicle movements, HGVs and the closeness of sensitive receptors to the site. Increases in levels to PM and pollutants related to increased traffic can be predicted however relative to baseline levels, the impact of the proposed development during construction will not have an adverse impact in concentrations over the limit of regulation values.

8.4.1.2 Operational phase

The design and construction of buildings in accordance with National Building Regulations (The Irish Building Regulations Technical Guidance Document L – Conservation of Fuel & Energy – Dwellings) will ensure that modern building materials are used and that they are designed to be thermally efficient resulting in a reduction in the volume of fossil fuels required to heat the buildings. In order to counteract the impact of the development on the existing and future air quality the design of the proposed residential apartments and houses has considered a number of sustainable heating and energy saving features.

The operational phase of the proposed development also has the potential to result in an impact on local air quality primarily as a result of the increased traffic movements associated with the development. It is envisioned that a proportion of the commuting residents will avail of Dublin Bus commuter services. The availability of public transport will significantly reduce the number of private vehicles exiting and entering the development. The DMRB screening air quality spreadsheet from the U.K Highway Agency Design Manual for Roads and Bridges, was used to assess the impact of increased traffic associated with the new development. Annual Average Daily Traffic Flow (AADT) information was obtained from Waterman Moylan Consulting on this project and has been used to model pollutant levels under various traffic scenarios to assess whether any significant air quality impact on sensitive receptors may occur.

Projected transport figures were used to predict the concentrations of traffic-derived pollutants in future years. The model then combined background concentrations of pollutants, sourced from the EPA reports (4-year average values were used). Results were generated using an average speed of 40 km/h assuming congested traffic conditions. 2 no. of neighbouring receptors were chosen, see receptor A and B on image 8.2 for their location.

Image 8-2. 2 no. neighbouring receptor locations, A and B.

In order to quantify the magnitude of change in pollutant concentrations, the descriptors in table 8.4 were used. To describe the significance of the impact, table 8.5 was then used. These descriptor tables are from the Transport Infrastructure Ireland Guidelines for the Treatment of Air Quality during the Planning and Construction of National Road Schemes which detail a methodology for determining air quality impact significance criteria for road schemes and has been adopted for this assessment. The degree of impact is determined based on both the absolute and relative impact of the proposed development. Results are compared against the 'Do-Nothing' scenario, which assumes that the proposed development is not in place in future years, in order to determine the degree of impact.

Table 8-4. Definition of impact magnitude for changes in ambient air pollutant concentrations.

Magnitude of Change	Annual Mean NO2 / PM10 (µg/m3)	No. of Days with PM10 concentration >50µg/m3	Annual Mean PM (µg/m3)
Large	Increase/decrease ≥4	Increase/decrease >4 days	Increase/decrease ≥2.5
Medium	Increase/decrease 2 - <4	Increase/decrease 3 or 4 days	Increase/decrease 1.25 - <2.5
Small	Increase/decrease 0.4 - <2	Increase/decrease 1 or 2 days	Increase/decrease 0.25 - <1.25
Imperceptible	Increase/decrease <0.4	Increase/decrease <1 day	Increase/decrease <0.25

Table 8.5: Air quality impact descriptors for changes in annual mean NO2, PM10 and PM2.5 concentrations.

Absolute Concentration in Relation to Objective /Limit Value	Changes in Concentration		
	Small	**Medium**	**Large**
Increase with Scheme			
Above Limit Value with Scheme (≥40µg/m3 of NO2 or PM10) (≥25µg/m3 of PM2.5)	Slight Adverse	Moderate Adverse	Substantial Adverse
Just Below Limit Value with Scheme (36-<40µg/m3 of NO2 or PM10) (22.5-<25µg/m3 of PM2.5)	Slight Adverse	Moderate Adverse	Moderate Adverse
Below Limit Value with Scheme (30-<36µg/m3 of NO2 or PM10) (18.75-<22.5µg/m3 of PM2.5)	Negligible	Slight Adverse	Slight Adverse
Well Below Limit Value with Scheme (<30µg/m3 of NO2 or PM10) (<18.75µg/m3 of PM2.5)	Negligible	Negligible	Slight Adverse

The results of the impact assessment arising from increased transport are presented in Table 8.6 and 8.7. The results predict the future air quality relative to the existing baseline.

Table 8.6: Modelled results for receptor A

Receptor A	Annual Average NO_2 ($\mu g/m^3$)	Annual Average PM_{10} ($\mu g/m^3$)	Annual Average ($\mu g/m^3$)Benzene	Annual Average CO ($\mu g/m^3$)
Background (2021)	14.05	13.53	0.46	0.27
Limits	40	40	5	10
Do Nothing (2030)	15.15	14.10	0.49	0.30
Increase	+ 1.10	+ 0.57	+ 0.03	+ 0.03
Magnitude	small	small	imperceptible	imperceptible
Description	negligible	negligible	Negligible	negligible
Do Something (2030)	16.11	14.55	0.54	0.34
Increase	+ 2.06	+ 1.02	+ 0.08	+ 0.07
Magnitude	medium	small	imperceptible	imperceptible
Description	negligible	negligible	Negligible	negligible

Table 8.7: Modelled results for receptor B

Receptor B	Annual Average NO_2 ($\mu g/m^3$)	Annual Average PM_{10} ($\mu g/m^3$)	Annual Average ($\mu g/m^3$)Benzene	Annual Average CO ($\mu g/m^3$)
Background (2021)	14.05	13.53	0.46	0.27
Limits	40	40	5	10
Do Nothing (2030)	15.39	14.14	0.49	0.30
Increase	+ 1.34	+ 0.61	+ 0.03	+ 0.03
Magnitude	small	small	imperceptible	imperceptible
Description	negligible	negligible	Negligible	negligible
Do Something (2030)	16.45	14.65	0.54	0.35
Increase	+ 2.4	+ 1.12	+ 0.08	+ 0.08
Magnitude	medium	small	imperceptible	imperceptible
Description	negligible	negligible	Negligible	negligible

8.4.1.3 Summary of modelling assessment

Levels of traffic-derived air pollutants for the development at receptor A and B show an expected increase in annual NO_2, PM_{10}, benzene and CO but each parameter remain well below the limit values for EU regulations and will not exceed the ambient air quality standards either with or without the proposed development in place. Using the assessment criteria outlined previously, the impact of the development in terms of PM_{10}, CO, NO_2 and benzene is negligible and would not result in a perceptible change in the existing local air quality environment.

8.5 Mitigation Measures

8.5.1 Remedial and Reductive Measures

Construction phase

Full details of the dust management plan can be found in Appendix 8.1. At all times, the procedures within the plan will be monitored and assessed. Summary of mitigation measures include:

- Avoid unnecessary vehicle movements and limit speeds on site so as to minimise the generation of airborne dust.
- Use of rubble chutes and receptor skips during construction activities.
- Site roads shall be regularly cleaned and maintained as appropriate, especially during dry and/or windy conditions. Any unsurfaced roads shall be restricted to essential site traffic only.
- A mobile wheel wash unit shall be installed at the site exit to wash down the wheels of all trucks exiting the site.
- The overloading of tipper trucks exiting the site shall not be permitted and aggregates will be transported to and from the site in covered trucks.
- Material handling systems and site stockpiling of materials will be designed and laid out to minimise exposure to wind, stockpiles holding fine or dusty elements including top soils shall be covered with tarpaulins. Water misting or sprays will be used as needed if particularly dusty activities are necessary during dry or windy periods.
- Where drilling or pavement cutting operations are taking place, measures to control dust emissions will be used to prevent unnecessary dust emissions by the erection of wind breaks or barriers.
- All vehicles which present a risk of spillage of materials, while either delivering or removing materials, will be loaded in such a way as to prevent spillage.
- A complaints log shall be maintained by the construction site manager and in the event of a complaint relating to dust nuisance, an investigation shall be initiated.

Operational phase

No additional mitigation measures are required as the operational phase of the proposed development as it is predicted the operational phase will not generate air emissions that would have an adverse impact on local ambient air quality. The government aims to promote sustainability by enhancing public transport with regular and ongoing increases in the public transport capacity, both road and rail and to reduce dependency on the use of the private car. The operational phase includes mitigation by design measures to minimise the impact of the development on air quality are as follows:

- Inclusion of electric car charging points to encourage electric vehicle ownership
- Proximity to public transport will reduce private vehicle use.

8.5.2 Monitoring

Construction phase: If the construction contractor adheres to good working practices and the mitigation measures are in place, the levels of emission generated are assessed to be minimal and are

unlikely to cause an impact on air quality during the construction phase, there is no monitoring recommended.

Operational phase: There is no monitoring recommended for the operational phase of the development as impacts to air quality are predicted to be negligible.

8.5.3 Cumulative effects

Construction phase

Should the construction phase of the proposed development coincide with the construction of any other potential development in the close locality then there is the potential for cumulative dust emissions to impact the nearby sensitive receptors. The dust mitigation measures outlined already should be applied throughout the construction phase of the proposed development, with similar best practice mitigation measures applied for other potential / permitted developments which will avoid significant cumulative impacts on air quality. With appropriate mitigation measures in place, the predicted cumulative impacts on air quality associated with the construction phase of the proposed development are deemed short-term and not significant.

Operational phase

If additional developments are built in the vicinity of the proposed development site in the future, this has the potential to add further additional vehicles to the local road network. However, as the air quality impact for the proposed development is predicted to be negligible and would not result in a perceptible change in the existing local air quality environment, due to the predicated increase in traffic, it is unlikely that other future developments of similar scale would give rise to a dissimilar impact on air quality.

8.5.4 Difficulties encountered in compiling the chapter

There were no difficulties met when conducting this assessment.

8.5.5 References

- EPA. Air Quality Monitoring Report 2019 (and previous annual reports)
- EPA. Ireland's Provisional Greenhouse Gas Emissions 1990 – 2019
- EPA Air Quality Index for health. AirQuality.ie
- Met Eireann (2021). Met Eireann website: www.met.ie
- TII (2011). Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes
- UK Highways Agency (2019b). UK Design Manual for Roads and Bridges (DMRB) Volume 11 Environmental Assessment, Section 3 Environmental Assessment Techniques, Part 14 LA 114 Climate
- Transport Infrastructure Ireland (TII) 2011 Guidelines for the Treatment of Air Quality during the Planning and Construction of National Road Schemes Revision 1.
- The Irish Building Regulations Technical Guidance Document L 'Conservation of Fuel & Energy Dwellings'

9.0 NOISE AND VIBRATION

9.1 Introduction

This chapter of this Environmental Impact Assessment has been prepared by DKP Environmental (DKPEV) and assesses noise and vibration impacts associated with the proposed development at Oldtown, Swords, Co. Dublin. The proposed residential development consists of residential housing units, duplexes and apartment blocks. This chapter will identify and assess the impact of the proposed development in terms of noise and vibration during the construction phase and operational use with particular attention to the nearby residential units. Increased traffic volumes associated with the subject site is likely to be the main impact source. Traffic volumes for the proposed scheme have been projected in Chapter 12 and therefore the noise impact assessment for the operational phase of the subject site will consider the cumulative impact of the existing and new predicted volumes.

This assessment was prepared in accordance with the EIA Directive 2014/52/EC and current EPA guidelines. This section should be read in conjunction with any guidance documents for the site and project description sections of this EIAR.

9.2 Research Methodology

9.2.1 Construction Noise Criteria

The level of environmental noise generated during the construction phase of any development is determined primarily by the exact construction methods employed. The level of the noise impact of these methods will arise from the specific sound power levels generated by the plant and machinery used, the duration of each particular construction activity, as well as the time and location in which the equipment is used. The potential sources of environmental noise during the construction phase of the development will primarily arise from increased traffic on the surrounding roads (from construction workers and delivery of plant and materials) and actual on-site works where plant and machinery will be deployed.

As at this point of time we do not have an any actual specific construction plan to outline details of plant and machinery to be used, materials, construction phasing and working hours) it is not possible to accurately model construction noise levels using the recommended standard ISO 9613:1996 - Acoustics, Attenuation of sound during propagation outdoors however a basic analysis of worst-case noise levels has been calculated. This basic calculation was based on the current construction methods applied on site to complete the works and assessed noise impacts for the anticipated construction equipment.
As we do not have any published statutory Irish guidance relating to the maximum permissible noise level that may be generated during the construction phase of a project however local authorities normally control construction activities by imposing limits on the hours of operation with certain noise limits at their discretion. For this report we applied the British Standard BS 5228-1:2009+A1: 2014 - Code of practice for noise and vibration control on construction and open sites.

BS 5228-1:2009+A1: 2014 sets out a method of calculating the propagation of sound towards a receiver from the use of certain construction plant and machinery on a construction site. The standard

describes single octave sound power level data for a range of standardised plant and machinery as would be expected to be the norm on construction sites.

9.2.2 Construction Vibration Criteria

During the construction phase of a development certain aspects of the site work may result in increased levels of vibration in the vicinity of the site. BS 5228-2:2009+A1:2014 - Code of practice for noise and vibration control on construction and open sites: - Part 2: Vibration, outlines a number of calculation methods for predicting peak particle velocity (PPV) resulting from construction works on open sites.

The prediction methods require specific information relating to the soil composition and compaction levels within the propagation path between the construction area and nearest receiver, as well as highly detailed information regarding the type and location of plant and machinery. As such specific data is not available a quantitative impact of vibration will not be undertaken as part of this assessment. Construction practices employed should have regard to best practice as recommended in the following standards and guidance:

- BS 7385-1 (1990) Evaluation and Measurement for Vibration in Buildings - Guide for Measurement of Vibration and evaluation of their effects on buildings.
- BS 7385-2 (1993) Evaluation and Measurement for Vibration in Buildings - Guide to damage levels from Ground borne Vibration.
- BS 5228-2:2009+A1:2014 - Code of practice for noise and vibration control on construction and open sites – Part 2: Vibration.
- BS 6472-1 (2008) Guide to evaluation of Human Exposure to Vibration in Buildings - Vibration sources other than Blasting.

9.2.3 Operational Noise Criteria

As we do not have any statutory limits, it is therefore necessary to reference appropriate best practice guidance and standards in order to determine the impact of the subject site on the noise climate in the surrounding area during the operational phase. It is important to note that the primary potential source of noise arising during the operational phase is that of road traffic associated with the increased population of the area.

For the calculation and assessment of road it has generally been best practice to assess road traffic noise on the basis of the LA10 18-hour parameter as outlined in the CRTN document. Transport Infrastructure Ireland (formerly the National Roads Authority (NRA)) have produced guidelines for national road schemes however in this development we do not have any national primary road hence this standard would not apply.

The World Health Organisation propose guideline values for the prevention of moderate and serious nuisance in outdoor areas as 50dB LAeq (16 hour) and 55dB LAeq (16 hour) respectively although a more appropriate criteria for assessing disturbance or annoyance from noise arising from the site would be related to the significance of changes in noise levels as perceptible to human beings.

The information in the table below is taken from the 'Guidelines for Noise Impact Assessment' produced by the Institute of Environmental Management and Assessment (IEMA). This document

replaces the draft guidelines published by the Institute of Acoustics (IOA) and IEMA in April 2002 and shows an appropriate impact.

Table 9.1. Noise Methodology

Change in Noise Level	Subjective Reaction	Impact Guidelines for Noise Impact assessment significance	Impact Guidelines on the Information to be contained in EIAR's
0 dB	No change	None	Imperceptible
0.1 to 2.9 dB	Barely perceptible	Minor	Slight
3.0 to 4.9 dB	Noticeable	Moderate	Moderate
5.0 to 9.9 dB	Up to a doubling or halving of loudness	Substantial	Significant
10 dB or more	More than a doubling or halving of loudness	Major	Profound

The following tasks were carried out in order to assess the noise impacts of the subject site on identified receptors during the operational phase of the scheme:

- A survey has been conducted to establish baseline noise levels or background noise levels at the nearest noise sensitive receptor surrounding the site.
- A calculation of anticipated noise levels arising at the nearest noise sensitive receptors due to current and forecast increases in traffic arising from the subject site as per basis of the LA10 18hour parameter as outlined in the CRTN document.
- An assessment of the cumulative calculated anticipated noise levels and potential impact upon noise sensitive receptors was carried out with reference to best practice guidelines in the assessment of environmental noise.

9.2.4 Vibration Assessment Criteria

There are generally accepted criteria for vibration levels that would be likely to lead to complaints and vibration levels that would be likely to lead to structural damage. These levels are outlined in the guidance documents BS6472: 1992 Guide to Evaluation of human exposure to vibration in buildings (1Hz to 80Hz), and BS7385: Part 2 1990: Evaluation and measurement for vibration in buildings - Guide to damage levels from ground-borne vibration.

9.2.5 Operational Vibration Criteria

Traffic has been identified as the only likely source of vibration during the operational phase of the scheme. In the case of nominally continuous sources of vibration, such as traffic, vibration is perceptible at around 0.5 mm/s PPV and may become disturbing or annoying at higher magnitudes. Currently no major sources of vibration exist on the site. It would therefore be appropriate to assume that negligible vibration impacts will occur during the operation of the subject site and no further assessment is deemed to be required.

9.3 Receptor Location Identification

In this chapter an assessment was made on receptor location having due regard to several considerations including:

- Determining the most exposed or nearest sensitive receptor (NSR) to potential sources of environmental noise related to current and future increases in traffic volumes.
- Ensuring that the number of receptors assessed would allow for sufficient baseline data to be obtained in the allocated background measurement period but also that the spatial spread of receptor locations was such that all locations in and around the subject site were assessed.

Table 9.2 below represents the background noise monitoring locations chosen and figure 9.1 highlights these monitoring stations on a site map.

Table 9.2. Noise Monitoring Locations

Measurement location	Location	Measurement Type	Justification
Station 1	Junction location with Rathbeale Road	Manual	To determine back ground noise levels
Station 2	Junction location with Millers Avenue	Manual	To determine back ground noise levels

Figure 9.1: receptor locations highlighted in yellow.

9.3.1 Calculated Noise levels

For the anticipated road traffic noise levels and cumulative noise levels the measured noise level data was applied and calculated on the basis of the LA10 18hour parameter as outlined in the CRTN document issued by Transport Infrastructure Ireland (formerly the National Roads Authority (NRA)). Using the Chapter 12 traffic report for the increased volume of traffic on the Rathbeale Road and Millers Avenue being the 2 no roads taking traffic in and out of the new proposed development.

9.3.2 Receiving Environment

Swords is a growing town in north County Dublin, Ireland. Phase 5 is the latest phase of the Oldtown development of Gerard Gannon Properties and is approximately 1km from the Swords town centre (Main Street). The phase 5 development site has existing residential units and under construction residential units mainly to the East. To the West and North the site is facing agricultural fields. To the south it faces the Rathbeale Road.

9.3.3 Back-ground Noise Survey

To assess the surrounding background noise levels, a daytime background noise survey was carried out on November 18th and 19th 2021 outside the covid lockdown period. During the survey the 2 attended stations were monitored and at each station three consecutive 15-minute measurements were recorded during the period from 08:00 to 13:00. The measurements taken are deemed to be representative of typical noise levels on the relevant roads.

The measurements have been performed using a Bruel & Kjaer Type 2260 sound level meter and Bruel & Kjaer 4231 sound level calibrator. All measurements were carried out in accordance with ISO 1996: 'Acoustics-Description and measurement of environmental noise'. Weather conditions during the survey were in line with the conditions described within ISO 1996, Acoustics 'Description and Measurements of Environmental Noise'. Weather conditions were rainy and cool with a moderate wind.

The following environmental noise parameters were measured which are defined below.

- **LAeq** is the A-weighted equivalent continuous steady sound level during the measurement period and effectively represents an average ambient noise value.
- **LAmax** is the maximum A-weighted sound level measured during the measurement period.
- **LAmin** is the minimum A-weighted sound level measured during the measurement period.
- **LA10** is the A-weighted sound level that is exceeded for 10% of the sample period; this parameter is typically used to quantify traffic noise.
- **LA90** is the A-weighted sound level that is exceeded for 90% of the sample period; this parameter is typically used to quantify background noise.

Typical ranges of noise levels are presented in the table below comparing against the baseline noise levels measured:

Table 9.3. Typical noise ranges

Sound level (dB (A))	Description of Activity
0	Absolute silence
25	Very Quiet
35	Rural night-time
55	Suburban roadway 0.5km away
70	Busy Restaurant
85	Very busy pub, voice is raised to be heard
100	Rock concert
120	Uncomfortably loud, conversation impossible
140	Noise causes pain in ears

9.3.5 Back-ground Noise Survey Data

The following 2 no. tables are the measured and calculated (average) background noise levels from the 2 no. monitoring locations.

Table 9.4. Noise survey data – Station 1

Station 1						
Time	LAeq	LAmax	LAmin	LA10	LA90	Comments
8.00	60	85	48	67	50	Mainly general traffic noise with occasional lorry for construction site main artery road
9.00	61	88	49	67	51	
11.00	58	80	47	62	49	
13.00	60	84	47	59	49	
Avg	60			63.5	50	

Table 9.5. Noise survey data – Station 1

Station 2						
Time	LAeq	LAmax	LAmin	LA10	LA90	Comments
8.00	57	88	46	64	47	Mainly general traffic noise with occasional lorry for construction site main artery road
9.00	58	88	47	65	49	
11.00	57	81	46	60	47	
13.00	56	82	46	59	46	
Avg	56			62	47.5	

9.3.6 Basic Noise Measurement Overview

During daytime periods average ambient noise levels were in the range 56 to 61dB LAeq Average background noise levels were in the range 46 to 51dB LA90 and average LA10 values, typically used to describe traffic noise were in the range 62 to 67dB, indicating that most of the measured noise levels would have arisen from traffic noise.

9.3.7 Background Vibration Survey

Only minor vibration was observed during the noise measurements and therefore it has not been considered necessary to undertake baseline vibration monitoring as there is no evidence to suggest that existing receptors are currently affected by appreciable environmental vibration.

9.3.8 Dublin Airport noise contour maps

EPA noise contour maps available show Lden and Lnight contours. Lnight is the A-weighted long-term average sound level for the night time period (23.00 to 07.00). Lden – is the A-weighted long-term average sound level for the day-evening-night noise indicator in decibels (24 hours).

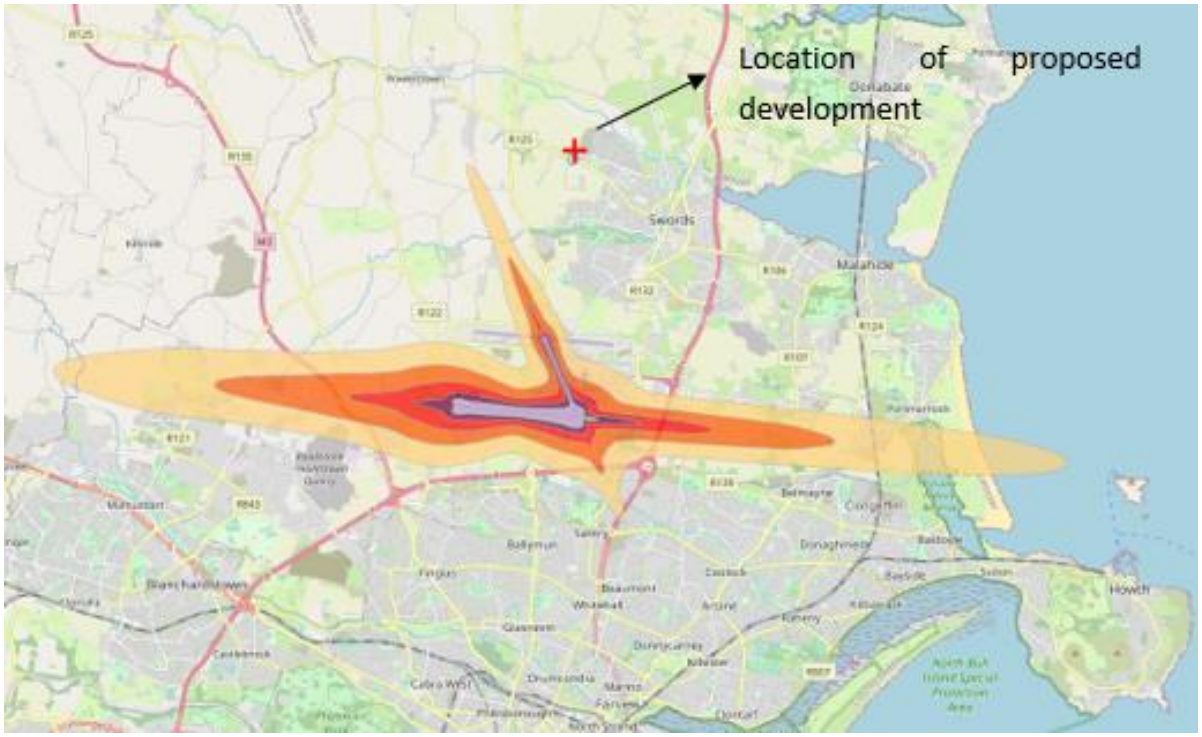


Figure 9.2: EPA airport noise map – Lnight Night time 23.00 – 7.00 noise map

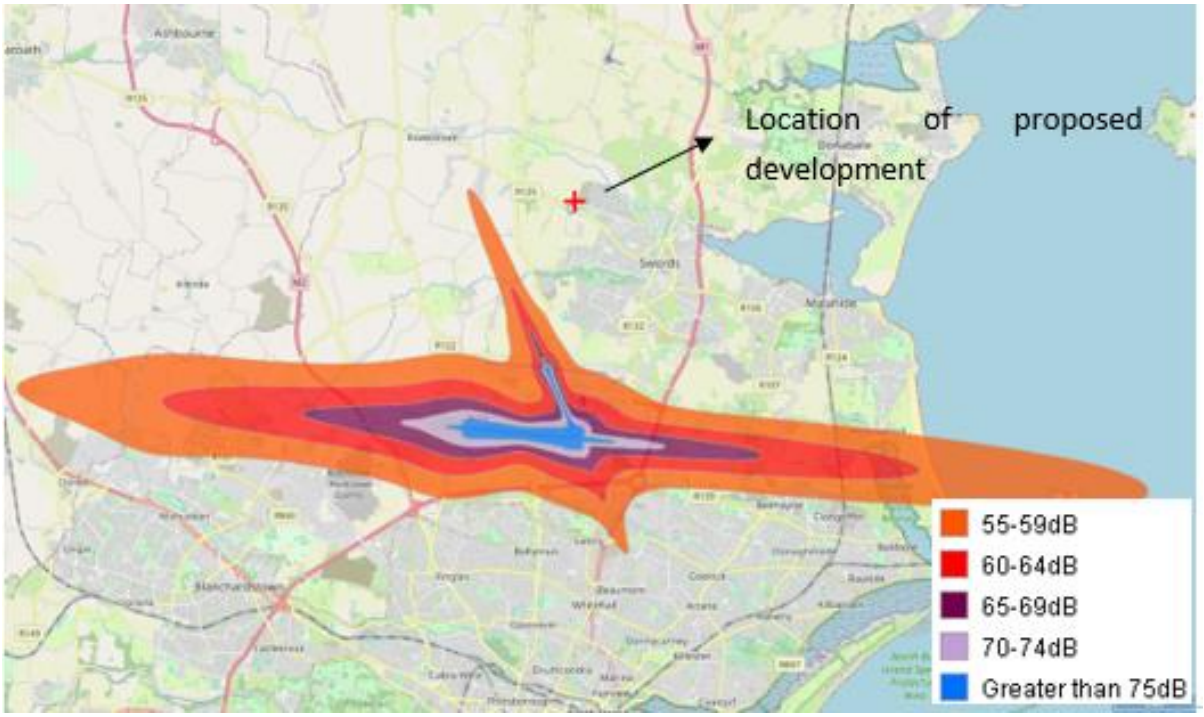


Figure 9.3: EPA airport noise map – Lden Day time 7.00 – 23.00 noise map

These strategic noise mapping of Dublin airport indicate that the proposed development site in Oldtown is located outside the area of Dublin Airport's noise contour map. Fingal County Council's County Development Plan 2017 - 2023 has defined noise zones A-D, with zone A having the most potential for noise exposure during airport operations. The new proposed development site at is located in zone D, where the zone is identified as 'likely to be acceptable from a noise perspective'.

9.4 Characteristics of the Proposed Development

The proposed development is for residential use and consists of dwelling houses and apartments spread over multiple blocks with a total of 377 units.

9.5 Potential Impact of the Proposed Development

The anticipated noise impacts on the surrounding environment must be considered for both the short-term impact of the construction phase and the operational phase.

9.5.1 Construction Phase

Short-term noise impacts are only to occur during the construction phase of the development due to the requirement to use plant and machinery on and to the construction site. In the absence of specific construction information regarding the construction stage, construction noise impacts cannot be fully quantified at this point, therefore sample calculations have been provided. Minor short-term vibration impacts may occur during the construction phase as a result of the use of heavy plant and machinery; however, these impacts will be unlikely to propagate beyond the construction site boundary.

9.5.2 Operational Phase

As per measured noise level data the main potential noise source that would be evident during the operational phase of the development would be that of increased road traffic noise associated with the subject site. In general, this can be categorised as:

- Residents small vehicular traffic in and out of the development site.
- Delivery and service vehicles servicing the dwelling houses.
- General activities, landscape maintenance, cleaning, energy producing equipment etc.
- Vibration is not anticipated to be a contributing factor in the operational phase.

9.6 Predicted Impact of the Proposed Development

9.6.1 Construction Noise

Using the method outlined in BS5228, a worst case LAeq value at potential NSRs at distances of 100m, 150m, 200m and 250m have been calculated for a range of construction plant. The following plant has been applied to give an example of the potential construction noise levels:

- Heavy delivery trucks.
- Ground works excavators.
- Noisy construction plant (mixers, vibrators).

We have used BS 5228-1:2009+A1: 2014 to anticipate/calculate the construction noise levels in the proposed development. This methodology relates to the method for construction vehicles/plant in a defined construction area. The prediction of the LAeq from construction plant operating over a small area or on site can be used for other activities when items of construction plant are operating in close proximity to the reception point, taking into account the adjustment of the predicted LAeq for standing and idling time of the plant. It is assumed that over a 1-hour period, all construction plant

will be operational for 80% of the time. The results of these calculations are presented in the tables below.

Table 9.6. Noise levels of construction plant

Noise Source	Sound Power LWA dB
Heavy delivery truck	102
Ground works excavator	100
Noisy construction plant (mixers, vibrators)	106

Distance of Potential NSR from construction site	Predicted Noise levels at NSR LAeq dB	BS5228-1 (2009)	
		Monday-Friday (07.00–19.00)	Saturday (07.00–13.00)
100m	**59**	**70**	**65**
150m	**56**		
200m	**53**		
250m	**51**		

As most of the construction sites will generally be within 100m of an occupied building the results of the indicative construction calculations shows that the resultant LAeq (1 hour) values of using such construction plant and vehicles would be in the region of 59db LAeq and below the maximum allowable day time ambient level of 70dB LAeq. BS5228-1 (2009) +A1: 2014 specifies that a daytime limit of 70dB LAeq shall apply on weekdays and a daytime limit of 65dB LAeq shall apply on Saturday.

The ambient noise levels at the nearest noise measurement location with construction noise (NSR2) are comfortably below the BS5228-1 limits and will be short-term in duration also. The construction phase generally has no noticeable change on the noise environment in the longer term.

9.6.2 Construction Vibration

We only anticipate minor temporary ground borne vibration events during the construction phase, but the exact impact of these vibration impacts cannot accurately be quantified.

9.6.3 Operational Noise

The anticipated noise impacts from the overall development during its operational phase will mainly be as a result of increased small vehicle traffic flows along the incoming and outgoing routes into the proposed development site. It is anticipated that the additional road traffic noise attributable to the development (cumulatively with existing Rathbeale Road and Millers Avenue traffic) will result in an increase in the baseline noise environment by 1.0 to 1.25 dB(A) at the Rathbeale Road junction entrance and by 1.25 to 1.5 dB(A) at the proposed (most Northern) Millers Avenue junction.

The change in noise levels and the significance of such changes can be categorised by the Guidelines for Noise Impact Assessment, Institute of Environmental Management and Assessment. The table below details the impact/category.

Table 9.7. Noise impact guidelines

Change in Noise Level	Subjective Reaction	Impact Guidelines for Noise Impact assessment significance	Impact Guidelines on the Information to be contained in EIAR's (EPA)
0 dB	No change	None	Imperceptible
0.1 to 2.9 dB	Barely perceptible	Minor	Slight
3.0 to 4.9 dB	Noticeable	Moderate	Moderate
5.0 to 9.9 dB	Up to a doubling or halving of loudness	Substantial	Significant
10 dB or more	More than a doubling or halving of loudness	Major	Profound

Based on the table above and the anticipated increase in noise levels we deem the operational noise impact to be categorised as 'Slight' at the worst case. The increase in traffic associated with the proposed development scheme is therefore not expected to give rise to any significant noise nuisance in the area. We note that as part of the Government Climate Change action plan that petrol and diesel passenger vehicles are being phased out and replaced by quieter electric vehicles eventually leading to less operational noise.

9.6.4 Operational Vibration

Operational vibration is deemed not to have any noticeable impacts on the development.

9.7 Remedial and Reductive Measures

DKPEV do not anticipate the requirement of any remedial measures but list the following recommendations mainly for the construction sites:

- Ensure that the local authority guidelines or planning directives to noise levels and operational times are adhered too.
- Prepare a construction phase operational plan with regards to limiting noise nuisance.
- Ensure all construction vehicles and plant are regularly maintained including any noise
- control measures such as attenuators, filters etc.
- Limit any construction noise spreading to neighbouring site by erecting temporary noise barriers (site boundary hoarding).
- Schedule particular high-level noise activities for times when increased noise levels are less sensitive or notify neighbouring residents or any sensitive sites.

9.8 Monitoring

No noise monitoring is deemed necessary for the operational phase however noise monitoring will most likely be a requirement as directed by the local authority for the construction phase based on the local authorities imposed limits on the hours of operation and noise limits. No vibration monitoring is deemed necessary for both the operational and construction phase.

9.9 Cumulative effects

Construction phase

The construction noise assessment in the previous sections represents the worst-case scenario's and it is very unlikely that the same noise/vibration event would happen to coincide at the same time of other potential developments giving rise to a theoretical increase in predicted noise levels. However, the impact of any predicted cumulative noise or vibration levels is assumed not to exceed the worst-case scenario and is temporary, negative, and deemed not significant.

Operational phase

The anticipated noise impacts from the development during the operational phase will mainly be as a result of increased vehicle traffic flows along the incoming and outgoing routes into the proposed development site. It is anticipated that additional road traffic noise attributable to the potential of other permitted developments will result in an increase in the baseline noise environment.

The change in noise levels and the significance of such changes can be categorised by the Guidelines for Noise Impact Assessment, Institute of Environmental Management and Assessment. The table in section 9.6.3 details the impact/category. Based on these guidelines the anticipated increase in noise levels can be categorised as 'Slight' at the worst case. The increase in traffic associated with the proposed development scheme together with other potential developments is therefore not expected to give rise to any significant noise nuisance in the area. We note that as part of the Government Climate Change action plan that petrol and diesel passenger vehicles are being phased out and potentially replaced by quieter electric vehicles eventually leading to less operational noise.

Traffic has been identified as the only likely source of vibration during the operational phase of the scheme. In the case of nominally continuous sources of vibration, such as traffic, vibration is perceptible at around 0.5 mm/s PPV and may become disturbing or annoying at higher magnitudes. There may, in theory, be a small increase (+/-10%) in vibration levels as a result of increased traffic from the other potential developments, however, it would still be appropriate to assume that negligible vibration impacts will occur during the operation and no further assessment is deemed to be required. The cumulative noise / vibration impact is determined to be not significant.

10.0 CLIMATE

10.1 Introduction

Chapter 10 of this Environmental Impact Assessment has been prepared by DKP Environmental (DKPEV) and assesses the effects of the proposed development on Carbon Dioxide (CO2) emissions effecting the current climatic conditions. The proposed development at Oldtown, Swords, Co. Dublin consists of residential housing units, duplex, and apartment blocks. This section will identify and assess the impact of the proposed development in terms of CO2 emissions during the construction phase and when in full operational use.

We note that although the construction phase contributes to CO2 emissions through the type of construction methods, choice of materials, transport / traffic requirements etc its impact compared with the operational use is minimal. This assessment was prepared in accordance with the EIA Directive 2014/52/EC and current EPA guidelines.

10.2 Research Methodology

CO2 is the largest and most important contributor to climate change. Methane, nitrous oxide, other gases, and ozone are also important greenhouse gases. CO2 is particularly important owing to its role in the global carbon cycle, which is central to life on Earth. This cycle is being significantly disrupted by the combustion of fossil fuels. Consequently, CO2 is accumulating in the atmosphere, where it is the key driver of global climate change. It is difficult to accurately apportion any increase in CO2 emissions as a result of the proposed development at Oldtown to any specific climate impacts other than noting that any increase large or small will more than likely also effect the climate or climate change.

We have therefore concentrated the report on the proposed development's CO2 emission impact and methods to reduce this to a minimum on both the construction and operational stages in line with Ireland's National Policy Position on 'Climate Action and Low Carbon Development'.

10.2.1 Climate Policy

The National Policy Position on Climate Action and Low Carbon Development was published on in April 2014 but was updated with the government's latest plan in January 2021. The policy sets a fundamental national objective to achieve transition to a competitive, low-carbon, climate-resilient and environmentally sustainable economy by 2050. The National Policy Position envisages that development of National Mitigation Plans will be guided by a long-term vision of low carbon transition based on aggregate reduction in CO2 emissions of at least 80% compared to 1990 levels by 2050 across the construction and transport section relative to this planning application.

10.2.2 Transport

Transport / road transport is currently the second largest contributor of greenhouse gas emissions (after agriculture) at +/- 20%. Between 1990 and 2015, the transport sector showed the greatest overall increase of +/- 130% and increases are linked to economic prosperity with year-on-year

increases observed up to 2007 followed by six years of year on year decrease during the economic downturn.

The latest EPA projections from 'An Integrated Assessment 2020' state greenhouse gas emissions from transport accounted for 20.3 per cent of Ireland's total national emissions in 2019. EPA projections indicate that transport emissions are projected to decrease by 38.6 per cent over the period 2021-2030 to 7.6 Mt CO2 eq under the 'with additional measures' scenario, which assumes that 936,000 electric vehicles, including approximately 840,000 passenger cars, will be on the road by 2030.

10.2.3 Residential

Emissions from the residential sector have fluctuated in the period 1990 to 2015 but overall, the 2015 emissions are +/- 20% lower than their 1990 level. Initially there was a sharp reduction in emissions in the early 1990's from residential fuel switching to cleaner fuels. The increase in housing stock drove a gradual upward trend in the emissions from the residential sector after 1998 to reach a peak in 2010. For the residential sector under the various (energy reduction) schemes the CO2 emissions are targeted to be reduced by 60% for new dwellings mainly through the implementation of the new Nearly Zero Energy Building (NZEB) regulations (Part L 2017 for non-residential units and Part L 2019 for residential units) and increased use of renewable energy.

The latest EPA projections from 'An Integrated Assessment 2020' state emissions are projected to decrease by 52.4 per cent between 2021 and 2030 to 2.9 Mt CO2 eq under the 'with additional measures' scenario. This scenario assumes full implementation of the measures in Ireland's Climate Action Plan, including upgrades to homes and significant supports for heat pumps.

10.3 Receiving Environment

Swords is a growing town in north County Dublin, Ireland. The proposed development (Phase 5) is the latest phase of the Oldtown development of Gannon properties and is approximately 1km from the Swords town centre (Main Street). The phase 5 development site has existing residential units and under construction residential units mainly to the East. To the West and North the site facing agricultural fields. To The south it faces the Rathbeale Road.

10.4 Potential CO2 Emission Effect

The CO2 impact in this development is affected by the construction phase and operational residential phase with the latter dominating the emissions. In essence any new development will add to existing CO2 emissions until we have managed to construct & operate at zero emissions however in the meantime it is key to limit the additional CO2 emissions to a minimum.

10.4.1 The construction phase baseline

The base line construction transport CO2 data is based on an average 4,500km of vehicular movement of HGV's (50%), LGV's (35%) and private cars (15%) with a combined average carbon output of 255 gr/km/CO2 taken from the Irish Construction Federation statistics resulting in emission totalling +/- 1100 kg CO2 for the construction period.

The base line embodied CO2 data is taken from the data base available from the university of Bath CO2 embodied carbon dioxide tables with a typical average residential unit (90m2) to embody +/- 23,000 kg CO2 using typical traditional building materials.

Table 10.1: Construction phase base line CO2 emissions

Construction phase base line CO2 emissions	Life cycle impact	Single unit
	emission rate	emission
	kgCO2/m2	ton-CO2
	baseline	baseline
Construction transport	0.23	1.1
Construction embodied CO2	4.8	23.0
Total impact	5.0	24.1

10.4.2 Operational Phase

The operational phase of the buildings also has 2 no typical CO2 emission sources: Transport and energy mainly for heating/hot-water use. During the operational phase a residential development emits CO2 through vehicular traffic into and out of the development and energy usage within the buildings. Vehicular impact is mainly addressed using a predicted traffic count based on general transport use for a residential development taking in account any proposed central locations for schools, social / recreational spaces, and the inclusion of options for pedestrian and bicycle movement with a view to encouraging public transport. We note that the Governments Climate Change policy sets out to phase out petrol and diesel cars by 2030 hence this will result in a significant CO2 reduction it is envisaged at least 936,000 electric vehicles, both passenger and commercial, will be on the road by 2030 with additional charging infrastructure to cater for planned growth. Transport emissions from the residential sector have fluctuated in the period 1990 to 2015 but overall, the 2015 emissions are +/- 20% lower than their 1990 level. Initially there was a sharp reduction in emissions in the early 1990's from residential fuel switching to cleaner fuels. The increase in housing stock drove a gradual upward trend in the emissions from the residential sector after 1998 to reach a peak in 2010.

CO2 emissions from energy supplies to buildings is the more significant part of the overall operational development operational contribution. The main energy supply CO2 emissions in residential developments come from providing space heating and domestic hot-water heating. In recent years great strides have been made with regards to reducing energy for space heating using efficient technologies (heat pumps, photovoltaic solar panels) however hot-water heating is determined mainly by its use and therefore reductions are harder to achieve.

The operational phase of a building is much longer than the construction phase with the standard building life cycle period of 60 years. As a result of the much longer operational phase any reductions made to this have significant impacts on the CO2 emissions over the life cycle period of the building.

10.4.2.1 Operational Phase base line

The base line construction transport CO2 data for residential vehicular movement CO2 emissions are based on an average of 10,000km/year per residential unit with a current vehicular output of 175

gr/km to represent private and LGV's manufactured between 2005 and 2022 resulting in a yearly emission of 1750 kg/CO2/year or 1.75 ton-CO2/year.

The base line CO2 emissions from energy supplies to buildings is the more significant part of the overall development's operational phase contribution. Using the national software for CO2 emissions attributed to energy supplies for a typical 90m2 residential unit the emissions of a standard reference unit 5150 kg/CO2/year or 5.15 ton-CO2/year. We note the

Table 10.2: Operational phase base line CO2 emissions.

Operational phase base line CO2 emissions.	Life cycle impact	Single unit
	emission rate	1 year
	kgCO2/m2	ton-CO2
		baseline
Transport	21.9	1.75
Energy (heat & hot water)	64.4	5.15
Total impact	86.3	6.90

Transport emissions personal and delivery vehicles are being reduced through EU and national initiatives and regulation on a continuous basis. CO2 emissions from cars are regulated through EU legislation which sets statutory maximum emission targets for new vehicles currently set to achieve an average of 95 grams of CO2 per km in 2022 compared to the current average vehicular emission rate of 175 gr/km.

10.5 Minimizing CO2 Emissions

The following sections are reduction measures implemented in the project's CO2 emission calculations to illustrate the effects of such reductions on the environment.

10.5.1 Construction phase transport

CO2 reduction measures to minimise impacts from transport during the construction phase include the following:

- Local sourcing of construction materials such as the recycling of material from excavations for reuse on site.
- Implementation of the Traffic Management Plan to minimise congestion and queuing, reduce distances of deliveries and eliminate unnecessary loads.
- Reducing the idle times by providing an efficient material handling plan that minimises the waiting time for loads and unloads. Reducing idle times could save up to 10% of total emissions during construction phase.
- To turn off engines when machinery is not required to operate in the relative short term unless this is an issue for security or functionality reasons.
- Periodic maintenance of plant and equipment.
- Technical inspection of vehicles to ensure they will perform the most efficiently.
- Possible use of electric construction equipment / vehicles.

10.5.2 Construction phase Embodied CO2

Embodied CO2 is the amount of carbon dioxide a material emits to the environment per unit (weight / volume) including its exploration, manufacturing process, transport to site, its 60-year use and end-of -life requirements also known as the Cradle-to-Grave impact. Embodied CO2 is attributed to all materials to be used on site and by minimising or avoiding certain materials the impact on CO2 emissions can be reduced by:

- Increasing the use of locally available recycled materials.
- Reducing the use of materials with a high embodied CO2 element.
- Increasing the use of "green" concrete (Granulated Blast Furnace Slag to replace Portland cements as the latter has significant embodied CO2.)
- Reducing the use of metals. Metals generally contain the highest embodied CO2 element of all materials mainly due to their exploration and manufacturing processes.

10.5.3 Operational phase transport

Transport emissions personal and delivery vehicles are being reduced through EU and national initiatives and regulation on a continuous basis. CO2 emissions from cars are regulated through EU legislation which sets statutory maximum emission targets for new vehicles currently set to achieve an average of 95 grams of CO2 per km in 2022. The following is applied to lower CO2 emissions as a result of transport:

- Encourage the use of electric cars.
- Encourage the use of new low CO2 petrol cars.
- Utilise available fiscal measures for the use of electric vehicles or renewable fuels.
- Design and plan the overall project in such manner as to encourage walking and cycling.
- Design and plan certain required facilities like schools, medical centres, shopping areas recreational spaces, within the development to lower the need to use motorised vehicles.
- Design and plan public transport routes throughout the development to encourage the use of public transport.

10.5.4 Operational phase energy CO2 Emissions

Under the new building regulation requirements (NZEB), in not so many words, the electrical and thermal energy systems in buildings must be designed and constructed to deliver at least a 70% primary energy reduction and a 60% CO2 reduction over the Part L reference dwelling and have at least 20% primary energy equivalent energy coming from on-site produced renewable energy.

To achieve these reductions to following outline specification can be applied:

- Ground floors: U <= 0.110 W/m2K
- External walls: U <= 0.150 W/m2K
- Party walls: U= 0.0 W/m2K (solid party wall)
- Roofs: U <= 0.125 W/m2K
- Window & frame: U <=1.20 W/m2/K, Solar transmittance <= 0.64
- External (unglazed) door & frame: U <= 1.2 W/m2K

- Cold bridging: U <=0.08 W/m2K special construction joints applied.
- Thermal mass: TP250
- Ventilation: Humidity controlled natural ventilation / intermittent extracts or full MVHR.
- Air tightness: Design assumption <= 2.75 m3/m2*h
- Lighting: 100% LED
- Controls: Time clock/ thermostatic control for each separate heating/hot-water zone
- Circulation pumps: Class A variable speed pump
- Heating / hot-water system: Air source heat pump / exhaust air heat pump.
- Renewable energy: Air source heat pump / exhaust air heat pump.

10.6 Effects of reductions measures.

Applying the suggested reduction measures listed in sections 10.5.1,-2,-3 and -4 effects the construction and operational phase emissions for a single unit and for the total combined number residential units tabled below. The total 377 no. of units is made up of 173 no. houses, 70 no. duplexes and 134 no. apartments with an average unit floor plate of 92.7m2.

10.6.1 Construction phase.

Table 10.3: Construction phase base line CO2 emissions and effects of reductions

Construction phase base line CO2 emissions and effects of reductions	**Life cycle impact**		**Single unit**		**377 units**	
	emission rate		emissions		emissions	
	kgCO2/m2		ton-CO2		ton-CO2	
	baseline	reduced	baseline	reduced	baseline	reduced
Construction transport	0.23	0.20	1.1	1.0	414.7	363
Construction embodied CO2	4.8	4.0	23.0	19.0	8671	7154
Total impact	5.0	4.2	24.1	19.9	9085.7	7516

We note the reduction of 12.5% on transport and 17.5% on embodied CO2 reductions to result in a reduction of 4.2 tonCO2 for a single unit and a reduction of 1,569 tonCO2 for the 377 units. The emission rate for the construction phase was reduced from 5.0 kgCO2/m2 to 4.2 kgCO2/m2 or an overall reduction of 17.3%.

10.6.2 Operational phase.

Table 10.4: Operational phase base line CO2 emissions and effects of reductions.

Operational phase base line CO2 emissions and effects of reductions.	**Life cycle impact**		**Single unit**		**377 units**	
	rate / m2		1 year		1 year	
	kgCO2/m2		ton-CO2		ton-CO2	
	baseline	reduced	baseline	Reduced	baseline	reduced
Transport	21.9	19.0	1.75	1.52	659.75	574
Energy (heat & hot water)	64.4	18.0	5.15	1.44	1941.55	544
Total impact	86.3	37.1	6.90	2.96	2601.3	1118

We note the reduction of 13.0% on transport and 72.0% on energy CO2 reductions to result in a reduction of 3.9 tonCO2 per year for the average single unit totalling 1,484 tonCO2 / year for 377 units. Over the 60-year life cycle of the building this represents a reduction of 236.1 tonCO2 for a single unit and a total of 89,021 tonCO2 for the 377 units. The emission rate for the construction phase was reduced from 86.3 kgCO2/m2 to 37.1 kgCO2/m2 or an overall reduction of 57.0%.

10.7 National 2022 and 2030 CO2 emissions.

The impact on Irelands current and 2030 predicted CO2 emissions are based on the EPA data issued in their "Greenhouse Gas Emissions projection report 2020-2040" report. For this chapter we have targeted the current and 2030 data being the first major milestone for European. The emissions are expressed in Mt or one million (Mega) tons.

Table 10.5: National overall CO2 emissions in 2022 and 2030.

EPA CO2 emission data	**National emissions**
	Mt-CO2/year
2022 emissions	60
2030 emissions	58
2030 emission with additional measures	47.5

10.7.1 Proposed development CO2 emissions.

Using the data from tables 10.3 and 10.4 we have calculated to CO2 emissions using the same unit (Mt-CO2/year) as the National CO2 emission table (10.5) to get a better idea of the actual impacts. For this chapter for now we assumed the emissions of the construction phase to be executed in one year (2022).

Table 10.6: Proposed project CO2 emissions in 2022 and 2030.

Total project CO2 emissions	377 units	377 units	377 units
	construction	operational	combined
	Mt-CO2 /year	Mt-CO2 /year	Mt-CO2 /year
2022	0.00752	0.00112	0.00863
2030	0.00000	0.00112	0.00112

10.7.2 Effects of the proposed project CO2 emissions on the national emissions.

Using the data from tables 10.5 and 10.6 we have calculated to CO2 emissions from the proposed project and compare these with the National (EPA) listed emissions for 2022 and 2030.

Table 10.7: Effect of proposed project CO2 emissions on national emissions in 2022 and 2030.

Project CO2 emission impact on National emissions	National emissions Mt-CO_2 /year	377 units emissions Mt-CO_2 /year	fraction %
2022	60	0.00863	0.01439
2030	58	0.00112	0.00193
2030 with additional measures	48	0.00112	0.00235

The national impact:

The impact of this 377-unit development/phase of 0.00863 Mt-CO2 on Ireland's current emissions (2022) @ 60 Mt-CO2/year represents an increase of 0.01439%.

The impact of this 377-unit development/phase of 0.00112 Mt-CO2 on Ireland's projected 2030 emissions @ 58 Mt-CO2/year represents an increase of 0.00193%.

Based on the above findings we note the impacts on the national CO2 emission at worse to be very fractional. CO2 emission from the construction and operational phase have been reduced to a minimum and the impact on National emissions for the construction phase are therefore deemed to be imperceptible and short term and for the operational phase to be deemed imperceptible and long term both in 2022 and 2030. Any new development in essence will increase CO2 emissions to the national and global environment however by introducing the reduction measures at design stage the increase has been kept to a reasonable minimum.

10.8 Mitigation measures.

There are no particular mitigation measures noted. All the recommended reduction measures at design stage and as applied in the CO2 reduction tables are for the greater part mandatory to comply to the relevant regulations and standards. As each development/building can only be certified for compliance under the Building Control Amendment Regulations (BCaR) if the minimum criteria set at design stage is met in full it is very unlikely that noncompliance i.e., mitigation occurs.

10.9 Monitoring

Construction phase: No CO2 monitoring is deemed necessary for the construction phase as the CO2 output / emission is relatively small and the duration of the construction phase is short-term.

Operational phase: No CO2 monitoring is deemed necessary for the operational phase as the current and future mandatory CO2 reduction requirement (BER) are a secure process to ensure compliance.

10.10 Cumulative effects on National emissions including neighbouring developments.

Based on available planning permission data and current status on the ground we confirm that a combined total of 967 dwellings, 5 crèches and 1,537 sqm of retail uses have been granted planning permission. Of these, 615 dwellings are complete, and 140 dwellings are under construction (755

total), leaving 221 to be built. The current proposal will provide another 377 dwellings, which would bring the overall total to 1,344 dwellings or 589 dwellings to be built.

It could be assumed that the dwellings constructed at this point would be included in the national greenhouse gas emission data of 2022 which leaves us to add the 221 units in neighbouring projects to be added. For ease of calculation for the national impact we have assessed the small commercial element as 20 residential units as the CO2 emissions would be similar.

Project CO2 emission impact on National emissions	**National**	**589 units**	**fraction**
	emissions	emissions	
	Mt-CO2 /year	Mt-CO2 /year	%
2022	60	0.01349	0.02248
2030	58	0.00175	0.00301
2030 with additional measures	48	0.00175	0.00368

The national impact:

The impact of this 589-unit development/phase of 0.01349 Mt-CO2 on Ireland's current emissions (2022) @ 60 Mt-CO2/year represents an increase of 0.02248%.

The impact of this 589-unit development/phase of 0.00175 Mt-CO2 on Ireland's projected 2030 emissions @ 58 Mt-CO2/year represents an increase of 0.00301%.

Based on the above findings we note the cumulative impacts on the national CO2 emission at worse to be very fractional. CO2 emissions from the construction and operational phase have been reduced to a minimum and the impact on National emissions for the construction phase are therefore deemed to be imperceptible and short term and for the operational phase to be deemed imperceptible and long term both in 2022 and 2030. Any new development in essence will increase CO2 emissions to the national and global environment however by introducing the reduction measures at design stage the increase has been kept to a reasonable minimum.

11.0 LANDSCAPE AND VISUAL

11.1 Introduction

This Landscape & Visual Impact Assessment (LVIA) report has been prepared by doyle + o'troithigh landscape architecture. The purpose of this study is to appraise the existing landscape settings of the site, to assess the likely impacts arising from the proposed development and describe the proposed mitigation measures and residual impacts.

This standalone EIA has considered the previous EIAR assessments and addenda relating to the development lands in Phases 1 to 4 and reviews the baseline landscape and visual conditions for this Phase 5 development. This chapter which addresses the Phase 5 application (the proposed development), has been prepared by doyle + o'troithigh landscape architecture. Description of the receiving environment is studied under the following headings: -

- Description of the proposed development
- Potential Impacts of the proposed development including cumulative impacts of the committed development to date
- Remedial and reductive measures
- Predicted impacts of the proposed development.

This assessment should be read in conjunction with Chapter 2 the description of the project and the alternatives examined, and in conjunction with the verified photomontages prepared for the scheme (refer to Appendix 11.1).

11.2 Methodology

This assessment has been based on the following guidelines:

- Environmental Protection Agency (EPA) publication 'Guidelines on the Information to be contained in Environmental Impact Statements (2017) and the accompanying Draft Advice Notes on Current Practice in the Preparation of Environmental Impact Statements (2017); and,
- 'Guidelines for Landscape and Visual Assessment', 3rd Ed., The Landscape Institute and Institute of Environmental Management and Assessment, 2013.
- Urban Development & Building Heights, Guidelines for Planning Authorities, 2018, Dept. of Housing Planning & Local Government.

This assessment has involved:

- Reviewing in detail the originally prepared Landscape and Visual Assessment by Mitchell & Associates (November 2011)
- Undertaking a desk-top study of the site; including reviewing ordnance survey mapping and aerial photography;
- Reviewing the plans, sections, and elevations of the proposed scheme;
- A review of statutory planning and other documentation in order to ascertain the local and wider significance of the landscape and key views; and

- Visiting the site and surrounding area during the autumn of 2021 and preparing a photographic record of views and landscape features.

11.2.1 Definition of Landscape

The Council of Europe defines "*Landscape as an area, as perceived by people, whose character is a result of action and interaction of natural and/or human factors*". The definition broadens the concept of landscape further than solely framed in terms of aesthetics and visual amenity. This definition of landscape is what will be used in this report.

11.2.2 Forces for Landscape Change

The demand for housing in the area close to Dublin City is at a high level and therefore there is a need for a range of housing types for the expanding population. This area in North Dublin has a good supply of available lands for residential development and good local transport links along with accessible retail and educational facilities make the area suitable for such a development. The general area is changing from extensive agriculture into residential, infrastructure and commercial development as per the relevant local authority zoning and Local Area Plans.

11.2.3 Nature of Impacts

Impact on landscape arising from development has two distinct but closely related aspects. The first is impact in the form of change to the character of the landscape that arises from the insertion of the proposed development into the existing context. The second aspect is the visual impact; which depends on the degree and nature of change in the visual environment. It is recognised that the combined impact on character and views will draw responses, the significance of which will be partly informed by an individual's subjective perception of how much the changes matter.

The assessment of landscape and visual impacts include:

- Direct impacts upon specific landscape elements and buildings within and adjacent to the site.
- Effects on the overall pattern of the landscape elements that give rise to the character of the site and its surroundings.
- Impacts upon any special features or interests in or around the site.
- Direct impacts of the scheme upon views in the landscape / townscape.
- Overall impact on townscape character and visual amenity.

11.2.3.1 Impact Significance Criteria

Whenever appropriate the following terms are used to describe the degree, quality, and duration of an impact: (Note this is based on the EPA Advice Notes and Guidelines) and provided in Table 11.1 below.

Table 11.1: Terms used to describe Quality of Visual Impact

Impact Criteria	Description
Profound Effects	An effect which obliterates sensitive characteristics
Very Significant	An effect which, by its character, magnitude, duration, or intensity significantly alters the majority of a sensitive aspect of the environment
Significant Effects	An effect which, by its character, magnitude, duration, or intensity alters a sensitive aspect of the environment
Moderate Effects	An effect that alters the character of the environment in a manner that is consistent with the existing and emerging trends
Slight Effects	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities
Not Significant	An effect which causes notable changes in the character of the environment but without significant consequences.
Imperceptible	An effect capable of measurement but without significant consequences.

Terms used to describe the quality of change:

- Positive impact: A change that improved the quality of the environment.
- Neutral impact: A change that does not affect the quality of the environment.
- Negative impact: A change that reduces the quality of the environment.

Terms used to describe the quality of change:

- Positive impact: A change that improved the quality of the environment.
- Neutral impact: A change that does not affect the quality of the environment.
- Negative impact: A change that reduces the quality of the environment.

11.2.3.2 Terms used to describe the Duration of Visual Impact

Terms relating to the duration of impacts as described in the EPA Guidelines are listed as follows:

- Temporary impact: Lasting one year or less.
- Short-term impact: Lasting one to seven years.
- Medium-term impact: Lasting seven to fifteen years.
- Long-term impact: Lasting fifteen to sixty years.
- Permanent impact: Lasting over sixty years.

11.2.4 Photomontages

Figure 11.1: Oldtown Phase 5 - 4 no. Photomontage & 5 No. CGI Locations (Source Modelworks) [Note: Red line developable site area indicatively shown]

A collection of 4 photomontages have been prepared by Modelworks Media from the surrounds of the site to fully illustrate the physical and visual nature of the proposed development. These have been prepared from publicly accessible locations that are representative of views of the scheme from surrounding areas (Appendix 11.1). Existing views and proposed versions of each view have been provided and have been taken at the following locations: -

Table 11.2: Existing and proposed views

View	Description	Location in relation to site:
View 01	View southwards from Balheary Road	Northeast
View 02	View northeast from Rathbeale Cottages, Rathbeale Road	West
View 03	View northwest from Rathbeale Road	Southeast
View 04	View west from Meadowbank Road, Millers Glen.	East

Subsequent CGI's (Computer Generated Images) CGI Views 1 to 5 have been prepared for selected views around the site. (See Modelworks submission with this application)

Refer to Appendix 11.1 for locations of Photomontage viewpoints – 'View Map Reference'

11.3 Receiving Environment

The description of the receiving environment was assessed as part of the previous Planning Application for Phase 1 & 2 in terms of the topography, slope regime, vegetation, and land use. For clarity refer to Fig A below denoting the lands relating to the Phase 5 application; based on the original Phase 1 & 2 Study Area.

The Phase 5 lands are gently sloping from south (33.00 OD) to north (16.00 OD) and contain site offices, site compounds and soil storage mounds at the southern end. The northern end of the site adjoins Phase 4 which is nearing completion and also contains a National Monument Enclosure (Ref DU011-150) which is to be protected and incorporated into the open space design.

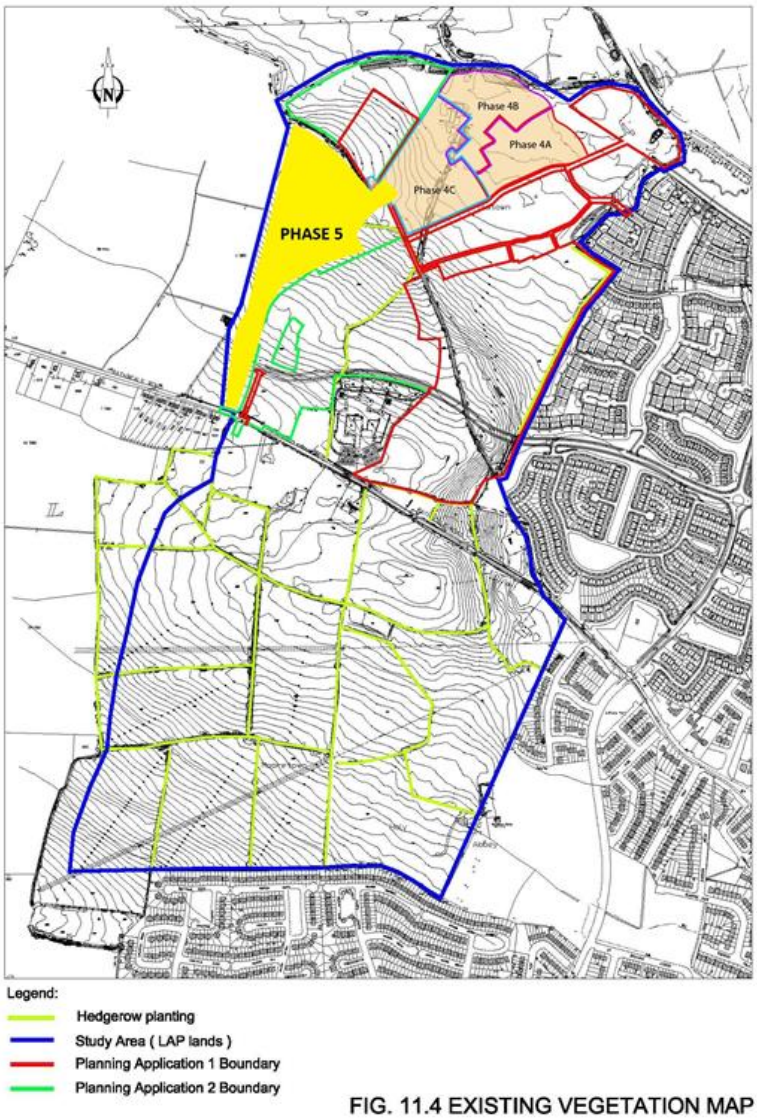


FIG. 11.4 EXISTING VEGETATION MAP

Fig 11.2: Phase 5 (proposed development) shown on extract from original LVIA prepared by Mitchell & Associates for the purposes of the EIAR. Note: (a) Phase 4 development is shown with various phases marked for construction (b)Red line developable site area indicatively shown]

In terms of the vegetation on site, the lands relating to Phase 5 have largely been 'stripped' of topsoil and show signs of lands inevitably awaiting development Figure B illustrates an overlay of the various phases of the Phase 4 development; namely 4A, 4B and 4C which has been overlaid on Google maps imagery taken in 2017. The original hedgerow on the western side of the site, adjoining the proposed Regional Park lands was removed in the past as part of the original site clearance works and was replaced by a temporary steel security fence which will be removed when the development is complete and the area is landscaped to link with the proposed Regional Park. Construction work on developing the phases 1 to 4 have been continuing for the past 10 years adjacent to the Phase 5 lands and therefore would be considered as an ongoing cumulative development process.

Fig 11.3: Phase 5 (proposed development) shown on aerial photography for reference. [Note: Red line developable site area indicatively shown]

The 'land use' and the 'visual analysis' as described in 11.3 is largely similar to the earlier phases of the development lands. The Regional Park, located to the west of Phase 4 and this development site, has also progressed with the first playing pitch complete. Refer to Photoviews 1-5 inclusive below showing current status of development.

In addition to the original Landscape and Visual assessment, the Ballyheary Road located to the north of the site was included within this updated visual assessment. Refer to Photoview 6 below, which shows a select view from this roadway which is largely screened due to roadside vegetation and intervening hedgerows defining field boundaries.

11.3.1 Landscape Policy Context

The lands are zoned 'RA' under the Fingal County Development Plan 2017-2023 which provides for 'new residential communities subject to the provision of the necessary social and physical infrastructure' As part of the Oldtown-Mooretown Local Area Plan 2010, the lands are identified as 'Lower Density Lands' and 'Open Space and Riparian Corridor'. Refer to Fig D below for reference.

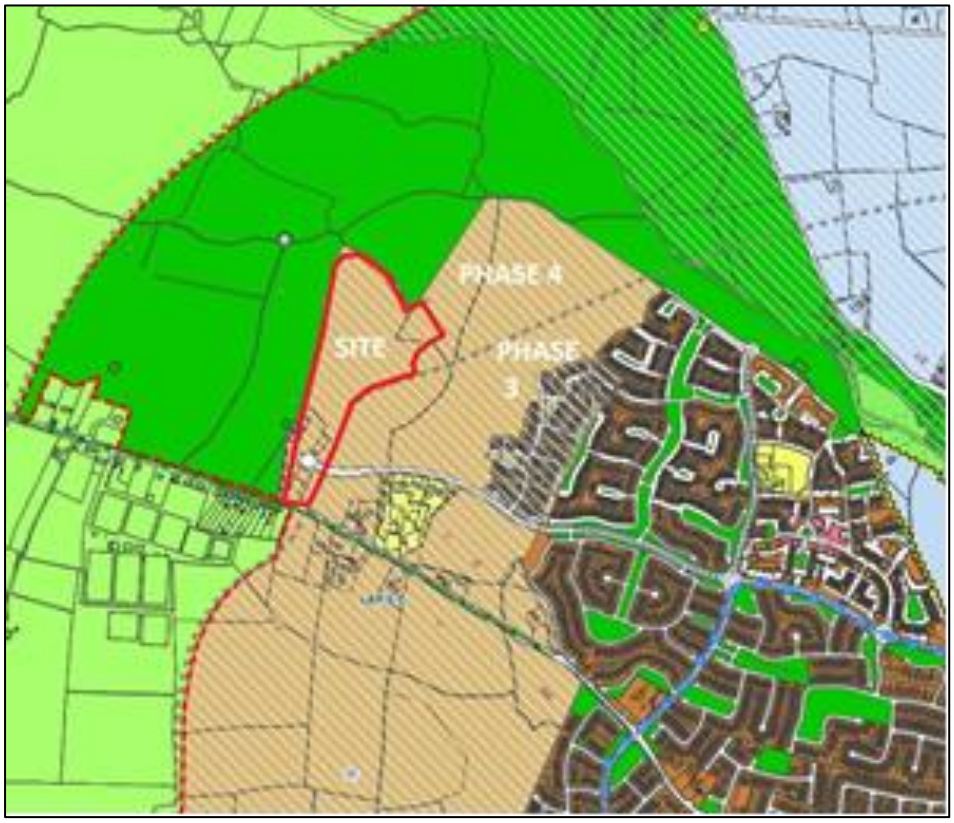


Fig 11. 4: Extract from Fingal County Development Plan 2017-2023 showing 'RA' Lands [Note: Red line developable site area indicatively shown]

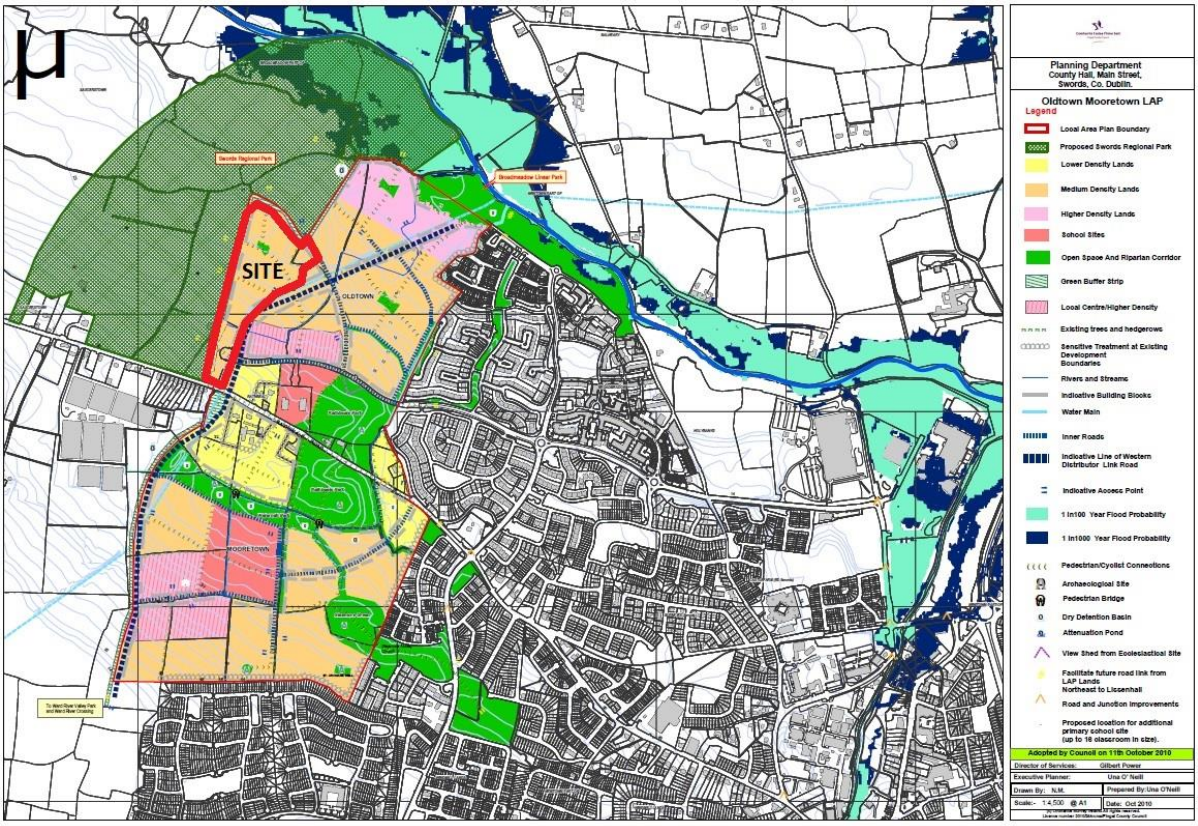


Fig 11. 5: Oldtown – Mooretown LAP Map (2010) – with subject lands denoted. [Note: Red line developable site area indicatively shown]

It is important to note there are no designations such as Special Areas of Conservation or Natural Heritage Areas associated with the said lands.

Specific references in respect of landscape policies are listed as follows:

Fingal County Council Development Plan 2017-2023

As referenced in the 'Natural Heritage' chapter (section 9.4) of the Fingal Development Plan 2017 to 2032, 'the Development Plan's Character Assessment (LCA) provides for the classification of Fingal's landscapes into the following (1) types and values and (2) sensitivities. The LCA divides the County into 6 Landscape Character Types representing generic areas of distinctive character that makes one landscape different from another such as uplands or the coast. The LCA places a value on each landscape character type ranging from exceptional to low'

The Landscape Character types are as follows (and are listed in the table below as well as the map extract, Fig E. (Green Infrastructure Plan 1, Fingal County Development Plan 2017-2023 (Sheet no. 14):

Table 11.3 Landscape Character Types

Landscape Character Types	Landscape Value	Landscape Sensitivity
Rolling Hill Type	***Modest***	***Medium***
High Lying Type	High	High
Low Lying Type	Modest	Low
Estuary Type	Exceptional	High
Coastal Type	Exceptional	High
River Valley and Canal Type	High	High

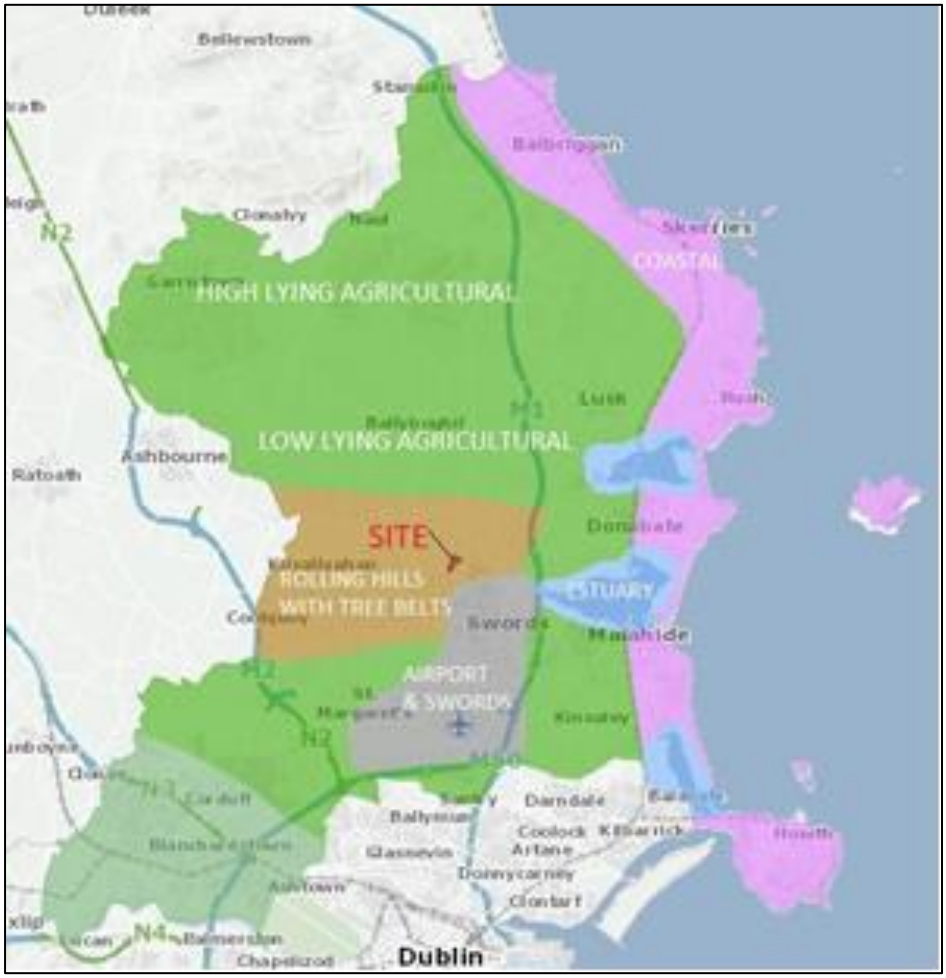


Fig 11.6: Landscape Character Types for Fingal (Fingal Development Plan 2017-2023)

As noted in the aforementioned Development Plan, *"this area of Fingal is mainly agricultural land characterised by rolling landscapes across the Ward and Broadmeadow River Valleys. The undulating nature of the countryside together with the presence of larger properties and tree belts has resulted in a varied landscape. The trees together with the river corridors help to create a rich landscape, both visually and ecologically. Views are generally contained by the rolling landscape, which creates a landscape of short horizons".* There are protected views which are listed in the Development Plan from the R108 (St. Margaret's to Naul Road) and R125 (Swords to Ashbourne Road). Swords is the main settlement within this area.

The Rolling Hills Character Type is made up principally of agricultural landscape and is of value due to the Ward and Broadmeadow River and the ecological and visual attributes they bring. The protected views, tree belts and undulating lands also add value to the area. An important quality of the archaeological heritage in Swords. The Rolling Hills Character Type is categorised as having a modest value.'

As noted above, there is a protected view listed immediately to the south of the site along the Swords to Ashbourne Road (R125), refer to Fig F. extract of (Green Infrastructure Plan 1, Fingal County Development Plan 2017-2023 (Sheet no. 14):

Fig 11.7: Extract from Fingal County Development Plan 'Green Infrastructure Plan 1' 2017-2023 (Sheet No. 14) (with subject lands denoted)

It is further noted under 'Views and Prospects (page 333, Fingal County Development Plan 2017-2023); that there is a need to 'protect and conserve views and prospects throughout the County for future generations. In assessing views and prospects it is not proposed that this should give rise to the prohibition of development along these routes, but development where permitted, should not hinder or obstruct these views and prospects and should be designed and located to minimise their impact.'

Oldtown – Mooretown Local Area Plan 2010

'The Oldtown – Mooretown LAP will set out the optimum development strategy for the proper planning and sustainable development for the plan lands, and will address the following elements: (limited to 'landscape' related items only):

- Provision of high quality recreational open space and amenity facilities to meet active and passive recreational needs of the expanding population of this area;
- Enhancement and preservation of existing archaeological sites and increase in appropriate usage and public acknowledgement of such sites.

Enhancement and protection of existing environmental features within the plan lands and Broadmeadow Linear Park northwest of the plan lands.

National Monuments

There is one National Monument Enclosure (ref. DU011-150) listed on the lands and it lies to the northeast beside the Phase 4 development. This feature is to be protected and incorporated into an open space area. The development will surround this feature as has been the case with the Phase 4 development which lies close to the feature.

11.3.4 Photoviews

Fig 11.8: Location of Photoviews of existing & Phase 5 site (Bing Maps). [Note: Red line developable site area indicatively shown]

Photoview 1: West from Millers Ave.	**Photoview 2:** North over Archaeological Site

Photoview 3: Northeast over site	**Photoview 4**: East over site

Photoview 5: North from site office compound.	**Photoview 6:** View taken from Church, Ballyheary Road, viewing south-westward to site. Existing trees within field boundary hedgerows screening views to the site.

11.4 Characteristics of the Proposed Development

This planning application is made on behalf of Gerard Gannon Properties for a Strategic Housing Development on the townland of Oldtown, Swords, Co. Dublin.

Gerard Gannon is the owner of the Oldtown development lands and has sought and obtained planning for the new residential village known as Miller's Glen. To date, a number of separate planning permissions have been granted for a total of 967 dwellings and of these, 647 dwellings are complete, and 207 dwellings are under construction.

This planning application is for the fifth and final planning phase. It is a natural and integrated extension to Miller's Glen and will be a new character area in its own right, incorporating a number of smaller, sub-character areas within its bounds.

The new development will immediately benefit from the educational, community, retail and amenity infrastructure that has already been constructed to serve the overall Oldtown lands. The proposed development will comprise a residential neighbourhood of 377 dwellings comprising 173 houses, 35 duplex units, 169 apartments, and a 519 sqm childcare facility with capacity for up to 102 children.

The development includes all associated site works and infrastructure, comprising landscaped open space, internal roads, paths, public lighting, and drainage. The development also includes off-site drainage works for a stormwater storage tank and overflow outfall gravity sewer to the Broadmeadow River on lands at the junction on the Glen Ellan and Balheary roads, known as the Celestica or Motorola site.

The vision for the development is to create a permeable, accessible and pedestrian-friendly residential neighbourhood integrated with the existing village centre, and which uses its location on the edge of the Swords Regional Park to 'join the dots' between the emerging arc of green spaces and walks from the Broadmeadow River Park to the Ward River Valley. The gross site area is 10.2233 hectares, of which the net development area is c.7.80 hectares. The net density of this 377-unit development is 48.30 units per hectare. The net development area excludes Class 1 open space on OS zoned lands and the off-site drainage works referred to above.

Table 11.4: Dwelling mix

Table 1 Dwelling Mix: Bedrooms

1 bed	98	26%
2 bed	113	30%
3 bed	149	39.5%
4 bed	17	4.5%
Total	377	

Table 2 Dwelling Mix: Unit Type

Houses	173	46%
Duplex	35	9%
Apartment	169	45%
Total	377	

Table 3 Part V: Summary

1 bed	31
2 bed	31
3 bed	15
Total	77

Table 4 Part V: Typology

Houses	17
Duplex	14
Apartments	46
Total	77

The development shall also include all associated site works and infrastructure which includes landscaped open space, internal roads, paths, cycle-paths, public lighting, utilities, drainage, and surface water attenuation.

Vehicular and pedestrian access to the site will be via the infrastructural network designed as part of the Phase 1 & Phase 2 application, and the section of the Western Distributor Link Road (WDLR) 'connection' currently being installed as part of the Phase 3 application. The internal access roads and street network servicing the scheme are largely 'organic' in nature to aid in terms of traffic safety, visual interest, and a distinct sense of place.

The development contains a range of open spaces for both passive and active recreation. One large park with play areas and a kick-about open space is being proposed in the centre of the development along with a series of landscaped open spaces with woodland planting running along the western boundary beside the future regional park. A further open space on the northeast boundary with Phase 4 includes the site of a former ringfort and the landscape elements as identified are cognisant of the

protection required for the archaeological remains. Two pocket parks in the northern section of the development create overlooked safe play environments for children.

11.5 Potential Impact of the Proposed Development

With regard to the impact on landscape character, the foregoing description of the landscape and its setting along with the site images show that the subject lands are a visually unremarkable unused marginal agricultural lands adjacent to an expanding urban area with a landscape character designation of modest landscape value and medium landscape sensitivity. The proposed development will alter the existing landscape character from agriculture to residential sub-urban character and will be seen as a logical extension of the existing residential area to the east. Development has already taken place on the subject lands in the form of the recently constructed schools and the Glen Ellan Distributor Road extension.

There will be general overall improvement in the quality of the landscape with the introduction of the public square, the landscaped archaeological park and also the landscaped streets and open spaces throughout the development. The public square and archaeological park will be linked using traffic calming paving and will form an attractive focal point in the area. The impact is therefore assessed as moderate and positive'. In consideration of the proposed development application, it is broadly considered that the impact would be neutral given the existing landscape character and setting.

11.6 Remedial and Reductive Measures

There are a number of measures that have and can be taken to ensure that the impacts of the proposed development are minimised during construction and subsequent occupation.

11.6.1 Design Phase

Consideration of the impact on the landscape and visual aspects has been integral in the design and layout of the scheme. A number of mitigation measures have been addressed including:

- Provision of new public open spaces for future interaction of the said and adjoining developments; and in particular the proposed Regional Park
- Addressing and adopting the requirements stipulated within the Oldtown Mooretown LAP 2010.
- The use of high quality hard and soft landscape materials befitting of a new residential scheme and suitable to the existing landscape.

11.6.2 Construction Phase

Consideration shall be made to limit potential adverse construction-related effects during the construction stage. Whilst considering the above, the operation of a well-managed organised and planned construction site, with adequate control of construction traffic and working activity is key to avoiding or minimising impact. Other measures shall include:

- Use of hoarding for screening works as appropriate,
- Directing site lighting away from the adjoining properties where applicable, including operational aspects of Regional Park.

Fig 11.9: Landscape Masterplan Doyle O'Troithigh Landscape

11.6.3 Operational Phase

Consistent and effective maintenance of hard and soft landscape areas, (in particular entrance areas, streetscapes, semi-public areas, and pocket parks) together with quality construction and building management are key to avoiding or minimising negative landscape and visual impacts arising from the operation of the proposed development.

The landscape proposals which accompany this application in scaled format note the detailed general landscape proposals as in the attached Landscape Masterplan

A series of Photomontages, as referenced in Appendix 11.1 below were chosen to assess the visual impact of the proposals within the operational Phase on the landscape.

11.7 Predicted Impact of Proposed Development

11.7.1 Construction Stage Impacts

The construction stage impact tends to be the greatest at the initial 'site disturbance' or 'breaking ground' stage. It is important to note that the adjoining sites of Phases 3-4 inclusive are currently under varying stages of construction and as such this 'type' of change or impact has become an emerging cumulative trend in recent years within the immediate vicinity.

Construction impacts on nearby built features (Swords Educate together National & Gaelscoil Bhrian Boroimhe School) within a wider perspective and from a distance will be slight and negative. The upper floors of this building will have open views to the site, given the local landform; however, this facility is familiar with construction presence on the local landscape.

The previous (~~original)~~ landscape and visual assessment noted that the construction stage impacts of Phase 1 to 4 would be 'short term' and would 'terminate upon completion of the development. Given the low level of visual amenity and low-quality landscape character of the existing landscape the visual impact during the construction stage is judged as being moderate and negative.' In considering Phase 5 scheme at construction stage; it is considered that the impact will be similar to the aforementioned assessment.

11.7.2 Operation Stage Impacts

It is considered that given the zoning objectives pertaining to the lands, the characterising of the lands as being of 'modest value and low sensitivity', the detailed requirements and policies outlined in the Oldtown-Moortown LAP 2010 and the current grant of permission with regard to the Swords Western Distributor Link Road to the south of the site; the lands are positioned to somewhat 'expect a residential scheme of this nature. Residential development is a familiar element within the immediate landscape setting.

Whilst there is a protected view immediately to the south of the site along the Swords to Ashbourne Road (R125), the potential impacts of the development on this route are limited given the roadside hedgerow screening and intervening landform.

The design and layout of the proposed scheme is considered appropriate in terms of its character, zoning and context. The proposed scheme, as per landscape drawings provided with this package, includes for a series of measures that will ensure a long-term positive impact including the introduction of one large open space in the centre of the site and an open space in the existing archaeological area, consistent treatment of streetscapes, dedicated cycleways / footpaths, introduction of specimen tree planting and high seed meadow grass mix to aid feeding birds and naturalised/drifts of daffodil planting.

11.7.3 Visual Impact: Photomontages

Four photomontages (Refer to Appendix 11.1) have been prepared to illustrate the physical and visual character of this residential development within its surrounds. In each instance the existing view is illustrated together with the proposed development as seen from the same viewpoint. Views 3 & 4

include completed granted development fronting Rathbeale Road. A description of the visual impact from each viewpoint is illustrated in Table 11.7 below.

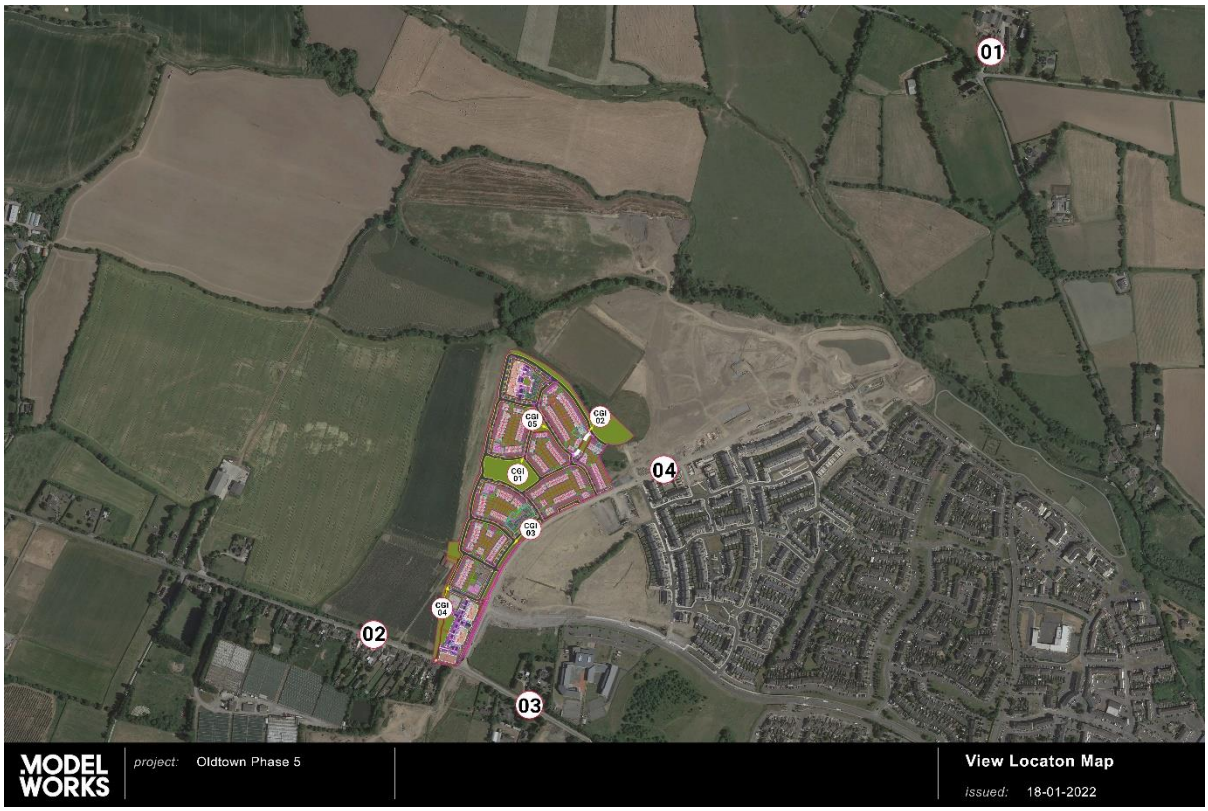


Fig. 11.10 – 4 No. Photomontage view locations & 5 No. CGI Locations. [Note: Red line developable site area indicatively shown]

	Photomontage View 01 **View southwards from Balheary Road**
Existing View	View southwards to the site from Ballyheary Road close to the Balheary Church shows agricultural land lined with mature hedgerows in winter form with glimpse views of housing in the distance.
Proposed View	The 'red line' denotes the extent and height of the proposed development. The established field hedgerows screen potential views of the proposed development.
Impact (Construction Stage)	Imperceptible neutral short-term visual impact.
Impact (Operation Stage)	Imperceptible neutral long-term visual impact.

	Photomontage View 02 **View northeast from Rathbeale Cottages, Rathbeale Road**
Existing View	View northeast from Rathbeale Cottages, Rathbeale Road shows the temporary site offices on the left of the image with part of the Phase 3 Millers Glen residential development visible in the distance. There are listed view contained in the Fingal Co. Development Plan from this road and while views northwards are generally screened by roadside hedges there are glimpse views of the open countryside to the north of the site.
Proposed View	The Proposed View shows the 4 storey apartment buildings facing onto the Rathbeale Road and will be a strongly defined western edge of the Millers Glen development bounding the proposed Regional Park to the west of the site. A proposed buffer zone to the west of the development will be landscaped and planted with trees defining the western edge of the development. The apartment blocks close to the edge of the road will create a level of negative visual impact particularly during the construction stage but façade finish and roof level treatment along with significant tree planting around the buildings will anchor the proposals in the landscape.
Impact (Construction Stage)	Moderate negative short term visual impact.
Impact (Operation Stage)	Slight negative tending towards imperceptible long term visual impact.
	Photomontage View 03 **View northwest from Rathbeale Road**
Existing View	View northwest from Rathbeale Road shows existing housing on the right with the Millers Glen development site in the centre of the image where the roadside hedgerow has been removed to facilitate granted works. Existing roadside vegetation lines the road on the left of the image. There are listed view contained in the Fingal Co. Development Plan from this road and while views northwards are generally screened by development there are glimpse views of the open countryside to the north of the site.
Proposed View	The Proposed View shows 4 storey apartment blocks as part of the Phase 5 development appearing isolated with reference to the existing landscape. The Proposed and Permitted View shows the 2 and 3 storey development which is under construction to the east of the site shows the Phase 5 visually connected to the permitted development and the taller elements of Phase 5 creating a landmark at the edge of the Millers Glen development and at the junction of the Millers Avenue and the Rathbeale Road. The apartment blocks of up to 5 storeys beside the roadway could impact negatively on the listed views however, as in View 2, the finish to the buildings and the tree planting will anchor the buildings in the landscape.
Impact (Construction Stage)	Moderate negative short term visual impact.
Impact (Operation Stage)	Slight negative tending towards imperceptible long term visual impact.

	Photomontage View 04 **View west from Meadowbank Road, Millers Glen.**
Existing View	View west from Millers Avenue shows completed Millers Glen Phase 3 residential on the left and Phase 4 under construction on the right of the image. The Phase 5 lands in the centre of the image rise up towards the Rathbeale Road in the distance.
Proposed View	The Proposed View shows the Phase 5 development bounding the Meadowbank Road with Phase 4 under construction. The proposed development visually links with the style and layout of the earlier phases. The Proposed and Permitted View shows the completed Phase 4 visually linked with the proposed Phase 5 development.
Impact (Construction Stage)	Moderate negative short term visual impact.
Impact (Operation Stage)	Imperceptible neutral long term visual impact.

The CGI views provided (Views CGI 1 to CGI 5) are computer generated images of the proposed scheme illustrating the extent, scale and character of the built development (See Modelworks submission with this application). CGI 1 View considers a north-westerly view to the north of the site, at the northern end of the central open space area with the proposed housing in the background. CGI View 2 is a view southward at the northern edge of the Phase 5 lands where it adjoins the archaeological feature which will be landscaped and incorporated into the open space of the development. CGI View 3 is a southwest view along the green space bounding Millers Avenue with the duplex and apartments visible in the distance. CGI View 4 is a view northward along the western edge of the site. CGI View 5 is view east over the pocket park with seating and tree planting in the open space.

As the CGI views are largely taken within a future 'enclosed' built development, and currently within a construction site context; the impact at construction stage is considered moderate to significant in the short term. However, as part of the greater built development, and long-term establishment of the residential scheme along with the delivery of a robust and featured open space, the scheme will have a moderate impact on the landscape which will become neutral to positive in the short to medium term.

11.7.4 Impacts on Landscape Planning

It is considered that the proposed development is in accordance with the various landscape and visual objectives, policies and land use zonings pertaining to the site and as set out in the Oldtown-Mooretown LAP 2010 and the Fingal Development Plan 2017-2023.

There are listed views from Rathbeale Road as shown in the Fingal Development Plan. The proposal to construct apartment blocks of up to 5 storeys in height close to the road will create a visual impact which will be moderately visually negative at the construction stage. However, proposed tree planting around these blocks and along the western edge adjoining the proposed regional park will help anchor the buildings in the landscape as the trees develop over time. The buildings will also create a visual sense of arrival into the town of Swords.

The development is located on lands zoned for residential development, varying between medium and high-density lands.

The proposed development, and particularly in terms of its open space establishment is considered to have a neutral to positive impact on the landscape planning context.

11.8 Interactions and Cumulative Impacts

11.8.1 Interactions

The pertinent environmental interactions for landscape and visual are with Human Beings, Flora and Fauna and Cultural Heritage. In this regard, landscape proposals for the scheme have been developed in consultation with the Project Ecologist, Open Field Ecologists and the Cultural Heritage Consultants, Courtney Deery Heritage Consultancy.

The result of these consultations is noted as follows:

In terms of the Flora and Fauna, specific high seed producing meadow grass mix has been proposed within the pocket park/former ringfort to the west of the scheme. This seed mix has been proposed in consultation with Open Field Ecologists to support feeding Yellow Hammers in particular.

There are significant archaeological remains at the interface of the Phase 4 and Phase 5 lands in the form of a ring fort. A detailed review with Courtney Deery Heritage Consultants has been carried out as part of this process in terms of proposing a landscape scheme which is responsive and protective of the archaeological remains for both now and into the future. Protective mounding and non-dig pathway links have been included within the overall scheme along with a location point for archaeological interpretive panels to provide information to future uses. Considering the above, there will be little or no 'conflicts' with Cultural Heritage. It could be considered that the impact is positive in that it raises the awareness of archaeological remains present on site and that its future protection is afforded with the site development works.

11.8.2 Cumulative Impacts

The existing low-quality landscape and visually unremarkable tract of agricultural land will be replaced by a primarily residential scheme and high quality designed public space linked to a landscape archaeological park which will both act as a focal point for the area. The development will be seen juxtaposed against the existing large scale residential development to the east and will form part of the expansion of Swords in this area. The landscape and visual impact of the proposed development is therefore assessed as being moderate and positive.'

As stated earlier in the report (11.7.1) the on-going development of the earlier phases could be considered as cumulative development but residential development in the area around Swords is seen as a common occurrence in a rapidly developing part of the wider Dublin area. The cumulative impact therefore would appear as moderate to positive in that this final phase of development in this tranche of lands would complete the residential development in this area.

11.9 Monitoring

Soft landscape works will be monitored to check establishment during the first 12 months post-planting. Plant failure during this defects liability period shall be replaced within the following planting season (i.e. November to March) as necessary.

Aftercare to a high standard of both hard and soft landscape elements throughout the scheme will form part of the annual management/maintenance programme which shall be adopted as part of the scheme.

11.10 References

- Environmental Protection Agency (EPA) publication 'Guidelines on the Information to be contained in Environmental Impact Statements (2017) and the accompanying Draft Advice Notes on Current Practice in the Preparation of Environmental Impact Statements (2017); and,
- 'Guidelines for Landscape and Visual Assessment', 3rd Ed., The Landscape Institute and Institute of Environmental Management and Assessment, 2013.
- Urban Development & Building Heights, Guidelines for Planning Authorities, 2018, Dept. of Housing Planning & Local Government.
- British Standard BS5837:2012 Trees in Relation to Design, Demolition and Construction. Recommendations

12.0 MATERIAL ASSETS - TRAFFIC AND TRANSPORT

12.1 Introduction

This chapter has been prepared by Waterman Moylan Consulting Engineers.

This section assesses the likely effects of the proposed development in terms of vehicular, pedestrian and cycle access during the construction and operational phases of the proposed development.

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; and the remedial or reductive measures required to prevent, reduce or offset any significant adverse effects.

12.2 Methodology

Research for this section included a review of the Air Quality Standards Regulations (S.I. 180 of 2011) The following methodology has been adopted for this assessment:

- Review of relevant available information including where available Development Plans, 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 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 the construction stage traffic; and
- Assessment of the percentage 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 at Oldtown, Swords, Applewood

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

12.3.1 Site Location

The area of the Oldtown-Moore LAP lands is approximately 111 hectares. The lands are located at the western development edge of Swords, within the catchment of the Broadmeadow River.

The Oldtown-Mooretown lands are divided by Rathbeale Road, with Oldtown lands to the north (Circa 50 ha) and Mooretown to the south (circa 61 ha). The subject application (circa 10.23 ha.), which forms the final phase the Oldtown development, is located in the north-west quarter of the Oldtown Lands. The surface water storage tank and drainage outfall line, that forms part of this planning application, is located at the junction of Glen Ellan Road and Balheary Road. The planning application locations are shown in Figure 12.1 below.

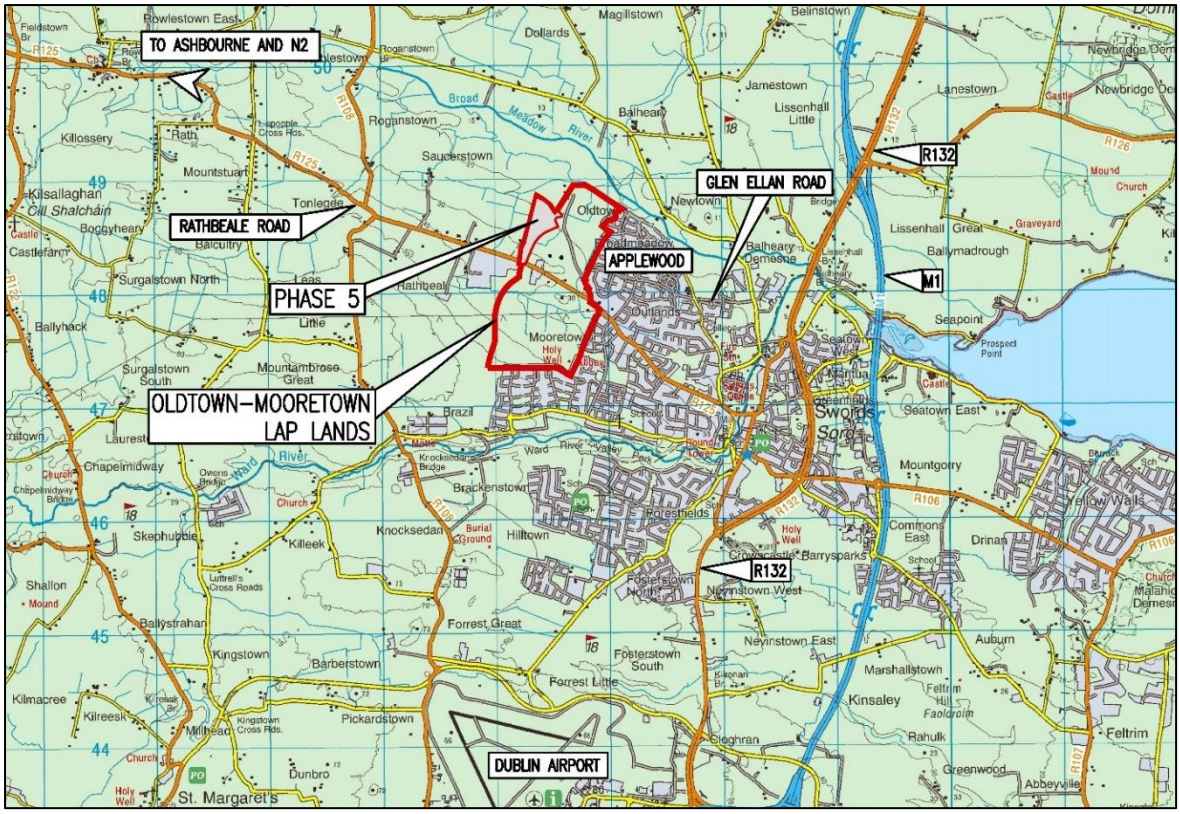


Figure 12.1 – Site Location [Note: Red line developable site area indicatively shown]

12.3.2 Existing Road Network

The main existing roads currently serving the Oldtown-Mooretown LAP lands are R125 Rathbeale Road and Glen Ellan Road.

R125 Rathbeale Road bisects the Oldtown Mooretown LAP lands and forms the southern boundary of the Oldtown lands. This road connects Swords with Ashbourne to the west. The road links to the R135 Old Dublin Road just south of Ashbourne to the N2 at Interchange No 3, Fleenstown Little. R125 Rathbeale Road also provides a direct link from Oldtown towards the east to Swords Main Street, at the junction between Bridge Street and Main Street. Improvements works including new cycle lanes and dedicated pedestrian facilities were recently complete on R125 Rathbeale Road fronting the Oldtown/Mooretown LAP lands.

Glen Ellan Road is a 7.5m wide single carriageway road which is subject to a speed limit of 50kph with cycle lanes and footpaths running along both sides. Traveling in the easterly direction from the subject site, Glen Ellan Road terminates at a four-armed signal-controlled junction with Balheray Road.

Glen Ellan Road serves an existing school complex to the south of the Oldtown lands as follows:

- Swords Educate Together has approximately 444 students and 21 staff. The operating hours of the school are 08:30 – 13:10 for Junior and Senior Infants and 08:30 – 14:10 for all other classes.
    - Gaelscoil Brian Boroimhe has approximately 360 students and 20 staff. The operating hours of the school are 08:50 – 13:30 for Junior and Senior Infants and 08:50 – 14:30 for all other classes.

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 four junctions in the vicinity of the site. The junctions that have been assessed are the following:

- **Junction 1 (Priority T-junction): R125 Rathbeale Road/R108 Naul Road;**
- **Junction 2 (Signalised Crossroads): R125 Rathbeale Road/Western Distributor Link Road;**
- **Junction 3 (Signalised Crossroads): R125 Rathbeale Road/Murrough Road;**
- **Junction 4 (Four-armed Roundabout): Glen Ellan Road.**

Figure 12.2 Location of Junctions Surveyed.

Due to the ongoing travel restrictions that have been implemented to curb the spread of COVID-19, carrying out traffic count surveys was not possible for this application, and in any case would not yield useful data. Instead, historic traffic count data from 2005/2006, 2017 and 2019 has been used to extrapolate current and anticipated volumes.

The 2017 and 2019 data used is taken from a traffic count survey which was carried by IDASO Ltd. on 03rd October 2017 and on 21st May 2019 at the two junctions indicated in Figure 12.2. The junctions surveyed were Junction 2 (2017) and Junction 4 (2019).

The 2005/2006 traffic volume data used is taken from the Environmental Impact Statement (EIS) prepared by Downey Hynes Partnership in November 2011 approved by FCC under Reg. Ref. F11A/0436. This data was based on extensive traffic and transportation studies that were carried out in 2010 on behalf of Fingal County Council.

It is recognised that traffic volume data from 2005/2006 are not appropriate to be used when preparing a report 15 years later as such data is likely to change as a reflex of many factors along the years. However, due to the absence of more recent traffic volume data and the impossibility of carrying out useful traffic count surveys due to the restrictions to curb the spread of COVID-19, the 2005/2006 has been used for Junctions 1 and 3.

The use of historical traffic counts can be further justified due to the emerging neighbourhood surrounding the proposed development. The representativeness of current existing survey data in this

context may be questionable with construction traffic meaning the survey data may only be temporary in nature.

The results of this survey indicated that the peak traffic levels through the junctions occurred between the hours of 08:00 – 09:00 in the morning and 17:00 – 18:00 during the evening. These traffic levels can be seen in Figure 12.3.

Full traffic survey 2017/2019 are shown in Appendix A of the TTA accompanying the application.

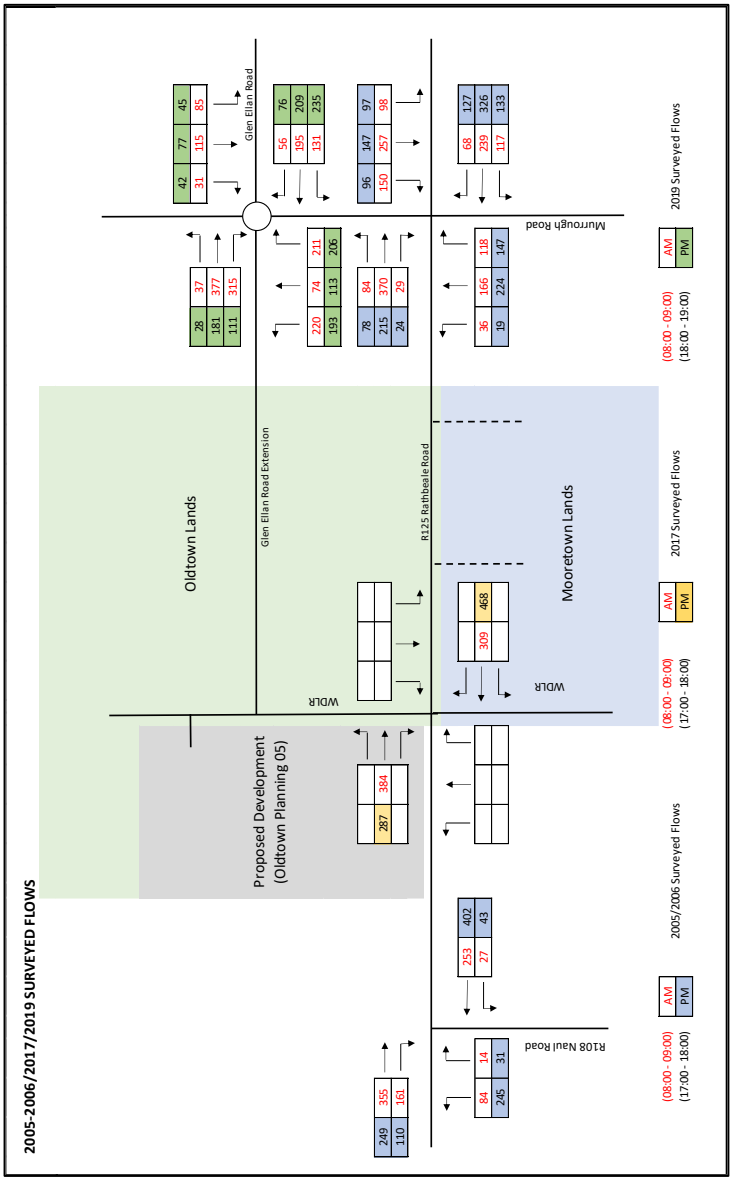


Figure 12.3 Surveyed Flows

12.3.3 Pedestrian and Cycling Facilities

The existing pedestrian facilities in the surrounding area comprise an inter-connected network of footways linking the various neighbourhoods to each other, to the existing schools, to the local bus stops and to the surrounding public network.

Glen Ellan Road (and extension) and the associated development in the Applewood area are provided with a minimum of 1.5m wide footpaths on each side of the road.

Regarding cycle facilities, Figure 12.4 below shows the local cycle track and lane network as taken from the National Transport Authority's (NTA) Greater Dublin Area Cycle Network Plan.

Cyclists can benefit from the provision of dedicated cycle lanes along both sides of the carriageway on Glen Ellan Road (and extension) for the entirety of its length. These cycle lanes are generally separate from the carriageway by a grass verge, except for a small portion of the road extension which comprises a cycle track immediately adjacent to the carriageway along the northern side.

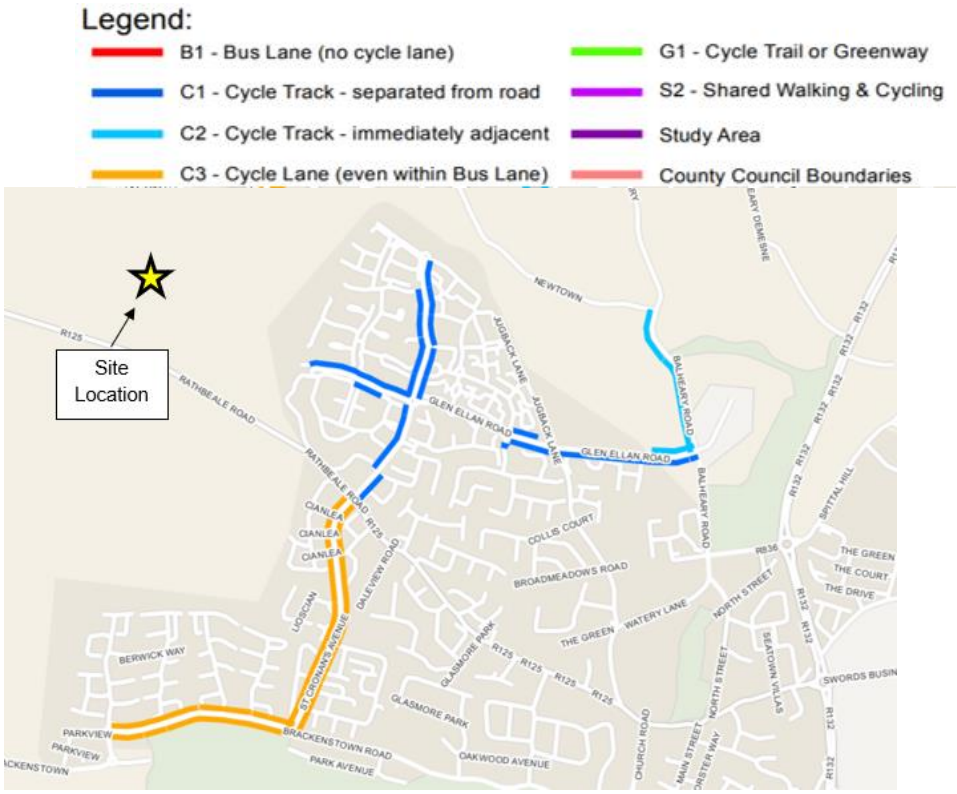


Figure 12.4 - Local Cycle Infrastructure

As part of the development works that are now complete on the R125 Rathbeale Road within the Oldtown-Mooretown LAP lands, cycle lanes have been installed along both sides of the carriageway from the new signal-controlled junction with Western Distributor Link Road to the eastern edge of the LAP lands. These road upgrade works were subject to a Part 8 planning application by FCC which were subject to LIHAF funding. The planning application for this development works received approval in 2017. Works were approved for LIHAF funding and are now complete and open to the public.

All the existing pedestrian and cycle facilities make the subject site highly accessible by a wide variety of transportation options which will facilitate a modal shift away from private vehicle usage.

12.3.4 Existing Public Transport Accessibility

<u>Dublin Bus</u>

The Oldtown LAP lands are currently served by various bus services which serve a number of bus stops distributed across the vicinity area. The closest bus stops in relation to the subject development site are located on R125 Rathbeale Road approximately 100m west of the south-western edge of the

subject site. See Figure 12.5. The subject bus stops are currently served by 2 No. bus routes, being the Dublin Bus Route 41B and Go-Ahead Bus Route 197. (The stormwater storage tank, submitted as part of the planning application is not considered as requiring any demand for public transport.) A summary of the weekday frequencies of these routes is presented in Table 12.1.

Approximately 700 metres east of the subject development site, there are two additional bus stops on Glen Ellan Road which are currently served by two Swords Express bus routes, Route 506 – operating from Edan Quay in Dublin only two times a day, both during the PM peak period (from 17:00 to 19:00), and Route 506X – operating from Broadmeadow, Miller's Glen to Dublin Eden Quay only three times a day, all during the AM peak period (from 07:00 to 09:00).

In addition to the above cited bus stops, there are two other bus stops on Glen Ellan Road which are served by a number of additional bus routes. These are:

- Dublin Bus Route 41: from/to Lower Abbey Street in Dublin City Centre, this route operates every 15 to 20 minutes during the AM (07:00 to 09:00) and PM (17:00 to 19:00) peak periods.
- Dublin Bus Route 41C: from/to Abbey Street in Dublin City Centre, this route operates every 10 to 20 minutes during the AM and PM peak periods.
- Swords Express Route 500: to/from Edan Quay in Dublin City Centre, this route operates nine times during the AM peak period and six times during the PM peak period. This equates to approximately a bus running every 13 minutes in the morning and a bus running every 20 minutes in the evening.
- Swords Express Route 503: this route operates five times per day, three times in the AM peak period towards Marion Square in Dublin City Centre and two times in the PM peak period on the opposite direction – from Marion Square.
- Swords Express Route 507: this route operates three times per day, two times in the AM peak period (07:00 to 09:00) towards Eden Quay in Dublin City Centre and one time in the PM peak (17:00 to 19:00) on the opposite direction.
- Swords Express Route 500X: this route operates three times in the AM peak period (07:00 to 09:00) towards Eden Quay in Dublin City Centre and four times in the PM peak (17:00 to 19:00) on the opposite direction.

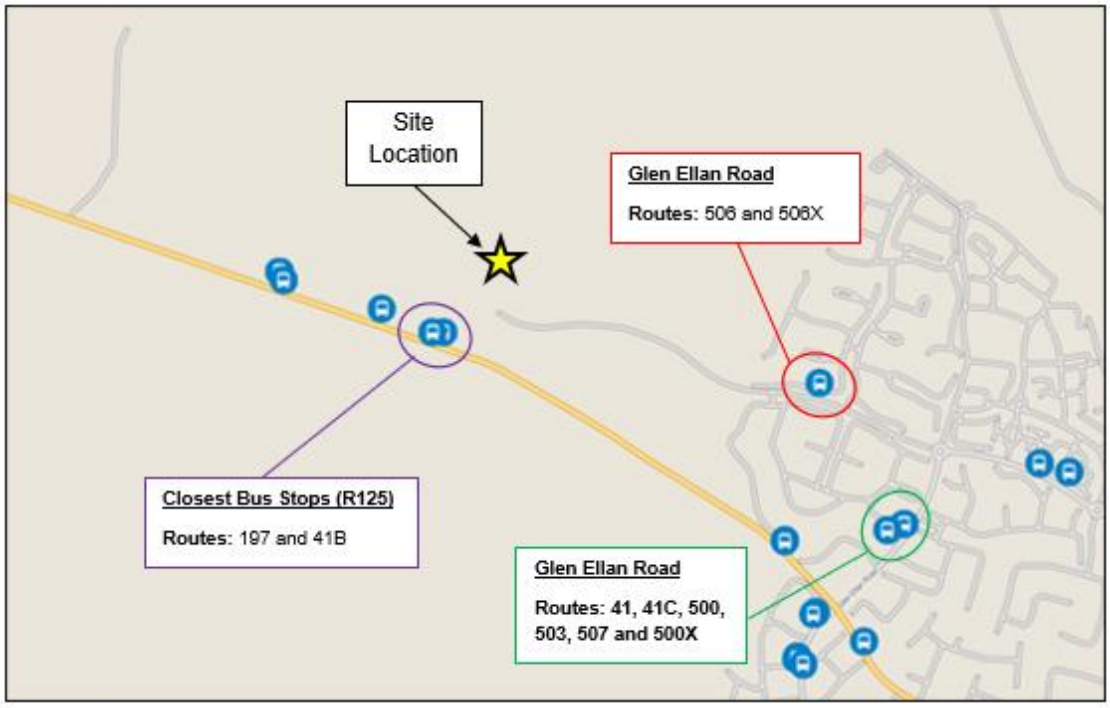


Figure 12.5 - Location of Public Transport Facilities

Route	From	To	AM Frequency (07:00 to 09:00)	PM Frequency (17:00 to 19:00)
197	Ashbourne (Opp Pillo Hotel)	Swords, Airside Ind. Estate	2 services	2 services
	Swords, Airside Ind. Estate	Ashbourne (Opp Pillo Hotel)	2 services	2 services
41B	Rowlestown	Irish Life Mall	1 service	1 service
	Irish Life Mall	Rowlestown	1 service	1 service

Table 12.1 - Bus Service Frequencies for Routes 197 and 41B

Go Car

The closest GoCar vehicle is located in the car park at Braeburn Terrace, Applewood, approximately 1.5km (18-minute walk) east from the subject development site. At the time of writing in 2022, two vehicles are provided at the Braeburn Terrace station.

12.4 Transportation Improvements

12.4.1 Oldtown-Mooretown LAP Road Improvements

The road improvements required as part of the Oldtown-Mooretown LAP, both within and outside the LAP boundaries, include:

- Development of a number of new road/road links – in particular the provision of the Western Distributor Link Road (WDLR) and the Inner Ward River Valley Crossing;
- Enhancement of existing junctions and roads external to the lands;
- Redesign of Glen Ellan Road as a main urban street within the lands and design of a main street within Mooretown lands;

- Provision of a quality bus route to transport those living in northwest Swords into the Town Centre;
- Provision of pedestrian and cyclist networks associated with green corridors both within and into adjoining areas.

The WDLR is substantially complete within the Oldtown lands. These development works were undertaken as part of the previous phases of Oldtown lands.

The road upgrades along R125 Rathbeale Road, both within and outside the LAP boundaries, were recently completed and opened to the public. The upgrades included dedicated pedestrian and cyclist facilities.

The Glen Ellan Road Extension works are substantially complete as part of the previous phases of Oldtown lands.

The scope, extent and timing of the works related to the Swords Quality Bus Corridor are to be agreed with Fingal County Council.

12.4.2 MetroLink

MetroLink is a proposed high-capacity, high-frequency rail line running from Swords through Dublin Airport and Dublin City Centre to Charlemont. MetroLink will carry up to 50 million passengers annually, cutting journey times from Swords to the city centre to 25 minutes. The preferred route for MetroLink is currently undergoing consultation and an application for planning approval for the MetroLink Scheme is expected to be made to An Bord Pleanala in Q2, 2022. Once a Railway Order has been granted, work can commence on site. According to MetroLink, the construction work will take between 6-and 8 years to complete.

The Estuary Park and Ride station, which is also the terminus of MetroLink is located approximately 2.5km east of the proposed site. It will comprise a multi-storey park-and-ride facility with a total of 3,000 car parking spaces. It is envisaged that the introduction of the MetroLink will see a significant modal shift towards public transport resulting in a lower dependence on the private car.

12.4.3 BusConnects

The Bus Connects project currently being promoted by the National Transport Authority aims to deliver a much-enhanced bus service to the Greater Dublin Area (GDA). The routes proposed to directly serve the proposed development site are the **City Bound Route 82** and the **Local Route 197**. A summary of the frequency of these proposed routes is presented below.

Route No.	From	To	AM Weekday Frequency (07:00 to 09:00)	PM Weekday Frequency (17:00 to 19:00)
82	Glen Ellan Road	Merrion Square	Every 15 minutes	Every 15 minutes
197	Airside	Ashbourne	1 service per hour	1 service per hour

Table 12.2 - Bus Connects Routes 82 and 197 – AM and PM Weekday Frequency

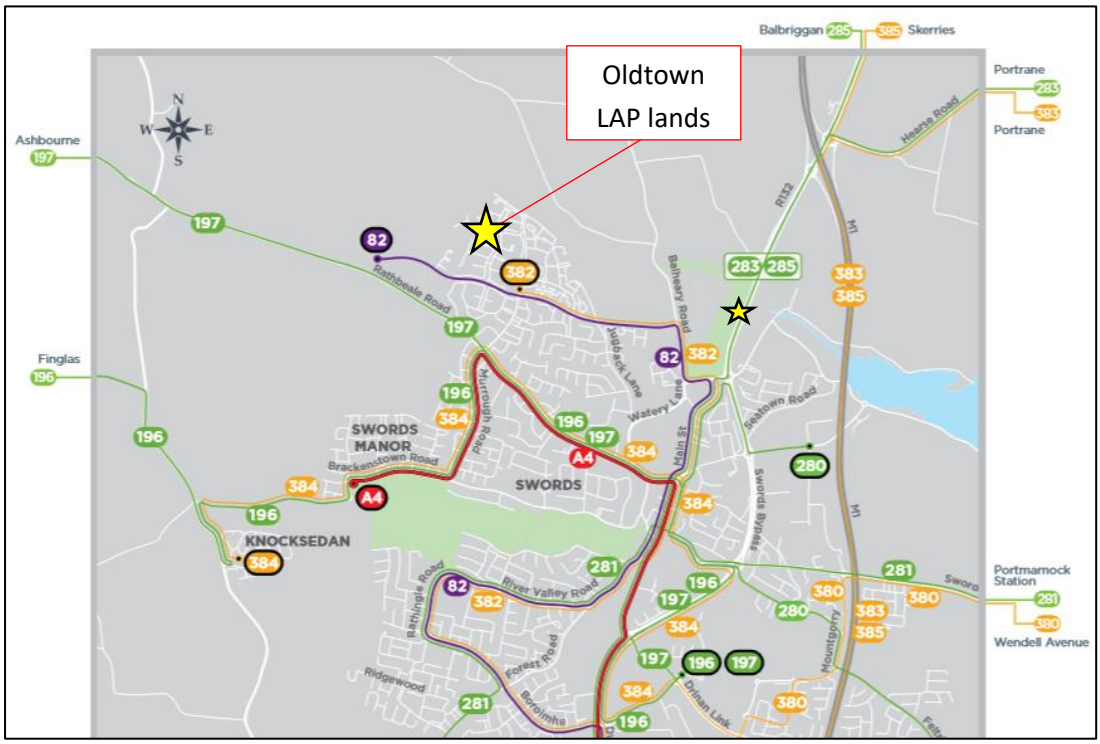


Figure 12.6 – Bus Connects Routes Map.

In Figure 12.6 above it can be seen that Bus Connects project will provide 4 No. additional routes on the surrounding area which could also be utilised by the proposed development (Oldtown Planning 05) residents. The additional routes are:

- Branch Route A4: will operate every 10 to 15 minutes from the Brackenstown Road via the City Centre towards Dundrum.
- Local Route 196: will operate every 120 minutes from Airside to Finglas.
- Peak-time Route 382: will operate from Glen Ellan Road via the City Centre towards UCD 3 times during the AM (07:00 0 08:00) and 3 times during the PM (17:00 – 18:00) peak hours.
- Peak-time Route 384: will operate from Knocksedan via Swords Manor and the City Centre towards UCD 3 times during the AM (07:00 – 08:00) and 3 times during the PM (17:00 – 18:00) peak hours.

12.5 Characteristics of the Proposed Development

12.5.1 Overview

The proposed development forms part of the Oldtown lands, northwest of Swords, which are subject to the Oldtown-Mooretown Local Area Plan (LAP) adopted by Fingal County Council in October 2010.

The proposed development will comprise a total of 377 residential units and is the eighth planning application in Oldtown-Mooretown LAP lands.

The proposed site for the stormwater storage tank that also forms part of this application is located on the junction of Glen Ellan Road and Balheary Road, Swords, Co. Dublin. The site is 1.4km north of swords, 1.1km west of the M1 motorway and 300m south of the Broadmeadow River. The site is owned by The Applicant and is locally referred to as the Celestica/Motorola site.

The development of Oldtown-Mooretown LAP lands commenced in 2011 and is expected to be complete by 2030.

The overall Oldtown Mooretown LAP development will comprise approximately 2,485 dwellings units, 7,510 sqm of commercial floorspace and a 1,624-pupil primary and post-primary school on a 111 hectares site.

The proposed development consists of the construction of 173 houses, 169apartments, 35Duplex units and a 519 sqm Creche on a total area of c. 10.23 Ha.

The development includes all associated site works and infrastructure, including internal roads, paths, cycle-paths, public lighting, utilities, foul and surface water drainage, and landscaped open-space.

Unit Type	Block	1 – Bedroom	2 – Bedroom	3 – Bedroom	4 - Bedroom	Total
Houses	-	-	9	147	17	173
Duplexes	A	9	8	1	-	18
	B	3	5	-	-	8
	C	3	5	-	-	8
	D	10	9	1	-	20
	E	3	5	-	-	8
	F	3	5	-	-	8
Apartments	A	18	30	-	-	48
	B1	9	23	-	-	32
	B2	9	23	-	-	32
	C	4	18	-	-	22
Total	-	71	140	149	17	377

Table 12.3: Schedule of Accommodation

12.5.2 Physical Infrastructure

Local access roads and pedestrian/cyclist links shall be provided to open up the LAP lands development as per the plan layout.

The internal road network and the pedestrian / cycle links are being provided as the overall LAP development progresses. Footpaths and cycle tracks are being provided as part of Phase 1 along Glen Ellan Road, Oldtown Avenue, Mooretown Avenue and Rathbeale Road as far as the archaeological park. This will continue through Phase 2. There will be 440 cycle parking spaces provided for the site.

The site is accessed from Glen Ellan Road and Rathbeale Road via Oldtown Avenue/Miller's Avenue (SWDLR), Park Avenue and Longview Avenue which have been constructed as part of the previous phases of the Oldtown LAP developments. The proposed stormwater storage tank site that forms part of this planning application, is accessed from the Balheary Road.

All the road network improvements required as part of the local area plan, both within and outside the LAP boundaries, have been summarised earlier. Details of these improvements are described in the TTA accompanying the subject planning application package.

12.6 Potential Impact of the Proposed Development During Construction Stage

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 and from general earthwork activities. 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).

12.7 Potential Impact of the Proposed Development During Operational Stage

In order to assess the potential impact of the proposed development a detailed Traffic and Transport Assessment has been prepared and is included as part of the subject application under a separate cover. Details of this assessment are set out below.

Separately, it is noted that the proposed stormwater storage tank site that forms part of this application is not anticipated to generate traffic trips, aside from infrequent maintenance vehicles, and as such does not warrant trip generation assessment. It is considered that the storage tank traffic impact on the local network during operation stage is negligible.

12.7.1 Trip Generation

Person Trip Rates

Full person trip rates for the residential and retail developments, which were taken from TRICS Database version 7.6.4 are included and are summarised in Table 12.4

Land Use Category	AM Peak Hour		PM Peak Hour	
	Trip Rate IN	Trip Rate OUT	Trip Rate IN	Trip Rate OUT
Mixed Residential (Flats and Houses)	**0.107** per unit	**0.284** per unit	**0.237** per unit	**0.136** per unit
Retail	**2.373** per 100 sqm	**1.594** per 100 sqm	**2.637** per 100 sqm	**2.912** per 100 sqm
Commercial (Non-retail)	**0.780** per 100 sqm	**0.314** per 100 sqm	**2.352** per 100 sqm	**1.874** per 100 sqm

Table 12.4: Person Trip Generation - Residential and Retail - AM and PM Peak Hour.

The vehicle trip generation calculation for the assessment year of 2025 (Opening Year of Proposed Development – Oldtown Planning 05) is shown below. As presented earlier in Section 7 of this report, it is estimated that, in 2025, the following developments will be in place at the Oldtown-Mooretown lands:

12.7.2 Oldtown Development

- Residential development (constructed and occupied, constructed not occupied, approved not constructed and proposed) comprising a total of 1,344 residential units.
- Retail development (constructed and operational) comprising of 1,510 sqm of area.

Land Use	Phase Reference	Dev. Size	AM Peak Hour		PM Peak Hour	
			Trips IN	Trips OUT	Trips IN	Trips OUT
Residential	Oldtown 01*	243 units	26	69	58	33
Residential	Oldtown 03A&D*	181 units	19	51	43	25
Residential	Oldtown 04A*	95 units	10	27	23	13
Residential	Oldtown 04B*	98 units	10	28	23	13
Residential	Oldtown 04C&D*	101 units	11	29	24	14
Residential	Oldtown 02A**	86 units	9	24	20	12
Residential	Oldtown 02B**	91 units	10	26	22	12
Residential	Oldtown 02C**	56 units	6	16	13	8
Residential	Oldtown 05***	377 units	40	107	89	51
Retail	Oldtown 02*	1,510sqm	36	24	40	44
Total	Oldtown	1,344 units 1,510 sqm	178	401	355	225

Table 12.5: Trip Generation – Oldtown Developments - 2025.

* Development Constructed and Occupied.

** Development Approved but not Constructed.

*** Development proposed as part of the subject application.

As can be seen from above, it is estimated that the Oldtown development (considering constructed, approved and proposed developments) will generate a total of 579 vehicle trips in the AM peak hour (178 inbound and 401 outbound) and a total of 579 vehicle trips in the PM peak hour (355 inbound and 225 outbound).

At the time of writing this report, the developments of Oldtown 01 and Oldtown 03A&D were fully constructed and occupied, which suggests that the trips associated with these developments already exist on the road network and the calculation of trip generation for them would not be necessary. In a typical and normal situation, these trips would be accounted for in the traffic survey. However, as previously described, a traffic survey was not carried out as part of the subject application, and instead, historic traffic count data, extracted from previous assessments in the area, were used. At the time when the used traffic surveys were carried out, the development of the Oldtown 01 and Oldtown 03A&D were not in place and therefore their associated trips, were not existent. In this case, with the objective to undertake a robust, complete assessment of the surrounding road network and analysed junctions, trip generation for Oldtown 01 and Oldtown 03A&D have been calculated and included in this assessment as part of the additional trips.

12.7.3 Mooretown Development

- Residential development (approved not constructed) comprising a total of 521 residential units.
- School development (constructed not occupied) to cater for 1,624 pupils on site.

The Mooretown School Site received permission from FCC to develop one primary school and one post-primary school to cater for a total population of 1,624 pupils. These schools are currently constructed but not yet operational.

In order to understand the future travel patterns of the pupils attending these schools, the approved School Travel Plan (STP) prepared by Waterman Moylan for the school site (Reg. Ref: F18A/0163) has been consulted. In this consultation, it was identified two modal split scenarios of which trip generation calculation was based on; the Opening Modal Split, referent to the expected modal split during the opening year of the schools, and the Target Modal Split, which indicates a target pattern of commuting based on a reduced use of car which will be achieved through the methods described in the STP, such as promoting car-pooling / sharing, promoting private bus services, promoting park and stride strategies and promoting walking and cycling.

For the Opening Modal Split, the usage of private car to commute to the school site was determined as 40%, which reduces to 35% for the Target Modal Split with the school fully operational.

As part of the STP, two other relevant commuting parameters were also used to calculate car trip generation for the schools during the opening and future years. These are shown below.

	Average Car Occupancy	% Early Drop Off
School Opening Year:	1.5	5%
Future Year:	1.75	10%

It is recognised that by the year of 2025 (Opening Year of the proposed development at Oldtown and assessment year of this TTA) the schools are unlikely to be operating at full capacity. However, in order to undertake a robust and conservative assessment of the surrounding road network and analysed junctions, as part of this TTA, trip generation for the Mooretown School site has been calculated based on the future year parameters as shown above and the schools operating at their full capacities. The estimated car trips for the Mooretown School development are presented below.

Development	Pupils	% Car (Future Modal Split)	Average Car Occupancy	% Early Drop Off	AM Peak Hour Trips	
					Trips IN	Trips OUT
Mooretown School	1,624 pupils	35%	1.75	10%	292	292
Total	-	-	-	-	292	292

Table 12.6| Trip Generation – School Site in Mooretown – 2025.

As can be seen from above, based on the future travel patterns as indicated in the School Travel Plan for the Mooretown School, the site is estimated to generate a total of 584 car trips in the AM peak hour (292 inbound and 292 outbound). No PM peak hour trips were assumed for the school site as the school collection period will not coincide with the road network peak hour.

Trip generation calculation for the residential developments in Mooretown (approved but not constructed) are shown below.

Land Use	Phase Reference	Dev. Size	AM Peak Hour		PM Peak Hour	
			Trips IN	Trips OUT	Trips IN	Trips OUT
Residential	Mooretown 01AB&C*	283 units	30	80	67	38
Residential	Mooretown 02*	208 units	22	59	49	28
Total	Mooretown	491 units 1,624 pupils	52	139	116	66

Table 12.7 | Trip Generation – Mooretown Developments - 2025.

* Development Approved but not Constructed.

As can be seen from above, it is estimated that the Mooretown development (considering the constructed school site and approved but not constructed residential developments) will generate a total of 775 vehicle trips in the AM peak hour (344 inbound and 431 outbound) and a total of 182 vehicle trips in the PM peak hour (116 inbound and 66 outbound).

12.7.4 Modal Split

Residential

The Census 2016 surveyed modal split for the journey to work, school or college by the residents living at developed area surrounding Oldtown and Mooretown LAP lands, recorded that approximately 75% of the 7,606 population generated 5,914 trips for the journey to work, school or college. The results of the Census 2016 survey and the target proposals for modal split for residents engaged on the

journey to and from work, school or college outside Oldtown-Mooretown Lands in 2030 are shown below.

Mode	Census 2016	Target 2030
Car (Driver)	55%	30%
Train	1%	30%
Bus	18%	20%
Cycle	2%	5%
On Foot	14%	15%
Other	10%	-
Total	**100%**	**100%**

Table 12.7: Census 2016 and 2030 Target Modal Split for Residents Journey to Work, School or College.

This target reduction in the use of private car and increase in the use of public transport have been based on the proposed local improvements in the area, such as BusConnects, MetroLink and the Swords Western Quality Bus Corridor.

12.7.5 Multi-Modal Trip Generation – 2025 – LAP Phases 1 and 2

Residential

From Table 12.8, it can be seen that the 1,344 new residential units (under construction, permitted and proposed) to be developed on Oldtown-Mooretown LAP lands by 2025 are expected to generate a total of 710 person trips during the AM peak hour (194 inbound and 516 outbound) and a total of 678 person trips during the PM peak hour (431 inbound and 247 outbound).

The analysis of the Census 2016 showed that the modal split for the journey to work, school or college by residents living in the surrounding area, was 55% by car, 1% by rail, 18% by bus, 2% by cycle, 14% on foot and the remaining 10% by others or were not stated. Accordingly, the mode shares percentages have been applied to the calculated person trips to quantify the multi-modal trip generation for the residential units and the results are presented below.

2025 - LAP Phases 1 & 2 (1,344 new residential units)					
Mode	**Modal Split (Census 2016)**	**AM Peak Hour Trips**		**PM Peak Hour Trips**	
		In	**Out**	**In**	**Out**
Car	55%	107	284	237	136
Train	1%	2	5	4	2
Bus	18%	35	93	78	44
Cycle	2%	4	10	4	4
On foot	14%	27	72	60	35
Other	10%	19	52	43	25
Total	**100.0%**	194	516	426	246

Table 12.8: Peak Hour Multi-Modal Trip Generation – Residential Units - 2025.

Retail

As shown, the new retail units (under construction) to be developed in Oldtown-Mooretown lands by 2025 are expected to generate a total of 60 person trips during the AM peak hour (36 inbound and 24 outbound) and a total of 84 person trips during the PM peak hour (40 inbound and 44 outbound).

It is understanding that the new retail units will primarily serve the residents of the LAP lands. However, with the objective to undertake a robust assessment of the surrounding road network, for the purpose of this TTA, it was assumed that 50% of all retail trips will originate externally, from outside of the LAP boundaries, 30% made by car, 10% by cycle and 10% on foot.

The calculated multi-modal trip generation for the retail units in 2025 is presented below.

2025 - LAP Phases 1 & 2 (1,510 sqm new retail)					
Mode	Assumed Modal Split (External)	AM Peak Hour Trips		PM Peak Hour Trips	
		In	Out	In	Out
Car	30%	5	4	6	7
Train	-	-	-	-	-
Bus	-	-	-	-	-
Cycle	10%	2	1	2	2
On foot	10%	2	1	2	2
Other	-	-	-	-	-
Total	**50%**	**9**	**6**	**10**	**21**

Table 12.9: Peak Hour Multi-Modal Trip Generation – Retail Units - 2025.

School

The under-construction Mooretown School Site (Reg. Ref. F18A/0163) received permission to develop one primary and one post-primary schools to cater for a total population of 1,624 students. It is likely that the majority of these students will originate internally, from within the LAP lands. However, in order to provide a conservative assessment of the surrounding road network, for the purpose of this TTA, it was assumed that 50% of students will attend the schools from outside the LAP lands, representing a total of 812 students.

The analysis of the Census 2016 showed that the modal split for the journey to school or college by residents living in Swords settlement area, was 38% by car, 1% by rail, 21% by bus, 2% by cycle, 33% on foot and the remaining 5% by others or were not stated. Assuming a realist occupancy rate of 1.75 pupils per car, the 38% recorded by Census 2016 will be reduced to approximately 22%.

The estimated multi-modal trip generation for the under-construction school site is presented below.

2025 - LAP Phases 1 & 2 (812 pupils attending the schools from outside LAP)						
Mode	Modal Split (Census 2016)	Car Occupancy of 1.75	AM Peak Hour Trips		PM Peak Hour Trips	
			In	Out	In	Out
Car	38%	22%	179	179	-	-
Train	1%	-	8	-	-	-
Bus	21%	-	171	-	-	-

Cycle	2%	-	16	-	-	-
On foot	33%	-	268	-	-	-
Other	5%	-	41	-	-	-
Total	**100%**	**-**	**683**	**179**	**-**	**-**

Table 12.10: Peak Hour Multi-Modal Trip Generation – School Site - 2025.

Multi-Modal Trip Generation – 2030 – Overall LAP

Residential

From Table 12.11, it can be seen that the 2,485 new residential units (under construction, permitted, proposed and future) to be developed on Oldtown-Mooretown LAP lands by 2030 are expected to generate a total of 1,437 person trips during the AM peak hour (378 inbound and 1,059 outbound) and a total of 1,643 person trips during the PM peak hour (983 inbound and 660 outbound).

Based on the target modal split proposals, the multi-modal trip generation calculated for the residential units in 2030 is presented below.

2030 – Overall LAP (2,485 new residential units)					
Mode	**Target Modal Split**	**AM Peak Hour Trips**		**PM Peak Hour Trips**	
		In	**Out**	**In**	**Out**
Car	30%	113	318	295	198
Train	30%	113	318	295	198
Bus	20%	76	212	197	132
Cycle	5%	19	53	49	33
On foot	15%	57	158	147	99
Total	**100.0%**	**378**	**1,059**	**983**	**660**

Table 12.11: Peak Hour Multi0Modal Trip Generation - Residential Units - 2030

From Table 12.12, it can be seen that the 1,768 new residential units (under construction, permitted, proposed and future) to be developed on Oldtown-Mooretown LAP lands by 2030 are expected to generate a total of 1,437 person trips during the AM peak hour (378 inbound and 1,059 outbound) and a total of 1,643 person trips during the PM peak hour (983 inbound and 660 outbound).

Retail - 2030

As presented in Table 12-6, the new retail units (under construction and future) to be developed in Oldtown-Mooretown lands by 2030 are expected to generate a total of 590 person trips during the AM peak hour (297 inbound and 293 outbound) and a total of 715 person trips during the PM peak hour (317 inbound and 398 outbound).

It is understanding that the new retail units will primarily serve the residents of the LAP lands. However, as assumed for the assessed year of 2025, in order to undertake a robust assessment of the surrounding road network, for 2030 it was also assumed that 50% of all retail trips will originate externally, from outside of the LAP boundaries, with 30% of these trips made by car, 10% by cycle and 10% on foot. The calculated multi-modal trip generation for the retail units in 2030 is presented below.

2030 – Overall LAP (7,510 sqm new retail)					
Mode	**Assumed Modal Split (External)**	**AM Peak Hour Trips**		**PM Peak Hour Trips**	
		In	**Out**	**In**	**Out**
Car	30%	89	88	95	119
Train	-	-	-	-	-
Bus	-	-	-	-	-
Cycle	10%	30	29	32	40
On foot	10%	30	29	32	40
Total	**100.0%**	**149**	**146**	**159**	**199**

Table 12.12: Peak Hour Multi-Modal Trip Generation – Retail Units – 2030.

School – 2030

The estimated multi-modal trip generation for the under-construction school site in 2030 is presented below. It has been assumed that the 2025 school travel patterns will be maintained in 2030.

2030 – Overall LAP (812 pupils attending the schools from outside LAP)

Mode	**Modal Split (Census 2016)**	**Car Occupancy of 1.75**	**AM Peak Hour Trips**		**PM Peak Hour Trips**	
			In	**Out**	**In**	**Out**
Car	38%	22%	179	179	-	-
Train	1%	-	8	-	-	-
Bus	21%	-	171	-	-	-
Cycle	2%	-	16	-	-	-
On foot	33%	-	268	-	-	-
Other	5%	-	41	-	-	-
Total	**100%**	**-**	**683**	**179**	**-**	**-**

Table 12.13: Peak Hour Multi-Modal Trip Generation – School Site – 2030.

Summary of Peak Hour Trips – 2030

Table 12.14 below shows a summary of the all mode, inbound and outbound trips expected to be generated by the new developments in Oldtown-Mooretown by 2030 during the AM and PM peak periods.

Mode	AM Peak Hour Trips		PM Peak Hour Trips	
	In	Out	In	Out
Car	381	585	390	317
Train	121	318	295	198
Bus	247	212	197	132
Cycle	65	82	81	73
On foot	355	187	179	139
Other	41	-	-	-
Total	**1,210**	**1,384**	**1,142**	**859**

Table 12.14: Peak Hour Multi-Modal Trip Generation – Summary – 2030.

12.7.6 Trip Distribution

In order to determine the amount of new car trips expected to travel through each assessed junction in the local road network, the calculated vehicle trips for Oldtown and Mooretown lands in the assessed years of 2025 (Opening Year of Proposed Development – Oldtown Planning 05) and 2030 (Opening Year of Proposed Development + 5 Years), summarised in Table 12, have been distributed and are presented below.

Access to the Oldtown lands will be provided via the Recently Constructed Signalised Crossroads between the R125 Rathbeale Road and the Western Distributor Link Road (WDLR), and via the Existing Four-armed Roundabout between the Glen Ellan Road and the Glen Ellan Road Western Extension.

Given the location of Oldtown lands – at the north-western edge of Swords, its position in relation to major employment and commercial centres, and the access routes to the R132 and the M1 motorway to the east, it was assumed that 80% of all Oldtown trips will make their way to the east along R125 Rathbeale Road and Glen Ellan Road, whilst the remaining 20% will travel westward along R125 Rathbeale Road. Of the 80% traveling east, 40% was assumed to leave the Oldtown lands via the Glen Ellan Road and 40% via the R125 Rathbeale Road.

Trip distribution percentage for the Glen Ellan Road roundabout, the signalised crossroads between R125 Rathbeale Road and Murrough Road and the priority T-junction between R125 Rathbeale Road and R108 Naul Road, were generally calculated using the base surveyed flows and associated turning movements. These percentages are shown in Figure 12-7.

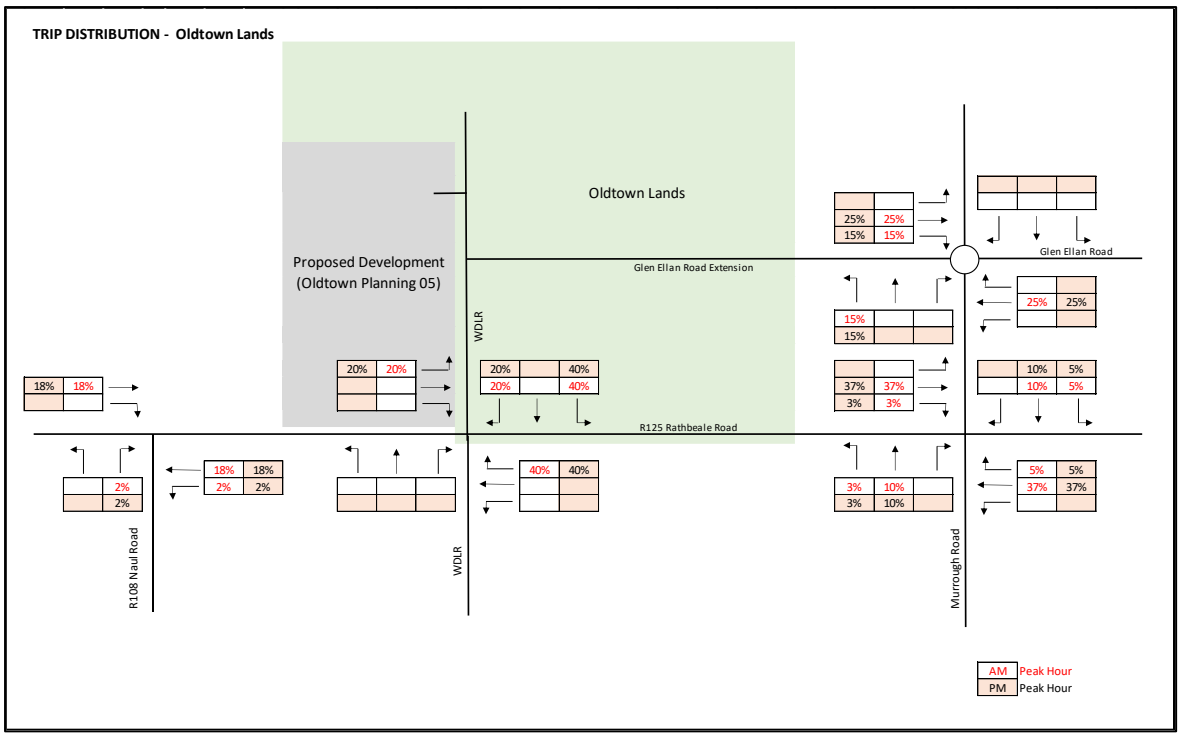


Figure 12.7 - Distribution of Generated Traffic

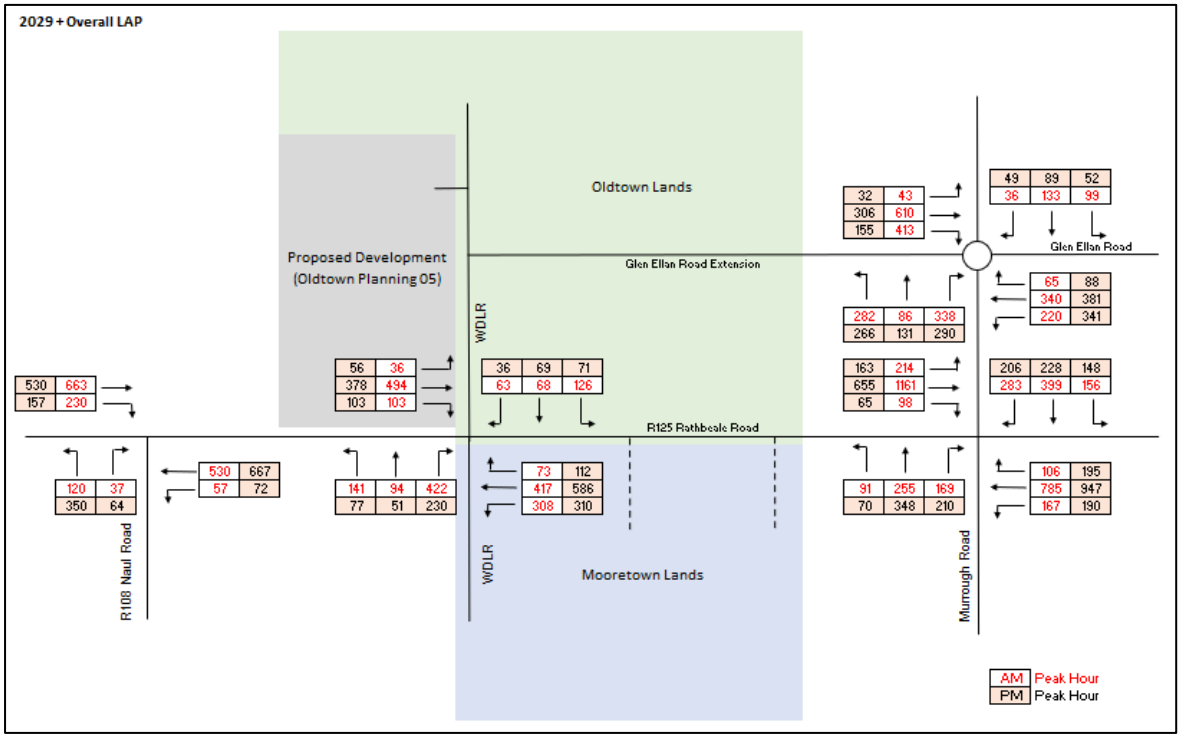


Figure 12.8: Car Trip Generation for AM and PM Peak Hours - Overall LAP – 2029

12.7.7 Traffic Growth and Assessment Periods

For the purpose of establishing the baseline year of 2020, the peak hour flows taken from the traffic surveys illustrated in Figure 12.3 have been factored up and the results are presented in Figure 12.10. As previously stated above, historic data from 2005/2006, 2017 and 2019 have been used.

The background traffic growth rates used to factor up the 2005/2006, 2017 and 2019 surveyed 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:

- 1.293 (Central Growth) growth factor from 2005/2006 to 2022.
- 1.084 (Central Growth) growth factor from 2017 to 2022.
- 1.049 (Central Growth) growth factor from 2019 to 2022.

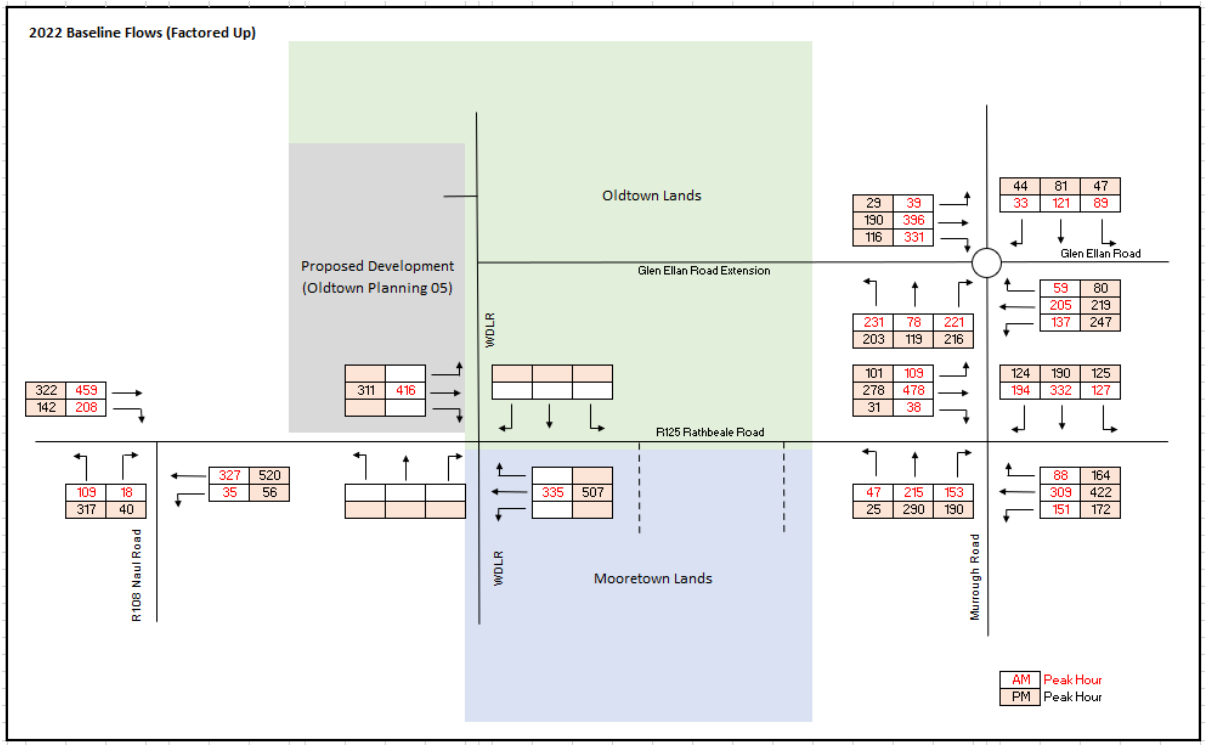


Figure 12.9 - 2040 Design Year Traffic Flows

12.7.8 Road Impact – Junction Analysis

Junctions Assessed

The assessment was based on the existing junction layouts which comprise: -

- Junction 1: R125 Rathbeale Road/R108 Naul Road (Priority T-junction);
- Junction 2: R125 Rathbeale Road/Western Distributor Link Road (Signalised Crossroads);
- Junction 3: R125 Rathbeale Road/Murrough Road (Signalised Crossroads);
- Junction 4: Glen Ellan Road (Four-armed Roundabout);

Modelling Background

There are various modelling software packages available to assess every type of junction. Waterman Moylan uses ARCADY, TRANSYT and PICADY to analyse roundabouts, signalised and priority junctions, respectively.

ARCADY is a software for modelling roundabouts. This programme utilises roundabouts geometry and traffic flows input by the user to determine Ratio of Flow to Capacity (RFC) and queue length for each link on the roundabout.

TRANSYT (Traffic Network Study Tool) software is a widely accepted software for modelling signalled controlled junctions. This programme utilises the phases input by the user and optimises their timings over a cycle time. The outputs of a TRANSYT assessment include a Degree of Saturation percentage (DOS%) figure and queue length for each link on the road network.

PICADY is a software for modelling priority-controlled junctions. This programme utilises junction's geometry and traffic flows input by the user to determine Ratio of Flow to Capacity (RFC) and queue length for each link on the junction.

Typically, a junction is said to be working satisfactorily when the DOS% or RFC of each link does not exceed 90%/0.9. Acceptable DOS% or RFC values are considered to be in the range of 80%/0.8 to 100%/1.0 with higher values indicating restrained movements.

Assessment Scenarios

The performance of the junctions has been analysed for the critical AM Peak Hour and PM Peak Hour (08:00 – 09:00 and 17:00 – 18:00) for the following scenarios:

- **2021 (Base Year**): Surveyed Flows factored up to 2021 Baseline Flows.
- **2024**: 2021 Baseline Flows factored up to 2024.
- **2024 + LAP Developments**: 2024 Flows + Constructed, Approved and Proposed Developments in Oldtown-Mooretown LAP.
- **2029**: 2021 Baseline Flows factored up to 2029.
- **2029 + Overall LAP**: 2029 Flows + Overall Oldtown-Mooretown LAP Developments.
- **2039**: 2021 Flows factored up to 2039.
- **2039 + Overall LAP**: 2039 Flows + Overall Oldtown-Mooretown LAP Developments.

A summary of the baseline two-way flows and the two-way flows expected to be generated by the proposed + committed and potential future developments in the Oldtown-Mooretown LAP are presented below for each individual junction.

Description	Total Junction Two Way Flow (Veh)	Proposed + Committed + Future Developments Two Way Flow (Veh)	% Traffic Increase
AM Peak Hour (08:00 - 09:00)	1092	290	26.57%
PM Peak Hour (17:00 - 18:00)	1319	212	16.07%

Table 12.15: Existing and Predicted Two-way Traffic – 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)	722	821	113.71%
PM Peak Hour (17:00 - 18:00)	786	601	76.46%

Table 12.16: Existing and Predicted Two-way Traffic – 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)	2,115	580	27.43%
PM Peak Hour (17:00 - 18:00)	1,994	424	21.26%

Table 12.17: Existing and Predicted Two-way Traffic – 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)	1,872	193	10.31%
PM Peak Hour (17:00 - 18:00)	1,536	142	9.25%

Table 12.18: Existing and Predicted Two-way Traffic – Junction 4..

As recommended in the 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 (ADDT) 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 I 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. Note that: for Junction 1 and Junction 3 the date of

the survey is unknown and the day and month for the ADDT calculation was assumed to be the same as Junction 2 Survey – IDASO 2017.

Junction 1 (Priority T-junction): R125 Rathbeale Road / R108 Naul Road:

Hour Ending	Proportion of Daily Traffic	Existing Two-way Flows Through Site 1 (Veh)
09:00	**0.081**	**894**
18:00	**0.088**	**1,080**
Total	**0.169**	**1,974**

Table 12.19: Junction 1 – AADT Calculations

24 Hour Estimate = 1,974/0.169 = 11,680 vehicles

Weekly Average Daily Traffic (WADT) = 11,680 x 0.94 = 10,979 vehicles

Annual Average Daily Traffic (AADT) = 10,979 x 0.98 = **10,759 vehicles**

Junction 2 (Signalised Crossroads): R125 Rathbeale Road/Western Distributor Link Road;

Junction 2 has a full 24-hour survey and the traffic count for this junction was 7,645 vehicles.

24 Hour Traffic = 7,645

Weekly Average Daily Traffic (WADT) = 7,645 x 0.94 = 7,186 vehicles

Annual Average Daily Traffic (AADT) = 7,186 x 0.98 = **7,042 vehicles**

Junction 3 (Signalised Crossroads): R125 Rathbeale Road/Murrough Road:

Hour Ending	Proportion of Daily Traffic	Existing Two-way Flows Through Site 3 (Veh)
09:00	0.081	1683
18:00	0.088	1623
Total	0.169	3,306

Table 12.20: Junction 3 – AADT Calculations

24 Hour Estimate = 3,306/0.169 = 19,562 vehicles

Weekly Average Daily Traffic (WADT) = 19,562 x 0.94 = 18,388 vehicles

Annual Average Daily Traffic (AADT) = 18,388 x 0.98 = **18,020 vehicles**

Junction 4 (Four-armed Roundabout): Glen Ellan Road:

Hour Ending	Proportion of Daily Traffic	Existing Two-way Flows Through Site 3 (Veh)
07:00	0.037	921
08:00	0.077	1,849
09:00	0.081	962
10:00	0.066	576
11:00	0.055	658
12:00	0.055	819
13:00	0.059	1,142
14:00	0.062	1,266
15:00	0.063	1,144
16:00	0.069	1,309
17:00	0.083	1,494
18:00	0.088	1,521
Total	0.795	13,661

Table 12.21: Junction 4 – AADT Calculations.

24 Hour Estimate = 13,661/0.795 = 17,184 vehicles

Weekly Average Daily Traffic (WADT) = 17,184 x 0.94 = 16,153 vehicles

Annual Average Daily Traffic (AADT) = 16,153 x 0.98 = **15,830 vehicles**

12.7.9 Junction Analysis Results

Junction 1 – R125 Rathbeale Road / R018 Naul Road

Junction 1 is an existing three-armed priority-controlled junction located to the west of the proposed development site. This junction has been modelled based on its current configuration and the PICADY analysis results are summarise in Table 12.22 below. The results are shown below. The arms of the junction were labelled as follows within PICADY model:

- Arm A: R125 Rathbeale Road (E);
- Arm B: R108 Naul Road (S);
- Arm C: R125 Rathbeale Road (W).

Figure 12.10: Junction 1 Rathbeale Road / R018 Naul Road

Junction 1 is an existing three-armed priority-controlled junction located to the west of the proposed development site. This junction has been modelled based on its current configuration and the PICADY analysis results are summarise in Table 12.22 below. The arms of the junction were labelled as follows within the PICADY model:

- Arm A: R125 Rathbeale Road (E);
- Arm B: R108 Naul Road (S);
- Arm C: R125 Rathbeale Road (W).

Stream	AM Peak (08:00 to 09:00)		PM Peak (17:00 to 18:00)	
	Queue (veh.)	RFC	Queue (veh.)	RFC
2022				
Stream B-C	0.2	0.16	1.2	0.54
Stream B-A	0.1	0.06	0.2	0.14
Stream C-AB	1.9	0.54	0.9	0.37
2025				
Stream B-C	0.2	0.17	1.3	0.57
Stream B-A	0.1	0.06	0.2	0.16
Stream C-AB	2.2	0.58	1.0	0.40

2025 + LAP Developments				
Stream B-C	0.2	0.18	1.4	0.59
Stream B-A	0.1	0.10	0.3	0.21
Stream C-AB	3.2	0.65	1.3	0.42
2030				
Stream B-C	0.2	0.19	1.7	0.64
Stream B-A	0.1	0.07	0.2	0.20
Stream C-AB	3.2	0.66	1.3	0.44
2030 + Overall LAP Developments				
Stream B-C	0.3	0.20	2.3	0.70
Stream B-A	0.1	0.12	0.6	0.36
Stream C-AB	4.9	0.74	2.1	0.53
2040				
Stream B-C	0.2	0.20	2.0	0.67
Stream B-A	0.1	0.07	0.3	0.22
Stream C-AB	3.6	0.69	1.4	0.47
2040 + Overall LAP Developments				
Stream B-C	0.3	0.21	2.8	0.74
Stream B-A	0.1	0.13	0.7	0.41
Stream C-AB	6.2	0.78	2.4	0.56

Table 12.22 | Junction 1 - PICADY Analysis Results.

The analysis results in Table 12.22 indicate that the Junction 1 is currently operating well within capacity during both peak periods, with the highest RFC at 0.54 and a corresponding queue of 1.9 vehicle during the AM peak period and a maximum RFC at 0.54 with a corresponding queue of 1.2 vehicle recorded for the PM.

For the future assessment year of 2040, with the baseline traffic factored up and the inclusion of the trips generated by the overall Oldtown Mooretown LAP lands (including the proposed development), the subject junction would continue to operate within capacity during both peak hours, with the highest RFC at 0.78 and a corresponding queue of 6.2 vehicles during the AM and with the highest RFC at 0.74 and a corresponding queue of 2.8 vehicles recorded for the PM.

Junction 2 – R125 Rathbeale Road/Western Distributor Link Road

Junction 2 is a recently constructed signalised crossroads located immediately south of the proposed development site. This junction has been modelled based on its current configuration and the TRANSYT analysis results are summarise in Table 12.23 below. The arms of the junction were labelled as follows within the TRANSYT model:

- Arm A: R125 Rathbeale Road (E);
- Arm B: WDLR (S);
- Arm C: R125 Rathbeale Road (W);
- Arm D: WDLR (N).

Arm	Mov.	AM Peak (08:00 to 09:00)		PM Peak (17:00 to 18:00)	
		Queue (veh.)	DOS%	Queue (veh.)	DOS%
2025 + LAP Developments					
A	S/L	14.24	62	13.16	54
	R	2.51	50	4.71	53
B	S/L	3.23	32	0.55	14
	R	6.19	54	0.99	24
C	S/L	12.71	57	7.93	37
	R	1.75	36	0.50	6
D	S/L	6.33	58	3.38	47
	R	2.32	22	1.39	19
2030 + Overall LAP					
A	S/L	15.35	65	24.27	79
	R	2.51	50	5.47	72
B	S/L	3.74	35	3.90	50
	R	7.28	60	8.66	86
C	S/L	13.90	61	9.38	42
	R	1.71	36	2.83	43
D	S/L	6.46	61	6.18	80
	R	2.35	24	1.42	23

2040 + Overall LAP					
A	S/L	15.75	67	25.46	81
	R	2.51	50	5.47	72
B	S/L	3.74	35	3.70	50
	R	7.28	60	8.66	86
C	S/L	14.52	63	9.51	43
	R	1.71	36	2.83	43
D	S/L	6.46	61	6.18	80
	R	2.35	24	1.42	23

Table 12.23: Junction 2 - TRANSYT Analysis Results.

The analysis results in Table 12.23 indicate that, the recently constructed Junction 2, with the inclusion of the trips estimated for the constructed, approved and proposed developments in the LAP lands, would operate within capacity for the assessment year of 2025 + LAP Developments during both peak hours, with the highest DOS at 62% and a corresponding queue of 14.30 vehicles during the AM, and with the highest DOS at 55% and a corresponding queue of 13.57 vehicles during the PM.

For the future assessment year of 2040, with the baseline flows factored up and the inclusion of the trips generated by the overall LAP (including the proposed development), the results indicate that Junction 2 would continue to operate within capacity during both peak hours, with the highest DOS at 91% and a corresponding queue of 17.48 vehicles during the AM, and the highest DOS at 92% and a corresponding queue of 11.21 vehicles recorded for the PM.

Junction 3 – R125 Rathbeale Road / Murrough Road

Junction 3 is an existing signalised crossroads located southeast of the proposed development site. This junction has been modelled based on its current configuration and the TRANSYT analysis results are summarise in Table 12.24 below. The arms of the junction were labelled as follows within the TRANSYT model:

- Arm A: Glen Ellan Road (NE);
- Arm B: R125 Rathbeale Road (SE);
- Arm C: Murrough Road (SW);
- Arm D: R125 Rathbeale Road (NE);

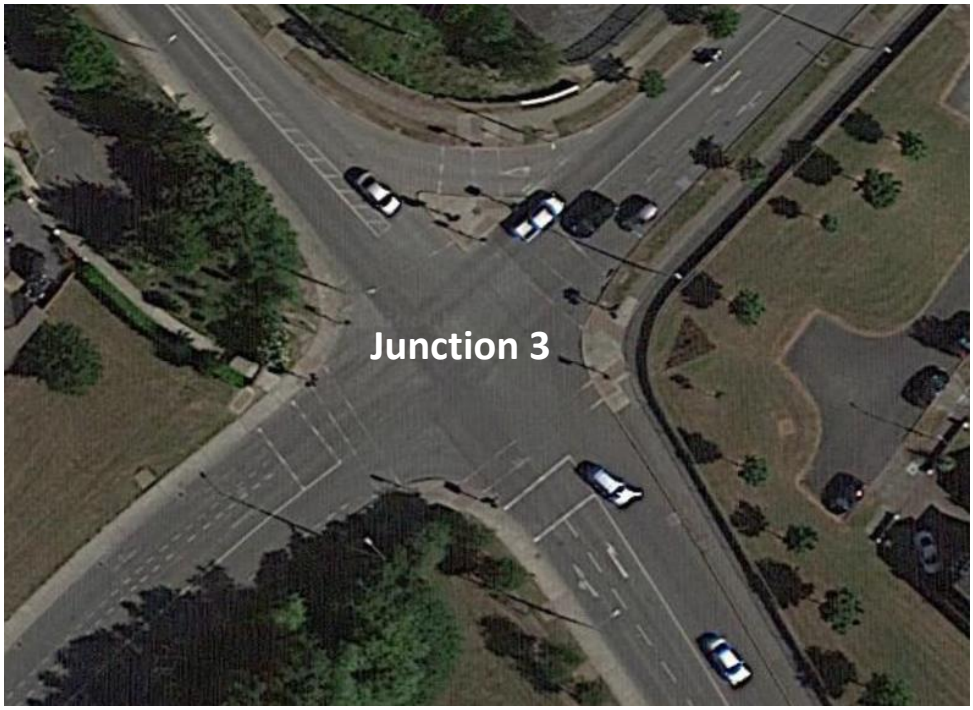


Figure 12.11: Junction 3 - R125 Rathbeale Road / Murrough Road.

Junction 3 is an existing signalised crossroads located southeast of the proposed development site. This junction has been modelled based on its current configuration and the TRANSYT analysis results are summarise in Table 12.24 below. The arms of the junction were labelled as follows within the TRANSYT model:

- Arm A: Glen Ellan Road (NE);
- Arm B: R125 Rathbeale Road (SE);
- Arm C: Murrough Road (SW);
- Arm D: R125 Rathbeale Road (NE).

Arm	Mov.	AM Peak (08:00 to 09:00)		PM Peak (17:00 to 18:00)	
		Queue (veh.)	DOS%	Queue (veh.)	DOS%
2022					
A	S/L	17.22	87	17.36	98
	R	5.32	35	3.79	37
B	S/L	22.33	97	27.69	97
	R	3.61	70	8.50	91
C	S/L	10.77	86	16.77	97
	R	4.85	48	6.17	56
D	S	11.99	76	3.65	36

	R	1.47	16	1.46	11
	L	0.82	8	0.79	8
2025					
A	S/L	18.23	88	21.62	103
	R	5.54	36	3.99	39
B	S/L	27.95	101	34.67	102
	R	4.86	85	10.04	95
C	S/L	11.88	89	20.53	101
	R	5.10	50	6.56	59
D	S	13.26	80	3.90	38
	R	1.47	18	1.46	11
	L	0.85	9	0.82	8

Table 12.24: Junction 3 - TRANSYT Analysis Results.

The analysis results indicate that the Junction 3 is currently operating at capacity during both peak hours, with the highest DOS at 97% and a corresponding queue of 22.33 vehicles during the AM peak hour and a maximum DOS at 97% with a corresponding queue of 27.69 vehicles recorded for the PM.

For the assessed year of 2025, even without the inclusion of any new development trips, the results indicate that Junction 3 would operate above capacity during both peak hours, with the highest DOS at 101% and a corresponding queue of 27.95 vehicles during the AM, and with the highest DOS at 103% and a corresponding queue of 21.62 vehicles during the PM. The Oldtown-Mooretown LAP acknowledges that, at the time of preparing the LAP document in 2010, this junction was already operating at capacity with the critical arm operating at 89% of the available capacity and sets out plan to modify this junction.

It is recognised by the Council that R125 Rathbeale Road is one of the critical routes currently serving the Swords Northwest area, including the Oldtown and Mooretown lands.

It is understanding that the development of Oldtown and Mooretown lands without any intervention to the transportation infrastructure is likely to increase the current pressures on R125 Rathbeale Road and consequently oversaturate its intersections with other important links, which are currently working at or above their capacities. Rathbeale Road / Murrough Road (Junction 3) is definitely one of the most affected junctions.

With the objective to update and refine the development strategy in the overall South Fingal area in terms of transportation, Fingal County Council commissioned SYSTRA to carry out the South Fingal Transport Study. This study, which includes an extensive assessment of the Swords North West area – where Oldtown-Mooretown LAP lands are situated, was published in February 2019 and will form

the basis for future transportation development in the medium and long terms. With the recommendations included as part of the SYSTRA assessment of the Swords North West area (presented later in Section 13), it is estimated that the overall traffic increase and impact arising from the new developments in North West Sector (including the Oldtown-Mooretown LAP lands) will not be of a scale that would indicate a requirement for additional road capacity.

Junction 4 – Glen Ellan Road Roundabout

Junction 4 is an existing four-armed priority-controlled roundabout located east of the proposed development site. This junction was modelled based on its current configuration and the results of the ARCADY modelling are shown below. The arms of the roundabout were labelled as follows within the ARCADY model:

- Arm 1: Glen Ellan Road (E);
- Arm 2: Glen Ellan Road (S);
- Arm 3: Glen Ellan Road (W);
- Arm 4: Northern Arm (N).

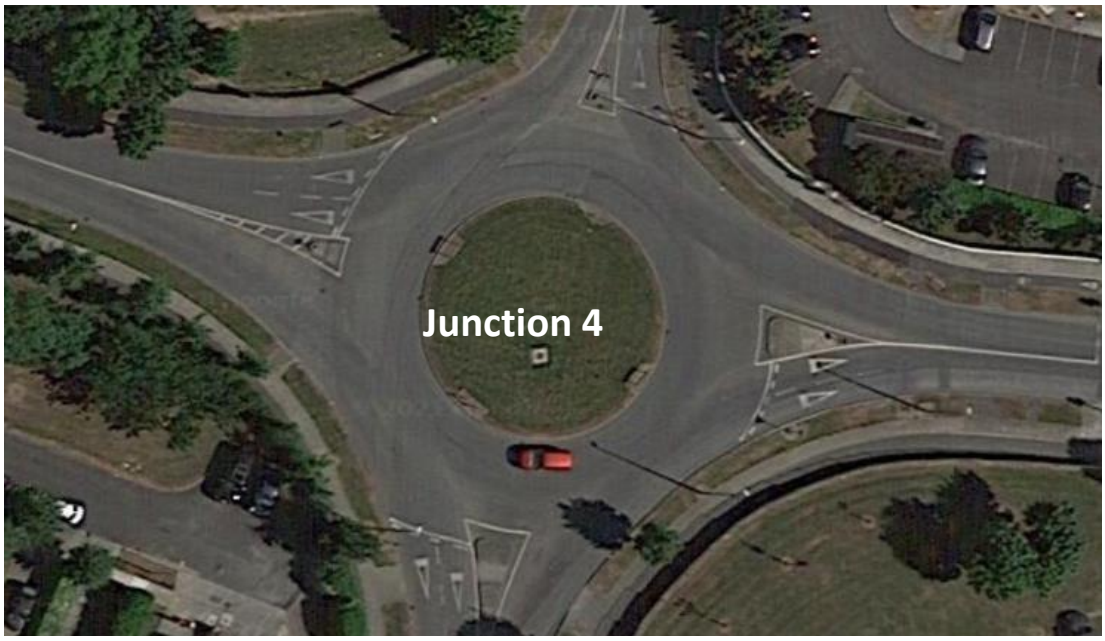


Figure 12.12: Junction 4 – Glen Ellan Road Roundabout

Junction 4 is an existing four-armed priority-controlled roundabout located east of the proposed development site. This roundabout has been modelled based on its current configuration and the ARCADY analysis results are summarise in Table 12.25 below. The arms of the roundabout were labelled as follows within the ARCADY model:

- Arm 1: Glen Ellan Road (E);
- Arm 2: Glen Ellan Road (S);
- Arm 3: Glen Ellan Road (W);
- Arm 4: Northern Arm (N).

The analysis results in Table 12.25 indicate that Junction 4 is currently operating well within capacity during both peak hours, with the highest RFC at 0.58 and a corresponding queue of 1.4 vehicle during the AM and a maximum RFC at 0.44 with a corresponding queue of 0.8 vehicle recorded for the PM.

For the future assessed year of 2040, with the inclusion of the estimated trips to/from the overall Oldtown Mooretown LAP development, the results indicate Junction 4 would operate at capacity during the AM peak hour, with the highest RFC at 0.89 and a corresponding queue of 7.4 vehicles, and within capacity during the PM peak hour, with the highest RFC at 0.70 and a corresponding queue of 2.3 vehicles recorded.

Arm	AM Peak (08:00 to 09:00)		PM Peak (17:00 to 18:00)	
	Queue (veh.)	RFC	Queue (veh.)	RFC
2022				
Arm 1	0.6	0.36	0.8	0.44
Arm 2	0.7	0.43	0.8	0.44
Arm 3	1.4	0.58	0.4	0.26
Arm 4	0.6	0.39	0.3	0.20
2025				
Arm 1	0.6	0.39	0.9	0.46
Arm 2	0.8	0.45	0.9	0.47
Arm 3	1.6	0.61	0.4	0.28
Arm 4	0.7	0.42	0.3	0.21
2025 + LAP Developments				
Arm 1	1.0	0.51	1.3	0.56
Arm 2	1.1	0.53	1.2	0.54
Arm 3	3.7	0.79	0.6	0.36
Arm 4	1.2	0.55	0.3	0.23
2030				
Arm 1	0.8	0.45	1.0	0.50
Arm 2	1.0	0.49	1.0	0.51
Arm 3	2.9	0.75	0.4	0.30

Arm 4	1.2	0.55	0.3	0.24
2030 + Overall LAP				
Arm 1	1.2	0.55	2.1	0.68
Arm 2	1.3	0.58	1.8	0.64
Arm 3	5.8	0.86	0.7	0.42
Arm 4	2.0	0.67	0.4	0.27
2040				
Arm 1	0.8	0.44	1.1	0.52
Arm 2	1.0	0.51	1.1	0.53
Arm 3	2.3	0.70	0.5	0.32
Arm 4	1.1	0.53	0.3	0.25
2040 + Overall LAP				
Arm 1	1.3	0.57	2.3	0.70
Arm 2	1.5	0.60	2.0	0.67
Arm 3	7.4	0.89	0.8	0.44
Arm 4	2.5	0.72	0.4	0.28

Table 12.25: Junction 4 - ARCADY Analysis Results.

12.8 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.

12.9 Risks to Human Health

Construction Stage

A number of temporary risks to human health may occur during construction phase related to noise, dust, air quality and visual impacts which are addressed in other sections of this EIAR. Traffic impacts are considered to be negligible due to the implementation of mitigation measures identified in Section 12.10.

Operational Stage

There will be increase in traffic on the local road network.

12.10 Mitigation Measures

In order to eliminate or reduce the potential impacts described above, remedial and mitigation measures will be implemented as set out below and in the Construction Management Plan included under a separate cover with this application.

Construction Stage

- Adequate signposting will be located on-site to ensure safety of all road users and construction workers.
- Due to the proximity of the proposed site along well-serviced bus routes and being well served by cycle lanes, it is intended to limit construction staff parking and to encourage the use of public transport. A limited number of car parking spaces may be provided for senior construction managers within the development site. Suitable locations in the surrounding area may be identified where staff can park and link to public transportation.
- The main contractor as part of their site set-up arrangements, shall appoint a Coordinator responsible for the implementation of a Construction Stage Mobility Management Plan and shall carry out the following tasks as part of their role:
    - Provide an extensive information service for public transport options and routes at public location(s) within the development for construction workers;
    - Update the public transport information adjacent to the development on on-going basis; and
    - Advise company staff of tax incentives for public transport and bicycles.
- For those wishing to cycle to and from the development, dedicated cycle parking will be provided for the duration of the works within the site. Shower facilities and lockers will also be provided.
- A dedicated "construction site"' access/egress system will be implemented during the construction phases.
- Hoarding will be set up around the perimeter to prevent pedestrian access.
- Dedicated construction haul routes will be identified and agreed with the local authority prior to the commencement of constructions activities onsite.
- A material storage zone will also be provided in the Construction Compound area. This storage zone will include material recycling areas and facilities.
- A detailed Construction and Traffic Management Plan will be prepared by the contractor and agreed with the Local Authority prior to commencing works on site.

Operational Stage

- To reduce traffic impact and to promote more sustainable modes of transport a Mobility Management Plan will be prepared for the development
- A management company will be appointed by the developer to manage the development. A senior member of staff from the management company who supports the philosophy of the Plan will be appointed as the Co-ordinator. The Co-ordinator will be responsible for:

- Implementation and maintenance of the Plan;
- Monitoring progress of the Plan
- Liaison with public transport operators and officers of the Planning and Highway Authorities;
- Production of information reports for the Developer, the occupier(s) and the Planning and Highway Authorities; and
- Ongoing assessment of the objectives of the Plan.

- Up to date local bus timetables will be maintained within the tenant amenity area and other fixed points within the buildings on the site. Residents will be advised of their location. In addition, internet access to travel information will be provided. The developer will provide all new residents with a travel pack showing alternative modes of travel to the development. Where possible, the developer will advise visitors to the site of alternative modes of travel to that of the car.
- Secure parking facilities will be provided for residents, visitors and Creche users. Local cycle route information will be provided in the tenant amenity area and at other fixed points within the development and residents will be advised of their location. Details of cycle parking provided is included in the Traffic and Transport Assessment provided with the planning submission.
- 2 No. go Car spaces will be initially provided and details of how to join the scheme will be provided to all residents when they move into their apartment. Information will also be displayed within the resident amenity area and updated when required.
- The Co-ordinator will be responsible for the management of inappropriate parking within the development. This parking management will ensure that spaces are reserved for those who have rented the space and will be accessible only to those users.

12.11 Predicted Impacts of the Proposed Development

Construction Stage

Due to the proposed mitigation measures outlined above, the impact of the proposed development will be temporary and minimised during the construction stage.

Operational Stage

- There will be increase in the use of the road network by private vehicles. A mobility management plan will promote more sustainable forms of transport.

There will be an increase in the number of pedestrians and cyclists in the surroundings of the development. However, footpaths and cycling paths are provided as part of the proposed development and the overall Oldtown area, thus, impact should be minimal.

12.12 Monitoring

Construction Stage

Traffic management and deliveries will be carefully monitored during the construction stage as part of the Construction Management Plan. The appointed contractor will monitor their mobility management plan to ensure that is operating effectively. Local residents will be kept fully informed of construction activities through mail shots, email and site notices.

Operational Stage

During the operational stage the Mobility Management Plan will be monitored by the Co-ordinator. The travel survey will establish the initial modal split of travel by residents.

The Co-ordinator, in consultation with the Developer, the Occupiers, and the Local Authority or its agents, will agree annual targets, following completion and analysis of the travel survey, for increasing the percentage of non-car modes.

The Co-ordinator will:

- Meet with officers of the Local Authorities or its agents within a period of 6 months following occupation of the building(s) and thereafter every 12 months to assess and review progress of the Plan and agree objectives for the next 12 months, and
- Prepare and submit to senior management of the Developer, the Occupier(s) and the Local Authorities or its agents, an annual Monitoring Report.

12.13 Interactions

Construction Stage

Temporary negative impacts to human health may be likely during the Construction Phase due to noise, dust, air quality and visual impacts which are discussed in the relevant chapters of this EIAR. Temporary traffic management will be required to facilitate connections to existing utilities in the existing roads.

The traffic impacts, which would be temporary in duration are not considered to be significant due to the implementation of the mitigation measures identified in Section 12.10.

Operational Stage

Noise generated by increased traffic flows have been assessed in the Air and Noise Chapters of the EIAR.

12.14 Difficulties Encountered

There were no difficulties encountered.

12.15 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
- Oldtown-Mooretown Local Area Plan (October 2010)
- 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
- Transport for Ireland (TFI): www.transportforireland.ie

13.0 CULTURAL HERITAGE

13.1 Introduction

Chapter 13 of this Environmental Impact Assessment has been prepared by Courtney Deery Heritage Consultancy Ltd. the cultural heritage (comprising cultural heritage, archaeological and architectural heritage background relating to the proposed development at Oldtown, Swords, Co. Dublin. The proposed development area lies in the townlands of Rathbeal and Oldtown, north of the Rathbeale Road (R125) to the west of Swords Town, north County Dublin (Fig.13.1).

Figure 13.1 – Site Location

The subject application, referred as Oldtown Planning 5, will comprise a total of 377 residential units (c. 10.223 hectares) (Fig.13.2). The site is made up of a large open field which covers the north and central area, while several structures, surfaces and amenities occupy the southern extent of the lands where a temporary school was erected in the late 2000s.

The objective of the report is to assess the impact of the proposed development on the receiving cultural, archaeological and archaeological heritage environments and to propose ameliorative measures to safeguard any monuments, features, finds of antiquity or features of architectural or cultural heritage merit.

This assessment has been prepared in accordance with the EIA Directive 2014/52/EC and current Environmental Protection Agency (EPA) guidelines. This section should be read in conjunction with the site layout plans and project description sections of this EIAR.

Figure 13.2 – Site layout Figure

13.2 Methodology

13.2.1 Archaeological Heritage Assessment Methodology

This archaeological impact study was based on the combination of a desk study, geophysical survey, archaeological testing, monitoring and excavations within the application area. The following sources were availed of:

Record of Monuments and Places (RMP) and Sites and Monuments Record (SMR) (Fig. 13.3)

The primary source of information for the desk study is the Record of Monuments and Places (RMP) of the Department of Housing, Local Government and Housing (DHLGH). The Sites and Monuments Record (SMR), as revised in the light of fieldwork, formed the basis for the establishment of the statutory RMP pursuant to Section 12 of the National Monuments (Amendment) Act, 1994. The RMP records known upstanding archaeological monuments, their original location (in cases of destroyed monuments) and the position of possible sites identified as cropmarks on vertical aerial photographs. It is based on a comprehensive range of published and publicly available documentary and cartographic sources. The information held in the RMP files is read in conjunction with constraint maps (published at reduced six-inch scale). The RMP is constantly updated and is the first stage in the preparation of a national archaeological survey; inventories are published at an interim stage. The sites and monuments database of the Archaeological Survey of Ireland which is available online at www.archaeology.ie was also examined.

The topographical files of the National Museum of Ireland

The topographical files of the National Museum of Ireland (NMI) identify recorded stray finds held in the museum's archive. The finds, which are donated to the state in accordance with national

monuments legislation, are provenanced to townland and sometimes include reports on excavations undertaken by NMI archaeologists earlier in the twentieth century.

Oldtown-Mooretown Archaeological Investigations 2003–2009, 2011, 2013–2020

As part of the LAP, (adopted 2010) several phases of licenced non-invasive and invasive archaeological assessments have been carried out across the Oldtown-Mooretown LAP lands within which the present planning application lies (Appendix 13.1 provides a full list of surveys carried out). The focus of many of the earlier investigations was to provide a detailed archaeological assessment for consideration in the development of a planning strategy for the LAP. The most significant result of these investigations has been the identification of a previously unknown extensive early medieval ecclesiastical complex; a religious site with burials and settlement, dating to the first millennium AD. This complex is entirely subsurface, without any remains above ground, and presents only as natural ridges within green fields. It extends from the southern part of Oldtown, into the northern part of Mooretown. The complex is now cut by the Rathbeale Road and separated into two different townlands. Later investigations were specific to individual planning applications within the LAP area.

In addition to the ecclesiastical complex at Oldtown-Mooretown, further significant unrecorded archaeological sites were discovered within the Mooretown lands to the south of the Rathbeale Road, including a water mill, a medieval settlement in vicinity of what is known as Glasmore Abbey (RMP no: DU011-019), a fulacht fiadh (RMP no: DU011-148) and natural spring source for the recorded holy well (RMP no: DU011-018), and a possible ringfort (RMP no: DU011-147). In Oldtown a large ditched-enclosure was identified as a result of testing in 2013 and remains in situ (RMP no: DU011-150) within the Phase 5 and adjacent Phase 4 lands and more recently a further ditched enclosure was excavated in Rathbeal within the Phase 2 lands (licence Ref. 19E0736). Further smaller scale archaeological remains have also been uncovered within the wider lands as a result of testing and monitoring and include a number of cereal drying kilns, a well and various pits. Figures 13.4 and 13.6 provide an overview of the archaeological findings.

Oldtown Mooretown Conservation and Management Plan (Courtney, 2010)

Given the scale and significance of the discoveries within the LAP lands, a Conservation and Management Plan was undertaken on behalf of Fingal County Council. The plan outlines the historical and cultural significance of the LAP lands at Oldtown-Mooretown. It recognises the subsurface nature of the newly identified sites and features, and that any future development layout should support the identity of these sites and features. The provisions of the Archaeological Conservation and Management Plan form an integral element of the LAP strategy and have been vital in informing the Urban Design/Landscape Masterplan(s) for the lands.

The plan outlines policies for the protection and management of the below-ground remains and provides recommendations for improving access in the form of an Archaeological Park and greenways, linking archaeological features and surrounding parklands. It also provides guiding principles for the future planning and development strategies in the LAP area.

Consultation

The then Department of Culture Heritage and the Gaeltacht (DCHG, now Department of Housing Local Government and Heritage, DHLGH) was consulted through all key stages of the LAP particularly in relation to the establishment of buffer zones around the sensitive subsurface archaeological sites and in the compilation of the Conservation and Management Plan 2010 which has informed the Masterplan for the area.

Geophysical Survey

Two phases of geophysical survey have been undertaken within the Phase 5 application lands (Fig. 13.4). The first was undertaken in April 2006 as part of a predevelopment assessment in advance of the construction of a temporary school in the southern extent of the Phase 5 application area (Leigh 2006; Licence no: 06R0067), while the second was undertaken in 2011 across the central and northern portions of the application area as part of pre-planning investigations (Target Geophysics 2011; Licence no: 11R0044).

Test Excavations

A programme of test excavations was undertaken in September 2017 in advance of a planning application for the Phase 5 development (McLoughlin 2018; Licence no: 17E0446). A total of twelve test trenches were excavated in order to examine anomalies identified within the geophysical survey (Licence no: 11R0044) and to establish whether there were any archaeological remains associated with features indicated in aerial photography to the west of the application area (RMP no's: DU011-135, DU011-136, DU011-137), and to establish the nature, extent and character of any such remains. These investigations revealed the remains of a probable cereal drying kiln and a pit. Recommendations included the excavation of these features and archaeological monitoring of topsoil stripping of the proposed development area.

Excavations

In addition to the extensive archaeological investigations within the lands, the summary results of excavations that previously have been undertaken in the environs of the proposed development was also examined in 'Excavations', an annual bulletin that contains summary accounts of all excavations carried out annually in Ireland. The bulletins range from 1969 to 2020 and can be accessed at www.excavations.ie. Within the development area archaeological monitoring of topsoil removal was carried out and further small-scale archaeological features were identified. These features along with those identified in testing were excavated in 2018 (licence Ref. 17E0446, Rice, 2019).

13.2.2 Architectural and Cultural Heritage Assessment Methodology

The main purpose of the architectural heritage and cultural heritage assessment is to examine the potential significance and sensitivity of the existing architectural and cultural heritage environment, and in turn to evaluate the likely and significant impacts of the proposed development on this environment. The assessment of the architectural and cultural heritage is based on a desk study of published and unpublished documentary and cartographic sources:

The Record of Protected Structures (RPS) and National Inventory of Architectural Heritage (NIAH)

The primary source of architectural heritage information is Fingal County Development Plan (2017-2023) which was consulted for the Record of Protected Structures (RPS) in the study area. The National Inventory of Architectural Heritage (NIAH) survey of Fingal was carried out in 2002; this building survey highlights a representative sample and raises awareness of the wealth of architectural heritage in the county. The NIAH surveys can be reviewed at www.buildingsofireland.ie.

Documentary and Cartographic Sources

Documentary and literary sources were consulted in the Trinity map library and the National Library of Ireland; they are listed in the bibliography in Section 12. A review of historical maps was also undertaken, at sources online such as www.downsurvey.tcd.ie and www.osi.ie where the following were examined: Down Survey, Barony Map of Nethercross, 1656 (Fig. 13.11), the first six-inch edition of the Ordnance Survey series, 1843 (Fig. 13.14), and Revised 25-Inch OS Map, 1907. In addition, digital copies of John Rocque's map of County Dublin 1756 (Fig. 13.12) and Taylor's Map of County Dublin, 1816 (Fig. 13.13) were also reviewed.

13.2.3 Architectural and Cultural Heritage Assessment Methodology

The following guidelines were considered and consulted for the purposes of the report:

- National Monuments Acts, 1930-2004
- The Planning and Development (Strategic Infrastructure) Bill, 2006
- Heritage Act, 1995
- CAAS Environmental Ltd on behalf of the Environmental Protection Agency (EPA) (2002), Guidelines on the information to be contained in Environmental Impact Statements
- CAAS Environmental Ltd on behalf of the Environmental Protection Agency (EPA) (2003), Advice Notes on Current Practice (in preparation of Environmental Impact Statements)
- EPA (2017), Revised Guidelines on The Information to be Contained in Environmental Impact Statements, Draft
- EPA (2017), Advice Notes for Preparing Environmental Impact Statements Draft
- Department of Arts, Heritage, Gaeltacht and Islands (DAHGI), (1999a), Framework and Principles for the Protection of the Archaeological Heritage
- NRA, (2006), Guidelines for the Assessment of Archaeological Heritage Impacts of National Road Schemes
- NRA, (2006), Guidelines for the Assessment of Architectural Heritage Impacts of National Road Schemes
- Architectural Heritage (National Inventory) and Historic Monuments (Miscellaneous Provisions) Act, 1999 and the Planning and Development Act 2000 to 2006

Excerpts from the relevant legislation are contained in Appendix 13.2-13.3.

13.2.4 Assessment Criteria/Indicators

Archaeological Heritage

The significance criteria used to evaluate an archaeological site, monument or complex are as follows: existing status (level of protection), condition or preservation, documentation or historical significance, group value, rarity, visibility in the landscape, fragility or vulnerability, and amenity value. In accordance with the EPA guidelines (EPA, 2003, 139) the removal of archaeological remains will result in a negative, direct and significant impact. This impact can, however, be mitigated by excavation in which a detailed record and archive of each site and also the publication of the results are provided, thereby ensuring preservation by record. Archaeological features may, in some situations, be considered as architectural heritage and therefore, may appear on both the RMP and RPS. This means that these features are protected by both the National Monuments Act and the Planning and Development Act 2000 and 2006.

Architectural Heritage

'Architectural heritage' is defined as all structures and buildings (together with their settings and attendant grounds, fixtures and fittings, groups of such structures and buildings and sites), which are of architectural, historical, archaeological, artistic, cultural, scientific, social or technical interest. Architectural heritage is generally visible and has a presence in the landscape which requires assessment (Architectural Heritage Guidelines for Local Authorities 2006). The Record of Protected Structures (RPS) was set up to protect structures determined to be of special interest and its effect is to seek to retain the special character and features that make these structures significant. A direct impact is where a feature or site of architectural heritage merit is physically located in whole or in part within the footprint of a potential development site. Recommendations are based on the architectural heritage merit of a structure or building, and whether this necessitates its preservation, either by avoidance, or by carrying out a record of the past prior to removal or if possible, relocation.

The management and protection of architectural heritage in Ireland is achieved through a framework of European and international conventions and national laws and policies (Department of Arts, Heritage, Gaeltacht and the Islands, Framework and principles for the protection of the archaeological heritage 1999, 35). The Convention for the protection of Architectural Heritage in Europe (the Granada Convention, 1985) was ratified by Ireland in 1997. The Convention emphasises the importance of inventories in underpinning conservation policies. The National Inventory of Architectural Heritage (NIAH) was established to fulfil Ireland's obligations under the Granada Convention.

Cultural Heritage

'Cultural heritage' is a general term used to describe aspects of the environment which are valued for their age, beauty, history or tradition. It encompasses aspects of archaeology, architecture, history, landscape and garden design, folklore and tradition and topography. Cultural heritage is expressed in the physical landscape in numerous and often interrelated ways. Cultural heritage is bound up with the beliefs and oral traditions of local populations, and any items of interest made known by local inhabitants during the course of site work will be duly considered, recorded and assessed. Site work was augmented by an examination of local publications and historic map sources, namely Ordnance

Survey six-inch maps. In terms of impact on cultural heritage the EIS only details the features that will be physically or socially (human beings chapter) impacted by the scheme.

13.3 Receiving Environment

13.3.1 Archaeological and Historical Background

13.3.1.1 Introduction

The proposed development lands lie within the Oldtown Mooretown Local Area Plan (LAP) lands on the north-western outskirts of Swords town, Co. Dublin. The LAP lands are situated either side of the Rathbeale Road within the townlands of Rathbeal, Oldtown and Mooretown, in the parish of Swords and the barony of Nethercross. The planning application lands, lie to the north of the Rathbeale Road (R125), in the north of the LAP lands, in the townlands of Rathbeal and Oldtown (Fig. 13.1).

13.3.1.2 Bronze Age / Iron Age

The Bronze Age is represented by the ditched enclosure located within the Phase 5 application lands (DU011-150) and the recently excavated cremation burials, urn burial, burnt spread, troughs and a range of Bronze Age pits discovered during monitoring of the phase 5 development area and subsequently excavated under licence 17E0446 in 2019 (Rice, 2019). In addition, two fulachta fiadh and a ring ditch were identified in Mooretown during testing (RMP no: DU011-146001, DU011-148) with one of the fulachta fiadh overlying a ring-ditch (RMP no: DU011-146002).

Other recent additions to the prehistoric record include a pit containing Bronze Age coarse ware ceramics excavated in Oldtown (Seaver 2017) and an Iron Age cereal drying kiln excavated in the townland of Rathbeal, to the east of the Phase 5 application area. A charred barley grain from the kiln was sampled for C14 dating and returned a 2σ date range of 402—207 cal. BC (Moraghan and McLoughlin 2016). Two additional kilns were identified at the site of the GAA pitches and attenuation area north of the application area. One was dated to the middle Iron Age (149-118 cal. BC), while the second kiln and associated hearth were dated to the later Iron Age (cal. AD 341-533, cal. AD 263-505) (Clancy and McLoughlin 2018; Licence no: 16E0342). The Iron Age is thought to have been a period of climatic decline, lower populations and woodland regeneration. Archaeological investigations are increasingly demonstrating, however, that significant agriculture and settlement was practiced in certain areas. The discovery of cereal drying kilns dating to this period in Oldtown demonstrates that this was an important agricultural area at that time and suggests continuity between the Bronze Age and Early Medieval phases which are so evident in that landscape.

Fulachta fiadh ('burnt mounds', 'burnt spreads' or 'cooking sites') are made up of three main elements: a hearth in which stones were heated; a trough in which water was heated using the stones; and a low mound or flatter 'spread' of the stones, burnt and shattered after use. Besides cooking, a variety of functions have been suggested for these sites, including their use as saunas (Buckley 1990; Barfield and Hodder 1987; Brindley 1989–90), for the washing and dyeing of cloth or wool and for tanning/leatherworking (Brindley 1989–90). In instances where no confirmed trough has been located, the sites are usually assigned the moniker 'burnt mound'— indicating that there is some surviving depth of charcoal ash and fire-cracked stone and/or the site presents as a topographic feature—or 'burnt spread'—implying only a thin depth of surviving archaeology. These sites represent

a basic and widely-used kind of technology—the heating of stones as a means of warming, heating or boiling water. They have been called the 'kitchen sinks' of the Irish Bronze Age (Quinn and Moore 2007), an indication of the variety of purposes for which they served. Increasingly, the absence of water at some of these sites may also suggest that heated stones were used for other purposes that did not involve water – for example cooking in an 'earth oven' or 'roasting pit'. Their use as open-air cooking sites has been interpreted as feasting and food-sharing sites among small family groups which was related to social bonding (Hawkes 2015). The majority of fulachta fiadh/burnt mounds/burnt spreads in Ireland that have been dated indicate use during the Mid–Late Bronze Age.

Ring-ditches are another widespread type of prehistoric site type, dating from the Bronze and Iron Ages (c. 2400BC–400AD). The term refers to the circular—or sometimes annular—shape in plan of an encircling ditch, sometimes surrounded by a low concentric bank ('ring-bank') or enclosing a low interior mound ('ring-barrow'). The distinction between the three types of related funerary monuments is often hard to discern, particularly after centuries of farming have truncated their remains. Ring ditches are usually associated with pits filled with cremated human burial remains. They seem often to be distributed along river valleys, frequently in topographical locations that mimic their shape or accent their prominence—on hillslope spurs or 'false crests' near to the summit of hills. A ring-ditch (RMP no: DU011-146002), approximately 11–12m in diameter, was identified in Mooretown, apparently beneath part of a fulacht fiadh (although this provisional chronological sequencing of the two may be complicated by subsequent ploughing and re-depositing of the latter's burnt mound deposit).

13.3.1.3 Early Medieval Period

Ecclesiastical Settlement

A significant early medieval ecclesiastical complex with burials - a previously unknown settlement and religious site dating from the first millennium AD- was identified in 2003 (Baker 2004). The complex is centred in the southern part of Oldtown townland and extends further south across the Rathbeale Road into Mooretown townland (Fig. 13.3). The northern extent of this site is located approximately 400m to the southeast (RMP no: DU011-144001).

A holy well (RMP no: DU011-018) dedicated to St Cronan, the seventh-century-AD saint, is recorded within the southeast corner of the Mooretown LAP lands. Holy wells are a Christian adaptation of a pre-Christian tradition of sacred springs, which like their pagan predecessors, were often visited at certain times of the years, and often had a reputation for effecting cures. There is a growing acceptance among archaeologists that holy wells are often indicators of early ecclesiastical settlement. Even though this well is 455m south of the secular activity revealed in Mooretown and some 700m from the ecclesiastical complex at Oldtown it may well have been venerated and linked to this establishment. It is no longer venerated and no longer visible above ground. It was formerly a station well and local tradition thought of it as cure for sore eyes and chicken pox (G. Stout, in RMP files at the DAHG). Test-trenching at the site of St. Cronan's holy well has identified the precise location of the spring. Beneath more than a metre of peat, a man-made streambed or path of metalled stones (stones pressed into the underlying soil) was found, associated with nineteenth–twentieth-century potsherds and ceramic drainpipe fragments. The route of the metalled streambed/path corresponds

with that represented on recent Ordnance Survey maps, indicating that the metalling and all of the overlying peat is recent/modern.

Nearby to St. Cronan's well, immediately east of the LAP lands are the reputed remains of Cronan's early medieval church, Glasmore Abbey (RMP no: DU011-019). Material evidence suggests that the building is not a church, and that it is post medieval in date. As such, the surviving structure is discussed in the post-medieval section below.

Further evidence of an early medieval landscape and the importance of the ecclesiastical site is the presence of a watermill in Mooretown (RMP no: DU011-145). Early medieval horizontal watermills were used to grind grain but were also a means through which local potentates could control agricultural production. Their construction, the engineering of the neighbouring landscape (millraces, ponds, etc.) and the sourcing of certain materials (millstones) all required specialist technical knowledge and significant resources. They also required a sizeable labour force, even if the labour was acquired via 'customary' payment-in-kind obligations rather than conscription or payment. As a result of all of these factors, mills of the era were invariably under the control of a significant local or regional power, and archaeology has increasingly demonstrated that power was often ecclesiastical. A similar situation also pertained later in the medieval period (twelfth–sixteenth century AD), and certain medieval monasteries—such as the Abbey of St Thomas in Dublin—were well-known for their control of milling activities. In practice, control over this aspect of grain production seems in most cases to have entailed the literal overseeing of the mill by an ecclesiastical or lay authority, and mills are usually found in close proximity to a monastery, a castle or similar site. The inference from recent evidence is that the mill, like the enclosure, should be seen as a characteristic component of the early Irish monastery (Mc Erlean & Crothers 2007, 433). An early medieval–medieval watermill was identified in Mooretown, along with part of its headrace and its tailrace. This site lies to the west of the Oldtown-Mooretown ecclesiastical centre, along a water course.

Secular Settlement

The most significant component of an early medieval secular settlement is the ringfort, the only domestic monument surviving in significant numbers from any period in Irish history. One possible ringfort has so far been identified within the Mooretown LAP lands (RMP no: DU011-147). The site in Mooretown was found to have a north-northeast entrance oriented towards the ecclesiastical complex and it is located c.920m south of the Phase 5 application lands. Ringforts are one of the most widespread archaeological sites surviving in the Irish landscape. They consist of a circular, sub-circular or D-shaped enclosure of 20–50m diameter. The enclosure is typically a deep ditch outside of a bank (of earth, of earth and stone) or a drystone wall. They seem to have functioned as farmsteads and served to protect interior dwellings, their inhabitants and the farm's livestock. Often they have associated field systems and sometimes underground souterrains. Most that have been robustly dated were occupied between c. 500–1200 AD. They tend to be situated on, or near, particularly good agricultural land for both pasture and tillage, although in the latter case, they often demonstrate a preference for heavier soils than those that are today considered ideal for arable farming. Ringforts are usually sited on a gentle slope where they have a good, commanding view of the surrounding landscape and are often clustered relatively nearby in small groups. Such clusters typically

demonstrate a morphological hierarchy, with a larger, often multivallate, ringfort in the best landscape position surrounded by smaller ringforts often oriented towards the main one.

Further ringfort sites are recorded c. 1km east in the townlands of Newtown and Broadmeadow (RMP nos: DU011-078 and DU011-079). Both of these sites have been interpreted as levelled ringforts with associated field systems. In addition, the name of the nearby townland of Rathbeal may suggest the presence of a similar early medieval settlement in the area, possibly beneath the location of a later recorded dwelling (at RMP no: DU011-014).

Archaeological investigations in advance of adjacent development phases have revealed further evidence of Early Medieval activity in this area. In the Phase 2 lands to the east of the application area, a number of features were identified including a well that produced an iron billhook and quernstone fragment, as well as a series of ditches and gullies (Seaver 2017). The site of the GAA pitches and Attenuation area to the north was also the location of an enclosure site dating to cal. AD 777-1020 (Clancy and McLoughlin 2018; Licence no: 16E0342).

13.3.1.4 Medieval Period

Revenues for the principal archiepiscopal manor at Swords were generated predominantly from agriculture, through a manorial system that extracted payment in-kind from landless peasants who worked the land, and eventually also from slightly better-off tenants—freemen peasants and lesser nobles both—who leased farms and generally paid their rents in agricultural produce. In some cases, particularly with monastic lands, 'grange' manors were used to administer ecclesiastical lands more directly. These granges served as agricultural estates centred around a manor farm—often with a nearby mill, sometimes with fish ponds—run by a steward with either local labour or lay brothers. Their produce could be used directly or sold. Lands that had formerly been within the purview of some manner of early medieval ecclesiastical power and that were reassigned to a new Anglo-Norman ecclesiastical establishment by the late twelfth century may therefore also contain traces of the later medieval manorial system of tenant farms, granges and farm labourers' residences.

This appears to be the case in Mooretown, where most of the early medieval Oldtown/Mooretown ecclesiastical complex—certainly the southern annex of the complex which lies within the LAP lands—seems to have been disused or abandoned by the twelfth century. Instead, agricultural production may have been administered from the medieval settlement identified south of the main ecclesiastical enclosure (RMP no: DU011-149). The archaeology identified there included a fair-sized assemblage of 127 medieval potsherds (dating from the twelfth–fourteenth century, and perhaps slightly later) and an iron riding spur, all of which may indicate the presence of a moderately-well-off tenant farm or grange farm. However, the ground plan of the settlement is more akin to the layout of a small village or hamlet, suggesting it formerly housed peasant labourers. In either case, settlement at the site seems to have persisted, in a reduced capacity, into the sixteenth–seventeenth centuries (on the basis of twenty early post-medieval potsherds also recovered).

13.3.1.5 Post-Medieval Period

Oldtown is not mentioned by name in the mid-seventeenth century AD Civil Survey, perhaps because it still formed part of the lands of the manor of Swords. Nicholas Barnewall of Turvey, 'Irish Papist', is recorded as the proprietor of 60 acres of arable and meadow, 6 acres of which was 'Bounded East

with part of Bath's farme; south with part of ye lands of Mooretowne, West and North [sic—south?] with part of ye lands of Mooretowne' and formed a part 'of ye Mannor of Swords'. The influential Barnewell family of Turvey built a vast estate partly by acquiring and leasing large segments of extensive old Episcopal manors in the parishes of Swords and Lusk. In the Ordnance Survey Names Books of 1843 Oldtown is recorded as 'bounded East by Broadmeadow' and 'of townlands in the Liberties of Swords Parish'. The property of 'Mr Boden Esq.' and 'Earl O'Neill', is described as 'Good Farm steading in the north part of the Townland and small Cott. In the South part being the only house in it' (O'Donovan 1843). The farmstead referred to is shown on each of the Ordnance Survey maps just south of the Broadmeadow River and no longer survives (Fig. 13.14). The site of the farmstead is located. 150m northeast of the Phase 5 application area within Phase 4. Historical mapping indicates that a long avenue once led off the Rathbeale Road and accessed the farmstead from the south. This was identified in archaeological investigations within the Oldtown Phase 1 area (Moraghan and McLoughlin 2016; Licence no: 13E0283). This appears to confirm the archaeological evidence from Oldtown (Baker 2003), and now also from Mooretown, that indicates no settlement and little or no activity on the site of the ecclesiastical complex from the twelfth century AD at least.

In contrast to Oldtown, Mooretown is mentioned in the mid-seventeenth-century Civil Survey (1654-56AD). At that time the proprietor of Mooretown was 'Sir Edward Bolton, knight of Brazeil, Protestant'. Several structures including a house, a barn and eight cabins are noted within the townland. Furthermore, it is recorded that ornamental ash trees, an orchard and a garden plot were also established by this time (after Bolger 2006). The latter features imply that the house was occupied by someone of middling station, in other words not Bolton 'of Brazeil' who resided in Brazil House (RMP no: DU011-086) in the townland of the same name, but rather his tenant. In the hearth money roll of 1664, the heads of eight households are listed in 'Murrtowne': Patrick Wales, John Kerrygane, James Gaffney, James Byrne, Christopher Comers, Nicholas Wales, Patrick Crane and John Ash (Anon. 1930–3: 418) all reside in homes with a single hearth, except Patrick Wales who possessed two hearths.

The reputed remains of Glasmore Abbey church (RMP no: DU011-019) lie just southeast and outside of the LAP lands. The site is said to have a 7th century AD origin, but there is some uncertainty as to whether the location is that of Glasmore or another similar site for which the name has been forgotten. The surviving remains of a building (RMP no: DU011-019) of coursed limestone with dressed quoins set on their narrow sides, stands to a single storey. At the northern end of the structure there is a (reused?) window of fifteenth–sixteenth-century date. The structure is likely to be of seventeenth–eighteenth-century date (i.e., post-medieval), but it is of vernacular construction and not readily dateable by its architectural features. It is traditionally held that the early medieval Glasmore Abbey church was founded by St Cronan before the mid-seventh century AD (he is also said to have been martyred here). However, the building does not at all resemble a church. It could be a folly except that it is not in the grounds of a large estate. The structure also lacks a fireplace, such as might be expected in a house, although early post-medieval dwellings sometimes lacked proper chimneys and possessed instead a simpler firehood or even just a central hearth (with either a smokehole or a permeable thatched roof). The structure underwent a programme of conservation in 2001, in which loose stone was collected and inserted into the structure. In 1999 nearby archaeological work relating to the adjacent development revealed nothing of archaeological significance (Swan 1999), in particular no

burials or any enclosure, both of which would normally be expected nearby an early medieval–medieval church. The small amount of early post-medieval pottery found nearby may be a clue as to the real origin of this building: it could be the surviving part of the house or barn (or a related outbuilding) owned by Edward Bolton in the mid-seventeenth-century, perhaps with some of the cottier 'cabins' mentioned in the Civil Survey built over the medieval settlement in the southeastern corner of the Mooretown lands. Local tradition holds that James II was brought to the nearby townland of Rathbeal while on the way to the Battle of the Boyne (1690). The site of possible fortifications associated with this tradition (RMP no: DU011-016) is located approximately 820m southwest of the Phase 5 lands. The site consists of a series of gullies running northeast–southwest across a field. Considerable quantities of cut stone have been exposed during ploughing (after Bolger 2006).

13.3.2 Recorded Archaeological Monuments

Before the extensive archaeological investigation at the LAP lands there was a paucity of known archaeological material in these areas. This possibly is a testimony to the fertile soils, which led to an intensive agricultural regime which can denude upstanding earthen features. As a result of the various archaeological investigations within the LAP lands since 2003 several previously unknown archaeological sites that have no surface appearance have been discovered. These sites have been added to the Sites and Monuments Record (SMR) and are scheduled for inclusion in the next revision of the Record of Monuments and Places (Fig.13.3). They are listed below in Table 13.1.

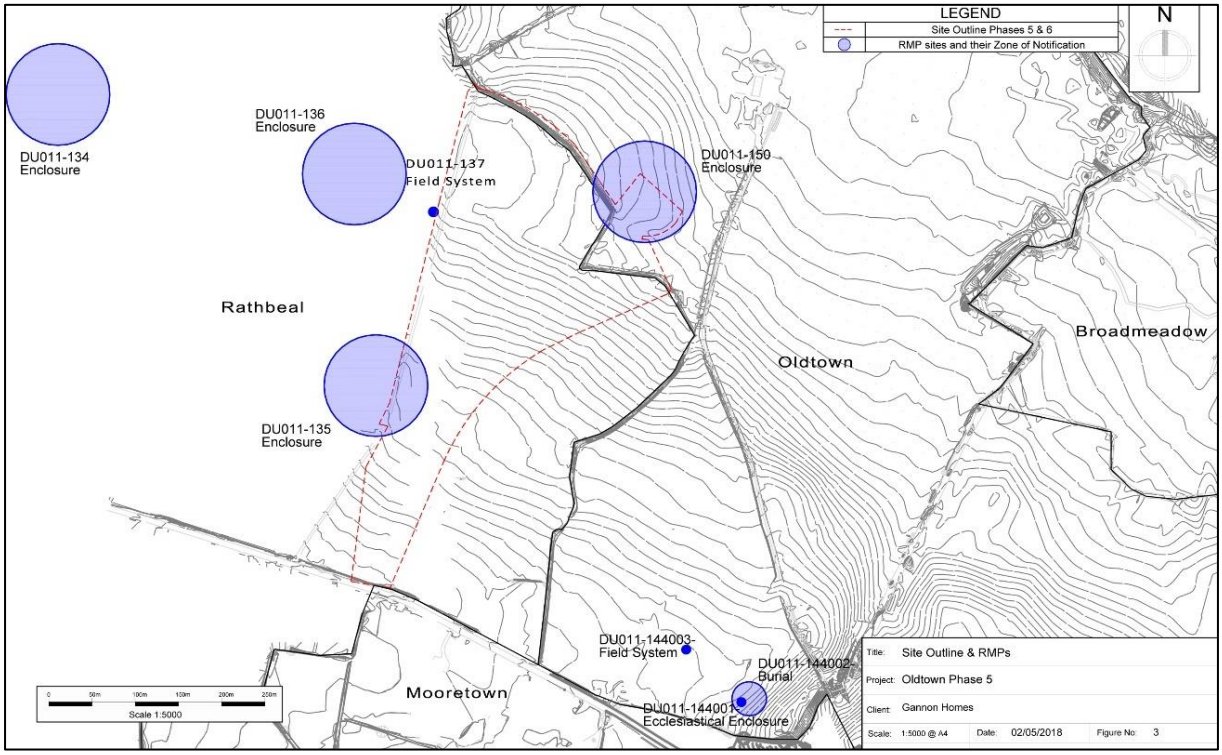


Figure 13.3 – Site Location and RMP sites

One recorded archaeological monument (RMP/SMR site) is located within the application area. This is a large ditched enclosure located in the northeast of the application area and in the north of the LAP lands (RMP no: DU011-150) (Figs. 13.3-5). The site was discovered during testing carried out in 2013 in advance of an earlier phase of development within the LAP lands. The enclosure measures 60m N-

S x 80m E-W, although the eastern extent of the enclosure was not identified during testing and may have been truncated in the past. The ditch (3m wide x 1.5m deep) contained inclusions of sea shells and animal bone. No datable finds were recovered during testing, however a sample of charcoal was recovered from an investigated section of a posthole within the enclosure (Moraghan and McLoughlin 2016; Licence no: 13E0283). This charcoal has been radiocarbon dated to 839-551 cal. BC, suggesting a Late Bronze Age / Early Iron Age date for the enclosure (Clancy and McLoughlin 2018). A buffer zone was established around the site in consultation with the DAHG and was fenced for protection. Development in the Phase 5 application area and the adjoining Phase 4 area has been designed around this monument.

In addition to the recorded monument, additional archaeological remains have been discovered within the Phase 5 lands through a programme of test trenching and monitoring (McLoughlin 2017; Rice 2019, Licence Ref. 17E0446). These remains comprise two Bronze Age cremation pits, an urn burial, a burnt spread with associated troughs, three cereal drying kilns and various post-medieval drainage ditches and undated pits. These features have all been archaeologically excavated and 'preserved by record' under licence Ref. 17E0446 (Rice, 2019) and no further mitigation is required.

Recorded archaeological sites within the overall LAP lands are described above in the context of their time periods and a full description of the investigations at each site is provided in Appendix 13.2. The protection of these subsurface sites was a major consideration in the development of a planning strategy for the LAP area and also in the Masterplan for the development of the present application areas. As such, sensitive zones indicating the extent of each site has been established in consultation with the DHLGH around each site which is published in the Conservation and Management Plan (Courtney, 2010). The large ditched enclosure site in the north of the application area (RMP no: DU011-150) was discovered after the LAP was published and a conservation plan has been prepared for its preservation and presentation (O' Brien and Deery 2018).

Three sites have been identified outside of the LAP lands in the fields to the west of the Phase 5 application area (Fig 13.3). Two enclosures (RMP nos. DU011-135, DU011-136) and a possible field system (RMP no: DU011-137) were identified through aerial photography, suggesting activity adjacent to the Phase 5 application lands. The Zone of Archaeological Potential for one of the enclosures (RMP no: DU011-035) extends into the southern portion of the application lands. Test trenching in the centre and northern portions of Phase 5 did not suggest that the field system extended into the application area.

Table 0-1. Recorded archaeological sites within the LAP Lands (RMP sites)

RMP no	Site Type and.	Possible date	Townland, Field #
DU011-144, DU001-003	Ecclesiastical complex, burials, field system	Early Medieval	Oldtown, Field 1
Area 11	Ditched enclosure site DU011-150	Possibly early medieval	Oldtown, Field 4
DU011-144004	Ecclesiastical complex (secular and agricultural activity) part of the site located in Oldtown	Early Medieval	Mooretown, Field 13
DU011-019	Medieval settlement (in the vicinity of recorded monument, Abbey, Church site) DU011-149	Medieval	Mooretown, Field 2

RMP no	Site Type and.	Possible date	Townland, Field #
Area 4	Natural spring source for the St Cronan's holy well (DU011-018) and a Fulacht fiadh (DU011-148)	Early Medieval and Bronze Age	Mooretown, Field 3
Area 5	Ringfort DU011-147	Early Medieval	Mooretown, Field 5
Area 6	Fulacht fiadh (DU011-146001) and ring-ditch (DU011-146002)	Bronze Age	Mooretown, Field 17
Area 8	Water mill DU011-145	Early Medieval	Mooretown, Field 9

Outside the proposed development area several other features were identified and excavated during topsoil stripping of the Phase 1 and 2 application areas to the east and the GAA pitch and attenuation area to the north. East of the application area, a pit containing Bronze Age coarse ware ceramics, a well and a series of ditches and gullies have recently been excavated (Seaver 2017) as well as an Iron Age cereal drying kiln. A charred barley grain from the kiln was sampled for C14 dating and returned a 2-sigma date range of 402-207 cal. BC (Moraghan and McLoughlin 2016). To the north a scatter of isolated pits, a kiln, a hearth and an enclosure with internal features of archaeological interest were identified. The isolated features were fully resolved as were identified internal features within the enclosure. The enclosure ditch which returned an early medieval date (AD 777-1020) has been preserved in situ (Clancy 2017, Clancy and McLoughlin 2018).

Table 0-2. Other archaeological sites within the LAP Lands (excavated, no RMP designations)

Site Type	Possible date
Ditches (Resolved under licence 13E0336 – drainage ditches)	No archaeological significance
Pits and ditches (Resolved under licence 13E0336 – drainage features)	No evidence of archaeological significance
Drainage ditches & dispersed pits (Resolved under licence 13E0283)	Post medieval / modern
Hearth, pits, cereal drying kilns (Resolved under licence 16E0342, enclosure preserved in situ)	Iron Age / Early medieval
Cereal drying kiln (Resolved under licence 13E0283)	Iron Age
Ditches and gullies (Resolved under licence 17E0104)	Possibly early medieval
Well and associated gullies (Resolved under licence 17E0104)	Possibly early medieval
Pit containing pottery, charcoal and flint (Resolved under licence 17E0104)	Bronze Age
Urn burial, cremation pits, burnt spread & troughs, kilns,	Bronze Age & Iron Age/Early medieval
Circular ditched enclosure (Resolved under licence 19E0736)	Early medieval

13.3.3 Archaeological investigations within the proposed planning application area

Geophysical Survey

Two phases of geophysical survey have been undertaken within the Phase 5 application lands (Fig. 13.4). The first was undertaken in April 2006 as part of a predevelopment assessment in advance of the construction of a temporary school in the southern extent of the application area (Leigh 2006; Licence no: 06R0067), while the second was undertaken in 2011 across the central and northern portions of the application area as part of pre-planning investigations (Target Geophysics 2011; Licence no: 11R0044).

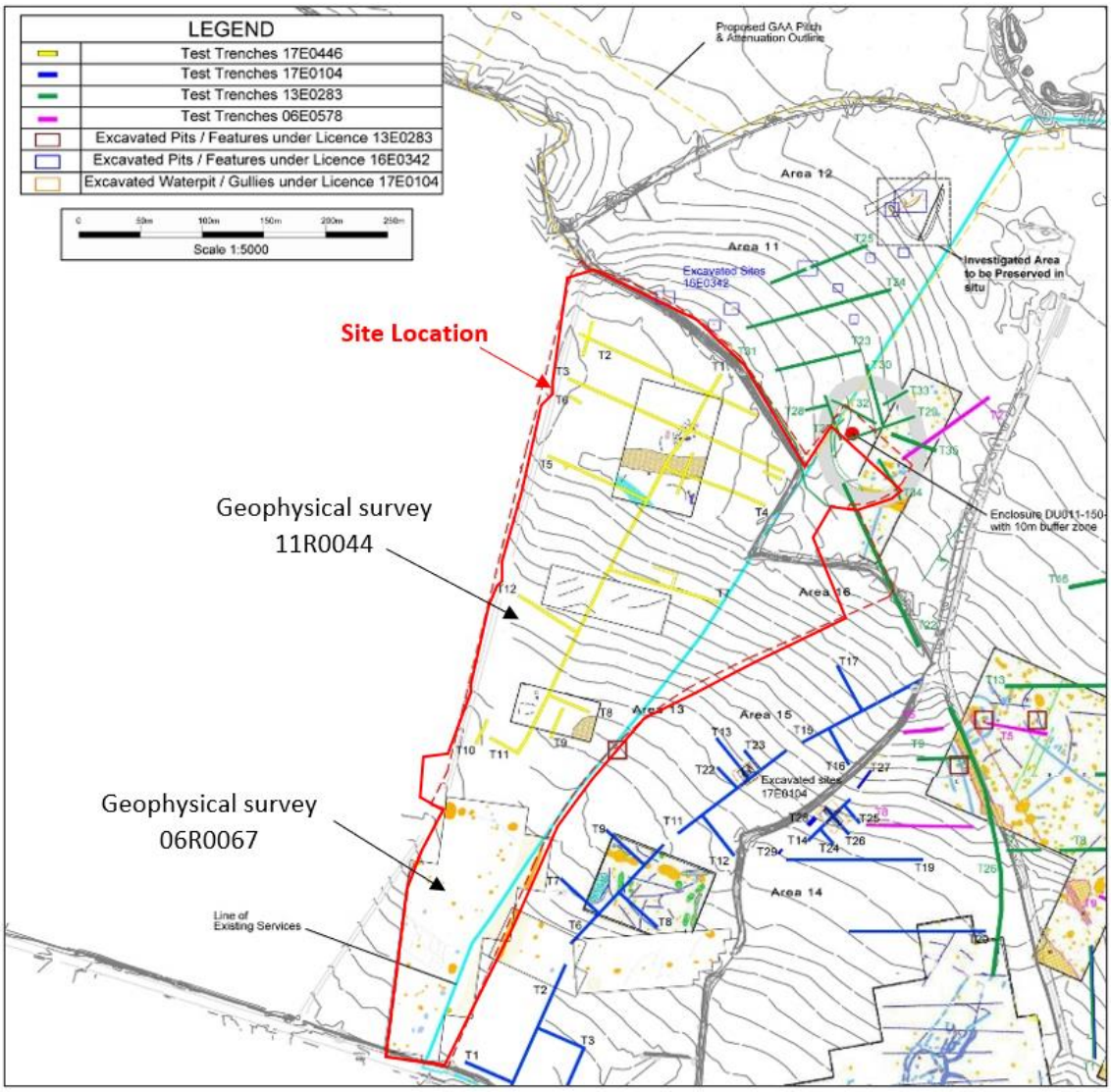


Figure 13.4 – Overview of geophysical survey and testing across the Oldtown development lands

The first survey (Leigh 2006; Licence no: 06R0067) revealed a series of isolated responses in the south of the survey area, and while no archaeological pattern was evident, they may represent ephemeral archaeological features. It was considered, however, that the archaeological potential of these features was limited.

The second geophysical survey (Target Geophysics 2011; Licence no: 11R0044) consisted of three survey areas (Areas 1, 2 and 3) north of the previous survey area. Area 1 revealed an anomaly in the northeast (A), with a poorly defined linear feature and weak trend (B) in the southeast. One possible pit (C) and positive response was located in the northwest of Area 3. Several linear trends were also detected on the west and considered to be related to recent landuse or natural soil / geology. It was concluded that the anomalies detected in all three areas were poorly defined and likely to be of limited archaeological interest, most likely the result of recent landuse or natural soil / geology.

Test Excavation

Archaeological investigations in advance of Oldtown Phase 1 included archaeological monitoring of topsoil stripping and a programme of test trenching for ESB ducting which extended in a northwest

direction from the Phase 1 lands to the northeast of the application lands (Moraghan and McLoughlin 2016; Licence no: 13E0283). This was undertaken from October to December 2013, revealing a curving ditch which was classified as an enclosure and added to the Sites and Monuments Record, to be included in the next revision of the Record of Monuments and Places (RMP no: DU011-150). This feature is located within the northern portion of the Phase 5 application lands. The area was cordoned off from construction activity and test trenches were excavated to establish the nature and extent of this ditch. An alternative route was devised for the ESB duct.

Test trenching included the excavation of eight test trenches (T27-30, T32-35) in this area in order to confirm the presence of the feature and to investigate a proposed new line for the ESB ducting to avoid the ditch. Two additional trenches (T22, T31) were excavated within the Phase 5 application lands associated with the ESB trench. In total, Test Trench T22, T27, T29, T31, T32 and T34 were excavated within the Phase 5 lands. Of these trenches, the ditch was discovered in Test Trenches T27, T32 and T34 (Fig. 13.5, trenches in green).

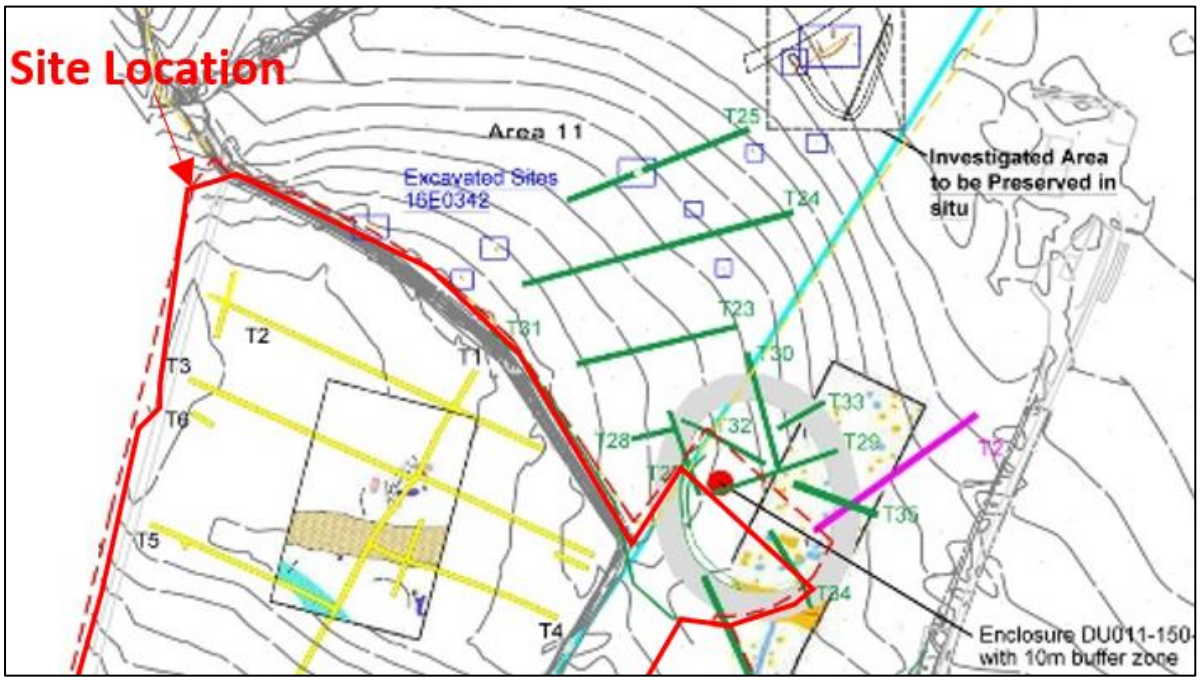


Figure 13.5– Overview of geophysical survey and testing across the Oldtown development lands

Test trenching confirmed that the ditch was archaeological in nature. It was steep-sided with a wide flat or U-shaped base. It measured 3m wide by 1.5m deep and much of the upper fill was composed of re-deposited natural subsoil with some inclusions of sea shells and animal bone. The lower fill was composed of grey-brown natural subsoil with frequent inclusions of snail shells at the base. No dateable artefacts were recovered from the excavated section of the ditch.

The exposed section ran in a roughly NNW-SSE direction before turning northeast. The location has been established to the west, north and south and appears to form a circular or sub-circular enclosure. The eastern extent was not identified, and this may be due either to the upper fills comprising re-deposited natural subsoil, or it may have been ploughed out.

Three features were identified in the interior of the enclosure in Test Trench T34. Posthole C10 measured 0.3m x 0.37m x 0.24m deep and the fill (C9) was compact sandy fill flecked with charcoal. A

second posthole 0.32m in diameter contained compact grey silty sand with flecks of charcoal (C16). This feature was not sectioned. A spread of charcoal rich soil, 0.38m in diameter was also identified (C17) with a depth of 0.03m. One of these postholes has been radiocarbon dated to 839-551 cal. BC, suggesting a date in the Late Bronze Age / Early Iron Age for the enclosure.

The soil profile of this area comprised of 30-40cm of loose dark-brown silty clay topsoil, with a subsoil of compact yellow silty clay with gravelly patches in places.

An alternative route for the ESB duct was tested and no archaeological features were identified in the course of testing or of topsoil stripping. Between the 2nd – 3rd December 2013 the exposed elements of the ditched enclosure were covered in terram and backfilled with topsoil. A 10m buffer was established and the area protected with post and wire fencing in order to preserve the site *in situ* as per discussions at the time with the National Monuments Service.

This site has since been allocated an RMP number (DU011-150). The report recommended redesign of the previously planned roadway, associated drainage and any other outlined future development in the vicinity of the site in order to facilitate the preservation of the site *in-situ*. This was fulfilled, and the area remains protected.

Test Excavations 2017 (17E0446, Fig. 13.6)

A programme of pre-planning test excavation was undertaken within the application area in September 2017 (McLoughlin 2017; Licence no: 17E0446). It followed the results of geophysical survey undertaken in this area (Target Geophysics 2011; Licence no: 11R0044) and aimed to examine the anomalies identified in that survey. It also sought to investigate if archaeological features identified through aerial photography to the west of Phase 5 extended into the application area and to establish the nature, extent and character of any such remains. Twelve test trenches were excavated, and two areas of archaeological activity were identified in Test Trenches T2 and T4; a probable cereal drying kiln and a single pit. The features were recorded, covered in polythene and the trenches backfilled.

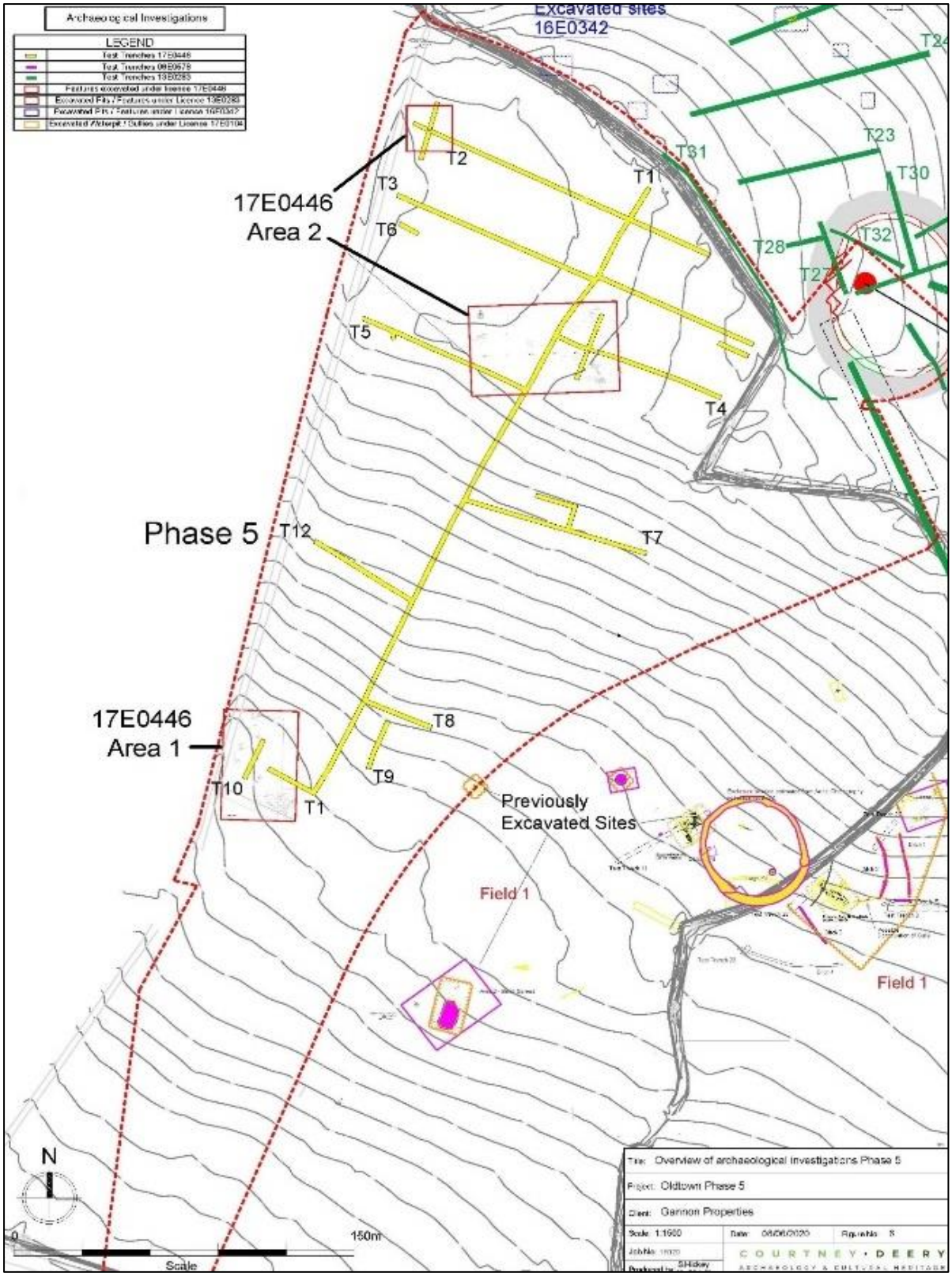


Figure 13.6– Overview of geophysical survey and testing across the Oldtown development lands and subsequent excavation areas

The testing revealed a large number of linear features associated with agricultural activity and drainage, none of which appeared to have been of archaeological significance. There was no evidence

that any of the linear features were associated with the registered monuments to the west of the application site (RMP no's: DU011-035, DU011-036, DU011-037).

Monitoring and Excavations 2018 (17E0446, Rice, 2019)

Archaeological monitoring was carried out in July and August 2018 across the application area and two zones of archaeological potential were revealed. The Area 1 features included a Bronze Age urn burial, two cremation pits, a large water pit, burnt spread and three troughs (Fig. 13.6). The features in Area 2 encompassed five prehistoric pits with burnt stone fills, another three pits of uncertain chronology, three early medieval grain-drying kilns and three post-medieval drainage ditches. It was subsequently recommended that the features uncovered during monitoring and testing should be archaeologically excavated under licence.

The excavation took place over four weeks in September-October 2018 and the investigations focused on the two zones of archaeological potential, Areas 1 and 2 and included the features found in the earlier testing.

The remains in Area 1 consisted of an urn burial, two cremation pits and a post-medieval field drain as well as a large water pit that was associated with a burnt spread and three troughs (Figs 13.6, 13.7 & 13.8).

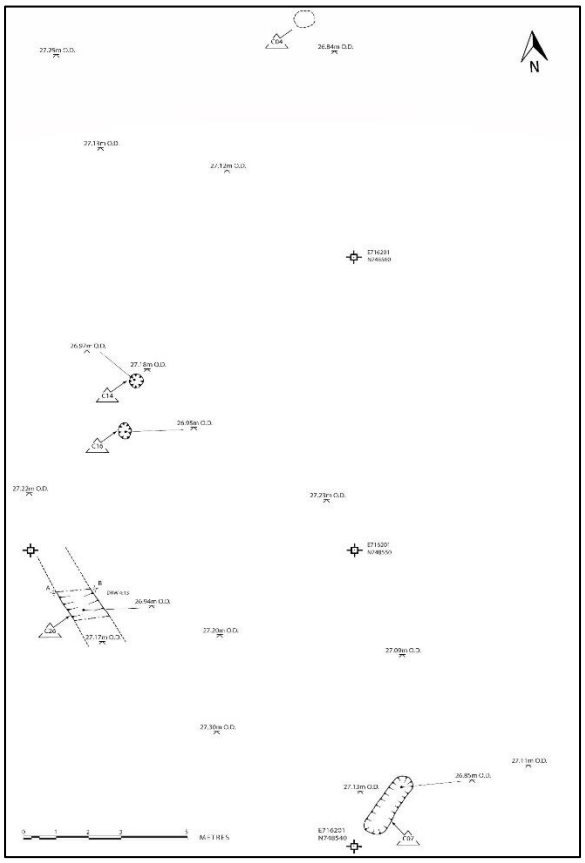


Figure 13.7–Excavation Area 1, NW extent

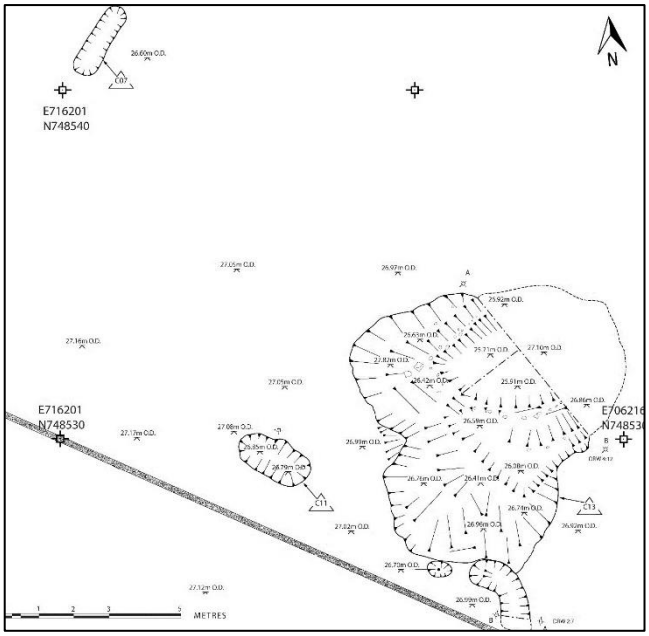
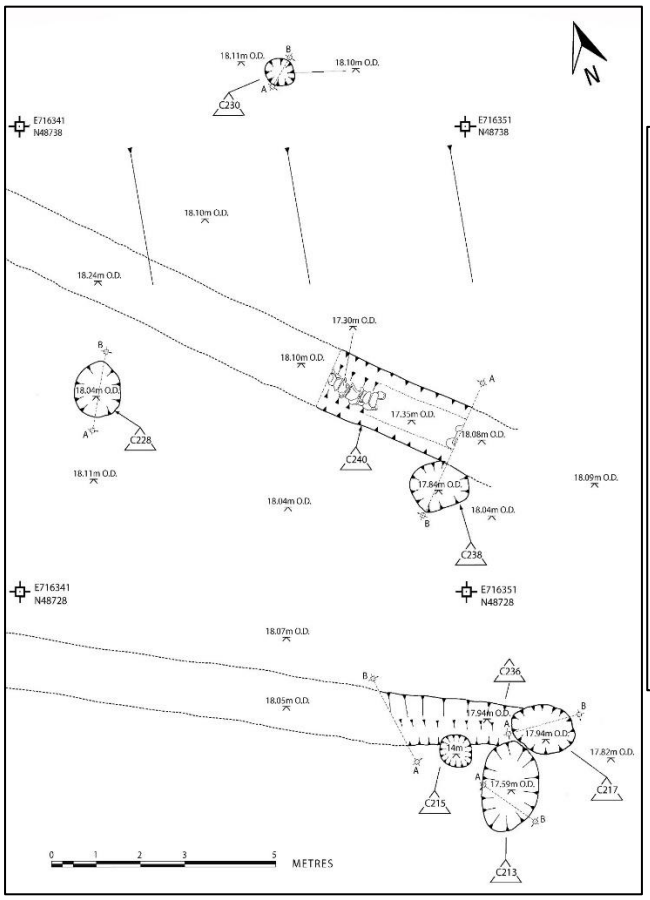


Figure 13.8– Excavation Area 1, SE extent

The prehistoric remains included the Middle to Late Bronze Age urn burial and two cremation pits in Area 1, while the burnt spread, troughs and water pit that were investigated to the southwest probably date to the Bronze Age too. It is likely that the cluster of pits with burnt stone fills from Area 2 also date to the Bronze Age. The remaining pits are undated and could date from any period from the Bronze Age to the early medieval.

The Area 2 features comprised five pits with burnt stone fills, three other pits with charcoal-rich fills, three grain-drying kilns and three drainage ditches (Figs 13.9 & 13.10).



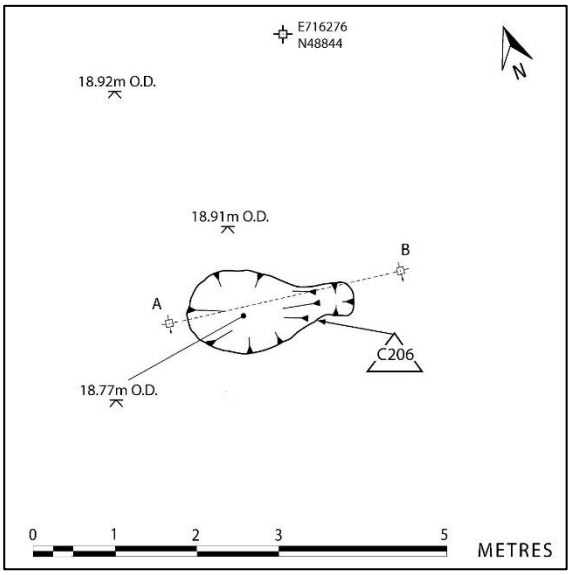


Figure 13.9– Excavation Area 1, SE extent

Figure 13.10- Excavation Area 2, E extent

The three grain-drying kilns either date to sometime in the Iron Age, or to the early medieval period. It is worth noticing that comparable figure-of-eight features were excavated nearby, in the townlands of Rathbeal and Oldtown, which produced Iron Age dates (Moraghan and McLoughlin 2016, 21; Clancy and McLoughlin 2018, 16). One of the kilns produced sherds of Beaker pottery; however, these were probably residual. The drainage ditches were indicative of agricultural land improvements that date to the post-medieval period, or later.

13.3.4 Topographical files of the National Museum of Ireland

The topographical files in the National Museum of Ireland, do not record any stray finds for Oldtown or Rathbeal townlands, although a stone mortar (NMI Reg. No 1958.80), is recorded from Mooretown townland to the south. The artefact has been variously interpreted as a holy water font possibly

associated with Glasmore Abbey or a mortar from the medieval or late medieval period which would correspond with the recent findings in the area.

13.3.5 Cultural Heritage

The Phase 5 application area is located within the townlands of Oldtown and Rathbeal, consequently incorporating part of the townland boundary. This boundary is composed of a tree-lined earthen bank. Google Earth Satellite imagery dating to 2014 shows that approximately 120m of the westmost portion and 30m of the eastmost portion of this boundary within the application lands was breached around that time.

Townland names/ the toponomy of an area can be a valuable indicator of the type of cultural heritage within the local area. They are an invaluable source of information not only on the topography, land ownership, and land use within the landscape, but also on its history, the archaeological monuments and the folklore. Where a monument has been forgotten or destroyed, a place name may still refer to it, and may indicate the possibility that the remains of certain sites may survive below the ground surface. A variety of place names, whether of Irish, Viking, Anglo-Norman, and English origin and the appearance of the different languages is often a good indicator of the cultural heritage, and therefore the archaeological record of the area. The townland names in this part of Dublin reflect both the Anglo-Norman/English heritage and are dominated by the English language and are derived from family names such as in Mooretown.

In light of the archaeological findings the townland name Oldtown, may be an indication that there was a surviving oral tradition of the abandoned ecclesiastical settlement recently identified here, if that is the case it is likely to have been an Anglicisation of the Irish 'Seanbaile'.

Rathbeal may also be another indication of the ecclesiastical site, the 'rath' element meaning fort and the 'beal' element suggesting an opening or perhaps an entrance.

In the Ordnance Survey Names Books of 1843 Oldtown is recorded as 'bounded East by Broadmeadow' and 'of townlands in the Liberties of Swords Parish'. The property of 'Mr Boden Esq.' and 'Earl O'Neill', is described as 'Good Farm steading in the north part of the Townland and small Cott. In the South part being the only house in it' (O'Donovan et al. 1843).

13.3.6 Architectural Heritage

There are no structures within the application area and no protected structures are listed in the record of protected structures (RPS sites) in the Fingal Development Plan or in the National Inventory of Architectural Heritage (NIAH) within the bounds of the LAP area. The nearest protected structures are Rathbeale Hall, located approximately 975m west of the application area and Newton House located approximately 1.9km to the east in Newtown townland. The historic centre of Swords, located approximately 2km to the southeast, contains a number of protected structures including the Swords Castle, Court House, Carnegie Library, the Old Borough School, Sexton's House, Old Vicarage, St. Columba's Church and St. Columcille's Church.

13.3.7 Cartographic Analysis

Down Survey, Barony Map of Nethercross, 1656 (Fig. 13.11)

Oldtown and Rathbeal townlands do not appear as distinct entities on the Down Survey Map of 1656. The application lands appear to be part of 'Reckon Hore', which was owned by George Blackney of Sawcerstowne (Saucerstown). A large house is depicted in the western portion of Reckon Hore, surrounded by trees, but it is outside of the Phase 5 application lands. No features are indicated within the lands. The Civil Survey indicates that Blackney held the land in 1640 in inheritance, paying six pounds yearly in rent to the Archbishop of Dublin. He abandoned it after the Rebellion of 1641.

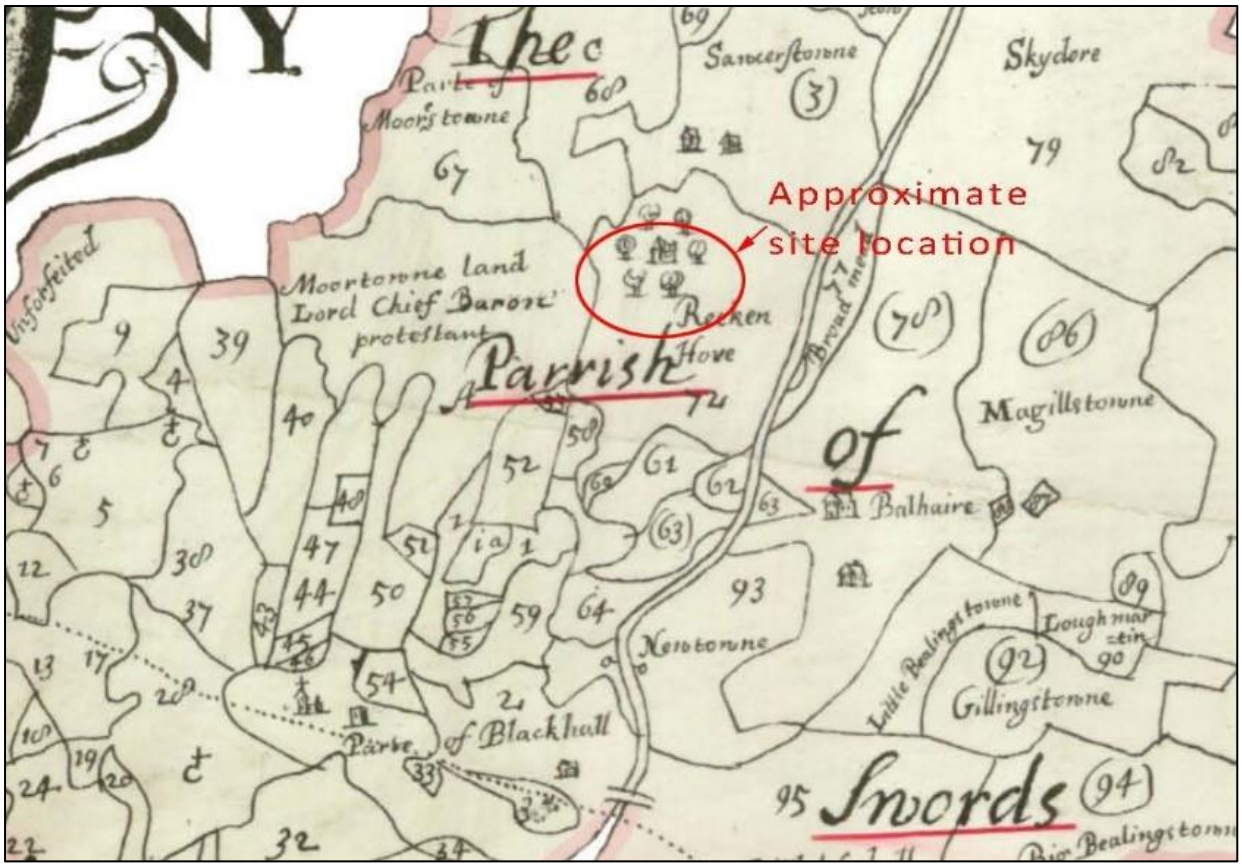


Figure 13.11- Down Survey Map of Nethercross 1656

Rocque's Map of County Dublin, 1760 (Fig. 13.12)

John Rocque's map of County Dublin in 1760 depicts Oldtown clearly. The existing Rathbeale Road was in existence by this time and forms part of the southern boundary to the townland. A farmstead is depicted in Oldtown, within the adjacent Phase 4 lands, with an associated roadway leading from the Rathbeal Road, past the farmstead and as far as the Broadmeadow River. No bridge is depicted but a road continues north of the river towards a property in Ballyhara (Ballyheary). A structure is depicted west of the Phase 5 application area in approximately the same location as the house illustrated in Reckon Hore on the Down Survey barony map. It is situated adjacent to a road leading north from the Rathbeal Road and curving east around the farmstead to join the other road at the river. Two further structures are depicted between this road and the Broadmeadow River under the label of Leabstown. Saucerstown House is labelled as Rickenhore, referencing the previous names of

the lands presided over by George Blackney. Rathbeal is not named on the map. The Phase 5 application areas are shown as open farmland, with no obvious structures depicted. In Mooretown to the south, a cluster of structures are shown in the vicinity of the present day Glasmore Abbey. However, the abbey is not marked on this map.

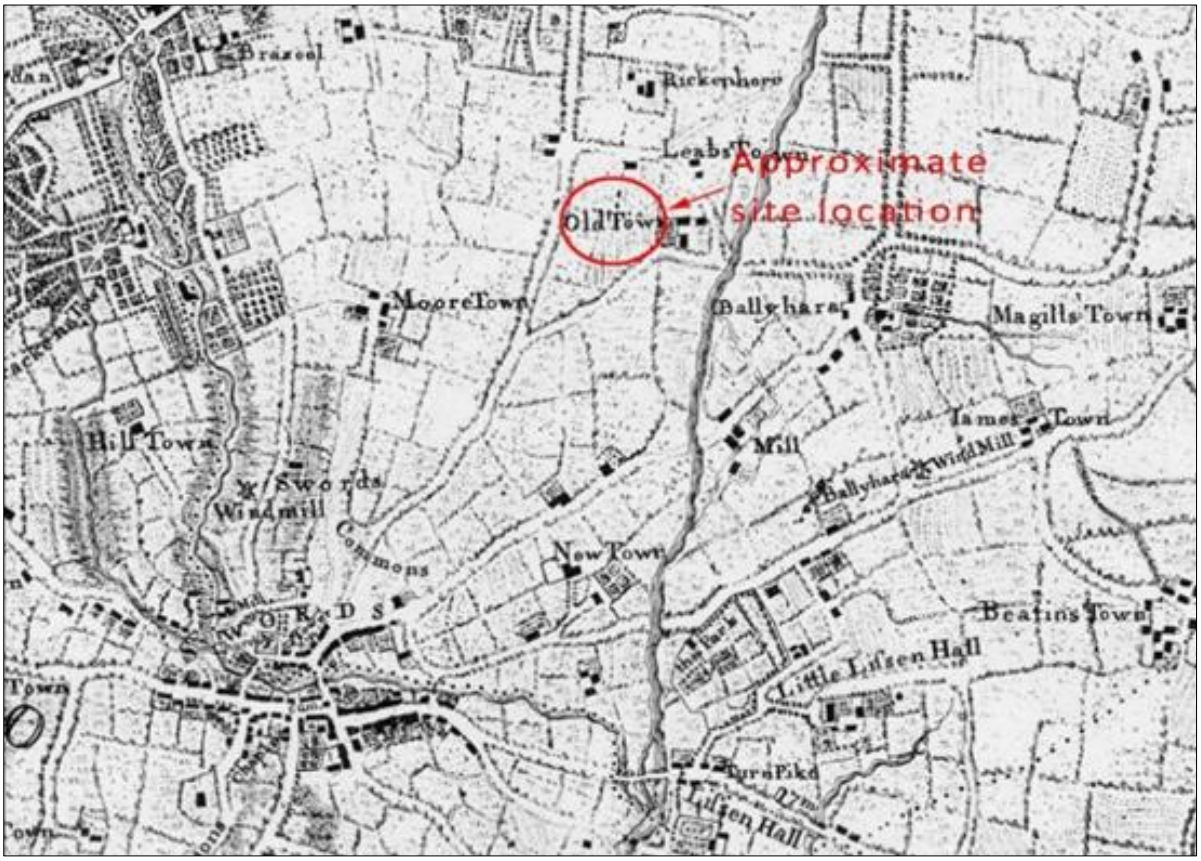


Figure 13.12 Down Survey Map of Nethercross 1656

Taylor's Map of County Dublin, 1816 (Fig. 13.13)

John Taylor records little additional detail on his 1816 map of Swords. The site of the study area at that time is referred to as Leabstown, with Rickenhore immediately to the west and Oldtown to the north. The farmstead in Oldtown in the Phase 4 area and the road leading to it from the Rathbeal Road are again depicted. North of the river, this road continues as a path towards the chapel at Ballyheary. There is no longer an adjoining road leading west from the farmstead as was depicted in Rocque, and the adjacent structure in Rickenhore is gone. The Phase 5 and 6 application lands do not appear to have any structures or features depicted.

Figure 13.13- Taylor's map of Dublin 1816

First edition Ordnance Survey map, scale 1:10560, 1837 (Fig. 13.14)

This is the first detailed map of the study area. The irregular alignment of the Rathbeal and Oldtown townland boundary can clearly be made out. The Phase 5 lands are depicted as open greenfield areas, with the only feature of note being the townland boundary. The property noted on Rocque's (Fig. 13.12) and Taylor's (Fig. 13.13) maps is clearly shown in the northern end of the Phase 4 development area. This is likely to be the property described by O'Donovan (1843) as a 'Good Farm steading in the north part of the Townland and small Cott. In the South part being the only house in it'. The road leading up to the property is shown but there is no longer any trace of it beyond the property and no trace of the pathway on the other side of the river. A pathway is depicted running roughly north-south through the townland, from the vicinity of Glasmore Abbey in the south, to where it meets the access road to the Oldtown property. No other structures are depicted in Oldtown or Rathbeal, but the curve of the road which had been noted north and west of the farmstead in Rocque's map is evident within the field boundaries, with a quarry located in approximately the same location as the structure which was also shown by Rocque adjacent to the former road.

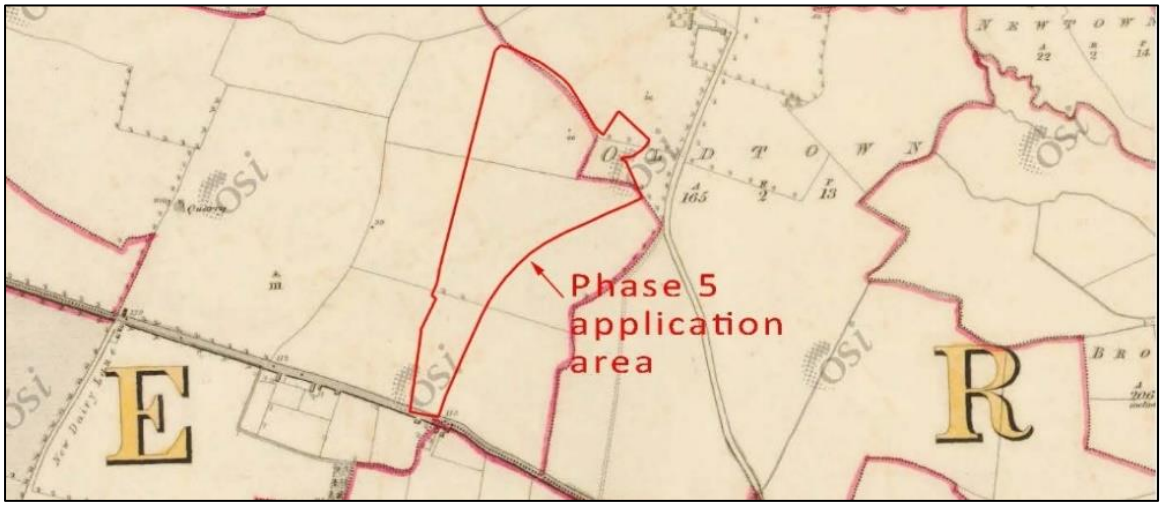


Figure 13.14- First edition OS six-inch map 1837

Ordnance Survey map, scale 1:2500, 1906 (not shown)

Few changes appear to have occurred to the townland between 1837-46 and 1906 and the field sub-divisions remain unaltered. The property in the northwest of the townland includes an additional structure with an entrance off the access road and two smaller structures elsewhere on the property. The pathway leading from the vicinity of Glasmore Abbey is not depicted on this map and appears to have fallen out of use by this time. Other than the Oldtown / Rathbeal townland boundary, there are no obvious features within the Phase 5 application area.

13.4 Characteristics of the Proposed Development

The LAP lands lie within the townlands of Oldtown and Mooretown, just over 1.5km to the west of Swords village. Mooretown lies to the south of the Rathbeale Road (R125) and is bounded to the east and south by existing residential housing estates and to the west by agricultural land belonging to Rathbeal townland. Oldtown lies to the north of Rathbeale Road and is again flanked by residential development to the east, and to the west and northwest by the future development of Swords Regional Park and the future Broadmeadow Linear Park to the north.

The subject application, referred as Oldtown Planning 5, will comprise a total of 377 residential units and is the eighth planning application in Oldtown-Mooretown LAP lands. The proposed site for the stormwater storage tank that also forms part of this application is located on the junction of the Glen Ellan Road and the Balheary Road, Swords, Co. Dublin. The site is owned by The Applicant and is locally referred to as the Celestica/Motorola site.

The Oldtown-Mooretown Local Area Plan (LAP) and Masterplan have been prepared for the lands and the development of LAP lands is taking place in a number of phases. The overall development will comprise approximately 2,300 dwellings units, 7,510 sqm of commercial floorspace and a 1,624-pupil primary and post-primary school on a 111 hectares site.

Enclosure site RMP DU011-150 which is located in the Phase 5 application area is to be preserved in situ and maintained as an open-space which is being integrated into the development proposals. A conservation plan has been created outlining the characteristics of the preservation and presentation of this site. Measures will include protection of the underlying archaeological remains with a layer of terram and soils, the enhancement of the topographical setting through mounding and naturalised bulb planting to demarcate the location of the belowground remains. This will be part of the green space strategy for the LAP lands involving footpaths, open spaces and Archaeology Parks. Signage and seating will be provided as part of a network of historic information throughout the LAP lands.

13.5 Potential impact of the proposed Development

13.5.1 Archaeological Heritage

One recorded (RMP/SMR) archaeological site has been identified within the Phase 5 lands and the proposed development layout has been designed to incorporate its preservation in situ. Newly discovered archaeological features have also been identified through a programme of test trenching and monitoring of topsoil removal within the Phase 5 application lands. These features have all been archaeologically excavated and preserved by record (17E0446, Rice, 2019).

The recorded archaeological site in the north of the Phase 5 application lands is a large ditched enclosure (RMP no: DU011-150) (Figs 13.3-13.5). This site was discovered during testing carried out in 2013 in advance of an earlier phase of development within the LAP lands. The enclosure measures 60m N-S x 80m E-W, although the eastern extent of the enclosure was not identified during testing and may have been truncated in the past. The ditch (3m wide x 1.5m deep) contained inclusions of seashells and animal bone. No datable finds were recovered during testing (McLoughlin 2013) however a sample of charcoal retrieved from a section of an internal posthole was radiocarbon dated to 839-551 cal. BC, suggesting a Late Bronze Age / Early Iron Age date for the enclosure (Clancy and McLoughlin 2018). A buffer of 10m surrounding this monument was agreed in consultation with the DAHG and in December 2013 the site was surrounded with post and wire fencing to protect it from any potential disturbance relating to the other phases of the development. Any construction activity in this area has the potential to disturb the archaeological remains. A Conservation Plan has been put in place to protect this site (See Section 13.6.1 Conservation Plan – Preservation in-situ of RMP DU011-150).

Testing of the Phase 5 lands revealed a probable cereal drying kiln and a pit (McLoughlin 2017; Licence no: 17E0446). The features were recorded, covered in polythene, and the test trenches backfilled. The testing report recommended that these features be archaeologically excavated under licence to the DHLGH in advance of development and that archaeological monitoring of topsoil removal be carried out. Archaeological monitoring identified further archaeological features (Areas 1 and 2) comprising two cremation pits, an urn burial, a burnt spread and associated troughs, three kilns, various prehistoric and undated pits and post medieval drainage ditches. All archaeological features within these areas have now been archaeologically resolved and no further mitigation is required within the Phase 5 application lands.

13.5.2 Architectural and Cultural Heritage Impacts

The Phase 5 application area includes approximately 420m of the Oldtown / Rathbeal townland boundary which appears as a tree-linked bank. Approximately 150m of this boundary has been removed previously and the remainder will be removed as part of the development (Figs 13.3 & 13.4).

The proposed Phase 5 development will have no direct impact on any features of architectural heritage within the proposed development area.

13.6 Remedial and Reductive Measures

13.6.1 Conservation Plan – Preservation in-situ of RMP DU011-150

Description of site

The discovery of the enclosure site (RMP no: DU011-150) in works associated with the Oldtown Phase 1 development in 2013 (Moraghan and McLoughlin 2016; Licence no: 13E0283) has led to the redesign of the Phase 5 development and the adjacent Phase 4 development, to avoid impacting the enclosure. The enclosure has been integrated into an open space area in the development enabling its preservation in-situ.

The site is entirely subsurface in nature. As detailed above, the enclosure has been traced to the west, north and south and appears to form a circular or sub-circular enclosure. Despite comprehensive testing, the eastern extent of the site was not identified, and this may be due either to the upper fills comprising re-deposited natural subsoil, or it may have been ploughed out. The topographical setting of the site is subtle, lying on a slope that falls away to the north and east. Its setting however has been disturbed and it no longer forms a part of the significance of the site.

Status

The site is recorded in the Record of Monuments and Places, RMP DU011-150. The DHLGH and the Planning Authority have been informed of the type of site, its location and extent through the licensing process and through the submission of the final stratigraphic report for Licence ref: 13E0283 (Moraghan, M. & McLoughlin, G., 2016).

Date

Charcoal from a posthole within the interior of the enclosure has been dated to the Late Bronze Age / early Iron Age.

Significance

This site is a significant addition to the record. It supports recent evidence of other dispersed Late Bronze Age/ Iron Age and activity which has been identified in the wider landscape of Oldtown, indicating a continued presence which carried on into the early medieval period and confirms possible earlier occupation at the significant early medieval enclosure complex at Oldtown/Mooretown, to the south-southeast (which is also being preserved in situ in Rathbeale Archaeological Park (RMP no: DU011-144). However, unlike the other sites preserved in the Oldtown/Mooretown Archaeological Parks this site in its survival is fragmentary and its plan form uncertain (it is likely that its eastern extent has potentially been removed by ploughing).

Issues / vulnerability

Buried archaeological remains are vulnerable to ground disturbance and inadvertent damage due to development in the area.

Mitigation strategy

In line with Oldtown-Mooretown Conservation Plan Polices for the preservation in-situ of archaeological remains the following strategy has been developed for RMP DU011-150:

- A protection zone has been placed around the recorded and notional extent of this feature. The protection zone encircles this area with a buffer zone of some 10m beyond the extent of the monument (as agreed with the then DCHG, now DHLGH) to protect it from any construction traffic. The site will be maintained as an open space and has integrated into the development proposals.
- The landscape design incorporates the below-ground remains into the development, retaining it as an amenity area in the landscape. The proposed Landscape Plan has previously been issued as part of compliance to address the Swords Regional Park (Ref. LP-05-CS) and was developed in

consultation with Fingal Co Co Parks Department (Kevin Halpenny and Marc Coyle). The landscaping proposals are both an interpretation and a protective measure for the site.

- The site will be covered in terram and soils will be introduced to protect the underlying archaeological remains which are at least 0.30m below the existing ground level. Mounding will enhance the topographical setting of the site to ensure views towards the west and north towards Saucerstowns Stream. Naturalised bulb planting will demarcate the location of the belowground remains on the western side.
- The amenity will link the green space strategy developed for the LAP lands, with pathways leading to a wider network of open spaces, Archaeological Parks and linear parks. Avoidance of railings or bollards to delineate an archaeological site or exclusion area is advised as they detract from the overall setting, provide obstacles to movement through the area and can attract antisocial behaviour.
- Provision of signage to interpret the below-ground remains for the general public with be placed at the centre of the site along with seating. It will form part of a network of historic information throughout the LAP lands.

13.6.2 Archaeology

Archaeological test trenching in the Phase 5 application lands revealed two previously unknown archaeological sites; a possible kiln and an undated pit (McLoughlin 2017; Licence no: 17E0446). Full excavation of the newly identified features was recommended along with monitoring of topsoil removal within the Phase 5 lands. This was based on the results of the testing and the proximity of three subsurface sites in the field to the west of the application area. Monitoring was carried out and further features were identified (Area 1 and 2) and subsequently excavated in 2018 (17E0446, Rice, 2019). There are no further archaeological requirements in this area.

The southern portion of the application area has been considerably disturbed due to the construction of a temporary school in that location. It was concluded after the geophysical survey of this area that the archaeological potential of the anomalies it identified was limited and, given the shallow depth of topsoil in the test trenches to the north of the school, it is unlikely that archaeological features or material will have survived the construction activity. There are, however, some areas which may remain undisturbed by the construction and given the proximity of subsurface enclosure DU011-135 and the additional archaeological features identified during monitoring to the north of the school, this will require remedial measures.

In addition, the Phase 5 application lands include approximately 420m of the Oldtown / Rathbeal townland boundary. Portions of this boundary have been removed previously and recommendations are included below in relation to the remaining upstanding portions.

- It is recommended that topsoil removal within the southern portion of the Phase 5 lands be monitored by a suitably qualified archaeologist. After the removal of the existing amenities in this area, the archaeologist will determine if it is necessary to monitor further groundworks. In the event of any archaeological features remaining beneath these structures and surfaces, the area will be cordoned off and protected until the archaeologist has made a decision on how best to deal with the remains in consultation with the DHLGH.

- It is recommended that removal of the Oldtown / Rathbeal townland boundary within the proposed development area be monitored by a suitably qualified archaeologist with the provision that in the event of any further archaeological remains being identified, the area be cordoned off and protected until the archaeologist has made a decision on how best to deal with the remains in consultation with the DHLGH.
- It is further recommended that heavy machinery movements related to this phase of development not encroach on the recorded archaeological monuments in the adjacent field to the west and that if construction activities, including soil movem##ents and storage, are to take place in the field to the west, the archaeological monuments should be fenced off for their protection.

All recommendations are subject to approval from the National Monuments Section of the Heritage and Planning Division, Department of Culture, Heritage and the Gaeltacht.

13.6.3 Architectural and Cultural Heritage

No protected structures or properties recorded in the Record of Protected Structures of Fingal County Council or within the National Inventory of Architectural Heritage will be impacted by the proposed Phase 5 development.

13.7 Predicted Impact of the Proposed Development

No predicted impacts are envisaged as all archaeological, architectural and cultural heritage issues have been resolved at the pre-construction stage of the development.

13.8 Interactions and Cumulative Impacts

There is an interaction with the landscape consultant to integrate RMP DU011-150 into the landscaping design. No interactions or cumulative impact are predicted.

13.9 Monitoring

Archaeological monitoring is not required as all archaeological, architectural and cultural heritage issues have been resolved at the pre-construction stage of the development.

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14.0 MATERIAL ASSETS - UTILITIES AND WASTE

14.1 Introduction

This chapter has been prepared by Waterman Moylan Consulting Engineers.

This section examines the material assets serving the subject lands relating to surface water drainage, water supply, foul sewerage, waste, electricity, gas, and telecommunications.

14.2 Study Methodology

The methodology followed for this section is in accordance with the EPA "*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 Irish Water Utility Plans, ESB Networks Utility Plans, Gas Networks Ireland Service Plans, Eir E-Maps and Virgin Media Maps;
- Consultation with Irish Water and Fingal County Council;
- Submission of a Pre-Connection Enquiry Application to Irish Water;
- Review of ESB Network Utility Plans & Site meetings with ESB Network
- Review of Gas Networks Ireland exiting network maps;
- Review of EIR Telecommunications exiting network maps;
- Site Inspection / Walkover.

As part of assessing the likely impact of the proposed development, surface water runoff, foul drainage discharge and water usage calculations were carried out in accordance with the following guidelines:

- Greater Dublin Strategic Drainage Study (GDSDS);
- IS EN752, "Drain and Sewer Systems Outside Buildings"; and
- Irish Water's Code of Practice (water demand and foul water loading).

14.3 Existing Receiving Environment (Baseline)

14.3.1 Surface Water Drainage

The subject lands are in the catchment of the Broadmeadow River which discharges to the Broadmeadow (Malahide) estuary.

Existing surface water drainage within the Oldtown lands consists of the following:-

Trunk surface water outfall sewers were constructed under Planning 1 to serve the proposed phasing 1, 2, 3, 4 and the proposed developments. The trunk sewers consist of a surface water system that ultimately discharges into an attenuation pond in the northeast of the development lands and immediately south of the Broadmeadow River.

The Broadmeadow River flows in a south-easterly direction towards the Irish Sea. It is joined by the Ward River prior to discharging to the Broadmeadow (Malahide) Estuary. The estuary is designated a

Special Protection Area (SPA), a candidate Special Area of Conservation (cSAC), a proposed Natural Heritage Area (pNHA) and a Ramsar site.

The Environmental Protection Agency (EPA) website shows the nearest water quality monitoring station on the Broadmeadow River, which lies downstream of the site, having a water quality, Q, value of 2-3 which represents a moderately polluted river, with Q = 1 being the lowest level of pollution and Q = 5 being the highest level of pollution.

Neither the Oldtown lands nor the adjacent Broadmeadow River are part of the SPA or SAC site, however, any development immediately upstream is required to maintain or improve the quality of surface water to status objectives as set out in the Water Framework Directive (WFD), to protect and enhance the status of the aquatic ecosystems. This will require the implementation of SUDS.

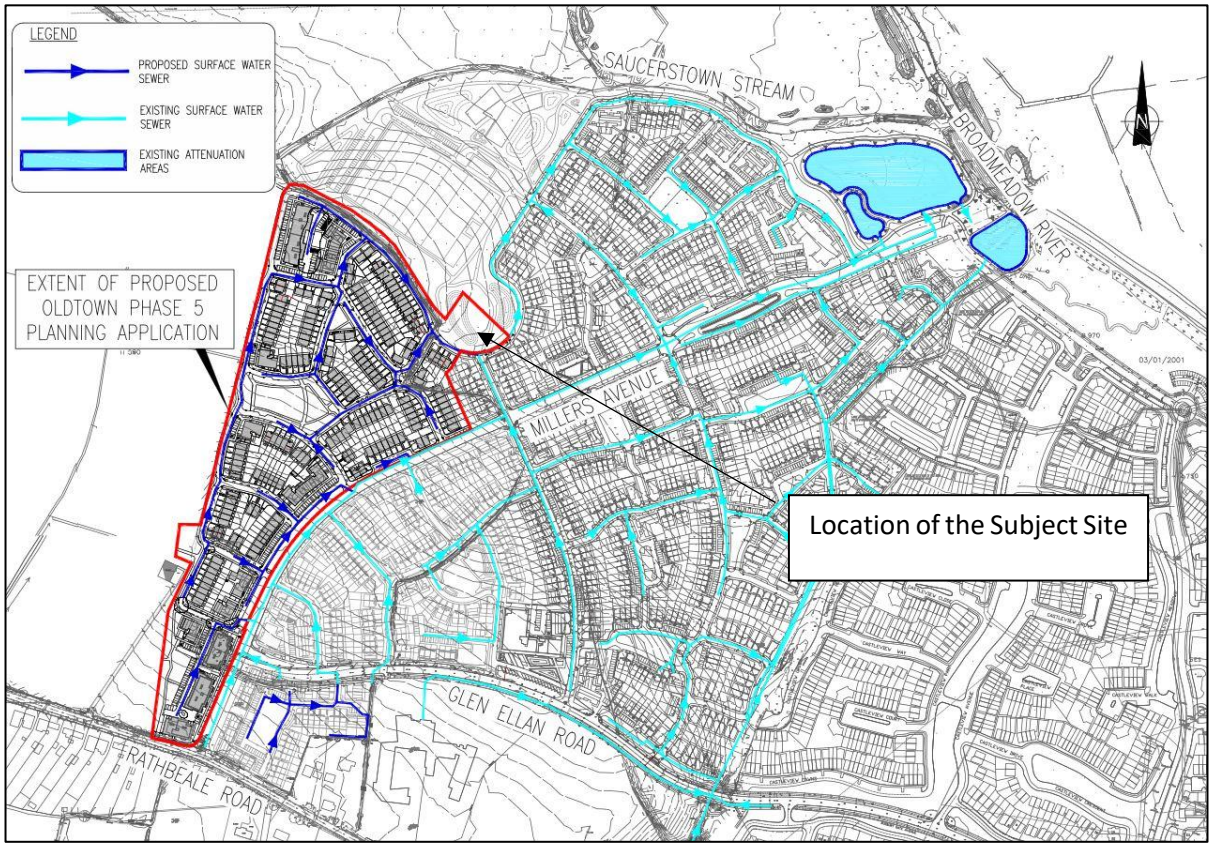

Figure 14.1 – Existing and Proposed Surface Water Drainage Network. [Note: Red line developable site area indicatively shown]

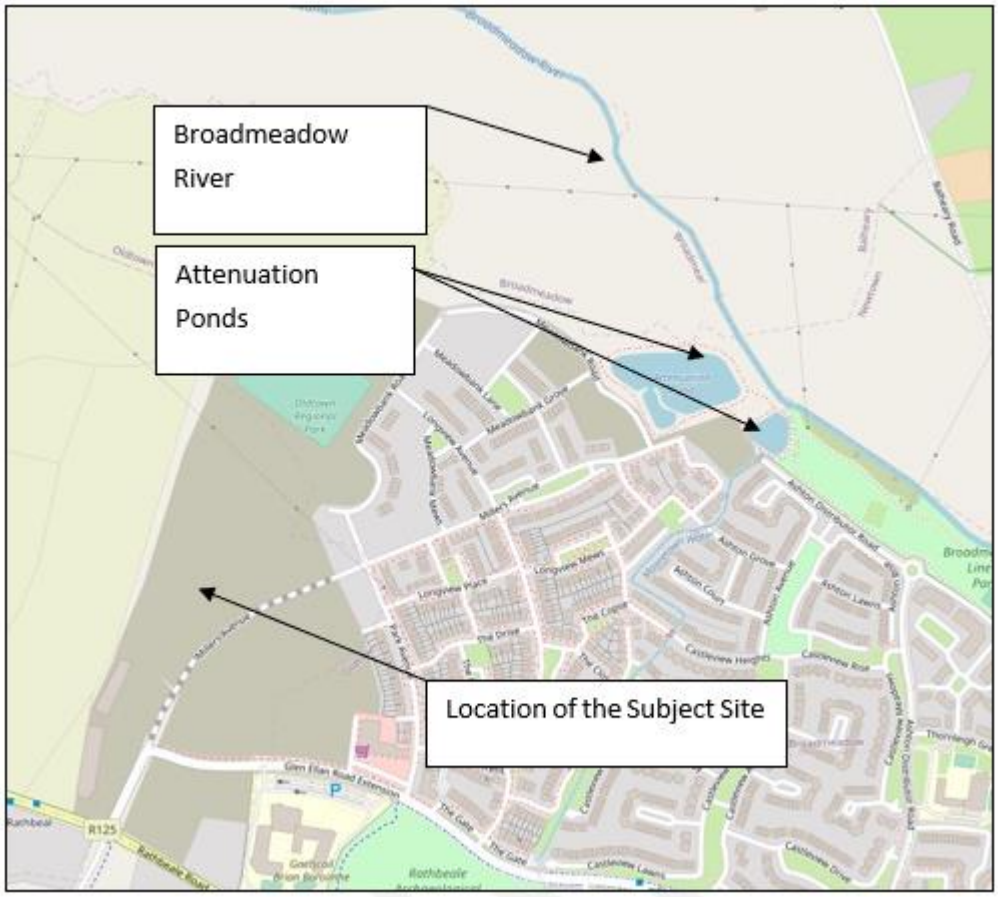

Figure 14.2 – EPA Watercourses Map

Also refer to Chapter 8.0 (Water) of this EIAR for further information on the surface water infrastructure impacts and mitigation measures.

14.3.2 Foul Sewers

There is an existing 450mm diameter foul water sewer in the north-east of the Oldtown lands which was constructed as part of the adjacent Ashton development to the east of the site. The sewer was constructed to facilitate the development of the Oldtown lands. This system discharges to the Swords Wastewater Treatment Plant.

As part of the Oldtown Phases 1, 3 and 4 developments, a series of 225mm and 300mm diameter outfall sewers were constructed along Millers Avenue, outfalling to the 450mm outfall sewer.

It is proposed to drain the proposed development to the series of 225mm and 300mm diameter outfall sewers that were constructed as part of the Planning 1, 3 and 4 developments. Suitably sized spurs have been made available from the existing outfall sewers located along Millers Avenue to facilitate connections to the Phase 5 development and to the adjacent Phase 4 development.

It is similarly proposed to install a storage tank on the public foul network is to alleviate constraints within the public foul network during times of heavy rainfall events, whereby stormwater enters the public foul network temporarily reducing available capacity. The proposed stormwater storage tank has been designed in conjunction with Irish Water and will not only facilitate the connection requirement of this subject application but will also have capacity to allow for continued development

in the Oldtown/Mooretown catchment. The storage tank in proposed to be located at the junction of the Glen Ellan Road and the Balheary Road, as indicated in Figure 14.3.

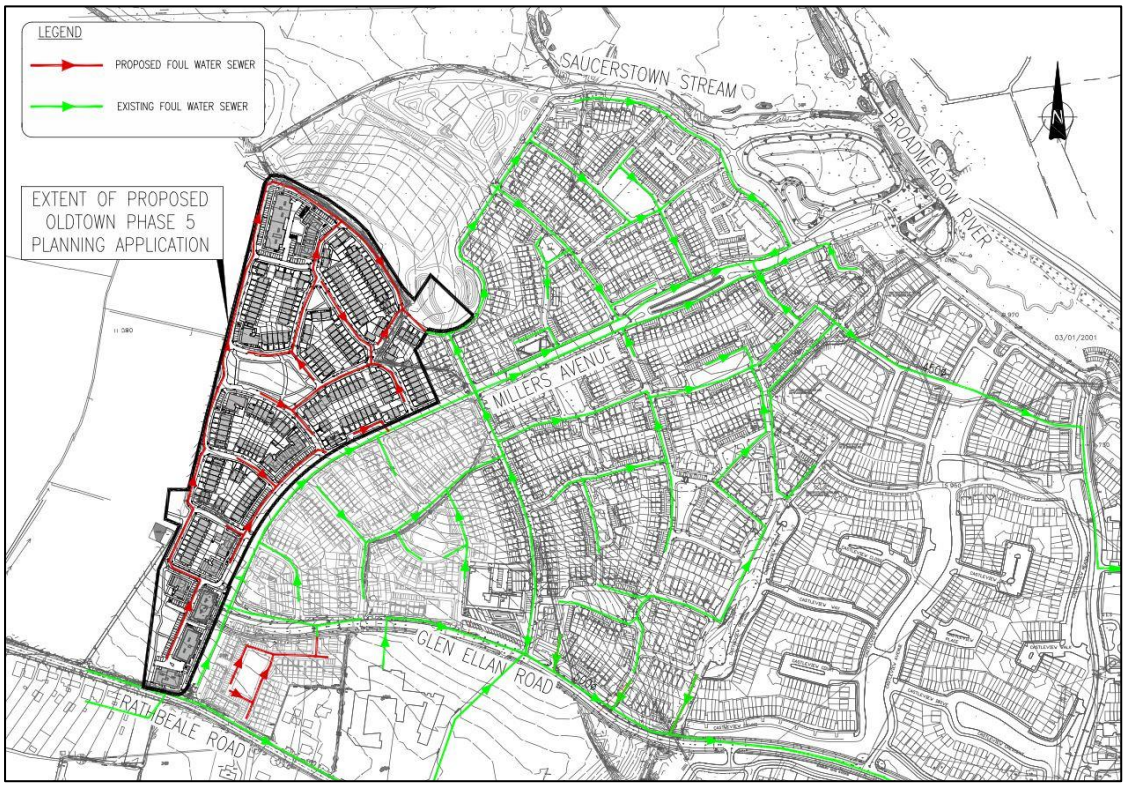

Figure 14.3 – Existing and Proposed Foul Drainage Network. [Note: Red line developable site area indicatively shown]

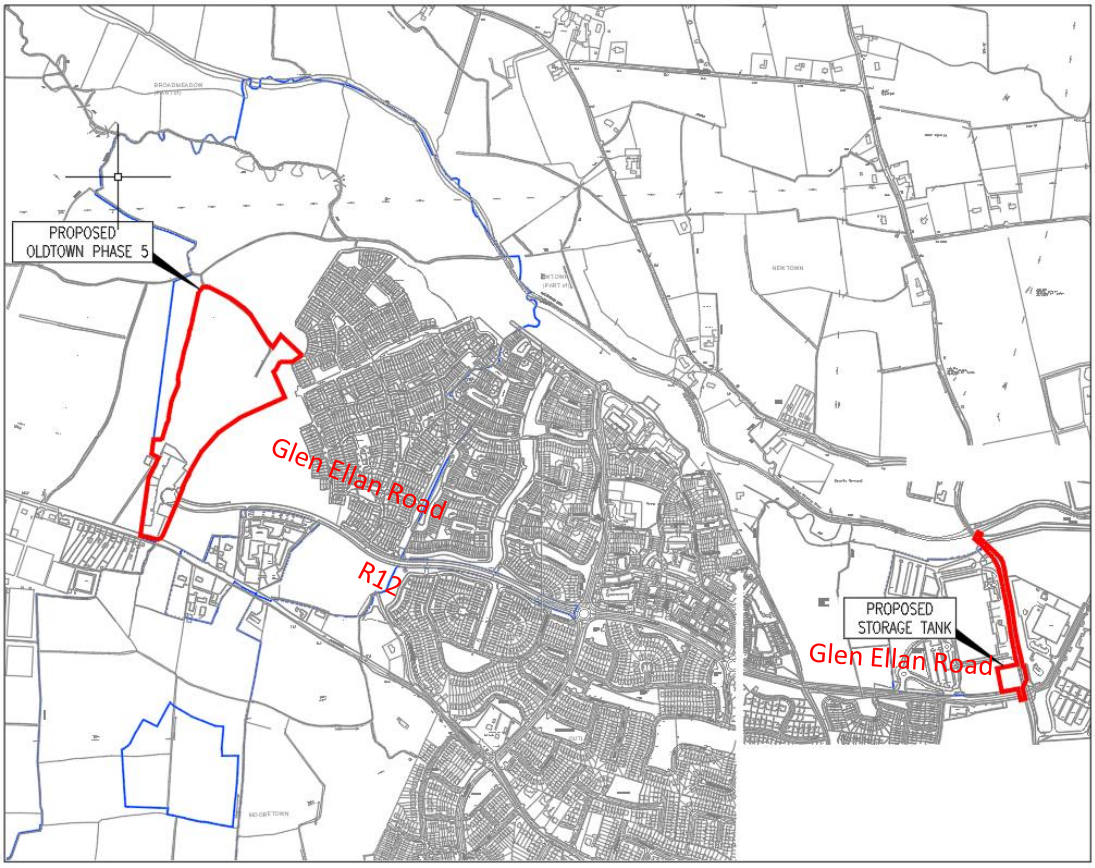

Figure 14.4 – Subject Application including Tank. [Note: Red line developable site area indicatively shown]

14.3.3 Water Supply

The Swords area, including the subject lands, is supplied from Leixlip Water Treatment Plant.

There is an 800mm diameter ductile iron trunk watermain crossing the lands. This main connects Kingston to Lissenhall. The trunk main has a 16-metre wayleave through the lands which has been incorporated into Oldtown Avenue, the main spine road of the development, in accordance with the LAP. A spur has been provided from the 800mm diameter water main to serve the Oldtown/Mooretown LAP lands, located just south of the Glen Ellan Road.

A series of 100/150/200mm trunk mains were constructed as part of the Phase 1 and Phase 3 developments that connect to the boundary of the Phase 5 development.

The proposed development will be served by the aforementioned connections that ultimately connect to the existing 800mm diameter trunk main. As part of the Planning 1 development, a connection was provided from the 800mm trunk main to the 250mm Glen Ellan watermain. Fingal County Council shut down the supply from the 250mm Glen Ellan watermain and the Oldtown development is now served from the 800mm connection.

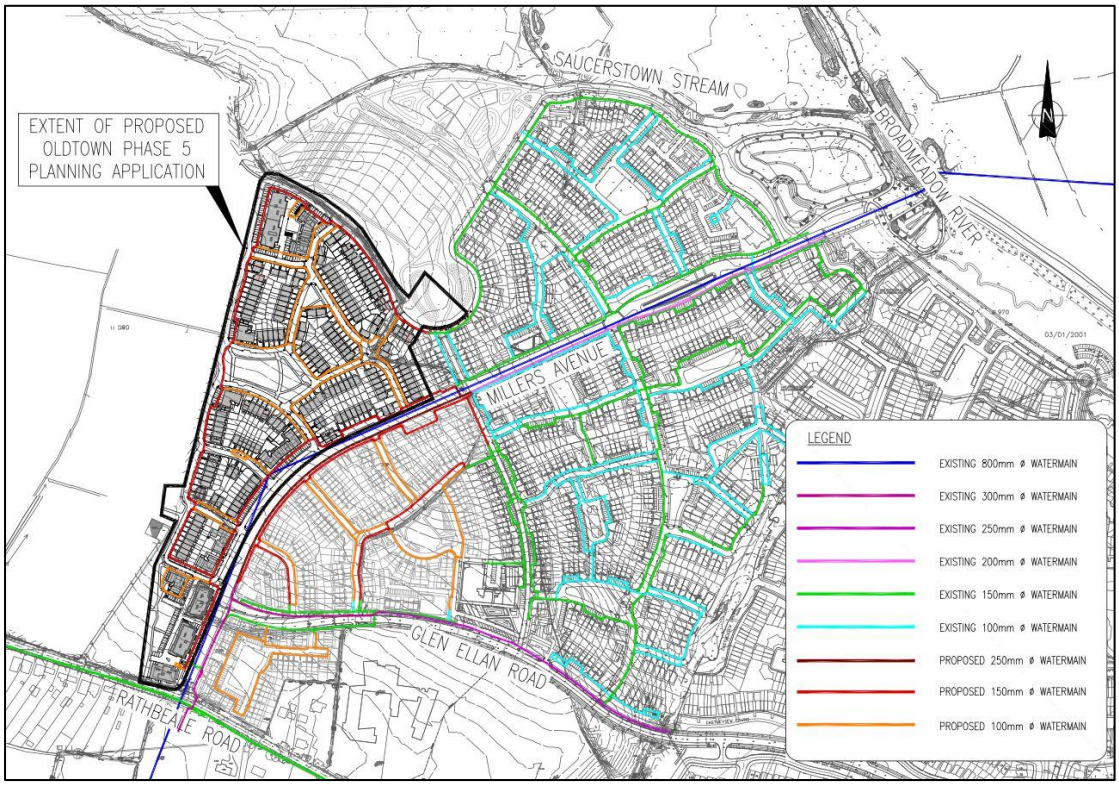

Figure 14.5 – Existing and Proposed Watermain Network. [Note: Red line developable site area indicatively shown]

14.3.4 Gas

Gas Networks Ireland have been contacted and an existing gas network map for the area surrounding the proposed development has been obtained, refer to Figure 14.6 overleaf showing an extract. There are existing gas pipes adjacent on Millers Avenue and Planning 4, to facilitate Oldtown Phase 5.

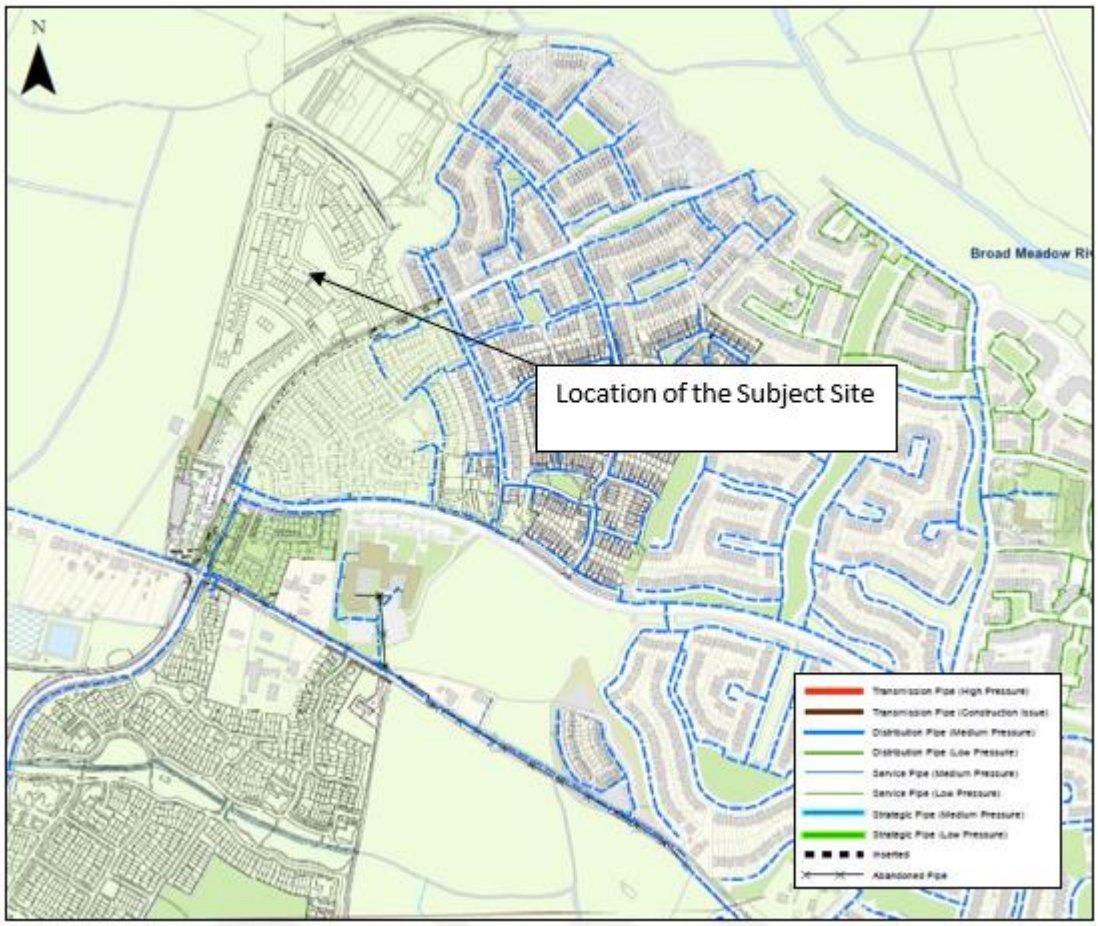

Figure 14.6 - Gas Network Map/ [Note: Red line developable site area indicatively shown]

14.3.5 ESB Supply

ESB Networks have been contacted and an existing ESB network map for the area surrounding the proposed development has been obtained, refer to Figure 14.7 overleaf. ESB infrastructure exists in Millers Avenue adjacent, to facilitate the proposed development.

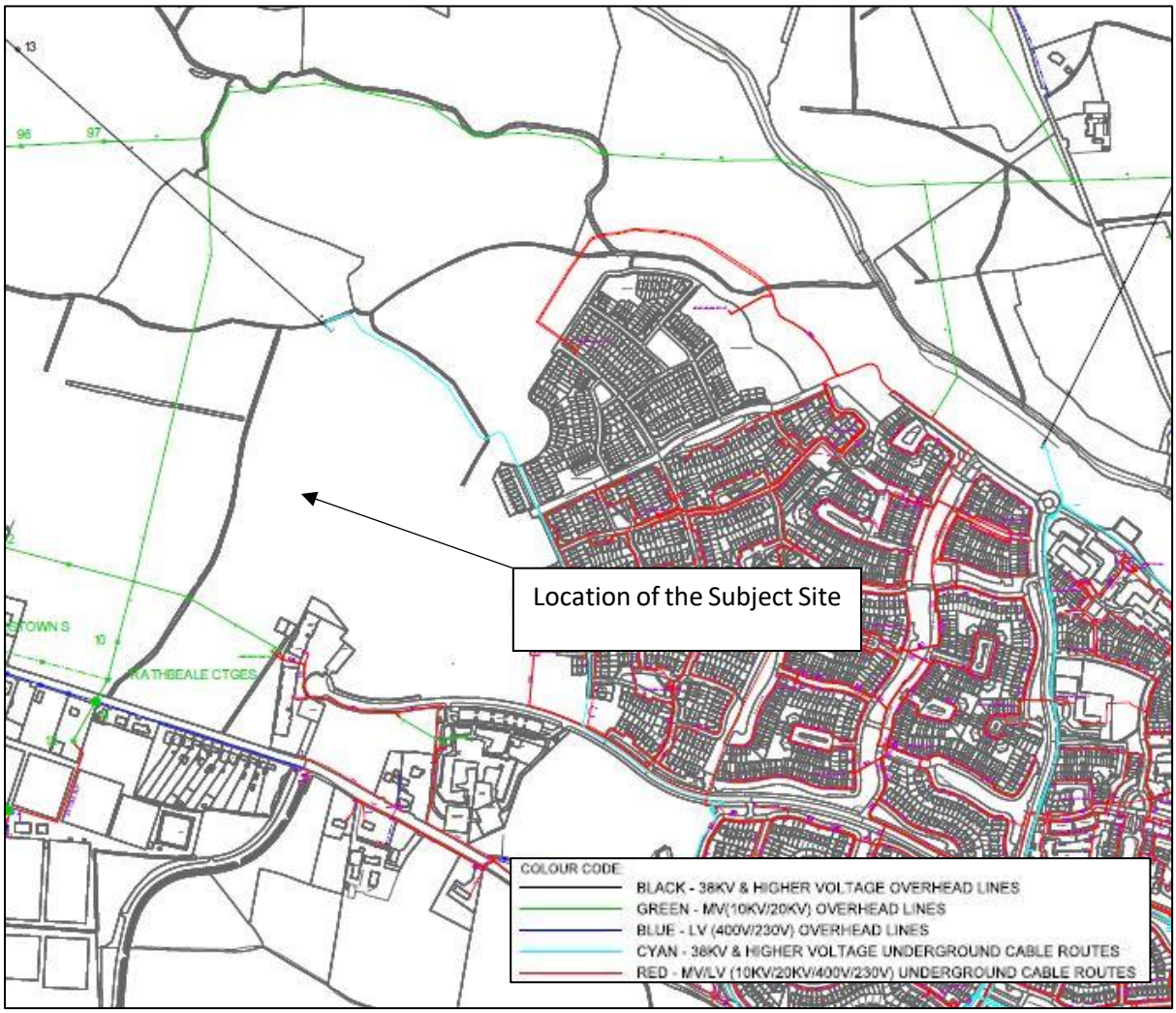

Figure 14.7 ESB Network Map

14.3.6 Telecommunications – EIR

Eir have been contacted and an existing Eir network map for the area surrounding the proposed development has been obtained. Figure 14.8 overleaf. There are existing Eir services adjacent to the subject site in Oldtown Planning 4 and are further proposed for Miller' Avenue by Oldtown Planning 2.

Figure 14. 8 - EIR Network Map Extract

14.4 Characteristics of the Proposal

The proposed development consists of 377 units, comprised of 173 house, 169 apartments and 35apartment/duplex units with associate parking and ancillary structures, on a site area of 10.223 ha.

The developer will construct all associated infrastructure to service the development including a network of foul water and surface water drains, watermain, access roads and footpaths.

It is similarly proposed to install a storage tank on the public foul network is to alleviate constraints within the public foul network during times of heavy rainfall events, whereby stormwater enters the public foul network temporarily reducing available capacity. The proposed stormwater storage tank has been designed in conjunction with Irish Water and will not only facilitate the connection requirement of this subject application but will also have capacity to allow for continued development in the Oldtown/Mooretown catchment. The storage tank is proposed to be located at the junction of Glen Ellan Road and Balheary Road.

14.4.1 Surface Water Drainage

Full development of the Oldtown LAP laps require approximately 7,800m³ of attenuation, based on the following criteria:

Total Development Area	= 41.0 Ha
Hard Standing Area (40%)	= 16.4Ha
Climate Change	= 20%

Attenuation for = 1 in 100 year flood event

Allowable Outflow = 213 l/s

The ponds have been constructed under Phase 1 to provide 7,800m3 of attenuation which accommodates the subject Phase 5 development.

The allowable runoff from the site is calculated in accordance with the Greater Dublin Strategic Drainage Study (GDSDS). This allowable runoff is to reflect the original green-field runoff, i.e. the storm water runoff before the site was developed. This is achieved by limiting the discharge from the developed site to similar flow rates that would be expected from a greenfield site for return periods of 1 year, 30 year and 100 year. Attenuation storage has been provided to retain surplus storm water on site during significant storm events. The runoff is factored to take into account climate change. This factor is based on a 20% increase in rainfall depth.

This was proposed and agreed in principle with FCC Planning Department, FCC Drainage Department and FCC Parks Department at a meeting on 14th September 2016 and again in further detail with FCC Drainage Department and FCC Parks Department at a meeting on 14th March 2017.

In this regard, compliance submissions were submitted in May 2017 outlining the proposal under Condition 18 of Reg. Ref. F11A/0436 (Oldtown Planning 1), Condition 19 of Reg. Ref. F11A/0473 (Oldtown Planning 2) and Condition 6(b) of Reg. Ref. F15A/0390 (Oldtown Planning 3).

The following is a breakdown of the permanent water volume and attenuation volume in the enlarged pond:

Description	Catchment	Soil Type	l/s/Ha	Allowable Outflow	Permanent Water Volume	Attenuation Water Volume
Newly Proposed Enlarged Attenuation Pond	41.0 Ha	4	5.2 l/s/ha	213 l/s	9,040m^3	7,800m^3

Table 14.1 – Oldtown Attenuation Provision

A planted forebay forms part of the inlet at the discharge point into the attenuation pond which provides a suitable area for specialist planting and to facilitate maintenance and removal of pollution loading. All associated surface water sewers will be sized to accommodate upstream development.

14.4.2 Foul Sewers

A Pre-Connection Enquiry was submitted to Irish Water and a Confirmation of Feasibility Letter was issued, dated 22 October 2018. The letter notes that upgrade works are required in order to accommodate the proposed connections to serve the site. At that time, the letter stated that ongoing hydraulic modelling of the existing network would be available by the second quarter of 2019 (subject to change), and that the Developer will be required to enter into a Project Works Services Agreement to deliver infrastructure upgrades to facilitate the connection of the development to Irish Water infrastructure.

On 3 March 2020, Waterman Moylan met with John O'Shaughnessy, Dermot Phelan, Keith Kirwan and Fergal Broderick of Irish Water to discuss the results of the modelling and to establish the scope of upgrades required to accommodate the proposed development.

Irish Water confirmed that their modelling identified flooding downstream of the proposed development, at Balheary near the Swords Business Campus. This flooding was determined by Irish Water to be the result of flows exceeding the capacity of the pipe crossing the R132 to the Swords Treatment Plant.

At this meeting, Irish Water set out their proposed network upgrade strategy to accommodate future developments at the Oldtown and Mooretown LAP lands, including the subject site. The proposed solution is to provide long term storage to reduce the peak flows to the pipe crossing the R132. Irish Water propose to include a contribution fee as part of any wastewater connection offer in the area. This solution will allow for phased increases in capacity as the lands are developed and does not require upsizing of the pipe crossing the R132.

This stormwater storage tank on the public foul network forms part of the subject application and is designed to alleviate constraints within the public foul network during times of heavy rainfall events, whereby stormwater enters the public foul network temporarily reducing available capacity. The proposed stormwater storage tank has been designed in conjunction with Irish Water and will not only facilitate the connection requirement of this subject application but will also have the capacity to allow for continued development in the Oldtown/Mooretown catchment. The storage tank is proposed to be sited at the junction of Glen Ellan Road and Balheary Road, as indicated in Figure 14.4.

The calculated foul water flows at the subject development are set out in the table overleaf. The wastewater loads have been calculated based on 2.7 residents per unit, and with a per capita wastewater flow of 150 litres per head per day in accordance with Appendix D of the Irish Water Code of Practice for Wastewater Infrastructure. The figure of 90 l/s for the creche has been obtained from Appendix C of the same document. A 10%per unit consumption allowance has been applied to all calculated flows, in line with Section 1.2.4 of Appendix C of the Code of Practice. A peaking factor of 3.0 has been used in line with Section 1.2.5 of Appendix C of the Code of Practice.

Description	**Total Population**	**Load per Capita**	**Daily Load**	**Total DWF**	**Peak Flow**
	No. People	*l/day*	*l/day*	*l/s*	*l/s*
173 Houses	467.1	150	77,071.5	0.892	2.676
70 Duplexes	189	150	31,185	0.361	1.083
134 Apartments	361.8	150	59,697	0.691	2.073
Creche	119	90	11,781	0.136	0.408
Total	**1,136.9**	**Varies**	**179,734.5**	**2.080**	**6.240**

Table 14.2 - Foul Water Calculations

Based on the above calculations, the DWF for the proposed development is 2.080 l/s, with a peak flow of 6.240 l/s.

14.4.3 Water Supply

The overall proposed development will have 4 no. connections to the existing Phase 2 watermain network & 2 no. connections to the eastern side of Phase 4D. The subject development will ultimately be serviced from the 800mm trunk main, via a 300mm main installed at Miller's Avenue.

A Pre-Connection Enquiry was submitted to Irish Water and a Confirmation of Feasibility Letter was issued, dated 22 October 2018 – a copy of the letter is included in Appendix A to the Engineering Assessment Report, submitted under a separate cover. The letter notes that new connection to the existing network is feasible without upgrade.

Description	**Total Population**	**Water Demand**	**Average Demand**	**Average Peak Demand**	**Peak Demand**
	No. People	*l/day*	*l/s*	*l/s*	*l/s*
173 Houses	467.1	77,071.5	0.892	1.115	5.575
70 Duplexes	189	31,185	0.361	0.451	2.255
134 Apartments	361.8	59,697	0.691	0.864	4.320
Creche	119	11,781	0.136	0.170	0.850
Total	**1,136.9**	**179,734.5**	**2.080**	**2.600**	**13.000**

Table 14.3 - Water Supply Calculations

Based on the above calculations, the average water demand for the proposed development is 2.080 l/s, with a peak demand of 13.000 l/s.

14.4.4 ESB Network

A new connection will be made to the existing ESB network at the eastern boundary of the site at Millers Avenue. The exact extent and location of these connections will be agreed with ESB during the design stage of the project.

All works on the ESB supply infrastructure will be carried out in accordance with ESB relevant guidelines.

14.4.5 Gas

A new gas connection will be made at the eastern boundary of the site on Millers Avenue. The exact extent and location of these connections will be agreed with Gas Networks Ireland during the design stage of the project.

All works on the gas supply infrastructure will be carried out in accordance with Gas Networks Ireland relevant guidelines. All gas infrastructure will be below ground with the possible exception of a gas pressure reduction station if required by Gas Networks Ireland.

14.4.6 Telecommunications- Eir

A new connection will be made to the existing Eir network at the eastern boundary of the site at Millers Avenue. The exact extent and location of these connections will be agreed with Eir during the design stage of the project.

All works on the Eir supply infrastructure will be carried out in accordance with Eir's relevant guidelines. All Eir infrastructure will be below ground with the possible exception of a Fibre Cabinet if required by Eir.

14.5 Potential Impact of the Proposed Development During the Construction Phase

The following potential impacts from the construction of the proposed development may occur:

14.5.1 Surface Water

- There is a risk that once topsoil has been stripped from the site there will be higher runoff rates from the lands with an increased amount of silt to existing watercourses in the runoff.
- There is a risk of pollution of groundwater / watercourses / soils by accidental spillage of oils / diesel from temporary storage areas or where maintaining construction equipment.
- There is a risk of damage to existing buried utilities during excavations works resulting in temporary loss of supply to existing properties.
- There is a possibility of a temporary increase in traffic due to deliveries of materials and other construction related traffic.
- Cross Connection between surface water and foul pipes.

14.5.2 Foul Water

- There is a risk of the ingress of ground/surface water to the foul water network.
- There is a risk of damage to existing buried utilities during excavations works resulting in temporary loss of supply to existing properties.
- There is a possibility of a temporary Increase in traffic due to deliveries of materials and other construction related traffic.
- Cross connection between foul and surface water pipes.

14.5.3 Water Supply

- There is a risk of contamination of the existing water supply during construction of the development when connection of the proposed development watermain to the public water supply is being made.
- There is a risk of damage to watermain fittings due to high pressure in the existing watermain.
- There will be a minor water demand for site offices.
- There is a possibility of a temporary increase in traffic due to deliveries of materials and other construction related traffic.
- There is a risk of damage to existing buried utilities during excavations works resulting in temporary loss of supply to existing properties.

- The proposed development will not give rise to any significant long term adverse impact. Negative impacts during the construction phase will be short term only.

14.5.4 ESB Network

The installation of the ESB utilities for the development will be conducted in parallel with the other services. This will mainly involve excavation of trenches to lay ducting, construction/installation of access chambers and backfilling of trenching. The trenching and backfilling works will be carried out in conjunction with the construction of the roads and footpaths throughout the scheme.

The relocation or diversions of the existing overhead ESB lines may lead to loss of connectivity to and / or interruption of the supply from the electrical grid to the surrounding areas. Any loss of supply will be managed by ESB Networks to minimise impact on neighbouring properties.

The site compound will require a power connection. This likely adverse impact will be temporary and negligible.

14.5.5 Gas

The installation of the gas utilities for the development will be conducted in parallel with the other services. This will mainly involve excavation of trenches to lay ducting, construction/installation of access chambers and backfilling of trenching. The trenching and backfilling works will be carried out in conjunction with the construction of the roads and footpaths throughout the scheme.

Potential loss of connection to the Gas Networks Ireland infrastructure while carrying out works to provide service connections. This likely adverse impact may be characterised as a temporary, regionally short term, moderate impact.

14.5.6 Telecommunications - Eir

The installation of the telecommunications utilities for the development will be conducted in parallel with the other services. This will mainly involve excavation of trenches to lay ducting, construction/installation of access chambers and backfilling of trenching. The trenching and backfilling works will be carried out in conjunction with the construction of the roads and footpaths throughout the scheme.

Potential loss of connection to the telecommunications infrastructure while carrying out works to provide service connections. This likely adverse impact may be characterised as a temporary, regionally short term, moderate impact.

The site compound will require a telecommunications connection. This likely adverse impact will be temporary and negligible.

14.6 Potential Construction/ Demolition Waste from the Construction Phase

The main sources of construction waste arising from this project will be:

- Topsoil and subsoil
- Packaging and general waste from construction activities
- General site clearance waste, roots, etc.

It is practical that as much as possible topsoil and subsoil generated remains on site and is used for landscaping and engineering purposes as appropriate.

14.6.1 Policy and Legislation

The principles and objectives to deliver sustainable waste management for this project have been incorporated in the preparation of this report and are based on the following strategic objectives: -

- National Policy: The Waste Management Acts 1996 to 2005.
- Local Policy: Waste Management Plan for the Dublin Region 2005 – 2010, November 2005.

This Waste Management Plan is also in accordance with the following guidance note published by the Department of the Environment, Heritage and Local Government in July 2006: -

- Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition (C&D) Projects.

The hierarchy of waste management sets out the guiding principles in order of importance as follows:

1. Reduction of the amount of waste generated by the construction process.
2. Segregation of waste is a key concept that will be implemented during the course of the construction phase of the development to enable ease of re-use and recycling, wherever appropriate.
3. Recycle waste material where feasible, including the use of excess excavations as fill material, recycling of various waste fractions such as metals, packaging etc.

14.6.2 On-site Waste Management

An estimate of the quantities of surplus construction and demolition (C&D) waste and materials which will arise during the course of the construction phase shall be created by the main contractor.

The Purchasing Manager shall ensure that materials are ordered so that the quantity delivered, the timing of the delivery and the storage is not conducive to the creation of unnecessary waste.

14.6.3 Off Site Waste Management Licensing/Permitting

All waste materials (where necessary, after in-situ reuse and recycling options have been fully considered) shall be disposed of off-site, under the appropriate Duty of Care and subject to approvals/consents from the relevant statutory bodies. It is the responsibility of the Main Contractor to ensure that any company to whom waste is transferred is legally permitted to do so and that the facility they bring the waste to is licensed to handle that type of waste as outlined in the Waste Management Acts 1996-2005. The Waste Collection Permit Register, in accordance with the Waste Management (Collection Permit) Regulations 2001 will be consulted to ensure that waste carriers hold the appropriate permit.

It is anticipated that there is the possibility that waste materials will have to be moved off-site. It is the intention to engage specialist waste service contractors, who will possess the requisite authorisations, for the collection and movement of waste off-site, and to transport the material to a facility which currently holds a Waste Licence, Waste Permit, or Certificate of Registration. Details of

waste service contractors and demolitions are not confirmed at the time of writing. The following waste authorisations will be arranged specifically for the project:

Authorisation Type	**Specific Need for Project** (Yes / No?)
Waste Licence	Yes
Waste Permit	Yes
Waste Collection Permit	Yes
Transfrontier Shipment Notification	Not expected
Movement of Hazardous Waste Form	Not expected

Table 14.4 Specific Waste Authorisation Necessary for the Scheme

Any wastes that have to be disposed/recycled off-site will be transported to the nearest appropriate facility in order to comply with the proximity principle and reduce the associated emissions from the transportation of waste. The Environmental Protection Agency holds details of waste facilities, which will be consulted where necessary.

An inspection of the site shall be made by the Main Contractor for hazardous substances, gas cylinders and the like. If such substances are encountered during the course of construction, then works must be halted. The project supervisor for the construction stage (PSCS) and the responsible Statutory Authority shall be informed immediately.

The Contractor shall prepare a detailed inventory of construction based hazardous waste generated, such as tars, adhesives, sealants, and other dangerous substances, and these will be kept segregated from other non-hazardous waste to prevent possible contamination. Arrangements shall be made for such substances for disposal in a safe manner to an authorized disposal site or by means acceptable to the relevant Authority.

Certificates and licenses of waste hauliers and recycling/ disposal facilities shall be held by the main contractor for inspection as part of the contractor's own construction waste management plan

The Contractor shall ensure that the excavation works are carried out in accordance with best standard practice and excavation materials are well segregated to minimize any potential cross-contamination.

In the unlikely case of a soil/topsoil surplus the Contractor shall carry out appropriate environmental chemistry testing in order to determine the waste classification of the soils that are to be excavated and that shall include Waste Acceptance Criteria testing. The test regime shall be agreed with the receiving landfill operator and the testing shall be carried out by an accredited laboratory.

Should excavation materials be assessed to be hazardous, the Contractor shall carry out pre-treatment of the waste soils to a methodology that is agreed with the receiving landfill operator and in accordance with Environmental Protection Agency guidance.

The Main Contractor is encouraged to reuse and recycle any waste materials as far as is reasonably practicable.

The Main Contractor shall manage and carry out the works in accordance with best environmental practice and in accordance with the requirements of Local Authority, EPA and all requirements as specified in this document.

14.6.4 Estimate and Details of C&D Waste Quantities and generation

The following is an estimate of the construction and demolition waste generated from this development. These figures are high level estimates only and shall be confirmed by the appointed contractor in the Final Construction, Environmental and Demolition Waste Management Plan.

As far as is practical, cut and fill and excavation operations shall be balanced in terms of quantities. In this regard, Phase 5 is proposed to balance in terms subsoil.

It is envisaged that surplus excavated subsoil material from the proposed storage tank works will amount to ~3,660m3. Export of this subsoil material shall be carried out to the nearby housing development works. Subsoil transfer such as this shall require an article 27 application and associated licence grant.

A breakdown of the generated subsoil calculations allowing for a 10% factor of safety follows below:

Storage Tank – accounting for tank wall and base widths: 35.5m long x 35.5m wide x 2.35m deep +~10% Factor of safety = 3000m3

Drainage Outfall – 400m long x 1m wide x 1.5m deep = 600m3 + 10% factor of Safety = 660m3

In conjunction with subsoil, there shall be stone and asphalt generated from the excavation of the drainage outfall line.

A breakdown of the generated stone and asphalt calculations allowing for a 10% factor of safety is provided below:

Drainage Outfall Stone – 400m long x 1m wide x 300mm deep = 120m3

Drainage Outfall Asphalt - 400m long x 1m wide x 200mm deep = 80m3

In the case of stone & asphalt material generated from the drainage outfall excavation, careful planning and on-site storage can ensure that these resources are reused on-site as much as possible, with temporary storage afforded adjacent the site compound. Any surplus of stone or asphalt not reused on site can be sold or disposed of at an appropriately licensed facility.

It is anticipated that waste concrete and masonry will either be stored on site and crushed and used for development site haul roads or disposed of at an appropriately licensed facility. It is estimated that there will be approximately 150-170 tonnes of this material generated.

Most of the wood will come in the form of wooden pallets that are used for transport of construction materials. There will be 35m3 roll-on skips provided for this type of waste. This waste will then be disposed by a licensed waste service provider, to be confirmed by the contractor. It is estimated there will be 60-70 tonnes of this material generated.

Other waste coming from packaging and running of site offices will be collected in separate 15m3 roll on skips, and similarly collected by a licensed waste service provider. It is estimated there will be 20-30 tonnes of this material generated.

Waste Material	Waste Quantity
Subsoil	3,660m3 – Refer Section 6.8
Concrete and Masonry	150-170 tonnes
Stone	120m3
Asphalt	80m3
Wood	60-70 tonnes
Packaging	40-30 Tonnes

Table 14.5 | Estimate of C&D Waste Quantities

14.6.5 Topsoil

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 of soil not reused on site can be sold. However, topsoil is quite sensitive and can be rendered useless if not stored and cared for properly.

- It is important that topsoil is kept completely separate from all other construction waste as any cross-contamination of the topsoil can render it useless for reuse.
- It is important to ensure that topsoil is protected from all kinds of vehicle damage and kept away from site-track, delivery vehicle turning areas and site plant and vehicle storage areas.
- The required inspections and analysis of topsoil (also applicable to subsoil) properties will be undertaken to accompany any Article 27 applications.

If topsoil is stored in piles of greater than two metres 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 moving around the site.

Records of topsoil storage, movements and transfer from site should be kept by the C&D Waste Manager. It is projected that topsoil will be reused on-site for landscaping purposes. Any excess/surplus material shall transfer though the Article 27 application process and associated licence grant.

14.6.6 Earthworks (Subsoil) – Cut and Fill Policy

Earthworks for tank structure and outfall line form a major part of the quantity of waste that will be generated by the construction phase of this project. In order to optimise the impact of the generation of surplus material due to excavation the following principles has been considered during the detail design and construction phase:

- The quantity of excavated materials to be removed from or imported into the site has been reduced by establishing levels of the proposed structure which optimise the volume of cut and fill. It is envisaged that surplus excavated subsoil material from these works will amount to ~3,000m3 for the tank itself and 660m3 for the outfall drainage line. As far as is practical arisings from excavations will be retained and reused on site. Should any import or export of subsoil material be required to/from the nearby housing development works, subsoil transfer such as this shall require an article 27 application and associated licence grant.
- Unsuitable sub-soils generated by excavations on site will be reviewed for reuse as landscaping or non-engineering fills on adjoining or other construction sites within the region.
- Careful separation of builder's rubble packaging and contaminated waste from re-usable material will result in the minimisation of the disposal of material to landfill.

14.7 Potential impact of the Proposed Development during Operational Phase

14.7.1 Surface Water

- There is a potential impact from increased surface water flows that could lead to downstream flooding.
- There is a potential impact for the discharge of contaminants from the proposed development and road surfaces to the surrounding drainage sewers. These would include particulates, oil, soluble extracts from the bitumen binder etc. The quality of runoff from the site would be dependent on the time of year, weather, particulate deposition from the atmosphere and any gritting or salting carried out by the Local Authority. The time of year has a major bearing on the quality of storm water run-off - in particular the first rains after a prolonged dry period where accumulated deposits of rubber, particulates, oils, etc. are, washed away.
- Stagnation of the water and siltation within the attenuation areas may occur.

14.7.2 Foul Water

- Blockages may occur within the pipe network and the wastewater could become septic.
- Foul water could be connected to the surface water drainage network.
- Increased flows to the wastewater network and the Swords wastewater treatment plant.

14.7.3 Water Supply

There will be an increased demand for water once the development is occupied.

14.7.4 ESB Network

There will be an increased demand for power once the development is occupied.

14.7.5 Gas

There will be an increased demand for gas once the development is occupied.

14.7.6 Telecommunications - Eir

The impact of the operational phase of the proposed development on the telecommunications network would be to increase the demand on the existing network.

14.8 Potential Cumulative Impacts

In the event of future development adjacent to the proposed development, there are no predicted cumulative impacts arising from the construction or operation phase related to the material assets – built services provided that the other developments implement appropriate mitigation measures.

14.8.1 Existing Oldtown Development

There are no additional impacts to those noted in section 14.6 on the Utilities.

14.8.2 Future Development

The applicant is in control of the adjacent Oldtown & Mooretown lands to provide a consolidated development in north Swords. This current application relates to Phase 5 of the Oldtown lands north of Rathbeale Road and the stormwater storage tank at the junction of the Glen Ellan Road and Balheary Road. This Phase is the final Phase of Masterplan development within the Oldtown lands. There has been a carefully considered design approach to development to ensure that the subject application can be delivered to enhance and improve upon existing amenity.

The Oldtown Masterplan development successfully integrates and enhances the existing built fabric in north Swords.

There are no additional impacts to those noted in section 14.6 on the Utilities.

14.9 Do Nothing Scenario

No change of use of the greenfield lands and therefore no further impact to the material assets.

14.10 Mitigation Measures- Construction Phase

14.10.1 Surface Water

- 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.
- Regular testing of surface water discharges will be undertaken at the outfall from the subject site.
- Where silt control measures are noted to be failing or not working adequately, works will cease in the relevant area. The system is cleaned and starts working again.
- 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 minimum distance of 50 m from any watercourse or other water conducting features, including the cut off trenches.

- All existing services will be located using service records, GPR surveys and slit trenches to ensure that their position accurately identified before excavation works commence.
- Surface Water pipes will be carefully laid so as to minimise the potential for cross connections.

No.	Risk	Possible Impact	Mitigation	Result of Mitigation
1	Hydrocarbons from carparking area entering the watercourse.	Water quality impacts Reduction in habitat quality Mortality of aquatic key ecological receptors/qualifying interests	Designated parking at least 50m from any watercourse.	Ensures no soil disturbance or hydrocarbons leak near aquatic zone
2	Pollutants from site compound areas entering the watercourse.	Water quality impacts Reduction in habitat quality Mortality of aquatic key ecological receptors/qualifying interests	The site compound will be located at least 50m from any watercourse.	Prevents pollution of the aquatic zone from toxic pollutants
3	Pollutants from material storage areas entering the watercourse.	Water quality impacts Reduction in habitat quality Mortality of aquatic key ecological receptors/qualifying interests	Fuels, oils, greases and other potentially polluting chemicals will be stored in bunded compounds at the Contractor's compound or at a location at least 50m from any body of water. Bunds are to be provided with 110% capacity of storage container. Spill kits will be kept on site at all times and all staff trained in their appropriate use. Method statements for dealing with accidental spillages will be provided the Contractor for review by the Employer's Representative.	Prevents contamination of aquatic zone by toxic pollutants

4	Concrete/cementitious materials entering the watercourse from washdown.	Water quality impacts Reduction in habitat quality Mortality of aquatic key ecological receptors/qualifying interests	A designated wash down area within the Contractor's compound will be used for cleaning of any equipment or plant, with the safe disposal of any contaminated water.	Prevents contamination of aquatic zone by suspended solids or pollutants, ensures invasive species material is not transported off site
5	Concrete/cementitious materials entering the watercourse from concrete pours.	Water quality impacts Reduction in habitat quality Mortality of aquatic key ecological receptors/qualifying interests	Pouring of cementitious materials will be carried out in the dry.	Prevents contamination of aquatic zone by suspended solids or pollutants, ensures invasive species material is not transported off site
6	Leaching of contaminated soil into groundwater.	Water quality impacts Reduction in habitat quality Mortality of aquatic key Ecological receptors/qualifying interests	Spill kits will contain 10 hr terrestrial oil booms (80mm diameter x 1000mm) and a plastic sheet, upon which contaminated soil can be placed to prevent leaching to ground water	Prevents contamination of aquatic zone by petrochemicals
7	Pollutants from equipment storage/refuelling area entering the watercourse.	Water quality impacts Reduction in habitat quality Mortality of aquatic key ecological receptors/qualifying interests	Any refuelling and maintenance of equipment will be done at designated bunded areas with full attendance of plant operative(s) within contained areas at least 50m from any watercourse	Prevents contamination of aquatic zone by petrochemicals
8	Runoff from exposed work areas and excavated material storage areas entering the watercourse.	Water quality impacts Reduction in habitat quality Mortality of aquatic key ecological receptors/qualifying interests	Contractor to prepare a site plan showing the location of all surface water drainage lines and proposed discharge points to the sewer. The plan will include the location of all surface water protection measures, including monitoring points and treatment facilities.	Prevents contamination of aquatic zone by suspended solids or pollutants.

Table 14.6 Surface Water: Impact, mitigation, and residual effects

14.10.2 Foul Water

- All existing services will be located using service records, GPR surveys and slit trenches to ensure that their position accurately identified before excavation works commence.
- Foul water pipes to be laid with sufficient falls to ensure self-cleansing velocity

- Foul pipes will be carefully laid so as to minimise the potential for cross connections.

14.10.3 Water Supply

- All existing services will be located using service records, GPR surveys and slit trenches to ensure that their position accurately identified before excavation works commence.
- All water mains will be cleaned, sterilised, and tested to the satisfaction of the Irish Water/Local Authority prior to connection to the public water main.
- All connections to the public water main will be carried out under the supervision of the Irish Water/Local Authority.

14.10.4 ESB Network

Where possible backup network supply to any services will be provided should the need for relocation or diversion of existing services be required otherwise, relocation or diversion works will be planned with the service provider to incur minimal impact, with users notified in advance of any works.

14.10.5 Gas

- Where possible backup network supply to any services will be provided should the need for relocation or diversion of existing services be required, otherwise relocation or diversion works will be planned with the service provider to incur minimal impact, with users notified in advance of any works.
- Connections to the existing gas networks will be coordinated with the relevant utility provider and carried out by approved contractors.

14.10.6 Telecommunications - Eir

- Where possible backup network supply to any services will be provided should the need for relocation or diversion of existing services be required, otherwise relocation or diversion works will be planned with the service provider to incur minimal impact, with users notified in advance of any works.
- Connections to the existing telecommunications networks will be coordinated with the relevant utility provider and carried out by approved contractors.

Construction Management Plans have been prepared for this application (for both the Phase 5 development site and the storage tank) and are included under a separate cover. It is considered that the Construction Management Plans (CMP) 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 results in contamination of receiving watercourses.
- Site personnel inductions are to be conducted such that all site personnel are made aware of the procedures and 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.
- Details of the headwall outfall construction methods, to prevent pollution of the Broadmeadow River during construction, are included in the Preliminary Construction Environmental and Waste Management Plan, which has been submitted under a separate cover.

14.10.7 Construction and Demolition Waste

Appointment of C&D Waste Manager

A C&D Waste Manager shall be appointed from the Contractor’s Staff and have overall responsibility for the implementation of the project Waste Management Plan (WMP) during the construction phase. The C&D Waste Manager will be appropriately trained and assigned the authority to instruct all site personnel to comply with the specific provisions of the WMP. At the operational level, a designated person from the main contractor and from each sub-contractor on the site shall be assigned the direct responsibility to ensure that the operations stated in the WMP are performed on an on-going basis.

Copies of the WMP will be made available to all relevant personnel on site. All site personnel and sub-contractors will be instructed about the objectives of the WMP and informed of the responsibilities which fall upon them as a consequence of its provisions. Where source segregation, selective demolition and material reuse techniques apply, each member of staff will be given instructions on how to comply with the WMP. Posters will be designed to reinforce the key messages within the WMP and will be displayed prominently for the benefit of site staff.

C&D Record Keeping

Details of all arisings, movement and treatment of C&D waste shall be recorded as part of the Waste Auditing regime.

It is the duty of the C&D Waste Manager to ensure that necessary licenses have been obtained as needed. Each consignment of C&D waste taken from the site will be subject to documentation which will conform with the table below along with Transportation Dockets to ensure full traceability of the material to its final destination.

Detail	Particulars
Project of Origin	Oldtown Phase 5 including Stormwater Storage Tank (Celestica Site), Swords, Co. Dublin
Material being Transported	Soil, Construction waste
Quantity of Material	TBC by Contractor prior to starting works
Date of Material Movement	TBC by Contractor prior to starting works
Name of Carrier	TBC by Contractor prior to starting works
Destination of Material	TBC by Contractor prior to starting works
Proposed Use	TBC by Contractor prior to starting works

Table 14.7 | Details of Materials Taken from Site

14.11 Mitigation Measures – Operational Phase

14.11.1 Surface Water

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 existing Oldtown attenuation ponds.

- Flow restrictors with attenuation storage will be used to slowdown and store surface water runoff from discharging above green field rates to the Broadmeadow River.
- 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.
- Regular inspection and maintenance of the drainage network, including petrol interceptor.
- 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.
- The outfall headwall to the Broadmeadow River will be fitted with a tide-flex (or similar approved) non-return valve to ensure surcharge from the Broadmeadow River will not backfill into the proposed pipe and tank during extreme weather events.
- The outfall volumes from the stormwater storage tank to the Broadmeadow River shall be metered to record the frequency and duration/volumes of overflows.

14.11.2 Foul Water

The foul network will be inspected annually and maintained.

14.11.3 Water Supply

It is not envisaged that any other remedial or reductive measures will be necessary upon the completion of the development.

14.11.4 ESB Network

On completion of the construction phase no further mitigation measures are proposed in relation to the electrical infrastructure.

14.11.5 Gas

On completion of the construction phase no further mitigation measures are proposed in relation to the gas infrastructure.

14.11.6 Telecommunications - Eir

On completion of the construction phase no further mitigation measures are proposed in relation to the telecommunications infrastructure.

14.12 Predicted Impacts of the Proposed Development During Construction Phase

14.12.1 Surface Water

Due to the proposed mitigation measures outlined above no significant impact will arise during the construction phase of the proposed development on a surface water quality.

14.12.2 Foul Water

Due to the proposed mitigation measures outlined above, the impact of the foul network construction will be not significant.

14.12.3 Water Supply

Due to the proposed mitigation measures outlined above, the impact on the water supply infrastructure during the construction phase of the proposed development is slight.

14.12.4 ESB Network

Implementation of the measures outlined in Section 14.9 will ensure that the potential impacts of the proposed development on the site's material assets do not occur during the construction phase and that any residual impacts will be short term.

14.12.5 Gas

Implementation of the measures outlined in Section 14.9 will ensure that the potential impacts of the proposed development on the site's material assets do not occur during the construction phase and that any residual impacts will be short term.

14.12.6 Telecommunications - Eir

Implementation of the measures outlined in Section 14.9 will ensure that the potential impacts of the proposed development on the site's material assets do not occur during the construction phase and that any residual impacts will be short term.

14.13 Predicted Residual Impacts of the Proposed Development During Operational Phase

14.13.1 Surface Water

Due to the proposed mitigation measures outlined above many of the potential impacts will not arise during the operation phase of the proposed development on surface water quality.

Surface water discharge from the site will be restricted by means of attenuation, therefore, no adverse impact in respect of flooding downstream will arise from the proposed development.

14.13.2 Foul Water

There will be increased flows in the existing foul water drainage network, resulting in a moderate impact in terms of demand on the receiving foul water network. This impact is proposed to be managed through the construction of a storage tank on the foul network as part of this application, to alleviate constraints within the network. Otherwise, consultation with Irish Water will be carried out as standard, to ensure any necessary upgrades are provided and that connections are carried out in accordance with the Code of Practice.

14.13.3 Water Supply

There will be an increased demand for water supply due to the development resulting in a moderate impact in terms of demand on the water supply infrastructure. This impact will be managed through

consultation with Irish Water to ensure necessary upgrades are provided and that connections are carried out in accordance with the Code of Practice.

14.13.4 ESB Network

The demand on power supply will increase due to the development of the lands. The development of the lands will be constructed in phases, with the final phase being completed circa 2025.

14.13.5 Gas

The demand on gas supply will increase due to the development of the lands. The development of the lands will be constructed in phases, with the final phase being completed circa 2025.

14.13.6 Telecommunications - Eir

The demand on telecommunications supply will increase due to the development of the lands. The development of the lands will be constructed in phases, with the final phase being completed circa 2025.

14.14 Monitoring and Reinstatement

The proposed monitoring of the various built services during the operation stage will include:

- Surface water drainage and SUDS features will be monitored and maintained by the Developer.
- The water usage within the proposed development will be monitored via the bulk water meters. Records will be maintained by Irish Water to ensure any excess usage is identified and investigated as necessary.
- Irish Water will monitor the operation of the foul drainage network including the receiving environment.
- The construction and waste management plans will be adhered to.
- The provision of utility services including electricity, gas and broadband will be monitored by the relevant utility provider.

14.15 Interactions

The main interactions relating to this EIAR Chapter are Water (Hydrology and Hydrogeology), Population and Human Health, and Traffic and Transport.

During construction stage, the connection of wastewater services has the potential to impact the local surface water from a hydrology and hydrogeology perspective. 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.

14.16 Difficulties Encountered

There were no particular difficulties encountered compiling the Material Assets –Utilities chapter of the EIAR.

14.17 References

- Code of Practice for Water Infrastructure – Connections and Developer Services, (2017), Irish Water
- Code of Practice for Wastewater Infrastructure – Connections and Developer Services, (2017), Irish Water
- Eircom Emaps
- Environmental Impact Assessment Reports – Draft Guidelines, (2017), Environmental Protection Agency
- ESB Networks
- Gas Networks Ireland – Cork Design Department
- Greater Dublin Strategic Drainage Study (GDSDS), (2015), Dublin Drainage
- Irish Building Regulations – Part H 2010 – Drainage and Waste Water Disposal

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	Material Assets – Utilities & Waste
4	Population and Human Health				X	X	X			X		
5	Biodiversity				X				X			
6	Land and Soils											
7	Water		X	X								X
8	Air Quality	X								X		
9	Noise & Vibration	X								X		
10	Climate											
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 Cumulative Effects

The potential for cumulative effects exists in combination with the remaining Oldtown lands which are zoned RA (new residential communities subject to the provision of the necessary social and physical infrastructure) under the Fingal County Development Plan 2017-2023 and were subject to the Oldtown-Mooretown Local Area Plan 2010 before it expired in July 2020. Planning permissions for development on the lands broadly followed the phasing plan in the Local Area Plan, and this is the final planning application for development on the Oldtown lands.

A combined total of 967 dwellings, 5 crèches and 1,537 sqm of retail uses have been granted planning permission. Of these, 647 dwellings are complete, and 207 dwellings are under construction. The current proposal will provide another 377 dwellings.

Table 15-2. Schedule of Planning Permissions and Status

Reg. Ref.	Description	Status
F11A/0436 'Miller's Glen'	'Phase 1' Parent Permission: 245 units, amended by subsequent permissions to 243 units	243 units complete
F11A/0473 'Westmill'	'Phase 2' Parent Permission: 224 units and the village centre, amended by subsequent permissions to 249 units	Civic Square, 1372sqm commercial uses, 48 dwellings and creche complete. 108 dwellings under construction
F13A/0185 'Longview'	'Phase 3' Parent Permission 246 units, amended by both planning conditions and subsequent permissions to 181 units.	161 units complete
F17A/0666 'Meadowbank'	'Phase 4A' Parent Permission: 96 units amended by condition to 95 units	41 units complete 54 units under construction
F17A/0735 'Meadowbank'	'Phase 4B' Parent Permission: 98 units granted	53 units complete 45 units under construction
F17A/0687 'Meadowbank'	'Phase 4C' Parent Permission: 92 units, amended by subsequent permission to 101 units.	101 units complete

Being the last phase of Miller's Glen, the proposed development will immediately benefit from new and recently completed civic, social, educational, and physical infrastructure serving the overall zoned lands.

Existing/Completed

- Two primary schools within minutes' walk of the proposed development: Gaelscoil Bhrian Boroimhe and Swords Educate Together
- Applewood Community Centre: indoor sports, fitness, dance, and children's activities
- New primary school in Mooretown: Broadmeadow Community National School
- New secondary school in Mooretown: Swords Community College
- High-quality civic square & meeting place: Miller's Square
- Local convenience shop
- Small shop units: built to shell and core and ready for fit-out
- Creche: built to shell and core and ready for fit-out
- Coffee shop: built to shell and core and ready for fit-out
- Pocket parks within completed phases
- Full size playing pitch

Under Construction

- Changing rooms & car park

- Playgrounds: large-scale within regional park, smaller play in pocket parks
- Mixed-Use Games Area
- Passive and informal open space within the regional park
- Passive and natural play within the Rathbeale Archaeology Park

It is proposed that the proposed development final phase will be constructed over 2-3 years from the grant of planning permission, working from the northern boundary to the south of the site, 'backing out' of the contractor compounds on the site, and leaving pockets or blocks of development complete and occupied in an orderly manner.

15.4 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 the overall town.

15.5 Biodiversity (Chapter 5.0)

Interactions

The key environmental interactions with Biodiversity are water and landscaping. 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.

Cumulative effects

A number of the identified impacts can also act cumulatively with other impacts from similar developments in this area of Dublin. These primarily arise through the urbanisation of the city's hinterland as provided for by land use zoning and include: loss of habitats and species, particularly hedgerows; pollution from surface water run-off and pollution from wastewater generation.

This proposed development can be viewed alongside the permitted construction of a series of project phases in Oldtown and the likely future development of all the lands at Mooretown, not far to the south. This will see the conversion of all these lands from agricultural to a combination of built and amenity space. In this case the lands for development are of negligible biodiversity value.

15.6 Land and Soils (Chapter 6.0)

Interactions

Any potential rock breaking will generate noise and excavations on site will give rise to dust. From review of the ground investigations discussed in section 6.3, it is not anticipated that rock breaking will be necessary.

Cumulative effects

It is not anticipated that potential cumulative impacts will be generated on land, soils and geology during the construction or operation phases or in the event of future developments adjacent to the site should they implement the appropriate mitigation measures:

- Existing Oldtown Development There are no anticipated cumulative impacts arising from the existing Oldtown Development in relation to lands, soils, and geology other than those noted in section 6.5 above.
- Future Development: The applicant is in control of the adjacent Oldtown & Mooretown lands to provide a consolidated development in north Swords. This current application relates to Phase 5 of the Oldtown lands north of Rathbeale Road. This Phase is the final Phase of development within the Oldtown lands. There has been a carefully considered design approach to development to ensure that the subject application can be delivered to enhance and improve upon existing amenity. The Oldtown Masterplan development successfully integrates and enhances the existing built fabric in north Swords. There are no additional impacts to those noted in section 6.5 above.

15.7 Water (Chapter 7.0)

Interactive effects

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

During construction stage, the connection of wastewater services has the potential to impact ground water 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 ground water and the bedrock geology is feasible. Any impact will be negligible as the aquifer is at low risk and is not considered to be regionally important. 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 Broadmeadow 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

The following effects have been identified for the water chapter:

- Existing Oldtown Development: There are no anticipated cumulative impacts arising from the existing Oldtown Development in relation to water other than those noted in section 7.5 above.
- Future Development: The applicant is in control of the adjacent Oldtown & Mooretown lands to provide a consolidated development in north Swords. This current application relates to Phase 5 of the Oldtown lands north of Rathbeale Road. This Phase is the final Phase of Masterplan development within the Oldtown lands. There has been a carefully considered design approach to development to ensure that the subject application can be delivered to enhance and improve upon existing amenity. The Oldtown Masterplan development successfully integrates and enhances the existing built fabric in north Swords. There are no additional impacts to those noted in Section 7.5 above.

15.8 Air Quality (Chapter 8.0)

Interactive effects

The main interactions relating to this EIAR Chapter are Population & Human Health, and Traffic and Transport.

These impacts are not considered to be significant. Please refer to the associated chapters for further information on these interactions.

Cumulative effects

- Construction phase: Should the construction phase of the proposed development coincide with the construction of any other potential development in the close locality then there is the potential for cumulative dust emissions to impact the nearby sensitive receptors. The dust mitigation measures outlined already should be applied throughout the construction phase of the proposed development, with similar best practice mitigation measures applied for other

potential / permitted developments which will avoid significant cumulative impacts on air quality. With appropriate mitigation measures in place, the predicted cumulative impacts on air quality associated with the construction phase of the proposed development are deemed short-term and not significant.

- Operational phase: If additional developments are built in the vicinity of the proposed development site in the future, this has the potential to add further additional vehicles to the local road network. However, as the air quality impact for the proposed development is predicted to be negligible and would not result in a perceptible change in the existing local air quality environment, due to the predicated increase in traffic, it is unlikely that other future developments of similar scale would give rise to a dissimilar impact on air quality.

15.9 Noise and Vibration (Chapter 9.0)

Interactive effects

The main interactions relating to this EIAR Chapter are Population & Human Health, and Traffic and Transport.

Noise generated by increased traffic flows have been assessed in the Air and Noise Chapters of the EIAR.

These impacts are not considered to be significant. Please refer to the associated chapters for further information on these interactions

Cumulative effects

- Construction phase: The construction noise assessment in the previous sections represents the worst-case scenario's and it is very unlikely that the same noise/vibration event would happen to coincide at the same time of other potential developments giving rise to a theoretical increase in predicted noise levels. However, the impact of any predicted cumulative noise or vibration levels is assumed not to exceed the worst-case scenario and is temporary, negative, and deemed not significant.

- Operational phase: The anticipated noise impacts from the development during the operational phase will mainly be as a result of increased vehicle traffic flows along the incoming and outgoing routes into the proposed development site. It is anticipated that additional road traffic noise attributable to the potential of other permitted developments will result in an increase in the baseline noise environment. The change in noise levels and the significance of such changes can be categorised by the Guidelines for Noise Impact Assessment, Institute of Environmental Management and Assessment. The table in section 9.6.3 details the impact/category. Based on these guidelines the anticipated increase in noise levels can be categorised as 'Slight' at the worst case. The increase in traffic associated with the proposed development scheme together with other potential developments is therefore not expected to give rise to any significant noise nuisance in the area. We note that as part of the Government Climate Change action plan that petrol and diesel passenger vehicles are being phased out and potentially replaced by quieter

electric vehicles eventually leading to less operational noise. Traffic has been identified as the only likely source of vibration during the operational phase of the scheme. In the case of nominally continuous sources of vibration, such as traffic, vibration is perceptible at around 0.5 mm/s PPV and may become disturbing or annoying at higher magnitudes. There may, in theory, be a small increase (+/-10%) in vibration levels as a result of increased traffic from the other potential developments, however, it would still be appropriate to assume that negligible vibration impacts will occur during the operation and no further assessment is deemed to be required. The cumulative noise / vibration impact is determined to be not significant.

15.10 Climate (Chapter 10)

Interactive effects

There are no interactive effects with this chapter of the EIAR

Cumulative effects

Cumulative effects on National emissions including neighbouring developments.

Based on available planning permission data and current status on the ground we confirm that a combined total of 967 dwellings, 5 crèches and 1,537 sqm of retail uses have been granted planning permission. Of these, 615 dwellings are complete, and 140 dwellings are under construction (755 total), leaving 221 to be built. The current proposal will provide another 377 dwellings, which would bring the overall total to 1,344 dwellings or 589 dwellings to be built.

It could be assumed that the dwellings constructed at this point would be included in the national greenhouse gas emission data of 2022 which leaves us to add the 221 units in neighbouring projects to be added. For ease of calculation for the national impact we have assessed the small commercial element as 20 residential units as the CO2 emissions would be similar.

Project CO2 emission impact on National emissions	National	589 units	fraction
	emissions	emissions	
	Mt-CO2 /year	Mt-CO2 /year	%
2022	60	0.01349	0.02248
2030	58	0.00175	0.00301
2030 with additional measures	48	0.00175	0.00368

The national impact:

The impact of this 589-unit development/phase of 0.01349 Mt-CO2 on Ireland's current emissions (2022) @ 60 Mt-CO2/year represents an increase of 0.02248%.

The impact of this 589-unit development/phase of 0.00175 Mt-CO2 on Ireland's projected 2030 emissions @ 58 Mt-CO2/year represents an increase of 0.00301%.

Based on the above findings we note the cumulative impacts on the national CO2 emission at worse to be very fractional. CO2 emissions from the construction and operational phase have been reduced to a minimum and the impact on National emissions for the construction phase are therefore deemed

to be imperceptible and short term and for the operational phase to be deemed imperceptible and long term both in 2022 and 2030. Any new development in essence will increase CO2 emissions to the national and global environment however by introducing the reduction measures at design stage the increase has been kept to a reasonable minimum.

15.11 Landscape and Visual Impact (Chapter 11)

Interactions

The pertinent environmental interactions for landscape and visual are with Human Beings, Flora and Fauna and Cultural Heritage. In this regard, landscape proposals for the scheme have been developed in consultation with the Project Ecologist, Open Field Ecologists and the Cultural Heritage Consultants, Courtney Deery Heritage Consultancy.

The result of these consultations is noted as follows:

In terms of the Flora and Fauna, specific high seed producing meadow grass mix has been proposed within the pocket park/former ringfort to the west of the scheme. This seed mix has been proposed in consultation with Open Field Ecologists to support feeding Yellow Hammers in particular.

There are significant archaeological remains at the interface of the Phase 4 and Phase 5 lands in the form of a ring fort. A detailed review with Courtney Deery Heritage Consultants has been carried out as part of this process in terms of proposing a landscape scheme which is responsive and protective of the archaeological remains for both now and into the future. Protective mounding and non-dig pathway links have been included within the overall scheme along with a location point for archaeological interpretive panels to provide information to future uses. Considering the above, there will be little or no 'conflicts' with Cultural Heritage. It could be considered that the impact is positive in that it raises the awareness of archaeological remains present on site and that its future protection is afforded with the site development works.

Cumulative effects

The existing low-quality landscape and visually unremarkable tract of agricultural land will be replaced by a primarily residential scheme and high quality designed public space linked to a landscape archaeological park which will both act as a focal point for the area. The development will be seen juxtaposed against the existing large scale residential development to the east and will form part of the expansion of Swords in this area. The landscape and visual impact of the proposed development is therefore assessed as being moderate and positive.'

As stated earlier in the report (11.7.1) the on-going development of the earlier phases could be considered as cumulative development but residential development in the area around Swords is seen as a common occurrence in a rapidly developing part of the wider Dublin area. The cumulative impact therefore would appear as moderate to positive in that this final phase of development in this tranche of lands would complete the residential development in this area.

15.12 Traffic and Transport (Chapter 12)

Interactions

Temporary negative impacts to human health may be likely during the Construction Phase due to noise, dust, air quality and visual impacts which are discussed in the relevant chapters of this EIAR. Temporary traffic management will be required to facilitate connections to existing utilities in the existing roads.

There is potential for some temporary impacts on traffic in the area and the road network from the utilities and services installation required by the construction phase of the development. However, this can be mitigated by the implementation of a Construction Management Plan for the development, preliminary CDWMP and CEWMP have been prepared by Waterman Moylan Consulting Engineers.

The traffic impacts during the operational stage of the development, which would be temporary in duration are not considered to be significant due to the implementation of the mitigation measures identified in Chapter 12.

Noise generated by increased traffic flows have been assessed in the Air and Noise Chapters of the EIAR.

15.13 Cultural Heritage (Chapter 13)

There is an interaction with the landscape consultant to integrate RMP DU011-150 into the landscaping design. No interactions or cumulative impacts are predicted.

15.14 Utilities and Waste (Chapter 14)

Interactions

The main interactions relating to this EIAR Chapter are Water (Hydrology and Hydrogeology), Population and Human Health, and Traffic and Transport.

During construction stage, the connection of wastewater services has the potential to impact the local surface water from a hydrology and hydrogeology perspective. 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.

Cumulative effects

In the event of future development adjacent to the proposed development, there are no predicted cumulative impacts arising from the construction or operation phase related to the material assets – built services provided that the other developments implement appropriate mitigation measures.

- Existing Oldtown Development: There are no additional impacts to those noted in section 14.6 on the Utilities.

- Future Development: The applicant is in control of the adjacent Oldtown & Mooretown lands to provide a consolidated development in north Swords. This current application relates to Phase 5 of the Oldtown lands north of Rathbeale Road and the stormwater storage tank at the junction of the Glen Ellan Road and Balheary Road. This Phase is the final Phase of Masterplan development within the Oldtown lands. There has been a carefully considered design approach to development to ensure that the subject application can be delivered to enhance and improve upon existing amenity. The Oldtown Masterplan development successfully integrates and enhances the existing built fabric in north Swords. There are no additional impacts to those noted in section 14.6 on the Utilities.

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 5.0 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 Biodiversity

16.2.1 Mitigation Measures

The following mitigation measures are proposed for the development

Construction Phase

Mitigation measure 1: Mortality to animals during construction

Construction will follow guidance from Inland Fisheries Ireland (IFI, 2016) for the protection of fish habitat. This will include the erection of a robust silt curtain (or similar barrier) along the northern boundary to prevent the ingress of silt to the River Broadmeadow. Water leaving the site will pass through an appropriately-sized silt trap or settlement pond so that only silt-free run-off will leave the site.

The surface water outfall headwall will be constructed behind a temporary coffer dam so that works will be undertaken 'in the dry'.

Dangerous substances, such as oils, fuels etc., will be stored in a bunded zone. Emergency contact numbers for the Local Authority Environment Section, Inland Fisheries Ireland, the Environmental Protection Agency and the National Parks and Wildlife Service will be displayed in a prominent position within the site compound. These agencies will be notified immediately in the event of a pollution incident.

Site personnel will be trained in the importance of preventing pollution and the mitigation measures described here to ensure same.

The site manager will be responsible for the implementation of these measures. They will be inspected on at least a daily basis for the duration of works, and a record of these inspections will be maintained. A specification brochure is included as an addendum to this report.

These measures have been incorporated into a preliminary Construction Environmental Management Plan (CEMP). This includes the following site specific measures:

Construction runoff is heavily laden with silt which can block road gullies and reduce the hydraulic capacity in pipes and rivers, contributing to ponding and flooding. Continued development without appropriate controls will ultimately keep maintenance costs elevated, whether that be in cleaning gullies, jetting pipes, or dredging. Sediment control plans can be implanted on site to mitigate these issues.

Sediment basins and traps should be installed before any major site grading takes place. Additional sediment traps and silt fences should be installed as grading takes place to keep sediment contained on site at appropriate locations.

Key runoff-control measures should be located in conjunction with sediment traps to divert water from planned undisturbed areas away from the traps and sediment-laden water into the traps. Diversions should be installed above the areas to be disturbed before any grading operations. Any perimeter drains should be installed with stable outlets before opening major areas for development. Any additional facilities needed for runoff control should be installed as grading takes place.

During grading operations temporary diversions, slope drains, and inlet and outlet protection installed in a timely manner can be very effective in controlling erosion and sediment build up.

The main run-off conveyance system with inlet and outlet protection measures should be installed early and used to convey stormwater run-off through the development site without creating gullies or channels. Install inlet protection for storm drains as soon as the drain is functional to trap sediment on site in shallow pools and to allow the flood flows to enter the storm drainage system safely. Install outlet protection at the same time as the conveyance system to prevent damage to the Broadmeadow River.

[…]

Sediment entrapment facilities are necessary to reduce sediment discharges to downstream properties and receiving waters. All run-off leaving a disturbed area should pass through a sediment entrapment facility before it exits the site and flows downstream.

- Straw Bales: Straw bales can be placed at the base of a slope to act as a sediment barrier. These are not recommended for use within a swale or channel. Straw bales are temporary in nature and may perform for only a period of weeks or months. Proper installation and maintenance is necessary to ensure their performance.
- Silt Fencing: A silt fence is made of a woven synthetic material, geotextile, and acts to filter run-off. Silt fencing can be placed as a temporary barrier along the contour at the base of a disturbed area but is not recommended for use in a channel or swale. The material is durable and will last for more than one season if properly installed and maintained. Silt fencing is not intended to be used as a perimeter fence or in area of concentrated flow. If concentrated flow conditions exist, a more robust filter should be considered.
- Silt Barriers: Silt barriers can also be temporarily installed in any road gullies of partially constructed roads to prevent sediment movement into downstream drainage systems or SUDS components. When the catchment area is greater than that allowed for straw bale barriers or silt fences, runoff should be collected in diversion drains and routed through temporary sediment basins.
- Diversion Drains: Diversion drains are simple linear ditches, often with an earth bund, for channelling water to a desired location. If the drains are being eroded, they can be lined with geotextile fabric or large stones or boulders.

16.2.2 Monitoring Measures

Monitoring is required where the success of mitigation measures is uncertain or where residual impacts may in themselves be significant. Section 5.7 summaries the likely impacts arising from this project. Uncertainly regarding the success of proposed mitigation for Yellowhammers has been highlighted.

Ecology monitoring has been carried out on these lands by Openfield since November 2013 and are on-going on a bi-monthly basis. This includes surveillance for protected species, water quality issues, protection of features to be retained and consultation with relevant stakeholders where required. Daily monitoring is also carried by site personnel in relation to water quality, storage of dangerous substances etc. Records are maintained at the site office for inspection.

16.3 Land and Soils

16.3.1 Mitigation Measures

Construction Stage

The provision of wheel wash facilities at the construction entrance to the development will minimise the amount of soil deposited on the surrounding road network. The adjoining road network will be cleaned on a regular basis, if required, to prevent the build-up of soils from the development site on the existing blacktop roads.

Measures will be implemented throughout the construction stage to prevent contamination of the soil and adjacent watercourses from oil and petrol leakages and significant siltation. Suitable bunded areas will be installed for oil and petrol storage tanks. Designated fuel filling points will be put in place with appropriate oil and petrol interceptors to provide protection from accidental spills. Spill kits will be provided by the Contractor to cater for any other spills.

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

Noise attenuation will be used on rock breakers to reduce noise levels.

After implementation of the above measures the proposed development will not give rise to any significant long-term adverse impact. Negative impacts during the construction phase will be short term only in duration.

Operational Stage

Within the development, landscape areas will be topsoiled and planted in accordance with the proposed landscaping plan. Following completion of these reinstatement works, no significant adverse impacts on the soils and geology of the subject lands are envisaged.

A comprehensive drainage network will be constructed to ensure that the lands drain effectively following their reshaping / re-profiling. The drainage system shall incorporate sustainable urban drainage methods to clean flows prior to discharge.

16.3.2 Monitoring Measures

Construction Stage

Monitoring as outlined below, during the construction phase will be undertaken; -

- Adequate protection of the topsoil stockpiled for reuse.
- Monitoring of surface water discharged to existing sewers.
- Monitoring cleanliness of the adjoining road network.
- Monitoring measures for prevention of oil and petrol spillages.
- Dampening down measures close to the boundaries of the site in dry weather.

Operational Stage

No operational stage / post-development monitoring will be required.

16.4 Water

16.4.1 Mitigation Measures

Construction environmental management

A Construction Management Plan has been prepared for this application and is included under a separate cover. It is considered that the Construction Management Plan (CMP) 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 results in contamination of receiving watercourses.
- Site personnel inductions are to be conducted such that all site personnel are made aware of the procedures and 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.
- Details of the headwall outfall construction methods, to prevent pollution of the Broadmeadow River during construction, are included in the Preliminary Construction Environmental and Waste Management Plan, which has been submitted under a separate cover.

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

All works will be undertaken with reference to the following guidelines:

- CIRIA C532: Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors (Masters-Williams et al., 2001).
- CIRIA C692: Environmental Good Practice on Site, (Audus et al., 2010)
- BPGCS005: Oil Storage Guidelines.
- CIRIA C648: Control of Water Pollution from Linear Construction Projects: Technical Guidance (Murnane et al., 2006a)
- CIRIA C648: Control of Water Pollution from Linear Construction Projects: Site Guide (Murnane et al., 2006a)
- Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters (IFI 2016)
- Guidelines for Planning Authorities – Architectural Heritage Protection – Guidance on Part IV of the Planning and Development Act 2000. (Part 2, Chapter 7) and ICOMOS Principles.

The schedule of mitigation presented within Table 7.5 summarises measures that will be undertaken in order to reduce impacts on ecological receptors within the zone of influence of the proposed development.

No.	Risk	Possible Impact	Mitigation	Result of Mitigation
1	Hydrocarbons from carparking area entering the watercourse.	Water quality impacts Reduction in habitat quality Mortality of aquatic key ecological receptors/qualifying interests	Designated parking at least 50m from any watercourse.	Ensures no soil disturbance or hydrocarbons leak near aquatic zone
2	Pollutants from site compound areas entering the watercourse.	Water quality impacts Reduction in habitat quality Mortality of aquatic key ecological receptors/qualifying interests	The site compound will be located at least 50m from any watercourse.	Prevents pollution of the aquatic zone from toxic pollutants
3	Pollutants from material storage areas entering the watercourse.	Water quality impacts Reduction in habitat quality Mortality of aquatic key ecological receptors/qualifying interests	Fuels, oils, greases and other potentially polluting chemicals will be stored in bunded compounds at the Contractor's compound or at a location at least 50m from any body of water. Bunds are to be provided with 110% capacity of storage container. Spill kits will be kept on site at all times and all staff trained in their appropriate use. Method statements for dealing with accidental spillages will be provided the Contractor for review by the Employer's Representative.	Prevents contamination of aquatic zone by toxic pollutants
4	Concrete/cementitious materials entering the watercourse from washdown.	Water quality impacts Reduction in habitat quality Mortality of aquatic key ecological receptors/qualifying interests	A designated wash down area within the Contractor's compound will be used for cleaning of any equipment or plant, with the safe disposal of any contaminated water.	Prevents contamination of aquatic zone by suspended solids or pollutants, ensures invasive species material is not transported off site
5	Concrete/cementitious materials entering the watercourse from concrete pours.	Water quality impacts Reduction in habitat quality Mortality of aquatic key ecological receptors/qualifying interests	Pouring of cementitious materials will be carried out in the dry.	Prevents contamination of aquatic zone by suspended solids or pollutants, ensures invasive species material is not transported off site

6	Leaching of contaminated soil into groundwater.	Water quality impacts Reduction in habitat quality Mortality of aquatic key ecological receptors/qualifying interests	Spill kits will contain 10 hr terrestrial oil booms (80mm diameter x 1000mm) and a plastic sheet, upon which contaminated soil can be placed to prevent leaching to ground water	Prevents contamination of aquatic zone by petrochemicals
7	Pollutants from equipment storage/refuelling area entering the watercourse.	Water quality impacts Reduction in habitat quality Mortality of aquatic key ecological receptors/qualifying interests	Any refuelling and maintenance of equipment will be done at designated bunded areas with full attendance of plant operative(s) within contained areas at least 50m from any watercourse	Prevents contamination of aquatic zone by petrochemicals
8	Runoff from exposed work areas and excavated material storage areas entering the watercourse.	Water quality impacts Reduction in habitat quality Mortality of aquatic key ecological receptors/qualifying interests	Contractor to prepare a site plan showing the location of all surface water drainage lines and proposed discharge points to the sewer. The plan will include the location of all surface water protection measures, including monitoring points and treatment facilities.	Prevents contamination of aquatic zone by suspended solids or pollutants.

Table 16.1: Measures to reduce impact on ecological receptors

Operational Stage

The implementation of the following operation stage mitigation measures will minimise the impact on the hydrology and hydrogeology aspects of the development lands, Oldtown Phase 5.

- 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 existing Oldtown attenuation ponds.
- Flow restrictors with attenuation storage will be used to slow down and store surface water runoff from discharging above greenfield rates to the Broadmeadow River.
- 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.
- Regular inspection and maintenance of the drainage network, including petrol interceptor.
- 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.
- The outfall from the stormwater storage tank headwall to the Broadmeadow River will be fitted with a tide-flex (or similar approved) non-return valve to ensure surcharge from the Broadmeadow River will not backfill into the proposed pipe and tank during extreme weather events.

- The outfall volumes from the stormwater storage tank to the Broadmeadow River shall be metered to record the frequency and duration/volumes of overflows.

16.4.2 Monitoring Measures

Construction Stage

Implementation of the Construction Management Plan is required to protect the hydrology and groundwater elements of the subject lands during the construction stage. Maintenance of the mitigation measures and monitoring of the management process 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 water main telemetry, 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.

Monitoring of the frequency and volume/duration of overflows from the proposed storage tank.

With this mitigation in place, the development will not result in significant adverse effects on the water environment during the construction phase of the development.

16.5 Air Quality

16.5.1 Mitigation Measures

Construction Stage

Full details of the dust management plan can be found in Appendix 8.1. At all times, the procedures within the plan will be monitored and assessed. Summary of mitigation measures include:

- Avoid unnecessary vehicle movements and limit speeds on site so as to minimise the generation of airborne dust.
- Use of rubble chutes and receptor skips during construction activities.
- Site roads shall be regularly cleaned and maintained as appropriate, especially during dry and/or windy conditions. Any unsurfaced roads shall be restricted to essential site traffic only.
- A mobile wheel wash unit shall be installed at the site exit to wash down the wheels of all trucks exiting the site.
- The overloading of tipper trucks exiting the site shall not be permitted and aggregates will be transported to and from the site in covered trucks.
- Material handling systems and site stockpiling of materials will be designed and laid out to minimise exposure to wind, stockpiles holding fine or dusty elements including topsoils shall be

covered with tarpaulins. Water misting or sprays will be used as needed if particularly dusty activities are necessary during dry or windy periods.

- Where drilling or pavement cutting operations are taking place, measures to control dust emissions will be used to prevent unnecessary dust emissions by the erection of wind breaks or barriers.
- All vehicles which present a risk of spillage of materials, while either delivering or removing materials, will be loaded in such a way as to prevent spillage.
- A complaints log shall be maintained by the construction site manager and in the event of a complaint relating to dust nuisance, an investigation shall be initiated.

Operation Stage

No additional mitigation measures are required as the operational phase of the proposed development as it is predicted the operational phase will not generate air emissions that would have an adverse impact on local ambient air quality. The government aims to promote sustainability by enhancing public transport with regular and ongoing increases in the public transport capacity, both road and rail and to reduce dependency on the use of the private car. The operational phase includes mitigation by design measures to minimise the impact of the development on air quality are as follows:

- Inclusion of electric car charging points to encourage electric vehicle ownership
- Proximity to public transport will reduce private vehicle use.

16.5.2 Monitoring Measures

Construction Stage

If the construction contractor adheres to good working practices and the mitigation measures are in place, the levels of emission generated are assessed to be minimal and are unlikely to cause an impact on air quality during the construction phase, there is no monitoring recommended.

Operation Stage

There is no monitoring recommended for the operational phase of the development as impacts to air quality are predicted to be negligible.

16.6 Noise and Vibration

16.6.1 Mitigation Measures

DKPEV do not anticipate the requirement of any remedial measures but list the following recommendations mainly for the construction sites:

- Ensure that the local authority guidelines or planning directives to noise levels and operational times are adhered too.
- Prepare a construction phase operational plan with regards to limiting noise nuisance.
- Ensure all construction vehicles and plant are regularly maintained including any noise
- control measures such as attenuators, filters etc.

- Limit any construction noise spreading to neighbouring site by erecting temporary noise barriers (site boundary hoarding).
- Schedule particular high-level noise activities for times when increased noise levels are less sensitive or notify neighbouring residents or any sensitive sites.

16.6.2 Monitoring Measures

No noise monitoring is deemed necessary for the operational phase however noise monitoring will most likely be a requirement as directed by the local authority for the construction phase based on the local authorities imposed limits on the hours of operation and noise limits. No vibration monitoring is deemed necessary for both the operational and construction phase.

16.7 Climate

16.7.1 Mitigation Measures

There are no particular mitigation measures noted. All the recommended reduction measures at design stage and as applied in the CO2 reduction tables are for the greater part mandatory to comply to the relevant regulations and standards. As each development/building can only be certified for compliance under the Building Control Amendment Regulations (BCaR) if the minimum criteria set at design stage is met in full it is very unlikely that noncompliance i.e., mitigation occurs.

16.7.2 Monitoring Measures

Construction Stage

No CO2 monitoring is deemed necessary for the construction phase as the CO2 output / emission is relatively small and the duration of the construction phase is short-term.

Operational Stage

No CO2 monitoring is deemed necessary for the operational phase as the current and future mandatory CO2 reduction requirement (BER) are a secure process to ensure compliance.

16.8 Landscape and Visual Impact

16.8.1 Mitigation Measures

There are a number of measures that have and can be taken to ensure that the impacts of the proposed development are minimised during construction and subsequent occupation.

Design Measures

Consideration of the impact on the landscape and visual aspects has been integral in the design and layout of the scheme. A number of mitigation measures have been addressed including:

- Provision of new public open spaces for future interaction of the said and adjoining developments; and in particular the proposed Regional Park.
- Addressing and adopting the requirements stipulated within the Oldtown Mooretown LAP 2010.

- The use of high quality hard and soft landscape materials befitting of a new residential scheme and suitable to the existing landscape.

Construction Stage

Consideration shall be made to limit potential adverse construction-related effects during the construction stage. Whilst considering the above, the operation of a well-managed organised and planned construction site, with adequate control of construction traffic and working activity is key to avoiding or minimising impact. Other measures shall include:

- Use of hoarding for screening works as appropriate;
- Directing site lighting away from the adjoining properties where applicable, including operational aspects of Regional Park.

Operation Stage

Consistent and effective maintenance of hard and soft landscape areas, (in particular entrance areas, streetscapes, semi-public areas, and pocket parks) together with quality construction and building management are key to avoiding or minimising negative landscape and visual impacts arising from the operation of the proposed development.

The landscape proposals which accompany this application in scaled format note the detailed general landscape proposals as in the attached Landscape Masterplan.

A series of Photomontages, as referenced in Appendix 11.1 below were chosen to assess the visual impact of the proposals within the operational Phase on the landscape.

16.8.2 Monitoring Measures

Soft landscape works will be monitored to check establishment during the first 12 months post-planting. Plant failure during this defects liability period shall be replaced within the following planting season (i.e. November to March) as necessary.

Aftercare to a high standard of both hard and soft landscape elements throughout the scheme will form part of the annual management/maintenance programme which shall be adopted as part of the scheme.

16.9 Traffic and Transport

16.9.1 Mitigation Measures

In order to eliminate or reduce the potential impacts described above, remedial and mitigation measures will be implemented as set out below and in the Construction Management Plan included under a separate cover with this application.

Construction Stage

- Adequate signposting will be located on site to ensure safety of all road users and construction workers.

- Due to the proximity if the proposed site along well serviced bus routes and being well served by cycle lanes, it is intended to limit construction staff parking and to encourage the use of public transport. A limited number of car parking spaces may be provided for senior construction managers within the development site. Suitable locations in the surrounding area may be identified where staff can park and link to public transportation.
- The main contractor as part of their site set up arrangements, shall appoint a Coordinator responsible for the implementation of a Construction Stage Mobility Management Plan and shall carry out the following tasks as part of their role:
    - Provide an extensive information service for public transport options and routes at public location(s) within the development for construction workers;
    - Update the public transport information adjacent to the development on on-going basis; and
    - Advise company staff of tax incentives for public transport and bicycles.
- For those wishing to cycle to and from the development, dedicated cycle parking will be provided for the duration of the works within the site. Shower facilities and lockers will also be provided.
- A dedicated "construction site"' access/egress system will be implemented during the construction phases.
- Hoarding will be set up around the perimeter to prevent pedestrian access.
- Dedicated construction haul routes will be identified and agreed with the local authority prior to the commencement of constructions activities onsite.
- A material storage zone will also be provided in the Construction Compound area. This storage zone will include material recycling areas and facilities.
- A detailed Construction and Traffic Management Plan will be prepared by the contractor and agreed with the Local Authority prior to commencing works on site.

<u>Operation Stage</u>

- To reduce traffic impact and to promote more sustainable modes of transport a Mobility Management Plan will be prepared for the development
- A management company will be appointed by the developer to manage the development. A senior member of staff from the management company who supports the philosophy of the Plan will be appointed as the Co-ordinator. The Co-ordinator will be responsible for:
    - Implementation and maintenance of the Plan;
    - Monitoring progress of the Plan;
    - Liaison with public transport operators and officers of the Planning and Highway Authorities;
    - Production of information reports for the Developer, the occupier(s) and the Planning and Highway Authorities; and

- Ongoing assessment of the objectives of the Plan.

- Up to date local bus timetables will be maintained within the tenant amenity area and other fixed points within the buildings on the site. Residents will be advised of their location. In addition, internet access to travel information will be provided. The developer will provide all new residents with a travel pack showing alternative modes of travel to the development. Where possible, the developer will advise visitors to the site of alternative modes of travel to that of the car.
- Secure parking facilities will be provided for residents, visitors and Creche users. Local cycle route information will be provided in the tenant amenity area and at other fixed points within the development and residents will be advised of their location. Details of cycle parking provided is included in the Traffic and Transport Assessment provided with the planning submission.
- 2 No go Car spaces will be initially provided and details of how to join the scheme will be provided to all residents when they move into their apartment. Information will also be displayed within the resident amenity area and updated when required.
- The Co-ordinator will be responsible for the management of inappropriate parking within the development. This parking management will ensure that spaces are reserved for those who have rented the space and will be accessible only to those users.

16.9.2 Monitoring Measures

Construction Stage

Traffic management and deliveries will be carefully monitored during the construction stage as part of the Construction Management Plan. The appointed contractor will monitor their mobility management plan to ensure that is operating effectively. Local residents will be kept fully informed of construction activities through mail shots, email and site notices.

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 watermain telemetry, SUDS features, road gullies and, attenuation ponds during the construction phase of the development.

Operational Stage

During the operational stage the Mobility Management Plan will be monitored by the Co-ordinator. The travel survey will establish the initial modal split of travel by residents.

The Co-ordinator, in consultation with the Developer, the Occupiers, and the Local Authority or its agents, will agree annual targets, following completion and analysis of the travel survey, for increasing the percentage of non-car modes.

The Co-ordinator will:

• Meet with officers of the Local Authorities or its agents within a period of 6 months following occupation of the building(s) and thereafter every 12 months to assess and review progress of the Plan and agree objectives for the next 12 months, and

• Prepare and submit to senior management of the Developer, the Occupier(s) and the Local Authorities or its agents, an annual Monitoring Report.

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.

Monitoring of the frequency and volume/duration of overflows from the proposed storage tank.

16.10 Cultural Heritage

16.10.1 Mitigation Measures

Conservation Plan – Preservation in-situ of RMP DU011-150

Description of site

The discovery of the enclosure site (RMP no: DU011-150) in works associated with the Oldtown Phase 1 development in 2013 (Moraghan and McLoughlin 2016; Licence no: 13E0283) has led to the redesign of the Phase 5 development and the adjacent Phase 4 development, to avoid impacting the enclosure. The enclosure has been integrated into an open space area in the development enabling its preservation in-situ.

The site is entirely subsurface in nature. As detailed above, the enclosure has been traced to the west, north and south and appears to form a circular or sub-circular enclosure. Despite comprehensive testing, the eastern extent of the site was not identified, and this may be due either to the upper fills comprising re-deposited natural subsoil, or it may have been ploughed out. The topographical setting of the site is subtle, lying on a slope that falls away to the north and east. Its setting however has been disturbed and it no longer forms a part of the significance of the site.

Status

The site is recorded in the Record of Monuments and Places, RMP DU011-150. The DHLGH and the Planning Authority have been informed of the type of site, its location and extent through the licensing process and through the submission of the final stratigraphic report for Licence ref: 13E0283 (Moraghan, M. & McLoughlin, G., 2016).

Date

Charcoal from a posthole within the interior of the enclosure has been dated to the Late Bronze Age / early Iron Age.

Significance

This site is a significant addition to the record. It supports recent evidence of other dispersed Late Bronze Age/ Iron Age and activity which has been identified in the wider landscape of Oldtown, indicating a continued presence which carried on into the early medieval period and confirms possible earlier occupation at the significant early medieval enclosure complex at Oldtown/Mooretown, to the south-southeast (which is also being preserved in situ in Rathbeale Archaeological Park (RMP no: DU011-144). However, unlike the other sites preserved in the Oldtown/Mooretown Archaeological Parks this site in its survival is fragmentary and its plan form uncertain (it is likely that its eastern extent has potentially been removed by ploughing).

Issues / vulnerability

Buried archaeological remains are vulnerable to ground disturbance and inadvertent damage due to development in the area.

Mitigation strategy

In line with Oldtown-Mooretown Conservation Plan Polices for the preservation in-situ of archaeological remains the following strategy has been developed for RMP DU011-150:

- A protection zone has been placed around the recorded and notional extent of this feature. The protection zone encircles this area with a buffer zone of some 10m beyond the extent of the monument (as agreed with the then DCHG, now DHLGH) to protect it from any construction traffic. The site will be maintained as an open space and has integrated into the development proposals.
- The landscape design incorporates the below-ground remains into the development, retaining it as an amenity area in the landscape. The proposed Landscape Plan has previously been issued as part of compliance to address the Swords Regional Park (Ref. LP-05-CS) and was developed in consultation with Fingal Co Co Parks Department (Kevin Halpenny and Marc Coyle). The landscaping proposals are both an interpretation and a protective measure for the site.
- The site will be covered in terram and soils will be introduced to protect the underlying archaeological remains which are at least 0.30m below the existing ground level. Mounding will enhance the topographical setting of the site to ensure views towards the west and north towards Saucerstowns Stream. Naturalised bulb planting will demarcate the location of the belowground remains on the western side.
- The amenity will link the green space strategy developed for the LAP lands, with pathways leading to a wider network of open spaces, Archaeological Parks and linear parks. Avoidance of railings or bollards to delineate an archaeological site or exclusion area is advised as they detract from the overall setting, provide obstacles to movement through the area and can attract antisocial behaviour.
- Provision of signage to interpret the below-ground remains for the general public with be placed at the centre of the site along with seating. It will form part of a network of historic information throughout the LAP lands.

Archaeology

Archaeological test trenching in the Phase 5 application lands revealed two previously unknown archaeological sites; a possible kiln and an undated pit (McLoughlin 2017; Licence no: 17E0446). Full excavation of the newly identified features was recommended along with monitoring of topsoil removal within the Phase 5 lands. This was based on the results of the testing and the proximity of three subsurface sites in the field to the west of the application area. Monitoring was carried out and further features were identified (Area 1 and 2) and subsequently excavated in 2018 (17E0446, Rice, 2019). There are no further archaeological requirements in this area.

The southern portion of the application area has been considerably disturbed due to the construction of a temporary school in that location. It was concluded after the geophysical survey of this area that the archaeological potential of the anomalies it identified was limited and, given the shallow depth of topsoil in the test trenches to the north of the school, it is unlikely that archaeological features or material will have survived the construction activity. There are, however, some areas which may remain undisturbed by the construction and given the proximity of subsurface enclosure DU011-135 and the additional archaeological features identified during monitoring to the north of the school, this will require remedial measures.

In addition, the Phase 5 application lands include approximately 420m of the Oldtown / Rathbeal townland boundary. Portions of this boundary have been removed previously and recommendations are included below in relation to the remaining upstanding portions.

- It is recommended that topsoil removal within the southern portion of the Phase 5 lands be monitored by a suitably qualified archaeologist. After the removal of the existing amenities in this area, the archaeologist will determine if it is necessary to monitor further groundworks. In the event of any archaeological features remaining beneath these structures and surfaces, the area will be cordoned off and protected until the archaeologist has made a decision on how best to deal with the remains in consultation with the DHLGH.
- It is recommended that removal of the Oldtown / Rathbeal townland boundary within the proposed development area be monitored by a suitably qualified archaeologist with the provision that in the event of any further archaeological remains being identified, the area be cordoned off and protected until the archaeologist has made a decision on how best to deal with the remains in consultation with the DHLGH.
- It is further recommended that heavy machinery movements related to this phase of development not encroach on the recorded archaeological monuments in the adjacent field to the west and that if construction activities, including soil movements and storage, are to take place in the field to the west, the archaeological monuments should be fenced off for their protection.

All recommendations are subject to approval from the National Monuments Section of the Heritage and Planning Division, Department of Culture, Heritage and the Gaeltacht.

Architectural and Cultural Heritage

No protected structures or properties recorded in the Record of Protected Structures of Fingal County Council or within the National Inventory of Architectural Heritage will be impacted by the proposed Phase 5 development.

16.10.2 Monitoring Measures

Archaeological monitoring is not required as all archaeological, architectural and cultural heritage issues have been resolved at the pre-construction stage of the development.

16.11 Utilities and Waste

16.11.1 Mitigation Measures

Construction Stage

Surface Water

- 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.
- Regular testing of surface water discharges will be undertaken at the outfall from the subject site.
- Where silt control measures are noted to be failing or not working adequately, works will cease in the relevant area. The system is cleaned and starts working again.
- 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 minimum distance of 50 m from any watercourse or other water conducting features, including the cut off trenches.
- All existing services will be located using service records, GPR surveys and slit trenches to ensure that their position accurately identified before excavation works commence.
- Surface Water pipes will be carefully laid so as to minimise the potential for cross connections.

No.	Risk	Possible Impact	Mitigation	Result of Mitigation
1	Hydrocarbons from carparking area entering the watercourse.	Water quality impacts Reduction in habitat quality Mortality of aquatic key ecological receptors/qualifying interests	Designated parking at least 50m from any watercourse.	Ensures no soil disturbance or hydrocarbons leak near aquatic zone

2	Pollutants from site compound areas entering the watercourse.	Water quality impacts Reduction in habitat quality Mortality of aquatic key ecological receptors/qualifying interests	The site compound will be located at least 50m from any watercourse.	Prevents pollution of the aquatic zone from toxic pollutants
3	Pollutants from material storage areas entering the watercourse.	Water quality impacts Reduction in habitat quality Mortality of aquatic key ecological receptors/qualifying interests	Fuels, oils, greases and other potentially polluting chemicals will be stored in bunded compounds at the Contractor's compound or at a location at least 50m from any body of water. Bunds are to be provided with 110% capacity of storage container. Spill kits will be kept on site at all times and all staff trained in their appropriate use. Method statements for dealing with accidental spillages will be provided the Contractor for review by the Employer's Representative.	Prevents contamination of aquatic zone by toxic pollutants
4	Concrete/cementitious materials entering the watercourse from washdown.	Water quality impacts Reduction in habitat quality Mortality of aquatic key ecological receptors/qualifying interests	A designated wash down area within the Contractor's compound will be used for cleaning of any equipment or plant, with the safe disposal of any contaminated water.	Prevents contamination of aquatic zone by suspended solids or pollutants, ensures invasive species material is not transported off site
5	Concrete/cementitious materials entering the watercourse from concrete pours.	Water quality impacts Reduction in habitat quality Mortality of aquatic key ecological receptors/qualifying interests	Pouring of cementitious materials will be carried out in the dry.	Prevents contamination of aquatic zone by suspended solids or pollutants, ensures invasive species material is not transported off site

6	Leaching of contaminated soil into groundwater.	Water quality impacts Reduction in habitat quality Mortality of aquatic key Ecological receptors/qualifying interests	Spill kits will contain 10 hr terrestrial oil booms (80mm diameter x 1000mm) and a plastic sheet, upon which contaminated soil can be placed to prevent leaching to ground water	Prevents contamination of aquatic zone by petrochemicals
7	Pollutants from equipment storage/refuelling area entering the watercourse.	Water quality impacts Reduction in habitat quality Mortality of aquatic key ecological receptors/qualifying interests	Any refuelling and maintenance of equipment will be done at designated bunded areas with full attendance of plant operative(s) within contained areas at least 50m from any watercourse	Prevents contamination of aquatic zone by petrochemicals
8	Runoff from exposed work areas and excavated material storage areas entering the watercourse.	Water quality impacts Reduction in habitat quality Mortality of aquatic key ecological receptors/qualifying interests	Contractor to prepare a site plan showing the location of all surface water drainage lines and proposed discharge points to the sewer. The plan will include the location of all surface water protection measures, including monitoring points and treatment facilities.	Prevents contamination of aquatic zone by suspended solids or pollutants.

Table 16.2 Surface Water: Impact, mitigation, and residual effects

Foul Water

- All existing services will be located using service records, GPR surveys and slit trenches to ensure that their position accurately identified before excavation works commence.
- Foul water pipes to be laid with sufficient falls to ensure self-cleansing velocity
- Foul pipes will be carefully laid so as to minimise the potential for cross connections.

Water Supply

- All existing services will be located using service records, GPR surveys and slit trenches to ensure that their position accurately identified before excavation works commence.
- All water mains will be cleaned, sterilised, and tested to the satisfaction of the Irish Water/Local Authority prior to connection to the public water main.
- All connections to the public water main will be carried out under the supervision of the Irish Water/Local Authority.

ESB Network

Where possible backup network supply to any services will be provided should the need for relocation or diversion of existing services be required otherwise, relocation or diversion works will be planned with the service provider to incur minimal impact, with users notified in advance of any works.

Gas

- Where possible backup network supply to any services will be provided should the need for relocation or diversion of existing services be required, otherwise relocation or diversion works will be planned with the service provider to incur minimal impact, with users notified in advance of any works.
- Connections to the existing gas networks will be coordinated with the relevant utility provider and carried out by approved contractors.

Telecommunications - Eir

- Where possible backup network supply to any services will be provided should the need for relocation or diversion of existing services be required, otherwise relocation or diversion works will be planned with the service provider to incur minimal impact, with users notified in advance of any works.
- Connections to the existing telecommunications networks will be coordinated with the relevant utility provider and carried out by approved contractors.

Construction Management Plans have been prepared for this application (for both the Phase 5 development site and the storage tank) and are included under a separate cover. It is considered that the Construction Management Plans (CMP) 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 results in contamination of receiving watercourses.
- Site personnel inductions are to be conducted such that all site personnel are made aware of the procedures and 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.
- Details of the headwall outfall construction methods, to prevent pollution of the Broadmeadow River during construction, are included in the Preliminary Construction Environmental and Waste Management Plan, which has been submitted under a separate cover.

Construction and Demolition Waste

Appointment of C&D Waste Manager

A C&D Waste Manager shall be appointed from the Contractor's Staff and have overall responsibility for the implementation of the project Waste Management Plan (WMP) during the construction phase. The C&D Waste Manager will be appropriately trained and assigned the authority to instruct all site personnel to comply with the specific provisions of the WMP. At the operational level, a designated person from the main contractor and from each sub-contractor on the site shall be assigned the direct responsibility to ensure that the operations stated in the WMP are performed on an on-going basis.

Copies of the WMP will be made available to all relevant personnel on site. All site personnel and sub-contractors will be instructed about the objectives of the WMP and informed of the responsibilities which fall upon them as a consequence of its provisions. Where source segregation, selective demolition and material reuse techniques apply, each member of staff will be given instructions on how to comply with the WMP. Posters will be designed to reinforce the key messages within the WMP and will be displayed prominently for the benefit of site staff.

C&D Record Keeping

Details of all arisings, movement and treatment of C&D waste shall be recorded as part of the Waste Auditing regime.

It is the duty of the C&D Waste Manager to ensure that necessary licenses have been obtained as needed. Each consignment of C&D waste taken from the site will be subject to documentation which will conform with the table below along with Transportation Dockets to ensure full traceability of the material to its final destination.

Detail	Particulars
Project of Origin	Oldtown Phase 5 including Stormwater Storage Tank (Celestica Site), Swords, Co. Dublin
Material being Transported	Soil, Construction waste
Quantity of Material	TBC by Contractor prior to starting works
Date of Material Movement	TBC by Contractor prior to starting works
Name of Carrier	TBC by Contractor prior to starting works
Destination of Material	TBC by Contractor prior to starting works
Proposed Use	TBC by Contractor prior to starting works

Table 16.3 | Details of Materials Taken from Site

Operation Stage

Surface Water

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 existing Oldtown attenuation ponds.
- Flow restrictors with attenuation storage will be used to slowdown and store surface water runoff from discharging above green field rates to the Broadmeadow River.
- 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.
- Regular inspection and maintenance of the drainage network, including petrol interceptor.
- 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.
- The outfall headwall to the Broadmeadow River will be fitted with a tide-flex (or similar approved) non-return valve to ensure surcharge from the Broadmeadow River will not backfill into the proposed pipe and tank during extreme weather events.

- The outfall volumes from the stormwater storage tank to the Broadmeadow River shall be metered to record the frequency and duration/volumes of overflows.

Foul Water

The foul network will be inspected annually and maintained.

Water Supply

It is not envisaged that any other remedial or reductive measures will be necessary upon the completion of the development.

ESB Network

On completion of the construction phase no further mitigation measures are proposed in relation to the electrical infrastructure.

Gas

On completion of the construction phase no further mitigation measures are proposed in relation to the gas infrastructure.

Telecommunications - Eir

On completion of the construction phase no further mitigation measures are proposed in relation to the telecommunications infrastructure.

16.11.2 Monitoring Measures

Construction Stage

The proposed monitoring measures are listed in the construction mitigation stage above.

Operation Stage

The proposed monitoring of the various built services during the operation stage will include:

- Surface water drainage and SUDS features will be monitored and maintained by the Developer.
- The water usage within the proposed development will be monitored via the bulk water meters. Records will be maintained by Irish Water to ensure any excess usage is identified and investigated as necessary.
- Irish Water will monitor the operation of the foul drainage network including the receiving environment.
- The construction and waste management plans will be adhered to.
- The provision of utility services including electricity, gas and broadband will be monitored by the relevant utility provider.

APPENDICES

APPENDIX 5.1: SPECIES LIST FOR HABITATS IDENTIFIED

The nomenclature for vascular plants is taken from the *New Flora of the British Isles* (Stace, 2010). Scientific names for mosses comes from *A Checklist and Census Catalogue of British and Irish Bryophytes* (Hill et al., 2008) while common names are taken from *Mossess and Liverworts of Britain and Ireland* (Atherton et al. eds., 2010). Species indicated with an asterisk '*' are known to have been introduced to Ireland by humans.

Treeline - WL2		**DAFOR**
*Acer pseudoplatanus**	Sycamore	O
Anthriscus sylvestris	Cow Parsley	O
Brachypodium sylvaticum	False Brome	O
Crataegus monogyna	Hawthorn	A
Galium aparine	Cleavers	O
Fraxinus excelsior	Ash	F
Hedera helix	Common Ivy	F
Heracleum sphondylium	Hogweed	O
Polystichum setiferum	Soft Shield-fern	O
Prunus spinosa	Blackthorn	O
Rosa sp.	Roses	R
Rubus fruticosus agg.	Brambles	A
Rumex sanguineus	Wood Dock	O
Salix cinerea	Grey Willow	O
Sambucus nigra	Elder	O
Urtica dioica	Common Nettle	F

Drainage ditch - FW4		**DAFOR**
Lemna sp.	Duckweeds	F
Veronica beccabunga	Brooklime	O

Scrub - WS1		**DAFOR**
Rubus fruticosus agg.	Brambles	A

Dry Meadow - GS1		**DAFOR**
Agrostis stolonifera	Creeping Bent	A

Arrhenatherum elatius	False Oat-grass	A
Cirsium arvense	Creeping Thistle	F
Epilobium hirsutum	Great Willowherb	O
Equisetum arvense	Field Horsetail	O
Medicago lupulina	Black Medick	O
Plantago lanceolata	Ribwort Plantain	O
Ranunculus repens	Creeping Buttercup	F
Rumex obtusifolius	Broad-leaved Dock	O
Taraxacum sp.	Dandelions	O
Trifolium repens	White Clover	O
Urtica dioica	Common Nettle	O
Vicia sepium	Bush Vetch	O
Vicia sativa	Common Vetch	O

Arable Crops - BC1		**DAFOR**
Agrostis stolonifera	Creeping Bent	F
Anagallis arvensis	Scarlet Pimpernel	O
*Avena fatua**	Wild-oat	O
Brassica nigra	Black Mustard	O
Capsella bursa-pastoris	Shepard's-purse	O
Cirsium arvense	Creeping Thistle	O
Epilobium parviflorum	Hoary Willowherb	O
Fumaria officinalis	Common Fumitory	O
Lamium purpureum	Red Dead-nettle	O
Poa annua	Annual Meadow-grass	F
Senecio jacobaea	Common Ragwort	O
Senecio vulgaris	Groundsel	O
Sonchus asper	Prickly Sowthistle	R
Veronica persica	Common Field- speedwell*	O

APPENDIX 6.1: SITE INVESTIGATION REPORT

S.I. Ltd Contract No: 5599

Client: Gannon Homes Ltd

Engineer: Waterman Moylan

Contractor: Site Investigations Ltd

Millers Glen – Phase 5,
Swords, Co. Dublin
Site Investigation Report

Prepared by:

.....

Stephen Letch

Issue Date:	20/06/2019
Status	Final
Revision	1

Contents:

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3.	Laboratory Testing	3
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5.	Recommendations and Conclusions	5

Appendices:

1. Cable Percussive Borehole Logs
2. Trial Pit and Dynamic Probe Logs and Photographs
3. Soakaway Test Results
4. Geotechnical Laboratory Test Results
5. Environmental Laboratory Test Results
6. Survey Data

1. Introduction

On the instructions of Waterman Moylan, Site Investigations Ltd (SIL) was appointed to complete a ground investigation at Millers Glen, Swords, Co. Dublin. The investigation was for the fifth phase of the Millers Glen residential development and was completed on behalf of the Client, Gannon Homes Ltd.

The fieldworks comprised a programme of cable percussive boreholes, trial pits with dynamic probes, soakaway tests and California Bearing Ratio tests. All fieldwork was carried out in accordance with BS 5930:2015, Engineers Ireland GI Specification and Related Document 2nd Edition 2016 and Eurocode 7: Geotechnical Design. Laboratory testing has been performed on representative soil samples recovered from the trial pits and these were completed in accordance of BS1377: 1990.

This report presents the factual geotechnical data obtained from the field and laboratory testing with interpretation of the ground conditions discussed.

2. Fieldwork

The initial geotechnical fieldworks were started and completed in May 2019 and comprised the following:

- 13 No. cable percussive boreholes
- 41 No. trial pits with dynamic probes
- 6 No. soakaway tests
- 37 No. California Bearing Ratio tests

2.1. Cable Percussive Boreholes

Cable percussion boring was undertaken at 13 No. locations using a Dando 150 rig and constructed 200mm diameter boreholes. The boreholes terminated on obstructions at varying depths ranging from 4.10mbgl (BH01) to 7.50mbgl (BH09). It was not possible to collect undisturbed samples due to the granular soils encountered so bulk disturbed samples were recovered at regular intervals.

To test the strength of the stratum, Standard Penetration Tests (SPT's) were performed at 1.00m intervals in accordance with BS 1377 (1990). In soils with high gravel and cobble content it is appropriate to use a solid cone (60°) (CPT) instead of the split spoon and this was used throughout the testing. The test is completed over 450mm and the cone is driven 150mm into the stratum to ensure that the test is conducted over an undisturbed zone. The cone is then driven the remaining 300mm and the blows recorded to report the N-Value. The report shows the N-Value with the 75mm incremental blows listed in brackets (e.g. BH01 at 1.00mbgl where

N=15-(3,3/4,3,4,4)). Where refusal of 50 blows across the test zone was encountered was achieved during testing, the penetration depth is also reported (e.g. BH01 at 4.00mbgl where N=50-(25 for 5mm/50 for 0mm)).

The logs are presented in Appendix 1.

2.2. Trial Pits and Dynamic Probes

41 No. trial pits were excavated using a wheeled excavator. At TP35, an additional pit was excavated due to the original location encountering shallow obstructions at 1.40mbgl. The pits were logged and photographed by SIL geotechnical engineer and representative disturbed bulk samples were recovered as the pits were excavated, which were returned to the laboratory for geotechnical testing.

Adjacent to the trial pits, dynamic probes were completed using a track mounted Competitor 130 machine. The testing complies with the requirements of BS1377: Part 9 (1990) and Eurocode 7: Part 3. The configuration utilised standard DPH (Heavy) probing method comprising a 50kg weight, 500mm drop height and a 50mm diameter (90°) cone. The number of blows required to drive the cone each 100mm increment into the sub soil is recorded in accordance with the standards. The dynamic probe provides no information regarding soil type or groundwater conditions.

The dynamic probe results can be used to analyse the strength of the soil strata encountered by the probe. 'Proceedings of the Trinity College Dublin Symposium of Field and Laboratory Testing of Soils for Foundations and Embankments' presents a paper by Foirbart that is most relevant to Irish soil conditions and within this paper the following equations were included:

Granular Soils: DPH N_{100} x 2.5 = SPT N value

Cohesive Soils: C_u = 15 x DPH N_{100} + 30 kN/m^2

These equations present a relationship between the probe N_{100} value and the SPT N value for granular soils and the undrained shear strength of cohesive soils.

The trial pit logs with the dynamic probe results are presented in Appendix 2 along with the photographs.

2.3. Soakaway Tests

At 6 No. locations, soakaway tests were completed and logged by SIL geotechnical engineer. The soakaway test is used to identify possible areas for storm water drainage. The pit was filled with water and the level of the groundwater was recorded over time. As stipulated by BRE Special Digest 365, the pit should be filled three times and that the final cycle is used to provide

the infiltration rate. The time taken for the water level to fall from 75% volume to 25% volume is required to calculate the rate of infiltration. However, if the water level does not fall at a steady rate then the test is deemed to have failed and the area is unsuitable for storm water drainage.

The results are provided in Appendix 3.

2.4. California Bearing Ratio tests

At 37 No. locations, undisturbed cylindrical mould samples were taken to complete California Bearing Ratio tests in the laboratory. 19 No. samples were recovered from independent locations and 18 No. samples were recovered from trial pits when the two locations were adjacent to each other. The results facilitate the designing of the access roads and associated areas. These tests were completed to BS1377: 1990: Part 4, Clause 7 'Determination of California Bearing Ratio'. The results are presented as part of Appendix 4 with the geotechnical laboratory test data.

2.5. Surveying

Following completion of all the fieldworks, a survey of the exploratory hole locations was completed using a GeoMax GPS Rover. The data is supplied on each individual log and along with a site plan in Appendix 6.

3. Laboratory Testing

Geotechnical laboratory testing is currently ongoing on representative soil samples in accordance with BS 1377 (1990). Testing included:

- 5 No. Moisture contents
- 5 No. Atterberg limits
- 5 No. Particle size gradings
- 5 No. pH, sulphate and chloride content

Environmental testing has been scheduled and is being completed by ALS Environmental Ltd. and consists of the following:

- 5 No. Rilta Suite analysis

The geotechnical laboratory test results are presented in Appendix 4 with the environmental tests reported in Appendix 5.

4. Ground Conditions

4.1. Overburden

A generalised summary of the ground profile is shown below. Reference should be made to the individual borehole and trial pit records in Appendices 1 and 2 for the full strata information at specific locations.

- TOPSOIL.
- Brown sandy slightly gravelly silty CLAY with low cobble content.
- Firm grey brown sandy slightly gravelly silty CLAY with low cobble content.
- Stiff becoming very stiff black slightly sandy gravelly silty CLAY with low cobble content.

MADE GROUND was encountered in 8 No. boreholes and in 8 No. trial pits and extended to a maximum depth of 2.50mbgl at TP27. The locations are generally around the area of the site previously used as a compound for the previous phases of the development and mainly consist of cohesive clay soils with construction waste fragments.

The natural soils consist of over-consolidated lodgment till which is encountered across the North Dublin region with several papers discussing the engineering characteristics of the soil. The brown soils are the weathered surface of the underlying black clays and the gravel and cobbles are generally subrounded to subangular and predominantly limestone in origin. The boundary between the brown soil and the black soil in the boreholes is between 1.60mbgl (BH09) and 3.50mbgl (BH12). The SPT N-values show an increase in blow counts when the black soils are encountered, and this also increases steadily with depth.

The laboratory testing of the soils recorded moisture contents between 10.4% and 15.4% with low plasticity index results between 10 and 14, which indicates CLAY soils with low and intermediate plasticity. The grading curves show poorly graded straight-line profiles with 18% to 36% fines content.

4.2. Groundwater

Groundwater details in the boreholes and trial pits during the fieldworks are noted on the logs in Appendices 1 and 2. Groundwater was recorded in 5 of the boreholes with the shallowest strike at 1.60mbgl and the deepest at 5.00mbgl. Groundwater was also encountered in 12 trial pits between 0.40mbgl and 2.20mbgl and these were all recorded as seepages.

5.0. Recommendations and Conclusions

Please note the following caveats:

The recommendations given, and opinions expressed in this report are based on the findings as detailed in the exploratory hole records. Where an opinion is expressed on the material between the exploratory hole locations or below the final level of excavation, this is for guidance only and no liability can be accepted for its accuracy. No responsibility can be accepted for adjacent unexpected conditions that have not been revealed by the exploratory holes. It is further recommended that all bearing surfaces when excavated should be inspected by a suitably qualified Engineer to verify the information given in this report.

Excavated surfaces in clay strata should be kept dry to avoid softening prior to foundation placement. Foundations should always be taken to a minimum depth of 0.50mBGL to avoid the effects of frost action and possible seasonal shrinkage/swelling.

If it is intended that on-site materials are to be used as fill, then the necessary laboratory testing should be specified by the Client to confirm the suitability. Also, relevant lab testing should be specified where stability of side slopes to excavations is a concern, or where contamination may be an issue.

5.1. Shallow Foundations

Due to the unknown depth of foundation and no longer-term groundwater information, this analysis assumes the groundwater will not influence the construction or performance of these foundations.

SIL do not recommend that shallow foundations are placed on fill material due to the unknown compaction methods used during laying of man-made material. This unknown could result in softer spots and differential settlement of a building once construction is completed. If shallow foundations are to be used and man-made soils are encountered below foundation level, then this soil should be removed and replaced with engineered fill.

The natural ground conditions recorded in the boreholes is generally firm brown slightly sandy gravelly silty CLAY with low cobble content at 1.00mbgl. The SPT test results are consistent with values of 9 to 16 recorded at 1.00mbgl. Therefore, for the analysis an N-value of 9 was chosen for the purposes of design in this stratum, in accordance with Eurocode 7 (EC 7).

Stroud and Butler proposed a correlation between the SPT N-value and undrained shear strength using the Atterberg Limits and using the indices of 14%, a correlation of Cu=6N has been chosen for this site. Therefore, using the value of 9, this indicates that the undrained shear strength of the CLAY is 54kN/m^2. This can be used to calculate the ultimate bearing capacity, and this has been calculated to be 300kN/m^2. Finally, a factor of safety is applied and with a

factor of 3, an allowable bearing capacity of 100kN/m^2 would be anticipated using these SPT values.

BH08 recorded a slightly lower value of 6 but stiffer soils were recorded at 1.60mbgl and therefore, foundations may require to be deeper than 1.00mbgl if soft spots or fill material are encountered across the site.

If higher bearing capacities were required, then the lower black CLAY could be founded on. This recorded an SPT range of 17 to 35 at 2.00mbgl and using this lower value, an ultimate bearing capacity of 555kN/m^2 and therefore, an allowable bearing capacity of 185kN/m^2 would be anticipated.

As previously discussed, papers have been published about the North Dublin soils and there engineering characteristics. These values recorded on site would be slightly lower than expected for this type of soil with the brown clay normally providing approximately 150kN/m^2 allowable bearing capacity with the stiffer black clay offering 300kN/m^2 allowable bearing capacity. However, it would still be important that all founding strata be examined by a qualified engineer prior to the pouring of the foundations to confirm the suitability of the soil for the design foundations.

The following assumptions were made as part of these analyses. If any of these assumptions are not in accordance with detailed design or observations made during construction these recommendations should be re-evaluated.

- Foundations are to be constructed on a level formation of uniform material type (described above).
- The bulk unit weight of the material in this stratum has a minimum density of 19kN/m^3.
- All bearing capacity calculations allow for a settlement of 25mm.

The trial pits indicate that excavations in the cohesive soils should be stable for a short while at least. However, regular inspection of temporary excavations should be completed during construction to ensure that all slopes are stable. Temporary support should be used on any excavation that will be left open for an extended period.

5.2. Groundwater

The caveats below relating to interpretation of groundwater levels should be noted:

There is always considerable uncertainty as to the likely rates of water ingress into excavations in clayey soil sites due to the possibility of localised unforeseen sand and gravel lenses acting as permeable conduits for unknown volumes of water.

Furthermore, water levels noted on the borehole and trial pit logs do not generally give an accurate indication of the actual groundwater conditions as the borehole or trial pit is rarely left open for sufficient time for the water level to reach equilibrium.

Also, during boring procedures, a permeable stratum may have been sealed off by the borehole casing, or water may have been added to aid drilling. Therefore, an extended period of groundwater monitoring using any constructed standpipes is required to provide more accurate information regarding groundwater conditions. Finally, groundwater levels vary with time of year, rainfall, nearby construction and tides.

Pumping tests would be required to determine likely seepage rates and persistence into excavations taken below the groundwater level. Deep trial pits also aid estimation of seepage rates.

As discussed previously, groundwater was encountered in 5 of the boreholes and 12 of the trial pits with slow ingress rates. There is always considerable uncertainty as to the likely rates of water ingress into excavations in cohesive soil sites due to the possibility of localised unforeseen sand and gravel lenses acting as permeable conduits for unknown volumes of water. However, based on this information at the exploratory hole locations to date, it is considered likely that any seepages into excavations of the CLAY will be slow. If granular soils are encountered, then the possibility of water ingressing into an excavation increases.

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

5.3. Soakaway Tests

The soakaway tests show that generally the areas of the site tested are unsuitable for soakaway design. The BRE Digest stipulates that the pit should half empty within 24hrs, and extrapolation indicates this condition would not be satisfied. The tests were terminated at the end of the first (of a possible three) fill/empty cycle since further testing would give even slower fall rates due to increased soil saturation. The unsuitability of the soils for soakaways is further suggested by the soil descriptions of the materials in this area of the site where the soakaway was completed, i.e. well compacted clay soils.

5.4. Pavement Design

The plate test results in Appendix 4 indicate CBR values are generally greater than 5% although lower values of 3.8% (CBR33), 4.2% (CBR32) and 4.7% (CBR25) were recorded.

The samples were taken at 0.50mbgl and inspection of the formation strata should be completed prior to construction of the pavement. Once the exact formation levels are finalised then additional in-situ testing could be completed to assist with the detailed pavement design.

5.5. Contamination

Environmental testing was carried out on five samples from the investigation and the results are shown in Appendix 5. For material to be removed from site, Rilta Suite testing was carried out to determine if the material is hazardous or non-hazardous and then the leachate results were compared with the published waste acceptance limits of BS EN 12457-2 to determine whether the material on the site could be accepted as 'inert material' by an Irish landfill.

The Waste Classification report created using HazWasteOnline™ software shows that the material tested can be classified as non-hazardous material. The Total Petroleum Hydrocarbon (TPH) results did record a level above the limit of detection, but the level was low and not in liquid form so therefore, the sample can be recorded as non-hazardous.

Following this analysis of the solid test results, the leachate disposal suite results indicate that the soils tested would generally be able to be treated as Inert Waste. However, the fluoride, sulphate, total dissolved solids and total monohydric phenols results were slightly elevated above the Inert threshold and therefore, these results should be sent to the individual landfill to ensure that the material can be accepted prior to excavation.

Only five samples were tested for analysis and therefore, any localised contamination may have been missed. Any MADE GROUND excavated on site should be stockpiled separately to natural soils to avoid any potential cross contamination of the soils. Additional testing of these soils may be requested by the individual landfill before acceptance and a testing regime designed by an environmental engineer would be recommended to satisfy the landfill.

5.6. Aggressive Ground Conditions

The chemical test results in Appendix 4 indicate a general pH value between 7.89 and 8.07, which is close to neutral and below the level of 9, therefore no special precautions are required.

The maximum value obtained for water soluble sulphate was 130mg/l as SO_3. The BRE Special Digest 1:2005 – '*Concrete in Aggressive Ground'* guidelines require SO_4 values and after conversion ($SO_4 = SO_3 \times 1.2$), the maximum value of 156mg/l shows Class 1 conditions and no special precautions are required.

Appendix 1

Cable Percussive Borehole Logs

Contract No: 5599	# Cable Percussion Borehole Log				Borehole No: **BH01**
Contract:	Millers Glen - Phase 5	Easting:	716173.830	Date Started:	27/05/2019
Location:	Swords, Co. Dublin	Northing:	748313.669	Date Completed:	27/05/2019
Client:	Gannon Homes Ltd	Elevation:	32.86	Drilled By:	T. Tindall
Engineer:	Waterman Moylan	Borehole Diameter:	200mm	Status:	FINAL

Depth (m) Scale	Depth	Stratum Description	Legend	Level (mOD) Scale	Depth	Samples and Insitu Tests Depth	Type	Result	Water Strike	Backfill
	0.10	TOPSOIL.			32.76					
		Firm brown slightly sandy gravelly silty CLAY with low cobble content.								
						1.00	B	TT01		
						1.00	C	N=15 (3,3/4,3,4,4)		
	1.70				31.16					
		Stiff becoming very stiff black slightly sandy gravelly silty CLAY with low cobble content.								
						2.00	B	TT02		
						2.00	C	N=29 (5,7/6,6,8,9)		
						3.00	B	TT03		
						3.00	C	N=47 (7,7/9,11,13,14)		
	4.00	Obstruction - possible boulder.			28.86	4.00	C	50 (25 for 5mm/50 for 0mm)		
	4.10	Borehole terminated due to obstruction.			28.76					
		End of Borehole at 4.10m								

Chiselling: From:	To:	Time:	Water Strikes: Strike:	Rose:	Depth Sealed	Water Details: Date:	Hole Depth:	Water Depth:	Installation: From:	To:	Pipe:	Backfill: From:	To:	Type:	Remarks:
4.00	4.10	01:00				27/05	4.10	Dry				0.00	4.10	Arisings	Borehole terminated due to obstruction.

Legend:
B: Bulk
D: Disturbed
U: Undisturbed
ES: Environmental
W: Water
C: Cone SPT
S: Split spoon SPT

Contract No: 5599	# Cable Percussion Borehole Log				Borehole No: **BH02**
Contract:	Millers Glen - Phase 5	Easting:	716186.310	Date Started:	28/05/2019
Location:	Swords, Co. Dublin	Northing:	748346.488	Date Completed:	28/05/2019
Client:	Gannon Homes Ltd	Elevation:	31.64	Drilled By:	T. Tindall
Engineer:	Waterman Moylan	Borehole Diameter:	200mm	Status:	FINAL

Depth (m) Scale	Depth	Stratum Description	Legend	Level (mOD) Scale	Depth	Samples and Insitu Tests Depth	Type	Result	Water Strike	Backfill
	0.20	TOPSOIL.		31.5	31.44					
0.5		Stiff brown slightly sandy gravelly silty CLAY with low cobble content.		31.0						
1.0				30.5		1.00 1.00	B C	TT04 N=18 (4,3/4,4,5,5)		
1.5				30.0						
	1.80	Stiff becoming very stiff black slightly sandy gravelly silty CLAY with low cobble content.			29.84					
2.0				29.5		2.00 2.00	B C	TT05 N=35 (6,7/6,8,10,11)		
2.5				29.0						
3.0				28.5		3.00 3.00	B C	TT06 N=50 (9,11/50 for 250mm)		
3.5				28.0						
4.0				27.5		4.00 4.00	B C	TT07 50 (8,13/50 for 80mm)		
	4.30	Obstruction - possible boulder.			27.34					
4.5	4.40	Borehole terminated due to obstruction.			27.24	4.40	C	50 (25 for 5mm/50 for 0mm)		
		End of Borehole at 4.40m		27.0						
5.0				26.5						
5.5				26.0						
6.0				25.5						
6.5				25.0						
7.0				24.5						
7.5				24.0						
8.0				23.5						
8.5				23.0						
9.0				22.5						
9.5				22.0						

Chiselling:

From:	To:	Time:
3.40	3.50	00:45
4.30	4.40	01:00

Water Strikes:

Strike:	Rose:	Depth Sealed

Water Details:

Date:	Hole Depth:	Water Depth:
28/05	4.40	Dry

Installation:

From:	To:	Pipe:

Backfill:

From:	To:	Type:
0.00	4.40	Arisings

Remarks:

Borehole terminated due to obstruction.

Legend:
B: Bulk
D: Disturbed
U: Undisturbed
ES: Environmental
W: Water
C: Cone SPT
S: Split spoon SPT

Contract No: 5599	# Cable Percussion Borehole Log				Borehole No: **BH03**
Contract:	Millers Glen - Phase 5	Easting:	716201.740	Date Started:	28/05/2019
Location:	Swords, Co. Dublin	Northing:	748380.797	Date Completed:	28/05/2019
Client:	Gannon Homes Ltd	Elevation:	30.79	Drilled By:	J. O'Toole
Engineer:	Waterman Moylan	Borehole Diameter:	200mm	Status:	FINAL

Depth (m) Scale	Depth	Stratum Description	Legend	Level (mOD) Scale	Depth	Samples and Insitu Tests Depth	Type	Result	Water Strike	Backfill
	0.20	TOPSOIL.			30.59					
		Firm brown slightly sandy gravelly silty CLAY with low cobble content.		30.5						
0.5				30.0						
1.0						1.00 1.00	B C	JOT54 N=9 (0,1/2,2,2,3)		
1.5				29.5						
	1.80	Stiff becoming very stiff black slightly sandy gravelly silty CLAY with low cobble content.		29.0	28.99					
2.0						2.00 2.00	B C	JOT55 N=19 (2,3/4,4,5,6)		
2.5				28.5						
3.0				28.0		3.00 3.00	B C	JOT56 N=23 (2,3/5,5,6,7)		
3.5				27.5						
4.0				27.0		4.00 4.00	B C	JOT57 50 (6,7/50 for 125mm)		
4.5				26.5						
	4.80	Obstruction - possible boulder.		26.0	25.99					
5.0	5.00	Borehole terminated due to obstruction. End of Borehole at 5.00m			25.79	5.00 5.00	B C	JOT58 50 (25 for 5mm/50 for 0mm)		
5.5				25.5						
6.0				25.0						
6.5				24.5						
7.0				24.0						
7.5				23.5						
8.0				23.0						
8.5				22.5						
9.0				22.0						
9.5				21.5						
				21.0						

Chiselling: From:	To:	Time:	Water Strikes: Strike:	Rose:	Depth Sealed	Water Details: Date:	Hole Depth:	Water Depth:	Installation: From:	To:	Pipe:	Backfill: From:	To:	Type:	Remarks:
4.30 4.80	4.40 5.00	00:45 01:00				28/05	5.00	Dry				0.00	5.00	Arisings	Borehole terminated due to obstruction.

Legend:
B: Bulk
D: Disturbed
U: Undisturbed
ES: Environmental
W: Water
C: Cone SPT
S: Split spoon SPT

Contract No: 5599	# Cable Percussion Borehole Log	Borehole No: **BH04**

Contract:	Millers Glen - Phase 5	Easting:	716199.260	Date Started:	24/05/2019
Location:	Swords, Co. Dublin	Northing:	748431.387	Date Completed:	24/05/2019
Client:	Gannon Homes Ltd	Elevation:	29.65	Drilled By:	J. O'Toole
Engineer:	Waterman Moylan	Borehole Diameter:	200mm	Status:	FINAL

Depth (m) Scale	Depth	Stratum Description	Legend	Level (mOD) Scale	Depth	Samples and Insitu Tests Depth	Type	Result	Water Strike	Backfill
0.5	0.70	MADE GROUND: brown sandy slightly gravelly silty clay with low cobble content and some brick and plastic.		29.5	28.95					
1.0		Firm brown slightly sandy gravelly silty CLAY with low cobble content.		29.0		1.00 1.00	B C	JOT44 N=14 (2,3/3,3,4,4)		
1.5				28.5						
2.0	2.10			28.0	27.55	2.00 2.00	B C	JOT45 N=32 (2,4/7,7,8,10)		
2.5		Very stiff black slightly sandy gravelly silty CLAY with low cobble content.		27.5						
3.0	2.80	Very stiff grey brown sandy slightly gravelly silty CLAY.		27.0	26.85	3.00 3.00	B C	JOT46 N=48 (4,7/7,10,16,15)		
3.5				26.5						
4.0				26.0		4.00 4.00	B C	JOT47 N=30 (3,4/7,7,7,9)		
4.5	4.50	Very stiff grey brown slightly sandy gravelly silty CLAY with low cobble content.		25.5	25.15					
5.0				25.0		5.00 5.00	B C	JOT48 N=46 (4,7/9,9,12,16)		
5.5				24.5						
6.0	5.80 6.00	Obstruction - possible boulder. Borehole terminated due to obstruction. End of Borehole at 6.00m		24.0	23.85 23.65	6.00	C	50 (25 for 5mm/50 for 0mm)		
6.5				23.5						
7.0				23.0						
7.5				22.5						
8.0				22.0						
8.5				21.5						
9.0				21.0						
9.5				20.5						
				20.0						

Chiselling:

From:	To:	Time:
3.60	3.80	00:45
5.80	6.00	01:00

Water Strikes:

Strike:	Rose:	Depth Sealed

Water Details:

Date:	Hole Depth:	Water Depth:
24/05	6.00	Dry

Installation:

From:	To:	Pipe:

Backfill:

From:	To:	Type:
0.00	6.00	Arisings

Remarks:

Borehole terminated due to obstruction.

Legend:
B: Bulk
D: Disturbed
U: Undisturbed
ES: Environmental
W: Water
C: Cone SPT
S: Split spoon SPT

Contract No: 5599	# Cable Percussion Borehole Log				Borehole No: **BH05**
Contract:	Millers Glen - Phase 5	Easting:	716170.020	Date Started:	27/05/2019
Location:	Swords, Co. Dublin	Northing:	748448.030	Date Completed:	27/05/2019
Client:	Gannon Homes Ltd	Elevation:	29.46	Drilled By:	J. O'Toole
Engineer:	Waterman Moylan	Borehole Diameter:	200mm	Status:	FINAL

Depth (m) Scale	Depth	Stratum Description	Legend	Level (mOD) Scale	Depth	Samples and Insitu Tests Depth	Type	Result	Water Strike	Backfill
		MADE GROUND: grey silty sandy gravel.								
0.5	0.50	MADE GROUND: black sandy slightly gravelly silty clay with low cobble content and some brick.		29.0	28.96					
	0.80	Firm becoming stiff brown slightly sandy gravelly silty CLAY with low cobble content.			28.66					
1.0				28.5		1.00 1.00	B C	JOT49 N=10 (1,1/2,2,3,3)		
1.5				28.0						
2.0				27.5		2.00 2.00	B C	JOT50 N=16 (2,2/3,4,4,5)		
2.5				27.0						
	2.80	Black slightly sandy gravelly silty CLAY.			26.66					
3.0	3.00	Stiff becoming very stiff brown slightly sandy gravelly silty CLAY.		26.5	26.46	3.00 3.00	B C	JOT51 N=28 (2,3/5,7,7,9)		
3.5				26.0						
4.0				25.5		4.00 4.00	B C	JOT52 N=36 (4,7/7,9,9,11)		
4.5				25.0						
	4.80	Very stiff grey slightly sandy gravelly silty CLAY with low cobble content.			24.66					
5.0				24.5		5.00 5.00	B C	JOT53 50 (11,12/50 for 225mm)		
	5.40	Obstruction - possible boulder.		24.0	24.06					
5.5	5.50	Borehole terminated due to obstruction.			23.96	5.50	C	50 (25 for 5mm/50 for 0mm)		
		End of Borehole at 5.50m								
6.0				23.5						
6.5				23.0						
7.0				22.5						
7.5				22.0						
8.0				21.5						
8.5				21.0						
9.0				20.5						
9.5				20.0						

Chiselling: From:	To:	Time:	Water Strikes: Strike:	Rose:	Depth Sealed	Water Details: Date:	Hole Depth:	Water Depth:	Installation: From:	To:	Pipe:	Backfill: From:	To:	Type:	Remarks:
5.40	5.50	01:00				27/05	5.50	Dry				0.00	5.50	Arisings	Borehole terminated due to obstruction.

Legend:
B: Bulk
D: Disturbed
U: Undisturbed
ES: Environmental
W: Water
C: Cone SPT
S: Split spoon SPT

Contract No: 5599	# Cable Percussion Borehole Log				Borehole No: **BH06**
Contract:	Millers Glen - Phase 5	Easting:	716227.020	Date Started:	23/05/2019
Location:	Swords, Co. Dublin	Northing:	748511.910	Date Completed:	23/05/2019
Client:	Gannon Homes Ltd	Elevation:	26.94	Drilled By:	J. O'Toole
Engineer:	Waterman Moylan	Borehole Diameter:	200mm	Status:	FINAL

Depth (m) Scale	Depth	Stratum Description	Legend	Level (mOD) Scale	Depth	Samples and Insitu Tests Depth	Type	Result	Water Strike	Backfill
0.5		MADE GROUND: brown sandy slightly gravelly silty clay with low cobble content and some brick and plastic.		26.5						
1.0				26.0		1.00 1.00	B C	JOT34 N=8 (0,1/2,2,2,2)		
1.5	1.40	Stiff brown sandy slightly gravelly silty CLAY.		25.5	25.54					
2.0				25.0		2.00 2.00	B C	JOT35 N=19 (2,3/4,5,5,5)		
2.5	2.40	Grey slightly sandy gravelly silty CLAY with low cobble content.		24.5	24.54					
3.0	3.00	Very stiff dark grey slightly sandy gravelly silty CLAY with low cobble content.		24.0	23.94	3.00 3.00	B C	JOT36 N=31 (3,5/7,6,9,9)		
3.5				23.5						
4.0				23.0		4.00 4.00	B C	JOT37 N=50 (7,8/50 for 240mm)		
4.5				22.5						
5.0				22.0		5.00 5.00	B C	JOT38 N=31 (5,5/6,7,9,9)		
5.5				21.5						
6.0	5.90 6.00	Obstruction - possible boulder. Borehole terminated due to obstruction. End of Borehole at 6.00m		21.0	21.04 20.94	6.00	C	50 (25 for 5mm/50 for 0mm)		
6.5				20.5						
7.0				20.0						
7.5				19.5						
8.0				19.0						
8.5				18.5						
9.0				18.0						
9.5				17.5						

Chiselling:

From:	To:	Time:
4.40	4.50	00:45
5.90	6.00	01:00

Water Strikes:

Strike:	Rose:	Depth Sealed

Water Details:

Date:	Hole Depth:	Water Depth:
23/05	6.00	Dry

Installation:

From:	To:	Pipe:

Backfill:

From:	To:	Type:
0.00	6.00	Arisings

Remarks:

Borehole terminated due to obstruction.

Legend:
B: Bulk
D: Disturbed
U: Undisturbed
ES: Environmental
W: Water
C: Cone SPT
S: Split spoon SPT

Contract No: 5599	# Cable Percussion Borehole Log				Borehole No: **BH07**
Contract:	Millers Glen - Phase 5	Easting:	716243.650	Date Started:	22/05/2019
Location:	Swords, Co. Dublin	Northing:	748621.941	Date Completed:	22/05/2019
Client:	Gannon Homes Ltd	Elevation:	23.57	Drilled By:	J. O'Toole
Engineer:	Waterman Moylan	Borehole Diameter:	200mm	Status:	FINAL

Depth (m) Scale	Depth	Stratum Description	Legend	Level (mOD) Scale	Depth	Samples and Insitu Tests Depth	Type	Result	Water Strike	Backfill
0.5		MADE GROUND: brown sandy slightly gravelly silty clay with low cobble content and some brick and plastic.		23.5, 23.0						
1.0				22.5		1.00 1.00	B C	JOT29 N=4 (0,1/1,0,1,2)		
1.5				22.0						
	1.80	MADE GROUND: brown black sandy slightly gravelly silty clay with low cobble content and some brick and plastic.			21.77					
2.0	2.00			21.5	21.57	2.00 2.00	B C	JOT30 N=17 (2,3/4,4,5,4)		
2.5		Stiff black slightly sandy gravelly silty CLAY with low cobble content.		21.0						
	2.80	Stiff becoming very stiff grey slightly sandy gravelly silty CLAY.			20.77					
3.0				20.5		3.00 3.00	B C	JOT31 N=25 (2,4/6,6,6,7)		
3.5				20.0						
4.0				19.5		4.00 4.00	B C	JOT32 50 (6,7/50 for 25mm)		
4.5	4.60	Grey slightly sandy gravelly silty CLAY with low cobble content.		19.0	18.97					
5.0	5.00	Obstruction - possible boulder. Borehole terminated due to obstruction. End of Borehole at 5.00m		18.5	18.57	5.00 5.00	B C	JOT33 50 (25 for 5mm/50 for 0mm)		
5.5				18.0						
6.0				17.5						
6.5				17.0						
7.0				16.5						
7.5				16.0						
8.0				15.5						
8.5				15.0						
9.0				14.5						
9.5				14.0						

Chiselling:

From:	To:	Time:
4.20	4.40	00:45
5.00	5.00	01:00

Water Strikes:

Strike:	Rose:	Depth Sealed
4.60	4.50	NS

Water Details:

Date:	Hole Depth:	Water Depth:
22/05	5.00	4.90

Installation:

From:	To:	Pipe:

Backfill:

From:	To:	Type:
0.00	5.00	Arisings

Remarks:

Borehole terminated due to obstruction.

Legend:
B: Bulk
D: Disturbed
U: Undisturbed
ES: Environmental
W: Water
C: Cone SPT
S: Split spoon SPT

Contract No: 5599	# Cable Percussion Borehole Log				Borehole No: **BH08**
Contract:	Millers Glen - Phase 5	Easting:	716256.480	Date Started:	22/05/2019
Location:	Swords, Co. Dublin	Northing:	748690.585	Date Completed:	22/05/2019
Client:	Gannon Homes Ltd	Elevation:	20.91	Drilled By:	J. O'Toole
Engineer:	Waterman Moylan	Borehole Diameter:	200mm	Status:	FINAL

Depth (m) Scale	Depth	Stratum Description	Legend	Level (mOD) Scale	Depth	Samples and Insitu Tests Depth	Type	Result	Water Strike	Backfill
0.5		Soft brown slightly sandy gravelly silty CLAY with low cobble content.		20.5						
1.0				20.0		1.00 1.00	B C	JOT25 N=6 (1,1/1,2,1,2)		
1.5	1.60	Stiff brown slightly sandy gravelly silty CLAY with low cobble content.		19.5	19.31					
2.0				19.0		2.00 2.00	B C	JOT26 N=22 (2,4/5,5,6,6)		
2.5	2.60 2.80	Black slightly sandy gravelly silty CLAY with low cobble content.		18.5	18.31 18.11					
3.0		Stiff becoming very stiff brown slightly sandy gravelly silty CLAY.		18.0		3.00 3.00	B C	JOT27 N=26 (2,3/6,6,7,7)		
3.5				17.5						
4.0				17.0		4.00 4.00	B C	JOT28 N=50 (2,7/50 for 250mm)		
4.5	4.40 4.50	Obstruction - possible boulder. Borehole terminated due to obstruction. End of Borehole at 4.50m		16.5	16.51 16.41	4.50	C	50 (25 for 5mm/50 for 0mm)		
5.0				16.0						
5.5				15.5						
6.0				15.0						
6.5				14.5						
7.0				14.0						
7.5				13.5						
8.0				13.0						
8.5				12.5						
9.0				12.0						
9.5				11.5						
				11.0						

Chiselling: From:	To:	Time:	Water Strikes: Strike:	Rose:	Depth Sealed	Water Details: Date:	Hole Depth:	Water Depth:	Installation: From:	To:	Pipe:	Backfill: From:	To:	Type:	Remarks:
4.40	4.50	01:00				22/05	4.50	Dry				0.00	4.50	Arisings	Borehole terminated due to obstruction.

Legend:
B: Bulk
D: Disturbed
U: Undisturbed
ES: Environmental
W: Water
C: Cone SPT
S: Split spoon SPT

Contract No: 5599	**Cable Percussion Borehole Log**	Borehole No: **BH09**

Contract:	Millers Glen - Phase 5	Easting:	716287.710	Date Started:	21/05/2019
Location:	Swords, Co. Dublin	Northing:	748869.142	Date Completed:	21/05/2019
Client:	Gannon Homes Ltd	Elevation:	18.34	Drilled By:	J. O'Toole
Engineer:	Waterman Moylan	Borehole Diameter:	200mm	Status:	FINAL

Depth (m) Scale	Depth	Stratum Description	Legend	Level (mOD) Scale	Depth	Samples and Insitu Tests Depth	Type	Result	Water Strike	Backfill
0.5		MADE GROUND: brown sandy slightly gravelly silty clay with low cobble content and some brick and plastic.		18.0						
1.0	1.00	Firm brown slightly sandy gravelly silty CLAY with low cobble content.		17.5	17.34	1.00 1.00	B C	JOT18 N=11 (1,2/2,2,3,4)		
1.5	1.60	Stiff becoming very stiff black slightly sandy gravelly silty CLAY with low cobble content.		17.0	16.74					
2.0				16.5		2.00 2.00	B C	JOT19 N=19 (3,4/3,5,5,6)		
2.5				16.0						
3.0				15.5		3.00 3.00	B C	JOT20 N=32 (2,6/7,7,9,9)		
3.5				15.0						
4.0				14.5		4.00 4.00	B C	JOT21 N=19 (2,3/3,4,6,6)		
4.5				14.0						
5.0				13.5		5.00 5.00	B C	JOT22 N=31 (2,4/7,9,8,7)		
5.5				13.0						
6.0				12.5		6.00 6.00	B C	JOT23 N=47 (4,7/9,12,12,14)		
6.5				12.0						
7.0				11.5		7.00 7.00	B C	JOT24 50 (6,10/50 for 125mm)		
7.5	7.40 7.50	Obstruction - possible boulder. Borehole terminated due to obstruction. End of Borehole at 7.50m		11.0	10.94 10.84	7.50	C	50 (25 for 5mm/50 for 0mm)		
8.0				10.5						
8.5				10.0						
9.0				9.5						
9.5				9.0						
				8.5						

Chiselling: From:	To:	Time:	Water Strikes: Strike:	Rose:	Depth Sealed	Water Details: Date:	Hole Depth:	Water Depth:	Installation: From:	To:	Pipe:	Backfill: From:	To:	Type:	Remarks:
7.40	7.50	01:00	1.60	1.50	2.80	21/05	7.50	Dry				0.00	7.50	Arisings	Borehole terminated due to obstruction.

Legend:
B: Bulk
D: Disturbed
U: Undisturbed
ES: Environmental
W: Water
C: Cone SPT
S: Split spoon SPT

Contract No: 5599	**Cable Percussion Borehole Log**	Borehole No: **BH10**

Contract:	Millers Glen - Phase 5	Easting:	716331.870	Date Started:	20/05/2019
Location:	Swords, Co. Dublin	Northing:	748840.936	Date Completed:	20/05/2019
Client:	Gannon Homes Ltd	Elevation:	18.54	Drilled By:	J. O'Toole
Engineer:	Waterman Moylan	Borehole Diameter:	200mm	Status:	FINAL

Depth (m) Scale	Depth	Stratum Description	Legend	Level (mOD) Scale	Depth	Samples and Insitu Tests Depth	Type	Result	Water Strike	Backfill
0.5		MADE GROUND: brown sandy slightly gravelly silty clay with low cobble content and some brick and plastic.		18.0						
1.0				17.5		1.00 1.00	B C	JOT12 N=17 (1,2/3,4,5,5)		
1.5	1.60	Very stiff brown slightly sandy gravelly silty CLAY with low cobble content.		17.0	16.94					
2.0				16.5		2.00 2.00	B C	JOT13 N=32 (3,4/7,7,9,9)		
2.5	2.80	Very stiff dark grey slightly sandy gravelly silty CLAY with low cobble content.		16.0	15.74					
3.0				15.5		3.00 3.00	B C	JOT14 N=45 (2,4/9,11,12,13)		
3.5				15.0						
4.0				14.5		4.00 4.00	B C	JOT15 N=50 (6,9/50 for 250mm)		
4.5				14.0						
5.0				13.5		5.00 5.00	B C	JOT16 50 (10,11/50 for 125mm)		
5.5				13.0						
6.0				12.5		6.00 6.00 6.30	B C C	JOT17 50 (10,13/50 for 50mm) 50 (25 for 5mm/50 for 0mm)		
	6.20 6.30	Obstruction - possible boulder. Borehole terminated due to obstruction. End of Borehole at 6.30m			12.34 12.24					
6.5				12.0						
7.0				11.5						
7.5				11.0						
8.0				10.5						
8.5				10.0						
9.0				9.5						
9.5				9.0						

Chiselling:

From:	To:	Time:
5.30	5.40	00:45
6.20	6.30	01:00

Water Strikes:

Strike:	Rose:	Depth Sealed
1.60	1.50	3.00

Water Details:

Date:	Hole Depth:	Water Depth:
20/05	6.30	Dry

Installation:

From:	To:	Pipe:

Backfill:

From:	To:	Type:
0.00	6.30	Arisings

Remarks:

Borehole terminated due to obstruction.

Legend:
B: Bulk
D: Disturbed
U: Undisturbed
ES: Environmental
W: Water
C: Cone SPT
S: Split spoon SPT

Contract No: 5599	# Cable Percussion Borehole Log				Borehole No: **BH11**
Contract:	Millers Glen - Phase 5	Easting:	716392.760	Date Started:	17/05/2019
Location:	Swords, Co. Dublin	Northing:	748754.806	Date Completed:	17/05/2019
Client:	Gannon Homes Ltd	Elevation:	17.57	Drilled By:	J. O'Toole
Engineer:	Waterman Moylan	Borehole Diameter:	200mm	Status:	FINAL

Depth (m) Scale	Depth	Stratum Description	Legend	Level (mOD) Scale	Depth	Samples and Insitu Tests Depth	Type	Result	Water Strike	Backfill
0.5		MADE GROUND: brown sandy slightly gravelly silty clay with low cobble content and some brick and plastic.		17.5, 17.0						
1.0				16.5		1.00	B	JOT06		
	1.20	Firm becoming stiff grey brown slightly sandy gravelly silty CLAY with low cobble content.			16.37	1.00	C	N=10 (1,2/2,2,3,3)		
1.5				16.0						
2.0				15.5		2.00	B	JOT07		
						2.00	C	N=30 (4,5/6,7,9,8)	▼	
2.5	2.60	Very stiff brown sandy slightly gravelly silty CLAY.		15.0	14.97					
3.0				14.5		3.00	B	JOT08		
						3.00	C	N=41 (4,7/9,10,10,12)		
3.5				14.0						
4.0				13.5		4.00	B	JOT09		
						4.00	C	N=50 (3,6/50 for 275mm)		
4.5				13.0						
	4.80	Very stiff brown slightly sandy gravelly silty CLAY with low cobble content.			12.77					
5.0				12.5		5.00	B	JOT10		
						5.00	C	N=50 (5,7/10,11,14,15)		
5.5				12.0						
6.0				11.5		6.00	B	JOT11		
	6.20	Obstruction - possible boulder.			11.37	6.00	C	50 (12,13/50 for 25mm)		
	6.30	Borehole terminated due to obstruction.			11.27	6.30	C	50 (25 for 5mm/50 for 0mm)		
6.5		End of Borehole at 6.30m		11.0						
7.0				10.5						
7.5				10.0						
8.0				9.5						
8.5				9.0						
9.0				8.5						
9.5				8.0						

Chiselling: From:	To:	Time:	Water Strikes: Strike:	Rose:	Depth Sealed	Water Details: Date:	Hole Depth:	Water Depth:	Installation: From:	To:	Pipe:	Backfill: From:	To:	Type:	Remarks:
6.20	6.30	01:00	2.60	2.40	3.00	17/05	6.30	Dry				0.00	6.30	Arisings	Borehole terminated due to obstruction.

Legend:
B: Bulk
D: Disturbed
U: Undisturbed
ES: Environmental
W: Water
C: Cone SPT
S: Split spoon SPT

Contract No: 5599	# Cable Percussion Borehole Log				Borehole No: **BH12**
Contract:	Millers Glen - Phase 5	Easting:	716448.980	Date Started:	16/05/2019
Location:	Swords, Co. Dublin	Northing:	748663.363	Date Completed:	16/05/2019
Client:	Gannon Homes Ltd	Elevation:	18.00	Drilled By:	J. O'Toole
Engineer:	Waterman Moylan	Borehole Diameter:	200mm	Status:	FINAL

Depth (m) Scale	Depth	Stratum Description	Legend	Level (mOD) Scale	Level (mOD) Depth	Samples and Insitu Tests Depth	Type	Result	Water Strike	Backfill
0.5		MADE GROUND: brown sandy slightly gravelly silty clay with low cobble content and some brick and plastic.		17.5						
1.0	0.90	Very stiff brown slightly sandy gravelly silty CLAY with low cobble content.		17.0	17.10	1.00 1.00	B C	JOT01 N=16 (2,3/3,4,4,5)		
1.5				16.5						
2.0				16.0		2.00 2.00	B C	JOT02 N=33 (5,5/7,8,9,9)		
2.5				15.5						
3.0	2.80	Very stiff brown sandy slightly gravelly silty CLAY.		15.0	15.20	3.00 3.00	B C	JOT03 N=32 (4,5/7,9,8,8)		
3.5	3.50	Very stiff dark grey slightly sandy gravelly silty CLAY with low cobble content.		14.5	14.50					
4.0				14.0		4.00 4.00	B C	JOT04 N=40 (3,7/7,9,12,12)		
4.5				13.5						
5.0				13.0		5.00 5.00 5.30	B C C	JOT05 50 (10,15/50 for 50mm) 50 (25 for 5mm/50 for 0mm)		
	5.20 5.30	Obstruction - possible boulder. Borehole terminated due to obstruction. End of Borehole at 5.30m			12.80 12.70					
5.5				12.5						
6.0				12.0						
6.5				11.5						
7.0				11.0						
7.5				10.5						
8.0				10.0						
8.5				9.5						
9.0				9.0						
9.5				8.5						

Chiselling: From:	To:	Time:	Water Strikes: Strike:	Rose:	Depth Sealed	Water Details: Date:	Hole Depth:	Water Depth:	Installation: From:	To:	Pipe:	Backfill: From:	To:	Type:	Remarks:
5.20	5.30	01:00	5.00	4.80	NS	16/05	5.30	5.10				0.00	5.30	Arisings	Borehole terminated due to obstruction.

Legend:
B: Bulk
D: Disturbed
U: Undisturbed
ES: Environmental
W: Water
C: Cone SPT
S: Split spoon SPT

Contract No: 5599	# Cable Percussion Borehole Log	Borehole No: **BH13**

Contract:	Millers Glen - Phase 5	Easting:	716363.050	Date Started:	23/05/2019
Location:	Swords, Co. Dublin	Northing:	748603.479	Date Completed:	24/05/2019
Client:	Gannon Homes Ltd	Elevation:	22.06	Drilled By:	J. O'Toole
Engineer:	Waterman Moylan	Borehole Diameter:	200mm	Status:	FINAL

Depth (m) Scale	Depth	Stratum Description	Legend	Level (mOD) Scale	Depth	Samples and Insitu Tests Depth	Type	Result	Water Strike	Backfill
	0.20	TOPSOIL.			21.86					
		Soft brown sandy slightly gravelly silty CLAY.								
0.5				21.5						
1.0				21.0		1.00	B	JOT39		
	1.20				20.86	1.00	C	N=13 (1,1/3,3,3,4)		
		Firm brown slightly sandy gravelly silty CLAY with low cobble content.								
1.5				20.5						
2.0	2.00			20.0	20.06	2.00	B	JOT40		
		Very stiff black slightly sandy gravelly silty CLAY with low cobble content.				2.00	C	N=35 (2,4/7,8,10,10)		
2.5				19.5						
3.0				19.0		3.00	B	JOT41		
						3.00	C	N=40 (3,6/7,9,12,12)		
3.5				18.5						
4.0				18.0		4.00	B	JOT42		
						4.00	C	N=33 (4,5/8,8,9,8)		
4.5				17.5						
5.0				17.0		5.00	B	JOT43		
						5.00	C	N=41 (4,7/8,10,11,12)		
	5.40				16.66					
5.5		Obstruction - possible boulder.		16.5	16.56	5.50	C	50 (25 for 5mm/50 for 0mm)		
	5.50	Borehole terminated due to obstruction.								
		End of Borehole at 5.50m								
6.0				16.0						
6.5				15.5						
7.0				15.0						
7.5				14.5						
8.0				14.0						
8.5				13.5						
9.0				13.0						
9.5				12.5						

Chiselling:

From:	To:	Time:
5.40	5.50	01:00

Water Strikes:

Strike:	Rose:	Depth Sealed

Water Details:

Date:	Hole Depth:	Water Depth:
23/05	3.00	Dry
24/05	3.00	1.80
24/05	5.50	Dry

Installation:

From:	To:	Pipe:

Backfill:

From:	To:	Type:
0.00	5.50	Arisings

Remarks:

Overnight seepage into borehole.

Legend:
B: Bulk
D: Disturbed
U: Undisturbed
ES: Environmental
W: Water
C: Cone SPT
S: Split spoon SPT

Appendix 2

Trial Pit and Dynamic Probe Logs and Photographs

Contract No: 5599	**Trial Pit and Dynamic Probe Log**				Trial Pit No: **TP01**
Contract:	Millers Glen - Phase 5	Easting:	716487.900	Date:	14/05/2019
Location:	Swords, Co. Dublin	Northing:	748655.913	Excavator:	12T Wheeled Excavator
Client:	Gannon Homes Ltd	Elevation:	17.02	Logged By:	M. Kaliski
Engineer:	Waterman Moylan	Dimensions (LxWxD) (m):	3.00 x 0.70 x 3.30	Scale:	1:25

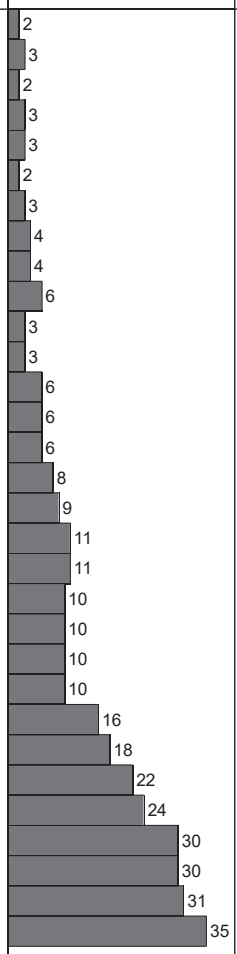
Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples Depth	Type	Probe	Water Strike
0.5		MADE GROUND: light brown slightly sandy gravelly silty clay with low cobble content and some plastic pipe fragments.		16.5				3, 2, 3, 3, 3, 4, 4, 5, 5, 5, 6, 5, 4, 4, 5, 6, 6, 6, 6, 6, 5, 6, 6, 5, 6, 7, 7, 6, 6, 6, 9, 9, 8, 7, 13, 16, 16, 18, 17, 17, 16, 35	
	0.90				16.12				
1.0		Firm becoming stiff brown slightly sandy gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone.		16.0		1.00	B		
1.5				15.5					
2.0				15.0		2.00	B		
2.5				14.5					
	2.70				14.32				
3.0		Stiff brown slightly sandy gravelly silty CLAY with medium cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter).		14.0		2.80	B		
	3.10				13.92				
	3.30	Very stiff black slightly sandy gravelly silty CLAY with medium cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter).			13.72	3.20	B		
3.5				13.5					
4.0				13.0					
4.5				12.5					

Pit terminated at 3.30m

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Scheduled depth.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5599	# Trial Pit and Dynamic Probe Log				Trial Pit No: **TP02**
Contract:	Millers Glen - Phase 5	Easting:	716440.610	Date:	14/05/2019
Location:	Swords, Co. Dublin	Northing:	748689.188	Excavator:	12T Wheeled Excavator
Client:	Gannon Homes Ltd	Elevation:	16.51	Logged By:	M. Kaliski
Engineer:	Waterman Moylan	Dimensions (LxWxD) (m):	3.00 x 0.70 x 3.00	Scale:	1:25

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples Depth	Type	Probe	Water Strike
	0.30	TOPSOIL.			16.21				
0.5		Firm becoming stiff brown slightly sandy gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone.		16.0					
1.0				15.5		1.00	B		
1.5				15.0					
2.0				14.5					
2.5				14.0		2.50	B		
3.0	3.00	**Pit terminated at 3.00m**		13.5	13.51				
3.5				13.0					
4.0				12.5					
4.5				12.0					



Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Scheduled depth.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

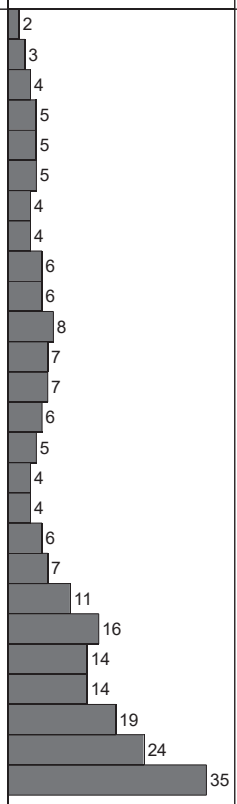
Contract No: 5599	# Trial Pit and Dynamic Probe Log				Trial Pit No: **TP03**
Contract:	Millers Glen - Phase 5	Easting:	716438.670	Date:	14/05/2019
Location:	Swords, Co. Dublin	Northing:	748638.308	Excavator:	12T Wheeled Excavator
Client:	Gannon Homes Ltd	Elevation:	19.04	Logged By:	M. Kaliski
Engineer:	Waterman Moylan	Dimensions (LxWxD) (m):	3.00 x 0.70 x 3.00	Scale:	1:25

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples Depth	Type	Probe	Water Strike
0.5		Firm becoming stiff brown slightly sandy gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone.		19.0		0.50	CBR	3, 3, 3, 4, 4, 4, 4, 4	
1.0				18.5		1.00	B	6, 5, 4, 6, 6, 6, 6, 6	
1.5				18.0				8, 8, 11, 11, 9, 9, 9	
2.0				17.5		2.50	B	11, 10, 11, 14, 13, 13, 12, 12, 12, 16, 16, 16, 15, 15, 35	
2.5				17.0					
3.0	3.00	**Pit terminated at 3.00m**		16.5	16.04				
3.5				16.0					
4.0				15.5					
4.5				15.0					
				14.5					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Scheduled depth.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5599	**Trial Pit and Dynamic Probe Log**				Trial Pit No: **TP04**
Contract:	Millers Glen - Phase 5	Easting:	716414.100	Date:	15/05/2019
Location:	Swords, Co. Dublin	Northing:	748697.864	Excavator:	12T Wheeled Excavator
Client:	Gannon Homes Ltd	Elevation:	16.89	Logged By:	M. Kaliski
Engineer:	Waterman Moylan	Dimensions (LxWxD) (m):	3.00 x 0.70 x 3.00	Scale:	1:25

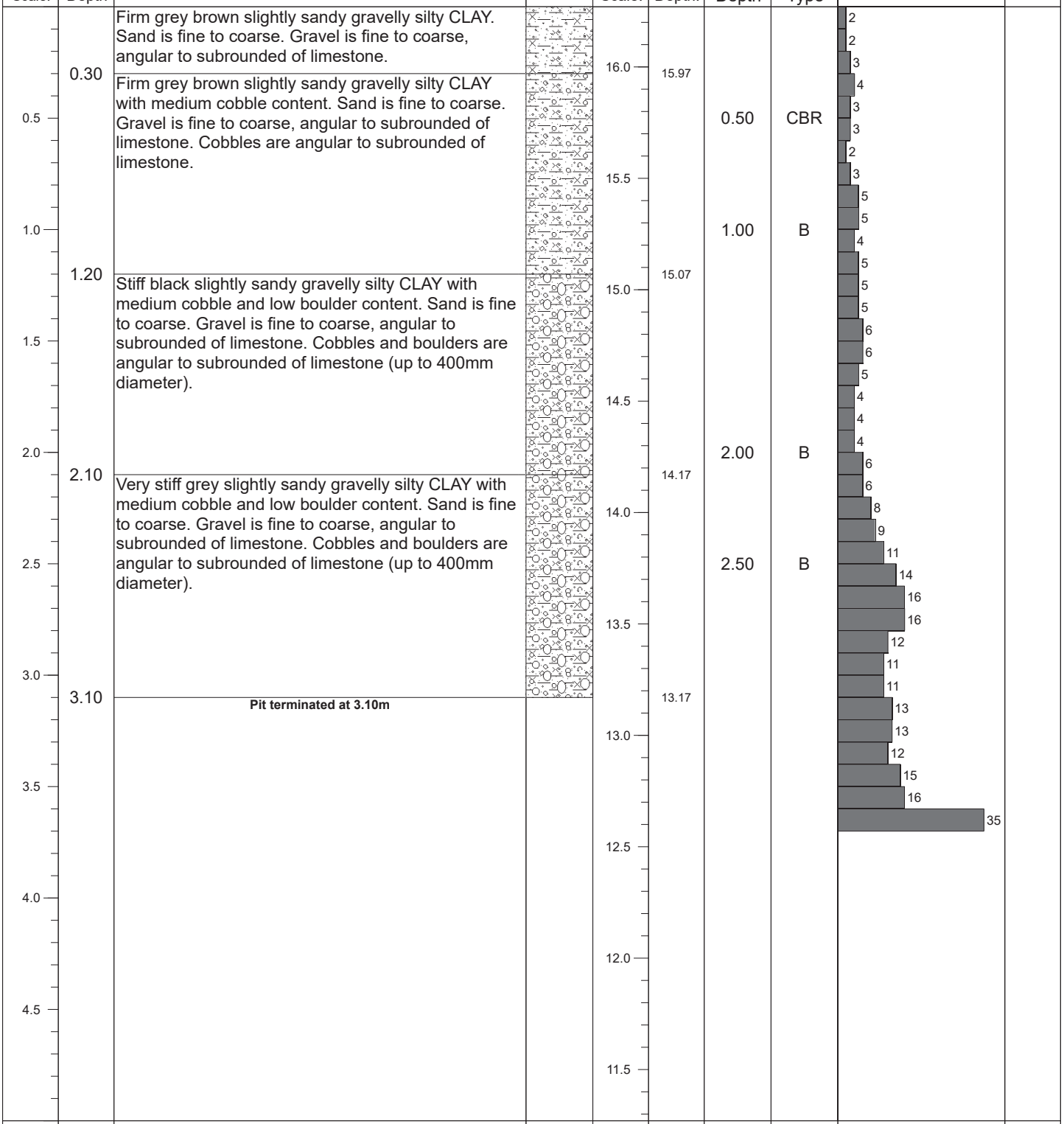
Level (mbgl) Depth	Stratum Description	Legend	Level (mOD) Depth	Samples Depth	Samples Type	Probe	Water Strike
0.10	Soft light brown sandy silty CLAY. Sand is fine to coarse.		16.79				
0.70	Firm grey brown slightly sandy gravelly silty CLAY with medium cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone.		16.19				
	Firm becoming stiff brown slightly sandy gravelly silty CLAY with medium cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter).			1.00	B		
				2.50	B		
3.00	**Pit terminated at 3.00m**		13.89				



Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Scheduled depth.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5599	**Trial Pit and Dynamic Probe Log**				Trial Pit No: **TP05**
Contract:	Millers Glen - Phase 5	Easting:	716430.510	Date:	16/05/2019
Location:	Swords, Co. Dublin	Northing:	748728.368	Excavator:	12T Wheeled Excavator
Client:	Gannon Homes Ltd	Elevation:	16.27	Logged By:	M. Kaliski
Engineer:	Waterman Moylan	Dimensions (LxWxD) (m):	3.00 x 0.70 x 3.10	Scale:	1:25

Level (mbgl) Depth	Stratum Description	Legend	Level (mOD) Depth	Samples Depth	Samples Type	Probe	Water Strike
0.30	Firm grey brown slightly sandy gravelly silty CLAY. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone.		15.97				
1.20	Firm grey brown slightly sandy gravelly silty CLAY with medium cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone.		15.07	0.50	CBR		
2.10	Stiff black slightly sandy gravelly silty CLAY with medium cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter).		14.17	1.00	B		
3.10	Very stiff grey slightly sandy gravelly silty CLAY with medium cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter).		13.17	2.00	B		
	Pit terminated at 3.10m			2.50	B		



Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Scheduled depth.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5599	**Trial Pit and Dynamic Probe Log**				Trial Pit No: **TP06**
Contract:	Millers Glen - Phase 5	Easting:	716399.090	Date:	15/05/2019
Location:	Swords, Co. Dublin	Northing:	748727.592	Excavator:	12T Wheeled Excavator
Client:	Gannon Homes Ltd	Elevation:	17.39	Logged By:	M. Kaliski
Engineer:	Waterman Moylan	Dimensions (LxWxD) (m):	3.00 x 0.70 x 3.00	Scale:	1:25

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples Depth	Samples Type	Probe	Water Strike
0.5, 1.0, 1.5, 2.0, 2.5, 3.0, 3.5, 4.0, 4.5	1.90	Firm becoming stiff grey brown slightly sandy gravelly silty CLAY with medium cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone.		17.0, 16.5, 16.0, 15.5, 15.0, 14.5, 14.0, 13.5, 13.0, 12.5	15.49	0.50 1.00	ES B	2, 2, 1, 2, 2, 2, 2, 2, 2, 2, 4, 5, 5, 7, 7, 8, 9, 11, 11, 14, 15, 35	
	3.00	Very stiff grey slightly sandy gravelly silty CLAY with medium cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter).			14.39	2.50	B		
		Pit terminated at 3.00m							

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Scheduled depth.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5599	Trial Pit and Dynamic Probe Log				Trial Pit No: **TP07**
Contract:	Millers Glen - Phase 5	Easting:	716410.670	Date:	15/05/2019
Location:	Swords, Co. Dublin	Northing:	748766.653	Excavator:	12T Wheeled Excavator
Client:	Gannon Homes Ltd	Elevation:	17.33	Logged By:	M. Kaliski
Engineer:	Waterman Moylan	Dimensions (LxWxD) (m):	3.00 x 0.70 x 3.10	Scale:	1:25

Level (mbgl) Depth	Stratum Description	Level (mOD) Depth	Samples Depth	Samples Type	Probe	Water Strike
0.40	Firm light brown slightly sandy gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone.	16.93	0.50	CBR	3, 2, 2, 2, 2, 2, 2, 2, 2, 3	
1.60	Firm becoming stiff grey brown slightly sandy gravelly silty CLAY with high cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone.	15.73	1.00	B	3, 2, 2, 3, 4, 4	
3.10	Very stiff grey slightly sandy gravelly silty CLAY with medium cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter).	14.23	2.00	B	5, 5, 5, 4, 4, 5, 6, 5, 7, 8, 7, 7, 9, 11, 13, 12, 12, 14, 11, 10, 12, 13, 14, 16, 21, 21, 35	
	Pit terminated at 3.10m					

Scale: 0.5, 1.0, 1.5, 2.0, 2.5, 3.0, 3.5, 4.0, 4.5

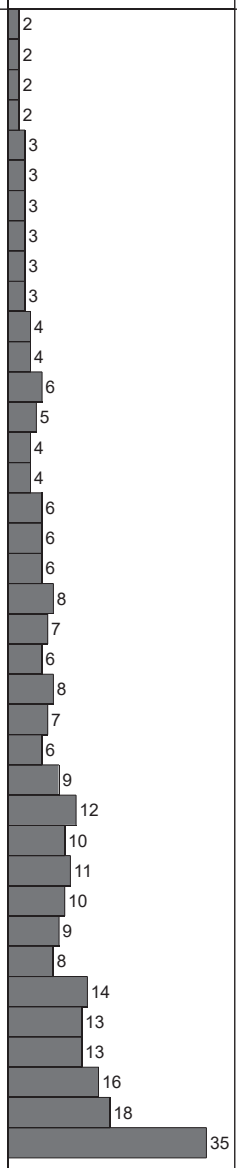
Scale: 17.0, 16.5, 16.0, 15.5, 15.0, 14.5, 14.0, 13.5, 13.0, 12.5

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Scheduled depth.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5599	**Trial Pit and Dynamic Probe Log**	Trial Pit No: **TP08**

Contract:	Millers Glen - Phase 5	Easting:	716388.910	Date:	15/05/2019
Location:	Swords, Co. Dublin	Northing:	748784.825	Excavator:	12T Wheeled Excavator
Client:	Gannon Homes Ltd	Elevation:	18.00	Logged By:	M. Kaliski
Engineer:	Waterman Moylan	Dimensions (LxWxD) (m):	3.00 x 0.70 x 3.10	Scale:	1:25

Level (mbgl) Depth	Stratum Description	Level (mOD) Depth	Samples Depth	Samples Type	Probe	Water Strike
0.50	Firm light brown slightly sandy gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone.					
2.00	Firm becoming stiff grey brown slightly sandy gravelly silty CLAY with medium cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone.	17.50	1.00	B		
2.10	Light grey silty slightly gravelly fine to coarse SAND. Gravel is fine to coarse, angular to subrounded of limestone.	16.00				▼
3.10	Very stiff black slightly sandy gravelly silty CLAY with medium cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter).	15.90	2.50	B		
	Pit terminated at 3.10m	14.90				



Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Scheduled depth.	Pit walls stable.	2.00 Seepage	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5599	**Trial Pit and Dynamic Probe Log**	Trial Pit No: **TP09**

Contract:	Millers Glen - Phase 5	Easting:	716373.980	Date:	15/05/2019
Location:	Swords, Co. Dublin	Northing:	748731.567	Excavator:	12T Wheeled Excavator
Client:	Gannon Homes Ltd	Elevation:	17.85	Logged By:	M. Kaliski
Engineer:	Waterman Moylan	Dimensions (LxWxD) (m):	3.00 x 0.70 x 3.00	Scale:	1:25

Level (mbgl) Depth	Stratum Description	Level (mOD) Depth	Samples Depth	Samples Type	Probe	Water Strike
1.60	Firm becoming stiff grey brown slightly sandy gravelly silty CLAY with medium cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone.	16.25	0.50 1.00	CBR B	4, 3, 3, 2, 4, 4, 4, 5, 6, 6, 5, 7, 6, 5, 4, 6, 7, 9, 9, 9, 12, 14, 16, 16, 15, 13, 17, 35	▼
3.00	Very stiff black slightly sandy gravelly silty CLAY with medium cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter).	14.85	2.00	B		
	Pit terminated at 3.00m					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Scheduled depth.	Pit walls stable.	1.30 Seepage	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5599	**Trial Pit and Dynamic Probe Log**	Trial Pit No: **TP10**

Contract:	Millers Glen - Phase 5	Easting:	716356.260	Date:	15/05/2019
Location:	Swords, Co. Dublin	Northing:	748794.276	Excavator:	12T Wheeled Excavator
Client:	Gannon Homes Ltd	Elevation:	18.54	Logged By:	M. Kaliski
Engineer:	Waterman Moylan	Dimensions (LxWxD) (m):	3.00 x 0.70 x 3.00	Scale:	1:25

Level (mbgl) Depth	Stratum Description	Level (mOD) Depth	Samples Depth	Samples Type	Probe	Water Strike
	Firm becoming stiff grey brown slightly sandy gravelly silty CLAY with medium cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone.		0.50	CBR	2, 2, 2, 2, 3, 3, 3, 3, 4, 3	
			1.00	B	5, 5, 8, 9, 12, 12, 14, 16, 17	
1.90	Very stiff black slightly sandy gravelly silty CLAY with medium cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter).	16.64	2.00	B	18, 18, 24, 27, 35	▼
			2.50	B		
3.00	**Pit terminated at 3.00m**	15.54				

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Scheduled depth.	Pit walls stable.	2.10 Seepage	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5599	**Trial Pit and Dynamic Probe Log**				Trial Pit No: **TP11**
Contract:	Millers Glen - Phase 5	Easting:	716353.400	Date:	15/05/2019
Location:	Swords, Co. Dublin	Northing:	748825.420	Excavator:	12T Wheeled Excavator
Client:	Gannon Homes Ltd	Elevation:	18.39	Logged By:	M. Kaliski
Engineer:	Waterman Moylan	Dimensions (LxWxD) (m):	3.00 x 0.70 x 3.00	Scale:	1:25

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples Depth	Samples Type	Probe	Water Strike
0.5, 1.0, 1.5, 2.0, 2.5, 3.0, 3.5, 4.0, 4.5	1.60	Firm becoming stiff grey brown slightly sandy gravelly silty CLAY with medium cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone.		18.0, 17.5, 17.0, 16.5, 16.0, 15.5, 15.0, 14.5, 14.0, 13.5	16.79	0.50 1.00	CBR B	3, 3, 3, 3, 2, 4, 3, 4, 3, 4, 5, 4, 4, 4, 5, 5, 4, 5, 5, 5, 5, 8, 7, 8, 11, 14, 16, 15, 18, 21, 23, 35	
	3.00	Very stiff black slightly sandy gravelly silty CLAY with medium cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter).			15.39	2.00	B		
		Pit terminated at 3.00m							

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Scheduled depth.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5599	**Trial Pit and Dynamic Probe Log**				Trial Pit No: **TP12**
Contract:	Millers Glen - Phase 5	Easting:	716300.540	Date:	15/05/2019
Location:	Swords, Co. Dublin	Northing:	748834.757	Excavator:	12T Wheeled Excavator
Client:	Gannon Homes Ltd	Elevation:	18.90	Logged By:	M. Kaliski
Engineer:	Waterman Moylan	Dimensions (LxWxD) (m):	3.00 x 0.70 x 3.00	Scale:	1:25

Level (mbgl) Depth	Stratum Description	Level (mOD) Depth	Samples Depth	Samples Type	Probe	Water Strike
0.60	Firm light brown slightly sandy gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone.	18.30	1.00	B	2, 2, 2, 2, 2, 3, 2, 4, 3, 5, 3, 4, 4, 8, 6, 9, 12, 17, 14, 16, 16, 15, 16, 22, 35	▼
1.70	Firm becoming stiff grey brown slightly sandy gravelly silty CLAY with medium cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone.	17.20	2.00	B		
3.00	Very stiff black slightly sandy gravelly silty CLAY with medium cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter).	15.90				
	Pit terminated at 3.00m					

Legend

Level (mOD) Scale: 18.5, 18.0, 17.5, 17.0, 16.5, 16.0, 15.5, 15.0, 14.5, 14.0

Level (mbgl) Scale: 0.5, 1.0, 1.5, 2.0, 2.5, 3.0, 3.5, 4.0, 4.5

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Scheduled depth.	Pit walls stable.	1.10 Seepage	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5599	**Trial Pit and Dynamic Probe Log**	Trial Pit No: **TP13**

Contract:	Millers Glen - Phase 5	Easting:	716260.720	Date:	15/05/2019
Location:	Swords, Co. Dublin	Northing:	748800.659	Excavator:	12T Wheeled Excavator
Client:	Gannon Homes Ltd	Elevation:	19.30	Logged By:	M. Kaliski
Engineer:	Waterman Moylan	Dimensions (LxWxD) (m):	3.00 x 0.70 x 3.10	Scale:	1:25

Level (mbgl) Depth	Stratum Description	Level (mOD) Depth	Samples Depth	Samples Type	Probe	Water Strike
0.30	Firm grey brown slightly sandy gravelly silty CLAY. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone.	19.00	0.50	CBR	1, 1, 2, 4, 4, 3, 4, 4, 4, 5, 7, 4, 4	
1.80	Firm becoming stiff grey brown slightly sandy gravelly silty CLAY with medium cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone.	17.50	1.00	B	11, 14, 16, 15, 17, 19, 19, 18, 21, 23, 22, 24, 28, 35	
3.10	Very stiff black slightly sandy gravelly silty CLAY with medium cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter).	16.20	2.00	B		
	Pit terminated at 3.10m					

Level (mbgl) Scale: 0.5, 1.0, 1.5, 2.0, 2.5, 3.0, 3.5, 4.0, 4.5

Level (mOD) Scale: 19.0, 18.5, 18.0, 17.5, 17.0, 16.5, 16.0, 15.5, 15.0, 14.5

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Scheduled depth.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5599	# Trial Pit and Dynamic Probe Log				Trial Pit No: **TP14**
Contract:	Millers Glen - Phase 5	Easting:	716317.030	Date:	15/05/2019
Location:	Swords, Co. Dublin	Northing:	748767.699	Excavator:	12T Wheeled Excavator
Client:	Gannon Homes Ltd	Elevation:	18.75	Logged By:	M. Kaliski
Engineer:	Waterman Moylan	Dimensions (LxWxD) (m):	3.00 x 0.70 x 3.00	Scale:	1:25

Level (mbgl) Depth	Stratum Description	Legend	Level (mOD) Depth	Samples Depth	Samples Type	Probe	Water Strike
1.80	Firm becoming stiff grey brown slightly sandy gravelly silty CLAY with medium cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone.			0.50 0.50 1.00	CBR ES B	2, 2, 3, 2, 2, 4, 5, 5, 4, 6, 6, 8, 7, 5, 9, 9, 12, 14, 12, 11, 11, 11, 8, 15, 35	
3.00	Very stiff black slightly sandy gravelly silty CLAY with medium cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter).		16.95	2.00	B		
	Pit terminated at 3.00m		15.75				

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Scheduled depth.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5599	**Trial Pit and Dynamic Probe Log**	Trial Pit No: **TP15**

Contract:	Millers Glen - Phase 5	Easting:	716255.270	Date:	15/05/2019
Location:	Swords, Co. Dublin	Northing:	748746.026	Excavator:	12T Wheeled Excavator
Client:	Gannon Homes Ltd	Elevation:	19.00	Logged By:	M. Kaliski
Engineer:	Waterman Moylan	Dimensions (LxWxD) (m):	3.00 x 0.70 x 3.00	Scale:	1:25

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples Depth	Type	Probe	Water Strike
0.5		Firm brown slightly sandy gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone.		18.5				3, 2, 3, 3, 2, 2, 2, 3, 3	
	0.90				18.10				
1.0		Firm becoming stiff grey slightly sandy gravelly silty CLAY with high cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone.		18.0		1.00	B	3, 3, 3, 3, 3, 4	
1.5				17.5				6, 5, 4, 4	
2.0				17.0		2.00	B	6, 6, 6, 7, 6, 7	▼
2.5				16.5				9, 12, 35	
3.0	3.00	**Pit terminated at 3.00m**		16.0	16.00				
3.5				15.5					
4.0				15.0					
4.5				14.5					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Scheduled depth.	Pit walls stable.	2.10 Slow	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5599	# Trial Pit and Dynamic Probe Log				Trial Pit No: **TP16**
Contract:	Millers Glen - Phase 5	Easting:	716324.060	Date:	15/05/2019
Location:	Swords, Co. Dublin	Northing:	748719.507	Excavator:	12T Wheeled Excavator
Client:	Gannon Homes Ltd	Elevation:	18.26	Logged By:	M. Kaliski
Engineer:	Waterman Moylan	Dimensions (LxWxD) (m):	3.00 x 0.70 x 3.10	Scale:	1:25

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples Depth	Type	Probe	Water Strike
	0.20	Firm brown slightly sandy gravelly silty CLAY. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone.			18.06				
		Firm becoming stiff grey brown slightly sandy gravelly silty CLAY with medium cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone.				0.50	CBR		
						1.00	B		
						2.50	B		
	3.10	**Pit terminated at 3.10m**			15.16				

Scale: 0.5, 1.0, 1.5, 2.0, 2.5, 3.0, 3.5, 4.0, 4.5

Level (mOD) Scale: 18.0, 17.5, 17.0, 16.5, 16.0, 15.5, 15.0, 14.5, 14.0, 13.5

Probe: 2, 2, 2, 2, 4, 4, 3, 5, 5, 4, 3, 5, 7, 6, 9, 12, 11, 10, 9, 12, 12, 15, 17, 16, 16, 14, 11, 14, 14, 18, 22, 35

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Scheduled depth.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5599	**Trial Pit and Dynamic Probe Log**				Trial Pit No: **TP17**
Contract:	Millers Glen - Phase 5	Easting:	716290.650	Date:	15/05/2019
Location:	Swords, Co. Dublin	Northing:	748715.769	Excavator:	12T Wheeled Excavator
Client:	Gannon Homes Ltd	Elevation:	19.49	Logged By:	M. Kaliski
Engineer:	Waterman Moylan	Dimensions (LxWxD) (m):	3.00 x 0.70 x 3.00	Scale:	1:25

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples Depth	Type
	0.30	Firm light brown slightly sandy gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone.			19.19		
0.5		Firm becoming stiff grey brown slightly sandy gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone.		19.0			
1.0				18.5		1.00	B
1.5				18.0			
2.0				17.5			
	2.40	Very stiff grey slightly sandy gravelly silty CLAY with medium cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter).			17.09		
2.5				17.0		2.50	B
3.0	3.00	**Pit terminated at 3.00m**		16.5	16.49		
3.5				16.0			
4.0				15.5			
4.5				15.0			

Probe: 2, 3, 2, 2, 3, 4, 4, 3, 4, 4, 5, 5, 8, 8, 7, 8, 8, 11, 14, 16, 14, 16, 18, 35

Water Strike: ▼

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Scheduled depth.	Instability between 0.40m and 2.20m.	0.40 Seepage	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5599	**Trial Pit and Dynamic Probe Log**				Trial Pit No: **TP18**
Contract:	Millers Glen - Phase 5	Easting:	716342.450	Date:	15/05/2019
Location:	Swords, Co. Dublin	Northing:	748696.355	Excavator:	12T Wheeled Excavator
Client:	Gannon Homes Ltd	Elevation:	18.84	Logged By:	M. Kaliski
Engineer:	Waterman Moylan	Dimensions (LxWxD) (m):	3.00 x 0.70 x 3.00	Scale:	1:25

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples Depth	Type	Probe	Water Strike
	0.40	Firm brown slightly sandy gravelly silty CLAY. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone.		18.5	18.44			3, 3, 3, 3, 3	
0.5		Firm grey brown slightly sandy gravelly silty CLAY with high cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone.		18.0		0.50	CBR	2, 2, 2, 3, 3, 3, 3, 3	
1.0				17.5		1.00	B	4, 4, 4, 3, 5, 8, 7, 8	
1.5				17.0				12, 11, 14, 14, 35	
2.0	2.30	Stiff light grey slightly sandy gravelly silty CLAY with low cobble and boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter).		16.5	16.54	2.50	B		
2.5				16.0					
3.0	3.00	**Pit terminated at 3.00m**			15.84				
3.5				15.5					
4.0				15.0					
4.5				14.5					
				14.0					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Scheduled depth.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5599	**Trial Pit and Dynamic Probe Log**				Trial Pit No: **TP19**
Contract:	Millers Glen - Phase 5	Easting:	716367.790	Date:	15/05/2019
Location:	Swords, Co. Dublin	Northing:	748666.198	Excavator:	12T Wheeled Excavator
Client:	Gannon Homes Ltd	Elevation:	19.73	Logged By:	M. Kaliski
Engineer:	Waterman Moylan	Dimensions (LxWxD) (m):	3.00 x 0.70 x 3.10	Scale:	1:25

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples Depth	Type	Probe	Water Strike
		Firm brown slightly sandy gravelly silty CLAY with high cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone.				1.00	B	2, 2, 2, 2, 2, 4, 4, 3, 4, 6, 6, 7, 8, 8, 8, 7, 11, 6	
	1.50	Stiff grey slightly sandy gravelly silty CLAY with high cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter).			18.23	2.00	B	14, 12, 12, 11, 14, 12, 12, 12, 16, 35	
	3.10	**Pit terminated at 3.10m**			16.63				

Scale: 0.5, 1.0, 1.5, 2.0, 2.5, 3.0, 3.5, 4.0, 4.5

Level (mOD) Scale: 19.5, 19.0, 18.5, 18.0, 17.5, 17.0, 16.5, 16.0, 15.5, 15.0

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Scheduled depth.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

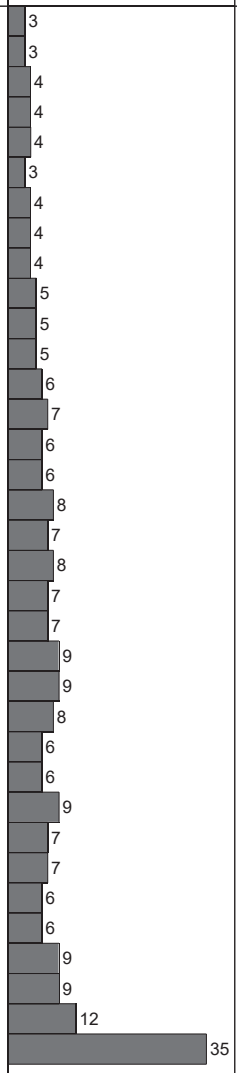
Contract No: 5599	**Trial Pit and Dynamic Probe Log**				Trial Pit No: **TP20**
Contract:	Millers Glen - Phase 5	Easting:	716337.270	Date:	14/05/2019
Location:	Swords, Co. Dublin	Northing:	748662.233	Excavator:	12T Wheeled Excavator
Client:	Gannon Homes Ltd	Elevation:	20.42	Logged By:	M. Kaliski
Engineer:	Waterman Moylan	Dimensions (LxWxD) (m):	3.00 x 0.70 x 2.40	Scale:	1:25

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples Depth	Type	Probe	Water Strike
0.5, 1.0, 1.5, 2.0, 2.5, 3.0, 3.5, 4.0, 4.5	1.50	Firm becoming stiff brown slightly sandy gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone.		20.0, 19.5, 19.0, 18.5, 18.0, 17.5, 17.0, 16.5, 16.0, 15.5	18.92	1.00	B	2, 2, 2, 3, 2, 3, 3, 3, 6, 8, 7, 8, 8, 7, 9, 11, 14, 16, 16, 18, 19, 18, 35	
	2.40	Very stiff black slightly sandy gravelly silty CLAY with medium cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter).			18.02	2.00	B		
		Pit terminated due to boulder obstructions. **Pit terminated at 2.40m**							

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Obstruction - boulders.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5599	**Trial Pit and Dynamic Probe Log**				Trial Pit No: **TP21**
Contract:	Millers Glen - Phase 5	Easting:	716377.280	Date:	14/05/2019
Location:	Swords, Co. Dublin	Northing:	748605.280	Excavator:	12T Wheeled Excavator
Client:	Gannon Homes Ltd	Elevation:	21.71	Logged By:	M. Kaliski
Engineer:	Waterman Moylan	Dimensions (LxWxD) (m):	3.00 x 0.70 x 3.00	Scale:	1:25

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples Depth	Type	Probe	Water Strike
		TOPSOIL.							
	0.40	Firm becoming stiff brown slightly sandy gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone.			21.31	1.00	B		
	2.30	Very stiff black slightly sandy gravelly silty CLAY with medium cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter).			19.41	2.00	B		▼
	3.00	**Pit terminated at 3.00m**			18.71	2.50	B		



Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Scheduled depth.	Pit walls stable.	2.20 Seepage	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5599	**Trial Pit and Dynamic Probe Log**	Trial Pit No: **TP22**

Contract:	Millers Glen - Phase 5	Easting:	716302.370	Date:	15/05/2019
Location:	Swords, Co. Dublin	Northing:	748636.517	Excavator:	12T Wheeled Excavator
Client:	Gannon Homes Ltd	Elevation:	22.02	Logged By:	M. Kaliski
Engineer:	Waterman Moylan	Dimensions (LxWxD) (m):	3.00 x 0.70 x 3.00	Scale:	1:25

Level (mbgl) Depth	Stratum Description	Level (mOD) Depth	Samples Depth	Samples Type	Probe	Water Strike
	Firm grey brown slightly sandy gravelly silty CLAY with high cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone.		1.00	B	3, 3, 3, 4, 5, 3, 3, 4, 5, 5, 5, 4, 5, 5, 4	▼
1.50	Stiff grey slightly sandy gravelly silty CLAY with low cobble and boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter).	20.52	1.80	B	6, 6, 5, 4, 3, 5, 6, 7, 7, 7, 8, 6, 5, 8, 8	
1.90	Stiff light grey slightly sandy gravelly silty CLAY with low cobble and boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter).	20.12	2.50	B	15, 14, 15, 35	
3.00	**Pit terminated at 3.00m**	19.02				

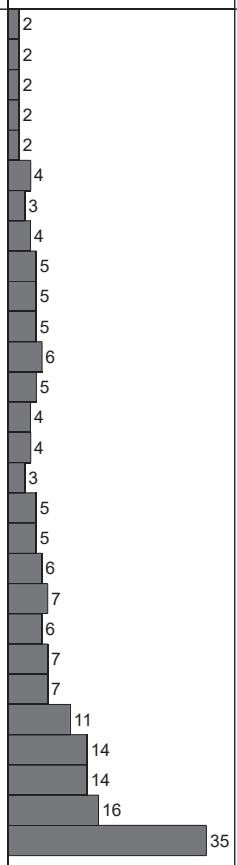
Scale: 0.5, 1.0, 1.5, 2.0, 2.5, 3.0, 3.5, 4.0, 4.5

Level (mOD) Scale: 21.5, 21.0, 20.5, 20.0, 19.5, 19.0, 18.5, 18.0, 17.5

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Scheduled depth.	Pit walls stable.	0.80 Seepage	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5599	**Trial Pit and Dynamic Probe Log**				Trial Pit No: **TP23**
Contract:	Millers Glen - Phase 5	Easting:	716266.450	Date:	15/05/2019
Location:	Swords, Co. Dublin	Northing:	748652.449	Excavator:	12T Wheeled Excavator
Client:	Gannon Homes Ltd	Elevation:	22.11	Logged By:	M. Kaliski
Engineer:	Waterman Moylan	Dimensions (LxWxD) (m):	3.00 x 0.70 x 3.00	Scale:	1:25

Level (mbgl) Depth	Stratum Description	Legend	Level (mOD) Depth	Samples Depth	Samples Type	Probe	Water Strike
0.20	Firm brown slightly sandy gravelly silty CLAY. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone.		21.91				
2.10	Firm brown slightly sandy gravelly silty CLAY with high cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone.		20.01	1.00	B		
3.00	Stiff grey slightly sandy gravelly silty CLAY with low cobble and boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter).		19.11	2.50	B		
	Pit terminated at 3.00m						



Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Scheduled depth.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5599	**Trial Pit and Dynamic Probe Log**	Trial Pit No: **TP24**

Contract:	Millers Glen - Phase 5	Easting:	716231.410	Date:	15/05/2019
Location:	Swords, Co. Dublin	Northing:	748696.705	Excavator:	12T Wheeled Excavator
Client:	Gannon Homes Ltd	Elevation:	21.08	Logged By:	M. Kaliski
Engineer:	Waterman Moylan	Dimensions (LxWxD) (m):	3.00 x 0.70 x 3.10	Scale:	1:25

Level (mbgl) Depth	Stratum Description	Legend	Level (mOD) Depth	Samples Depth	Samples Type	Probe	Water Strike
0.40	Firm brown slightly sandy gravelly silty CLAY. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone.		20.68	0.50	CBR	2, 2, 3, 3, 3, 3, 2, 3, 3, 3, 3	
1.40	Firm grey brown slightly sandy gravelly silty CLAY with high cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone.		19.68	1.00	B	4, 4, 5, 7, 6, 5, 5, 6, 6, 7, 7	▼
2.40	Stiff grey slightly sandy gravelly silty CLAY with low cobble and boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter).		18.68	2.00	B	6, 6, 7, 7, 7, 6, 6	
3.10	Very stiff black slightly sandy gravelly silty CLAY with medium cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter).		17.98	2.50	B	7, 8, 9, 9, 12, 12, 35	
	Pit terminated at 3.10m						

Scale: 0.5, 1.0, 1.5, 2.0, 2.5, 3.0, 3.5, 4.0, 4.5

Level (mOD) Scale: 21.0, 20.5, 20.0, 19.5, 19.0, 18.5, 18.0, 17.5, 17.0, 16.5

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Scheduled depth.	Pit walls stable.	1.50 Seepage	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5599	**Trial Pit and Dynamic Probe Log**	Trial Pit No: **TP25**

Contract:	Millers Glen - Phase 5	Easting:	716219.840	Date:	15/05/2019
Location:	Swords, Co. Dublin	Northing:	748622.510	Excavator:	12T Wheeled Excavator
Client:	Gannon Homes Ltd	Elevation:	24.15	Logged By:	M. Kaliski
Engineer:	Waterman Moylan	Dimensions (LxWxD) (m):	3.00 x 0.70 x 3.10	Scale:	1:25

Level (mbgl) Depth	Stratum Description	Level (mOD) Depth	Samples Depth	Samples Type	Probe	Water Strike
1.10	Firm brown slightly sandy gravelly silty CLAY. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone.	23.05	1.00	B	2, 2, 2, 1, 2, 2, 2, 2, 2, 2, 4, 4	
2.50	Firm becoming stiff brown slightly sandy gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone.	21.65	2.00	B	5, 5, 5, 7, 7, 9, 9, 11, 11, 14, 12, 13, 12, 12, 12, 12	
3.10	Very stiff black slightly sandy gravelly silty CLAY with medium cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter).	21.05	2.80	B	15, 17, 35	
	Pit terminated at 3.10m					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Scheduled depth.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5599	# Trial Pit and Dynamic Probe Log				Trial Pit No: **TP26**
Contract:	Millers Glen - Phase 5	Easting:	716241.970	Date:	15/05/2019
Location:	Swords, Co. Dublin	Northing:	748643.520	Excavator:	12T Wheeled Excavator
Client:	Gannon Homes Ltd	Elevation:	22.73	Logged By:	M. Kaliski
Engineer:	Waterman Moylan	Dimensions (LxWxD) (m):	3.00 x 0.70 x 3.00	Scale:	1:25

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples Depth	Type	Probe	Water Strike
0.5, 1.0, 1.5, 2.0, 2.5, 3.0, 3.5, 4.0, 4.5	1.50	Firm becoming stiff brown slightly sandy gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone.		22.5, 22.0, 21.5, 21.0, 20.5, 20.0, 19.5, 19.0, 18.5, 18.0	21.23	1.00	B	2, 3, 3, 2, 3, 3, 2, 3, 4, 4, 4, 3, 5, 4, 5, 5, 7, 11, 12, 8, 9, 12, 12, 12, 11, 10, 12, 12, 35	
	3.00	Very stiff black slightly sandy gravelly silty CLAY with medium cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter).			19.73	2.00	B		
		Pit terminated at 3.00m							

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Scheduled depth.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5599	**Trial Pit and Dynamic Probe Log**				Trial Pit No: **TP27**
Contract:	Millers Glen - Phase 5	Easting:	716269.330	Date:	14/05/2019
Location:	Swords, Co. Dublin	Northing:	748608.685	Excavator:	12T Wheeled Excavator
Client:	Gannon Homes Ltd	Elevation:	23.47	Logged By:	M. Kaliski
Engineer:	Waterman Moylan	Dimensions (LxWxD) (m):	3.00 x 0.70 x 3.10	Scale:	1:25

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples Depth	Type
		MADE GROUND: brown black slightly sandy gravelly silty clay with low cobble and boulder content and some gravel laminas.				1.00	B
	2.50	Very stiff black slightly sandy gravelly silty CLAY with medium cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter).			20.97	2.80	B
	3.10	**Pit terminated at 3.10m**			20.37		

Scale: 0.5, 1.0, 1.5, 2.0, 2.5, 3.0, 3.5, 4.0, 4.5

Level (mOD) Scale: 23.0, 22.5, 22.0, 21.5, 21.0, 20.5, 20.0, 19.5, 19.0

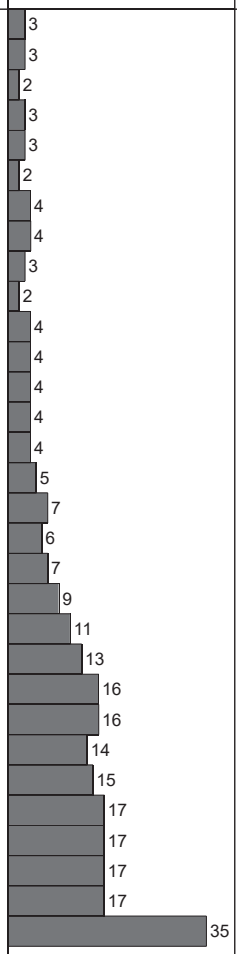
Probe: 3, 3, 4, 4, 3, 5, 4, 3, 6, 5, 5, 5, 4, 6, 6, 6, 5, 4, 7, 6, 8, 8, 7, 8, 8, 7, 6, 7, 7, 7, 9, 12, 12, 12, 11, 10, 12, 14, 35

Water Strike: ▼

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Scheduled depth.	Instability between 0.20m and 1.50m.	1.50 Seepage	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5599	**Trial Pit and Dynamic Probe Log**				Trial Pit No: **TP28**
Contract:	Millers Glen - Phase 5	Easting:	716242.180	Date:	14/05/2019
Location:	Swords, Co. Dublin	Northing:	748582.076	Excavator:	12T Wheeled Excavator
Client:	Gannon Homes Ltd	Elevation:	25.18	Logged By:	M. Kaliski
Engineer:	Waterman Moylan	Dimensions (LxWxD) (m):	3.00 x 0.70 x 3.00	Scale:	1:25

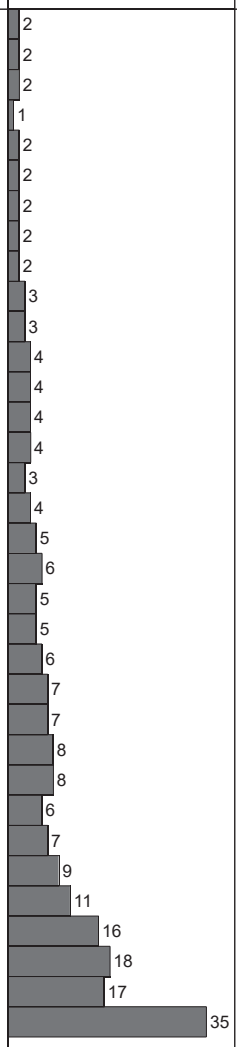
Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples Depth	Type	Probe	Water Strike
		MADE GROUND: brown slightly sandy gravelly silty clay with low cobble content and some gravel laminas.				0.50	CBR		
						1.00	B		
	2.00	MADE GROUND: black slightly sandy gravelly silty clay with low cobble and boulder content and some gravel laminas.			23.18	2.20	B		
	2.30	Firm becoming stiff brown slightly sandy gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone.			22.88	2.80	B		
	3.00	**Pit terminated at 3.00m**			22.18				



Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Scheduled depth.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5599	**Trial Pit and Dynamic Probe Log**				Trial Pit No: **TP29**
Contract:	Millers Glen - Phase 5	Easting:	716305.130	Date:	15/05/2019
Location:	Swords, Co. Dublin	Northing:	748611.372	Excavator:	12T Wheeled Excavator
Client:	Gannon Homes Ltd	Elevation:	23.58	Logged By:	M. Kaliski
Engineer:	Waterman Moylan	Dimensions (LxWxD) (m):	3.00 x 0.70 x 3.40	Scale:	1:25

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples Depth	Samples Type	Probe	Water Strike
		Firm becoming stiff brown slightly sandy gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone.				0.50 0.50 1.00	CBR ES B		
	1.90	Very stiff black slightly sandy gravelly silty CLAY with medium cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter).			21.68	2.50	B		
	3.10	**Pit terminated at 3.10m**			20.48				



Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Scheduled depth.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5599	Trial Pit and Dynamic Probe Log				Trial Pit No: **TP30**
Contract:	Millers Glen - Phase 5	Easting:	716294.200	Date:	14/05/2019
Location:	Swords, Co. Dublin	Northing:	748561.395	Excavator:	12T Wheeled Excavator
Client:	Gannon Homes Ltd	Elevation:	25.04	Logged By:	M. Kaliski
Engineer:	Waterman Moylan	Dimensions (LxWxD) (m):	3.00 x 0.70 x 2.50	Scale:	1:25

Level (mbgl) Depth	Stratum Description	Level (mOD) Depth	Samples Depth	Samples Type	Probe	Water Strike
0.30	Firm grey brown slightly sandy gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone.	24.74			3, 3, 3, 3, 3	
2.20	Firm becoming stiff brown slightly sandy gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone.	22.84	1.00	B	4, 4, 3, 5, 5, 5, 6, 8, 6, 7, 7, 7, 7, 7, 11, 16, 17, 19, 19, 14, 15, 16, 17, 18, 35	▼
2.50	Very stiff black slightly sandy gravelly silty CLAY with medium cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter).	22.54	2.40	B		
	Pit terminated due to boulder obstructions. **Pit terminated at 2.50m**					

Level (mbgl) scale: 0.5, 1.0, 1.5, 2.0, 2.5, 3.0, 3.5, 4.0, 4.5

Level (mOD) scale: 25.0, 24.5, 24.0, 23.5, 23.0, 22.5, 22.0, 21.5, 21.0, 20.5

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Obstruction - boulders.	Pit walls stable.	2.20 Seepage	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5599	**Trial Pit and Dynamic Probe Log**	Trial Pit No: **TP31**

Contract:	Millers Glen - Phase 5	Easting:	716211.620	Date:	14/05/2019
Location:	Swords, Co. Dublin	Northing:	748584.607	Excavator:	12T Wheeled Excavator
Client:	Gannon Homes Ltd	Elevation:	25.91	Logged By:	M. Kaliski
Engineer:	Waterman Moylan	Dimensions (LxWxD) (m):	3.00 x 0.70 x 2.10	Scale:	1:25

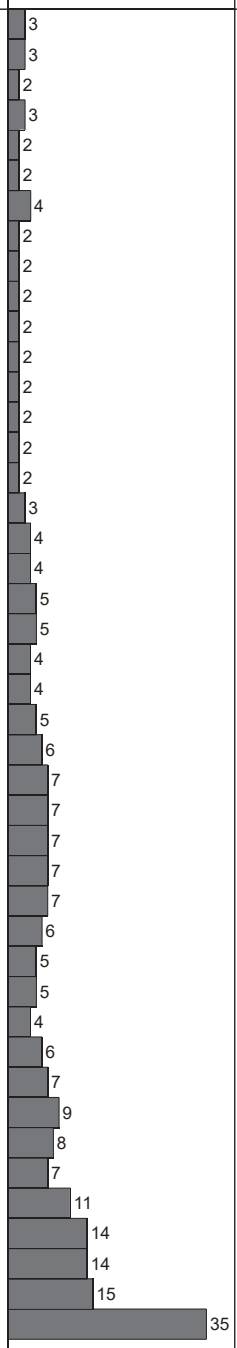
Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples Depth	Type	Probe	Water Strike
0.5, 1.0, 1.5, 2.0, 2.5, 3.0, 3.5, 4.0, 4.5	1.90 2.10	Firm becoming stiff brown slightly sandy gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone. Very stiff black slightly sandy gravelly silty CLAY with medium cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter). Pit terminated due to boulder obstructions. **Pit terminated at 2.10m**		25.5, 25.0, 24.5, 24.0, 23.5, 23.0, 22.5, 22.0, 21.5, 21.0	24.01 23.81	1.00 2.00	B B	3, 2, 3, 3, 4, 4, 4, 4, 4, 5, 4, 6, 7, 8, 8, 8, 7, 6, 6, 7, 7, 6, 7, 7, 7, 7, 8, 9, 9, 8, 8, 12, 12, 16, 35	

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Obstruction - boulders.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5599	Trial Pit and Dynamic Probe Log				Trial Pit No: **TP32**
Contract:	Millers Glen - Phase 5	Easting:	716233.520	Date:	14/05/2019
Location:	Swords, Co. Dublin	Northing:	748550.545	Excavator:	12T Wheeled Excavator
Client:	Gannon Homes Ltd	Elevation:	26.34	Logged By:	M. Kaliski
Engineer:	Waterman Moylan	Dimensions (LxWxD) (m):	3.00 x 0.70 x 3.10	Scale:	1:25

Level (mbgl) Depth	Stratum Description	Level (mOD) Depth	Samples Depth	Samples Type	Probe	Water Strike
0.30	MADE GROUND: light brown slightly sandy gravelly silty clay with low cobble content and some plastic pipe fragments.	26.04				
1.60	MADE GROUND: brown slightly sandy gravelly silty clay with low cobble content and some gravel laminas.	24.74	1.00	B		
1.80	MADE GROUND: black slightly sandy gravelly silty clay with low cobble and boulder content and some gravel laminas.	24.54				▼
2.70	Firm becoming stiff brown slightly sandy gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone.	23.64	2.00	B		
3.10	Very stiff black slightly sandy gravelly silty CLAY with medium cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter).	23.24	3.00	B		

Pit terminated at 3.10m



Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Scheduled depth.	Pit walls stable.	1.90 Seepage	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5599	# Trial Pit and Dynamic Probe Log				Trial Pit No: **TP33**
Contract:	Millers Glen - Phase 5	Easting:	716269.980	Date:	14/05/2019
Location:	Swords, Co. Dublin	Northing:	748552.133	Excavator:	12T Wheeled Excavator
Client:	Gannon Homes Ltd	Elevation:	25.43	Logged By:	M. Kaliski
Engineer:	Waterman Moylan	Dimensions (LxWxD) (m):	3.00 x 0.70 x 2.20	Scale:	1:25

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples Depth	Samples Type	Probe	Water Strike
0.5		Firm becoming stiff brown slightly sandy gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone.		25.0		0.50	CBR	2, 2, 3, 4, 3, 3, 4, 4, 3	
1.0				24.5		1.00	B	5, 4, 4, 5, 6	
1.5				24.0				8, 7, 6	
	1.70	Very stiff black slightly sandy gravelly silty CLAY with medium cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter).			23.73			6, 6, 6	
2.0				23.5		2.00	B	6, 4	
	2.20	Pit terminated due to boulder obstructions. **Pit terminated at 2.20m**			23.23			5, 6, 6, 6	
2.5				23.0				7, 7, 6	
3.0				22.5				7, 9, 8, 7	
3.5				22.0				6, 7, 6, 7, 12, 35	
4.0				21.5					
4.5				21.0					
				20.5					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Obstruction - boulders.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5599	**Trial Pit and Dynamic Probe Log**				Trial Pit No: **TP34**
Contract:	Millers Glen - Phase 5	Easting:	716192.930	Date:	16/05/2019
Location:	Swords, Co. Dublin	Northing:	748510.478	Excavator:	12T Wheeled Excavator
Client:	Gannon Homes Ltd	Elevation:	29.42	Logged By:	M. Kaliski
Engineer:	Waterman Moylan	Dimensions (LxWxD) (m):	3.00 x 0.70 x 1.60	Scale:	1:25

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples Depth	Samples Type	Probe	Water Strike
0.5, 1.0, 1.5, 2.0, 2.5, 3.0, 3.5, 4.0, 4.5	1.60	MADE GROUND: dark grey silty sandy gravel with high cobble content and some concrete, timber, rags, plastic bags, steel and mortar.		29.0, 28.5, 28.0, 27.5, 27.0, 26.5, 26.0, 25.5, 25.0, 24.5	27.82	0.50 1.00	ES B	3, 3, 4, 4, 6, 7, 6, 5, 7, 7, 9, 9, 9, 9, 9, 16, 17, 21, 24, 27, 23, 35	
		Pit terminated due to obstructions. **Pit terminated at 1.60m**							

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Obstruction - boulders.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5599	**Trial Pit and Dynamic Probe Log**				Trial Pit No: **TP35**
Contract:	Millers Glen - Phase 5	Easting:	716220.970	Date:	16/05/2019
Location:	Swords, Co. Dublin	Northing:	748495.365	Excavator:	12T Wheeled Excavator
Client:	Gannon Homes Ltd	Elevation:	28.88	Logged By:	M. Kaliski
Engineer:	Waterman Moylan	Dimensions (LxWxD) (m):	3.00 x 0.70 x 1.40	Scale:	1:25

Level (mbgl) Depth	Stratum Description	Legend	Level (mOD) Depth	Samples Depth	Samples Type	Probe	Water Strike
0.70	MADE GROUND: brown slightly sandy gravelly silty clay with low cobble content and some gravel laminas.		28.18	1.00	B	4, 5, 5, 6, 4, 5, 5, 5, 4, 4, 4, 5, 6, 6, 6, 35	
1.40	MADE GROUND: black sandy gravelly silty clay with some plastic, red brick, tin cans and concrete blocks.		27.48				
	Pit terminated due to obstructions. **Pit terminated at 1.40m**						

Scale: 0.5, 1.0, 1.5, 2.0, 2.5, 3.0, 3.5, 4.0, 4.5

Scale: 28.5, 28.0, 27.5, 27.0, 26.5, 26.0, 25.5, 25.0, 24.5, 24.0

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Obstruction - boulders.	Pit walls stable.	Dry	Pit terminated due to obstruction - reattempt made - TP35A.	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5599	# Trial Pit and Dynamic Probe Log				Trial Pit No: **TP35A**
Contract:	Millers Glen - Phase 5	Easting:	716226.270	Date:	16/05/2019
Location:	Swords, Co. Dublin	Northing:	748493.202	Excavator:	
Client:	Gannon Homes Ltd	Elevation:	28.90	Logged By:	
Engineer:	Waterman Moylan	Dimensions (LxWxD) (m):	x x	Scale:	1:25

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples Depth	Type	Probe	Water Strike
0.5		MADE GROUND: brown slightly sandy gravelly silty clay with low cobble content and some gravel laminas.		28.5					
	0.80	MADE GROUND: dark grey silty sandy gravelly cobbles with high boulder content and some concrete fragments.		28.0	28.10				
1.0									
	1.40	Pit terminated due to obstructions.		27.5	27.50				
1.5		**Pit terminated at 1.40m**							
				27.0					
2.0									
				26.5					
2.5									
				26.0					
3.0									
				25.5					
3.5									
				25.0					
4.0									
				24.5					
4.5									
				24.0					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Obstruction - boulders.		Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

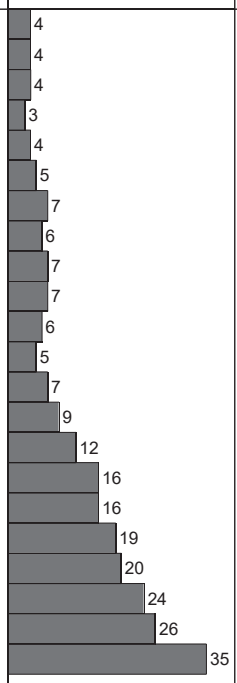
Contract No: 5599	**Trial Pit and Dynamic Probe Log**				Trial Pit No: **TP36**
Contract:	Millers Glen - Phase 5	Easting:	716167.410	Date:	16/05/2019
Location:	Swords, Co. Dublin	Northing:	748460.628	Excavator:	12T Wheeled Excavator
Client:	Gannon Homes Ltd	Elevation:	29.38	Logged By:	M. Kaliski
Engineer:	Waterman Moylan	Dimensions (LxWxD) (m):	3.00 x 0.70 x 3.00	Scale:	1:25

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples Depth	Type	Probe	Water Strike
	0.20	MADE GROUND: grey silty sandy gravel (Cl. 804).			29.18			3, 5, 5, 7, 6, 4, 4, 4, 3, 3, 4, 4, 3, 3, 4, 4, 4, 4, 5, 4, 4, 5	
	0.40	Firm light brown slightly sandy gravelly silty CLAY. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone.		29.0	28.98				
0.5		Firm becoming stiff grey brown slightly sandy gravelly silty CLAY with medium cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone.		28.5		1.00	B		
1.0									
1.5				28.0					
2.0				27.5					
	2.10	Very stiff grey slightly sandy gravelly silty CLAY with medium cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter).			27.28			11, 12, 16, 35	
2.5				27.0		2.50	B		
				26.5					
3.0	3.00	**Pit terminated at 3.00m**			26.38				
3.5				26.0					
4.0				25.5					
4.5				25.0					
				24.5					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Scheduled depth.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5599	# Trial Pit and Dynamic Probe Log				Trial Pit No: **TP37**
Contract:	Millers Glen - Phase 5	Easting:	716212.620	Date:	16/05/2019
Location:	Swords, Co. Dublin	Northing:	748434.663	Excavator:	12T Wheeled Excavator
Client:	Gannon Homes Ltd	Elevation:	29.12	Logged By:	M. Kaliski
Engineer:	Waterman Moylan	Dimensions (LxWxD) (m):	3.00 x 0.70 x 3.00	Scale:	1:25

Level (mbgl) Depth	Stratum Description	Level (mOD) Depth	Samples Depth	Samples Type	Probe	Water Strike
0.05	MADE GROUND: grey silty sandy gravel (Cl. 804).	29.07				
	Firm becoming stiff brown slightly sandy gravelly silty CLAY with medium cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter).		1.00	B		
2.10	Very stiff black slightly sandy gravelly silty CLAY with medium cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter).	27.02	2.50	B		
3.00	**Pit terminated at 3.00m**	26.12				



Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Scheduled depth.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5599	# Trial Pit and Dynamic Probe Log				Trial Pit No: **TP38**
Contract:	Millers Glen - Phase 5	Easting:	716206.730	Date:	16/05/2019
Location:	Swords, Co. Dublin	Northing:	748385.328	Excavator:	12T Wheeled Excavator
Client:	Gannon Homes Ltd	Elevation:	30.43	Logged By:	M. Kaliski
Engineer:	Waterman Moylan	Dimensions (LxWxD) (m):	3.00 x 0.70 x 3.00	Scale:	1:25

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples Depth	Samples Type	Probe	Water Strike
0.5	0.90	MADE GROUND: brown black slightly sandy gravelly silty clay with low cobble content.		30.0		0.50	CBR	2, 2, 4, 4, 5, 6, 7, 7, 8, 6	
1.0, 1.5	1.90	Firm becoming stiff brown slightly sandy gravelly silty CLAY with medium cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter).		29.5, 29.0	29.53	1.00	B	11, 14, 16, 19, 22, 35	
2.0, 2.5	3.00	Very stiff black slightly sandy gravelly silty CLAY with medium cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter).		28.5, 28.0, 27.5	28.53	2.50	B		
3.0, 3.5, 4.0, 4.5		**Pit terminated at 3.00m**		27.0, 26.5, 26.0, 25.5	27.43				

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Scheduled depth.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5599	# Trial Pit and Dynamic Probe Log				Trial Pit No: **TP39**
Contract:	Millers Glen - Phase 5	Easting:	716179.600	Date:	16/05/2019
Location:	Swords, Co. Dublin	Northing:	748389.142	Excavator:	12T Wheeled Excavator
Client:	Gannon Homes Ltd	Elevation:	30.92	Logged By:	M. Kaliski
Engineer:	Waterman Moylan	Dimensions (LxWxD) (m):	3.00 x 0.70 x 3.00	Scale:	1:25

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples Depth	Type	Probe	Water Strike
	0.10	TOPSOIL.			30.82			2	
		Firm becoming stiff brown slightly sandy gravelly silty CLAY with medium cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter).		30.5		0.50	CBR	2, 2, 2, 3, 2	
0.5								4, 4	
1.0				30.0		1.00	B	6, 9, 9, 7, 8	
1.5				29.5				12, 16, 18, 22, 26, 35	
	1.90	Very stiff black slightly sandy gravelly silty CLAY with medium cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter).		29.0	29.02				
2.0									
2.5				28.5		2.50	B		
3.0	3.00	**Pit terminated at 3.00m**		28.0	27.92				
3.5				27.5					
4.0				27.0					
4.5				26.5					
				26.0					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Scheduled depth.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5599	**Trial Pit and Dynamic Probe Log**				Trial Pit No: **TP40**
Contract:	Millers Glen - Phase 5	Easting:	716190.650	Date:	16/05/2019
Location:	Swords, Co. Dublin	Northing:	748345.002	Excavator:	12T Wheeled Excavator
Client:	Gannon Homes Ltd	Elevation:	32.20	Logged By:	M. Kaliski
Engineer:	Waterman Moylan	Dimensions (LxWxD) (m):	3.00 x 0.70 x 3.00	Scale:	1:25

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples Depth	Type	Probe	Water Strike
	0.20	TOPSOIL.							
	1.90	Firm becoming stiff brown slightly sandy gravelly silty CLAY with medium cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter).				1.00	B		
	3.00	Very stiff black slightly sandy gravelly silty CLAY with medium cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter).				2.50	B		
		Pit terminated at 3.00m							

Probe values: 2, 2, 3, 4, 4, 4, 5, 3, 5, 6, 7, 7, 6, 6, 9, 11, 14, 16, 16, 16, 17, 15, 21, 35

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Scheduled depth.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5599	**Trial Pit and Dynamic Probe Log**				Trial Pit No: **TP41**
Contract:	Millers Glen - Phase 5	Easting:	716145.700	Date:	16/05/2019
Location:	Swords, Co. Dublin	Northing:	748341.706	Excavator:	12T Wheeled Excavator
Client:	Gannon Homes Ltd	Elevation:	32.17	Logged By:	M. Kaliski
Engineer:	Waterman Moylan	Dimensions (LxWxD) (m):	3.00 x 0.70 x 3.00	Scale:	1:25

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples Depth	Type	Probe	Water Strike
		MADE GROUND: grey silty sandy gravel (Cl. 804).		32.0				2, 4, 3, 3, 4, 4, 5, 5, 5, 6, 11, 11, 14, 16, 18, 35	
0.5	0.40	Firm becoming stiff brown slightly sandy gravelly silty CLAY with medium cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter).		31.5	31.77	0.50	CBR		
1.0				31.0		1.00	B		
1.5	1.80	Very stiff black slightly sandy gravelly silty CLAY with medium cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter).		30.5	30.37				
2.0				30.0		2.00	B		
2.5				29.5					
3.0	3.00	**Pit terminated at 3.00m**		29.0	29.17				
3.5				28.5					
4.0				28.0					
4.5				27.5					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Scheduled depth.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

TP01 Sidewall

TP01 Spoil

TP02 Sidewall

TP02 Spoil

TP03 Sidewall

TP03 Spoil

TP04 Sidewall

TP04 Spoil

TP05 Sidewall

TP05 Spoil

TP06 Sidewall

TP06 Spoil

TP07 Sidewall

TP07 Spoil

TP08 Sidewall

TP08 Spoil

TP09 Sidewall

TP09 Spoil

TP10 Sidewall

TP10 Spoil

TP11 Sidewall

TP11 Spoil

TP12 Sidewall

TP12 Spoil

TP13 Sidewall

TP13 Spoil

TP14 Sidewall

TP14 Spoil

TP15 Sidewall

TP15 Spoil

TP16 Sidewall

TP16 Spoil

TP17 Sidewall

TP17 Spoil

TP18 Sidewall

TP18 Spoil

TP19 Sidewall

TP19 Spoil

TP20 Sidewall

TP20 Spoil

TP21 Sidewall

TP21 Spoil

TP22 Sidewall

TP22 Spoil

TP23 Sidewall

TP23 Spoil

TP24 Sidewall

TP24 Spoil

TP25 Sidewall

TP25 Spoil

TP26 Sidewall

TP26 Spoil

TP27 Sidewall

TP27 Spoil

TP29 Sidewall

TP29 Spoil

TP30 Sidewall

TP30 Spoil

TP31 Sidewall

TP31 Spoil

TP32 Sidewall

TP32 Spoil

TP33 Sidewall

TP33 Spoil

TP34 Sidewall

TP34 Spoil

TP35 Sidewall

TP35 Spoil

TP35A Sidewall

TP35A Spoil

TP36 Sidewall

TP36 Spoil

TP37 Sidewall

TP37 Spoil

TP38 Sidewall

TP38 Spoil

TP39 Sidewall

TP39 Spoil

TP40 Sidewall

TP40 Spoil

TP41 Sidewall

TP41 Spoil

Appendix 3

Soakaway Test Results

SOAKAWAY TEST

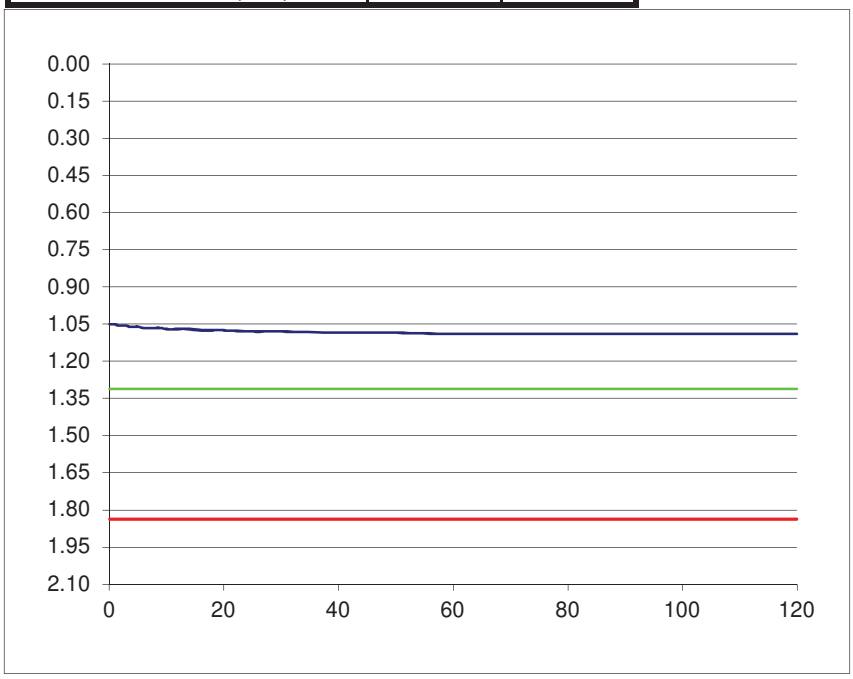
Project Reference:	5599
Contract name:	Millers Glen - Phase 5
Location:	Swords, Co. Dublin
Test No:	SA01
Date:	16/05/2019

Ground Conditions

From	To	
0.00	0.20	MADE GROUND: grey silty sandy gravel (Cl. 804).
0.20	0.40	Firm light brown slightly sandy gravelly silty CLAY.
0.40	2.10	Firm becoming stiff grey brown slightly sandy gravelly silty CLAY with medium cobble content.

Elapsed Time (mins)	Fall of Water (m)
0	1.05
0.5	1.05
1	1.05
1.5	1.06
2	1.06
2.5	1.06
3	1.06
3.5	1.06
4	1.06
4.5	1.06
5	1.06
6	1.07
7	1.07
8	1.07
9	1.07
10	1.07
12	1.07
14	1.07
16	1.08
18	1.08
20	1.08
25	1.08
30	1.08
40	1.09
50	1.09
60	1.09
75	1.09
90	1.09
120	1.09

Pit Dimensions (m)		
Length (m)	2.60	m
Width (m)	0.70	m
Depth	2.10	m
Water		
Start Depth of Water	1.05	m
Depth of Water	1.05	m
75% Full	1.31	m
25% Full	1.84	m
75%-25%	0.53	m
Volume of water (75%-25%)	**0.96**	m3
Area of Drainage	**13.86**	m2
Area of Drainage (75%-25%)	**5.285**	m2
Time		
75% Full	N/A	min
25% Full	N/A	min
Time 75% to 25%	**N/A**	min
Time 75% to 25% (sec)	**N/A**	sec



f = **Fail** or **Fail**

m/min **m/s**

SOAKAWAY TEST

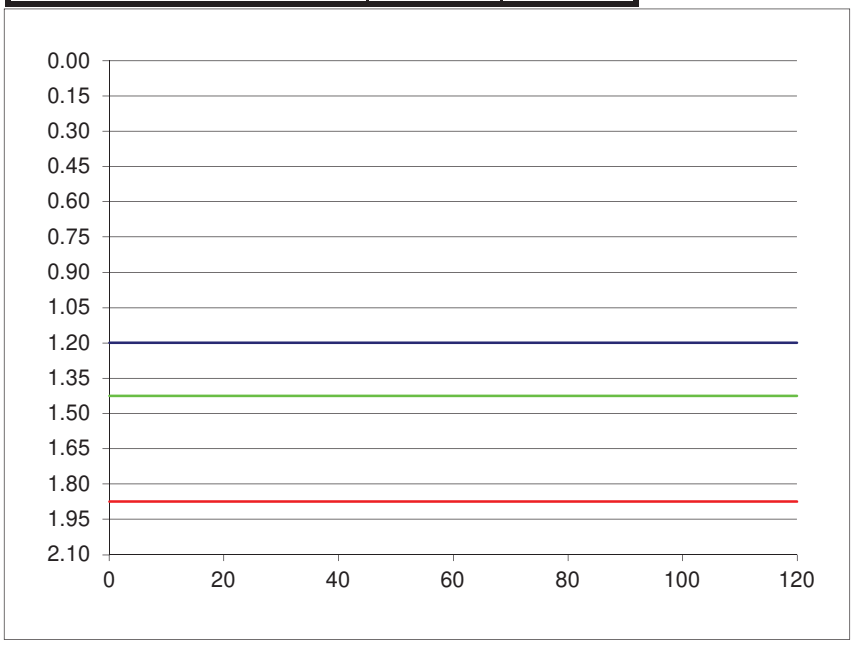
Project Reference:	5599
Contract name:	Millers Glen - Phase 5
Location:	Swords, Co. Dublin
Test No:	SA02
Date:	14/05/2019

Ground Conditions

From	To	
0.00	0.30	MADE GROUND: light brown slightly sandy gravelly silty clay with low cobble content and some plastic pipe fragments.
0.30	1.40	MADE GROUND: brown slightly sandy gravelly silty clay with low cobble content and some gravel laminas.
1.40	2.10	Firm brown slightly sandy gravelly silty CLAY with low cobble content.

Elapsed Time (mins)	Fall of Water (m)
0	1.20
0.5	1.20
1	1.20
1.5	1.20
2	1.20
2.5	1.20
3	1.20
3.5	1.20
4	1.20
4.5	1.20
5	1.20
6	1.20
7	1.20
8	1.20
9	1.20
10	1.20
12	1.20
14	1.20
16	1.20
18	1.20
20	1.20
25	1.20
30	1.20
40	1.20
50	1.20
60	1.20
75	1.20
90	1.20
120	1.20

Pit Dimensions (m)		
Length (m)	2.40	m
Width (m)	0.70	m
Depth	2.10	m
Water		
Start Depth of Water	1.20	m
Depth of Water	0.90	m
75% Full	1.43	m
25% Full	1.88	m
75%-25%	0.45	m
Volume of water (75%-25%)	**0.76**	m3
Area of Drainage	**13.02**	m2
Area of Drainage (75%-25%)	**4.47**	m2
Time		
75% Full	N/A	min
25% Full	N/A	min
Time 75% to 25%	**N/A**	min
Time 75% to 25% (sec)	**N/A**	sec



f = Fail (m/min) or **Fail** (m/s)

SOAKAWAY TEST

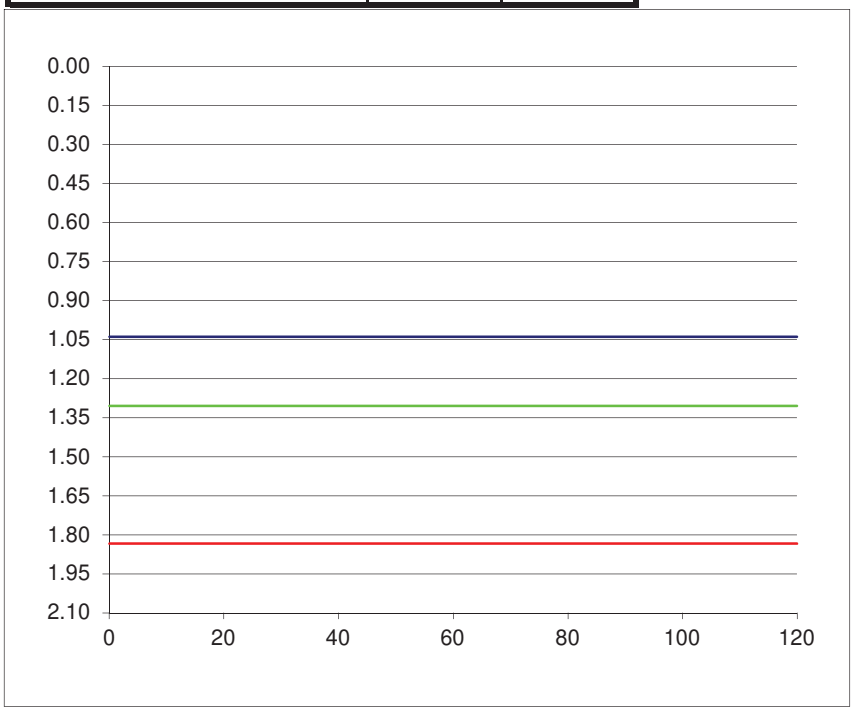
Project Reference:	5599
Contract name:	Millers Glen - Phase 5
Location:	Swords, Co. Dublin
Test No:	SA03
Date:	15/05/2019

Ground Conditions

From	To	
0.00	0.30	Firm light brown slightly sandy gravelly silty CLAY with low cobble content.
0.30	2.10	Firm becoming stiff grey brown slightly sandy gravelly silty CLAY with low cobble content.

Elapsed Time (mins)	Fall of Water (m)
0	1.04
0.5	1.04
1	1.04
1.5	1.04
2	1.04
2.5	1.04
3	1.04
3.5	1.04
4	1.04
4.5	1.04
5	1.04
6	1.04
7	1.04
8	1.04
9	1.04
10	1.04
12	1.04
14	1.04
16	1.04
18	1.04
20	1.04
25	1.04
30	1.04
40	1.04
50	1.04
60	1.04
75	1.04
90	1.04
120	1.04

Pit Dimensions (m)		
Length (m)	2.50	m
Width (m)	0.70	m
Depth	2.10	m
Water		
Start Depth of Water	1.04	m
Depth of Water	1.06	m
75% Full	1.31	m
25% Full	1.84	m
75%-25%	0.53	m
Volume of water (75%-25%)	**0.93**	m3
Area of Drainage	**13.44**	m2
Area of Drainage (75%-25%)	**5.142**	m2
Time		
75% Full	N/A	min
25% Full	N/A	min
Time 75% to 25%	**N/A**	min
Time 75% to 25% (sec)	**N/A**	sec



f = **Fail** or **Fail**

m/min **m/s**

SOAKAWAY TEST

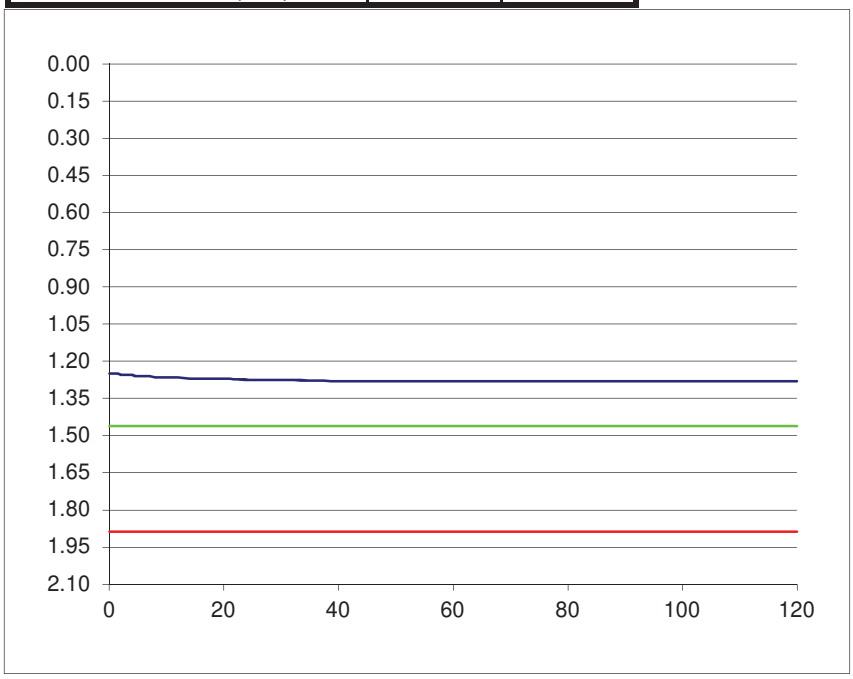
Project Reference:	5599
Contract name:	Millers Glen - Phase 5
Location:	Swords, Co. Dublin
Test No:	SA04
Date:	15/05/2019

Ground Conditions

From	To	
0.00	1.80	Firm becoming stiff grey brown slightly sandy gravelly silty CLAY with medium cobble content.
1.80	2.10	Very stiff black slightly sandy gravelly silty CLAY with medium cobble and low boulder content.

Elapsed Time (mins)	Fall of Water (m)
0	1.25
0.5	1.25
1	1.25
1.5	1.25
2	1.26
2.5	1.26
3	1.26
3.5	1.26
4	1.26
4.5	1.26
5	1.26
6	1.26
7	1.26
8	1.27
9	1.27
10	1.27
12	1.27
14	1.27
16	1.27
18	1.27
20	1.27
25	1.28
30	1.28
40	1.28
50	1.28
60	1.28
75	1.28
90	1.28
120	1.28

Pit Dimensions (m)		
Length (m)	2.30	m
Width (m)	0.70	m
Depth	2.10	m
Water		
Start Depth of Water	1.25	m
Depth of Water	0.85	m
75% Full	1.46	m
25% Full	1.89	m
75%-25%	0.43	m
Volume of water (75%-25%)	**0.68**	m3
Area of Drainage	**12.6**	m2
Area of Drainage (75%-25%)	**4.16**	m2
Time		
75% Full	N/A	min
25% Full	N/A	min
Time 75% to 25%	**N/A**	min
Time 75% to 25% (sec)	**N/A**	sec



f = **Fail** m/min or **Fail** m/s

SOAKAWAY TEST

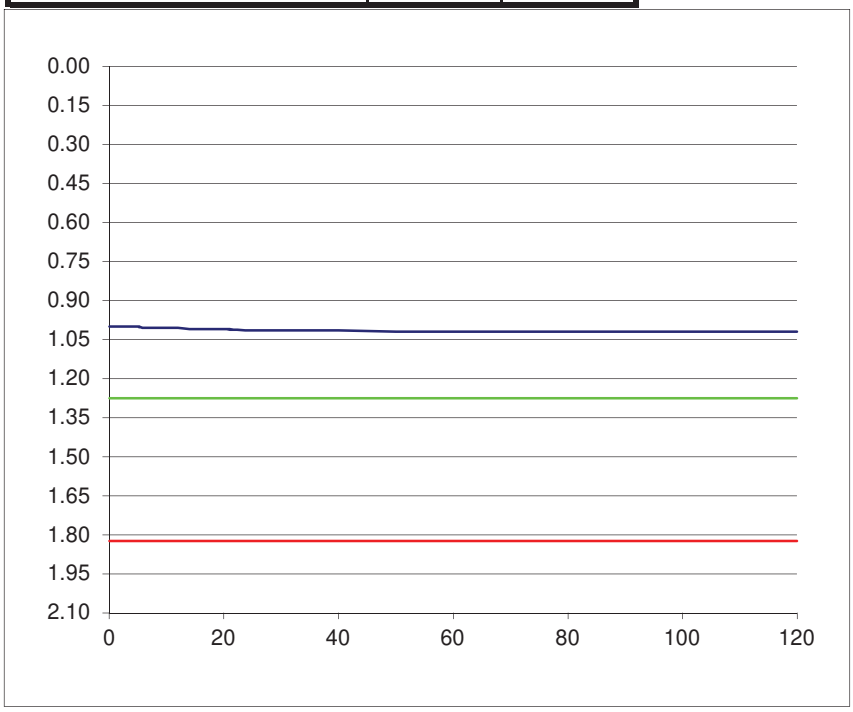
Project Reference:	5599
Contract name:	Millers Glen - Phase 5
Location:	Swords, Co. Dublin
Test No:	SA05
Date:	15/05/2019

Ground Conditions

From	To	
0.00	0.20	Firm brown slightly sandy gravelly silty CLAY.
0.20	2.10	Firm becoming stiff grey brown slightly sandy gravelly silty CLAY with medium cobble content.

Elapsed Time (mins)	Fall of Water (m)
0	1.00
0.5	1.00
1	1.00
1.5	1.00
2	1.00
2.5	1.00
3	1.00
3.5	1.00
4	1.00
4.5	1.00
5	1.00
6	1.01
7	1.01
8	1.01
9	1.01
10	1.01
12	1.01
14	1.01
16	1.01
18	1.01
20	1.01
25	1.02
30	1.02
40	1.02
50	1.02
60	1.02
75	1.02
90	1.02
120	1.02

Pit Dimensions (m)		
Length (m)	2.50	m
Width (m)	0.70	m
Depth	2.10	m
Water		
Start Depth of Water	1.00	m
Depth of Water	1.10	m
75% Full	1.28	m
25% Full	1.83	m
75%-25%	0.55	m
Volume of water (75%-25%)	**0.96**	m3
Area of Drainage	**13.44**	m2
Area of Drainage (75%-25%)	**5.27**	m2
Time		
75% Full	N/A	min
25% Full	N/A	min
Time 75% to 25%	**N/A**	min
Time 75% to 25% (sec)	**N/A**	sec



f = Fail m/min or **Fail** m/s

SOAKAWAY TEST

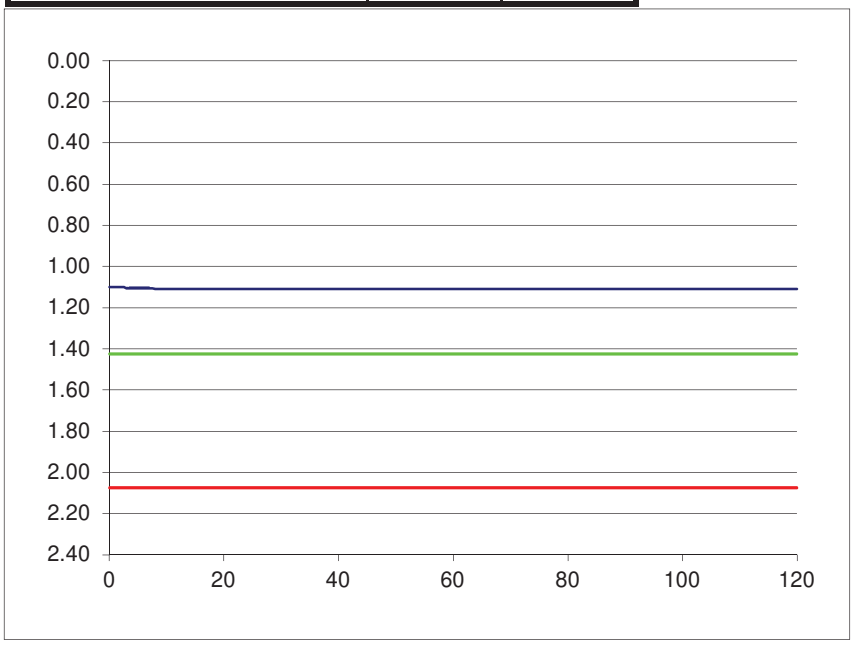
Project Reference:	5599
Contract name:	Millers Glen - Phase 5
Location:	Swords, Co. Dublin
Test No:	SA06
Date:	14/05/2019

Ground Conditions

From	To	
0.00	0.20	MADE GROUND: grey brown sandy gravelly silty clay with medium cobble content and some tree roots.
0.20	2.10	Firm brown slightly sandy slightly gravelly silty CLAY with low cobble content.
2.10	2.30	Dark grey silty sandy GRAVEL with low cobble content.
2.30	2.40	Firm brown slightly sandy slightly gravelly silty CLAY with low cobble content.

Elapsed Time (mins)	Fall of Water (m)
0	1.10
0.5	1.10
1	1.10
1.5	1.10
2	1.10
2.5	1.10
3	1.11
3.5	1.11
4	1.11
4.5	1.11
5	1.11
6	1.11
7	1.11
8	1.11
9	1.11
10	1.11
12	1.11
14	1.11
16	1.11
18	1.11
20	1.11
25	1.11
30	1.11
40	1.11
50	1.11
60	1.11
75	1.11
90	1.11
120	1.11

Pit Dimensions (m)		
Length (m)	2.10	m
Width (m)	0.70	m
Depth	2.40	m
Water		
Start Depth of Water	1.10	m
Depth of Water	1.30	m
75% Full	1.43	m
25% Full	2.08	m
75%-25%	0.65	m
Volume of water (75%-25%)	**0.96**	m3
Area of Drainage	**13.44**	m2
Area of Drainage (75%-25%)	**5.11**	m2
Time		
75% Full	N/A	min
25% Full	N/A	min
Time 75% to 25%	**N/A**	min
Time 75% to 25% (sec)	**N/A**	sec



f = **Fail** or **Fail**

m/min **m/s**

Appendix 4

Geotechnical Laboratory Test Results

Classification Tests in accordance with BS1377: Part 4

Client	Gannon Homes Ltd.
Site	Millers Glen - Phase 5
S.I. File No	5599 / 19
Test Lab	Site Investigations Ltd., Carhugar The Grange, 12th Lock Rd., Lucan Co. Dublin. Tel (01) 6108768 Email info@siteinvestigations.ie
Report Date	7th June 2019

Hole ID	Depth	Sample No	Lab Ref No.	Sample Type	Natural Moisture Content %	Liquid Limit %	Plastic Limit %	Plastic Index %	Min. Dry Density Mg/m^3	Particle Density Mg/m^3	% passing 425um	Comments	**Remarks** **C**=Clay; **M**=Silt **Plasticity**: **L**=Low; **I**=Intermediate; **H**=High; **V**=Very High; **E**=Extremely High
TP01	1.00	MK01	19/755	B	15.4	36	22	14			54.3		CI
TP10	2.50	MK67	19/756	B	10.4	33	23	10			31.0		CL
TP15	1.00	MK50	19/757	B	13.1	35	21	14			39.2		CL
TP27	1.00	MK26	19/758	B	14.7	35	23	12			46.9		CL/CI
TP37	1.00	MK85	19/759	B	10.5	34	20	14			46.1		CL

Printed 20/06/2019

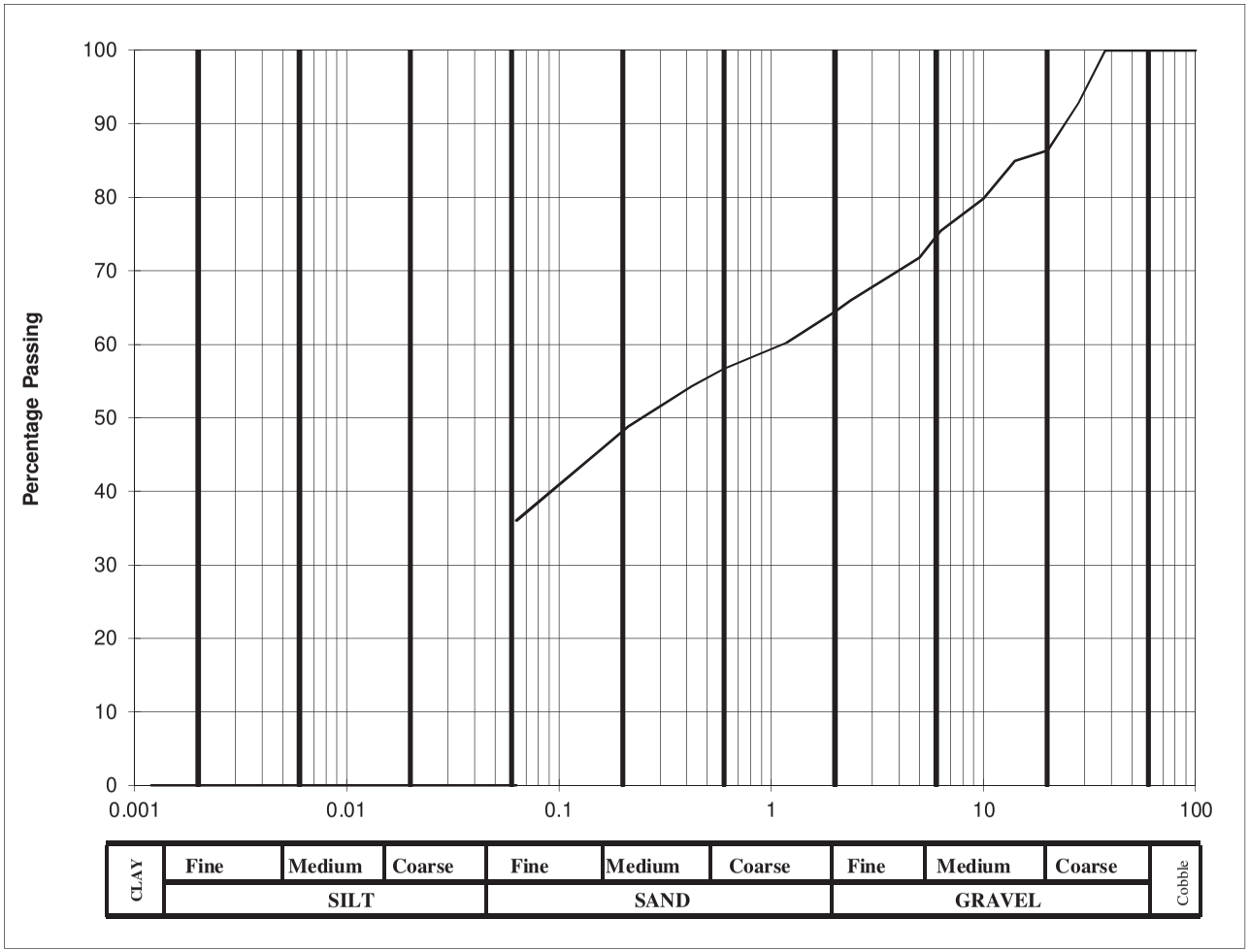
_____Paddy McGonagle
Site Investigations Ltd

BS 1377 Particle Size Analysis

Site Investigations Limited

BS Sieve size, mm	Percent passing	Hydrometer analysis	
		Diameter, mm	% passing
100	100	**0.0630**	
90	100	**0.0200**	
75	100	**0.0060**	
63	100	**0.0020**	
50	100		
37.5	100		
28	92.8		
20	86.3		
14	84.9		
10	79.8		
6.3	75.4		
5.0	71.8		
2.36	66		
2.00	64.4		
1.18	60.2		
0.600	56.7		
0.425	54.3		
0.300	51.6		
0.212	48.8		
0.150	45.2		
0.063	36		

Cobbles, %	0
Gravel, %	36
Sand, %	28
Clay / Silt, %	36



Client :	Gannon Homes Ltd.	Lab. No :	19/755	Hole ID :	TP 01
Project :	Millers Glen - Phase 5	Sample No :	MK01	Depth, m :	1.00

Material description :	slightly sandy gravelly silty CLAY
Remarks :	Soils with clay or silt content between 15% - 35% can be classified as clay or silt depending on the field Engineers assessment of in-situ behaviour. Where material is for re-use and therefore disturbed, only soils with clay or silt >35% are classified as clay or silt

Printed 20/06/2019

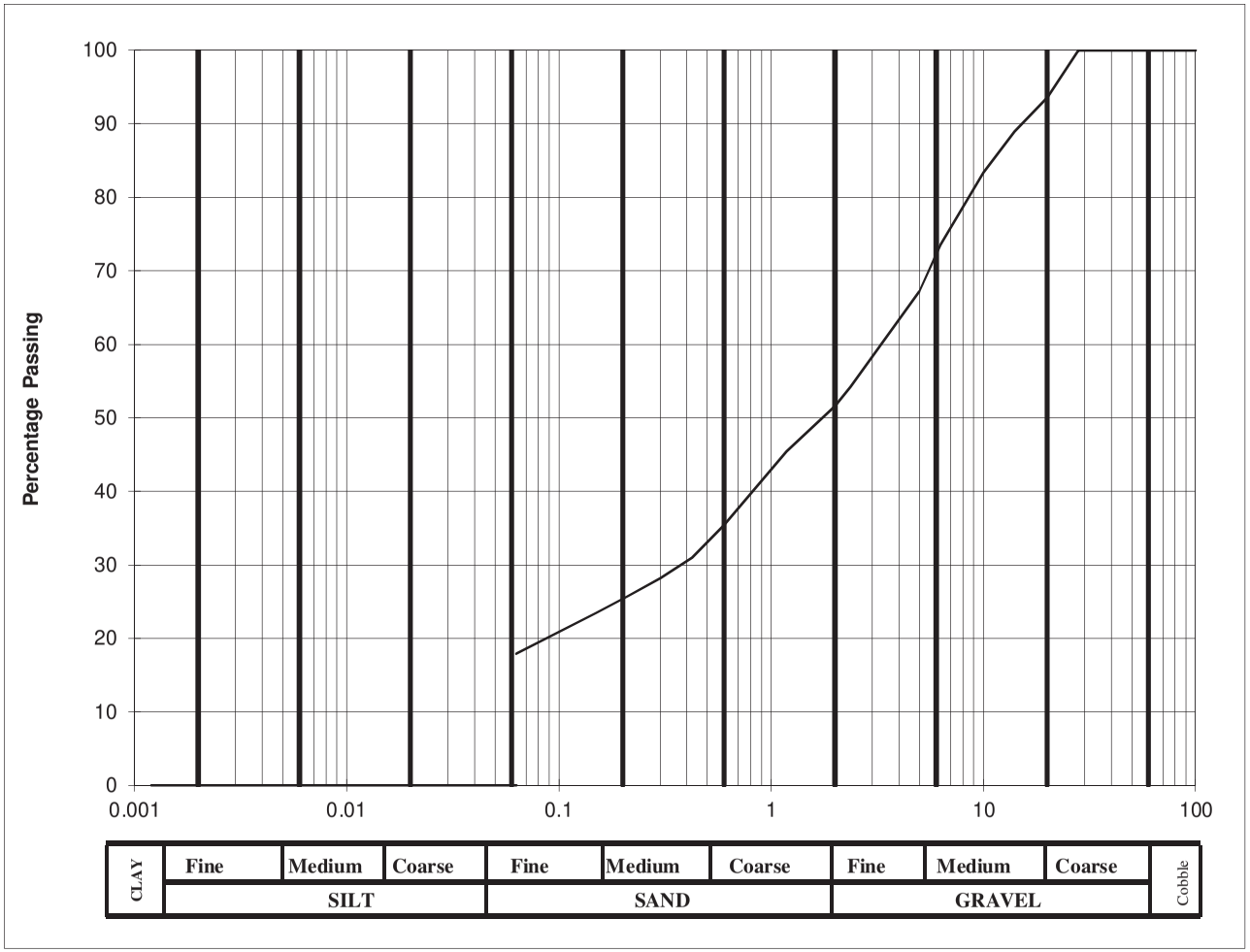
_____Paddy McGonagle
Site Investigations Ltd

BS 1377 Particle Size Analysis

Site Investigations Limited

BS Sieve size, mm	Percent passing	Hydrometer analysis	
		Diameter, mm	% passing
100	100	**0.0630**	
90	100	**0.0200**	
75	100	**0.0060**	
63	100	**0.0020**	
50	100		
37.5	100		
28	100		
20	93.6		
14	88.9		
10	83.4		
6.3	73.6		
5.0	67.2		
2.36	54.2		
2.00	51.6		
1.18	45.4		
0.600	35.4		
0.425	31		
0.300	28.2		
0.212	25.7		
0.150	23.5		
0.063	18		

Cobbles, %	0
Gravel, %	48
Sand, %	34
Clay / Silt, %	18



Client :	Gannon Homes Ltd.	Lab. No :	19/756	Hole ID :	TP 10
Project :	Millers Glen - Phase 5	Sample No :	MK67	Depth, m :	2.50

Material description :	slightly sandy gravelly silty CLAY
Remarks :	Soils with clay or silt content between 15% - 35% can be classified as clay or silt depending on the field Engineers assessment of in-situ behaviour. Where material is for re-use and therefore disturbed, only soils with clay or silt >35% are classified as clay or silt

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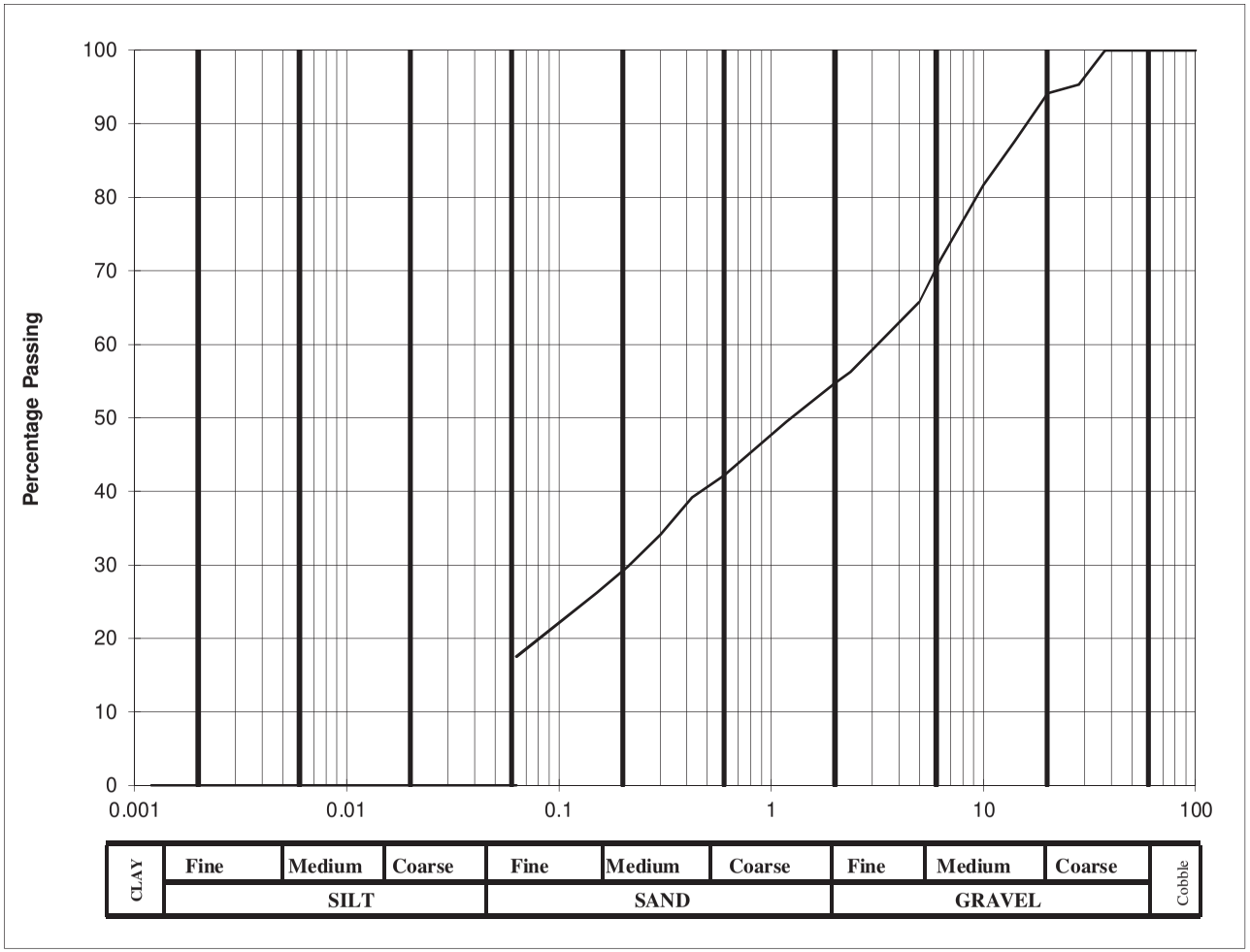
Site Investigations Ltd

BS 1377 Particle Size Analysis

Site Investigations Limited

BS Sieve size, mm	Percent passing	Hydrometer analysis	
		Diameter, mm	% passing
100	100	**0.0630**	
90	100	**0.0200**	
75	100	**0.0060**	
63	100	**0.0020**	
50	100		
37.5	100		
28	95.3		
20	94.1		
14	87.6		
10	81.7		
6.3	71.5		
5.0	65.8		
2.36	56.2		
2.00	54.7		
1.18	49.5		
0.600	42.1		
0.425	39.2		
0.300	34.1		
0.212	29.8		
0.150	26.2		
0.063	18		

Cobbles, %	0
Gravel, %	45
Sand, %	37
Clay / Silt, %	18



Client :	Gannon Homes Ltd.	Lab. No :	19/757	Hole ID :	TP 15
Project :	Millers Glen - Phase 5	Sample No :	MK50	Depth, m :	1.00

Material description :	sandy gravelly silty CLAY
Remarks :	Soils with clay or silt content between 15% - 35% can be classified as clay or silt depending on the field Engineers assessment of in-situ behaviour. Where material is for re-use and therefore disturbed, only soils with clay or silt >35% are classified as clay or silt

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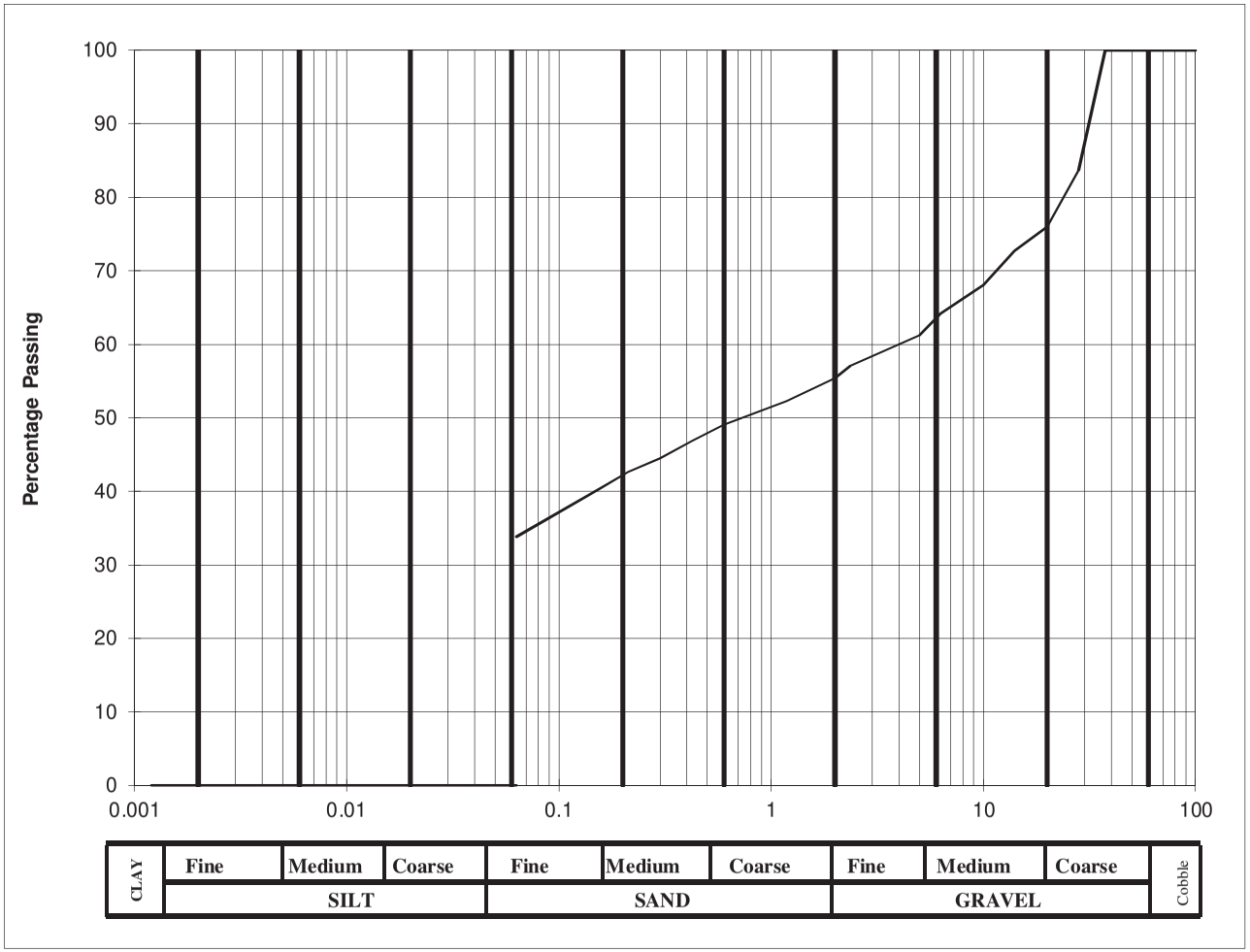
Site Investigations Ltd

BS 1377 Particle Size Analysis

Site Investigations Limited

BS Sieve size, mm	Percent passing	Hydrometer analysis	
		Diameter, mm	% passing
100	100	**0.0630**	
90	100	**0.0200**	
75	100	**0.0060**	
63	100	**0.0020**	
50	100		
37.5	100		
28	83.6		
20	76		
14	72.7		
10	68.1		
6.3	64.2		
5.0	61.2		
2.36	57.1		
2.00	55.4		
1.18	52.3		
0.600	49.1		
0.425	46.9		
0.300	44.5		
0.212	42.6		
0.150	40.1		
0.063	34		

Cobbles, %	0
Gravel, %	45
Sand, %	21
Clay / Silt, %	34



Client :	Gannon Homes Ltd.
Project :	Millers Glen - Phase 5

Lab. No :	19/758
Sample No :	MK26

Hole ID :	TP 27
Depth, m :	1.00

Material description :	slightly sandy gravelly silty CLAY
Remarks :	Soils with clay or silt content between 15% - 35% can be classified as clay or silt depending on the field Engineers assessment of in-situ behaviour. Where material is for re-use and therefore disturbed, only soils with clay or silt >35% are classified as clay or silt

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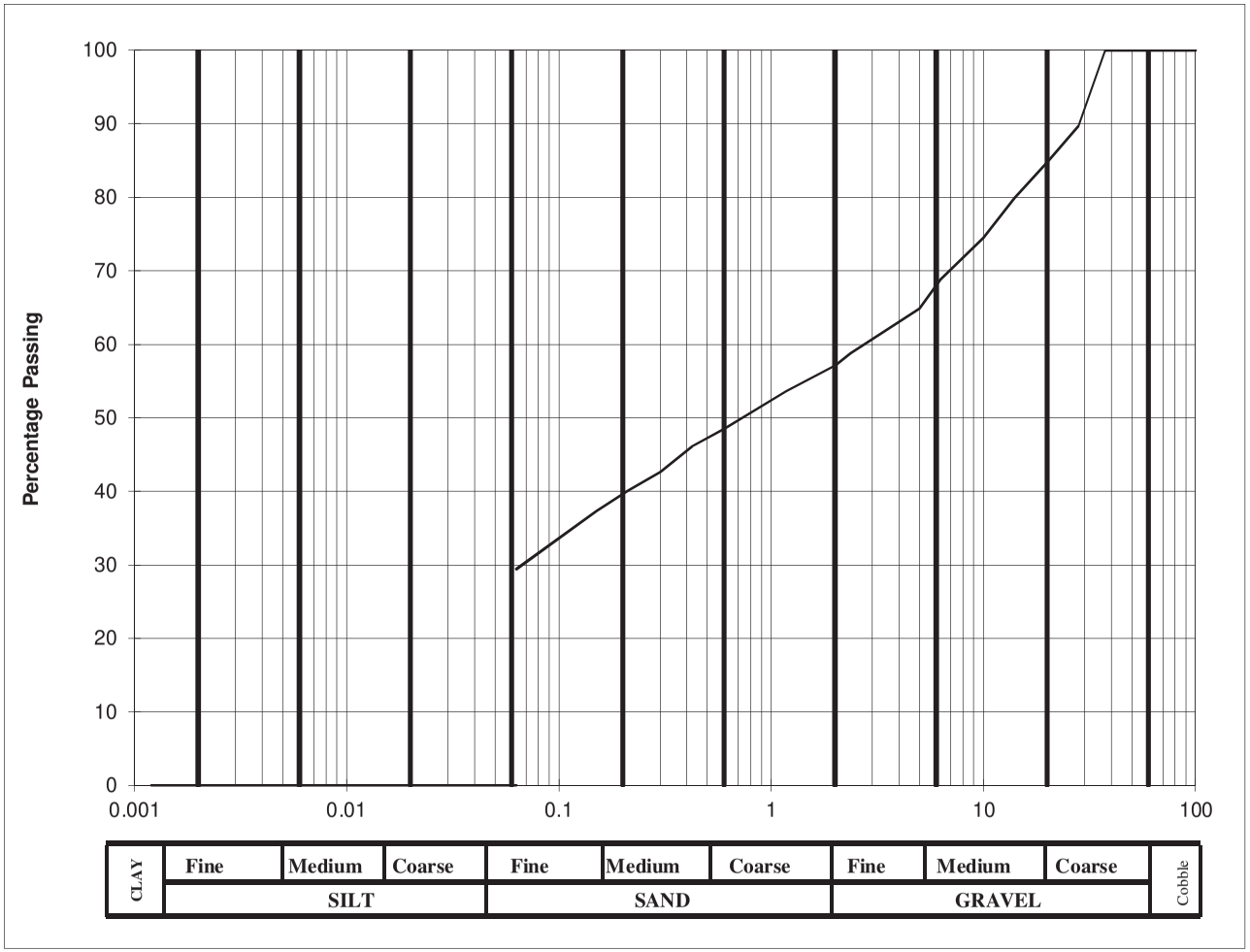
Site Investigations Ltd

BS 1377 Particle Size Analysis

Site Investigations Limited

BS Sieve size, mm	Percent passing	Hydrometer analysis	
		Diameter, mm	% passing
100	100	**0.0630**	
90	100	**0.0200**	
75	100	**0.0060**	
63	100	**0.0020**	
50	100		
37.5	100		
28	89.7		
20	84.8		
14	79.9		
10	74.5		
6.3	68.8		
5.0	64.9		
2.36	58.8		
2.00	57.1		
1.18	53.6		
0.600	48.5		
0.425	46.1		
0.300	42.6		
0.212	40.1		
0.150	37.3		
0.063	29		

Cobbles, %	0
Gravel, %	43
Sand, %	28
Clay / Silt, %	29



Client :	Gannon Homes Ltd.
Project :	Millers Glen - Phase 5

Lab. No :	19/759
Sample No :	MK85

Hole ID :	TP 37
Depth, m :	1.00

Material description :	slightly sandy gravelly silty CLAY
Remarks :	Soils with clay or silt content between 15% - 35% can be classified as clay or silt depending on the field Engineers assessment of in-situ behaviour. Where material is for re-use and therefore disturbed, only soils with clay or silt >35% are classified as clay or silt

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Site Investigations Ltd

California Bearing Ratio (CBR) In accordance with BS1377: Part 4: Method 7

Client	Gannon Homes Ltd.
Site	Millers Glen - Phase 5
S.I. File No	5599 / 19
Test Lab	Site Investigations Ltd., Carhugar The Grange, 12th Lock Rd., Lucan Co. Dublin. Tel (01) 6108768 Email info@siteinvestigations.ie
Report Date	13th June 2019

CBR No	Depth (mBGL)	Sample No	Sample Type	Lab Ref	Moisture Content (%)	CBR Value (%)	Location / Remarks
CBR01	0.50	MK100	CBR	19/760	12.3	12.7	
CBR02	0.50	MK101	CBR	19/761	11.6	9.3	Sample taken from TP41
CBR03	0.50	MK102	CBR	19/762	14.2	8.6	Sample taken from TP39
CBR04	0.50	MK103	CBR	19/763	12.7	7.7	Sample taken from TP38
CBR05	0.50	MK104	CBR	19/764	10.5	9.4	
CBR06	0.50	MK105	CBR	19/765	13.7	14.0	
CBR07	0.50	MK106	CBR	19/766	15.7	5.8	
CBR08	0.50	MK107	CBR	19/767	20.3	6.1	
CBR09	0.50	MK108	CBR	19/768	11.1	9.7	
CBR10	0.50	MK109	CBR	19/769	26.7	8.1	
CBR11	0.50	MK110	CBR	19/770	13.8	8.9	Sample taken from TP33
CBR12	0.50	MK111	CBR	19/771	17.4	7.7	Sample taken from TP28
CBR13	0.50	MK112	CBR	19/772	15.7	13.2	
CBR14	0.50	MK113	CBR	19/773	13.7	7.7	Sample taken from TP24
CBR15	0.50	MK114	CBR	19/774	12.8	8.1	
CBR16	0.50	MK115	CBR	19/775	17.4	7.3	Sample taken from TP29
CBR17	0.50	MK116	CBR	19/776	10.0	7.3	
CBR18	0.50	MK117	CBR	19/777	14.6	7.7	
CBR19	0.50	MK118	CBR	19/778	11.0	7.3	Sample taken from TP03
CBR20	0.50	MK119	CBR	19/779	12.1	7.8	Sample taken from TP04
CBR21	0.50	MK120	CBR	19/780	12.4	6.9	Sample taken from TP18
CBR22	0.50	MK121	CBR	19/781	31.2	6.2	Sample taken from TP16
CBR23	0.50	MK122	CBR	19/782	20.5	6.9	

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Site Investigations Ltd

California Bearing Ratio (CBR) In accordance with BS1377: Part 4: Method 7

Client	Gannon Homes Ltd.
Site	Millers Glen - Phase 5
S.I. File No	5599 / 19
Test Lab	Site Investigations Ltd., Carhugar The Grange, 12th Lock Rd., Lucan Co. Dublin. Tel (01) 6108768 Email info@siteinvestigations.ie
Report Date	13th June 2019

CBR No	Depth (mBGL)	Sample No	Sample Type	Lab Ref	Moisture Content (%)	CBR Value (%)	Location / Remarks
CBR24	0.50	MK123	CBR	19/783	18.4	7.2	
CBR25	0.50	MK124	CBR	19/784	21.4	4.7	
CBR26	0.50	MK125	CBR	19/785	12.5	8.6	
CBR27	0.50	MK126	CBR	19/786	17.8	6.4	Sample taken from TP14
CBR28	0.50	MK127	CBR	19/787	9.0	11.6	Sample taken from TP09
CBR29	0.50	MK128	CBR	19/788	11.0	7.9	Sample taken from TP05
CBR30	0.50	MK129	CBR	19/789	12.0	7.4	
CBR31	0.50	MK130	CBR	19/790	11.6	8.1	Sample taken from TP07
CBR32	0.50	MK131	CBR	19/791	15.6	4.2	
CBR33	0.50	MK132	CBR	19/792	15.2	3.8	Sample taken from TP11
CBR34	0.50	MK133	CBR	19/793	13.6	5.3	Sample taken from TP10
CBR35	0.50	MK134	CBR	19/794	12.1	8.3	
CBR36	0.50	MK135	CBR	19/795	20.7	6.5	
CBR37	0.50	MK136	CBR	19/796	13.3	5.3	Sample taken from TP13

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Site Investigations Ltd

Chemical Testing
In accordance with BS 1377: Part 3

Client	Gannon Homes Ltd.
Site	Millers Glen - Phase 5
S.I. File No	5599 / 19
Test Lab	Site Investigations Ltd., Carhugar The Grange, 12th Lock Rd., Lucan Co. Dublin. Tel (01) 6108768 Email:info@siteinvestigations.ie
Report Date	7th June 2019

Hole Id	Depth (mBGL)	Sample No	Lab Ref	pH Value	Water Soluble Sulphate Content (2:1 Water-soil extract) (SO_3) g/L	Water Soluble Sulphate Content (2:1 Water-soil extract) (SO_3) %	Loss on Ignition (Organic Content) %	Chloride ion Content (water:soil ratio 2:1) %	% passing 2mm	Remarks
TP01	1.00	MK01	19/755	7.96	0.116	0.075		0.19	64.4	
TP10	2.50	MK67	19/756	7.89	0.130	0.067		0.18	51.6	
TP15	1.00	MK50	19/757	7.96	0.126	0.069		0.21	54.7	
TP27	1.00	MK26	19/758	8.07	0.123	0.068		0.17	55.4	
TP37	1.00	MK85	19/759	8.01	0.117	0.067		0.19	57.1	

Printed 20/06/2019

_____Paddy McGonagle
Site Investigations Ltd.

Appendix 5

Environmental Laboratory Test Results

Unit 7-8 Hawarden Business Park
Manor Road (off Manor Lane)
Hawarden
Deeside
CH5 3US
Tel: (01244) 528700
Fax: (01244) 528701
email: hawardencustomerservices@alsglobal.com
Website: www.alsenvironmental.co.uk

Site Investigations Ltd
The Grange
Carhugar
12th Lock Road
Lucan
Co. Dublin

Attention: Stephen Letch

CERTIFICATE OF ANALYSIS

Date of report Generation:	29 May 2019
Customer:	Site Investigations Ltd
Sample Delivery Group (SDG):	190521-93
Your Reference:	5599
Location:	Millers Glen - Phase 5
Report No:	507840

We received 5 samples on Tuesday May 21, 2019 and 5 of these samples were scheduled for analysis which was completed on Wednesday May 29, 2019. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden (Method codes TM) or ALS Life Sciences Ltd Aberdeen (Method codes S).

All sample data is provided by the customer. The reported results relate to the sample supplied, and on the basis that this data is correct.
Incorrect sampling dates and/or sample information will affect the validity of results.
The customer is not permitted to reproduce this report except in full without the approval of the laboratory.

Approved By:

Sonia McWhan

Operations Manager

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
19996776	CBR6		0.50 - 0.50	20/05/2019
19996774	TP6		0.50 - 0.50	20/05/2019
19996775	TP14		0.50 - 0.50	20/05/2019
19996779	TP29		0.50 - 0.50	20/05/2019
19996778	TP34		0.30 - 0.30	20/05/2019

Maximum Sample/Coolbox Temperature (°C) : **10.6**

ISO5667-3 Water quality - Sampling - Part3 -
During Transportation samples shall be stored in a cooling device capable of maintaining a temperature of (5±3)°C.

ALS have data which show that a cool box with 4 frozen icepacks is capable of maintaining pre-chilled samples at a temperature of (5±3)°C for a period of up to 24hrs.

Only received samples which have had analysis scheduled will be shown on the following pages.

Validated

CERTIFICATE OF ANALYSIS

SDG:	190521-93	**Client Reference:**	5599	**Report Number:**	507840
Location:	Millers Glen - Phase 5	**Order Number:**	46/A/19	**Superseded Report:**	

Results Legend

X Test

N No Determination Possible

Sample Types -

S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

Lab Sample No(s)			19996776			19996774			19996775			19996779			19996778		
Customer Sample Reference			CBR6			TP6			TP14			TP29			TP34		
AGS Reference																	
Depth (m)			0.50 - 0.50			0.50 - 0.50			0.50 - 0.50			0.50 - 0.50			0.30 - 0.30		
Container			1kg TUB	250g Amber Jar (ALE210)	60g VOC (ALE215)	1kg TUB	250g Amber Jar (ALE210)	60g VOC (ALE215)	1kg TUB	250g Amber Jar (ALE210)	60ml Amber Glass Jar	1kg TUB	250g Amber Jar (ALE210)	60g VOC (ALE215)	1kg TUB	250g Amber Jar (ALE210)	60g VOC (ALE215)
Sample Type			S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Anions by Kone (w)	All	NDPs: 0 Tests: 5	X			X			X			X			X		
Asbestos ID in Solid Samples	All	NDPs: 0 Tests: 1				X											
CEN Readings	All	NDPs: 0 Tests: 5	X			X			X			X			X		
Chromium III	All	NDPs: 0 Tests: 5		X			X			X			X			X	
Coronene	All	NDPs: 0 Tests: 5		X			X			X			X			X	
Dissolved Metals by ICP-MS	All	NDPs: 0 Tests: 5	X			X			X			X			X		
Dissolved Organic/Inorganic Carbon	All	NDPs: 0 Tests: 5	X			X			X			X			X		
EPH CWG (Aliphatic) GC (S)	All	NDPs: 0 Tests: 5		X			X			X			X			X	
EPH CWG (Aromatic) GC (S)	All	NDPs: 0 Tests: 5		X			X			X			X			X	
Fluoride	All	NDPs: 0 Tests: 5	X			X			X			X			X		
GRO by GC-FID (S)	All	NDPs: 0 Tests: 5			X			X			X			X			X
Hexavalent Chromium (s)	All	NDPs: 0 Tests: 5		X			X			X			X			X	
Loss on Ignition in soils	All	NDPs: 0 Tests: 5		X			X			X			X			X	
Mercury Dissolved	All	NDPs: 0 Tests: 5	X			X			X			X			X		
Metals in solid samples by OES	All	NDPs: 0 Tests: 5		X			X			X			X			X	

Validated

CERTIFICATE OF ANALYSIS

SDG:	190521-93	**Client Reference:**	5599	**Report Number:**	507840
Location:	Millers Glen - Phase 5	**Order Number:**	46/A/19	**Superseded Report:**	

Results Legend

X Test

N No Determination Possible

Sample Types -

S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

Lab Sample No(s)				19996776				19996774				19996775				19996779				19996778
Customer Sample Reference				CBR6				TP6				TP14				TP29				TP34
AGS Reference																				
Depth (m)				0.50 - 0.50				0.50 - 0.50				0.50 - 0.50				0.50 - 0.50				0.30 - 0.30
Container				1kg TUB	250g Amber Jar (ALE210)	60g VOC (ALE215)		1kg TUB	250g Amber Jar (ALE210)	60g VOC (ALE215)		1kg TUB	250g Amber Jar (ALE210)	60ml Amber Glass Jar		1kg TUB	250g Amber Jar (ALE210)	60g VOC (ALE215)		1kg TUB	250g Amber Jar (ALE210)	60g VOC (ALE215)
Sample Type				S	S	S		S	S	S		S	S	S		S	S	S		S	S	S
Mineral Oil	All	NDPs: 0 Tests: 5			X				X				X				X				X	
PAH by GCMS	All	NDPs: 0 Tests: 5			X				X				X				X				X	
PCBs by GCMS	All	NDPs: 0 Tests: 5			X				X				X				X				X	
Phenols by HPLC (W)	All	NDPs: 0 Tests: 5		X				X				X				X				X		
Sample description	All	NDPs: 0 Tests: 5			X				X				X				X				X	
Total Dissolved Solids on Leachates	All	NDPs: 0 Tests: 5		X				X				X				X				X		
Total Organic Carbon	All	NDPs: 0 Tests: 5			X				X				X				X				X	
TPH CWG GC (S)	All	NDPs: 0 Tests: 5			X				X				X				X				X	
VOC MS (S)	All	NDPs: 0 Tests: 5				X				X				X				X				X

Sample Descriptions

Grain Sizes

very fine	<0.063mm	fine	0.063mm - 0.1mm	medium	0.1mm - 2mm	coarse	2mm - 10mm	very coarse	>10mm

Lab Sample No(s)	Customer Sample Ref.	Depth (m)	Colour	Description	Inclusions	Inclusions 2
19996776	CBR6	0.50 - 0.50	Dark Brown	Sandy Loam	Stones	None
19996774	TP6	0.50 - 0.50	Dark Brown	Silt Loam	Stones	Crushed Brick
19996775	TP14	0.50 - 0.50	Dark Brown	Silt Loam	Stones	Vegetation
19996779	TP29	0.50 - 0.50	Dark Brown	Loamy Sand	Vegetation	Stones
19996778	TP34	0.30 - 0.30	Dark Brown	Loamy Sand	Stones	None

These descriptions are only intended to act as a cross check if sample identities are questioned, and to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions.

We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally ocurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample.

Other coarse granular materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

Validated

CERTIFICATE OF ANALYSIS

SDG:	190521-93	**Client Reference:**	5599	**Report Number:**	507840
Location:	Millers Glen - Phase 5	**Order Number:**	46/A/19	**Superseded Report:**	

Results Legend

#	ISO17025 accredited.
M	mCERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	Subcontracted - refer to subcontractor report for accreditation status.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
(F)	Trigger breach confirmed
1-3+§@	Sample deviation (see appendix)

Customer Sample Ref.			CBR6	TP6	TP14	TP29	TP34
Depth (m)			0.50 - 0.50	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50	0.30 - 0.30
Sample Type			Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
Date Sampled			20/05/2019	20/05/2019	20/05/2019	20/05/2019	20/05/2019
Sample Time			.	.	.	.	.
Date Received			21/05/2019	21/05/2019	21/05/2019	21/05/2019	21/05/2019
SDG Ref			190521-93	190521-93	190521-93	190521-93	190521-93
Lab Sample No.(s)			19996776	19996774	19996775	19996779	19996778
AGS Reference							
Component	**LOD/Units**	**Method**					
Moisture Content Ratio (% of as received sample)	%	PM024	15	10	14	15	6.3
Loss on ignition	<0.7 %	TM018	4.11 M	1.65 M	2.85 M	2.73 M	1.86 M
Mineral oil >C10-C40	<1 mg/kg	TM061	<1	<1	<1	<1	<1
Organic Carbon, Total	<0.2 %	TM132	0.663 M	0.452 M	0.484 M	0.466 M	0.534 M
Chromium, Hexavalent	<0.6 mg/kg	TM151	<0.6 #	<0.6 #	<0.6 #	<0.6 #	<0.6 #
PCB congener 28	<3 µg/kg	TM168	<3 M	<3 M	<3 M	<3 M	<3 M
PCB congener 52	<3 µg/kg	TM168	<3 M	<3 M	<3 M	<3 M	<3 M
PCB congener 101	<3 µg/kg	TM168	<3 M	<3 M	<3 M	<3 M	<3 M
PCB congener 118	<3 µg/kg	TM168	<3 M	<3 M	<3 M	<3 M	<3 M
PCB congener 138	<3 µg/kg	TM168	<3 M	<3 M	<3 M	<3 M	<3 M
PCB congener 153	<3 µg/kg	TM168	<3 M	<3 M	<3 M	<3 M	<3 M
PCB congener 180	<3 µg/kg	TM168	<3 M	<3 M	<3 M	<3 M	<3 M
Sum of detected PCB 7 Congeners	<21 µg/kg	TM168	<21	<21	<21	<21	<21
Chromium, Trivalent	<0.9 mg/kg	TM181	18.7	9.28	11.9	12	<0.9
Antimony	<0.6 mg/kg	TM181	1.88 #	1.73 #	1.86 #	2 #	2.14 #
Arsenic	<0.6 mg/kg	TM181	15 M	12.7 M	13 M	13.9 M	43.9 M
Barium	<0.6 mg/kg	TM181	151 #	137 #	318 #	84 #	122 #
Cadmium	<0.02 mg/kg	TM181	1.93 M	1.27 M	1.52 M	1.33 M	0.222 M
Chromium	<0.9 mg/kg	TM181	18.7 M	9.28 M	11.9 M	12 M	<0.9 M
Copper	<1.4 mg/kg	TM181	29.3 M	28.1 M	30 M	31.3 M	12.9 M
Lead	<0.7 mg/kg	TM181	24.9 M	20.6 M	19.6 M	19.6 M	19.3 M
Mercury	<0.14 mg/kg	TM181	<0.14 M	<0.14 M	<0.14 M	<0.14 M	<0.14 M
Molybdenum	<0.1 mg/kg	TM181	3.37 #	3.52 #	5.36 #	3.11 #	0.422 #
Nickel	<0.2 mg/kg	TM181	48.3 M	36.2 M	37.6 M	38.4 M	31.8 M
Selenium	<1 mg/kg	TM181	<1 #	1 #	<1 #	<1 #	<1 #
Zinc	<1.9 mg/kg	TM181	86.4 M	72.7 M	64.7 M	68.9 M	62.6 M
Coronene	<200 µg/kg	TM410	<200	<200	<200	<200	<200

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CERTIFICATE OF ANALYSIS

SDG:	190521-93	**Client Reference:**	5599	**Report Number:**	507840
Location:	Millers Glen - Phase 5	**Order Number:**	46/A/19	**Superseded Report:**	

PAH by GCMS

Results Legend

#	ISO17025 accredited.
M	mCERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	Subcontracted - refer to subcontractor report for accreditation status.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
(F)	Trigger breach confirmed
1-3+§@	Sample deviation (see appendix)

Customer Sample Ref.			CBR6	TP6	TP14	TP29	TP34	
Depth (m)			0.50 - 0.50	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50	0.30 - 0.30	
Sample Type			Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	
Date Sampled			20/05/2019	20/05/2019	20/05/2019	20/05/2019	20/05/2019	
Sample Time			.	.	.	.	.	
Date Received			21/05/2019	21/05/2019	21/05/2019	21/05/2019	21/05/2019	
SDG Ref			190521-93	190521-93	190521-93	190521-93	190521-93	
Lab Sample No.(s)			19996776	19996774	19996775	19996779	19996778	
AGS Reference								
Component	**LOD/Units**	**Method**						
Naphthalene	<9 µg/kg	TM218	<9 M	<9 M	<9 M	<9 M	<9 M	
Acenaphthylene	<12 µg/kg	TM218	<12 M	<12 M	<12 M	<12 M	<12 M	
Acenaphthene	<8 µg/kg	TM218	<8 M	<8 M	<8 M	<8 M	<8 M	
Fluorene	<10 µg/kg	TM218	<10 M	<10 M	<10 M	<10 M	<10 M	
Phenanthrene	<15 µg/kg	TM218	<15 M	<15 M	<15 M	<15 M	<15 M	
Anthracene	<16 µg/kg	TM218	<16 M	<16 M	<16 M	<16 M	<16 M	
Fluoranthene	<17 µg/kg	TM218	<17 M	<17 M	<17 M	<17 M	<17 M	
Pyrene	<15 µg/kg	TM218	<15 M	<15 M	<15 M	<15 M	<15 M	
Benz(a)anthracene	<14 µg/kg	TM218	<14 M	<14 M	<14 M	<14 M	<14 M	
Chrysene	<10 µg/kg	TM218	<10 M	<10 M	<10 M	<10 M	<10 M	
Benzo(b)fluoranthene	<15 µg/kg	TM218	<15 M	<15 M	<15 M	<15 M	<15 M	
Benzo(k)fluoranthene	<14 µg/kg	TM218	<14 M	<14 M	<14 M	<14 M	<14 M	
Benzo(a)pyrene	<15 µg/kg	TM218	<15 M	<15 M	<15 M	<15 M	<15 M	
Indeno(1,2,3-cd)pyrene	<18 µg/kg	TM218	<18 M	<18 M	<18 M	<18 M	<18 M	
Dibenzo(a,h)anthracene	<23 µg/kg	TM218	<23 M	<23 M	<23 M	<23 M	<23 M	
Benzo(g,h,i)perylene	<24 µg/kg	TM218	<24 M	<24 M	<24 M	<24 M	<24 M	
PAH, Total Detected USEPA 16	<118 µg/kg	TM218	<118	<118	<118	<118	<118	

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CERTIFICATE OF ANALYSIS

SDG:	190521-93	**Client Reference:**	5599	**Report Number:**	507840
Location:	Millers Glen - Phase 5	**Order Number:**	46/A/19	**Superseded Report:**	

TPH CWG (S)

Results Legend

#	ISO17025 accredited.
M	mCERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	Subcontracted - refer to subcontractor report for accreditation status.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
(F)	Trigger breach confirmed
1-3+§@	Sample deviation (see appendix)

Customer Sample Ref.			CBR6	TP6	TP14	TP29	TP34
Depth (m)			0.50 - 0.50	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50	0.30 - 0.30
Sample Type			Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
Date Sampled			20/05/2019	20/05/2019	20/05/2019	20/05/2019	20/05/2019
Sample Time			.	.	.	.	.
Date Received			21/05/2019	21/05/2019	21/05/2019	21/05/2019	21/05/2019
SDG Ref			190521-93	190521-93	190521-93	190521-93	190521-93
Lab Sample No.(s)			19996776	19996774	19996775	19996779	19996778
AGS Reference							
Component	**LOD/Units**	**Method**					
GRO Surrogate % recovery**	%	TM089	126	98.7	98 2	118	49.8 3
GRO TOT (Moisture Corrected)	<100 µg/kg	TM089	<100 M	<100 M	<100 2 M	<100 M	<100 3 #
Aliphatics >C5-C6	<10 µg/kg	TM089	<10	<10	<10 2	<10	53.4 3
Aliphatics >C6-C8	<10 µg/kg	TM089	<10	<10	<10 2	<10	<10 3
Aliphatics >C8-C10	<10 µg/kg	TM089	<10	<10	<10 2	<10	11.7 3
Aliphatics >C10-C12	<10 µg/kg	TM089	<10	<10	<10 2	<10	<10 3
Aliphatics >C12-C16	<100 µg/kg	TM173	<100	<100	<100	<100	<100
Aliphatics >C16-C21	<100 µg/kg	TM173	<100	<100	<100	<100	<100
Aliphatics >C21-C35	<100 µg/kg	TM173	250	<100	<100	<100	3210
Aliphatics >C35-C44	<100 µg/kg	TM173	<100	<100	<100	<100	<100
Total Aliphatics >C12-C44	<100 µg/kg	TM173	250	<100	<100	<100	3210
Aromatics >EC5-EC7	<10 µg/kg	TM089	<10	<10	<10 2	<10	<10 3
Aromatics >EC7-EC8	<10 µg/kg	TM089	<10	<10	<10 2	<10	<10 3
Aromatics >EC8-EC10	<10 µg/kg	TM089	<10	<10	<10 2	<10	<10 3
Aromatics >EC10-EC12	<10 µg/kg	TM089	<10	<10	<10 2	<10	<10 3
Aromatics >EC12-EC16	<100 µg/kg	TM173	<100	<100	<100	<100	<100
Aromatics >EC16-EC21	<100 µg/kg	TM173	402	<100	<100	<100	<100
Aromatics >EC21-EC35	<100 µg/kg	TM173	4210	<100	<100	<100	869
Aromatics >EC35-EC44	<100 µg/kg	TM173	913	<100	<100	<100	<100
Aromatics >EC40-EC44	<100 µg/kg	TM173	<100	<100	<100	<100	<100
Total Aromatics >EC12-EC44	<100 µg/kg	TM173	5530	<100	<100	<100	869
Total Aliphatics & Aromatics >C5-C44	<100 µg/kg	TM173	5780	<100	<100	<100	4150
GRO >C5-C6	<20 µg/kg	TM089	<20	<20	<20 2	<20	53.4 3
GRO >C6-C7	<20 µg/kg	TM089	<20	<20	<20 2	<20	<20 3
GRO >C7-C8	<20 µg/kg	TM089	<20	<20	<20 2	<20	<20 3
GRO >C8-C10	<20 µg/kg	TM089	<20	<20	<20 2	<20	<20 3
GRO >C10-C12	<20 µg/kg	TM089	<20	<20	<20 2	<20	<20 3

Validated

CERTIFICATE OF ANALYSIS

SDG:	190521-93	**Client Reference:**	5599	**Report Number:**	507840
Location:	Millers Glen - Phase 5	**Order Number:**	46/A/19	**Superseded Report:**	

VOC MS (S)

Results Legend

#	ISO17025 accredited.
M	mCERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	Subcontracted - refer to subcontractor report for accreditation status.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
(F)	Trigger breach confirmed
1-3+§@	Sample deviation (see appendix)

Customer Sample Ref.			CBR6	TP6	TP14	TP29	TP34	
Depth (m)			0.50 - 0.50	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50	0.30 - 0.30	
Sample Type			Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	
Date Sampled			20/05/2019	20/05/2019	20/05/2019	20/05/2019	20/05/2019	
Sample Time			.	.	.	.	.	
Date Received			21/05/2019	21/05/2019	21/05/2019	21/05/2019	21/05/2019	
SDG Ref			190521-93	190521-93	190521-93	190521-93	190521-93	
Lab Sample No.(s)			19996776	19996774	19996775	19996779	19996778	
AGS Reference								
Component	**LOD/Units**	**Method**						
Dibromofluoromethane**	%	TM116	104	107	125 2	122	109	
Toluene-d8**	%	TM116	97.5	98.7	99 2	99.1	98	
4-Bromofluorobenzene**	%	TM116	85.7	95	96.6 2	94.6	83.2	
Methyl Tertiary Butyl Ether	<10 µg/kg	TM116	<10 M	<10 M	<10 2 M	<10 M	<100 M	
Benzene	<9 µg/kg	TM116	<9 M	<9 M	<9 2 M	<9 M	<90 M	
Toluene	<7 µg/kg	TM116	<7 M	10.4 M	14.2 2 M	10.5 M	<70 M	
Ethylbenzene	<4 µg/kg	TM116	<4 M	<4 M	<4 2 M	<4 M	<40 M	
p/m-Xylene	<10 µg/kg	TM116	<10 #	<10 #	<10 2 #	<10 #	<100 #	
o-Xylene	<10 µg/kg	TM116	<10 M	<10 M	<10 2 M	<10 M	<100 M	

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CERTIFICATE OF ANALYSIS

SDG:	190521-93	**Client Reference:**	5599	**Report Number:**	507840
Location:	Millers Glen - Phase 5	**Order Number:**	46/A/19	**Superseded Report:**	

Asbestos Identification - Solid Samples

Results Legend

#	ISO17025 accredited.
M	*m*CERTS accredited.
*	Subcontracted test.
(F)	Trigger breach confirmed
1-5&+§@	Sample deviation (see appendix)

		Date of Analysis	Analysed By	Comments	Amosite (Brown) Asbestos	Chrysotile (White) Asbestos	Crocidolite (Blue) Asbestos	Fibrous Actinolite	Fibrous Anthophyllite	Fibrous Tremolite	Non-Asbestos Fibre
Cust. Sample Ref.	TP6	23/05/2019	Agnieszka Chelmowska	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Depth (m)	0.50 - 0.50										
Sample Type	SOLID										
Date Sampled	20/05/2019 00:00:00										
Date Receieved	21/05/2019 09:30:00										
SDG	190521-93										
Original Sample	19996774										
Method Number	TM048										

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CERTIFICATE OF ANALYSIS

SDG:	190521-93	**Client Reference:**	5599	**Report Number:**	507840
Location:	Millers Glen - Phase 5	**Order Number:**	46/A/19	**Superseded Report:**	

CEN 10:1 SINGLE STAGE LEACHATE TEST

WAC ANALYTICAL RESULTS

REF : BS EN 12457/2

Client Reference		**Site Location**	Millers Glen - Phase 5
Mass Sample taken (kg)	0.100	**Natural Moisture Content (%)**	11.1
Mass of dry sample (kg)	0.090	**Dry Matter Content (%)**	90
Particle Size <4mm	>95%		

Case	
SDG	190521-93
Lab Sample Number(s)	19996774
Sampled Date	20-May-2019
Customer Sample Ref.	TP6
Depth (m)	0.50 - 0.50

Solid Waste Analysis	**Result**	**Landfill Waste Acceptance Criteria Limits: Inert Waste Landfill**	**Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon (%)	0.452	3	5	6
Loss on Ignition (%)	1.65	-	-	10
Sum of BTEX (mg/kg)	-	-	-	-
Sum of 7 PCBs (mg/kg)	<0.021	1	-	-
Mineral Oil (mg/kg)	<1	500	-	-
PAH Sum of 17 (mg/kg)	-	-	-	-
pH (pH Units)	-	-	-	-
ANC to pH 6 (mol/kg)	-	-	-	-
ANC to pH 4 (mol/kg)	-	-	-	-

Eluate Analysis	**C_2 Conc^n in 10:1 eluate (mg/l)**		**A_2 10:1 conc^n leached (mg/kg)**		**Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg**		
	Result	**Limit of Detection**	**Result**	**Limit of Detection**			
Arsenic	<0.0005	<0.0005	<0.005	<0.005	0.5	2	25
Barium	0.00791	<0.0002	0.0791	<0.002	20	100	300
Cadmium	<0.00008	<0.00008	<0.0008	<0.0008	0.04	1	5
Chromium	<0.001	<0.001	<0.01	<0.01	0.5	10	70
Copper	<0.0003	<0.0003	<0.003	<0.003	2	50	100
Mercury Dissolved (CVAF)	<0.00001	<0.00001	<0.0001	<0.0001	0.01	0.2	2
Molybdenum	0.00947	<0.003	0.0947	<0.03	0.5	10	30
Nickel	<0.0004	<0.0004	<0.004	<0.004	0.4	10	40
Lead	<0.0002	<0.0002	<0.002	<0.002	0.5	10	50
Antimony	<0.001	<0.001	<0.01	<0.01	0.06	0.7	5
Selenium	<0.001	<0.001	<0.01	<0.01	0.1	0.5	7
Zinc	<0.001	<0.001	<0.01	<0.01	4	50	200
Chloride	<2	<2	<20	<20	800	15000	25000
Fluoride	<0.5	<0.5	<5	<5	10	150	500
Sulphate (soluble)	<2	<2	<20	<20	1000	20000	50000
Total Dissolved Solids	58.1	<10	581	<100	4000	60000	100000
Total Monohydric Phenols (W)	<0.016	<0.016	<0.16	<0.16	1	-	-
Dissolved Organic Carbon	<3	<3	<30	<30	500	800	1000

Leach Test Information

Date Prepared	22-May-2019
pH (pH Units)	8.47
Conductivity (µS/cm)	72.30
Temperature (°C)	20.20
Volume Leachant (Litres)	0.890

Solid Results are expressed on a dry weight basis, after correction for moisture content where applicable
Stated limits are for guidance only and ALS Environmental cannot be held responsible for any discrepancies with current legislation
Mcerts Certification does not apply to leachates
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CERTIFICATE OF ANALYSIS

SDG:	190521-93	**Client Reference:**	5599	**Report Number:**	507840
Location:	Millers Glen - Phase 5	**Order Number:**	46/A/19	**Superseded Report:**	

CEN 10:1 SINGLE STAGE LEACHATE TEST

WAC ANALYTICAL RESULTS

REF : BS EN 12457/2

Client Reference		**Site Location**	Millers Glen - Phase 5
Mass Sample taken (kg)	0.105	**Natural Moisture Content (%)**	16.3
Mass of dry sample (kg)	0.090	**Dry Matter Content (%)**	86
Particle Size <4mm	>95%		

Case	
SDG	190521-93
Lab Sample Number(s)	19996775
Sampled Date	20-May-2019
Customer Sample Ref.	TP14
Depth (m)	0.50 - 0.50

Solid Waste Analysis	**Result**	**Landfill Waste Acceptance Criteria Limits** Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
Total Organic Carbon (%)	0.484	3	5	6
Loss on Ignition (%)	2.85	-	-	10
Sum of BTEX (mg/kg)	-	-	-	-
Sum of 7 PCBs (mg/kg)	<0.021	1	-	-
Mineral Oil (mg/kg)	<1	500	-	-
PAH Sum of 17 (mg/kg)	-	-	-	-
pH (pH Units)	-	-	-	-
ANC to pH 6 (mol/kg)	-	-	-	-
ANC to pH 4 (mol/kg)	-	-	-	-

Eluate Analysis	**C_2** Conc^n in 10:1 eluate (mg/l)		**A_2** 10:1 conc^n leached (mg/kg)		Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg		
	Result	Limit of Detection	Result	Limit of Detection			
Arsenic	<0.0005	<0.0005	<0.005	<0.005	0.5	2	25
Barium	0.0127	<0.0002	0.127	<0.002	20	100	300
Cadmium	<0.00008	<0.00008	<0.0008	<0.0008	0.04	1	5
Chromium	<0.001	<0.001	<0.01	<0.01	0.5	10	70
Copper	<0.0003	<0.0003	<0.003	<0.003	2	50	100
Mercury Dissolved (CVAF)	<0.00001	<0.00001	<0.0001	<0.0001	0.01	0.2	2
Molybdenum	0.00683	<0.003	0.0683	<0.03	0.5	10	30
Nickel	<0.0004	<0.0004	<0.004	<0.004	0.4	10	40
Lead	0.000665	<0.0002	0.00665	<0.002	0.5	10	50
Antimony	<0.001	<0.001	<0.01	<0.01	0.06	0.7	5
Selenium	<0.001	<0.001	<0.01	<0.01	0.1	0.5	7
Zinc	0.00258	<0.001	0.0258	<0.01	4	50	200
Chloride	<2	<2	<20	<20	800	15000	25000
Fluoride	0.771	<0.5	7.71	<5	10	150	500
Sulphate (soluble)	<2	<2	<20	<20	1000	20000	50000
Total Dissolved Solids	68	<10	680	<100	4000	60000	100000
Total Monohydric Phenols (W)	<0.016	<0.016	<0.16	<0.16	1	-	-
Dissolved Organic Carbon	<3	<3	<30	<30	500	800	1000

Leach Test Information

Date Prepared	22-May-2019
pH (pH Units)	6.82
Conductivity (µS/cm)	88.70
Temperature (ºC)	20.40
Volume Leachant (Litres)	0.885

Solid Results are expressed on a dry weight basis, after correction for moisture content where applicable
Stated limits are for guidance only and ALS Environmental cannot be held responsible for any discrepancies with current legislation
Mcerts Certification does not apply to leachates
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CERTIFICATE OF ANALYSIS

SDG:	190521-93	**Client Reference:**	5599	**Report Number:**	507840
Location:	Millers Glen - Phase 5	**Order Number:**	46/A/19	**Superseded Report:**	

CEN 10:1 SINGLE STAGE LEACHATE TEST

WAC ANALYTICAL RESULTS

REF : BS EN 12457/2

Client Reference		**Site Location**	Millers Glen - Phase 5
Mass Sample taken (kg)	0.105	**Natural Moisture Content (%)**	17.6
Mass of dry sample (kg)	0.090	**Dry Matter Content (%)**	85
Particle Size <4mm	>95%		

Case	
SDG	190521-93
Lab Sample Number(s)	19996776
Sampled Date	20-May-2019
Customer Sample Ref.	CBR6
Depth (m)	0.50 - 0.50

Solid Waste Analysis	**Result**	**Landfill Waste Acceptance Criteria Limits**		
		Inert Waste Landfill	**Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon (%)	0.663	3	5	6
Loss on Ignition (%)	4.11	-	-	10
Sum of BTEX (mg/kg)	-	-	-	-
Sum of 7 PCBs (mg/kg)	<0.021	1	-	-
Mineral Oil (mg/kg)	<1	500	-	-
PAH Sum of 17 (mg/kg)	-	-	-	-
pH (pH Units)	-	-	-	-
ANC to pH 6 (mol/kg)	-	-	-	-
ANC to pH 4 (mol/kg)	-	-	-	-

Eluate Analysis	**C_2 Conc^n in 10:1 eluate (mg/l)**		**A_2 10:1 conc^n leached (mg/kg)**		**Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg**		
	Result	**Limit of Detection**	**Result**	**Limit of Detection**			
Arsenic	0.00096	<0.0005	0.0096	<0.005	0.5	2	25
Barium	0.0226	<0.0002	0.226	<0.002	20	100	300
Cadmium	<0.00008	<0.00008	<0.0008	<0.0008	0.04	1	5
Chromium	<0.001	<0.001	<0.01	<0.01	0.5	10	70
Copper	0.00076	<0.0003	0.0076	<0.003	2	50	100
Mercury Dissolved (CVAF)	<0.00001	<0.00001	<0.0001	<0.0001	0.01	0.2	2
Molybdenum	0.00717	<0.003	0.0717	<0.03	0.5	10	30
Nickel	0.00165	<0.0004	0.0165	<0.004	0.4	10	40
Lead	<0.0002	<0.0002	<0.002	<0.002	0.5	10	50
Antimony	<0.001	<0.001	<0.01	<0.01	0.06	0.7	5
Selenium	<0.001	<0.001	<0.01	<0.01	0.1	0.5	7
Zinc	0.00353	<0.001	0.0353	<0.01	4	50	200
Chloride	2.8	<2	28	<20	800	15000	25000
Fluoride	0.524	<0.5	5.24	<5	10	150	500
Sulphate (soluble)	34.2	<2	342	<20	1000	20000	50000
Total Dissolved Solids	143	<10	1430	<100	4000	60000	100000
Total Monohydric Phenols (W)	<0.016	<0.016	<0.16	<0.16	1	-	-
Dissolved Organic Carbon	5.06	<3	50.6	<30	500	800	1000

Leach Test Information

Date Prepared	22-May-2019
pH (pH Units)	8.04
Conductivity (µS/cm)	189.00
Temperature (°C)	20.40
Volume Leachant (Litres)	0.884

Solid Results are expressed on a dry weight basis, after correction for moisture content where applicable
Stated limits are for guidance only and ALS Environmental cannot be held responsible for any discrepancies with current legislation
Mcerts Certification does not apply to leachates
29/05/2019 15:22:04

15:21:49 29/05/2019

Validated

CERTIFICATE OF ANALYSIS

SDG:	190521-93	**Client Reference:**	5599	**Report Number:**	507840
Location:	Millers Glen - Phase 5	**Order Number:**	46/A/19	**Superseded Report:**	

CEN 10:1 SINGLE STAGE LEACHATE TEST

WAC ANALYTICAL RESULTS

REF : BS EN 12457/2

Client Reference		**Site Location**	Millers Glen - Phase 5
Mass Sample taken (kg)	0.097	**Natural Moisture Content (%)**	6.72
Mass of dry sample (kg)	0.090	**Dry Matter Content (%)**	93.7
Particle Size <4mm	>95%		

Case	
SDG	190521-93
Lab Sample Number(s)	19996778
Sampled Date	20-May-2019
Customer Sample Ref.	TP34
Depth (m)	0.30 - 0.30

Solid Waste Analysis	**Result**	**Landfill Waste Acceptance Criteria Limits**		
		Inert Waste Landfill	**Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon (%)	0.534	3	5	6
Loss on Ignition (%)	1.86	-	-	10
Sum of BTEX (mg/kg)	-	-	-	-
Sum of 7 PCBs (mg/kg)	<0.021	1	-	-
Mineral Oil (mg/kg)	<1	500	-	-
PAH Sum of 17 (mg/kg)	-	-	-	-
pH (pH Units)	-	-	-	-
ANC to pH 6 (mol/kg)	-	-	-	-
ANC to pH 4 (mol/kg)	-	-	-	-

Eluate Analysis	**C_2** Conc^n in 10:1 eluate (mg/l)		**A_2** 10:1 conc^n leached (mg/kg)		**Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg**		
	Result	**Limit of Detection**	**Result**	**Limit of Detection**			
Arsenic	<0.0005	<0.0005	<0.005	<0.005	0.5	2	25
Barium	0.0339	<0.0002	0.339	<0.002	20	100	300
Cadmium	<0.00008	<0.00008	<0.0008	<0.0008	0.04	1	5
Chromium	<0.001	<0.001	<0.01	<0.01	0.5	10	70
Copper	<0.0003	<0.0003	<0.003	<0.003	2	50	100
Mercury Dissolved (CVAF)	<0.00001	<0.00001	<0.0001	<0.0001	0.01	0.2	2
Molybdenum	<0.003	<0.003	<0.03	<0.03	0.5	10	30
Nickel	0.00437	<0.0004	0.0437	<0.004	0.4	10	40
Lead	0.000294	<0.0002	0.00294	<0.002	0.5	10	50
Antimony	<0.001	<0.001	<0.01	<0.01	0.06	0.7	5
Selenium	<0.001	<0.001	<0.01	<0.01	0.1	0.5	7
Zinc	0.0296	<0.001	0.296	<0.01	4	50	200
Chloride	<2	<2	<20	<20	800	15000	25000
Fluoride	1.04	<0.5	10.4	<5	10	150	500
Sulphate (soluble)	1380	<10	13800	<100	1000	20000	50000
Total Dissolved Solids	1510	<10	15100	<100	4000	60000	100000
Total Monohydric Phenols (W)	0.13	<0.016	1.3	<0.16	1	-	-
Dissolved Organic Carbon	<3	<3	<30	<30	500	800	1000

Leach Test Information

Date Prepared	22-May-2019
pH (pH Units)	7.18
Conductivity (µS/cm)	2,020.00
Temperature (°C)	20.60
Volume Leachant (Litres)	0.894

Solid Results are expressed on a dry weight basis, after correction for moisture content where applicable
Stated limits are for guidance only and ALS Environmental cannot be held responsible for any discrepancies with current legislation
Mcerts Certification does not apply to leachates
29/05/2019 15:22:04

15:21:49 29/05/2019

Validated

CERTIFICATE OF ANALYSIS

SDG:	190521-93	**Client Reference:**	5599	**Report Number:**	507840
Location:	Millers Glen - Phase 5	**Order Number:**	46/A/19	**Superseded Report:**	

CEN 10:1 SINGLE STAGE LEACHATE TEST

WAC ANALYTICAL RESULTS

REF : BS EN 12457/2

Client Reference		**Site Location**	Millers Glen - Phase 5
Mass Sample taken (kg)	0.106	**Natural Moisture Content (%)**	17.6
Mass of dry sample (kg)	0.090	**Dry Matter Content (%)**	85
Particle Size <4mm	>95%		

Case	
SDG	190521-93
Lab Sample Number(s)	19996779
Sampled Date	20-May-2019
Customer Sample Ref.	TP29
Depth (m)	0.50 - 0.50

Solid Waste Analysis	**Result**	**Landfill Waste Acceptance Criteria Limits**		
		Inert Waste Landfill	**Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon (%)	0.466	3	5	6
Loss on Ignition (%)	2.73	-	-	10
Sum of BTEX (mg/kg)	-	-	-	-
Sum of 7 PCBs (mg/kg)	<0.021	1	-	-
Mineral Oil (mg/kg)	<1	500	-	-
PAH Sum of 17 (mg/kg)	-	-	-	-
pH (pH Units)	-	-	-	-
ANC to pH 6 (mol/kg)	-	-	-	-
ANC to pH 4 (mol/kg)	-	-	-	-

Eluate Analysis	**C_2 Conc^n in 10:1 eluate (mg/l)**		**A_2 10:1 conc^n leached (mg/kg)**		**Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg**		
	Result	**Limit of Detection**	**Result**	**Limit of Detection**			
Arsenic	<0.0005	<0.0005	<0.005	<0.005	0.5	2	25
Barium	0.0106	<0.0002	0.106	<0.002	20	100	300
Cadmium	<0.00008	<0.00008	<0.0008	<0.0008	0.04	1	5
Chromium	<0.001	<0.001	<0.01	<0.01	0.5	10	70
Copper	<0.0003	<0.0003	<0.003	<0.003	2	50	100
Mercury Dissolved (CVAF)	<0.00001	<0.00001	<0.0001	<0.0001	0.01	0.2	2
Molybdenum	0.00552	<0.003	0.0552	<0.03	0.5	10	30
Nickel	<0.0004	<0.0004	<0.004	<0.004	0.4	10	40
Lead	<0.0002	<0.0002	<0.002	<0.002	0.5	10	50
Antimony	<0.001	<0.001	<0.01	<0.01	0.06	0.7	5
Selenium	<0.001	<0.001	<0.01	<0.01	0.1	0.5	7
Zinc	0.00372	<0.001	0.0372	<0.01	4	50	200
Chloride	<2	<2	<20	<20	800	15000	25000
Fluoride	<0.5	<0.5	<5	<5	10	150	500
Sulphate (soluble)	<2	<2	<20	<20	1000	20000	50000
Total Dissolved Solids	69.1	<10	691	<100	4000	60000	100000
Total Monohydric Phenols (W)	<0.016	<0.016	<0.16	<0.16	1	-	-
Dissolved Organic Carbon	<3	<3	<30	<30	500	800	1000

Leach Test Information

Date Prepared	22-May-2019
pH (pH Units)	8.32
Conductivity (µS/cm)	86.10
Temperature (ºC)	20.20
Volume Leachant (Litres)	0.884

Solid Results are expressed on a dry weight basis, after correction for moisture content where applicable
Stated limits are for guidance only and ALS Environmental cannot be held responsible for any discrepancies with current legislation
Mcerts Certification does not apply to leachates
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Table of Results - Appendix

Method No	Reference	Description
PM001		Preparation of Samples for Metals Analysis
PM024	Modified BS 1377	Soil preparation including homogenisation, moisture screens of soils for Asbestos Containing Material
PM115		Leaching Procedure for CEN One Stage Leach Test 2:1 & 10:1 1 Step
TM018	BS 1377: Part 3 1990	Determination of Loss on Ignition
TM048	HSG 248, Asbestos: The analysts' guide for sampling, analysis and clearance procedures	Identification of Asbestos in Bulk Material
TM061	Method for the Determination of EPH,Massachusetts Dept.of EP, 1998	Determination of Extractable Petroleum Hydrocarbons by GC-FID (C10-C40)
TM089	Modified: US EPA Methods 8020 & 602	Determination of Gasoline Range Hydrocarbons (GRO) by Headspace GC-FID (C4-C12)
TM090	Method 5310, AWWA/APHA, 20th Ed., 1999 / Modified: US EPA Method 415.1 & 9060	Determination of Total Organic Carbon/Total Inorganic Carbon in Water and Waste Water
TM104	Method 4500F, AWWA/APHA, 20th Ed., 1999	Determination of Fluoride using the Kone Analyser
TM116	Modified: US EPA Method 8260, 8120, 8020, 624, 610 & 602	Determination of Volatile Organic Compounds by Headspace / GC-MS
TM123	BS 2690: Part 121:1981	The Determination of Total Dissolved Solids in Water
TM132	In - house Method	ELTRA CS800 Operators Guide
TM151	Method 3500D, AWWA/APHA, 20th Ed., 1999	Determination of Hexavalent Chromium using Kone analyser
TM152	Method 3125B, AWWA/APHA, 20th Ed., 1999	Analysis of Aqueous Samples by ICP-MS
TM168	EPA Method 8082, Polychlorinated Biphenyls by Gas Chromatography	Determination of WHO12 and EC7 Polychlorinated Biphenyl Congeners by GC-MS in Soils
TM173	Analysis of Petroleum Hydrocarbons in Environmental Media – Total Petroleum Hydrocarbon Criteria	Determination of Speciated Extractable Petroleum Hydrocarbons in Soils by GC-FID
TM181	US EPA Method 6010B	Determination of Routine Metals in Soil by iCap 6500 Duo ICP-OES
TM183	BS EN 23506:2002, (BS 6068-2.74:2002) ISBN 0 580 38924 3	Determination of Trace Level Mercury in Waters and Leachates by PSA Cold Vapour Atomic Fluorescence Spectrometry
TM184	EPA Methods 325.1 & 325.2,	The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric Analysers
TM218	Shaker extraction - EPA method 3546.	The determination of PAH in soil samples by GC-MS
TM259	by HPLC	Determination of Phenols in Waters and Leachates by HPLC
TM410	Shaker extraction-In house coronene method	Determination of Coronene in soils by GCMS

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden (Method codes TM) or ALS Life Sciences Ltd Aberdeen (Method codes S).

Validated

CERTIFICATE OF ANALYSIS

SDG:	190521-93	**Client Reference:**	5599	**Report Number:**	507840
Location:	Millers Glen - Phase 5	**Order Number:**	46/A/19	**Superseded Report:**	

Test Completion Dates

Lab Sample No(s)	19996776	19996774	19996775	19996779	19996778
Customer Sample Ref.	CBR6	TP6	TP14	TP29	TP34
AGS Ref.					
Depth	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50	0.30 - 0.30
Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
Anions by Kone (w)	24-May-2019	24-May-2019	24-May-2019	24-May-2019	24-May-2019
Asbestos ID in Solid Samples		23-May-2019			
CEN 10:1 Leachate (1 Stage)	22-May-2019	22-May-2019	22-May-2019	22-May-2019	22-May-2019
CEN Readings	25-May-2019	25-May-2019	25-May-2019	25-May-2019	25-May-2019
Chromium III	25-May-2019	25-May-2019	25-May-2019	25-May-2019	25-May-2019
Coronene	28-May-2019	28-May-2019	28-May-2019	28-May-2019	28-May-2019
Dissolved Metals by ICP-MS	28-May-2019	28-May-2019	28-May-2019	28-May-2019	28-May-2019
Dissolved Organic/Inorganic Carbon	24-May-2019	24-May-2019	24-May-2019	24-May-2019	24-May-2019
EPH CWG (Aliphatic) GC (S)	28-May-2019	28-May-2019	24-May-2019	28-May-2019	28-May-2019
EPH CWG (Aromatic) GC (S)	28-May-2019	28-May-2019	24-May-2019	28-May-2019	28-May-2019
Fluoride	28-May-2019	28-May-2019	28-May-2019	28-May-2019	24-May-2019
GRO by GC-FID (S)	28-May-2019	29-May-2019	29-May-2019	28-May-2019	29-May-2019
Hexavalent Chromium (s)	24-May-2019	24-May-2019	24-May-2019	24-May-2019	24-May-2019
Loss on Ignition in soils	23-May-2019	28-May-2019	23-May-2019	23-May-2019	23-May-2019
Mercury Dissolved	24-May-2019	24-May-2019	24-May-2019	24-May-2019	24-May-2019
Metals in solid samples by OES	24-May-2019	23-May-2019	24-May-2019	24-May-2019	24-May-2019
Mineral Oil	28-May-2019	28-May-2019	28-May-2019	28-May-2019	28-May-2019
PAH by GCMS	29-May-2019	24-May-2019	24-May-2019	24-May-2019	29-May-2019
PCBs by GCMS	24-May-2019	24-May-2019	24-May-2019	24-May-2019	24-May-2019
Phenols by HPLC (W)	24-May-2019	24-May-2019	28-May-2019	24-May-2019	28-May-2019
Sample description	21-May-2019	21-May-2019	21-May-2019	21-May-2019	21-May-2019
Total Dissolved Solids on Leachates	24-May-2019	24-May-2019	24-May-2019	24-May-2019	24-May-2019
Total Organic Carbon	24-May-2019	24-May-2019	24-May-2019	28-May-2019	24-May-2019
TPH CWG GC (S)	28-May-2019	29-May-2019	29-May-2019	28-May-2019	29-May-2019
VOC MS (S)	28-May-2019	28-May-2019	28-May-2019	28-May-2019	29-May-2019

Appendix

General

1. Results are expressed on a dry weight basis (dried at 35ºC) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH4 by the BRE method, VOC TICs and SVOC TICs.

2. Samples will be run in duplicate upon request, but an additional charge may be incurred.

3. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALS reserve the right to charge for samples received and stored but not analysed.

4. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

5. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

6. When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2005), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as “Not detected”. If no asbestos fibre types are found all will be reported as “Not detected” and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

7. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

8. If appropriate preserved bottles are not received preservation will take place on receipt. However, the integrity of the data may be compromised.

9. NDP - No determination possible due to insufficient/unsuitable sample.

10. Metals in water are performed on a filtered sample, and therefore represent dissolved metals - total metals must be requested separately.

11. Results relate only to the items tested.

12. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

13. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

14. **Product analyses** - Organic analyses on products can only be semi-quantitative due to the matrix effects and high dilution factors employed.

15. Phenols monohydric by HPLC include phenol, cresols (2-Methylphenol, 3-Methylphenol and 4-Methylphenol) and Xylenols (2,3 Dimethylphenol, 2,4 Dimethylphenol, 2,5 Dimethylphenol, 2,6 Dimethylphenol, 3,4 Dimethyphenol, 3,5 Dimethylphenol).

16. Total of 5 speciated phenols by HPLC includes Phenol, 2,3,5-Trimethyl Phenol, 2-Isopropylphenol, Cresols and Xylenols (as detailed in 15).

17. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

18. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

19. Mercury results quoted on soils will not include volatile mercury as the analysis is performed on a dried and crushed sample.

20. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

21. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

22. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

23. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

24. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as “mixed hydrocarbons”. Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

Sample Deviations

If a sample is classed as deviated then the associated results may be compromised.

1	**Container with Headspace provided for volatiles analysis**
2	**Incorrect container received**
3	**Deviation from method**
§	**Sampled on date not provided**
♦	**Sample holding time exceeded in laboratory**
@	**Sample holding time exceeded due to late arrival of instructions or samples**

Asbestos

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials are obtained from supplied bulk materials which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anthophyllite	-
Fibrous Tremolite	-

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace - Where only one or two asbestos fibres were identified.

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.

HazWasteOnline™

Waste Classification Report

AJAAJ-XCRQW-V5W5W

Job name

5599

Description/Comments

Client: Gannon Homes Ltd
Engineer: Waterman Moylan

Project

Millers Glen - Phase 5

Site

Swords, Co. Dublin

Related Documents

#	Name	Description
1	190521-93.hwol	.hwol file used to create the Job

Waste Stream Template

Rilta Suite NEW

Classified by

Name:
Stephen Letch
Date:
05 Jun 2019 12:30 GMT
Telephone:
353 1 6108 768

Company:
Site Investigations Ltd
Carhugar, The Grange
12th Lock Road, Lucan
Dublin

Report

Created by: Stephen Letch
Created date: 05 Jun 2019 12:30 GMT

Job summary

#	Sample Name	Depth [m]	Classification Result	Hazard properties	Page
1	CBR6-200519-0.50-0.50		Non Hazardous		2
2	TP14-200519-0.50-0.50		Non Hazardous		5
3	TP29-200519-0.50-0.50		Non Hazardous		8
4	TP34-200519-0.30-0.30		Non Hazardous		11
5	TP6-200519-0.50-0.50		Non Hazardous		14

Appendices	Page
Appendix A: Classifier defined and non CLP determinands	17
Appendix B: Rationale for selection of metal species	19
Appendix C: Version	19

Classification of sample: CBR6-200519-0.50-0.50

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
CBR6-200519-0.50-0.50
Moisture content:
15%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 15% Wet Weight Moisture Correction applied (MC)

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		TPH (C6 to C40) petroleum group			TPH		5.78	mg/kg		4.913	mg/kg	0.000491 %	✓	
2		antimony { antimony trioxide }	051-005-00-X	215-175-0	1309-64-4		1.88	mg/kg	1.197	1.913	mg/kg	0.000191 %	✓	
3		arsenic { arsenic compounds, with the exception of those specified elsewhere in this Annex }	033-002-00-5			1	15	mg/kg		12.75	mg/kg	0.00128 %	✓	
4		barium { barium oxide }		215-127-9	1304-28-5		151	mg/kg	1.117	143.304	mg/kg	0.0143 %	✓	
5		cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		1.93	mg/kg	1.142	1.874	mg/kg	0.000187 %	✓	
6		copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		29.3	mg/kg	1.126	28.04	mg/kg	0.0028 %	✓	
7		lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			1	24.9	mg/kg		21.165	mg/kg	0.00212 %	✓	
8		mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.14	mg/kg	1.353	<0.189	mg/kg	<0.0000189 %		**<LOD**
9		molybdenum { molybdenum(VI) oxide }	042-001-00-9	215-204-7	1313-27-5		3.37	mg/kg	1.5	4.297	mg/kg	0.00043 %	✓	
10		nickel { nickel sulfate }	028-009-00-5	232-104-9	7786-81-4		48.3	mg/kg	2.637	108.249	mg/kg	0.0108 %	✓	
11		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<1	mg/kg	2.554	<2.554	mg/kg	<0.000255 %		**<LOD**
12		zinc { zinc sulphate }	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]		86.4	mg/kg	2.469	181.345	mg/kg	0.0181 %	✓	
13		chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		18.7	mg/kg	1.462	23.231	mg/kg	0.00232 %	✓	

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
14		chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.6	mg/kg	1.923	<1.154	mg/kg	<0.000115 %		**<LOD**
15		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.009	mg/kg		<0.009	mg/kg	<0.0000009 %		**<LOD**
16		acenaphthylene		205-917-1	208-96-8		<0.012	mg/kg		<0.012	mg/kg	<0.0000012 %		**<LOD**
17		acenaphthene		201-469-6	83-32-9		<0.008	mg/kg		<0.008	mg/kg	<0.0000008 %		**<LOD**
18		fluorene		201-695-5	86-73-7		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		**<LOD**
19		phenanthrene		201-581-5	85-01-8		<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		**<LOD**
20		anthracene		204-371-1	120-12-7		<0.016	mg/kg		<0.016	mg/kg	<0.0000016 %		**<LOD**
21		fluoranthene		205-912-4	206-44-0		<0.017	mg/kg		<0.017	mg/kg	<0.0000017 %		**<LOD**
22		pyrene		204-927-3	129-00-0		<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		**<LOD**
23		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<0.014	mg/kg		<0.014	mg/kg	<0.0000014 %		**<LOD**
24		chrysene	601-048-00-0	205-923-4	218-01-9		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		**<LOD**
25		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		**<LOD**
26		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.014	mg/kg		<0.014	mg/kg	<0.0000014 %		**<LOD**
27		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		**<LOD**
28		indeno[123-cd]pyrene		205-893-2	193-39-5		<0.018	mg/kg		<0.018	mg/kg	<0.0000018 %		**<LOD**
29		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<0.023	mg/kg		<0.023	mg/kg	<0.0000023 %		**<LOD**
30		benzo[ghi]perylene		205-883-8	191-24-2		<0.024	mg/kg		<0.024	mg/kg	<0.0000024 %		**<LOD**
31		polychlorobiphenyls; PCB	602-039-00-4	215-648-1	1336-36-3		<0.021	mg/kg		<0.021	mg/kg	<0.0000021 %		**<LOD**
32		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		**<LOD**
33		benzene	601-020-00-8	200-753-7	71-43-2		<0.009	mg/kg		<0.009	mg/kg	<0.0000009 %		**<LOD**
34		toluene	601-021-00-3	203-625-9	108-88-3		<0.007	mg/kg		<0.007	mg/kg	<0.0000007 %		**<LOD**
35		ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.004	mg/kg		<0.004	mg/kg	<0.0000004 %		**<LOD**
36		coronene		205-881-7	191-07-1		<0.2	mg/kg		<0.2	mg/kg	<0.00002 %		**<LOD**
37		o-xylene; [1] p-xylene; [2] m-xylene; [3] xylene [4]	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		**<LOD**
											Total:	0.0535 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous property to non hazardous because HP 3 can be discounted as this is a solid waste without a free draining liquid phase.

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.00049%)

Classification of sample: TP14-200519-0.50-0.50

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
TP14-200519-0.50-0.50
Moisture content:
14%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 14% Wet Weight Moisture Correction applied (MC)

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		TPH (C6 to C40) petroleum group			TPH		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
2		antimony { antimony trioxide }	051-005-00-X	215-175-0	1309-64-4		1.86	mg/kg	1.197	1.915	mg/kg	0.000191 %	✓	
3		arsenic { arsenic compounds, with the exception of those specified elsewhere in this Annex }	033-002-00-5			1	13	mg/kg		11.18	mg/kg	0.00112 %	✓	
4		barium { barium oxide }		215-127-9	1304-28-5		318	mg/kg	1.117	305.342	mg/kg	0.0305 %	✓	
5		cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		1.52	mg/kg	1.142	1.493	mg/kg	0.000149 %	✓	
6		copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		30	mg/kg	1.126	29.048	mg/kg	0.0029 %	✓	
7		lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			1	19.6	mg/kg		16.856	mg/kg	0.00169 %	✓	
8		mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.14	mg/kg	1.353	<0.189	mg/kg	<0.0000189 %		**<LOD**
9		molybdenum { molybdenum(VI) oxide }	042-001-00-9	215-204-7	1313-27-5		5.36	mg/kg	1.5	6.915	mg/kg	0.000692 %	✓	
10		nickel { nickel sulfate }	028-009-00-5	232-104-9	7786-81-4		37.6	mg/kg	2.637	85.26	mg/kg	0.00853 %	✓	
11		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<1	mg/kg	2.554	<2.554	mg/kg	<0.000255 %		**<LOD**
12		zinc { zinc sulphate }	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]		64.7	mg/kg	2.469	137.397	mg/kg	0.0137 %	✓	
13		chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		11.9	mg/kg	1.462	14.958	mg/kg	0.0015 %	✓	

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
14		chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.6	mg/kg	1.923	<1.154	mg/kg	<0.000115 %		**<LOD**
15		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.009	mg/kg		<0.009	mg/kg	<0.0000009 %		**<LOD**
16		acenaphthylene		205-917-1	208-96-8		<0.012	mg/kg		<0.012	mg/kg	<0.0000012 %		**<LOD**
17		acenaphthene		201-469-6	83-32-9		<0.008	mg/kg		<0.008	mg/kg	<0.0000008 %		**<LOD**
18		fluorene		201-695-5	86-73-7		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		**<LOD**
19		phenanthrene		201-581-5	85-01-8		<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		**<LOD**
20		anthracene		204-371-1	120-12-7		<0.016	mg/kg		<0.016	mg/kg	<0.0000016 %		**<LOD**
21		fluoranthene		205-912-4	206-44-0		<0.017	mg/kg		<0.017	mg/kg	<0.0000017 %		**<LOD**
22		pyrene		204-927-3	129-00-0		<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		**<LOD**
23		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<0.014	mg/kg		<0.014	mg/kg	<0.0000014 %		**<LOD**
24		chrysene	601-048-00-0	205-923-4	218-01-9		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		**<LOD**
25		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		**<LOD**
26		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.014	mg/kg		<0.014	mg/kg	<0.0000014 %		**<LOD**
27		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		**<LOD**
28		indeno[123-cd]pyrene		205-893-2	193-39-5		<0.018	mg/kg		<0.018	mg/kg	<0.0000018 %		**<LOD**
29		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<0.023	mg/kg		<0.023	mg/kg	<0.0000023 %		**<LOD**
30		benzo[ghi]perylene		205-883-8	191-24-2		<0.024	mg/kg		<0.024	mg/kg	<0.0000024 %		**<LOD**
31		polychlorobiphenyls; PCB	602-039-00-4	215-648-1	1336-36-3		<0.021	mg/kg		<0.021	mg/kg	<0.0000021 %		**<LOD**
32		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		**<LOD**
33		benzene	601-020-00-8	200-753-7	71-43-2		<0.009	mg/kg		<0.009	mg/kg	<0.0000009 %		**<LOD**
34		toluene	601-021-00-3	203-625-9	108-88-3		0.0142	mg/kg		0.0122	mg/kg	0.00000122 %	✓	
35		ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.004	mg/kg		<0.004	mg/kg	<0.0000004 %		**<LOD**
36		coronene		205-881-7	191-07-1		<0.2	mg/kg		<0.2	mg/kg	<0.00002 %		**<LOD**
37		o-xylene; [1] p-xylene; [2] m-xylene; [3] xylene [4]	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		**<LOD**
											Total:	0.0615 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous property to non hazardous because HP 3 can be discounted as this is a solid waste without a free draining liquid phase.

Hazard Statements hit:

Flam. Liq. 2; H225 "Highly flammable liquid and vapour."

Because of determinand:

toluene: (conc.: 1.22e-06%)

Classification of sample: TP29-200519-0.50-0.50

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
TP29-200519-0.50-0.50
Moisture content:
15%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 15% Wet Weight Moisture Correction applied (MC)

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		TPH (C6 to C40) petroleum group			TPH		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
2		antimony { antimony trioxide }	051-005-00-X	215-175-0	1309-64-4		2	mg/kg	1.197	2.035	mg/kg	0.000204 %	✓	
3		arsenic { arsenic compounds, with the exception of those specified elsewhere in this Annex }	033-002-00-5			1	13.9	mg/kg		11.815	mg/kg	0.00118 %	✓	
4		barium { barium oxide }		215-127-9	1304-28-5		84	mg/kg	1.117	79.719	mg/kg	0.00797 %	✓	
5		cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		1.33	mg/kg	1.142	1.291	mg/kg	0.000129 %	✓	
6		copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		31.3	mg/kg	1.126	29.954	mg/kg	0.003 %	✓	
7		lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			1	19.6	mg/kg		16.66	mg/kg	0.00167 %	✓	
8		mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.14	mg/kg	1.353	<0.189	mg/kg	<0.0000189 %		**<LOD**
9		molybdenum { molybdenum(VI) oxide }	042-001-00-9	215-204-7	1313-27-5		3.11	mg/kg	1.5	3.966	mg/kg	0.000397 %	✓	
10		nickel { nickel sulfate }	028-009-00-5	232-104-9	7786-81-4		38.4	mg/kg	2.637	86.061	mg/kg	0.00861 %	✓	
11		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<1	mg/kg	2.554	<2.554	mg/kg	<0.000255 %		**<LOD**
12		zinc { zinc sulphate }	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]		68.9	mg/kg	2.469	144.614	mg/kg	0.0145 %	✓	
13		chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		12	mg/kg	1.462	14.908	mg/kg	0.00149 %	✓	

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number							
14		chromium in chromium(VI) compounds { chromium(VI) oxide }				<0.6 mg/kg	1.923	<1.154 mg/kg	<0.000115 %		<LOD
		024-001-00-0	215-607-8	1333-82-0							
15		naphthalene				<0.009 mg/kg		<0.009 mg/kg	<0.0000009 %		<LOD
		601-052-00-2	202-049-5	91-20-3							
16		acenaphthylene				<0.012 mg/kg		<0.012 mg/kg	<0.0000012 %		<LOD
			205-917-1	208-96-8							
17		acenaphthene				<0.008 mg/kg		<0.008 mg/kg	<0.0000008 %		<LOD
			201-469-6	83-32-9							
18		fluorene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
			201-695-5	86-73-7							
19		phenanthrene				<0.015 mg/kg		<0.015 mg/kg	<0.0000015 %		<LOD
			201-581-5	85-01-8							
20		anthracene				<0.016 mg/kg		<0.016 mg/kg	<0.0000016 %		<LOD
			204-371-1	120-12-7							
21		fluoranthene				<0.017 mg/kg		<0.017 mg/kg	<0.0000017 %		<LOD
			205-912-4	206-44-0							
22		pyrene				<0.015 mg/kg		<0.015 mg/kg	<0.0000015 %		<LOD
			204-927-3	129-00-0							
23		benzo[a]anthracene				<0.014 mg/kg		<0.014 mg/kg	<0.0000014 %		<LOD
		601-033-00-9	200-280-6	56-55-3							
24		chrysene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
		601-048-00-0	205-923-4	218-01-9							
25		benzo[b]fluoranthene				<0.015 mg/kg		<0.015 mg/kg	<0.0000015 %		<LOD
		601-034-00-4	205-911-9	205-99-2							
26		benzo[k]fluoranthene				<0.014 mg/kg		<0.014 mg/kg	<0.0000014 %		<LOD
		601-036-00-5	205-916-6	207-08-9							
27		benzo[a]pyrene; benzo[def]chrysene				<0.015 mg/kg		<0.015 mg/kg	<0.0000015 %		<LOD
		601-032-00-3	200-028-5	50-32-8							
28		indeno[123-cd]pyrene				<0.018 mg/kg		<0.018 mg/kg	<0.0000018 %		<LOD
			205-893-2	193-39-5							
29		dibenz[a,h]anthracene				<0.023 mg/kg		<0.023 mg/kg	<0.0000023 %		<LOD
		601-041-00-2	200-181-8	53-70-3							
30		benzo[ghi]perylene				<0.024 mg/kg		<0.024 mg/kg	<0.0000024 %		<LOD
			205-883-8	191-24-2							
31		polychlorobiphenyls; PCB				<0.021 mg/kg		<0.021 mg/kg	<0.0000021 %		<LOD
		602-039-00-4	215-648-1	1336-36-3							
32		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
		603-181-00-X	216-653-1	1634-04-4							
33		benzene				<0.009 mg/kg		<0.009 mg/kg	<0.0000009 %		<LOD
		601-020-00-8	200-753-7	71-43-2							
34		toluene				0.0105 mg/kg		0.0089 mg/kg	0.000000893 %	✓	
		601-021-00-3	203-625-9	108-88-3							
35		ethylbenzene				<0.004 mg/kg		<0.004 mg/kg	<0.0000004 %		<LOD
		601-023-00-4	202-849-4	100-41-4							
36		coronene				<0.2 mg/kg		<0.2 mg/kg	<0.00002 %		<LOD
			205-881-7	191-07-1							
37		o-xylene; [1] p-xylene; [2] m-xylene; [3] xylene [4]				<0.02 mg/kg		<0.02 mg/kg	<0.000002 %		<LOD
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]							
								Total:	0.0396 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous property to non hazardous because HP 3 can be discounted as this is a solid waste without a free draining liquid phase.

Hazard Statements hit:

Flam. Liq. 2; H225 "Highly flammable liquid and vapour."

Because of determinand:

toluene: (conc.: 8.93e-07%)

Classification of sample: TP34-200519-0.30-0.30

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
TP34-200519-0.30-0.30
Moisture content:
6.3%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 6.3% Wet Weight Moisture Correction applied (MC)

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		TPH (C6 to C40) petroleum group			TPH		4.15	mg/kg		3.889	mg/kg	0.000389 %	✓	
2		antimony { antimony trioxide }	051-005-00-X	215-175-0	1309-64-4		2.14	mg/kg	1.197	2.4	mg/kg	0.00024 %	✓	
3		arsenic { arsenic compounds, with the exception of those specified elsewhere in this Annex }	033-002-00-5			1	43.9	mg/kg		41.134	mg/kg	0.00411 %	✓	
4		barium { barium oxide }		215-127-9	1304-28-5		122	mg/kg	1.117	127.632	mg/kg	0.0128 %	✓	
5		cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		0.222	mg/kg	1.142	0.238	mg/kg	0.0000238 %	✓	
6		copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		12.9	mg/kg	1.126	13.609	mg/kg	0.00136 %	✓	
7		lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			1	19.3	mg/kg		18.084	mg/kg	0.00181 %	✓	
8		mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.14	mg/kg	1.353	<0.189	mg/kg	<0.0000189 %		**<LOD**
9		molybdenum { molybdenum(VI) oxide }	042-001-00-9	215-204-7	1313-27-5		0.422	mg/kg	1.5	0.593	mg/kg	0.0000593 %	✓	
10		nickel { nickel sulfate }	028-009-00-5	232-104-9	7786-81-4		31.8	mg/kg	2.637	78.564	mg/kg	0.00786 %	✓	
11		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<1	mg/kg	2.554	<2.554	mg/kg	<0.000255 %		**<LOD**
12		zinc { zinc sulphate }	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]		62.6	mg/kg	2.469	144.84	mg/kg	0.0145 %	✓	
13		chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		<0.9	mg/kg	1.462	<1.315	mg/kg	<0.000132 %		**<LOD**

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
14		chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.6	mg/kg	1.923	<1.154	mg/kg	<0.000115 %		**<LOD**
15		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.009	mg/kg		<0.009	mg/kg	<0.0000009 %		**<LOD**
16		acenaphthylene		205-917-1	208-96-8		<0.012	mg/kg		<0.012	mg/kg	<0.0000012 %		**<LOD**
17		acenaphthene		201-469-6	83-32-9		<0.008	mg/kg		<0.008	mg/kg	<0.0000008 %		**<LOD**
18		fluorene		201-695-5	86-73-7		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		**<LOD**
19		phenanthrene		201-581-5	85-01-8		<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		**<LOD**
20		anthracene		204-371-1	120-12-7		<0.016	mg/kg		<0.016	mg/kg	<0.0000016 %		**<LOD**
21		fluoranthene		205-912-4	206-44-0		<0.017	mg/kg		<0.017	mg/kg	<0.0000017 %		**<LOD**
22		pyrene		204-927-3	129-00-0		<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		**<LOD**
23		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<0.014	mg/kg		<0.014	mg/kg	<0.0000014 %		**<LOD**
24		chrysene	601-048-00-0	205-923-4	218-01-9		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		**<LOD**
25		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		**<LOD**
26		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.014	mg/kg		<0.014	mg/kg	<0.0000014 %		**<LOD**
27		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		**<LOD**
28		indeno[123-cd]pyrene		205-893-2	193-39-5		<0.018	mg/kg		<0.018	mg/kg	<0.0000018 %		**<LOD**
29		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<0.023	mg/kg		<0.023	mg/kg	<0.0000023 %		**<LOD**
30		benzo[ghi]perylene		205-883-8	191-24-2		<0.024	mg/kg		<0.024	mg/kg	<0.0000024 %		**<LOD**
31		polychlorobiphenyls; PCB	602-039-00-4	215-648-1	1336-36-3		<0.021	mg/kg		<0.021	mg/kg	<0.0000021 %		**<LOD**
32		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
33		benzene	601-020-00-8	200-753-7	71-43-2		<0.09	mg/kg		<0.09	mg/kg	<0.000009 %		**<LOD**
34		toluene	601-021-00-3	203-625-9	108-88-3		<0.07	mg/kg		<0.07	mg/kg	<0.000007 %		**<LOD**
35		ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
36		coronene		205-881-7	191-07-1		<0.2	mg/kg		<0.2	mg/kg	<0.00002 %		**<LOD**
37		o-xylene; [1] p-xylene; [2] m-xylene; [3] xylene [4]	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.2	mg/kg		<0.2	mg/kg	<0.00002 %		**<LOD**
											Total:	0.0437 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous property to non hazardous because HP 3 can be discounted as this is a solid waste without a free draining liquid phase.

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.00038%)

Classification of sample: TP6-200519-0.50-0.50

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
TP6-200519-0.50-0.50
Moisture content:
10%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 10% Wet Weight Moisture Correction applied (MC)

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		TPH (C6 to C40) petroleum group			TPH		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
2		antimony { antimony trioxide }	051-005-00-X	215-175-0	1309-64-4		1.73	mg/kg	1.197	1.864	mg/kg	0.000186 %	✓	
3		arsenic { arsenic compounds, with the exception of those specified elsewhere in this Annex }	033-002-00-5			1	12.7	mg/kg		11.43	mg/kg	0.00114 %	✓	
4		barium { barium oxide }		215-127-9	1304-28-5		137	mg/kg	1.117	137.665	mg/kg	0.0138 %	✓	
5		cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		1.27	mg/kg	1.142	1.306	mg/kg	0.000131 %	✓	
6		copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		28.1	mg/kg	1.126	28.474	mg/kg	0.00285 %	✓	
7		lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			1	20.6	mg/kg		18.54	mg/kg	0.00185 %	✓	
8		mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.14	mg/kg	1.353	<0.189	mg/kg	<0.0000189 %		**<LOD**
9		molybdenum { molybdenum(VI) oxide }	042-001-00-9	215-204-7	1313-27-5		3.52	mg/kg	1.5	4.753	mg/kg	0.000475 %	✓	
10		nickel { nickel sulfate }	028-009-00-5	232-104-9	7786-81-4		36.2	mg/kg	2.637	85.903	mg/kg	0.00859 %	✓	
11		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<1	mg/kg	2.554	<2.554	mg/kg	<0.000255 %		**<LOD**
12		zinc { zinc sulphate }	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]		72.7	mg/kg	2.469	161.566	mg/kg	0.0162 %	✓	
13		chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		9.28	mg/kg	1.462	12.207	mg/kg	0.00122 %	✓	

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
14		chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.6	mg/kg	1.923	<1.154	mg/kg	<0.000115 %		**<LOD**
15		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.009	mg/kg		<0.009	mg/kg	<0.0000009 %		**<LOD**
16		acenaphthylene		205-917-1	208-96-8		<0.012	mg/kg		<0.012	mg/kg	<0.0000012 %		**<LOD**
17		acenaphthene		201-469-6	83-32-9		<0.008	mg/kg		<0.008	mg/kg	<0.0000008 %		**<LOD**
18		fluorene		201-695-5	86-73-7		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		**<LOD**
19		phenanthrene		201-581-5	85-01-8		<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		**<LOD**
20		anthracene		204-371-1	120-12-7		<0.016	mg/kg		<0.016	mg/kg	<0.0000016 %		**<LOD**
21		fluoranthene		205-912-4	206-44-0		<0.017	mg/kg		<0.017	mg/kg	<0.0000017 %		**<LOD**
22		pyrene		204-927-3	129-00-0		<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		**<LOD**
23		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<0.014	mg/kg		<0.014	mg/kg	<0.0000014 %		**<LOD**
24		chrysene	601-048-00-0	205-923-4	218-01-9		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		**<LOD**
25		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		**<LOD**
26		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.014	mg/kg		<0.014	mg/kg	<0.0000014 %		**<LOD**
27		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		**<LOD**
28		indeno[123-cd]pyrene		205-893-2	193-39-5		<0.018	mg/kg		<0.018	mg/kg	<0.0000018 %		**<LOD**
29		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<0.023	mg/kg		<0.023	mg/kg	<0.0000023 %		**<LOD**
30		benzo[ghi]perylene		205-883-8	191-24-2		<0.024	mg/kg		<0.024	mg/kg	<0.0000024 %		**<LOD**
31		polychlorobiphenyls; PCB	602-039-00-4	215-648-1	1336-36-3		<0.021	mg/kg		<0.021	mg/kg	<0.0000021 %		**<LOD**
32		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		**<LOD**
33		benzene	601-020-00-8	200-753-7	71-43-2		<0.009	mg/kg		<0.009	mg/kg	<0.0000009 %		**<LOD**
34		toluene	601-021-00-3	203-625-9	108-88-3		0.0104	mg/kg		0.0093	mg/kg	0.000000936 %	✓	
35		ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.004	mg/kg		<0.004	mg/kg	<0.0000004 %		**<LOD**
36		coronene		205-881-7	191-07-1		<0.2	mg/kg		<0.2	mg/kg	<0.00002 %		**<LOD**
37		o-xylene; [1] p-xylene; [2] m-xylene; [3] xylene [4]	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		**<LOD**
											Total:	0.0468 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous property to non hazardous because HP 3 can be discounted as this is a solid waste without a free draining liquid phase.

Hazard Statements hit:

Flam. Liq. 2; H225 "Highly flammable liquid and vapour."

Because of determinand:

toluene: (conc.: 9.36e-07%)

Appendix A: Classifier defined and non CLP determinands

TPH (C6 to C40) petroleum group (CAS Number: TPH)

Description/Comments: Hazard statements taken from WM3 1st Edition 2015; Risk phrases: WM2 3rd Edition 2013
Data source: WM3 1st Edition 2015
Data source date: 25 May 2015
Hazard Statements: Aquatic Chronic 2 H411 , Repr. 2 H361d , Carc. 1B H350 , Muta. 1B H340 , STOT RE 2 H373 , Asp. Tox. 1 H304 , Flam. Liq. 3 H226

arsenic compounds, with the exception of those specified elsewhere in this Annex

CLP index number: 033-002-00-5
Description/Comments: Worst Case: IARC considers arsenic compounds Group 1; Carcinogenic to humans
Data source: Regulation 1272/2008/EC - Classification, labelling and packaging of substances and mixtures. (CLP)
Additional Hazard Statement(s): Carc. 1A H350
Reason for additional Hazards Statement(s)/Risk Phrase(s):
03 Jun 2015 - Carc. 1A H350 hazard statement sourced from: IARC Group 1 (23, Sup 7, 100C) 2012

barium oxide (EC Number: 215-127-9, CAS Number: 1304-28-5)

Conversion factor: 1.117
Description/Comments: Data from C&L Inventory Database; No entries in Registered Substances Database, IARC or Pesticide Properties Database
Data source:
http://clp-inventory.echa.europa.eu/SummaryOfClassAndLabelling.aspx?SubstanceID=88825&HarmOnly=no?fc=true&lang=en
Data source date: 02 Jun 2014
Hazard Statements: Skin Irrit. 2 H315 , STOT SE 3 H335 , Eye Irrit. 2 H319 , Skin Corr. 1A H314 , Acute Tox. 3 H301 , Acute Tox. 4 H302 , Acute Tox. 4 H332

lead compounds with the exception of those specified elsewhere in this Annex (worst case)

CLP index number: 082-001-00-6
Description/Comments: Worst Case: IARC considers lead compounds Group 1; Carcinogenic to humans; Lead REACH Consortium considers some lead compounds Carcinogenic category 1A
Data source: Regulation 1272/2008/EC - Classification, labelling and packaging of substances and mixtures. (CLP)
Additional Hazard Statement(s): Carc. 1A H350
Reason for additional Hazards Statement(s)/Risk Phrase(s):
03 Jun 2015 - Carc. 1A H350 hazard statement sourced from: IARC Group 2A (Sup 7, 87) 2006; Lead REACH Consortium www.reach-lead.eu/substanceinformation.html (worst case lead compounds). Review date 29/09/2015

chromium(III) oxide (EC Number: 215-160-9, CAS Number: 1308-38-9)

Conversion factor: 1.462
Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Repr. 1B H360FD , Skin Sens. 1 H317 , Resp. Sens. 1 H334 , Skin Irrit. 2 H315 , STOT SE 3 H335 , Eye Irrit. 2 H319 , Acute Tox. 4 H302 , Acute Tox. 4 H332

acenaphthylene (EC Number: 205-917-1, CAS Number: 208-96-8)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Skin Irrit. 2 H315 , STOT SE 3 H335 , Eye Irrit. 2 H319 , Acute Tox. 1 H310 , Acute Tox. 1 H330 , Acute Tox. 4 H302

acenaphthene (EC Number: 201-469-6, CAS Number: 83-32-9)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Aquatic Chronic 2 H411 , Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Skin Irrit. 2 H315 , STOT SE 3 H335 , Eye Irrit. 2 H319

fluorene (EC Number: 201-695-5, CAS Number: 86-73-7)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400

- **phenanthrene** (EC Number: 201-581-5, CAS Number: 85-01-8)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Skin Irrit. 2 H315 , Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Skin Sens. 1 H317 , Carc. 2 H351 , STOT SE 3 H335 , Eye Irrit. 2 H319 , Acute Tox. 4 H302

- **anthracene** (EC Number: 204-371-1, CAS Number: 120-12-7)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Skin Sens. 1 H317 , Skin Irrit. 2 H315 , STOT SE 3 H335 , Eye Irrit. 2 H319

- **fluoranthene** (EC Number: 205-912-4, CAS Number: 206-44-0)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 21 Aug 2015
Hazard Statements: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Acute Tox. 4 H302

- **pyrene** (EC Number: 204-927-3, CAS Number: 129-00-0)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 2014
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 21 Aug 2015
Hazard Statements: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , STOT SE 3 H335 , Eye Irrit. 2 H319 , Skin Irrit. 2 H315

- **indeno[123-cd]pyrene** (EC Number: 205-893-2, CAS Number: 193-39-5)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Carc. 2 H351

- **benzo[ghi]perylene** (EC Number: 205-883-8, CAS Number: 191-24-2)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 28/02/2015
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 23 Jul 2015
Hazard Statements: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400

- **polychlorobiphenyls; PCB** (EC Number: 215-648-1, CAS Number: 1336-36-3)

CLP index number: 602-039-00-4
Description/Comments: Worst Case: IARC considers PCB Group 1; Carcinogenic to humans; POP specific threshold from ATP1 (Regulation 756/2010/EU) to POPs Regulation (Regulation 850/2004/EC). Where applicable, the calculation method laid down in European standards EN 12766-1 and EN 12766-2 shall be applied.
Data source: Regulation 1272/2008/EC - Classification, labelling and packaging of substances and mixtures. (CLP)
Additional Hazard Statement(s): Carc. 1A H350
Reason for additional Hazards Statement(s)/Risk Phrase(s):
29 Sep 2015 - Carc. 1A H350 hazard statement sourced from: IARC Group 1 (23, Sup 7, 100C) 2012

- **ethylbenzene** (EC Number: 202-849-4, CAS Number: 100-41-4)

CLP index number: 601-023-00-4
Description/Comments:
Data source: Commission Regulation (EU) No 605/2014 – 6th Adaptation to Technical Progress for Regulation (EC) No 1272/2008. (ATP6)
Additional Hazard Statement(s): Carc. 2 H351
Reason for additional Hazards Statement(s)/Risk Phrase(s):
03 Jun 2015 - Carc. 2 H351 hazard statement sourced from: IARC Group 2B (77) 2000

- **coronene** (EC Number: 205-881-7, CAS Number: 191-07-1)

Description/Comments: Data from C&L Inventory Database; no entries in Registered Substances or Pesticides Properties databases; SDS: Sigma Aldrich, 1907/2006 compliant, dated 2012 - no entries; IARC – Group 3, not carcinogenic.
Data source:
http://clp-inventory.echa.europa.eu/SummaryOfClassAndLabelling.aspx?SubstanceID=17010&HarmOnly=no?fc=true&lang=en
Data source date: 16 Jun 2014
Hazard Statements: STOT SE 2 H371

Appendix B: Rationale for selection of metal species

antimony {antimony trioxide}

Worst case scenario

arsenic {arsenic compounds, with the exception of those specified elsewhere in this Annex}

Chromium VII at limits of detection. Arsenic compounds used as the next most hazardous species. No chromate present.

barium {barium oxide}

Chromium VII at limits of detection. Barium compounds used as the next most hazardous species. No chromate present.

cadmium {cadmium oxide}

Chromium VII at limits of detection. Cadmium compounds used as the next most hazardous species. No chromate present.

copper {dicopper oxide; copper (I) oxide}

Reasonable case CLP species based on hazard statements/molecular weight and insolubility in water. Worse case copper sulphate is very soluble and likely to have been leached away if ever present and/or not enough soluble sulphate detected.

lead {lead compounds with the exception of those specified elsewhere in this Annex (worst case)}

Chromium VII at limits of detection. Lead compounds used as the next most hazardous species. No chromate present.

mercury {mercury dichloride}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

molybdenum {molybdenum(VI) oxide}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

nickel {nickel sulfate}

Chromium VII at limits of detection. Nickel sulphate used as the next most hazardous species. No chromate present.

selenium {selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex}

Harmonised group entry used as most reasonable case. Pigment cadmium sulphoselenide not likely to be present in this soil. No evidence for the other CLP entries: sodium selenite, nickel II selenite and nickel selenide, to be present in this soil. (edit as required)

zinc {zinc sulphate}

Chromium VII at limits of detection. Zinc sulphate used as the next most hazardous species. No chromate present.

chromium in chromium(III) compounds {chromium(III) oxide}

Reasonable case species based on hazard statements/molecular weight. Industrial sources include: tanning, pigment in paint, inks and glass (edit as required)

chromium in chromium(VI) compounds {chromium(VI) oxide}

Worst case CLP species based on hazard statements/molecular weight. Industrial sources include: production stainless steel, electroplating, wood preservation, anti-corrosion agents or coatings, pigments (edit as required)

Appendix C: Version

HazWasteOnline Classification Engine: WM3 1st Edition v1.1, May 2018
HazWasteOnline Classification Engine Version: 2019.152.3882.7895 (01 Jun 2019)
HazWasteOnline Database: 2019.152.3882.7895 (01 Jun 2019)

This classification utilises the following guidance and legislation:
WM3 v1.1 - Waste Classification - 1st Edition v1.1 - May 2018
CLP Regulation - Regulation 1272/2008/EC of 16 December 2008
1st ATP - Regulation 790/2009/EC of 10 August 2009
2nd ATP - Regulation 286/2011/EC of 10 March 2011
3rd ATP - Regulation 618/2012/EU of 10 July 2012
4th ATP - Regulation 487/2013/EU of 8 May 2013
Correction to 1st ATP - Regulation 758/2013/EU of 7 August 2013
5th ATP - Regulation 944/2013/EU of 2 October 2013
6th ATP - Regulation 605/2014/EU of 5 June 2014
WFD Annex III replacement - Regulation 1357/2014/EU of 18 December 2014
Revised List of Wastes 2014 - Decision 2014/955/EU of 18 December 2014
7th ATP - Regulation 2015/1221/EU of 24 July 2015
8th ATP - Regulation (EU) 2016/918 of 19 May 2016
9th ATP - Regulation (EU) 2016/1179 of 19 July 2016
10th ATP - Regulation (EU) 2017/776 of 4 May 2017
HP14 amendment - Regulation (EU) 2017/997 of 8 June 2017
13th ATP - Regulation (EU) 2018/1480 of 4 October 2018
POPs Regulation 2004 - Regulation 850/2004/EC of 29 April 2004
1st ATP to POPs Regulation - Regulation 756/2010/EU of 24 August 2010
2nd ATP to POPs Regulation - Regulation 757/2010/EU of 24 August 2010

Appendix 6

Survey Data

Survey Data

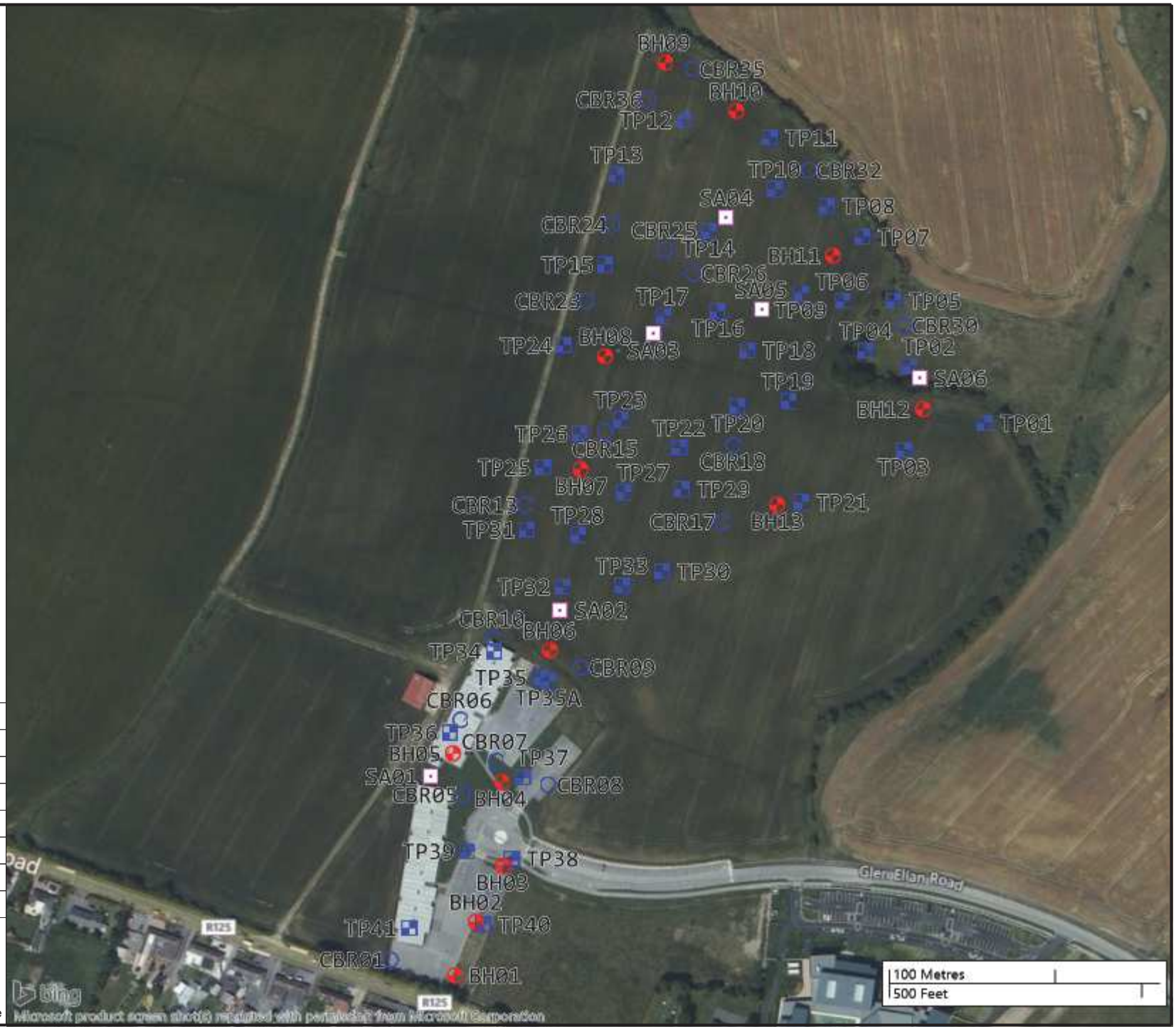
Location	Irish Transverse Mercator		Elevation	Irish National Grid	
	Easting	Northing		Easting	Northing
Boreholes					
BH01	716173.833	748313.669	32.86	316248.146	248290.467
BH02	716186.310	748346.488	31.64	316260.625	248323.293
BH03	716201.741	748380.797	30.79	316276.059	248357.610
BH04	716199.256	748431.387	29.65	316273.573	248408.211
BH05	716170.019	748448.030	29.46	316244.330	248424.857
BH06	716227.020	748511.910	26.94	316301.342	248488.751
BH07	716243.645	748621.941	23.57	316317.970	248598.806
BH08	716256.475	748690.585	20.91	316330.802	248667.465
BH09	716287.706	748869.142	18.34	316362.038	248846.061
BH10	716331.869	748840.936	18.54	316406.210	248817.849
BH11	716392.764	748754.806	17.57	316467.119	248731.701
BH12	716448.979	748663.363	18.00	316523.347	248640.238
BH13	716363.054	748603.479	22.06	316437.404	248580.341
Trial Pits					
TP01	716487.904	748655.913	17.02	316562.281	248632.787
TP02	716440.612	748689.188	16.51	316514.978	248666.069
TP03	716438.671	748638.308	19.04	316513.037	248615.178
TP04	716414.104	748697.864	16.89	316488.464	248674.747
TP05	716430.514	748728.368	16.27	316504.878	248705.257
TP06	716399.085	748727.592	17.39	316473.442	248704.481
TP07	716410.670	748766.653	17.33	316485.029	248743.550
TP08	716388.911	748784.825	18.00	316463.265	248761.726
TP09	716373.983	748731.567	17.85	316448.335	248708.457
TP10	716356.264	748794.276	18.54	316430.611	248771.179
TP11	716353.395	748825.420	18.39	316427.741	248802.330
TP12	716300.535	748834.757	18.90	316374.870	248811.668
TP13	716260.724	748800.659	19.30	316335.051	248777.563
TP14	716317.031	748767.699	18.75	316391.370	248744.596
TP15	716255.273	748746.026	19.00	316329.599	248722.918
TP16	716324.058	748719.507	18.26	316398.399	248696.394
TP17	716290.650	748715.769	19.49	316364.984	248692.655
TP18	716342.446	748696.355	18.84	316416.791	248673.237
TP19	716367.785	748666.198	19.73	316442.136	248643.073
TP20	716337.273	748662.233	20.42	316411.617	248639.107
TP21	716377.279	748605.280	21.71	316451.632	248582.142
TP22	716302.365	748636.517	22.02	316376.702	248613.386
TP23	716266.448	748652.449	22.11	316340.777	248629.321
TP24	716231.411	748696.705	21.08	316305.733	248673.586
TP25	716219.839	748622.510	24.15	316294.159	248599.375
TP26	716241.971	748643.520	22.73	316316.295	248620.390
TP27	716269.330	748608.685	23.47	316343.660	248585.547
TP28	716242.182	748582.076	25.18	316316.507	248558.932

Survey Data

Location	Irish Transverse Mercator		Elevation	Irish National Grid	
	Easting	Northing		Easting	Northing
TP29	716305.130	748611.372	23.58	316379.468	248588.235
TP30	716294.195	748561.395	25.04	316368.531	248538.247
TP31	716211.618	748584.607	25.91	316285.936	248561.464
TP32	716233.523	748550.545	26.34	316307.846	248527.395
TP33	716269.975	748552.133	25.43	316344.306	248528.983
TP34	716192.929	748510.478	29.42	316267.244	248487.319
TP35	716220.972	748495.365	28.88	316295.293	248472.203
TP35A	716226.269	748493.202	28.90	316300.591	248470.039
TP36	716167.412	748460.628	29.38	316241.722	248437.458
TP37	716212.617	748434.663	29.12	316286.937	248411.487
TP38	716206.729	748385.328	30.43	316281.048	248362.142
TP39	716179.600	748389.142	30.92	316253.914	248365.956
TP40	716190.650	748345.002	32.20	316264.966	248321.807
TP41	716145.700	748341.706	32.17	316220.007	248318.510
Soakaways					
SA01	716156.205	748433.899	31.66	316230.513	248410.723
SA02	716232.482	748536.195	26.56	316306.805	248513.041
SA03	716285.525	748705.152	19.91	316359.858	248682.035
SA04	716327.695	748776.319	18.75	316402.036	248753.218
SA05	716350.282	748721.286	17.99	316424.629	248698.173
SA06	716447.087	748682.206	16.12	316521.455	248659.085
California Bearing Ratio tests					
CBR01	716135.149	748322.301	33.24	316209.454	248299.101
CBR05	716176.858	748423.197	29.92	316251.171	248400.019
CBR06	716173.387	748468.453	29.36	316247.698	248445.284
CBR07	716195.504	748443.952	29.68	316269.820	248420.778
CBR08	716228.398	748430.589	28.67	316302.722	248407.413
CBR09	716246.439	748501.985	26.83	316320.766	248478.824
CBR10	716191.946	748518.024	29.58	316266.261	248494.866
CBR13	716208.921	748599.441	25.38	316283.239	248576.301
CBR15	716257.640	748644.859	22.48	316331.968	248621.729
CBR17	716329.117	748592.228	24.15	316403.460	248569.087
CBR18	716335.098	748638.940	21.70	316409.442	248615.809
CBR23	716244.296	748723.792	20.81	316318.620	248700.679
CBR24	716258.830	748770.348	19.48	316333.157	248747.245
CBR25	716290.888	748755.859	19.20	316365.222	248732.753
CBR26	716308.219	748742.060	18.96	316382.556	248718.951
CBR30	716436.941	748713.604	15.45	316511.306	248690.490
CBR32	716376.589	748806.303	18.12	316450.940	248783.209
CBR35	716304.232	748865.656	18.31	316378.567	248842.574
CBR36	716278.329	748846.540	18.45	316352.659	248823.454

Legend Key

- Locations By Type - CP
- Locations By Type - ICBR
- Locations By Type - IP
- Locations By Type - TP



Contract No:	5599
Contract Name:	Millers Glen - Phase 5
Location:	Swords, Co. Dublin
Client:	Gannon Homes Ltd
Engineer:	Waterman Moylan
Title:	Site Plan
Scale:	1:3250
Drawn By:	SL

Site Investigations Ltd
The Grange
12th Lock Road
Lucan
Co. Dublin
T: 01 6108768
e: info@siteinvestigations.ie

APPENDIX 8.1: AIR QUALITY

Dust Management Plan

Site management

The aim is to ensure good site management by avoiding dust becoming airborne at source. This will be done through good design and effective control strategies. At the construction planning stage, the siting of activities and storage piles will take note of the location of sensitive receptors and prevailing wind directions. As the prevailing wind is predominantly south-westerly, locating construction compounds and storage piles downwind of sensitive receptors will minimise the potential for dust nuisance to occur at sensitive receptors. The Principal Contractor or equivalent must ensure that the proposed mitigation measures are implemented, and that dust impacts and nuisance are minimised.

- It is recommended that community engagement be undertaken before works commence on site explaining the nature and duration of the works to local residents and businesses.
- The name and contact details of a person to contact regarding air quality and dust issues shall be displayed on the site boundary. A complaints register will be kept on site detailing all sources of complaints received in connection with dust nuisance or air quality concerns, together with details of any remedial actions carried out.
- Regular inspections of the site and boundary should be carried out to monitor dust, records and notes on these inspections should be logged.
- Record any exceptional incidents that cause dust and/or air emissions, either on- or offsite, and the action taken to resolve the situation in the logbook.
- In the event of dust nuisance occurring outside the site boundary, site activities will be reviewed, and satisfactory procedures implemented to rectify the problem.

Preparing and maintaining the site

- Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.
- Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site if necessary.
- Fully enclose site or specific operations where there is a high potential for dust production and the site is actives for an extensive period
- Avoid site runoff of water or mud.
- Keep site fencing, barriers and scaffolding clean using wet methods.
- Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover or fence stockpiles to prevent wind whipping.

Site roads and operating vehicles / machinery

- A speed restriction of 20 km/hr will be applied as an effective control measure for dust for on-site vehicles using unpaved site roads.
- Access gates to the site shall be located at least 10m from sensitive receptors where possible.
- Bowsers or suitable watering equipment will be available during periods of dry weather. Watering shall be conducted during sustained dry periods to ensure that unpaved areas are kept moist.

- Any hard surface roads will be swept to remove mud and aggregate materials from their surface while any unsurfaced roads shall be restricted to essential site traffic only.
- Ensure all vehicles switch off engines when stationary.
- Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable.

Site traffic on public roads

- Vehicles delivering material with potential for dust emissions to an off-site location shall be enclosed or covered with tarpaulin at all times.
- At the main construction traffic exit, a wheel wash facility shall be installed. All trucks leaving the site must pass through the wheel wash. The wheel wash will be located sufficiently far from the exit to allow trucks to 'drip off' prior to exit. In addition, public roads outside the site shall be regularly inspected for cleanliness and cleaned as necessary.
- Vehicles onsite shall turn off engines when not in use to prevent idling emissions.

Onsite operations

- Only use cutting, grinding, or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays.
- Ensure an adequate water supply on the site for effective dust / particulate matter suppression.
- Use enclosed chutes and conveyors and covered skips.
- Avoid dry sweeping of large areas.
- Minimise drop heights from conveyors and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.
- Ensure equipment is readily available on site to clean any dry spillages and clean up spillages as soon as reasonably practicable after the event.

Waste management

- Avoid bonfires and burning of waste materials.

Demolition activities

- Soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust).
- Ensure effective water suppression is used during demolition operations.
- Avoid explosive blasting, using appropriate manual or mechanical alternatives.
- Bag and remove any biological debris or damp down such material before demolition.

Earthwork's activities

- Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable.
- Only remove the cover in small areas during work and not all at once.

- During dry and windy periods, and when there is a likelihood of dust nuisance, a bowser or similar will operate to ensure moisture content is high enough to increase the stability of the soil and thus suppress dust.

Construction activities

- Ensure aggregates are stored in bunded areas and are not allowed to dry out unless this is required for a particular process.
- Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in with suitable emission control systems to prevent escape of material and overfilling during delivery.
- For smaller supplies of fine power materials ensure bags are sealed after use and stored appropriately.
- During periods of very high winds (gales), construction activities likely to generate significant dust emissions should be postponed until the gale has subsided.

APPENDIX 11.1: VERIFIED PHOTOMONTAGES

Verified Photomontages

To be read in conjunction with
Townscape and Visual Impact Assessment Report

Proposed
Development at Oldtown, Swords, Co. Dublin Phase 5

Prepared by Model Works Ltd

January 2022

MODEL WORKS

MODEL WORKS

project: Oldtown Phase 5

View Locaton Map

issued: 26-01-2022

Angle of View 39° Horizontal (50 mm Lens)

MODEL WORKS

project: Oldtown Phase 5

photography: 09-11-2021 15:15
Canon 5D Mark II
50 mm Lens

location:
E 717103.809 N 749387.661

viewpoint: **View 01 Baseline**

issued: 26-01-2022

Angle of View 39° Horizontal (50 mm Lens)

MODEL WORKS

project: Oldtown Phase 5

photography: 09-11-2021 15:15
Canon 5D Mark II
50 mm Lens

location: E 717103.809 N 749387.661

viewpoint: **View 01 Proposed**

issued: 26-01-2022

Angle of View 73° Horizontal (24 mm Lens)

Angle of View 39° Horizontal (50 mm Lens)

MODEL WORKS

project: Oldtown Phase 5

photography: 09-11-2021 14:31
Canon 5D Mark II
24 mm Lens

location: E 716019.061 N 748338.609

viewpoint: **View 02 Baseline**

issued: 26-01-2022

Angle of View 73° Horizontal (24 mm Lens)

Angle of View 39° Horizontal (50 mm Lens)

MODEL WORKS

project: Oldtown Phase 5

photography: 09-11-2021 14:31
Canon 5D Mark II
24 mm Lens

location:
E 716019.061 N 748338.609

viewpoint: **View 02 Proposed**

issued: 26-01-2022

Angle of View 73° Horizontal (24 mm Lens)

Angle of View 39° Horizontal (50 mm Lens)

.MODEL WORKS	*project:* Oldtown Phase 5	*photography:* 09-11-2021 14:31 Canon 5D Mark II 24 mm Lens	*location:* E 716019.061 N 748338.609	*viewpoint:* **View 02** *issued:* 26-01-2022	**Proposed and Permitted**

Angle of View 73° Horizontal (24 mm Lens)

Angle of View 39° Horizontal (50 mm Lens)

.MODEL WORKS

project: Oldtown Phase 5

photography: 09-11-2021 14:21
Canon 5D Mark II
24 mm Lens

location:
E 716293.199 N 748227.189

viewpoint: **View 03 Baseline**

issued: 26-01-2022

Angle of View 73° Horizontal (24 mm Lens) | Angle of View 39° Horizontal (50 mm Lens)

.MODEL WORKS

project: Oldtown Phase 5

photography: 09-11-2021 14:21
Canon 5D Mark II
24 mm Lens

location:
E 716293.199 N 748227.189

viewpoint: **View 03 Proposed**

issued: 26-01-2022

Angle of View 73° Horizontal (24 mm Lens)

Angle of View 39° Horizontal (50 mm Lens)

MODEL WORKS

project: Oldtown Phase 5

photography: 09-11-2021 14:21
Canon 5D Mark II
24 mm Lens

location:
E 716293.199 N 748227.189

viewpoint: **View 03**

issued: 26-01-2022

Proposed and Permitted

Angle of View 73° Horizontal (24 mm Lens)

Angle of View 39° Horizontal (50 mm Lens)

.MODEL WORKS

project: Oldtown Phase 5

photography: 09-11-2021 14:44
Canon 5D Mark II
24 mm Lens

location:
E 716567.327 N 748667.761

viewpoint: **View 04 Baseline**

issued: 26-01-2022

Angle of View 73° Horizontal (24 mm Lens) | Angle of View 39° Horizontal (50 mm Lens)

.MODEL WORKS

project: Oldtown Phase 5

photography: 09-11-2021 14:44
Canon 5D Mark II
24 mm Lens

location:
E 716567.327 N 748667.761

viewpoint: **View 04 Proposed**

issued: 26-01-2022

Angle of View 73° Horizontal (24 mm Lens)

Angle of View 39° Horizontal (50 mm Lens)

MODEL WORKS

project: Oldtown Phase 5

photography: 09-11-2021 14:44
Canon 5D Mark II
24 mm Lens

location:
E 716567.327 N 748667.761

viewpoint: **View 04**

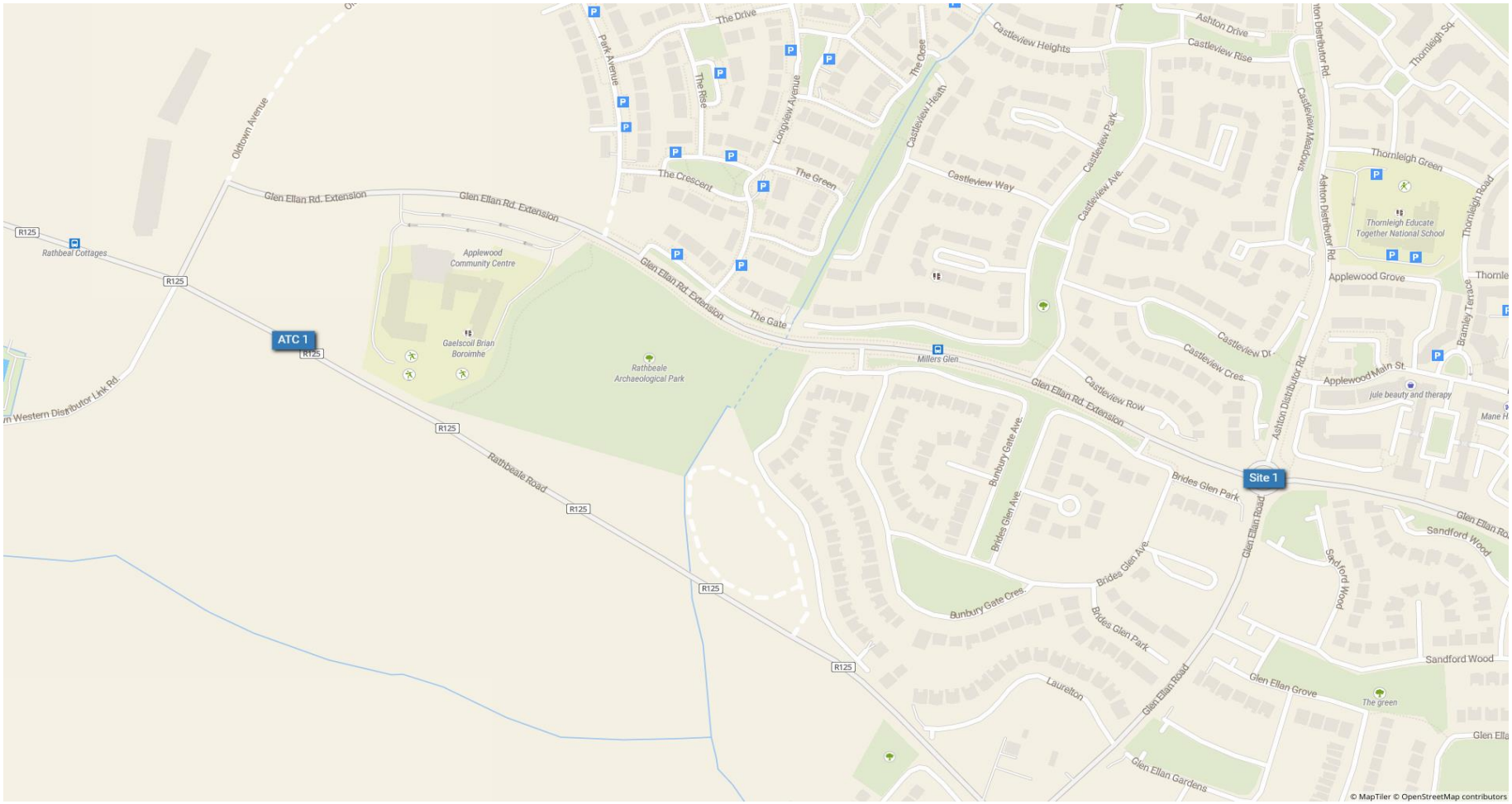
issued: 26-01-2022

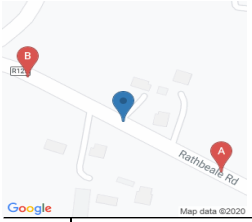
Proposed and Permitted

APPENDIX 12.1: TRAFFIC AND TRANSPORT

IDASO

Survey Name: HDR 20-032 Swords (Waterman Moylan)
Date: Tue 03 Oct 2017





IDASO

Survey Name: HDR 20-032 Swords (Waterman Moylan)
Site: ATC 1
Location: —
Date: Tue 03-Oct-2017

	A => A							A => B							B => A							B => B						
TIME	CAR	LGV	OGV1	OGV2	SV (BUS	TOT	PCU	CAR	LGV	OGV1	OGV2	SV (BUS	TOT	PCU	CAR	LGV	OGV1	OGV2	SV (BUS	TOT	PCU	CAR	LGV	OGV1	OGV2	SV (BUS	TOT	PCU
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00:30	0	0	0	0	0	0	0	5	0	0	0	0	5	5	1	0	0	0	0	1	1	0	0	0	0	0	0	0
00:45	0	0	0	0	0	0	0	1	0	0	0	0	1	1	2	0	0	0	0	2	2	0	0	0	0	0	0	0
H/TOT	0	0	0	0	0	0	0	12	0	0	0	0	12	12	12	0	0	0	0	12	12	0	0	0	0	0	0	0
01:00	0	0	0	0	0	0	0	2	0	0	0	0	2	2	1	0	0	0	0	1	1	0	0	0	0	0	0	0
01:15	0	0	0	0	0	0	0	1	0	0	0	0	1	1	1	0	0	0	0	1	1	0	0	0	0	0	0	0
01:30	0	0	0	0	0	0	0	3	0	0	0	0	3	3	1	0	0	1	0	2	3.3	0	0	0	0	0	0	0
01:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0
H/TOT	0	0	0	0	0	0	0	6	0	0	0	0	6	6	4	0	0	1	0	5	6.3	0	0	0	0	0	0	0
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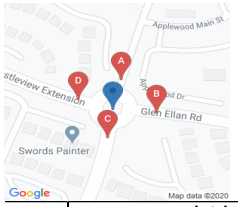
H/TOT	0	0	0	0	0	0	0	7	0	0	0	0	7	7	2	0	0	0	0	2	2	0	0	0	0	0	0	0
03:00	0	0	0	0	0	0	0	2	0	0	0	0	2	2	2	0	0	0	0	2	2	0	0	0	0	0	0	0
03:15	0	0	0	0	0	0	0	4	0	0	0	0	4	4	1	0	0	0	0	1	1	0	0	0	0	0	0	0
03:30	0	0	0	0	0	0	0	5	0	0	2	0	7	9.6	1	1	0	0	0	2	2	0	0	0	0	0	0	0
03:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	1	0	0	3	3.5	0	0	0	0	0	0	0
H/TOT	0	0	0	0	0	0	0	11	0	0	2	0	13	15.6	6	1	1	0	0	8	8.5	0	0	0	0	0	0	0
04:00	0	0	0	0	0	0	0	1	0	0	0	0	1	1	2	0	0	0	0	2	2	0	0	0	0	0	0	0
04:15	0	0	0	0	0	0	0	2	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30	0	0	0	0	0	0	0	2	0	0	0	0	2	2	3	0	1	0	0	4	4.5	0	0	0	0	0	0	0
04:45	0	0	0	0	0	0	0	1	0	0	0	0	1	1	3	0	0	1	0	4	5.3	0	0	0	0	0	0	0
H/TOT	0	0	0	0	0	0	0	6	0	0	0	0	6	6	8	0	1	1	0	10	11.8	0	0	0	0	0	0	0
05:00	0	0	0	0	0	0	0	6	0	0	2	0	8	10.6	3	0	0	1	0	4	5.3	0	0	0	0	0	0	0
05:15	0	0	0	0	0	0	0	2	0	0	1	0	3	4.3	6	1	1	0	0	8	8.5	0	0	0	0	0	0	0
05:30	0	0	0	0	0	0	0	6	0	0	0	0	6	6	8	3	1	0	0	12	12.5	0	0	0	0	0	0	0
05:45	0	0	0	0	0	0	0	6	0	0	1	0	7	8.3	10	1	1	1	0	13	14.8	0	0	0	0	0	0	0
H/TOT	0	0	0	0	0	0	0	20	0	0	4	0	24	29.2	27	5	3	2	0	37	41.1	0	0	0	0	0	0	0
06:00	0	0	0	0	0	0	0	8	0	0	0	0	8	8	10	0	0	0	0	10	10	0	0	0	0	0	0	0
06:15	0	0	0	0	0	0	0	6	0	1	0	0	7	7.5	6	0	2	0	0	8	9	0	0	0	0	0	0	0
06:30	0	0	0	0	0	0	0	13	0	0	0	0	13	13	14	0	0	0	0	14	14	0	0	0	0	0	0	0
06:45	0	0	0	0	0	0	0	24	4	0	0	0	28	28	15	8	3	0	0	26	27.5	0	0	0	0	0	0	0
H/TOT	0	0	0	0	0	0	0	51	4	1	0	0	56	56.5	45	8	5	0	0	58	60.5	0	0	0	0	0	0	0
07:00	0	0	0	0	0	0	0	26	8	2	2	0	38	41.6	20	12	5	0	0	37	39.5	0	0	0	0	0	0	0
07:15	0	0	0	0	0	0	0	32	14	3	1	0	50	52.8	35	17	0	12	0	64	79.6	0	0	0	0	0	0	0
07:30	0	0	0	0	0	0	0	63	18	0	1	1	83	85.3	61	9	2	0	2	74	77	0	0	0	0	0	0	0
07:45	0	0	0	0	0	0	0	64	14	1	0	1	80	81.5	84	9	3	2	1	99	104.1	0	0	0	0	0	0	0
H/TOT	0	0	0	0	0	0	0	185	54	6	4	2	251	261.2	200	47	10	14	3	274	300.2	0	0	0	0	0	0	0
08:00	0	0	0	0	0	0	0	45	4	0	1	0	50	51.3	93	6	1	0	1	101	102.5	0	0	0	0	0	0	0
08:15	0	0	0	0	0	0	0	68	6	2	3	0	79	83.9	98	11	1	0	1	111	112.5	0	0	0	0	0	0	0
08:30	0	0	0	0	0	0	0	98	8	3	2	0	111	115.1	64	11	1	0	1	77	78.5	0	0	0	0	0	0	0
08:45	0	0	0	0	0	0	0	64	4	1	0	0	69	69.5	83	9	2	1	0	95	97.3	0	0	0	0	0	0	0
H/TOT	0	0	0	0	0	0	0	275	22	6	6	0	309	319.8	338	37	5	1	3	384	390.8	0	0	0	0	0	0	0
09:00	0	0	0	0	0	0	0	58	6	1	2	0	67	70.1	77	6	1	1	0	85	86.8	0	0	0	0	0	0	0
09:15	0	0	0	0	0	0	0	42	8	2	0	0	52	53	45	4	3	2	0	54	58.1	0	0	0	0	0	0	0
09:30	0	0	0	0	0	0	0	38	8	1	0	0	47	47.5	43	6	1	0	0	50	50.5	0	0	0	0	0	0	0
09:45	0	0	0	0	0	0	0	23	2	2	0	0	27	28	72	8	3	0	0	83	84.5	0	0	0	0	0	0	0
H/TOT	0	0	0	0	0	0	0	161	24	6	2	0	193	198.6	237	24	8	3	0	272	279.9	0	0	0	0	0	0	0
10:00	0	0	0	0	0	0	0	29	12	0	0	0	41	41	44	9	0	1	0	54	55.3	0	0	0	0	0	0	0
10:15	0	0	0	0	0	0	0	39	5	3	0	0	47	48.5	42	9	2	0	0	53	54	0	0	0	0	0	0	0
10:30	0	0	0	0	0	0	0	32	6	1	0	0	39	39.5	24	6	3	0	0	33	34.5	0	0	0	0	0	0	0
10:45	0	0	0	0	0	0	0	50	7	3	1	0	61	63.8	38	4	0	1	0	43	44.3	0	0	0	0	0	0	0
H/TOT	0	0	0	0	0	0	0	150	30	7	1	0	188	192.8	148	28	5	2	0	183	188.1	0	0	0	0	0	0	0
11:00	0	0	0	0	0	0	0	28	4	4	0	0	36	38	38	6	6	1	0	51	55.3	0	0	0	0	0	0	0
11:15	0	0	0	0	0	0	0	35	6	1	0	0	42	42.5	48	5	2	0	0	55	56	0	0	0	0	0	0	0
11:30	0	0	0	0	0	0	0	47	4	3	0	0	54	55.5	44	8	1	2	0	55	58.1	0	0	0	0	0	0	0
11:45	0	0	0	0	0	0	0	50	3	1	1	0	55	56.8	28	4	4	1	0	37	40.3	0	0	0	0	0	0	0
H/TOT	0	0	0	0	0	0	0	160	17	9	1	0	187	192.8	158	23	13	4	0	198	209.7	0	0	0	0	0	0	0
12:00	0	0	0	0	0	0	0	42	4	0	1	0	47	48.3	40	9	3	1	0	53	55.8	0	0	0	0	0	0	0
12:15	0	0	0	0	0	0	0	36	12	3	1	1	53	56.8	28	8	3	0	0	39	40.5	0	0	0	0	0	0	0
12:30	0	0	0	0	0	0	0	44	5	4	1	0	54	57.3	37	9	1	0	0	47	47.5	0	0	0	0	0	0	0
12:45	0	0	0	0	0	0	0	42	7	3	0	0	52	53.5	37	7	2	1	1	48	51.3	0	0	0	0	0	0	0
H/TOT	0	0	0	0	0	0	0	164	28	10	3	1	206	215.9	142	33	9	2	1	187	195.1	0	0	0	0	0	0	0
13:00	0	0	0	0	0	0	0	40	5	2	1	0	48	50.3	44	6	3	1	0	54	56.8	0	0	0	0	0	0	0
13:15	0	0	0	0	0	0	0	47	11	1	0	0	59	59.5	38	9	1	0	0	48	48.5	0	0	0	0	0	0	0
13:30	0	0	0	0	0	0	0	59	2	0	2	0	63	65.6	45	8	1	2	0	56	59.1	0	0	0	0	0	0	0
13:45	0	0	0	0	0	0	0	57	7	1	0	0	65	65.5	48	3	1	1	0	53	54.8	0	0	0	0	0	0	0
H/TOT	0	0	0	0	0	0	0	203	25	4	3	0	235	240.9	175	26	6	4	0	211	219.2	0	0	0	0	0	0	0
14:00	0	0	0	0	0	0	0	56	6	4	1	0	67	70.3	38	6	1	1	0	46	47.8	0	0	0	0	0	0	0
14:15	0	0	0	0	0	0	0	66	7	1	1	0	75	76.8	31	5	1	1	0	38	39.8	0	0	0	0	0	0	0
14:30	0	0	0	0	0	0	0	46	10	0	1	0	57	58.3	44	8	2	2	0	56	59.6	0	0	0	0	0	0	0
14:45	0	0	0	0	0	0	0	55	4	1	0	1	61	62.5	62	5	1	0	0	68	68.5	0	0	0	0	0	0	0
H/TOT	0	0	0	0	0	0	0	223	27	6	3	1	260	267.9	175	24	5	4	0	208	215.7	0	0	0	0	0	0	0
15:00	0	0	0	0	0	0	0	51	8	2	0	1	62	64	43	5	3	0	2	53	56.5	0	0	0	0	0	0	0
15:15	0	0	0	0	0	0	0	43	4	0	0	0	47	47	51	7	1	0	0	59	59.5	0	0	0	0	0	0	0
15:30	0	0	0	0	0	0	0	50	7	2	1	0	60	62.3	55	8	4	1	0	68	71.3	0	0	0	0	0	0	0
15:45	0	0	0	0	0	0	0	69	6	4	0	0	79	81	39	3	0	0	0	42	42	0	0	0	0	0	0	0
H/TOT	0	0	0	0	0	0	0	213	25	8	1	1	248	254.3	188	23	8	1	2	222	229.3	0	0	0	0	0	0	0
16:00	0	0	0	0	0	0	0	68	14	4	1	1	88	92.3	46	11	2	0	0	59	60	0	0	0	0	0	0	0
16:15	0	0	0	0	0	0	0	76	13	1	0	1	91	92.5	55	11	1	0	1	68	69.5	0	0	0	0	0	0	0
16:30	0	0	0	0	0	0	0	84	10	2	0	1	97	99	66	17	3	1	1	88	91.8	0	0	0	0	0	0	0
16:45	0	0	0	0	0	0	0	75	14	2	0	0	91	92	54	8	2	0	0	64	65	0	0	0	0	0	0	0
H/TOT	0	0	0	0	0	0	0	303	51	9	1	3	367	375.8	221	47	8	1	2	279	286.3	0	0	0	0	0	0	0
17:00	0	0	0	0	0	0	0	86	16	2	2	0	106	109.6	51	7	2	0	0	60	61	0	0	0	0	0	0	0
17:15	0	0	0	0	0	0	0	101	16	0	0	1	118	119	73	15	1	0	1	90	91.5	0	0	0	0	0	0	0
17:30	0	0	0	0	0	0	0	109	14	0	1	0	124	125.3	59	7	1	1	0	68	69.8	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	0	105	14	1	0	0	120	120.5	62	6	0	0	1	69	70	0	0	0	0	0	0	0
H/TOT	0	0	0	0	0	0	0	401	60	3	3	1	468	474.4	245	35	4	1	2	287	292.3	0	0	0	0	0	0	0

18:00	0	0	0	0	0	0	0	82	8	0	1	0	91	92.3	56	0	1	0	0	57	57.5	0	0	0	0	0	0	0
18:15	0	0	0	0	0	0	0	76	3	3	0	0	82	83.5	44	4	1	0	0	49	49.5	0	0	0	0	0	0	0
18:30	0	0	0	0	0	0	0	65	4	1	1	0	71	72.8	58	2	1	0	0	61	61.5	0	0	0	0	0	0	0
18:45	0	0	0	0	0	0	0	52	3	3	0	0	58	59.5	44	6	0	0	0	50	50	0	0	0	0	0	0	0
H/TOT	0	0	0	0	0	0	0	275	18	7	2	0	302	308.1	202	12	3	0	0	217	218.5	0	0	0	0	0	0	0
19:00	0	0	0	0	0	0	0	53	2	0	0	0	55	55	36	7	0	0	0	43	43	0	0	0	0	0	0	0
19:15	0	0	0	0	0	0	0	44	2	1	0	1	48	49.5	47	7	0	0	0	54	54	0	0	0	0	0	0	0
19:30	0	0	0	0	0	0	0	36	1	0	0	0	37	37	32	2	0	0	0	34	34	0	0	0	0	0	0	0
19:45	0	0	0	0	0	0	0	47	1	0	0	0	48	48	41	1	1	0	0	43	43.5	0	0	0	0	0	0	0
H/TOT	0	0	0	0	0	0	0	180	6	1	0	1	188	189.5	156	17	1	0	0	174	174.5	0	0	0	0	0	0	0
20:00	0	0	0	0	0	0	0	54	0	0	0	0	54	54	33	1	0	0	0	34	34	0	0	0	0	0	0	0
20:15	0	0	0	0	0	0	0	31	0	0	0	0	31	31	31	2	1	0	0	34	34.5	0	0	0	0	0	0	0
20:30	0	0	0	0	0	0	0	27	1	0	0	0	28	28	23	3	0	0	0	26	26	0	0	0	0	0	0	0
20:45	0	0	0	0	0	0	0	21	1	1	0	0	23	23.5	16	1	0	0	0	17	17	0	0	0	0	0	0	0
H/TOT	0	0	0	0	0	0	0	133	2	1	0	0	136	136.5	103	7	1	0	0	111	111.5	0	0	0	0	0	0	0
21:00	0	0	0	0	0	0	0	29	1	0	1	0	31	32.3	18	1	0	0	0	19	19	0	0	0	0	0	0	0
21:15	0	0	0	0	0	0	0	34	0	0	0	0	34	34	20	0	0	0	0	20	20	0	0	0	0	0	0	0
21:30	0	0	0	0	0	0	0	23	0	0	0	0	23	23	19	1	0	0	0	20	20	0	0	0	0	0	0	0
21:45	0	0	0	0	0	0	0	11	2	0	0	0	13	13	16	1	0	2	0	19	21.6	0	0	0	0	0	0	0
H/TOT	0	0	0	0	0	0	0	97	3	0	1	0	101	102.3	73	3	0	2	0	78	80.6	0	0	0	0	0	0	0
22:00	0	0	0	0	0	0	0	21	2	0	0	0	23	23	12	0	0	1	0	13	14.3	0	0	0	0	0	0	0
22:15	0	0	0	0	0	0	0	11	0	0	1	0	12	13.3	16	0	0	0	0	16	16	0	0	0	0	0	0	0
22:30	0	0	0	0	0	0	0	7	0	0	0	0	7	7	13	0	0	0	0	13	13	0	0	0	0	0	0	0
22:45	0	0	0	0	0	0	0	16	0	0	0	0	16	16	8	0	0	1	0	9	10.3	0	0	0	0	0	0	0
H/TOT	0	0	0	0	0	0	0	55	2	0	1	0	58	59.3	49	0	0	2	0	51	53.6	0	0	0	0	0	0	0
23:00	0	0	0	0	0	0	0	12	0	0	0	0	12	12	6	0	1	0	0	7	7.5	0	0	0	0	0	0	0
23:15	0	0	0	0	0	0	0	5	0	0	1	0	6	7.3	0	0	0	0	1	1	2	0	0	0	0	0	0	0
23:30	0	0	0	0	0	0	0	7	0	0	0	0	7	7	6	1	0	0	0	7	7	0	0	0	0	0	0	0
23:45	0	0	0	0	0	0	0	6	0	0	0	1	7	8	7	1	0	0	0	8	8	0	0	0	0	0	0	0
H/TOT	0	0	0	0	0	0	0	30	0	0	1	1	32	34.3	19	2	1	0	1	23	24.5	0	0	0	0	0	0	0
24 TOT	0	0	0	0	0	0	0	3321	398	84	39	11	3853	3956.7	2933	402	97	45	14	3491	3612	0	0	0	0	0	0	0



IDASO

Survey Name: HDR 20-032 Swords (Waterman Moylan)
Site: Site 1
Location: —
Date: Tue 21-May-2019

A => A

TIME	CAR	LGV	M/C	OGV1	OGV2	P/C	SV (BUS	TOT	PCU
07:00	0	0	0	0	0	0	0	0	0
07:15	0	0	0	0	0	0	0	0	0
07:30	0	0	0	0	0	0	0	0	0
07:45	0	0	0	0	0	0	0	0	0
H/TOT	0	0	0	0	0	0	0	0	0
08:00	0	0	0	0	0	0	0	0	0
08:15	0	0	0	0	0	0	0	0	0
08:30	0	0	0	0	0	0	0	0	0
08:45	0	0	0	0	0	0	0	0	0
H/TOT	0	0	0	0	0	0	0	0	0
09:00	0	0	0	0	0	0	0	0	0
09:15	0	0	0	0	0	0	0	0	0
09:30	0	0	0	0	0	0	0	0	0
09:45	0	0	0	0	0	0	0	0	0
H/TOT	0	0	0	0	0	0	0	0	0
10:00	0	0	0	0	0	0	0	0	0
10:15	0	0	0	0	0	0	0	0	0
10:30	0	0	0	0	0	0	0	0	0
10:45	0	0	0	0	0	0	0	0	0
H/TOT	0	0	0	0	0	0	0	0	0
11:00	0	0	0	0	0	0	0	0	0
11:15	0	0	0	0	0	0	0	0	0
11:30	0	0	0	0	0	0	0	0	0
11:45	0	0	0	0	0	0	0	0	0
H/TOT	0	0	0	0	0	0	0	0	0
12:00	1	0	0	0	0	0	0	1	1
12:15	0	0	0	0	0	0	0	0	0
12:30	0	0	0	0	0	0	0	0	0
12:45	0	0	0	0	0	0	0	0	0
H/TOT	1	0	0	0	0	0	0	1	1
13:00	0	0	0	0	0	0	0	0	0
13:15	0	0	0	0	0	0	0	0	0
13:30	0	0	0	0	0	0	0	0	0
13:45	0	0	0	0	0	0	0	0	0
H/TOT	0	0	0	0	0	0	0	0	0
14:00	0	0	0	0	0	0	0	0	0
14:15	0	0	0	0	0	0	0	0	0
14:30	0	0	0	0	0	0	0	0	0
14:45	0	0	0	0	0	0	0	0	0
H/TOT	0	0	0	0	0	0	0	0	0
15:00	0	0	0	0	0	0	0	0	0
15:15	0	0	0	0	0	0	0	0	0
15:30	0	0	0	0	0	0	0	0	0
15:45	0	0	0	0	0	0	0	0	0
H/TOT	0	0	0	0	0	0	0	0	0
16:00	0	0	0	0	0	0	0	0	0
16:15	0	0	0	0	0	0	0	0	0
16:30	1	0	0	0	0	0	0	1	1
16:45	0	0	0	0	0	0	0	0	0
H/TOT	1	0	0	0	0	0	0	1	1
17:00	0	0	0	0	0	0	0	0	0
17:15	1	0	0	0	0	0	0	1	1
17:30	0	0	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	0	0	0
H/TOT	1	0	0	0	0	0	0	1	1
18:00	0	0	0	0	0	0	0	0	0
18:15	0	0	0	0	0	0	0	0	0
18:30	2	0	0	0	0	0	0	2	2
18:45	1	0	0	0	0	0	0	1	1
H/TOT	3	0	0	0	0	0	0	3	3
12 TOT	6	0	0	0	0	0	0	6	6

A => B

TIME	CAR	LGV	M/C	OGV1	OGV2	P/C	SV (BUS	TOT	PCU
07:00	7	0	0	0	0	0	0	7	7
07:15	13	1	0	0	0	1	0	15	14.2
07:30	16	0	0	0	0	0	0	16	16
07:45	14	0	0	0	0	0	0	14	14
H/TOT	50	1	0	0	0	1	0	52	51.2
08:00	23	1	0	0	0	0	0	24	24
08:15	22	2	0	0	0	1	0	25	24.2
08:30	11	0	0	0	0	6	0	17	12.2
08:45	18	0	0	0	0	1	0	19	18.2
H/TOT	74	3	0	0	0	8	0	85	78.6
09:00	5	0	0	0	0	1	0	6	5.2
09:15	11	0	0	0	0	1	0	12	11.2
09:30	12	1	0	1	0	0	0	14	14.5
09:45	4	2	0	0	0	0	0	6	6
H/TOT	32	3	0	1	0	2	0	38	36.9
10:00	6	1	0	1	0	0	0	8	8.5
10:15	6	0	0	0	0	0	0	6	6
10:30	6	1	1	0	0	0	0	8	7.4
10:45	6	0	0	0	0	0	0	6	6
H/TOT	24	2	1	1	0	0	0	28	27.9
11:00	3	0	0	0	0	0	0	3	3
11:15	7	2	0	0	0	0	0	9	9
11:30	9	0	0	0	0	0	0	9	9
11:45	3	0	0	0	0	0	0	3	3
H/TOT	22	2	0	0	0	0	0	24	24
12:00	6	1	0	1	0	0	0	8	8.5
12:15	10	0	0	0	0	0	0	10	10
12:30	7	2	1	0	0	0	0	10	9.4
12:45	7	1	0	0	0	0	0	8	8
H/TOT	30	4	1	1	0	0	0	36	35.9
13:00	15	1	0	0	0	0	0	16	16
13:15	8	0	0	0	0	0	1	9	10
13:30	6	0	0	0	0	0	0	6	6
13:45	5	0	0	0	0	0	0	5	5
H/TOT	34	1	0	0	0	0	1	36	37
14:00	17	1	0	0	0	0	0	18	18
14:15	10	1	0	0	0	0	0	11	11
14:30	10	3	0	0	0	0	0	13	13
14:45	13	0	0	0	0	0	0	13	13
H/TOT	50	5	0	0	0	0	0	55	55
15:00	20	1	0	0	0	3	0	24	21.6
15:15	6	0	0	0	0	0	0	6	6
15:30	19	0	0	0	0	0	0	19	19
15:45	9	1	0	0	0	0	0	10	10
H/TOT	54	2	0	0	0	3	0	59	56.6
16:00	10	0	0	0	0	2	0	12	10.4
16:15	7	1	0	0	0	1	0	9	8.2
16:30	13	0	0	0	0	0	0	13	13
16:45	9	0	0	0	0	0	0	9	9
H/TOT	39	1	0	0	0	3	0	43	40.6
17:00	7	0	0	0	0	0	0	7	7
17:15	7	0	0	0	0	0	0	7	7
17:30	12	0	0	0	0	4	0	16	12.8
17:45	9	0	0	0	0	0	0	9	9
H/TOT	35	0	0	0	0	4	0	39	35.8
18:00	7	2	0	0	0	0	0	9	9
18:15	15	0	1	0	0	0	0	16	15.4
18:30	13	0	0	0	0	0	0	13	13
18:45	7	0	0	0	0	0	0	7	7
H/TOT	42	2	1	0	0	0	0	45	44.4
12 TOT	486	26	3	3	0	21	1	540	523.9

A => C

TIME	CAR	LGV	M/C	OGV1	OGV2	P/C	SV (BUS	TOT	PCU
07:00	5	1	0	0	0	0	0	6	6
07:15	13	0	0	0	0	0	0	13	13
07:30	16	3	0	0	0	0	0	19	19
07:45	8	3	0	0	0	0	0	11	11
H/TOT	42	7	0	0	0	0	0	49	49
08:00	25	1	0	0	0	0	0	26	26
08:15	38	0	0	0	0	1	0	39	38.2
08:30	21	0	0	0	0	2	0	23	21.4
08:45	26	1	0	0	0	0	0	27	27
H/TOT	110	2	0	0	0	3	0	115	112.6
09:00	9	0	0	0	0	2	0	11	9.4
09:15	10	2	0	0	0	0	0	12	12
09:30	12	1	0	0	0	0	0	13	13
09:45	15	3	0	0	0	0	0	18	18
H/TOT	46	6	0	0	0	2	0	54	52.4
10:00	10	2	0	0	0	0	0	12	12
10:15	11	4	0	0	0	0	0	15	15
10:30	12	2	0	0	0	0	0	14	14
10:45	14	1	0	0	0	0	0	15	15
H/TOT	47	9	0	0	0	0	0	56	56
11:00	7	1	0	0	0	0	0	8	8
11:15	7	1	0	0	0	1	0	9	8.2
11:30	8	2	0	0	0	0	0	10	10
11:45	13	2	0	0	0	0	0	15	15
H/TOT	35	6	0	0	0	1	0	42	41.2
12:00	8	0	0	1	0	1	0	10	9.7
12:15	15	2	1	0	0	0	0	18	17.4
12:30	11	1	0	0	0	0	0	12	12
12:45	19	0	0	0	0	0	0	19	19
H/TOT	53	3	1	1	0	1	0	59	58.1
13:00	20	2	0	0	0	0	0	22	22
13:15	14	5	0	0	0	0	0	19	19
13:30	25	4	0	0	0	0	0	29	29
13:45	8	4	0	0	0	0	0	12	12
H/TOT	67	15	0	0	0	0	0	82	82
14:00	22	3	0	0	0	0	0	25	25
14:15	16	3	0	1	0	0	0	20	20.5
14:30	18	2	0	0	0	0	0	20	20
14:45	8	0	0	0	0	0	0	8	8
H/TOT	64	8	0	1	0	0	0	73	73.5
15:00	17	0	0	0	0	0	0	17	17
15:15	13	1	1	1	0	0	0	16	15.9
15:30	13	1	0	0	0	0	0	14	14
15:45	13	4	0	0	0	0	0	17	17
H/TOT	56	6	1	1	0	0	0	64	63.9
16:00	19	2	0	0	0	0	0	21	21
16:15	14	1	0	0	0	0	0	15	15
16:30	17	2	0	0	0	1	0	20	19.2
16:45	16	1	1	1	0	0	0	19	18.9
H/TOT	66	6	1	1	0	1	0	75	74.1
17:00	16	0	0	0	0	0	0	16	16
17:15	10	2	0	0	0	0	0	12	12
17:30	13	5	0	1	0	0	0	19	19.5
17:45	20	1	0	0	0	0	0	21	21
H/TOT	59	8	0	1	0	0	0	68	68.5
18:00	17	2	0	0	0	1	0	20	19.2
18:15	17	3	0	0	0	0	0	20	20
18:30	17	0	0	0	0	0	0	17	17
18:45	18	2	0	0	0	0	0	20	20
H/TOT	69	7	0	0	0	1	0	77	76.2
12 TOT	714	83	3	5	0	9	0	814	807.5

A => D

TIME	CAR	LGV	M/C	OGV1	OGV2	P/C	SV (BUS	TOT	PCU
07:00	0	0	0	0	0	0	0	0	0
07:15	1	0	0	0	0	0	0	1	1
07:30	1	0	0	0	0	0	0	1	1
07:45	3	1	0	0	0	1	0	5	4.2
H/TOT	5	1	0	0	0	1	0	7	6.2
08:00	7	0	0	0	0	0	0	7	7
08:15	12	0	0	0	0	0	0	12	12
08:30	7	0	0	0	0	4	0	11	7.8
08:45	1	0	0	0	0	0	0	1	1
H/TOT	27	0	0	0	0	4	0	31	27.8
09:00	0	0	0	0	0	0	0	0	0
09:15	6	0	0	0	0	0	0	6	6
09:30	0	0	0	0	0	0	0	0	0
09:45	1	0	0	0	0	0	0	1	1
H/TOT	7	0	0	0	0	0	0	7	7
10:00	1	0	0	0	0	0	0	1	1
10:15	3	0	0	0	0	0	0	3	3
10:30	0	0	0	0	0	0	0	0	0
10:45	0	0	0	0	0	0	0	0	0
H/TOT	4	0	0	0	0	0	0	4	4
11:00	5	0	0	0	0	0	0	5	5
11:15	2	0	0	0	0	0	0	2	2
11:30	5	0	0	0	0	0	0	5	5
11:45	1	0	0	0	0	0	0	1	1
H/TOT	13	0	0	0	0	0	0	13	13
12:00	7	0	0	0	0	0	0	7	7
12:15	3	0	0	0	0	0	0	3	3
12:30	9	0	0	0	0	0	0	9	9
12:45	5	0	0	0	0	0	0	5	5
H/TOT	24	0	0	0	0	0	0	24	24
13:00	11	0	0	0	0	0	0	11	11
13:15	7	1	0	0	0	0	0	8	8
13:30	6	0	0	0	0	0	0	6	6
13:45	4	0	0	0	0	0	0	4	4
H/TOT	28	1	0	0	0	0	0	29	29
14:00	11	0	0	0	0	0	0	11	11
14:15	8	2	0	0	0	0	0	10	10
14:30	3	0	0	0	0	0	0	3	3
14:45	0	1	0	0	0	0	0	1	1
H/TOT	22	3	0	0	0	0	0	25	25
15:00	11	0	0	0	0	0	0	11	11
15:15	7	0	0	0	0	1	0	8	7.2
15:30	0	0	0	0	0	0	0	0	0
15:45	10	2	0	0	0	0	0	12	12
H/TOT	28	2	0	0	0	1	0	31	30.2
16:00	4	0	0	0	0	0	0	4	4
16:15	11	1	0	0	0	0	0	12	12
16:30	7	1	0	0	0	0	0	8	8
16:45	9	0	0	0	0	0	0	9	9
H/TOT	31	2	0	0	0	0	0	33	33
17:00	4	0	0	0	0	0	0	4	4
17:15	8	1	0	0	0	0	0	9	9
17:30	11	0	0	0	0	0	0	11	11
17:45	5	1	0	0	0	1	0	7	6.2
H/TOT	28	2	0	0	0	1	0	31	30.2
18:00	15	0	0	0	0	0	0	15	15
18:15	5	2	0	0	0	0	0	7	7
18:30	11	0	0	0	0	0	0	11	11
18:45	9	0	0	0	0	0	0	9	9
H/TOT	40	2	0	0	0	0	0	42	42
12 TOT	257	13	0	0	0	7	0	277	271.4

B => A

TIME	CAR	LGV	M/C	OGV1	OGV2	P/C	SV (BUS	TOT	PCU
07:00	1	0	0	0	0	0	0	1	1
07:15	0	0	0	0	0	0	0	0	0
07:30	5	0	0	0	0	0	0	5	5
07:45	10	0	0	0	0	0	0	10	10
H/TOT	16	0	0	0	0	0	0	16	16
08:00	27	1	0	0	0	0	0	28	28
08:15	12	0	0	0	0	0	0	12	12
08:30	9	0	0	0	0	0	0	9	9
08:45	6	1	0	0	0	0	0	7	7
H/TOT	54	2	0	0	0	0	0	56	56
09:00	4	1	0	0	0	0	0	5	5
09:15	6	0	0	0	0	0	0	6	6
09:30	4	1	0	0	0	0	0	5	5
09:45	2	1	0	0	0	0	0	3	3
H/TOT	16	3	0	0	0	0	0	19	19
10:00	2	0	0	0	0	0	0	2	2
10:15	4	0	0	0	0	0	0	4	4
10:30	2	0	0	0	0	0	0	2	2
10:45	2	0	0	0	0	0	0	2	2
H/TOT	10	0	0	0	0	0	0	10	10
11:00	4	0	0	0	0	0	0	4	4
11:15	7	1	0	0	0	0	0	8	8
11:30	4	0	0	0	0	1	0	5	4.2
11:45	4	1	0	0	0	0	0	5	5
H/TOT	19	2	0	0	0	1	0	22	21.2
12:00	6	2	0	1	0	0	0	9	9.5
12:15	5	0	0	0	0	0	0	5	5
12:30	5	1	0	0	0	0	0	6	6
12:45	5	0	0	0	0	0	0	5	5
H/TOT	21	3	0	1	0	0	0	25	25.5
13:00	3	0	0	0	0	0	0	3	3
13:15	7	1	0	0	0	0	0	8	8
13:30	4	1	0	0	0	0	0	5	5
13:45	14	2	0	0	0	0	0	16	16
H/TOT	28	4	0	0	0	0	0	32	32
14:00	14	4	0	1	0	0	0	19	19.5
14:15	7	0	0	0	0	0	0	7	7
14:30	6	0	0	0	0	0	0	6	6
14:45	11	0	0	0	0	0	0	11	11
H/TOT	38	4	0	1	0	0	0	43	43.5
15:00	7	0	0	0	0	0	0	7	7
15:15	12	0	0	0	0	0	0	12	12
15:30	8	0	1	1	0	0	0	10	9.9
15:45	15	0	0	0	0	0	0	15	15
H/TOT	42	0	1	1	0	0	0	44	43.9
16:00	8	1	0	0	0	0	0	9	9
16:15	16	0	0	0	0	0	0	16	16
16:30	9	2	0	0	0	0	0	11	11
16:45	6	1	0	0	0	0	0	7	7
H/TOT	39	4	0	0	0	0	0	43	43
17:00	12	2	0	0	0	1	0	15	14.2
17:15	17	1	0	0	0	0	0	18	18
17:30	6	2	0	0	0	0	0	8	8
17:45	16	0	0	0	0	0	0	16	16
H/TOT	51	5	0	0	0	1	0	57	56.2
18:00	16	4	0	0	0	0	0	20	20
18:15	22	0	0	0	0	0	1	23	24
18:30	14	1	1	0	0	0	0	16	15.4
18:45	17	0	0	0	0	0	0	17	17
H/TOT	69	5	1	0	0	0	1	76	76.4
12 TOT	403	32	2	3	0	2	1	443	442.7

B => B									B => C									B => D									C => A									C => B								
CAR	LGV	M/C	OGV1	OGV2	P/C	SV (BUS	TOT	PCU	CAR	LGV	M/C	OGV1	OGV2	P/C	SV (BUS	TOT	PCU	CAR	LGV	M/C	OGV1	OGV2	P/C	SV (BUS	TOT	PCU	CAR	LGV	M/C	OGV1	OGV2	P/C	SV (BUS	TOT	PCU	CAR	LGV	M/C	OGV1	OGV2	P/C	SV (BUS	TOT	PCU
0	0	0	0	0	0	0	0	0	22	7	0	0	0	0	2	31	33	6	1	0	0	0	0	0	7	7	5	1	0	0	0	0	0	6	6	30	4	0	0	0	1	3	38	40.2
0	0	0	0	0	0	0	0	0	20	7	0	1	0	0	0	28	28.5	7	3	0	0	0	0	0	10	10	0	0	0	0	0	0	0	0	0	27	8	0	1	1	0	3	40	44.8
0	0	0	0	0	0	0	0	0	22	6	0	0	2	0	0	30	32.6	12	0	0	0	0	0	0	12	12	5	2	1	0	0	0	0	8	7.4	40	6	2	1	0	1	5	55	58.5
0	0	0	0	0	0	0	0	0	21	4	0	0	2	0	3	30	35.6	18	1	0	0	0	0	0	19	19	8	0	0	0	0	0	0	8	8	59	5	0	0	0	1	5	70	74.2
0	0	0	0	0	0	0	0	0	85	24	0	1	4	0	5	119	129.7	43	5	0	0	0	0	0	48	48	18	3	1	0	0	0	0	22	21.4	156	23	2	2	1	3	16	203	217.7
0	0	0	0	0	0	0	0	0	30	5	0	2	0	0	0	37	38	47	0	0	0	0	0	0	47	47	26	0	0	0	0	0	0	26	26	45	7	0	1	1	0	4	58	63.8
0	0	0	0	0	0	0	0	0	16	3	0	0	3	0	2	24	29.9	53	3	0	0	1	0	0	57	58.3	18	0	0	0	0	2	0	20	18.4	42	4	0	1	0	2	1	50	49.9
0	0	0	0	0	0	0	0	0	28	5	0	0	3	0	2	38	43.9	49	0	1	0	0	0	0	50	49.4	9	1	0	0	0	0	0	10	10	38	1	0	1	2	1	4	47	53.3
0	0	0	0	0	0	0	0	0	29	2	0	0	1	0	0	32	33.3	41	0	0	0	0	0	0	41	41	16	0	0	1	0	1	0	18	17.7	49	4	0	0	0	1	2	56	57.2
0	0	0	0	0	0	0	0	0	103	15	0	2	7	0	4	131	145.1	190	3	1	0	1	0	0	195	195.7	69	1	0	1	0	3	0	74	72.1	174	16	0	3	3	4	11	211	224.2
0	0	0	0	0	0	0	0	0	22	5	0	0	1	0	2	30	33.3	20	0	0	0	0	0	0	20	20	30	0	0	0	0	0	0	30	30	61	2	0	0	4	0	3	70	78.2
0	0	0	0	0	0	0	0	0	35	2	0	1	2	0	1	41	45.1	17	1	0	0	0	0	0	18	18	14	0	0	1	0	0	0	15	15.5	39	2	0	1	2	0	1	45	49.1
0	0	0	0	0	0	0	0	0	16	3	1	0	2	0	4	26	32	15	3	0	1	0	0	0	19	19.5	12	2	0	1	0	0	0	15	15.5	32	2	0	0	1	0	1	36	38.3
0	0	0	0	0	0	0	0	0	16	1	1	2	0	0	1	21	22.4	10	1	0	0	0	0	0	11	11	8	1	0	0	0	0	0	9	9	21	2	0	2	1	1	2	29	32.5
0	0	0	0	0	0	0	0	0	89	11	2	3	5	0	8	118	132.8	62	5	0	1	0	0	0	68	68.5	64	3	0	2	0	0	0	69	70	153	8	0	3	8	1	7	180	198.1
0	0	0	0	0	0	0	0	0	20	2	0	0	4	0	2	28	35.2	6	4	0	1	0	0	0	11	11.5	12	5	0	1	0	0	0	18	18.5	15	3	0	0	1	0	1	20	22.3
0	0	0	0	0	0	1	1	2	19	1	0	0	0	0	1	21	22	16	1	0	0	0	0	0	17	17	16	3	0	0	0	0	0	19	19	19	2	0	0	3	0	2	26	31.9
0	0	0	0	0	0	0	0	0	15	6	0	0	1	0	0	22	23.3	16	0	0	1	0	0	0	17	17.5	4	2	0	0	0	0	0	6	6	11	1	0	0	1	2	1	16	16.7
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C => C									C => D									D => A									D => B									D => C								
CAR	LGV	M/C	OGV1	OGV2	P/C	SV (BUS	TOT	PCU	CAR	LGV	M/C	OGV1	OGV2	P/C	SV (BUS	TOT	PCU	CAR	LGV	M/C	OGV1	OGV2	P/C	SV (BUS	TOT	PCU	CAR	LGV	M/C	OGV1	OGV2	P/C	SV (BUS	TOT	PCU	CAR	LGV	M/C	OGV1	OGV2	P/C	SV (BUS	TOT	PCU
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1	0	0	0	0	0	0	1	1	44	2	0	0	0	0	1	47	48	8	1	0	0	0	0	0	9	9	58	1	0	0	0	0	0	59	59	57	0	0	0	0	0	0	57	57
1	0	0	0	0	0	1	2	3	18	3	0	0	0	0	0	21	21	6	0	0	0	0	0	0	6	6	59	1	0	0	0	0	0	60	60	67	3	0	0	0	0	2	72	74
1	0	0	0	0	0	0	1	1	62	1	0	1	0	0	0	64	64.5	1	1	0	0	0	0	0	2	2	24	1	0	0	0	0	0	25	25	27	2	1	0	0	0	0	30	29.4
3	0	0	1	0	0	1	5	6.5	163	8	0	1	0	1	1	174	174.7	18	3	0	0	0	4	0	25	21.8	164	5	0	0	0	0	0	169	169	168	6	2	0	0	0	2	178	178.8
0	0	0	0	0	0	0	0	0	24	1	0	0	0	0	0	25	25	4	0	0	0	0	0	0	4	4	30	1	0	1	0	0	0	32	32.5	18	3	1	0	0	0	0	22	21.4
0	0	0	0	0	0	0	0	0	46	2	0	0	0	1	0	49	48.2	3	0	0	0	0	0	0	3	3	27	4	0	0	0	0	0	31	31	20	1	0	0	0	0	0	21	21
0	0	0	0	0	0	0	0	0	19	2	0	0	0	0	0	21	21	6	0	0	0	0	0	0	6	6	51	3	0	0	0	0	0	54	54	34	0	0	1	0	0	0	35	35.5
0	0	0	0	0	0	0	0	0	34	0	0	0	0	1	0	35	34.2	0	1	0	0	0	0	0	1	1	31	2	0	0	0	0	0	33	33	6	0	0	0	0	0	0	6	6
0	0	0	0	0	0	0	0	0	123	5	0	0	0	2	0	130	128.4	13	1	0	0	0	0	0	14	14	139	10	0	1	0	0	0	150	150.5	78	4	1	1	0	0	0	84	83.9
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0	0	0	0	0	0	0	0	0	38	4	1	1	0	1	0	45	44.1	7	0	0	0	0	0	0	7	7	42	3	0	0	0	0	0	45	45	18	2	0	0	0	0	0	20	20
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0	0	0	0	0	0	0	0	0	174	11	2	2	0	2	0	191	189.2	23	2	0	0	0	0	0	25	25	144	4	1	0	0	0	0	149	148.4	91	2	1	1	1	0	0	96	97.2
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1	0	0	0	0	0	0	1	1	178	11	2	1	0	1	0	193	191.5	27	0	0	0	0	1	0	28	27.2	173	8	0	0	0	0	0	181	181	105	6	0	0	0	0	0	111	111
8	0	0	2	0	0	2	12	15	1431	76	7	15	0	17	5	1551	1545.7	229	11	0	2	0	5	0	247	244	1924	89	11	9	1	10	3	2047	2041.2	1275	59	7	14	1	4	3	1363	1366.9

D => D								
CAR	LGV	M/C	OGV1	OGV2	P/C	SV (BUS	TOT	PCU
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
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0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	3	3

APPENDIX 13.1: CULTURAL HERITAGE: SUMMARY OF PREVIOUS ARCHAEOLOGICAL INVESTIGATIONS AT THE LAP LANDS

The focus of these investigations, which have been taking place since 2003, has been to provide a detailed archaeological assessment of the Mooretown and Oldtown lands. The result of these investigations is summarized in chronological order below.

Licence No. 03E1080, Archaeological Assessment, Oldtown (Baker, C. 2003b)

Archaeological assessment was carried out by Christine Baker (2003b) in the townland of

Oldtown, directly to the north of Rathbeale Road, when the construction of a temporary roadway uncovered human skeletal remains. The assessment revealed ten east–west oriented burials, and an amount of disarticulated bone not associated with burials. Six artefacts, from the latter half of the early medieval period, were also recovered. A subsequent bone retrieval exercise yielded a further 4216 bone fragments, representing a minimum of twenty individuals.

Licence No. 03R095, Geophysical Survey, Oldtown (Nicholls, J. 2003)

Geophysical survey (Nicholls 2003) showed that the burial site was part of a large complex of three concentric enclosures. The outer enclosure measured approximately 200m in diameter, with an entranceway towards the north. The middle and inner enclosures measured approximately 130m and 70m in diameter, respectively. All finds of human skeletal remains were from within the inner enclosure, suggesting this was a 'burial enclosure' within the ecclesiastical complex. To the northwest of the main complex, a network of cells within a further enclosure was recorded. This network was made up of sub-rectangular cells with possible internal pits, surrounded by a wider enclosure.

Licence No. 03E1080 (ext), Archaeological Assessment [of an] Access Road, Oldtown (Baker, C. 2003a)

The geophysical survey was followed by a further phase of test excavation (Baker 2003a) that uncovered thirty archaeological features—some 40% of which were investigated further—and several drains. It was found that the layout of the enclosure network respected the boundaries of the main complex identified during geophysical survey. The layout also corresponded with many of the internal divisions of the main enclosure. In addition, the fills of the investigated features corresponded to those of the central complex. The features investigated appeared to be field systems associated with the main ecclesiastical complex previously discovered.

Licence No. 03E1080 (ext.), Archaeological Monitoring [of an] Access Road, Oldtown, Swords, County Dublin (Baker, C. 2003c)

Archaeological monitoring was undertaken during the construction of an access road and the site of the temporary school, to the west of the ecclesiastical enclosure, was inspected after removal of topsoil. The monitoring confirmed the results of the geophysical survey, as no findings of archaeological significance were identified, thus delimiting the northern and western extent of the ecclesiastical complex.

Licence No. 04E0543, Geophysical Survey and Testing (Halliday, S. 2004, GSB Prospection & Arch Tech Ltd; report kindly supplied by Arch-Tech Ltd)

Geophysical survey and test excavation were carried out by Archtech Ltd in Mooretown townland, in two fields directly to the north of the Rathbeale Road and to the south of the

Oldtown enclosure site. These investigations revealed the continuation of the outer, or middle, ditch of the ecclesiastical enclosure in the westernmost field, south of the watercourse. From within the ditch, one sherd of possible souterrain ware was retrieved, supporting evidence from elsewhere in the complex that it is early medieval in date. Two archaeological features were identified outside the enclosure ditch: a possible rectangular feature to the southeast, and a curvilinear feature further to the south. It was also confirmed that the burials on the site did not extend south of the watercourse. In the easternmost field, no features of archaeological significance were identified, limiting the enclosure to the east.

Licence No. 05R139, Geophysical Survey, Oldtown (GSB Prospection, November, 2005)

Further geophysical survey covered the remainder of the Oldtown lands, apart from two small areas in the southeast corner that lay to the southeast of a watercourse which was itself of archaeological potential. The survey identified several possible archaeological anomalies in the central and eastern parts of the study area, as well as to its southeast. These possible archaeological features lay at the periphery of the previously identified archaeological site, and they are likely to be associated with land use rather than settlement activity. These features were tested by T. Bolger.

Licence No. 05R170, Geophysical Survey, Mooretown (Leigh, J., March, 2006)

This survey revealed the southern extent of the previously identified ecclesiastical complex at Oldtown. The results indicated a large southern annex, or cellular enclosure complex, extending into the Mooretown lands, and cut by the Rathbeale Road. The results showed a series of linear and curvilinear anomalies, indicating enclosing ditches and occupational activity. This annex was similar to the field system/enclosure annex to the northwest of the main complex. In the southeast of the Mooretown lands, a series of rectilinear responses, forming an L-shaped cellular pattern, were identified. These were similar to the previously identified cellular annexes/field systems associated with the ecclesiastical complex, and were thought to perhaps be related to the holy well (RMP DU011:018) or the supposed Glasmore Abbey church (RMP DU011:019), located to the south and southeast.

Licence No. 06E0578 Archaeological Assessment, Oldtown/Mooretown, (Bolger, T. July, 2006)

• *Archaeological testing of the Oldtown Geophysical Survey Anomalies*

Apart from the main ecclesiastical complex, no other large scale archaeological sites were identified in the Oldtown lands by this investigation. A number of linear features were recorded. These are most likely agricultural, but could possibly be ploughed-out ditches. No substantial features associated with the ecclesiastical complex were recorded to the north of the new access road. While the linear features described above are most likely post-medieval or modern in date, an earlier date cannot be

completely discounted, as these fields would have been continuously kept in use as tillage and pasture, and because the lands have a long history of agricultural development and exploitation.

• Archaeological testing of the Mooretown Geophysical Survey Anomalies

A high potential for additional surviving features, related to the ecclesiastical complex at Oldtown, had been suggested by the previous geophysical survey, directly to the south of Rathbeale Road. However, these lands were not available for testing at the time, which restricted the archaeological assessment to the western part of the Mooretown lands. Within this section of the lands, the geophysics did not indicate any area of strong archaeological potential, and no further information was gained during the testing. Apart from a linear feature—possibly an agricultural furrow—in T16, no archaeology of significance was identified.

Licence No. 06E0578 ext Archaeological Assessment, Permanent School, Oldtown, (Frazer, W.O. August 2007)

Two narrow, shallow curvilinear ditches were identified during test excavation, in advance of anew school development, to the west of the northwest annex of the main ecclesiastical complex at Oldtown. These ditches had not been identified by previous geophysical survey—most likely because of their sterile, subsoil-like fills—and they do not form part of any enclosure or 'cell'. Instead, they have been interpreted as 'livestock-driving ditches' outside of the annex, related to water management and cattle husbandry. Although the ditches yielded no direct evidence for dating, they are clearly connected to the adjacent northwest annex of the ecclesiastical complex.

Licence No. 08R0026, Geophysical Survey Report, Mooretown LAP (Thébaudeau, B. February 2008)

Several clusters of possible archaeological anomalies were indicated by further geophysical

survey, carried out in the western part of Mooretown townland. None of these responses were of the same calibre as the Oldtown ecclesiastical complex though they did prove to be archaeological in nature.

Licence No. 08E0303, Archaeological Assessment for Mooretown LAP (Frazer, W.O. & Eriksson C. July 2008)

Archaeology was identified in nine locations within the Mooretown Lands. Based upon the results of geophysical survey (Thébaudeau 2008), archaeological testing, and landscape archaeological analysis, 'Archaeological Risk Zones' have been established around the nine locations. These are not zones that preclude development, but rather indicate the extent of identified archaeology. The zones include 'buffer areas' of 10–20m around the identified archaeology, in keeping with accepted practice and the general recommendations of heritage authorities on other greenfield developments. The nature of the archaeology identified in the test excavation, the location of sites in the landscape and the artefacts recovered during testing suggest that the sites date predominantly from the Bronze Age (i.e. *c*. 2400–500 BC), early medieval period (*c*. 400–1200 AD) and medieval period (*c*. 1200–1600 AD).

Licence No. 09E562, Archaeological Assessment, Oldtown Swords (McQuade, M. December 2009)

No archaeological features were identified during monitoring of excavation works carried out for the construction of the access road and playing pitches (Baker 2003c). The results of testing (09E562) and geophysical survey (09-R-0217) indicate that much of the proposed development site had been disturbed by the insertion of services and other works associated with the existing road and pitches. One field ditch of unconfirmed date, which is thought to have little or no archaeological significance, was identified. A single sherd of 17th century pottery (North Devon gravel-free ware), not from its original context was retrieved from the spoil.

Licence No. 13E0283, Archaeological Testing, Oldtown Swords (Moraghan, M. & McLoughlin, G. November 2013)

35 test trenches were excavated in advance of a previous phase of development in Oldtown. The trenches were mostly located in the Phase 1 and Oldtown Regional Park areas of the development, however the Phase 3 development area was also included. Three areas of differing ground conditions were encountered during the testing and the largest of these was a wheat field immediately north of the Glen Ellan Road. Trenches T1-T16 were located in this area and of these T13-T16 were in the Phase 3 area. No features of archaeological interest were identified.

The second area lay to the north of the wheat field and consisted of entirely made-up ground. No original topsoil or upper subsoil levels survive *in situ* in this location. Trenches T17-T21 were located in this area. Two trenches excavated in this area in 2006 (Bolger) found the same results.

The third area was located in an area of pasture and potato crop. T22 was in a pasture field and T23-T25 and additional trenches T27-T35 were in the potato field (future Oldtown Regional Park). It was not possible to test in the potato field during the initial phase of testing and trenches T23-T25 and T27-T35 were tested at a later date after the crop of potatoes had been harvested.

Two archaeological features were identified in the potato field. The first was an elongated pit or possibly two intercutting or conjoined pits uncovered in T25 (Fig. 13.3) and the second was an enclosure ditch, the western extent of which was identified during topsoil stripping for an ESB duct. Additional testing followed this discovery in order to establish the nature and extent of the enclosure and the northern and southern extents were identified in trenches T27, T32 and T34 (Fig. 13.3). The eastern extent of the enclosure remains elusive. The upper fills were largely comprised of re-deposited natural subsoil, varying to grey silty clay and included sea shells, snail shells and animal bone. A test section of the ditch measured 3m wide x 1.5m deep and had steep sides and a broad U shaped or flat base. The enclosure is thought to measure approximately 60m east-west x 80m north-south. No dateable artefacts were recovered from the test section.

Licence No. 13E0283ext, Final Report on the results of Archaeological Test Trenching and Monitoring. Glen Ellan Road, Oldtown, Swords, County Dublin (Moraghan, M. and McLoughlin, G. 2016)

Archaeological monitoring of the Phase 1 housing development and wider drainage, road and ESB infrastructural works was carried out at the site from September 2013 – November 2014. Sections of a roadway and associated drainage ditches were identified during monitoring and in places were sealed by up to 0.8m of re-deposited subsoil. This feature represented the remains of a roadway depicted as early as 1760 on the mapping of the area and continued to be represented on the OS map editions of 1837 and 1906. The overburden of subsoil in places represents an attempt to level out the ground somewhat in the not too distant past.

A number of linear features consistent with agricultural activity were identified in the east of the site, oriented variously north-south, northwest – south east and southwest to northeast. They measured between 1-1.5m wide and between 0.2 – 0.5m deep and some of them may correspond with linear features identified in a previous geophysical survey. No dateable finds were recovered from any of the ditches. Various stone filled field drains, generally c.0.5m wide were also identified.

In addition, several small isolated pit features were identified during the course of the monitoring, none of which produced any dateable finds. In the west of the area along the line of the western distributor road a small oval cereal drying kiln was uncovered in Rathbeal townland. It measured 1.34m east-west x 1.04m x 0.26m deep and was filled with alternating layers of charcoal and re-deposited natural subsoil. A sample taken from the basal fill contained charred cereal remains. A charred barley grain from the kiln was sampled for C^{14} dating, and returned a 2^{σ} date range of 402—207 cal. BC (Moraghan and McLoughlin 2016).

Licence No. 13E0366 Final archaeological report on archaeological monitoring, Mooretown distributor road, Swords, Co. Dublin.(McLoughlin, G. 2015)

Archaeological monitoring took place in two phases. Phase 1 involved monitoring of geotechnical test pits and soak away pits in July 2014 and Phase 2 involved monitoring of topsoil stripping along the route of the proposed road and investigation of potential archaeological features uncovered. Phase 2 took place from May-July 2015. Following monitoring of topsoil stripping a team of three archaeologists investigated features identified during monitoring, including those identified during testing in 2008 as being of archaeological potential. All of the features identified in testing were sectioned and recorded and none of these features proved to be of archaeological significance. The large ditch thought to be a millrace in testing, proved to be a linear ditch oriented west-southwest – east-northeast and there was no evidence to suggest that it was related to the mill located to the east and it may simply represent a former field boundary. It does however remain a possibility that this ditch could represent a millrace and this should be kept in mind when further areas to the east are being stripped of topsoil in the future.

In addition to the features identified during testing a sub-oval pit containing charcoal and burnt stones was identified in southwest corner of field 16 and represented a trough most likely to have been associated with a burnt mound / fulacht fiadh which had been ploughed out. The pit was located in a low-lying area of the field likely to have been a wet area in the past, a typical location for these sites which have been found to predominantly date to the second millennium BC.

Licence No. 16E0342, Final Archaeological Monitoring and Excavation Report, GAA pitch and Attenuation Area, Glen Ellan Road, Oldtown, Swords, Co. Dublin (Clancy, P. and McLoughlin, G. 2018)

Excavations within the development area resulted in the preservation by record of two cereal drying kilns, a hearth and eight dispersed pits. A U-shaped enclosure measuring 42.6m east-west x 35m north-south with associated internal pits was also identified and in consultation with the National Monuments Services the proposed development was redesigned, and steps taken to preserve the remains in situ. To establish the nature of the enclosure, sections were excavated and recorded through the enclosing ditch and the internal features were fully excavated. The site is now covered by a large earthen bund.

Three phases of activity were identified as a result of these investigations. The first phase comprised a cereal drying kiln and two associated shallow pits. Charred cereal from the kiln was dated to BC 149 – 118 AD, placing this activity in the middle Iron Age. The second phase comprised a cereal drying kiln and a hearth. Charcoal from these features was dated to AD 341-533 and AD 263-505 AD, placing this activity in the later Iron Age. The third phase comprised a U-shaped ditched enclosure with associated internal features and charcoal from the ditch was dated to 777-1020 AD, placing this activity in the early medieval period.

Licence No. 17E0104, Archaeological Test trenching, Monitoring and Excavation, Phase 2. Glen Ellan Road, Oldtown, Swords, Co. Dublin (Seaver, M.2017 – preliminary report)

Twenty-three test machine dug trenches, T1–T23 were excavated in March 2017 in the Phase 2 application area and a further programme of archaeological monitoring and excavation were carried out at the site between March 28th and May 15th 2017. The test trenches revealed the remains of a C18th/C19th east-west field boundary shown on historic maps and on geophysical survey. Plough furrows and stone filled drains were identified in several trenches. Two areas of archaeological significance were found during testing. In Field 2 Trench 13 contained a large oval anomaly containing concentrations of burnt bone and charcoal flecks. In Field 1 Trench 14 contained a gully running northwest-southeast running into the existing hedgerow. It contained animal bone and charcoal. Archaeological monitoring took place of a substantial area at the northern end of Field 2 to allow for the construction of a temporary compound between 28th-30th March. This uncovered a pit and an area of scorching. All three areas were recommended for excavation.

Subsequent excavation took place between 5th April and 15 May.2017. The excavations in the Temporary Car Park revealed a pit containing Bronze Age ceramics and lithics in the north of the site. This is the earliest feature to be excavated in the Oldtown/Mooretown complex to date. Excavations in the area around Trench 13 uncovered a series of ditches and gullies and a substantial well up to 2.5m in depth. Animal bone indicated disposal of butchering and food waste while sawn antler suggested waste from craftworking. These features are likely to be of early medieval date. Two further gullies trending from east-west were excavated in Field 1, one of which contained a fragment of a granite quernstone and an iron billhook along with animal bone and charcoal rich soil.

Licence No. 17E0446, Archaeological Testing Report. Rathbeal, Swords, Co. Dublin (McLoughlin 2017)

Archaeological testing was carried out over 5 days from the 25th September 2017 in advance of planning for Oldtown Phase 5. The purpose of the programme of archaeological testing was to examine the anomalies identified in the geophysical survey of the area (Licence no: 11R0044) and to establish whether there were any archaeological remains associated with the features indicated in the aerial photography in the field to the west and if any remains were identified, to establish the nature, extent and character of any such remains. In total 12 test trenches were excavated and archaeological features were identified in two areas, in Trenches T2 and T4. A boundary ditch which corresponds with historical OS mapping was also identified, as well as numerous drainage features across the excavated areas.

A probable cereal drying kiln (C23) was discovered in test trench T2. The feature, oriented east-west measured c. 2.5m x 1.15m and oxidised soil was visible around the edges of the cut which appeared to be slightly waisted or figure-of-eight shaped. It was not deemed necessary to section this feature. Additional trenches were excavated in the vicinity of the kiln to investigate if there were any further associated features, and no further features were evident.

An apparently isolated pit (C21) was identified in trench T4 and further trenches were opened in the vicinity in an attempt to establish if there were any further associated features. The pit measured 0.65m x 0.5m x 0.24m deep and contained small fragments of poorly preserved animal bone and charcoal flecks. These features were recorded, covered in polythene and the trenches backfilled.

APPENDIX 13.2 CULTURAL HERITAGE NATIONAL MONUMENTS LEGISLATION 1930-2004

All archaeological sites have the full protection of the national monuments legislation (Principal Act 1930; Amendments 1954, 1987, 1994 and 2004).

In the 1987 Amendment of Section 2 of the Principal Act (1930), the definition of a national monument is specified as:

any artificial or partly artificial building, structure or erection or group of such buildings, structures or erections,

any artificial cave, stone or natural product, whether forming part of the ground, that has been artificially carved, sculptured or worked upon or which (where it does not form part of the place where it is) appears to have been purposely put or arranged in position,

any, or any part of any, prehistoric or ancient

(i) tomb, grave or burial deposit, or

(ii) ritual, industrial or habitation site,

and

any place comprising the remains or traces of any such building, structure or erection, any cave, stone or natural product or any such tomb, grave, burial deposit or ritual, industrial or habitation site...

Under Section 14 of the Principal Act (1930):

It shall be unlawful...

to demolish or remove wholly or in part or to disfigure, deface, alter, or in any manner injure or interfere with any such national monument without or otherwise than in accordance with the consent hereinafter mentioned (a licence issued by the Office of Public Works National Monuments Branch),

or

to excavate, dig, plough or otherwise disturb the ground within, around, or in the proximity to any such national monument without or otherwise than in accordance...

Under Amendment to Section 23 of the Principal Act (1930), a person who finds an archaeological object shall, within four days after the finding, make a report of it to a member of the Garda Síochána...or the Director of the National Museum...

The latter is of relevance to any finds made during a watching brief.

In the 1994 Amendment of Section 12 of the Principal Act (1930), all of the sites and 'places' recorded by the Sites and Monuments Record of the Office of Public Works are provided with a new status in law. This new status provides a level of protection to the listed sites that is equivalent to that accorded to 'registered' sites [Section 8(1), National Monuments Amendment Act 1954] as follows:

The Commissioners shall establish and maintain a record of monuments and places where they believe there are monuments and the record shall be comprised of a list of monuments and such places and a map or maps showing each monument and such place in respect of each county in the State.

The Commissioners shall cause to be exhibited in a prescribed manner in each county the list and map or maps of the county drawn up and publish in a prescribed manner information about when and where the lists and maps may be consulted.

In addition, when the owner or occupier (not being the Commissioners) of a monument or place which has been recorded, or any person proposes to carry out, or to cause or permit the carrying out of, any work at or in relation to such monument or place, he shall give notice in writing of his proposal to carry out the work to the Commissioners and shall not, except in the case of urgent necessity and with the consent of the Commissioners, commence the work for a period of two months after having given the notice.

The National Monuments Amendment Act 2004

The National Monuments Amendment Act enacted in 2004 provides clarification in relation to the division of responsibilities between the Minister of Environment, Heritage and Local Government, Finance and Arts, Sports and Tourism together with the Commissioners of Public Works. The Minister of Environment, Heritage and Local Government will issue directions relating to archaeological works and will be advised by the National Monuments Section and the National Museum of Ireland. The Act gives discretion to the Minister of Environment, Heritage and Local Government to grant consent or issue directions in relation to road developments (Section 49 and 51) approved by An Bord Pleanála and/or in relation to the discovery of National Monuments

14A. (1) The consent of the Minister under section 14 of this Act and any further consent or licence under any other provision of the National Monuments Acts 1930 to 2004 shall not be required where the works involved are connected with an approved road development.

(2) Any works of an archaeological nature that are carried out in respect of an approved road development shall be carried out in accordance with the directions of the Minister, which directions shall be issued following consultation by the minister with the Director of the National Museum of Ireland.

Subsection 14A (4) Where a national monument has been discovered to which subsection (3) of this section relates, then

the road authority carrying out the road development shall report the discovery to the Minister

subject to subsection (7) of this section, and pending any directions by the minister under paragraph (d) of this subsection, no works which would interfere with the monument shall be carried out, except works urgently required to secure its preservation carried out in accordance with such measures as may be specified by the Minister

The Minister will consult with the Director of the National Museum of Ireland for a period not longer than 14 days before issuing further directions in relation to the national monument.

The Minister will not be restricted to archaeological considerations alone, but will also consider the wider public interest.

APPENDIX 13.3 PLANNING AND DEVELOPMENT ACT, 2000

Structures of architectural, cultural, scientific, historical or archaeological interest can also be protected under the Planning and Development Act, 2000.

This act provides for the inclusion of protected structures into the planning authorities' development plans and sets out statutory regulations regarding works affecting such structures. Under the new legislation, no distinction is made between buildings formerly classified under development plans as List 1 and List 2. Such buildings are now all regarded as 'protected structures'.

The act defines a 'protected structure' as follows:

(a) a structure, or

(b) a specified part of a structure,

which is included in a record of protected structures, and, where that record so indicates, includes any specified feature which is within the attendant grounds of the structure and which would not otherwise be included in this definition.

'Protection', in relation to a structure or part of a structure, includes conservation, preservation, and improvement compatible with maintaining the character and interest of the structure or part;

Part IV of the act deals with architectural heritage, and Section 57 deals specifically with works affecting the character of protected structures or proposed protected structures.

…the carrying out of works to a protected structure, or a proposed protected structure, shall be exempted development only if those works would not materially affect the character of—

(a) the structure, or

(b) any element of the structure which contributes to its special architectural, historical, archaeological, artistic, cultural, scientific, social or technical interest.

Section 58, subsection 4 states that:

Any person who, without lawful authority, causes damage to a protected structure or a proposed protected structure shall be guilty of an offence.