



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

MAIN REPORT

Direct Application for Approval to An Bord Pleanála in accordance with Section 175 of the Planning and Development Act 2000

Proposed Residential Development

in the townlands of Shanganagh, Cork Little and Shankill, Co. Dublin.

On behalf of

Dún Laoghaire-Rathdown County Council, in partnership with the Land Development Agency

January 2020



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Part A – Non-Technical Summary



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1.0 INTRODUCTION

This Environmental Impact Assessment Report (EIAR) has been prepared by HRA | PLANNING Chartered Town Planning Consultants and a team of consultants on behalf of Dún Laoghaire-Rathdown County Council in partnership with the Land Development Agency for a residential development located in the townlands of Shanganagh, Cork Little and Shankill, Co. Dublin. Approval is sought to construct a 61,691sqm (gross) 56,641sqm (net) residential development partially comprising a “Build to Rent” scheme with ancillary commercial uses on a site measuring 9.69 hectares.

The EIAR has been prepared to accompany an application for approval to An Bord Pleanála for the aforementioned development works under Section 175 of the Planning & Development Act 2000 as amended.

The 9.69 hectare site is located adjacent to Shanganagh Park in southern Co. Dublin positioned between Shankill Village and the settlement of Bray. Access to the site is from an existing entrance off the R119 Old Dublin Road. The site is bound to the west by the R119, the north by residential housing (Castle Farm), by Shanganagh Castle to the east and by Shanganagh Park to the south and further to the east

1.1 Proposed Development

The public notices set out a detailed description of the development proposal. The description of the development can be summarised as: -

- Construction of 597 no. residential units (ranging from 1 – 6 stories in height with one block comprising a seventh storey setback) in a combination of housing, apartment and Build to Rent apartment units.
- Provision of 1 no. detached unit; 14 no. semi-detached units, 36 no. terraced houses; and 40 no. apartments and 506 no. Build to Rent apartments in 8 no. blocks of development.
- Provision of resident services & amenities including (a) Gym; (b) residents lounge/cinema room; (c) Function Room; (d) Gallery/Community Room; (e) 2 no. Lounge areas; (f) Business pods; and (f) Co-Working Office units.
- Provision of resident support facilities including (a) Concierge Facilities; (b) Parcel /Store Room; (c) Central Energy Centre; (d) waste management areas; and (e) bike storage rooms.
- Construction of a (i) creche facility with capacity to accommodate 107 no. children; (ii) local shop of 103sqm (NFA) and (iii) local café of 125sqm.
- Provision of water services, foul and surface water drainage and associated connections across Shanganagh Park to the proposed Woodbrook residential scheme with attenuation proposals including permeable paving, green roofs & swales.
- Extensive landscaping and public realm works including (a) regeneration of the existing pond within the Demense; (b) provision of playground and kick about areas; and (c) new pedestrian and cycle connections through the adjoining parkland to the south to facilitate a future connection to the proposed Woodbrook DART station.

- Works to the existing Shanganagh Castle entrance to the Dublin Road, including relocation of the existing entrance to the north; upgrade works to facilitate a signalised junction and provision of a separate pedestrian access. The existing Shanganagh Castle Entrance shall remain operational on a temporary basis to facilitate construction traffic
- Demolition of an existing house and maintenance buildings located within the Parks Maintenance Depot.
- All associated and ancillary site development and infrastructural works, hard and soft landscaping and boundary treatment works.

1.2 Function of the Environmental Impact Assessment Report

This EIAR is a statement of the potential significant effects that the proposed development may have on the receiving environment. The primary objective of the EIAR is to identify the baseline environmental context of the proposed development, predict potential beneficial and/or adverse effects of the development and propose appropriate mitigation measures where necessary.

The EIAR has been prepared following the logical analysis of the development proposal in relation to the receiving environment. This process of environmental impact 'assessment' and the preparation of this EIAR has been an evolving process which commenced at the project design stage and informed the overall design of the development so that potential adverse effects were omitted, reduced or off-set by design modification

1.3 Statutory Requirement for Environmental Impact Assessment Report

Proposed development which falls within one of the categories of development specified in Schedule 5 of the Planning and Development Regulations 2001, as amended, which equals or exceeds, a limit, quantity or threshold prescribed for that class of development must be accompanied by an EIAR. The subject development falls within a development class set out in Part 2 Schedule 5 of the Planning & Development Regulations 2001 as amended. The relevant class of development are 10(b)(i) as follows:

Category 10(b)(i) Construction of more than 500 dwelling units.

The proposed development comprises a new residential development, including 597 no. residential units and ancillary supporting facilities, on a site of c. 9.69 hectare. The project exceeds the 500 no. dwelling unit threshold, therefore triggering mandatory EIA.

1.4 Preparation of the Environmental Impact Assessment Report

The effects on the receiving environment are measured as the likely natural or physical changes in the environment resulting directly or indirectly from the development processes. Consideration of these effects was undertaken by assessing the proposed development against the defined environmental variables set out in the Planning and Development Regulations 2001, as amended and the Environmental Protection Agency (EPA) 'Guidelines on the Information Contained in Environmental Assessment Reports', Draft August 2017

In order to ensure an effective and conclusive environmental assessment consistent with best practice, the assessment of potential effects on the environment takes a holistic approach and

examines not only the effects arising from the physical characteristics of the proposed development but also the effects arising from demolition of buildings at construction stage and site clearance.

Although development on the site will be phased over a three year period, examination of an 'all phase' development scenario for the site will be undertaken, consistent with best practice in order to examine a 'worst-case' scenario of the project effects.

1.5 Technical Difficulties or Lack of Data

The compilation of the information necessary for the EIAR did not present any significant difficulties. However, some assumptions and projections were necessary for certain areas of this assessment, particularly the traffic and noise assessments. Survey work has been undertaken to compliment data from official sources in order to provide up-to-date base line information on which to undertake the environmental assessments. This EIAR has been prepared on the best available information and in accordance with current best practice and guidelines published by the Environmental Protection Agency.

1.6 Competencies of the Team

The preparation of this EIAR has been project managed by HRA | PLANNING Chartered Town Planning Consultants. The project management team hold recognised professional qualifications in Town Planning, Environmental Impact Assessment Management, and in Ecological Assessment. The assessment has been prepared with other specialist professional inputs as specified Table 1.1.

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Chapter 18	Interaction with the Foregoing	HRA Planning	Mary Hughes	BA (Hons) MSc PGDip EIA Mgmt. MIPI Town Planning & EIA Consultant	
Chapter 19	Summary of Mitigation Measures		Mary Hughes	BA (Hons) MSc PGDip EIA Mgmt. MIPI Town Planning & EIA Consultant	

Table 1.1 Competent Persons Preparing the EIAR

2.0 PROJECT CHARACTERISTICS

2.1 Site Description

The subject site is located adjacent to Shanganagh Park in southern Co. Dublin positioned between Shankill Village and the settlement of Bray. Access to the site is from an existing entrance off the R119 Old Dublin Road. The site is bound to the west by the R119, the north by residential housing (Castle Farm), by Shanganagh Castle to the east and by Shanganagh Park to the south and further to the east

The site measuring 9.69 hectares is currently dominated by grassland and an existing playing pitch, garden allotments, greenhouses and storage sheds, an existing two-storey house, and localised areas of plantation woodland. There are no other buildings within the boundary of the subject site. An existing water feature referred throughout the EIAR as 'the pond' is located immediately west of the maintenance depot surrounded by trees and scrub. Whilst the site appears to be relatively level, a topographical survey completed in January 2019 confirms that from the highest point in the north-west (+29.50m) to the lowest in the south (+24.00m), there exists a general site-wide slope of ~1:50. Results of the ground investigations from the Geo-Physical Report detailed in Appendix 8.1 suggests a significant amount of modern ground disturbance with concentrations and spreads of modern material throughout. It has been ascertained that the land was filled over time with material arising from road construction in the past.

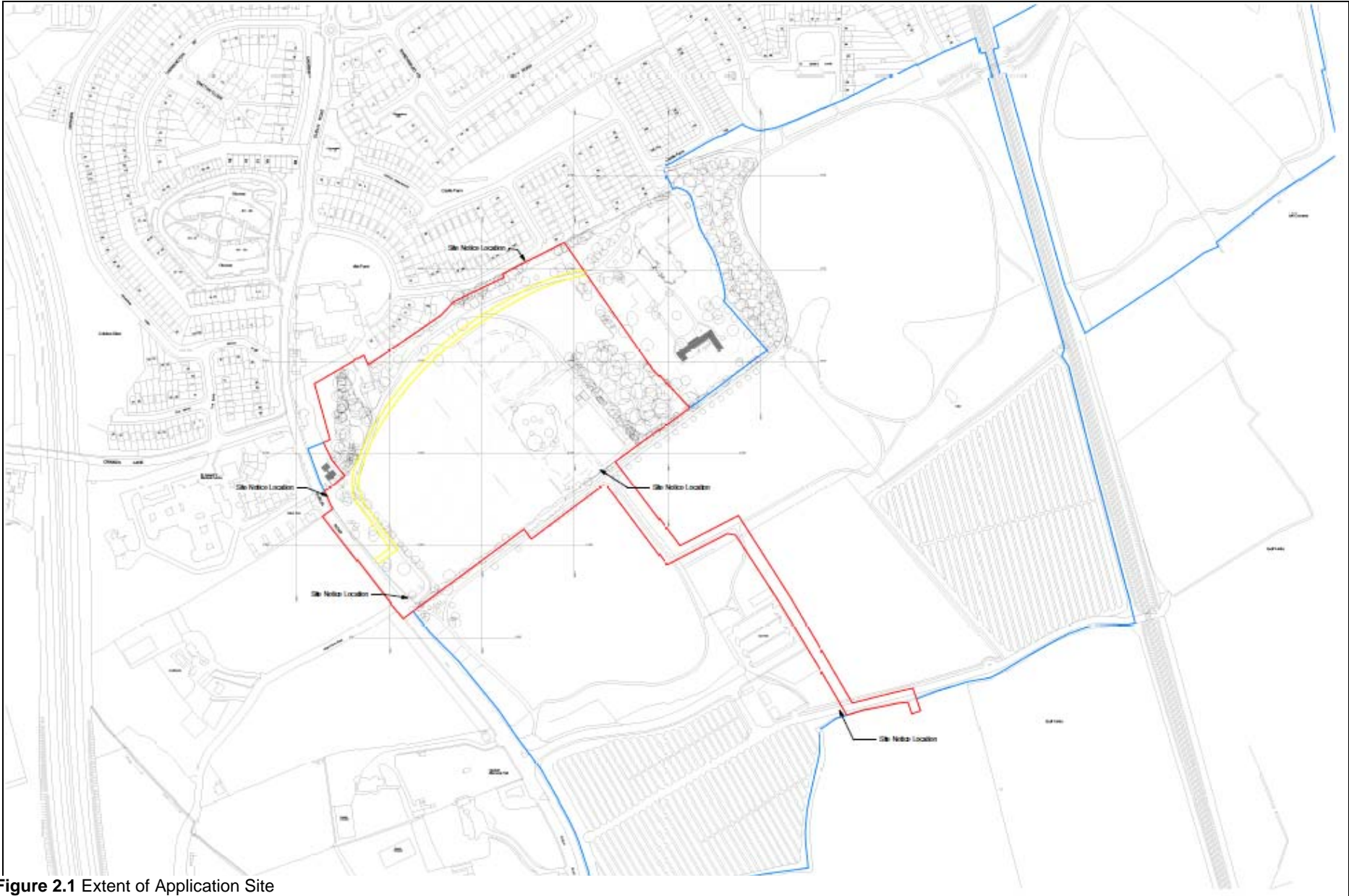


Figure 2.1 Extent of Application Site

The subject site is located in an area identified for residential development under the Woodbrook – Shanganagh LAP (2017 – 2023) – hereafter referred to the LAP. The residential site is situated between two major public transport arteries. The existing DART railway line is located east of the site with an existing station in Shankill village (circa 2.1km to the north) and a future station to be provided within the Woodbrook lands to the south (less than 1km from the site). To the west is the Old Dublin Road (R119) which is planned to accommodate Bus Connects Route 19 Bray – City Centre in the future. The M11 motorway lies further to the west.

The established settlement of Shankill largely consists of a more traditional village settlement pattern with a central main street – containing more localised shops and facilities – surrounded by relatively low density housing estates constructed through the seventies and eighties. A number of newer medium to high density residential developments, however, have been constructed in Shankill including for example – Olcovar, Aubrey and The Bridge.

2.2 Proposed Development

The application for approval to An Bord Pleanála under Section 175 of the Planning & Development Act 2000 – 2018 (the Act) is accompanied by detailed drawings and a detailed Architectural Design Statement, prepared by ABK Architects, which provides a rationale for the design of the proposed scheme and the dwelling types proposed. The Build to Rent (BTR) element of the development proposal is also supported by a Sustainable Communities and BTR Justification Report prepared by HRA Planning Chartered Town Planning Consultants.

Cognisant of the fact that the proposed development is within the curtilage of a protected structure, the development seeks to work with the remains of the existing picturesque landscape established in the early 19th century while adhering to the design principles set out in the Woodbrook-Shanganagh Local Area Plan 2017-2030 (LAP).

Whilst the Demense landscape is still legible, it has been poorly maintained and is much curtailed by recent development. Notwithstanding, it is these elements of cultural infrastructure, including its scenic approach, decorative pond and composed stands of trees, that underpin the development. The development seeks to reinforce these existing landscape characteristics and features and overlay them with a matrix of overlapping built and landscaped zones so as to create a coherent composition that meets with the objectives of the LAP.

The proposed development has been comprehensively described in the public notices. A Site Layout Plan is detailed in Figure 2.3. A summary of its description is provided hereunder:

- Construction of 597 no. residential units (ranging from 1 – 6 stories in height with one block comprising a seventh storey setback) in a combination of housing, apartment and Build to Rent apartment units.
- Provision of 1 no. detached unit; 14 no. semi-detached units, 36 no. terraced houses; and 40 no. apartments and 506 no. Build to Rent apartments in 8 no. blocks of development
- Provision of resident services & amenities including (a) Gym; (b) residents lounge/cinema room; (c) Function Room; (d) Gallery/Community Room; (e) 2 no. Lounge areas; (f) Business pods; and (f) Co-Working Office units.

- Provision of resident support facilities including (a) Concierge Facilities; (b) Parcel /Store Room; (c) Central Energy Centre; (d) waste management areas; and (e) bike storage rooms.
- Construction of a (i) creche facility with capacity to accommodate 108 no. children; (ii) local shop of 103sqm (NFA) and (iii) local café of 125sqm.
- Provision of water services, foul and surface water drainage and associated connections across Shanganagh Park to the proposed Woodbrook residential scheme with attenuation proposals including permeable paving, green roofs & swales.
- Extensive landscaping and public realm works including (a) re-remediation of the existing pond within the Demense; (b) provision of playground and kick about areas; and (c) new pedestrian and cycle connections through the adjoining parkland to the south to facilitate a future connection to the proposed Woodbrook DART station.
- Works to the existing Shanganagh Castle entrance to the Dublin Road, including relocation of the existing entrance to the north; upgrade works to facilitate a signalised junction and provision of a separate pedestrian access. The existing Shanganagh Castle Entrance shall remain operational on a temporary basis to facilitate construction traffic
- Demolition of an existing house and glass houses and maintenance buildings located within the Parks Maintenance Depot.
- All associated and ancillary site development and infrastructural works, hard and soft landscaping and boundary treatment works.



Figure 2.2 Proposed Site Layout Plan

The proposed development provides for 597 no. units and will provide for a mixed-tenure development, facilitating units for sale, social housing and rent as detailed in Table 2.2 across a range of unit sizes, detailed in Table 2.3. The social housing and rental units comprise Build to Rent apartment formats in accordance with Specific Planning Policy 7 and 8 as set out in the “Sustainable Urban House: Design Standards for New Apartments 2018” (Apartment Guidelines). The range and mix of units will ensure that the proposed development caters and provides for different household typologies in a sustainable and community-based manner.

Unit Format	Unit Type	Unit Location	No. of Units
Affordable Sale	Terraced House		51
Affordable Sale	Apartment	Block F	40
BTR Social Units	Apartment	Blocks D, E & H	200
BTR Cost Rental Units	Apartment	Block A, B, C, G	306

Table 2.1 Mixed Tenure Development Proposal

Unit Size	Detached	Semi Detached	Terraced	Apartments	% Mix of Overall Development
Studio				29	4.8%
1 bed				165	27.6%
2 bed	1	14	15	281	52%
3 bed			21	69	15%
4 bed				2	0.3%
Total	1	14	36	546	100%

Table 2.2 Unit Size and Number Across Entire Development

The number of units proposed within the overall development seeks to accommodate higher density development on site in accordance with national, regional and local policy. The proposed development results in a net residential density of 85 no. units per hectare based on a net site area of 7.03 hectares.

3.0 PLANNING CONTEXT

There is significant policy at national, regional and local level which supports the development of a high-density residential scheme at this location. The proposed development has been carefully considered and designed in the context of such policy and guidelines.

The proposed development complies with a number of the NPO's within the **National Planning Framework** with particular regard to development within the existing built up footprint of a settlement. The proposed development is strategically located on residentially zoned greenfield lands. The site is serviceable and well connected to the road network. The site has been identified as a prime location for future residential development at a sustainably high density. A future train station is proposed on land south of the subject site on the existing line between Dublin and Bray and a BusConnects corridor is proposed along the Old Dublin Road (R119) to the west of the site. This will result in the site being within a 10 minute walk of high frequency public transport.

The Woodbrook – Shanganagh site was identified as a 'Major Urban Housing Delivery Site' by the Department of Housing Planning Community and Local Government (DHPCLG) under Pillar 3 -

Building More Homes of the Government's ***"Rebuilding Ireland – an Action Plan for Housing and Homelessness"***.

The ***Sustainable Urban Housing: Design Standards for New Apartments 2018*** seek to promote high density and high quality apartment developments on residentially zoned land in appropriate locations. The subject site would appear to be most akin to a "Central and/or Accessible Urban Location" as per the Guidelines, located on residential zoned land within 400m from the Dublin Road (bus stops) and 800m (10 minute walking distance) across Shanganagh Park from the proposed new DART Station. The provision of the planned DART Station at Woodbrook will provide direct access to the Suburban Rail Network and wider heavy rail network as defined in the NTA's Transport Strategy for the Greater Dublin Area. The Guidelines confirm that these locations are generally suitable for higher density developments, comprising wholly of apartments in more central locations.

The ***Urban Development and Building Heights – Guidelines for Planning Authorities 2018*** recognises that our cities and towns must grow upwards and not outwards. Section 3.6 of the Guidelines states that development should include an effective mix of 2, 3 and 4-storey development which integrates well into existing and historical neighbourhoods and 4 storeys or more can be accommodated alongside existing larger buildings, trees and parkland, river/sea frontage or along wider streets. The proposed development comprises a mix of 2 - 6 stories with a seventh storey set back on one building fronting the Dublin Road. The development is within a parkland setting and within the curtilage of a protected structure, Shanganagh Castle.

The ***Regional Spatial and Economic Strategy for the Eastern & Midland Region*** confirms that Shanganagh – Woodbrook, within the Dublin Metropolitan Area has been strategically planned for development at a regional level, with its development planned having regard to integrated land use and transport uses and infrastructure.

In the ***Dún Laoghaire-Rathdown County Development Plan 2016 - 2022*** (CDP) Shanganagh - Woodbrook is identified as a future development area in the core strategy settlement structure. The CDP states that there is potential for an additional 2,300 residential units in Woodbrook – Shanganagh having regard to the extent of land that is zoned. The land use zoning objectives as set out within Map 10 and 14 of the CDP and affords Zoning Objective A1 to the land, which seeks "to provide for new residential communities in accordance with approved local area plans", whilst Shanganagh Park and Cemetery are zoned Objective – 'F': "To preserve and provide for open space with ancillary active recreational facilities". A 'H' symbol has also been afforded to the subject site, which is indicative that the subject land has been identified as a County Council Housing Programme Site.

The ***Woodbrook – Shanganagh Local Area Plan 2017 – 2023*** further supports this approach and puts in place the necessary design and delivery parameters to guide development on the subject site. It is these design and delivery parameters that have heavily influenced the design approach to development on the site.

4.0 SCOPING

Consultation was undertaken with statutory consultees and individual departments within Dún Laoghaire-Rathdown County Council to draw on their local knowledge and experience of the Shankill area and to identify issues of particular environmental significance. The project was initially scoped with the applicant and within the design team based on the expertise and past experience of the EIAR contributors for similar projects. Existing activities and features on site and similar developments in other locations, including the proposed development in Woodbrook on land south of Shanganagh Park, also informed the process.

Initial scoping by the design team was supplemented by written scoping requests to a number of statutory and non-statutory consultees. Contact was made with 15 no. consultees whereby a comprehensive overview of the proposed development along with an initial set of drawings, clearly demarcating the site and explaining the overall development approach, were issued.

The informal scoping requests were issued in January 2019. Although the scheme has evolved significantly since the original scoping requests were issued in January 2019, the responses nonetheless have informed this EIAR. Of the 15 no. consultees that were contacted responses were received from 5 no. consultees including the Geological Survey of Ireland; Inland Fisheries; Department of Culture Heritage & the Gaeltacht – Archaeology; Dún Laoghaire-Rathdown County Council Planning Department; and Transport Infrastructure Ireland.

Following the initial informal scoping process, the development proposal was amended to satisfy a revised development brief and to provide for greater density in accordance with national policy as detailed in the National Planning Framework (NPF) and national guidance. Given the sensitivities of the site further consultation was undertaken with the Department of Culture Heritage & the Gaeltacht. Two responses were received from the Department including Nature Conservation and from Built Heritage, which have extensively informed the design approach.

Following the informal scoping and consultation process all environmental topics have been comprehensively addressed within this EIAR.

5.0 EXAMINATION OF ALTERNATIVES

This chapter provides an outline of the main alternatives examined throughout the design and consultation process. This serves to indicate the main reasons for choosing the development proposed, taking into account and providing a comparison of the environmental effects.

The key environmental and practical considerations which influenced the design of the proposed development and alternative locations and layouts on the landholding included the following:

- The need to achieve sustainable densities in accordance with national policy in the National Planning Framework; national guidelines Sustainable Residential Development in Urban Areas; and the objectives of the Woodbrook – Shanganagh Local Area Plan 2017 – 2023 (LAP), given the location of the subject site on the edge of Shankill Village, in proximity to Bray and proximate to existing and future public transport provision.

- The protected structure and built heritage status of Shanganagh Castle and Lodge located on adjoining lands and the importance of maintaining the integrity of both structures and the visual focal point of the Castle, notwithstanding development within the attendant grounds.
- The location of the site within and adjoining Shanganagh Park and its parkland setting. Whilst the Demense landscape is still legible, it has been poorly maintained and is much curtailed by recent development. Nonetheless, it is these elements of cultural infrastructure, including its scenic approach, decorative pond and composed stands of trees, that underpin the development.
- The need to protect and enhance existing landscape features including the existing ornamental pond, trees of heritage significance and existing woodland, to ensure preservation and enhancement of the amenity and biodiversity of the area.
- Protection and preservation of existing natural habitats and species including bats, badger setts, birds, amphibian species (newts) and other protected mammal species, thereby preserving biodiversity.
- Protection of the residential amenities of adjoining housing in Castlefarm neighbouring the site to the north in the interest of human health.
- The quality of the urban environment to be delivered and the associated impact on human health.
- The need to maintain a riparian corridor between the proposed buildings and the boundary of the site adjoining the Dublin Road in accordance with the requirements of the LAP and specifically Objective SC31.
- Access, permeability and connectivity with surrounding areas and land uses and in particular connectivity to the proposed Woodbrook development in proximity to the site via a dedicated greenway through Shanganagh Park.
- Reduced on site car parking provision to encourage and facilitate modal shift to more sustainable modes of transport.

Following consideration of environmental and planning factors at a high level, including its established zoning, it was considered that the landholding is an appropriate location for residential development from an environmental perspective. The proposal adopts a plan led approach to development and seeks to provide for much needed housing, including social housing, in accordance with national, regional and local policy and guidance documents.

From an environmental perspective, beyond impact on human health from a failure to deliver sustainable residential development to meet housing and community development needs and further sustainable development based on alternatives to travel by private car, a 'do nothing' approach is otherwise likely to result in a neutral impact on the environment in respect of material assets, land, water, air, climate, cultural heritage, biodiversity and landscape.

The subject proposal evolved during the design phase in response to input from the appointed EIAR team, advice received from internal departments within Dún Laoghaire-Rathdown County Council, consultation with Elected Representatives and compliance with statutory guidelines and legislation. This iterative process inter alia highlighted environmental matters that informed the consideration of alternative layouts and designs up to the formalisation of the final scheme which is now being submitted to An Bord Pleanála for approval. The significant issues highlighted included:

- Open space provision, landscape masterplanning and preservation of key elements of the Demense landscape;
- Traffic and transportation and the need to encourage modal shift to more sustainable transport forms;
- Addressing the issues of population and human health in a city environment and the need to accommodate sufficient services and facilities;
- Biodiversity and the preservation of natural habitats including the existing newt population; and
- Sensitive design respective of the significance of Shanganagh Castle.

The final design presents the most effective utilisation of this significant site, fulfils the requirements of the LAP and provides for much needed social, affordable and cost effective housing. To summarise it is considered that the final layout:

- Advances the strategic and statutory objectives applicable to these lands and the wider area;
- Optimises development space within the overall site, in an efficient and sustainable manner.
- Facilitates the introduction of long-term public transport infrastructure (Bus Connects) to the area, which can be incorporated into future infrastructural networks.
- Facilitates ready access to all parts of the scheme and the future development of Shanganagh Castle for community purposes;
- Avoids significant environmental impacts;
- Enables extensive economic development through both employment created at construction and operational stages;
- Provides much-needed housing in an area characterised by very slow housing growth; and
- Encourages the use of public transport and provides pedestrian and cycle links throughout to minimise car usage within the scheme.

EFFECTS ON THE ENVIRONMENT

Consideration of environmental impacts in the EIAR were generally restricted to areas that initial scoping had indicated could be impact upon by the proposed development. These included:

- Population and Human Health
- Biodiversity
- Land & Soils
- Hydrology & Hydrogeology
- Air Quality & Climate
- Noise & Vibration
- Archaeology & Cultural Heritage
- Architecture & Cultural Heritage
- The Landscape
- Material Assets - Traffic and Transport
- Material Assets – Water Services
- Material Assets – Resources & Waste Management

Each of the above was considered in detail, having regard to both the environment as it currently exists prior to development, the likely impacts that a development of this kind would have, and the means of reducing the impacts of the development when it is in operation.

6.0 POPULATION & HUMAN HEALTH

The baseline information was gathered using desk top analysis of available mapping and aerial images; visits to the site and the surrounding area; analysis of census of population data; review of relevant documents; and a review of comments from statutory bodies and the public during the consultation process

The Shankill Shanganagh ED in which the subject site is located had a population of 5,488 no. persons in 2016. This represents a population percentage change of 2.8 per cent or an actual population increase of 154 no. persons from the 2011 Census figures, well below the national average of 3.8 per cent. The low population growth is likely attributable to the lack of available housing in the area and in particular the low delivery of new build units having regard to historical infrastructural deficiencies.

Within the Shanganagh Woodbrook Local Area Plan, there are circa 31 hectares of residential zoned lands which at sustainable density levels have the potential to deliver circa 1,600-2,300 new homes across a range of tenure types and typologies. Located 1km to the north is the established settlement of Shankill which largely consists of a more traditional village settlement pattern. To the south is the settlement of Bray. The area is well served with existing services and facilities and benefits from good public transport links.

The proposed development will consist of 597 no. residential units/households including 194 no. studio and 1 bed units. Allocating a generous household size of 1.5 persons to the 1 bed units and using the local average household size indicators from Census 2016 for this DED (2.92) for the remaining units, the proposed development may result in a projected population of approximately 1,470 no. persons residing at the site. This will result in a sizeable new community within Shankill at Shanaganagh. This is considered significant and positive, particularly in the context of current housing demand, but it will place significant additional strains on existing community facilities and services in the town.

The construction phase of the proposed development is unlikely to have any significant impact on social patterns within the surrounding area. Some temporary additional local populations may arise out of construction activity. However, these impacts are imperceptible, temporary in nature and therefore not considered significant.

Positive impacts on population and human health will include health benefits associated with the provision of a highly permeable layout which encourages walking and cycling, amenity and recreational facilities and the provision of a significant open space adjacent to the public park.

Issues examined as part of the possible impact on human health from the proposed development including Air Quality, Noise and Vibration, Traffic, Visual and Health and Safety. These chapters should be consulted in relation to specific impacts and mitigation measures.

In relation to air quality the impact of construction of the proposed development is likely to be negative, short-term and imperceptible with respect to human health. The mitigation measures that will be put in place during construction of the proposed development will ensure best dust mitigation practice based on the Institute of Air Quality Management (IAQM) Guidance. Furthermore, mitigation will ensure that the impact of the development complies with all EU ambient air quality legislative limit values which are based on the protection of human health. During the operational phase of the project the pollutants of most concern are NO₂ and PM₁₀, as these pollutants are generated as a direct result of vehicles and have the greatest potential to exceed the air quality standards. There are no other impacts on air quality associated with the operational phase of the proposed development.

As detailed in Chapter 12: Air (Noise & Vibration) it is believed noise and vibration impact of the construction phase of the proposed development will not be significant, temporary and short term in nature. A 2m high screen barrier is required to be erected along the northern site boundary during construction. No predicted significant adverse impact arising from vibration during construction provided works are carried out so as to fall under the relevant vibration criteria. Due to the type of proposed development (residential) the predicted increase in noise level at the nearest noise sensitive locations conclude that the associated impact is neutral, long term and imperceptible to minor during operation. The proposed development will not generate any perceptible levels of vibration during operation and therefore there will be no impact from vibrations on human health.

The impact of traffic generated by the proposed development on human health during both the construction and demolition phases of the proposed development is dealt with in Chapters 15.0: Material Assets (Transportation) of this EIAR.

There will be moderate to significant negative townscape impacts during the construction stage of the proposed development, however these will be short term in duration. Once operational, the new development will contribute positively to the form and function of the local area. The improved town scape and visual settings will result in a positive impact on population and human health in the area.

The proposed development has the potential for an impact on the health and safety of workers employed on the site, particularly during the construction phase. The activities of contractors during the construction phase will be carried out in accordance with the Safety, Health and Welfare at Work (Construction) Regulations 2013 (S.I. No. 291 of 2013) to minimise the likelihood of any impacts on worker's health and safety. During the operational phase of the development, the operator will implement an Environmental Safety and Health (EH&S) Management System and associated procedures at the facility. Full training in the EH&S Management System and relevant procedures will be provided to all employees.

7.0 BIODIVERSITY

An assessment of the potential impacts and effect of the proposed development on the ecological environment, i.e. plants and animals, collectively known as biodiversity has been undertaken. The assessment was carried out within the context of relevant legislation, national and local planning policies and relevant guidance documents.

The ecological baseline at the proposed development was established through a combination of desktop study, including consultation with statutory and non-statutory stakeholders, and targeted field survey. The desktop study involved the collection of available information on the ecological features present at or in the vicinity of the proposed development and the review of published documents relevant to the proposed development and/or surrounding area. Field survey was conducted for the following ecological features:

- habitats and flora;
- bats (including roosting bats and bats using the Proposed development for foraging and/or commuting);
- otter;
- badger;
- amphibians, namely smooth newt and common frog; and,
- breeding and non-breeding birds.

The habitats within the boundary of the proposed development were found to be of limited ecological value, predominantly comprising grasslands. However, blocks of mixed broadleaved woodland are of relatively high ecological importance, in addition to the treelines and hedgerows along the edges of the site, and the waterbody within the boundary of the proposed development (referred to as the 'Pond'). No plant species protected under the Flora Protection Order, and no rare or threatened species identified on national Red Lists were recorded during field survey. No scheduled invasive plant species (i.e. those listed on the Third Schedule of the Habitats Regulations) were identified. However, a low impact, non-scheduled invasive species, winter heliotrope, was recorded in three locations; within the peripheries of the mixed broadleaved woodland located in the north-west and south-east corners of the site, and within the hedgerow / tree line along the northern boundary of the Site.

No bat roosts were identified during field survey. However, a total of five trees with either Moderate or High suitability for bat roosting were found. Between August and October 2018 four species of bat were recorded by field survey: common pipistrelle, soprano pipistrelle, Nathusius' pipistrelle and Leisler's bat. Four key areas of highly suitable bat foraging habitat were identified on site; the Pond and immediate surrounds; the two broadleaved woodland areas; and, the hedgerow running east-west along the south-western boundary of the site. In addition to these areas, the wider site and surrounding environment provide good quality bat commuting and foraging habitat, in particular the network of unlit mature hedgerows and treelines which connect areas of foraging habitat.

No evidence of otter was found during field survey, though some habitat with limited suitability to be used by this species does exist (e.g. the wet ditches along the southern edge of the Site and the Pond).

Information on badgers is provided in a Confidential Appendix to this EIAR.

Smooth newts were found to be present in the Pond and associated drainage ditches to the south. Terrestrial habitat suitable for smooth newt was also present in the vicinity of the Pond and ditches with dense scrubby hedgerows in addition to a wide variety of structurally complex features associated with the hard-standing area adjoining the allotments (e.g. rubble, timber, litter, stored compost bags etc.). Common frog spawn was also found in one of the drainage ditches, indicating breeding by this species.

Breeding bird surveys identified two Birds of Conservation Concern Ireland (BoCCI) species as probably breeding on site: goldcrest and robin (both Amber List). Other species of conservation concern recorded, but which were not believed to breed on site, were swallow and starling (both Amber List). Numerous other species of low conservation concern were recorded on site, both breeding and non-breeding. This included mallard *Anas platyrhynchos* which was confirmed as breeding on the Pond.

Relatively small numbers of three gull species were recorded in the field in Shanganagh Park which is located immediately to the south-east of the proposed development: black-headed gull, herring gull and great black-backed gull. Black-headed gull and herring gull are Special Conservation Interest Species of the South Dublin Bay and River Tolka Estuary Special Protection Area (SPA) and The Murrough SPA.

In the absence of mitigation, significant negative effects were predicted on the following ecological features identified through baseline desktop study and/or field survey:

- non-Annex I habitats as a result of pollution incident during the construction phase;
- non-native plant species, as a result of their spread during the construction or operational phase;
- loss of bat roosts during construction and/or disturbance of roosting, foraging and/or commuting bats during construction and/or operation;
- otter, as a result of mortality during the construction phase;
- badger, as a result of mortality during the construction phase; and,
- smooth newt, due to disturbance or mortality during the construction or operational phase.

However, a range of inherent (embedded) mitigation and specific mitigation is proposed such that there are no residual significant negative effects on biodiversity expected from the proposed development, at any stage, i.e. construction or 'operation', either alone or in-combination with other projects or plans.

8.0 LAND & SOILS

The existing land and soils situation comprises a greenfield site. There is some small development on site but no existing basements. The pre-development soil comprises made ground overlaying glacial limestone till.

Quantities of soil will need to be removed as part of the development. This will primarily comprise new foundations, attenuation tanks and services works. It will be necessary to modify the site levels to suit the proposed buildings, roads and other paved areas. The impact of this is managed by reinstating appropriately on completion of works. Some topsoil and subsoils will be re-used on site where possible. All areas will be finished as either proposed buildings, internal road network, or landscape. The impact on topsoil is a significant long term effect. The impact on subsoils will be a moderate, long term effect in nature.

The impact of temporary construction impacts, such as oil leaks and construction traffic movements over soil, will be managed by careful monitoring and protection measures being implemented to protect the soil. Accidental spills and leaks will be managed via bunding relevant areas. The impact on soils at construction phase will be short term and low.

There is a cumulative impact associated with the removal of soils from the proposed sites in parallel with the adjacent constructed Castle Park estate to the north as well as the currently proposed Woodbrook estate to the south. The impact is considered long term and low.

9.0 HYDROLOGY & HYDROGEOLOGY

The site is underlain by Made Ground that are underlain by glaciofluvial sands and gravels, shallow well drained mineral soils and Irish Sea Till derived from limestones. Groundwater is present within the shallow relatively permeable subsoils across the site and appears to be underlain by lower permeability soft to firm gravelly clays. Groundwater is also present at depth within the deeper permeable clayey sands and gravels subsoils. Shallow groundwater is broadly flowing in a southeasterly direction across the site mimicking the topographical relief of the area and the site. This shallow water body appears to be continuous across the site and flowing under unconfined conditions. It also appears to be hydraulically connected with the Shanganagh Pond.

Groundwater within the deeper sands and gravels is broadly flowing in an east to southeasterly direction across the site. Groundwater within these deeper horizons appears to be flowing under confined conditions and does not appear to be hydraulically connected with shallow groundwater or Shanganagh Pond. The site is underlain by the Ordovician Metasediments, classified as being a locally important bedrock aquifer which is moderately productive only in local zones (LI).

According to the GSI the vulnerability classification for the site is largely classified as High (H) which infers groundwater or bedrock is present within 3 to 5 metres across the site, The recent 2019 site investigation confirmed that the classification of 'High' is deemed appropriate.

There are no rivers or streams which flow across the Shanganagh site. The closest flowing surface water feature is the Rathmichael Brook which flows approximately 330 m from the western site boundary at its closest point to the site.

Shanganagh Pond is located in the central/southeastern region of the site. It is broadly circular in shape with a 35-40 metre diameter. The pond is fed by a cut-and-cover drain along the northern boundary of the pond with water flowing from the north into the pond via this drain. The pond appears to be controlled by an outflow drain along the southern site boundary of the pond that flows in a southeasterly direction within an underground old stone drain before discharging into the drainage network of Shanganagh park.

Flood Maps produced as part of the Eastern CFRAMS were consulted to establish the Flood Zone. It was determined that the proposed development is currently located in Flood Zone C for fluvial flooding. A review of PFRA mapping shows portions of the site to be within Flood Zone A for pluvial flooding. However, it was considered that the pluvial risk will be managed through the construction of a new surface water drainage network, and therefore the site will be in Flood Zone C for pluvial flooding. The site is not affected by coastal or groundwater flooding.

The main environmental factors associated with the risk to the hydrogeological and hydrological environments primarily relate to general construction activities including uncontrolled sediment runoff from exposed soils, fuel and chemical storage, localised excavation of subsoils increasing the vulnerability of the aquifer to pollution events and encountering possible buried waste at the site (albeit somewhat unlikely). If any contaminated soils or buried waste are encountered, they are

anticipated to be very localised with a low-level risk posed to human health and the water environment posed.

The importation of the fill material is a necessary activity for the development and every effort will be made to utilise previously reworked or excavated inert and geotechnically suitable material. The raising of land will ensure additional protection is provided to the underlying aquifer.

Specific mitigation measures have been formulated for the construction phase of work to ensure that the level of risk posed will be short-term and imperceptible.

Example measures include:

- Implementing suitable runoff and sediment control measures;
- Providing suitable storage of fuel and waste materials during the site works and ensuring adequate security measures;
- Implementing the Construction & Demolition Waste Management Plan (C&DWMP) and Environmental Management Plan (EMP); and
- Appropriately designed environmental monitoring of Shanganagh Pond prior to, during and post completion of the works.
- Any detections of contamination or buried waste shall be appropriately assessed and remediated to ensure no residual long-term will be posed to groundwater, surface water or human health.

A drainage system across the site will incorporate SuDS measures such as green roofs, permeable paving, rain gardens, an oil-water interceptor and swales to improve quality and reduce run off rates from the site development. The new surface water drainage network within the development will also include two in-ground attenuation tanks with associated pipework and flow controls and a number of manhole sumps to provide additional attenuation measures within the system.

The only operational stage risk identified relates to the risk of Pluvial Flooding; however it was considered that the risk can be easily mitigated by the construction of a new surface water drainage network thereby ensuring a Flood Zone C of pluvial flooding for the site. Example mitigation measures include:

- Finished floor levels set ensuring a freeboard of greater than 2 m above the CFRAMS Q1000 flood level of 23.24 mAOD.
- All surface water drains to be sized such that they will prevent flooding and convey surface water flows from the site without causing pluvial flooding.
- Surface water attenuation tanks to be provided and sized to ensure runoff from the site does not exceed the level of the greenfield (pre-development) runoff rate thereby ensuring runoff rate from the site will not increase as a result of the proposed development.
- A non-return valve will be located at the downstream point of the drainage network to prevent any surcharging from the adjacent drainage network.

10.0 AIR QUALITY & CLIMATE

In terms of the existing air quality environment, data available from similar environments indicates that levels of nitrogen dioxide, carbon monoxide, particulate matter less than 10 microns and less

than 2.5 microns and benzene are generally well below the National and European Union (EU) ambient air quality standards.

Impacts to air quality and climate can occur during both the construction and operational phases of the proposed development. With regard to the construction stage the greatest potential for air quality impacts is from fugitive dust emissions impacting nearby sensitive receptors. Impacts to climate can occur as a result of vehicle and machinery emissions. In terms of the operational stage air quality and climate impacts will predominantly occur as a result of the change in traffic flows in the local areas associated with the proposed development.

Any potential dust impacts can be mitigated through the use of best practice and minimisation measures which are outlined in Chapter 10. Therefore, dust impacts will be short-term and not significant at all nearby sensitive receptors. It is predicted that impacts to climate will be short-term and imperceptible during the construction stage due to the duration and nature of the works.

The local air quality modelling assessment concluded that levels of traffic-derived air pollutants resulting from the development will not exceed the ambient air quality standards either with or without the proposed development in place. Using the assessment criteria outlined in Transport Infrastructure Ireland's guidance document '*Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes*' the impact of the development in terms of PM₁₀, PM_{2.5}, CO, NO₂ and benzene is negative, long-and term but overall imperceptible. The proposed development is not predicted to significantly impact regional air quality and climate during the operational stage. Increases in traffic derived levels of NO_x, VOCs and CO₂ have been assessed against Ireland's obligations under the EU Targets and emissions ceilings set out by Directive (EU) 2016/2284 "*On the Reduction of National Emissions of Certain Atmospheric Pollutants and Amending Directive 2003/35/EC and Repealing Directive 2001/81/EC*". Impacts to regional air quality and climate are deemed imperceptible and long-term with regard to NO_x, VOCs and CO₂ emissions.

As the National and EU standards for air quality are based on the protection of human health, and concentrations of pollutants for both the construction and operational stages of the proposed development are predicted to be significantly below these standards, the impact to human health is predicted to be negative but overall imperceptible in the short and long term.

No significant impacts to either air quality or climate are predicted during the construction or operational phases of the proposed development.

11.0 NOISE AND VIBRATION

The existing noise climate in the vicinity of the proposed development has been surveyed. Prevailing noise levels are primarily due to local road traffic.

The noise impact assessment has focused on the potential outward impacts associated with the construction and operational phases of the proposed development on its surrounding environment. The assessment also considers the inward noise impact of road traffic on the proposed development.

During the main construction phase involving site preparation, demolition, foundation, general construction and landscaping works, the assessment has determined that there is the potential for some temporary significant noise impacts when works are undertaken within close proximity of the receptor locations. However, these occurrences will only be temporary and the majority of the construction works will take place at distances from the receptors where no significant impacts are predicted and the construction criteria will be complied with. A schedule of noise mitigation measures including, noise limits and screening will all be employed to ensure any noise and vibration impacts during this phase will be reduced as far as is reasonably practicable.

During the operational phase, the outward noise impact to the surrounding environment will be limited to any additional traffic on surrounding roads, plant noise and operational noise from the commercial buildings as part of the development. The impact assessment has concluded that additional traffic from the proposed development will have an insignificant impact on the surrounding noise environment. A set of noise thresholds have been developed for plant and operational noise from the development to avoid disturbance to nearby sensitive receptors, at the design stage careful selection of plant will ensure that these thresholds are met. The resulting impact is of Neutral, Permanent and Not Significant.

Cumulative impacts have been assessed with consideration given to other nearby sites. Cumulative traffic noise levels are predicted to be Not Significant. Given the distances to permitted developments it is unlikely that there will be any additional construction phase impacts due to cumulative noise.

12.0 ARCHAEOLOGY & CULTURAL HERITAGE

The assessment comprised of a desktop study, consisting of the consultation of relevant and readily available archaeological and built heritage records, cartographic and literary sources, a site inspection, and an archaeological testing report. It aims to assess the baseline archaeological and cultural heritage environment, to evaluate the likely impacts of the proposed development on this environment, and to recommend mitigation measures to ameliorate these impacts.

The archaeological potential of the site relates to seven recorded monuments which have been identified within 150m of the proposed development, including Shanganagh Castle (RMP No. DU026-120--) and a complex of sites associated with Kiltuc Church (RMP Nos. (DU026-054001 to DU026-054005). One area of archaeological potential relating to the historic townland boundary between the townlands of Shanganagh and Shankill was also identified within the development site. Archaeological test excavation and geophysical survey was carried out to assess the level of impact on these sites, the results of these indicating that there is a low likelihood of impact of slight significance upon these sites. Further mitigation, in the form of archaeological monitoring of ground breaking work, is proposed. There will be no residual impacts to subsurface archaeology as this will be mitigated to full resolution if exposed during construction.

The impact upon the setting of Shanganagh Castle and demesne landscape has been dealt with in Chapter 13.0 Architectural and Cultural Heritage.

13.0 ARCHITECTURE & CULTURAL HERITAGE

The grounds of the subject site are currently in mixed use, containing both recreational spaces and former agricultural allotments, and are proposed to be converted to residential and community purposes with attendant new build and development.

The assessment for this chapter involved a desktop study comprising review of available cartographic records, primary and secondary research resources as well as consultation of built heritage records, surveys, and relevant legislative and guidance documents, and a dedicated site inspection taking in the proposed development site and the built and landscape heritage context of the immediate surrounding environment. The report aims to analyse the architectural and historic landscape character and surviving heritage value of the site as a baseline for assessing the likely impacts of the proposed development, and to set out recommendations for mitigating same where possible.

The following sites and features lie within 300m of the development site:

- 6 no. Protected Structures;
- 2 no. upstanding, built archaeological sites;
- 13 no. sites included on the National Inventory of Architectural Heritage; and
- Numerous designed landscape features: numerous

As part of the mitigation process, proposals have been provided for reducing the impacts on the above sites / features by virtue of the following:

1. Limited further recording of specific elements of built and historic landscape heritage of the site prior to development;
2. Repair and consolidation of the Cockburn Monument;
3. Inclusion of protective measures for the Ornamental Pond within the Construction Environmental Management Plan;
4. Comprehensive interpretation of the heritage of the site should be incorporated to the new signage associated with the development and the others associated with the Woodbrook-Shanganagh Local Area Plan;
5. The name “Shanganagh” or “Shanganagh Castle” should be incorporated to the name of the new development to retain the cultural focus on the principal structure and its demesne;
6. Continuation of current exercises being undertaken in line with the Woodbrook-Shanganagh Local Area Plan 2017-2023 to integrate the castle into a dynamic community use for the development; and
7. Support of objectives within the Woodbrook-Shanganagh Local Area Plan 2017-2023 to reinstate the historic visual relationship between Shanganagh Castle towards the Irish Sea and Bray Head.

14.0 THE LANDSCAPE

The principal mitigation for the proposed development is inherent in the design of its architecture, public realm, green infrastructure and open space, which has evolved through an iterative process of assessment and consultation. A full set of the landscape architectural master planning drawings and documents, as well as a Landscape Architecture and Public Realm design rationale is included in the planning application.

Construction effects will be temporary, short term effects which occur during the construction phase only. Areas experiencing visual effects during the construction stage will vary, depending on the active construction phase.

All groundworks, the construction of the buildings, road network and landscape architecture will be mainly experienced locally from within the boundary of the Proposed development site and from areas immediately adjacent, where available views exist. Locations in close adjacency to the Proposed development where landscape and visual effects at the construction stage are considered to be highest are areas along the R119 / Dublin Road to the west, areas of Castle Farm to the north, and from within Shanganagh Park to the south. The effects arising during construction will result from machinery, personnel, excavations, traffic and material movements. Beyond adjacent and immediately surrounding areas outside the site, intervening building structures and vegetation will quickly screen the site in distances of approximately 250m and beyond. Potential exceptions to this are open areas of Shanganagh Park to the east. Upper parts of the building works of the apartment blocks will become visible above mature tree lines within the park and from elevated areas within the wider study area to the west, where the development will be partially visible in longer distance views.

Direct and long-term change or modification will occur locally where the proposed development is physically located. The largest change will relate to the transformation of an area of currently green open space character to one with a built-up suburban character. It should be noted that whilst the proposed development is to be located within a former historic landscape, the addition of subsequent development over the years, which includes community allotment gardens, access roads and a council depot area, has previously compromised the quality of this historic landscape and it does not currently exist as an intact, preserved historic designed landscape anymore. While some components of the historic landscape remain, it is proposed that these features are protected, retained and incorporated into the design of the proposed development to form an integral part of the future character, identity and placemaking for the site.

Indirect change will occur outside of the proposed development site boundary within a distance of approximately 250m, where the change in landscape character will be perceptible. Considering the generally flat and gently undulating nature of the local landscape surrounding the immediate site, in addition to dense mature tree vegetation and existing settlement patterns, indirect change in landscape character is largely limited to areas south within Shanganagh Park, a limited section of the R119 / Dublin Road to the immediate west, and north from within Castle Farm Housing Estate. The sylvan character of the R119 / Dublin Road will remain largely intact, with the Proposed development serving to reinforce and contribute to this character along the western boundary of the site. The proposed development will integrate into the existing prevailing suburban character particularly in views to the north. The alteration to the character of the site in views from all directions is often screened by intervening vegetation and topography at this distance. The proposed development will therefore not result in a material change or modification of the wider landscape character.

The proposed development is located in a generally flat or undulating landscape and therefore even relatively low vegetation or intervening buildings will provide screening to receptors. The highest visual impacts tend to occur where there are no intervening screening elements, from open areas within Shanganagh Park, from residential areas to the immediate north of the subject site, and from

elevated areas located on the eastern slopes of the Dublin Mountains where visibility towards the development is achievable.

While the proposed development will create significant and adverse changes in terms of visual effects from certain viewing locations, it should be noted that the proposed residential development at Shanganagh Castle lands is in line with the policies and objectives, as outlined within both the Dún Laoghaire-Rathdown County Development Plan 2016-2022 and the Woodbrook – Shanganagh Local Area Plan 2017-2023, which prescribe for the provision of new residential communities within the proposed development site and wider LAP lands.

15.0 MATERIAL ASSETS - TRAFFIC & TRANSPORT

The site is approximately 17km from Dublin City Centre and 3km from Bray town centre. It is currently accessed from the R119 Dublin Road which runs adjacent to the site to the west. The site is located close to the M11 motorway which links with the M50 motorway to the north and heading south continues to Wexford. Located a 20 minute walk from Shankill train station providing DART services, with bus stops located on the Dublin Road in the vicinity of the site servicing relatively high frequency bus routes, the site is well serviced with public transport.

Access to the development will be via a new signalised junction from the Dublin Road. The proposed development will result in an increase in traffic volumes on the surrounding road network. Several junctions in the area were found to already perform poorly, but as such the development will have an imperceptible impact on them. Other junctions were found to perform satisfactorily and overall there will be a long-term slight impact to local traffic.

New pedestrian and cycle facilities will provide linkage to the surrounding road network together with the adjacent Shanganagh Park.

The increase in traffic volumes as a result of construction vehicles visiting the site is not considered to be excessive and will be spread out over the duration of the construction phases of the development. The Outline Construction Management Plan advises that the most onerous construction period with regards to traffic generation is expected to be the demolition, site clearance and excavation stage. The volumes of traffic generated during this period are likely to be small and only for a short period of time. Overall the impact will be an adverse slight short-term effect on local traffic during the construction phase.

It is assumed that the Shanganagh Castle Development will proceed in isolation. The worst-case scenario is if the works proceed concurrently with the Woodbrook SHD Development. Overall the proposed development is not likely to result in significant adverse impacts either alone or in combination with any likely future projects.

16.0 MATERIAL ASSETS – WATER SERVICES

There are currently public water services around the site, and minor water services on site to service the various buildings.

A new proposed wastewater network, potable water network and surface water network are proposed for the development. The surface water network will include attenuation tanks and SUDS measures to treat and reduce surface water runoff to greenfield equivalent rates. The impact on surface water will be long term and negligible.

The wastewater network is to be serviced by a new wastewater pumping station as part of the adjacent Woodbrook site to the south. Irish Water has confirmed that there is adequate capacity in their wastewater network via a confirmation of feasibility letter. There will be a long term and slight impact on the wastewater network.

The potable water network is to be serviced via a recently constructed watermain on R119 Dublin Rd to the west of the site. Irish Water has confirmed that there is adequate capacity in their potable water network via a confirmation of feasibility letter. There will be a long term and slight impact on the potable water network.

The works will require ground excavation to install as well as connections to public water networks and the area of construction works being inaccessible. The construction impact is short term and moderate. The connection impact is brief and not significant. The access issue is short term and slight.

There are cumulative operational impacts related to wastewater and potable water. This development in conjunction with adjacent developments cumulatively would have a more significant impact. The impact is slight and long term.

17.0 MATERIAL ASSETS – RESOURCES & WASTE MANAGEMENT

This chapter undertakes a review of the built services of the site, including electricity connections; natural gas supply; and telecommunications. It is assessed alongside other environmental factors including Urban Settlement, Ownership & Access and Waste Management.

The proposed development will consist of 598 no. residential units/households including 194 no. studio and 1 bed units. Allocating a generous household size of 1.5 persons to the 1 bed units and using the local average household size indicators from Census 2016 for this DED (2.92) for the remaining units, the proposed development may result in a projected population of approximately 1,470 no. persons residing at the site. This will result in a sizeable new community within the Shanganagh area and will place significant additional demands on existing services and infrastructure in the area.

The new development will require new connections to all service providers which may result in temporary disruption of existing services in the vicinity of the development; in order to facilitate the connection. This disruption, if any, will be brief and not significant. The potential impact on the services network would be short term and imperceptible.

The subject lands are not developed at present. There will be some temporary disturbance during construction to the surrounding area, however, this will be minimised through appropriate mitigation measures as set out in the Construction & Environmental Management Plan.

All the land within the application site is in the ownership of the applicant, with the exception of a small area of land at the southernmost extremity of the proposed greenway. This area of land, comprising 135sqm, extends into the Woodbrook development in order to facilitate a connection to their proposed wastewater network. A letter of consent has been secured from Aeval Limited to facilitate such connection, once constructed. Vehicular and pedestrian access are to be maintained to Shanganagh Castle at all time, irrespective of ownership. Having regard to the foregoing no significant ownership or access impacts shall arise.

The waste environment is largely regulated by Dun Laoghaire Rathdown County Council as the local authority responsible for setting and administering waste management activities in the area through regional and development zone specific policies and regulations.

During the demolition and construction phases, typical C&D waste materials will be generated which will be source segregated on-site into appropriate skips/containers, where practical and removed from site by suitably permitted waste contractors to authorised waste facilities. Where possible, materials will be reused on-site to minimise raw material consumption.

A carefully planned approach to waste management is proposed alongside a site-specific Construction and Demolition Waste Management Plan to be prepared by the construction contractor prior to beginning works onsite, during the construction phase will ensure that the effect on the environment will be short-term, neutral and imperceptible.

During the operation phase, waste will be generated from the residents as well as the commercial tenants. Dedicated communal waste storage areas have been allocated throughout the development for residents. The waste storage areas have been appropriately sized to accommodate the estimated waste arisings in both apartments and shared residential areas. An Operational Waste Management Plan has been prepared which provides a strategy for segregation (at source), storage and collection of wastes generated within the development during the operational phase.

Provided the mitigation measures outlined in Chapter 17.0 are implemented and a high rate of reuse, recycling and recovery is achieved, the predicted effect of the operational phase on the environment will be long-term, neutral and imperceptible.

18.0 INTERACTION BETWEEN ENVIRONMENTAL FACTORS

All environmental factors are inter-related to some extent and this chapter cross references the individual environmental assessments undertaken, including the proposed mitigation measures, having regard to current knowledge and methods of assessment.

The primary interactions can be summarised as follows:

- Demolition, air quality & climate, noise & vibration and road design;
- Architectural design, landscape design, cultural & built heritage and road and services design;
- Landscape design and engineering services with biodiversity and cultural & built heritage;
- Stormwater attenuation design with biodiversity and soil & geology;

- Visual impact with biodiversity and cultural & built heritage;
- Biodiversity with water and soils;
- Architectural and landscape design with noise, air quality & climate change and built & cultural heritage;
- Noise and vibration and population and human health;
- Air quality and climate and population and human health; and
- Material Assets with population and human health, water, noise and vibration, air quality and climate and built & cultural heritage.

An indication is also given of the cumulative effects of the proposed mixed use development. The overall cumulative impact of the proposed development will result in:

- An increase in economic activity in the local area region;
- An increase in traffic on the local road network which can be adequately managed;
- No significant environmental nuisance from an air quality perspective subject to implementation of the mitigation measures and adherence to good working practices; and
- A significant landscape visual effect due to the nature of the existing parkland and adjoining greenfield land, but regard must be had to the surrounding built environment and the residential zoning afforded to the land.

19.0 SUMMARY OF MITIGATION MEASURES

A summary of mitigation measures is proposed as detailed in Chapters 6.0 to 18.0. The appointed contractor will be required to adhere to the mitigation contained in the EIAR for the protection of the environment and to ensure sustainable development.

A number of mitigation measures have been incorporated into the design proposal, following an iterative assessment during the design stage. In some instances, these mitigatory measures have shaped the design of the scheme, the juxtaposition of the buildings and the mix of uses proposed.

The design rationale and detail employed seeks to mitigate potential negative effects on a series of environmental factors and considerations.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Part B – Main Report



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CHAPTER ONE INTRODUCTION

1.1 INTRODUCTION

This Environmental Impact Assessment Report (EIAR) has been prepared by HRA | PLANNING Chartered Town Planning Consultants and a team of consultants on behalf of Dún Laoghaire-Rathdown County Council in partnership with the Land Development Agency for a residential development located in the townlands of Shanganagh, Cork Little and Shankill, Co. Dublin. Approval is sought to construct a 61,691sqm (gross) 56,641sqm (net) residential development partially comprising a “Build to Rent” scheme with ancillary commercial uses on a site measuring 9.69 hectares.

The EIAR has been prepared to accompany an application for approval to An Bord Pleanála for the aforementioned development works under Section 175 of the Planning & Development Act 2000 as amended.

1.2 PURPOSE OF THE ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Environmental Impact Assessment (EIA) is a procedure under the terms of European Directives¹ for the assessment of the effects of development projects on the environment. An Environmental Impact Assessment Report (EIAR) is a statement prepared by the developer, providing information on the significant effects on the environment based on current knowledge and methods of assessment. It is carried out by competent experts, with appropriate expertise to provide informed assessment on their discipline.

The primary objective of the EIAR is to identify the baseline environmental context of the proposed development, predict potential beneficial and/or adverse effects of the development and propose appropriate mitigation measures where necessary. In preparing the EIAR the following regulations and guidelines were considered:

- The requirements of EC Directives and Irish Regulations regarding Environmental Impact Assessment;
- Guidelines on the Information to be Contained in Environmental Impact Statements (Environmental Protection Agency, Draft August 2017);
- Advice Notes on Current Practice in the Preparation of Environmental Impact Statements (EPA, 2003);
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment August 2018, Department of Housing Planning & Local Government; and
- In addition, specialist disciplines have had regard to other relevant guidelines, as noted in the specific chapters of the EIAR.

¹ EU Directive 85/337/EEC as amended by Directives 2011/92/EU and Directive 2014/52/EU

1.3 FUNCTION OF THE ENVIRONMENTAL IMPACT ASSESSMENT REPORT

This EIAR is a statement of the effects, if any, which the proposed development, if carried out, would have on the environment. It consists of a systematic analysis and assessment of the potential effects of a proposed project on the receiving environment. The function of the EIAR is to:

- Establish the existing environmental characteristics of the proposed site;
- Provide details of the proposed development and associated secondary developments;
- Predict the likely significant effects of the development on the environment;
- Outline the measures considered necessary to avoid, reduce or mitigate the negative impacts identified both individually and cumulatively to an acceptable degree;
- Identify areas requiring reinstatement and on-going monitoring.

The EIAR has been prepared following the logical analysis of the development proposal in relation to the receiving environment. This process of environmental impact 'assessment' and the preparation of this report has been an evolving iterative process. In order to avoid, reduce or negate potential adverse environmental effects, and to ensure holistic consideration of all environmental issues, the EIAR for this project has been cognisant of baseline environmental conditions established and assessed within other neighbouring permitted developments.

For the avoidance of doubt, all necessary technical information required for the purpose of the EIAR is enclosed within this report. Consideration of this EIAR is not reliant upon consideration of any data contained in any other separate assessment.

Prior to lodging this application, the required information has been issued for the Department of Housing, Planning and Local Government's EIA Portal. The purpose of this tool is to inform the public, in a timely manner, of applications that are accompanied by an EIAR. The portal provides a URL link.

1.4 TECHNICAL DIFFICULTIES or LACK OF DATA

The compilation of the information necessary for the EIAR did not present any significant difficulties. However, some assumptions and projections were necessary for certain areas of this assessment, particularly the traffic and noise assessments. Some areas of the site were difficult to access due to the presence of dense scrub including extensive copse of trees and areas of the waterbody (the pond). This particularly impacted the Biodiversity assessment (Chapter 7.0) although on balance, it was considered that adequate survey information was gathered to present a representative baseline study for the site.

Survey work has been undertaken to compliment data from official sources in order to provide up-to-date base line information on which to undertake the environmental assessments. This EIAR has been prepared on the best available information and in accordance with current best practice and guidelines published by the Environmental Protection Agency.

1.5 THE DEVELOPMENT

1.5.1 Site Context

The subject site is located adjacent to Shanganagh Park in southern Co. Dublin positioned between Shankill Village and the settlement of Bray. Access to the site is from an existing entrance off the R119 Old Dublin Road. The site is bound to the west by the R119, the north by residential housing (Castle Farm), by Shanganagh Castle to the east and by Shanganagh Park to the south and further to the east

The site measuring 9.69 hectares is currently dominated by grassland and an existing playing pitch, garden allotments, greenhouses and storage sheds, an existing two-storey house, and localised areas of plantation woodland. There are no other buildings within the boundary of the subject site. An existing water feature referred throughout the EIAR as 'the pond' is located immediately west of the maintenance depot surrounded by trees and scrub. Whilst the site appears to be relatively level, a topographical survey completed in January 2019 confirms that from the highest point in the north-west (+29.50m) to the lowest in the south (+24.00m), there exists a general site-wide slope of ~1:50.

The subject site is located in an area identified for residential development under the Woodbrook – Shanganagh LAP (2017 – 2023) – hereafter referred to the LAP. The residential site is situated between two major public transport arteries. The existing DART railway line is located east of the site with an existing station in Shankill village (circa 2.1km to the north) and a future station to be provided within the Woodbrook lands to the south (less than 1km from the site). To the west is the Old Dublin Road (R119) which is planned to accommodate Bus Connects Route 19 Bray – City Centre in the future. The M11 motorway lies further to the west.

The established settlement of Shankill largely consists of a more traditional village settlement pattern with a central main street – containing more localised shops and facilities – surrounded by relatively low density housing estates constructed through the seventies and eighties. A number of newer medium to high density residential developments, however, have been constructed in Shankill including for example – Olcovar, Aubrey and The Bridge.



Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community



Figure 1.1 Site Location Map with Extent of Overall Landholding Defined in Red

1.5.2 The Proposed Development

The public notices set out a detailed description of the development proposal. The description of the development can be summarised as: -

- Construction of 597 no. residential units (ranging from 1 – 6 stories in height with one block comprising a seventh storey setback) in a combination of housing, apartment and Build to Rent apartment units.
- Provision of 1 no. detached unit; 14 no. semi-detached units, 36 no. terraced houses; and 40 no. apartments and 506 no. Build to Rent apartments in 8 no. blocks of development.
- Provision of resident services & amenities including (a) Gym; (b) residents lounge/cinema room; (c) Function Room; (d) Gallery/Community Room; (e) 2 no. Lounge areas; (f) Business pods; and (f) Co-Working Office units.
- Provision of resident support facilities including (a) Concierge Facilities; (b) Parcel /Store Room; (c) Central Energy Centre; (d) waste management areas; and (e) bike storage rooms.
- Construction of a (i) creche facility with capacity to accommodate 107 no. children; (ii) local shop of 103sqm (NFA) and (iii) local café of 125sqm.
- Provision of water services, foul and surface water drainage and associated connections across Shanganagh Park to the proposed Woodbrook residential scheme with attenuation proposals including permeable paving, green roofs & swales.
- Extensive landscaping and public realm works including (a) regeneration of the existing pond within the Demesne; (b) provision of playground and kick about areas; and (c) new pedestrian and cycle connections through the adjoining parkland to the south to facilitate a future connection to the proposed Woodbrook DART station.
- Works to the existing Shanganagh Castle entrance to the Dublin Road, including relocation of the existing entrance to the north; upgrade works to facilitate a signalised junction and provision of a separate pedestrian access. The existing Shanganagh Castle Entrance shall remain operational on a temporary basis to facilitate construction traffic
- Demolition of an existing house, and glass house and maintenance buildings located within the Parks Maintenance Depot.
- All associated and ancillary site development and infrastructural works, hard and soft landscaping and boundary treatment works.

1.6 PLANNING APPLICATION AND ENVIRONMENTAL ASSESSMENT- CLARIFICATION

For the avoidance of doubt, all works proposed as part of the planning application for which planning permission is being sought, and described in the statutory notices, have been subject to environmental assessment which is presented in this EIAR. The 'physical characteristics' of these development works are presented and described in further detail in the following chapters. These characteristics of development present a phased approach to development on the lands and the proposed phasing approach is described and assessed as part of this EIAR.

All 'works' proposed as part of this planning application will / shall occur within the red line boundary as identified in this EIAR.

In order to ensure an effective and conclusive environmental assessment consistent with best practice, the assessment of potential effects on the environment takes a holistic approach and examines not only the effects arising from the physical characteristics of the proposed development but also the effects arising from demolition of buildings at construction stage and site clearance.

Although development on the site will be phased over a three year period, examination of an 'all phase' development scenario for the site will be undertaken, consistent with best practice in order to examine a 'worst-case' scenario of the project effects.

1.7 REQUIREMENT FOR ENVIRONMENTAL IMPACT ASSESSMENT REPORT

The process to determine whether an EIA is required for a proposed development is called Screening. This is dependent on the mandatory legislative threshold requirements or the type and scale of proposed development and significance or environmental sensitivity of the receiving environment.

Annex I of the EIA Directive 85/337/EC requires as mandatory the preparation of an EIA for all development projects listed therein. Schedule 5 (Part 1) of the Planning & Development Regulations 2001-2018 brought Annex 1 of the EIA Directive directly into Irish planning legislation. The Directive prescribes mandatory thresholds in respect to Annex 1 projects. Annex II of the EIA Directive provides EU Member States discretion in determining the need for an EIA on a case-by-case basis for certain classes of project having regard to the overriding consideration that projects likely to have significant effects on the environment should be subject to EIA.

Schedule 5 (Part 2) of the Planning & Development Regulations 2001 – 2019 sets mandatory thresholds for each project class and the subject development falls within a project class. The relevant class of development is 10(b)(i) as follows:

Category 10(b)(i) Construction of more than 500 dwelling units.

The proposed development comprises a new residential development, including 597 no. residential units and ancillary supporting facilities, on a site of c. 9.69 hectare. The project exceeds the 500 no. dwelling unit threshold, therefore triggering mandatory EIA.

1.8 STRUCTURE OF THE ENVIRONMENTAL IMPACT ASSESSMENT REPORT

1.8.1 Layout of the EIS

The EIAR comprises two parts which include:

- (I) Non-Technical Summary; and
- (II) EIAR Main Report

The EIAR Main Report can be considered under the following headings:

- Introduction & Overview
- Project Characteristics likely to have Significant Effects on the Environment;
- Examination of the Effects on the Environment, and
- Interaction between Environmental Factors

The Non-Technical Summary presents a synopsis of the specialist technical reports, and commentary on the significant direct and indirect effects on the environment. It omits technical terms and abbreviations but does not understate any issues of significance that may arise from the project.

The Introduction and Overview provides details on how the EIAR is structured, presents the project characteristics, the need for the development and the planning context, and details a number of alternatives that were considered in preparing the proposal.

The section '*Project Characteristics likely to have Significant Effects on the Environment*' details the project phase by phase from demolition to construction through to the operational phase. The effects of the project on identified environment variables are then undertaken whilst the final section of the EIAR examines the Interaction between the Examined variables.

1.8.2 Assessment Criteria

The EIAR includes a simplistic and systematic methodological assessment of the proposed development under the following sub-headings:

- Introduction
- Assessment Methodology
- Receiving Environment
- Likelihood of Impacts
- Description and Significance of Impacts
- Remedial and Mitigation Measures
- Residual Impacts
- Monitoring
- References

1.8.3 Significance of Environmental Effect

The effects on the receiving environment are measured as the likely natural or physical changes in the environment resulting directly or indirectly from the development processes. Consideration of these effects was undertaken by assessing the proposed development against the defined environmental variables set out in the Planning and Development Regulations 2001 – 2019 and the Environmental Protection Agency (EPA) 'Guidelines on the Information Contained in Environmental Assessment Reports', Draft August 2017

Impacts or effects are described in Guidance documents in terms of quality, significance, magnitude, probability, duration and type. Table 1.1 below presents the quality of effects, Table 1.2 presents the description of the significance of effects and Table 1.3 presents the description of the duration of effects as shown in the Draft Guidelines.

The quality of an 'effect' can be neutral, positive or negative	
Positive Effect	A change which improves the quality of the environment (for example, by increasing species diversity; or the improving reproductive capacity of an ecosystem, or by removing nuisances or improving amenities).
Neutral Effects	No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error.
Negative / Adverse Effects	A change which reduces the quality of the environment (for example, lessening species diversity or diminishing the reproductive capacity of an ecosystem; or damaging health or property or by causing nuisance).

Table 1.1: Quality of Effects

"Significance" is a concept that can have different meaning for different topics – in the absence of specific definitions for different topics the following definitions may be useful.	
Imperceptible	An effect capable of measurement but without noticeable consequences
Not significant	An effect which causes noticeable changes in the character of the environment but without noticeable consequences.
Slight Effects	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities
Moderate Effects	An effect that alters the character of the environment in a manner that is consistent with existing and emerging trends.
Significant Effects	An effect which, by its character, magnitude, duration or intensity significantly alters the majority of a sensitive aspect of the environment.
Very Significant	An effect which, by its character, magnitude, duration or intensity significantly alters the majority of a sensitive aspect of the environment.
Profound Effects	An effect which obliterates sensitive characteristics

Table 1.2 Describing the Significance of Effects

'Duration' is a concept that can have different meanings for different topics – in the absence of specific definitions for different topics the following definitions may be useful.	
Momentary Effects	Effects lasting from seconds to minutes.
Brief Effects	Effects lasting less than a day.
Temporary Effects	Effects lasting less than a year.
Short-term Effects	Effects lasting one to seven years.
Medium-term Effects	Effects lasting seven to fifteen years.
Long-term Effects	Effects lasting fifteen to sixty years.
Permanent Effects	Effects lasting over sixty years.

Table 1.3 Describing the Duration of Effects

1.8.4 Environmental Variables

The potential significance of the environmental variables was first identified in the scoping exercise that preceded the preparation of the EIAR. Further details of the scoping approach are detailed in Chapter 4.0. The environmental variables assessed for this project extend to include:

- Population & Human Health
- Biodiversity

- Land & Soils
- Hydrology & Hydrogeology
- Air Quality & Climate
- Noise & Vibration
- Archaeology & Cultural Heritage
- Architecture & Cultural Heritage
- The Landscape
- Material Assets – Traffic & Transport
- Material Assets – Waster Services
- Material Assets – Resources & Waste Management
- Interaction with the Foregoing

In assessing each of the above variables, examination was undertaken in terms of their context, character, significance and sensitivity in respect to the proposed development and location. The level of detail and information presented and assessed for each of the above variables differs depending on the context, character, significance and sensitivity of each variable within this receiving environment and, the potential effects that the proposed development may have on each variable.

1.9 COMPETENCIES OF TEAM

The preparation of this EIAR has been project managed by HRA | PLANNING Chartered Town Planning Consultants. The project management team hold recognised professional qualifications in Town Planning, Environmental Impact Assessment Management, and in Ecological Assessment. The assessment has been prepared with other specialist professional inputs as specified Table 1.3.

Chapter	Subject Area	Company	Author(s)	Qualification
Chapter 1	Introduction	HRA Planning	Mary Hughes	BA (Hons) MSc PGDip EIA Mgmt. MIPI Town Planning & EIA Consultant
Chapter 2	Project Description	HRA Planning	Mary Hughes	BA (Hons) MSc PGDip EIA Mgmt. MIPI Town Planning & EIA Consultant
		ABK Architects	John Parker	B.Arch RIAI RIBA Architect
Chapter 3	Spatial Planning Policy	HRA Planning	Mary Hughes	BA (Hons) MSc PGDip EIA Mgmt. MIPI Town Planning & EIA Consultant
Chapter 4	Project Scoping & Consultation	HRA Planning	Mary Hughes	BA (Hons) MSc PGDip EIA Mgmt. MIPI Town Planning & EIA Consultant
Chapter 5	Examination of Alternatives	HRA Planning	Mary Hughes	BA (Hons) MSc PGDip EIA Mgmt. MIPI Town Planning & EIA Consultant
		ABK Architects	John Parker	B.Arch RIAI RIBA Architect

Chapter	Subject Area	Company	Author(s)	Qualifications
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Chapter 7	Biodiversity	Aecom	Tony Marshall	BSc (Hons) MCIEEM Principal Ecologist
Chapter 8	Land & Soils	Punch Consulting	Philip Bayfield	BE (Hons) MSc CEng MICE MIEI, Chartered Engineer
Chapter 9	Water Hydrogeology & Hydrology	Punch Consulting	Leonard Brennan	BE Dip Hy&Geo Eng PGDip HSC CENG MIEI MIOSH Chartered Engineer
		Bluerock Environmental	Niall Mitchell	BE, CEng, MIEI, MSc, PGeo. Hydrogeologist & Chartered Engineer
Chapter 10	Air – Air Quality & Climate	AWN Consulting	Ciara Nolan	BSc. MSc. AMIEnvSc, AMIAQM Air Quality Consultant
Chapter 11	Air - Noise & Vibration	AWN Consulting	Alistair Maclaurin	BSc PgDip MIOA, Senior Acoustic Consultant
Chapter 12	Archaeology & Cultural Heritage	Shanarc Archaeology	Sean Shanahan	BA(Hons) MSc Archaeologist
			Edel Barry	BA MPhil Archaeologist
Chapter 13	Architecture & Cultural Heritage	ABK Architects & Sunni Goodson	Sunni L. Goodson	BA MSc Historic Buildings Consultant
Chapter 14	The Landscape	Aecom	Mark Hammond	MA Landscape Architecture, MILI Senior Landscape Architect
Chapter 15	Material Assets – Traffic & Transport	Punch Consulting	Philip Bayfield	BE (Hons) MSc CEng MICE MIEI, Chartered Engineer
Chapter 16	Material Assets – Wastewater & Surface Water	Punch Consulting	Philip Bayfield	BE (Hons) MSc CEng MICE MIEI, Chartered Engineer
			Leonard Brennan	BE Dip Hy&Geo Eng PGDip HSC CENG MIEI MIOSH Chartered Engineer
Chapter 17	Material Assets – Built Services & Waste Management	Punch Consulting	Philip Bayfield	BE (Hons) MSc CEng MICE MIEI Chartered Engineer
		Homan O'Brien	Brian Homan	BSc.Eng, CEng, Dip.Proj.Man., MCIBSE, MIEI, MConsEI Chartered Engineer
		HRA Planning	Mary Hughes	BA (Hons) MSc PGDip EIA Mgmt. MIPI Town Planning & EIA Consultant
Chapter 18	Interaction with the Foregoing	HRA Planning	Mary Hughes	BA (Hons) MSc PGDip EIA Mgmt. MIPI Town Planning & EIA Consultant
Chapter 19	Summary of Mitigation Measures		Mary Hughes	BA (Hons) MSc PGDip EIA Mgmt. MIPI Town Planning & EIA Consultant

Table 1.3 List of Competent Persons Relative to Authored Chapter

Mary Hughes is a Director of HRA Planning Chartered Town Planning Consultants and Corporate Member of the Irish Planning Institute. She qualified as a Town Planner in 1996 with a Masters of Science Degree from Queens University Belfast and has 23 years' experience in the field of town planning and environmental assessment. She received a Diploma in Environmental Impact Assessment Management from UCD in 1999. She spent her formative years working in local authorities throughout Ireland as a Town Planner before moving to private practice in 2002. Mary has project managed and co-authored many Environmental Impact Statements (EIS) and more recently

Environmental Impact Assessment Reports (EIAR) on behalf of private clients and public bodies across a diverse range of project typed and development sectors in Ireland.

John Parker is a Director with ABK Architects and is a practicing architect with 24 years' experience in the UK and Ireland. Having worked in a number of leading architectural practices, including Dixon and Jones Architects and de Blacam and Meagher Architects, he joined ABK Architects in 1998, becoming a director in 2001. He has extensive experience in residential design including the design of the Wooden Building in Temple Bar (RIAI Silver Medal for Housing 2002), and more recently, Brick Houses in Killiney and a private house in Glencree Co. Wicklow- both award winning projects. John has most recently completed the Older Persons Housing Project for Limerick Office of Regeneration, which has been taken in charge by Cluid. He is currently project director on social housing project in Southill Limerick for Limerick Co Council and a Cluid Housing project at Mulhuddart, Co. Dublin

Tony Marshall is an ecologist with Aecom and leads the AECOM Ecology Team in Scotland. Tony has ten years of experience as a professional ecologist and has worked on projects for private and public sector clients during this time. He has extensive experience in Ecological Impact Assessment (EclA) and Appropriate Assessment (AA), at all stages of the processes. He is a full member of the Chartered Institute of Ecology and Environmental Management (CIEEM) and is a committee member of the Scottish section of that professional body.

Ciara Nolan is an Air Quality Consultant with AWN Consulting specialising in the field of Air Quality. She holds a BSc (Hons) in Energy Systems Engineering from University College Dublin and has also completed an MSc in Applied Environmental Science at UCD. She is an Associate Member of the Institute of Air Quality Management. She specialises in the fields of air monitoring, air dispersion modelling and EIA. She has been active in the field of air quality for three years with a primary focus on consultancy.

Alistair Maclaurin is a Senior Consultant at AWN Consulting who has over 6 years' experience as an acoustic consultant.

Philip Bayfield is a Chartered Engineer with Punch Consulting. He has considerable experience in Civil Engineering projects in various roles. He has over 30 years post graduate experience in both Irish and international markets. He has worked on many projects of similar scale to those considered under this commission. Since 2001 he has been responsible for civil engineering assessments on numerous developments ranging from one off commercial developments to large residential Strategic Housing Development schemes including Rockbrook Residential in Sandyford.

Leonard Brennan is a Technical Director and Chartered Civil/Structural Engineer with PUNCH Consulting Engineers. Leonard's primary degree is in Civil Engineering from University College Dublin and he also has two post graduate diplomas from Trinity College Dublin; in Highway and Geotechnical engineering and also in Health & Safety in Construction. Leonard has almost 30 years' post graduate experience managing a diverse range of social housing, infrastructural, residential and commercial developments in Ireland. Significant Projects include: €100million Poppintree Quarter within the overall Ballymun Regeneration Project Dublin Georges Place Dun Laoghaire and Clúid Broome Lodge Cabra

Niall Mitchell is a professional Hydrogeologist and Chartered Engineer with over 20 years' experience in the area of hydrogeological investigations and assessments, contaminated land risk assessments and remediation design/validation. He has an honours Civil Engineering degree from NUI, Galway, a Master's degree in Environmental Engineering from Trinity College and a Master's degree in Applied Hydrogeology from Newcastle University. Niall has been involved with high profile projects across the island of Ireland providing hydrogeological and contamination expertise for Environmental Impact Assessments, brownfield/fuel spill/chemical spill site investigations, risk assessments and remediation design. Example projects have included the Corrib Gas Terminal Site, (Co. Mayo), Titanic Quarter Redevelopment (Belfast), Barrow Street Gasholder Site (Dublin), Poolbeg Incinerator Project (Dublin) and Haulbowline Naval Base (Co. Cork).

Brian Homan is a Chartered Engineer with Homan O'Brien. Brian has over 30 years experience in the building industry, graduating from The College of Technology, Bolton Street in 1987 with an honours degree in Building Services Engineering. Brian is Past President Elec 2014/2015 of the Association of Consulting Engineers of Ireland and past Chairman of the Republic of Ireland Branch of the Chartered Institution of Building Services Engineers. He is a member of Engineers Ireland and Member of Chartered Institution Building Services Engineers, since 1987.

Mark Hammond is a Senior Landscape Architect with over 5 years' of professional experience. His experience includes developing and managing landscape and visual impact assessments of large commercial, residential, infrastructural and renewable energy developments throughout the island of Ireland. He has comprehensive experience in all stages of the planning, design, tender and implementation process, contract management and as consultant for Part 8 and EIA / EIAR processes. In addition, he has direct experience with preparing detailed landscape mitigation proposals which includes landscape masterplanning and proposals concerned with mitigating landscape and visual impacts.

Seán Shanahan established Shanarc in 2014 and has over 25 years' experience working in commercial archaeology. He is a licence eligible director with an honours degree in Archaeology and Philosophy from NUI Galway and a Master's degree in Geographical Information Systems and Remote Sensing from NUI Maynooth.

Edel Barry has several years of experience in field archaeology and built heritage recording. She has an honours degree in Archaeology and English from NUI Galway, as well as an MPhil in Historic Archaeology and a Higher Diploma in Geographical Information Systems from University College Cork. Having several years' experience in field archaeology and in built heritage recording, she has worked for Shanarc Archaeology since 2015 and has co-authored numerous Impact Assessment Reports.

Sunni L. Goodson, BA, MSc, Historic Buildings Consultant has over ten years' experience in preparing architectural heritage impact assessments, designed landscape studies, built heritage recording, archival research and buildings archaeology. This work has been carried out as both an independent consultant and under the tutelage of Grade 1 architectural conservation firms.

CHAPTER TWO PROJECT DESCRIPTION

2.1 INTRODUCTION

This chapter sets out a description of the proposed development and information on the landholding; the project site; the design; extent; and other relevant features of the project. In accordance with Article 5(1)(a) of the 2011 Directive as amended by Directive 2014/52/EU the description of the proposal comprises “...information on the site, design, size and other relevant features of the project”.

A description of the landholding including its context and character is presented, together with the proposed design parameters. A summary of the construction phases of the development is also presented. This description sets the basis against which the specialist assessments presented in this EIAR have been undertaken.

The vision for the proposed scheme is to provide for a new, high density residential neighbourhood on a site identified as a ‘Major Urban Housing Delivery Site’ by the Department of Housing Planning Community and Local Government (DHPCLG) under Pillar 3 - Building More Homes of the Government’s “Rebuilding Ireland – an Action Plan for Housing and Homelessness” and specifically zoned, “to provide for new residential communities in accordance with approved local area plans” within the Woodbrook – Shanganagh Local Area Plan 2017 – 2023.

2.2 THE LOCATION OF THE PROJECT

2.2.1 Site Location & Context

The subject site is located adjacent to Shanganagh Park in southern Co. Dublin positioned between Shankill Village and the settlement of Bray. The site is situated on the eastern side of the old Dublin Road (R119) and the M11. The immediate surrounding area is characterised by a mixture of residential development and open space. The residential element comprises mainly of housing developments including Crinken Glenn, Castlefarm and Olcovar. The open space comprises notable amenities and facilities including Shanganagh Park, Shanganagh Cemetary and Woodbrook Golf Club.

The subject site is located in an area identified for residential development under the Woodbrook – Shanganagh LAP (2017 – 2023) – hereafter referred to the LAP. The site is bound to the west by the R119, the north by residential housing (Castle Farm), by Shanganagh Castle to the east and by Shanganagh Park to the south and further to the east

The residential site is situated between two major public transport arteries. The existing DART railway line is located east of the site with an existing station in Shankill village (circa 2.1km to the north) and a future station to be provided within the Woodbrook lands to the south (less than 1km from the site). To the west is the Old Dublin Road (R119) which is planned to accommodate Bus Connects Route 19 Bray – City Centre in the future. The M11 motorway lies further to the west.

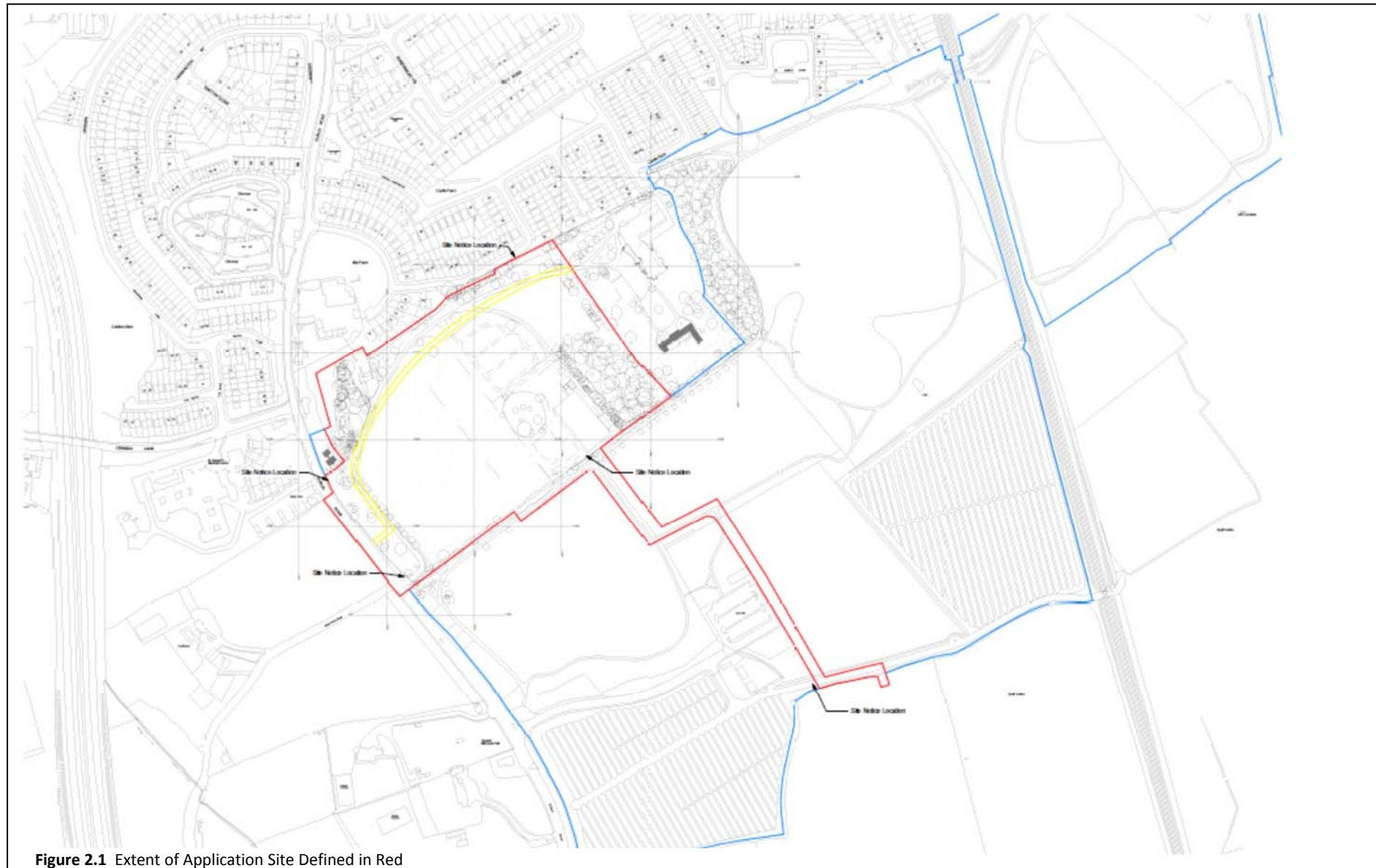


Figure 2.1 Extent of Application Site Defined in Red

The established settlement of Shankill largely consists of a more traditional village settlement pattern with a central main street, containing more localised shops and facilities and surrounded by relatively low density housing estates constructed through the seventies and eighties. A number of newer medium to high density residential developments, however, have been constructed in Shankill including for example – Olcovar, Aubrey and The Bridge.

The predominant residential unit in the area is that of a house. Of the 1,904 households in Shanganagh ED, 91 per cent comprise a house / bungalow with only 9 per cent comprising a flat / apartment¹. Most of these units were constructed between 1981 and 1990 with only 215 no. units constructed since 2001. Some 79 per cent of the units are owner occupier with 15 per cent rented from a private landlord and almost 4 per cent rented from the local authority or a voluntary housing authority. It can be concluded that the predominant unit and tenure type in the area is that of an owner-occupied house.

2.2.2 Existing & Planned Uses

The lands proposed for residential use is currently dominated by grassland and an existing playing pitch, garden allotments, greenhouses and storage sheds, an existing two-storey house, and localised areas of plantation woodland.

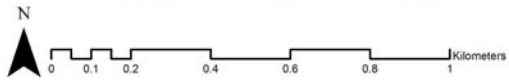
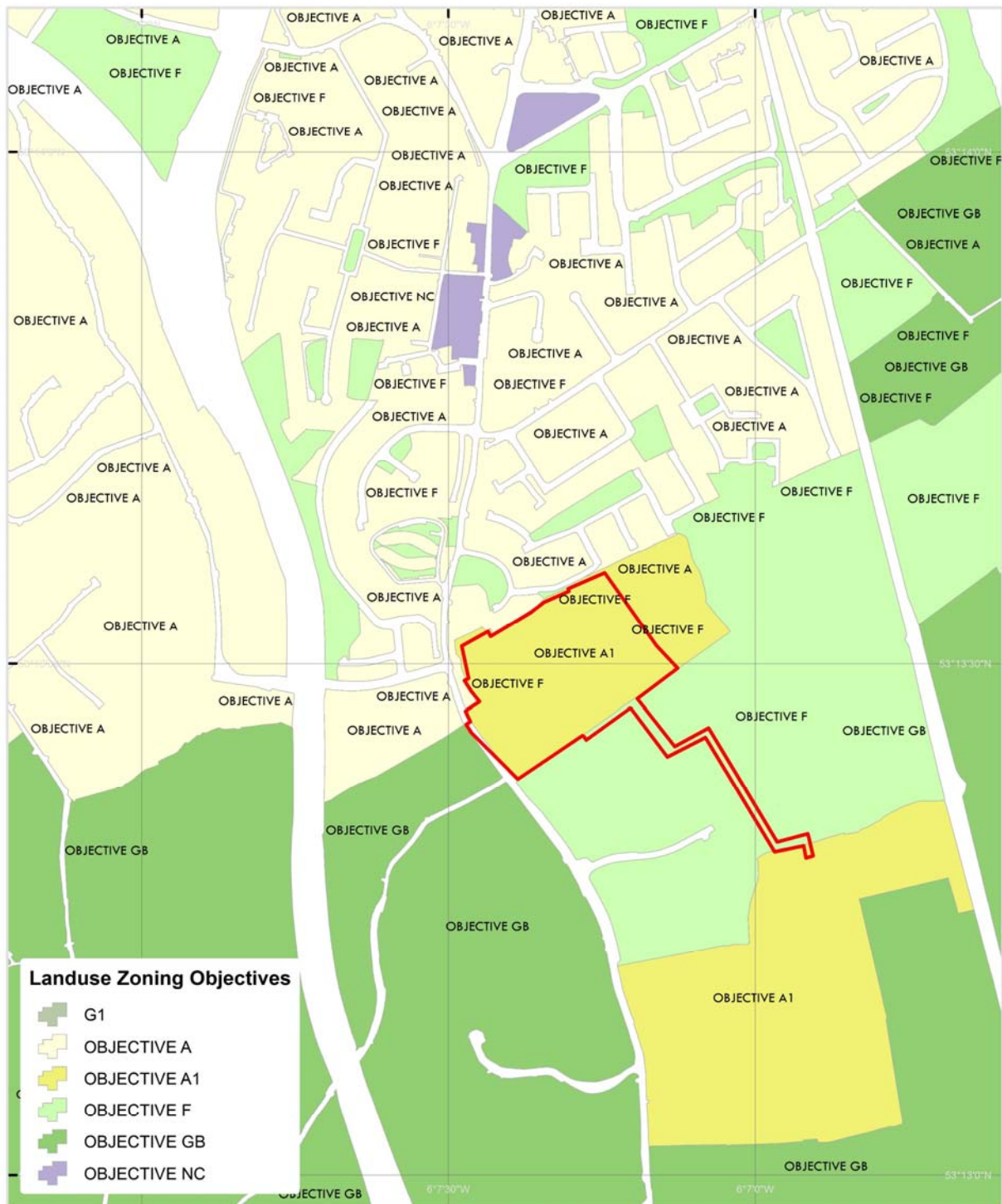
There is a cluster of 8 no. detached dwellings within Castle Farm which directly back on to the proposed development site. These houses are closest to the proposed development. Whilst there is a row of semi-detached units adjoining the site also within Castle Farm, these units are set back from the northern site boundary, substantially separated by an internal access road and green buffer with extensive hedgerow and boundary planting.

Much of the land immediately surrounding the subject site is zoned “*to preserve and provide for open space with ancillary active recreational amenities*” (Objective F). Shanganagh Park and its associated sports facilities, including Shanganagh Cemetery and proposed Crematorium (Part 8 Consent Approval) are located adjoining the subject site to the south. A masterplan has been prepared for the park, to facilitate its development into a regional park for the benefit of not only the local community but also the wider area. The masterplan provides for a significant number of playing pitches, playground, access routes and links and facilitates increased levels of tree planting.

In addition to Shanganagh Park, Woodbrook Golf Course lies in proximity to the site, with the closest point located some 710m east of the application site. The golf course is separated from the subject site by the existing rail line. Beyond the golf course, also separated by the rail line is the sea and Shankill beach situated some 915m from the site.

Immediately east of the subject site is Shanganagh Castle, a protected structure and is listed on the Record of Monuments and Places (RMP). Notwithstanding that ownership of the castle has not yet been transferred to Dún Laoghaire-Rathdown County Council (but it is anticipated to be in the near future as part of a land-swap necessary to facilitate the development of residential units at Woodbrook) a multi-disciplinary steering group has been assembled to manage the integration and refurbishment of the Shanganagh Castle and building. Currently the team is gathering site / building analysis information and is developing a strategy of reuse and integration for the Castle and its building that accords with

¹Small Area Population Statistics, Census of Population 2016



Site Boundary

Source: Dun Laoghaire and Rathdown County Council, & myplan zoning layer (myplan.ie)



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Figure 2.2 Extent of Landuse Zonings

the objectives of the Local Area Plan in the context of the wider community, the proposed Shanganagh residential development and the surrounding high amenity park lands.

South of the subject site, immediately beyond Shanganagh Park and cemetery, is the Woodbrook land which is also zoned for the provision of new residential communities. A planning application (PL06D.305844). was recently lodged with An Bord Pleanála under the legislative provisions of Strategic Housing Development (SHD) for 685 no. residential units, creche facility, distributor road and temporary car parking to facilitate future development of a new DART station. No decision has been made on the proposed development to date.

2.2.3 Land Evolution & History

There is no relevant planning history on the subject lands.

Shanganagh Castle and its Demesne was sold to the State in c.1936 when it was extended and used as a College of Education. It was then used as an open juvenile prison from 1969 to 2002. The castle and surrounding lands of 11.3 hectares were sold by the Department of Justice after the closure of the prison. Dún Laoghaire-Rathdown County Council purchased 8.4 hectares and the 2.5 hectares housing the castle building and its gardens were sold to a private development company.

A depot was constructed to the south of the planted woodland, and the adjoining fields to the south and east were developed as Shanganagh Park, containing football pitches and paved paths for walking.

As part of a long planned tripartite exchange of land within Shanganagh - Woodbrook, Aeval (the applicant advancing the Woodbrook scheme) will transfer an equivalent '4.4 hectares' area to Dún Laoghaire-Rathdown County Council comprising of 2.5 hectares at Shanganagh Castle and 2 no. lots of zoned residential lands at Woodbrook with a combined area of 1.89 hectares. It is understood that the tripartite agreement follows on from an original draft Heads of Agreement between the parties dating back to 2006 when Aeval originally acquired the Woodbrook lands. It is understood that upon receipt of a successful determination of the Woodbrook SHD planning application that the tripartite agreement will automatically trigger land exchanges between the parties, and the applicant will then effectively own and control Shanganagh Castle.

2.2.4 Development Area

The site measuring 9.69 hectares is currently dominated by grassland and an existing playing pitch, garden allotments, greenhouses and storage sheds, an existing two-storey house, and localised areas of plantation woodland. There are no other buildings within the boundary of the subject site. An existing water feature referred throughout the EIAR as 'the pond' is located immediately west of the maintenance depot surrounded by trees and scrub. Whilst the site appears to be relatively level, a topographical survey completed in January 2019 confirms that from the highest point in the north-west (+29.50m) to the lowest in the south (+24.00m), there exists a general site-wide slope of ~1:50.

Results of the ground investigations from the Geo-Physical Report detailed in Appendix 8.1 suggests a significant amount of modern ground disturbance with concentrations and spreads of modern material throughout. It has been ascertained that the land was filled over time with material arising from road construction in the past.

The site has extensive frontage onto the R119 Old Dublin Road to the northwest where it is bounded by a stone wall mostly constructed as part of works carried out to the road. The wall currently functions as an acoustic barrier from heavy traffic.

Access to the site is from an existing entrance off this road (R119). The R119 is a two-way single-carriageway road with cycle lanes and footpaths either side. Bus stops are located at intervals along the road accommodating four bus routes – 45, 84, 145 and 155.. Sections of the road have dedicated bus lanes but these are disjointed. The R119 is considered a Bus Priority Route and a Radial Cycle Route under the Dún Laoghaire-Rathdown County Development Plan 2016 – 2022.

There is an existing drain which runs along the south-eastern boundary of the site which drains the existing water feature on site (referred to as ‘the Pond’). The closest hydrological feature to the site is the Rathmichael Stream located some 260m west of the site. Flood Maps produced as part of the Eastern CFRAMS were consulted to establish the Flood Zone. It was determined that the proposed development is currently located in Flood Zone C for fluvial flooding. A review of PFRA mapping shows portions of the site to be within Flood Zone A for pluvial flooding. The issue of hydrology and flooding is dealt with further in Chapter 9.0 Water, Hydrology & Hydrogeology. It should be noted that no housing is proposed on that area of the site subject to pluvial flooding.

There are no recorded archaeological sites listed in the Record of Monuments and Places (RMP) or on the Sites and Monuments Record (SMR) database of the Archaeological Survey of Ireland (ASI) within the proposed development site.² There are no protected structures listed on the Record of Protected Structures within the site. There is one structure within the site, a granite monument, listed on the National Inventory of Architectural Heritage (NIAH). Shanganagh Castle neighbouring the site 50m to the east is a protected structure and is on the list of RMP’s and the NIAH as is Shanganagh Gate Lodge which adjoins the site to the west. Chapter 12.0 of this EIAR deals further with archaeology and cultural heritage, whilst Chapter 13.0 deals with Architecture & Cultural Heritage.

The site has been heavily modified over time with allotments and the Park Maintenance Depot dominating much of the eastern half of the site. The habitats within the site predominantly comprise grasslands, but there are blocks of significant mixed broadleaved woodland along with treelines and hedgerows along the edges of the site. These natural features are complimented by an unmaintained and partially obscured pond on the southern site boundary. The ornamental pond is a designed landscape feature which was first shown on the Ordnance Survey map of 1837. It contains an island planted with tall trees and shrubs, which is now heavily overgrown. Chapter 7.0 deals further with the biodiversity and habitats of the site.

An existing 10 KV / 20KV MV overhead ESB supply enters the site adjacent to the existing site entrance and is routed across the site to a pole mounted transformer in the adjacent Castle Farm Estate and also to serve Shanganagh Castle. Overhead supplies serve the cottage on the site adjacent to the Dublin Road. These supplies will be re-routed / underground and coordinated with the new development site infrastructure. Chapter 17.0 Material Assets – Resources & Waste Management deals further with electric, gas and telecommunication infrastructure serving the site.

² www.archaeology.ie

2.3 CHARACTERISTICS OF THE PROJECT

2.3.1 Description of the Proposed Development

The application for approval to An Bord Pleanála under Section 175 of the Planning & Development Act 2000 – 2018 (the Act) is accompanied by detailed drawings and a detailed Architectural Design Statement, prepared by ABK Architects, which provides a rationale for the design of the proposed scheme and the dwelling types proposed. The Build to Rent (BTR) element of the development proposal is also supported by a Sustainable Communities and BTR Justification Report prepared by HRA Planning Chartered Town Planning Consultants.

This EIAR contains a copy of the Site Layout Plan detailed in Figure 2.4 and the principle elevations which are detailed in Appendix 2.1.

The proposed development has been comprehensively described in the public notices accompanying the submission to An Bord Pleanála. A Site Layout Plan is detailed in Figure 2.4. A summary of the description and nature of development is provided hereunder:

- Construction of 597 no. residential units (ranging from 1 – 6 stories in height with one block comprising a seventh storey setback) in a combination of housing, apartment and Build to Rent apartment units.
- Provision of 1 no. detached unit; 14 no. semi-detached units, 36 no. terraced houses; and 40 no. apartments and 506 no. Build to Rent apartments in 8 no. blocks of development.
- Provision of resident services & amenities including (a) Gym; (b) residents lounge/cinema room; (c) Function Room; (d) Gallery/Community Room; (e) 2 no. Lounge areas; (f) Business pods; and (f) Co-Working Office units.
- Provision of resident support facilities including (a) Concierge Facilities; (b) Parcel /Store Room; (c) Central Energy Centre; (d) waste management areas; and (e) bike storage rooms.
- Construction of a (i) creche facility with capacity to accommodate 107 no. children; (ii) local shop of 103sqm (NFA) and (iii) local café of 125sqm.
- Provision of water services, foul and surface water drainage and associated connections across Shanganagh Park to the proposed Woodbrook residential scheme with attenuation proposals including permeable paving, green roofs & swales.
- Extensive landscaping and public realm works including (a) regeneration of the existing pond within the Demesne; (b) provision of playground and kick about areas; and (c) new pedestrian and cycle connections through the adjoining parkland to the south to facilitate a future connection to the proposed Woodbrook DART station.
- Works to the existing Shanganagh Castle entrance to the Dublin Road, including relocation of the existing entrance to the north; upgrade works to facilitate a signalised junction and provision of a separate pedestrian access. The existing Shanganagh Castle Entrance shall remain operational on a temporary basis to facilitate construction traffic
- Demolition of an existing house, and glasshouses and maintenance buildings located within the Parks Maintenance Depot.

- All associated and ancillary site development and infrastructural works, hard and soft landscaping and boundary treatment works.

2.3.2 Net Developable Area

Notwithstanding that the subject site as outlined in red comprises 9.69 hectares, the net developable area has been calculated at 7.03 hectares. The net developable area excludes that part of the site that cannot be developed, including significant tree stands and the woodland area measuring 1.54 hectares (identified in dark green in Figure 2.3), the existing Dublin Road and the proposed greenway connecting the site to Woodbrook

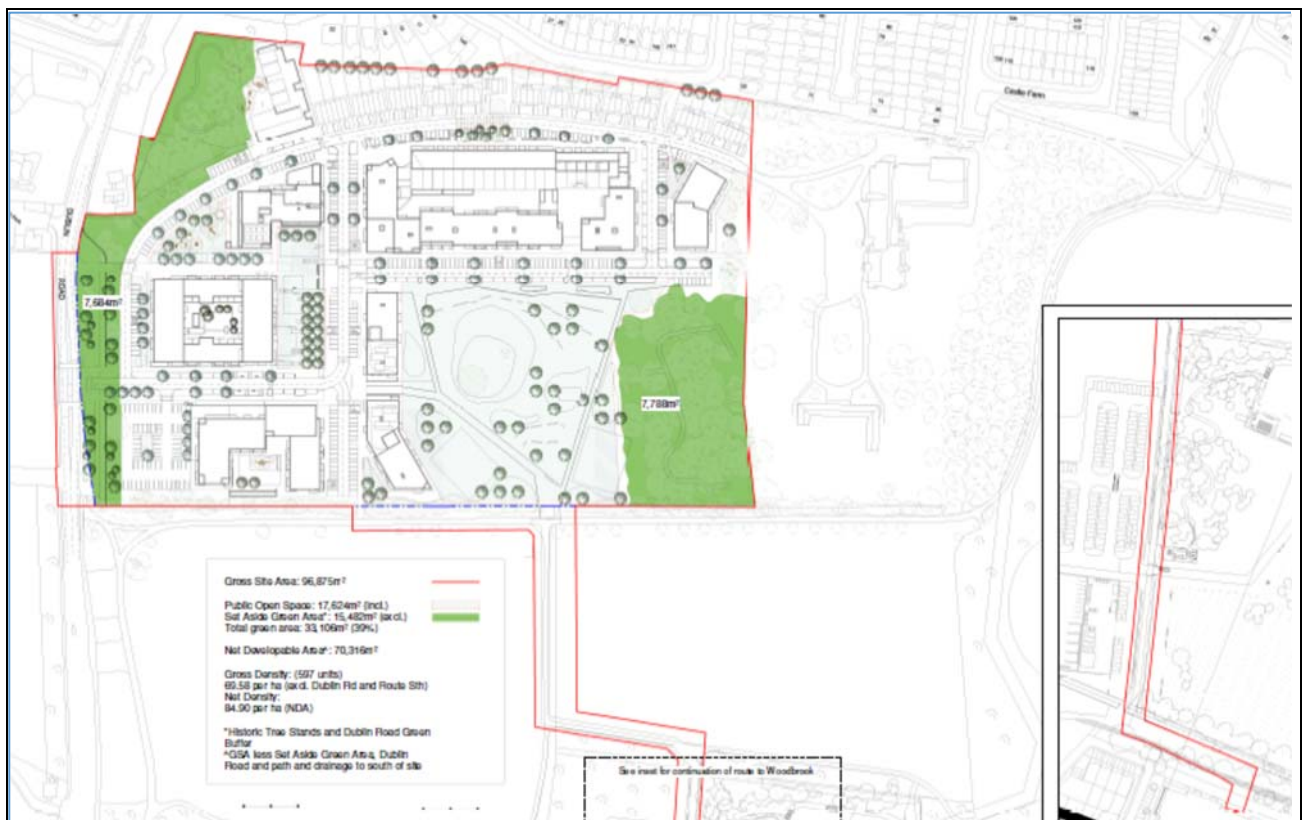


Figure 2.3 Net Developable Area

The net developable area includes 1.7 hectares of public open space required to service the development. When this area is considered in conjunction with the woodland and significant tree stands (1.54 hectares identified in dark green), the total open space provision within the development site increases to 3.31 hectares. This represents 34 per cent of the overall site identified in red or 39 per cent of the site excluding the Dublin Road and the proposed greenway. The retention of natural areas / open space is significant in the context of the overall development proposal



Figure 2.4 Site Layout Plan – Source: ABK Architects

2.3.3 General Design Approach

The proposed development has been designed by ABK Architects and full details of the proposed development can be found in the plans and drawings accompanying the planning application. The design rationale is further justified in the Architectural Design Statement.

Cognisant of the fact that the proposed development is within the curtilage of a protected structure, the development seeks to work with the remains of the existing picturesque landscape established in the early 19th century while adhering to the design principles set out in the Woodbrook- Shanganagh Local Area Plan 2017-2030 (LAP).

Whilst the Demesne landscape is still legible, it has been poorly maintained and is much curtailed by recent development. Notwithstanding, it is these elements of cultural infrastructure, including its scenic approach, decorative pond and composed stands of trees, that underpin the development. The development seeks to reinforce these existing landscape characteristics and features and overlay them with a matrix of overlapping built and landscaped zones so as to create a coherent composition that meets with the objectives of the LAP.

The proposed development seeks to create an integrated development that provides connectivity with the greater Woodbrook - Shanganagh Area. The establishment of a central visual axis or 'view corridor' focused on Shanganagh Castle together with secondary views and vistas to landscape features within and beyond the site is the principle organising device manipulating the scheme. The retention and realignment of the remains of the curved driveway that once formed the approach to Shanganagh Castle and as a new access route to the Castle has shaped the northern extremity of the site. The existing pond provided an opportunity to maintain the 'Parkland' setting as both foreground to the Castle and as a central amenity space for the proposed residential development.

The development has been broken into two distinctive quarters including an 'Urban Quarter' to the west – south west which consists of higher-density residential development and communal facilities focused on a new public space, 'The Square'; and the 'Residential Quarter' to the north – north east consisting of lower density residential development and housing organised around existing landscape features, streets and parkland to include the provision of crèche facilities to cater for the development.

The proposed new urban public space, 'The Square' is intended to act as a focus for community life at the heart of the development. This is complimented by the creation of a sequence of external amenity spaces that generate an interconnected and permeable landscape that extends to Shanganagh Park and beyond.

Development Statistics	Gross	Net
No. of Residential Units	597 units	
Gross Site Area	9.69 hectares	7.03 hectares
Density Gross	62 units per hectare	85 units per hectare
Gross Floor Area	61,691sqm	56,641sqm
Building Height	2 – 6 storey with 7 storey set back	
Public Open Space Gross	3.31 hectares	1.76 hectares

Table 2.1 Development Statistics

2.3.4 Development Proposal

The proposed development provides for 597 no. units and will provide for a mixed-tenure development, facilitating units for sale, social housing and rent as detailed in Table 2.2 across a range of unit sizes, detailed in Table 2.3. The social housing and rental units comprise Build to Rent apartment formats in accordance with Specific Planning Policy 7 and 8 as set out in the “Sustainable Urban House: Design Standards for New Apartments 2018” (Apartment Guidelines). The range and mix of units will ensure that the proposed development caters and provides for different household typologies in a sustainable and community-based manner.

Unit Format	Unit Type	Unit Location	No. of Units
Affordable Sale	Houses	Northern Boundary of Site	51
Affordable Sale	Apartment	Block F	40
BTR Social Units	Apartment	Blocks D, E & H	200
BTR Cost Rental Units	Apartment	Block A, B, C, G	306

Table 2.2 Mixed Tenure Development Proposal

Unit Size	Detached	Semi Detached	Terraced	Apartments	% Mix of Overall Development
Studio				29	4.8%
1 bed				165	27.6%
2 bed	1	14	15	281	52%
3 bed			21	69	15%
4 bed				2	0.3%
Total	1	14	36	546	100%

Table 2.3 Unit Size and Number Across Entire Development

The number of units proposed within the overall development seeks to accommodate higher density development on site in accordance with national, regional and local policy. The proposed development results in a net residential density of 85 no. units per hectare based on a net site area of 7.03 hectares.

2.3.4.1 Residential Units

The massing and distribution of units across the site has responded to Objective SC5 in the Woodbrook – Shanganagh Local Area Plan 2017 – 2023 (LAP).

Residential blocks have been distributed across the site with higher density to the front (west) providing a strong frontage to the Dublin Road and positioned around a proposed urban square within the development. Medium density is proposed on the southern side of the castle access road overlooking the pond and existing woodland, positioned immediately west (to the front) of Shanganagh Castle. Lower density development, comprising two storey terraces dominates the northern site boundary, adjoining the existing residential development of Castlefarm, thereby ensuring the protection of their residential amenity. This two storey terraced element also flanks the southern side of the access road increasing to three storey as one travels east towards the castle.

A new public space is proposed at the heart of the community that creates a unifying urban focus for the development. The Square, which is framed by Blocks A, E, F G & H runs North-South and is

traversed by the entrance road at its southern end and by the cycle-pedestrian route that follows the visual axis to Shanganagh Castle at its northern end. It is animated by a range of communal services and facilities further detailed in Table 2.4.

Own Door Residential Units

A total of 51 no. own door residential units are provided, fronting onto the castle access road, predominantly of two storey design but increasing to three storey on the southern side of the castle access road, to the east. Four different house types are proposed with units ranging in size from two bed to three bed, comprising 1 no. detached unit; 14 no. semi-detached units and 36 no. terraced houses;

Apartment Units

There are 8 no. blocks of development proposed. The height, type, number and unit mix of each block is detailed in Table 2.4 below.

In addition to apartment units, 4 no. blocks accommodate a range of services and facilities to support the 506 no. BTR units proposed. Rather than divide these services and facilities across each block of development, the services and facilities have been strategically located on the ground floor of those buildings defining the proposed urban square, thereby ensuring active ground floor uses. The intention is that the facilities will serve the entire development as opposed to individual blocks. The amenities and facilities are accessed independently from the blocks, thereby ensuring that they are tenure blind, enabling a shared environment centered around the proposed urban square.

Block	Height	Total Units	Unit Mix	Unit Type	Services & Facilities
A	6 storeys	61	6 no. studio	BTR Cost Rental	Residents Lounge / Cinema Gym
			25 no. 1 bed		
			19 no. 2 bed		
			11 no. 3 bed		
B	6 / 5 / 4 storeys	101	12 no. studio	BTR Cost Rental	Lounge
			13 no. 1 bed		
			65 no. 2 bed		
			11 no. 3 bed		
C	5 storeys	33	1 no. studio	BTR Cost Rental	
			25 no. 2 bed		
			7 no. 3 bed		
D	5 / 3 storeys	35	18 no. 1 bed	BTR Social Rental	
			8 no. 2 bed		
			7 no. 3 bed		
			2 no. 4 bed		
E	6 / 4 storeys	104	47 no. 1 bed	BTR Social Rental	Concierge / Storage Room Gallery / Community Room Lounge Local Shop
			42 no. 2 bed		
			15 no. 3 bed		
F	6 storeys	40	10 no. 1 bed	Affordable Sale (Non BTR)	Function Room Business Pods Cafe
			30 no. 2 bed		

G	6 / 5 storeys with 7 storey set back	111	10 no. studio	BTR Cost Rental	Co Working Office Unit
			26 no. 1 bed		
			62 no. 2 bed		
			13 no. 3 bed		
H	6 storeys	61	26 no.1 bed	BTR Social Rental	
			30 no. 2 bed		
			5 no. 3 bed		

Table 2.4 Block Analysis of Development Proposal

2.3.4.2 Ancillary Commercial Facilities

A local retail unit of 141sqm gross retail floor area and 103sqm net floor area is proposed on the ground floor of Block E, directly fronting onto the proposed urban square. The retail unit is intended to serve local top – up convenience shopping only. The retail unit is proposed, mindful of the fact that a local neighbourhood centre is proposed within the overall masterplan developed for the Woodbrook site. A green link (pedestrian and cycle) is proposed as part of this development, linking Woodbrook with the subject site.

A small café of 125sqm is proposed at ground floor level in Block F, also fronting and overlooking the proposed urban square. The café is not intended as a destination, but rather is intended to function as a gathering space for the residents within the development proposal, thereby facilitating social and community interaction.

2.3.4.3 Creche

The single storey creche facility is located on the northern site boundary adjacent to an established woodland setting, with a floor area of 778sqm. The creche has capacity to accommodate 107 no. children and has capacity to serve the development proposal. In accordance with the Childcare Facilities - Guidelines for Planning Authorities, provision has been made for 20 no. childcare spaces per 75 no. residential units, excluding 1 bed and studio units.

A dedicated play area of 2,725sqm is provided to exclusively serve the creche. This dedicated play area is complimented with walking paths through the adjoining woodland and a public playground to be provided on open space immediately west of Block A and north of Block E.

2.3.4.4 Public Realm & Open Space Provision

The development proposes the creation of a series of urban and landscaped public spaces. These include:

1. A buffer is proposed between the Dublin Road and the proposed development in accordance with Objective SC31 of the LAP. It is conceived as the re-establishment of the woodland setting that once framed the approach to Shanganagh Castle and formed the setting for the original Gate Lodge. Where possible, existing trees are retained with additional specimens added to create a woodland area along the boundary.
2. A new low boundary wall with railings set back from the road will provide an enhanced landscaped space for pedestrians. Screened from the busy traffic of the Dublin Road by a band of trees, the new footpath connects with existing footpaths at the entrance to Shanganagh Park to create a generous wooded walk for passers-by. This landscape motif of planted buffer and

path is in keeping with Shanganagh Landscape Character Area Strategy as identified in Appendix 7 of the Dún Laoghaire-Rathdown County Development Plan, 2016-2022 (CDP) which seeks to maintain the sylvan character of the Old Dublin Road.

3. Retention and enhancement of the remains of original picturesque parkland setting with its ornamental pond that once established the foreground to Shanganagh Castle be retained and enhanced to serve as an informal amenity space for residents and an extension of the adjacent Shanganagh Park.
4. Provision of a new urban square. The Square is a new public space at the heart of the community that creates a unifying urban focus for the development. Designed as an urban square, the space is comparable in scale to such spaces as Jervis Square in Dublin.

The primary public spaces are interspersed with secondary 'nodes' that provide activities and animation to the Public Realm. These include:

- A paved gathering space to the front of the crèche;
- A widened pavement incorporating seating along the pedestrian route to Castle Farm
- A Playground to the west of Block D
- A terrace to the front of the Café at the corner of Block F

In accordance with the public open space requirements set out in the CDP, provision has been made for in excess of the 15sqm of public open space per future resident, based on 3.5 persons per 3 bed unit and over; and 1.5 persons per 2 bed unit and under. Whilst the CDP requires 1.61 hectares of public open to serve the development, the proposed development provides for 1.76 hectares within the net development area.

However, in reality the proposed development provides for significant more open space when one takes account of the additional 1.54 hectares located within the red line boundary and which remains undisturbed. Given the sensitive nature of environmental elements within the site including mature woodlands, the pond and existing trees and hedgerows, the proposed development in reality provides for 3.3 hectares of open space. This equates to 34 per cent of the overall site identified in red or 39 per cent of the site excluding the Dublin Road and the proposed greenway. Such provision is in direct response to the demesne landscape setting and directly compliments and supports the provision of Build to Rent units.

In accordance with Objective SC25 in the LAP, the proposed central open space (parkland) which is focused around the pond, is located adjoining Shanganagh Park, thereby consolidating and reinforcing the recreational potential of the Park. Shanganagh Park provides a number of significant amenities and facilities to the surrounding area, which will also be available to the proposed residents, including 2 no. GAA pitches, 2 no. soccer pitches and training pitches, a playground, multi games area, cricket area and bring centre. There are proposals to upgrade the park from local to regional status with improved destination and public amenity facilities.

In addition to open space provision, a greenway is proposed north – south through Shanganagh Park, connecting the subject site with the proposed Woodbrook development. The greenway comprises a 5m wide shared tarmac surface with lighting intended to facilitate pedestrian and cycle access and is provided to facilitate access to future facilities in Woodbrook including the new DART station and the neighbourhood centre.

2.3.4.5 Access & Parking

Vehicular access to the site involves the relocation of the existing access to Shanganagh Castle to the north and the provision of a new signalised junction on the Dublin Road which provides for right-hand turning into the development for vehicles travelling northwards along the Dublin Road as well as cycle and pedestrian crossing points.

Vehicular and pedestrian circulation within the development consists of:

- The 'Entrance Road' that runs east-west from the Dublin Road to The Square then turns northwards where it meets with the Crescent.
- 'The Crescent', a two-way, perimeter vehicular route that follows the boundary of the site connecting
- The Entrance Road to Shanganagh Castle.
- The Avenue provides a new pedestrian-and cycle-only entrance to the development from the Dublin Road that extends eastwards before crossing the central public space of the development. This 'Avenue' provides a direct vista to the castle.

The proposed development creates a transport hierarchy providing primacy to pedestrians and cyclists through the introduction of shared surfaces, pedestrian-only areas and traffic-calming in accordance with DMURS and current best practice. Vehicular movements are designed to be indirect so as to reduce speed and give primacy to cyclists, pedestrians and the communal activity.

The majority of parking is provided as on-street parallel and perpendicular parking distributed along access roads throughout the development. A car park providing some 58 no. spaces is located immediately off the entrance road to the development.

The proposed development accommodates 365 no. car parking spaces on site and 1,318 bicycle spaces. The car parking spaces provides for 324 no. spaces to serve the residential units; 10 no. visitor car parking spaces; 20 no. spaces for the creche; 8 no. spaces serving the café and 3 no. spaces serving the local retail unit. The bicycle spaces have been allocated with 1,033 no. spaces serving the residential units, 279 no. spaces provided to serve visitors; 4 no. spaces serving the café; 1 no. space serving the creche; and 1 no. space serving the local retail unit.

A reduction in car parking standards has been considered in the context of the LAP and the Apartment Guidelines.

Objective SC13 in the LAP states that

"A relaxation of private open space standards for terraced, semi-detached or detached housing and car parking provision will be considered in order to achieve higher sustainable densities, subject to design and layout".

The Apartment Guidelines in Paragraph 4.19 states that,

"In larger scale and higher density developments, comprising wholly of apartments in more central locations that are well served by public transport, the default policy is for car parking provision to be minimised, substantially reduced or wholly eliminated in certain circumstances. The policies above would be particularly applicable in highly accessible areas such as in or

adjoining city cores or at a confluence of public transport systems such rail and bus stations located in close proximity”.

The location of the proposed development in proximity to Shankill DART Station and bus stops on the Dublin Road associated with the future provision of a new DART Station at Woodbrook and proposed Bus Connects, supports and justifies a significant reduction in car parking provision in this instance. Further an Outline Travel Plan accompanies the application for approval and justifies reduced car parking in the context of the location of the site in proximity to services and facilities and in particular the planned public transport infrastructure intended for the area.

Providing higher numbers of cycle parking is proposed to mitigate the demand for and result in reduced car parking. The cycle parking provision will generally be in accordance with 2018 Apartment Guidelines and is more than the requirement set out in *DLRCC Standards for Cycling Facilities for New Developments January 2018*.

GoCar, a car sharing facility that allows vehicle rental from a minimum of one hour, have confirmed their commitment to the scheme. A total of 10 Go Car Spaces will be provided at various convenient locations around the site. The GoCar company advise that each GoCar will equate to 15 to 20 privately owned vehicles. Therefore, GoCar parking spaces, suitably located, are an effective mechanism for reducing car parking demand.

2.3.5 Landscape Strategy

2.3.5.1 Landscape Masterplan

The Landscape Architecture Design Report prepared by Aecom and accompanying the application provides a comprehensive presentation of the proposed external works for the subject site. The design approach illustrates the design development and intent in conjunction with the vision, policies and objectives as identified within both the Dún Laoghaire-Rathdown County Development Plan 2016-2022 and the Woodbrook-Shanganagh Local Area Plan (LAP) 2017-2023. Furthermore, the design approach sets out the design principles that form the proposed intervention which include:

- Historic landscape retention
- Multi-modal connectivity
- Amenity through variety
- Resilience in design
- Landscape character

The original historic components of the parkland landscape, namely the woodland stands and pond, form the framework of the open space intervention. Furthermore, the principals of parkland landscape design within the new scheme have been reinterpreted through the creation of vistas, a sequence of spaces being revealed as one traverse the scheme and an alignment of the species that exist on site.

Acknowledging that there is a significant change in use for the site, there is a discreet approach to the landscape interventions which are visually appropriate. Several visual cues have been created which will be found in the scheme that illustrate the historical landscape with an overlay of contemporary functionality which are complementary. For example, the interface between the Avenue streetscape

and the parkland landscape is delineated by an upstand wall which overlooks the parkland meadow and is remnant of a ha-ha wall.

The development of distinct character areas across the scheme has been central to the programming and selection of hard and soft materials within both the of public and private open spaces, along with the streetscapes within this new residential community. These character areas function as part of a site-wide landscape architectural framework, ensuring suitable screening, visual and aesthetic interest, recreation and integration of the proposed development into its adjoining environs.

In conjunction to the fundamentals of designing the spatial framework for the reduced external landscape, a holistic approach has been taken to water management with a SuDS strategy which will add value to the landscape and create a sense of robustness. Roadside medians, usually seeded as standard amenity grass, are proposed as swales to act as collection trains from stormwater runoff, be visually attractive and reduce maintenance.

Overall, the landscape design approach aims at integrating the proposed development within the setting of a historic landscape. While some components of the historic landscape remain, it is proposed that these features are protected, retained and incorporated into the design of the proposed development to form an integral part of the future character, identity and placemaking for the site. The overarching design intention is to create of a strong sense of place and identity for this new residential community, whilst also respecting the historic sensitivities and heritage of the site.

2.3.5.2 Tree Retention Strategy

A strategy of tree retention, replacement and planting has influenced the overall development proposal, informed by an Arborists Report as detailed in Appendix 2.2.

The LAP, Map 3 indicates 'tree' symbols where trees/copses are to be protected and preserved as follows:

- Copse of trees north-east of the gate lodge (in and around tree tag no. 600);
- Trees in the planted woodland east of the pond (in and around tree tag no. 700);
- Tree(s) on the pond island (no tree tag no.); and
- Tree tag no. 616 (a mature Scots pine)

It is proposed to retain these trees and incorporate them within the development proposal save for the mature Scots pine (tree tag no.616) which must be removed due to its poor condition. Further, although the tree on the pond island has been deemed dead its removal is not proposed as it provides a positive habitat for habitat in the pond and surrounding area.

The Arborist Report details all trees to be removed, retained and managed on site and provides information on the trees, age and condition. Whilst the removal of some trees are necessary to facilitate the development proposal, a comprehensive strategy of tree planting, replacement and management is proposed an integral part of the overall development proposal.

2.3.5.3 Ornamental Pond Works

As part of the overall landscape strategy, works are proposed to the pond in an attempt to re-integrate it back into its demesne setting. The proposed pond will be de-silted in order to improve it as a historic amenity and to improve the biodiversity habitat for existing newts. This work will be undertaken at the time of year when newts are likely to be hibernating in terrestrial habitat away from the waterbody. This is generally between November and January, inclusive. Sumps shall also be provided on some of the upstream manholes to reduce silts entering the pond, which will provide an improvement on the existing situation, and reduce the need for future desilting of the pond, post construction.

A new headwall will be constructed where the existing drain enters the pond and this measure together with proposed SUDS will regulate the pond water level to prevent it overflowing or drying out.

Significant and sensitive landscape works are proposed around the pond to enhance the existing habitat. The landscaping works within and surrounding the Pond have been designed to benefit smooth newt and common frog. Measures include the retention of some of the existing scrub, the planting of marginal and aquatic native vegetation (which is currently lacking and is important for smooth newt egg laying) and the removal of some dense scrub and overhanging trees to reduce over-shading of the waterbody. Existing connections between the Pond and retained woodland blocks (e.g. the vegetated drainage ditches) will be maintained or will be facilitated through the creation of greenspace and the installation of amphibian tunnels.

2.3.6 Drainage Strategy

The drainage strategy is focused on meeting the requirements of Irish Water and Dún Laoghaire-Rathdown County Council (DLRCC) in terms of design, arrangement and clearances to other infrastructure. Further details are provided in Chapter 16.0 Material Assets – Water Services.

2.3.6.1 Foul Water

The existing houses adjacent to the northern boundary of the site will be drained via private gravity foul drains which connect to the public foul system in the adjacent Castlefarm development. It is proposed to service the development via a 225mm diameter gravity system through the adjacent Shanganagh Park connecting to the proposed system for the Woodbrook SHD development. From there foul water will then be pumped to the existing Irish Water system at St. Anne's Park Housing Development to the north of Shanganagh Park via a proposed rising main.

The rising main is to be constructed by Aeval Unlimited Company as part of the Woodbrook residential development, in agreement with the applicant. A letter of consent is attached to the application for approval and is detailed in Appendix 17.3 of this EIAR. Upon completion of the final rising main by Irish Water, wastewater flows will then be transferred to the new rising main and pumped to Shanganagh Waste Water Treatment Plant (WWTP) for treatment.

It is proposed that the foul drainage from the gate house will be diverted to the site development drainage system.

2.3.6.2 Surface Water

Run off from the existing site is collected by land drain and routed through the existing pond at the south-centre of the site. From there out flow is carried by another land drain and connects a ditch at the south eastern corner of the site in the adjacent Shanganagh Park. The drain runs south through the park and then continues through adjacent lands ultimately connecting to the Crinken Stream.

It is proposed to collect run off from the development site via gravity drains and discharge to the ditch in Shanganagh Park. Flow from the development will be attenuated to ensure that greenfield runoff is maintained.

A variety of SuDS measures will also be adopted on the site. Relatively small volumes of rainwater collected on the respective SuDS devices will enter the gravity drains during typical low intensity storms. The SuDS processes decrease the impact of the development on the receiving environment by providing amenity and biodiversity in many cases. The specific measures adopted for the proposed development comprise the following:

- Green roof across 60% of the roof
- Landscaping
- Pervious paving
- Rain Gardens
- Use of existing Pond
- Swales

2.3.6.3 Water Supply

The existing site is served by a 100mm diameter main which runs through the site connecting the castle building which is located to the east of the site. This pipe is connected to an existing 150mm diameter pipe which runs along Dublin Road to the west of the site. A pre-connection enquiry was made to Irish Water, and it has been confirmed that subject to agreement, the connection of the development to the Irish Water network can be facilitated. They require that the new site main be connected to a new 355mm diameter main which was laid on Dublin Road in 2019. Continuity of supply for the castle building will be maintained via a connection to the new site main.

The watermain layout has been designed in accordance with “Irish Water Code of Practice for Water Infrastructure”. All watermains are to be constructed in accordance with Irish Water Code of Practice.

To reduce the water demand on Local Authority water supplies and to reduce the foul discharge from the development, water conservation measures will be incorporated in the sanitary facilities throughout the development, e.g. dual flush toilets, monobloc low volume push taps and waterless urinals.

2.3.7 Energy Strategy

The strategy for sustainable design uses robust, passive, cost effective measures to create a more efficient and healthier environment within the planned spaces. The development provides an opportunity to create environmentally sound and energy efficient homes by using an integrated approach to design, planning, construction and operation. An Energy Report is detailed in Appendix 2.3.

The design strategies employed include a whole life cycle approach to management and planning of the development, energy efficiency with specific focus on reducing the carbon footprint, improving the environmental quality of the building spaces, material selection and use, waste management, water management and conservation and enhancing the ecological value of the site. Key Energy Reduction and Sustainable Design Features include:

- BER minimum of A3, with the majority of units achieving a BER of A2.
- Reduction in Primary Energy compared to a Building Regulation Compliant Residential Building
- Reduction in CO2 Emissions compared to a Building Regulation Compliant Residential Building to Part L 2018 (public consultation)
- Air Tightness Test to achieve 0.6m³/m²/hr an 88% improvement on the Building Regulations advised upper limit figure.
- Thermal Bridging factor 0.04 W/m²K represents calculated thermal bridge details throughout.
- Use of LED Lights. LED lights in the residences and in the Landlords areas.

To achieve the renewables requirement stipulated in TGD Part L, Centralised Air to Water Heat Pumps will be provided. BER Target is NZEB Part L 2019 Compliance. One centralised plantroom is proposed for all of the apartments. The house units will be provided with individual air to water heat pumps.

The ventilation strategy is to use mechanical ventilation with heat recovery (MVHR), meeting all of the supply and extract requirements. Part F will be fully complied with for the entire scheme.

5 no. dedicated ESB sub-stations will be sited in the development to power the entire site. The supply to all buildings, landlord and tenant services will be at low voltage.

2.3.8 Phasing

It is anticipated that approval for the subject site will be secured in Q2 2020 and that construction will commence on site in Q1 2021 subject to the discharge of any pre-commencement requirements.

It is intended to deliver the development in the shortest timeframe possible. Based on contracting market feedback to date, an overall construction duration of circa 3 years would be reasonably achievable. The phasing plan detailed on Drawing No. 788/PA1125 provides for four phases of development over a period of 3.5 years and the estimated timeframes for each phase is detailed in Table 2.5.

Phase	Extent of Development	Approx. Timeframe
Phase 01	51 no. affordable houses for sale and creche	14 months
Phase 02	230 no. units including 195 no. cost rental and 35 no. social Blocks A, B, C & D	18 months
Phase 03	144 no. units including 104 no. social and 40. No. affordable for sale Blocks E & F	18 months
Phase 04	172 no. units including 111 no. cost rental and 61 no. social Blocks G & H	18 months

Table 2.5 Proposed Phasing of Development

The timeframes provided are indicative only and there is likely to be overlap between phases. Generally, the foundation and structural works of each phase is likely to proceed at the same time as the fit out and commissioning of the previous phase.

The phasing plan as proposed is relevant to the current market and economic climate. Should the current market significantly shift, then a revised phasing approach may be necessary.

2.3.9 Construction Characteristics

2.3.9.1 Construction Activities

There are a number of construction activities involved in a project such as this. The activities (independent of phasing) can be divided into five general categories:

- Excavation: This includes site clearing and earthworks – soil / rock removal – required to prepare the site for the foundations and residential floorspace above.
- Structure: Structure includes the foundations and the physical frame of the residential units and childcare facility. This will include a mixture of strip & pad foundations and ground beams and piled foundations.
- Enclosures: The enclosures for the buildings will be formed from concrete frame, brick, block work, timber, and glass, with slate roofs and flat roofs, all with the required levels of insulation and water-proof membranes.
- Services: The requisite services will be provided including drainage and lightning.
- Landscaping: The landscaping works include some hard landscaping, roads, footpaths, pedestrian and cycle paths, bed and tree planting, and significant open spaces. In addition, there are a number of existing trees to be protected on site and incorporated into the new scheme.

2.3.9.2 Construction Waste

There are two main types of construction waste – Hazardous and Non-hazardous. Chapter 17.0 Material Assets - Built Services & Waste Management of this EIAR deals further with Waste Management. Appendix 17.2 also contains a Construction & Demolition Management Plan. The Main Contractor will be required to prepare a detailed Waste Management plan for the project. This will be included in the overall detailed Construction & Environmental Management Plan (CEMP). A Preliminary Construction Management Plan is detailed in Appendix 2.4.

Non hazardous wastes typically generated at construction sites include: timber waste, scrap metal, plastic, paper / cardboard, canteen waste, and litter. The hazardous wastes that may be experienced at a development of this nature include: adhesives and sealants, chemicals, cleaning products, oil (contaminated absorbent material or debris), paints and thinner and fuels, (hydrocarbons such as diesel).

The scheme will result in waste generation from the following activities:

- Demolition of the existing house, glasshouses and maintenance sheds;
- Removal of soil to make way for construction in areas of the site which have been previously undisturbed; and
- Removal of existing landscaping including trees in poor / unhealthy condition.

There are two existing buildings on site that require demolition to cater for the proposed development. The existing greenhouses to the south-east of the site, the depot outbuildings and the existing single storey house will be demolished as part of the site clearance. Demolition works will result in an estimated 4,420 tonnes of waste as detailed in Table 1.0 of the Construction & Demolition Waste Management Plan in Appendix 17.2 Construction & Demolition Waste Management Plan.

Topsoil removal and replacement will be required to implement the required works. The volume of topsoil from the stripped site totals approximately 15,000m³. It is estimated that 3,000m³ topsoil could be reused on site, adjacent to the existing pond and in proposed soft landscape areas, thereby necessitating the removal of 12,000m³ off site.

Significant subsoil cut and fill will be required to modify the site levels to suit the proposed buildings, roads and other paved areas. There are variable depths of excavation proposed for the above elements within the site. The depth of principal excavation varies from 2m fill to 3.5m cut below the underside of topsoil. The deepest excavation is proposed at the new attenuation tank areas. The estimated volumes of cut and fill of subsoils are 36,000 m³ cut and 13,300m³ fill. Accordingly, some 22,700 m³ will need to be removed off site to a licensed waste disposal facility. These figures exclude arisings from excavation of foundations and services. Final volumes may change subject to final site layout and earthworks assessment.

Additionally, existing trees and scrub will be cleared from the site. The majority of the site is covered by low level, grass type vegetation. These clearance works shall be undertaken in a manner which maximises the potential for recycling, including source segregating waste where appropriate.

It is anticipated that most of the excavated materials will be required to be removed from the site with some retained for landscaping purposes.

2.3.9.3 Site Logistics General Principles

The anticipated general construction hours are 08:00 to 19:00hrs, Monday to Friday and 08:00 to 14:00hrs on Saturdays. There may be exceptional instances where works are required outside of these hours including specialist deliveries. The appointed contractor will be required to prepare and adhere to a *Site Environmental Policy Plan as part of the CEMP* and any employed subcontractors will be required to buy into this document. Unscheduled deliveries will not be allowed access.

Pedestrian access will be strictly controlled. Only Safepass accredited personnel will be permitted on site and daily in-out attendance records will be maintained. Safe pedestrian access points will be provided based on the stage of works and layout of the construction site.

There are two proposed construction access points to the site, including the existing access to Shanganagh Caslte and the proposed pedestrian and cycle access route further north. It is proposed to afford flexibility to the appointed Contractor in the use of the construction entrances to ensure their efficient and practicable use in accordance with the agreed construction programme. Notwithstanding, it is envisaged that the southern site entrance (existing access to Shanganagh Castle) remains as the construction access after Phase 01 and the northern site entrance becomes the primary resident access until such time as Phase 04 is complete, thereafter reverting to a pedestrian & cycle access route only.

Construction traffic will be strictly managed and controlled, and details will be incorporated into a Site-Specific Traffic Management Plan as part of the CEMP. It should be noted that it is likely that construction traffic accessing and egressing the site will contain soil/stone as a result of the site clearance and construction works.

It is anticipated that a workforce varying in a range of approximately 70-100 people will be employed depending on phasing and stage of construction.

2.3.9.4 Employment Workforce

It is estimated that there will initially be 60 – 70 staff on site on a typical day. However, during peak construction periods this is expected to fluctuate up to 250 – 350 staff and contractors on site per day.

It is anticipated that the key project managers and main contractor representatives will maintain a presence on site for the whole duration of the project and the labour workforce will be determined by the specialist contractors required on site.

General Safety & Health Considerations

Health & Safety issues will be the primary concern for the appointed Contractors. This will apply in respect of persons working on the site and in respect of passing pedestrians, motorists or other transport carriers. In this regard the highest possible care will be taken in providing a detailed Construction Stage Health and Safety Plan in advance of works commencing on site.

It is intended to operate a Health, Safety & Environmental Management System in line with ISO 18001 & ISO 14001. This Management System translates the company policy into processes to ensure safety, health and environmental responsibilities and performance can be monitored, reported and improved.

A suitably qualified and competent Project Supervisor Design Process (PSDP) has been appointed and a suitably qualified and competent Project Supervisor Construction Stage (PSCS) will be appointed in line with those requirements laid down in the Safety, Health and Welfare at Work Construction Regulations 2013.

2.3.9.5 Monitoring During Construction & Demolition

Appropriate air quality and dust monitoring will be carried out and records will be kept of all such monitoring. Construction and demolition works will be carried out in such a way as to limit the emissions to air of pollutants (particularly dust and fine particles (PM10)), employing Best Practicable Means. Air Quality & Climatic issues associated with the propose development are dealt with in detail in Chapter 10.0 Air Quality & Climate of this EIAR.

Noise monitoring will be carried out in accordance in accordance with Safety, Health and Welfare at Work (Construction) Regulations 2006 – 2012 Safety, Health and Welfare at Work Act 2005, BS 6187:2011 - Code of Practice for Full & Partial Demolition, BS 5228:2009 Code of Practice for Noise & Vibration Control on Construction & Open Sites. Vibration monitoring will be carried out in accordance with BS 5228-1, 2009, Code of Practice for Noise & Vibration Control on Construction & Open Sites. Issues associated with Noise & Vibration are dealt with further in Chapter 11.0 Noise & Vibration.

In accordance with the recommended measures set out in Chapter 11.0 Noise & Vibration, site hoarding at least 2.4m high shall be erected along the northern western site boundary adjacent to the closest houses in Castlefarm including house no's. 16 to 22 (refer to mitigation measure N & V CONST 9).

2.3.10 Operational Characteristics

Pursuant to the EIA Directive an EIAR document is required to set out a description of the project processes, activities, materials and natural resources utilised; and the activities, materials and natural resources and the effects, residues and emissions anticipated by the operation of the project.

The proposed development comprises the provision of residential uses in the townlands of Shanganagh and Shankill, including associated infrastructural works, creche, road network, landscaping and areas of open space. The primary direct significant environmental effects will arise during the construction stage. As a result, post-construction, the operation of the proposed development is therefore relatively benign and not likely to give rise to any significant additional impacts in terms of activities, materials or natural resources used or effects, residues or emissions which are likely to have a significant impact on population and human health, biodiversity, soils, water, air, or climate.

The primary likely and significant environmental impacts of the operation of the proposed development are fully addressed in this EIAR document; and relate to Population and Human Health, Landscape and Visual Impact and Noise and Air impacts associated with the traffic generated.

The proposed development also has the potential for cumulative, secondary and indirect impacts particularly with respect to such topics as traffic – which in many instances – are often difficult to quantify due to complex inter-relationships. However, all cumulative secondary and indirect impacts are unlikely to be significant; and where appropriate, have been addressed in the content of this EIAR document.

2.3.11 Description of Secondary and Off-Site Developments

The planning application includes details of the necessary road works, which are required to facilitate this development. These works are assessed within this Environmental Impact Assessment Report.

The proposed development is dependent on the delivery of wastewater infrastructure, which is awaiting planning approval as part of an overall residential development being advanced on the neighbouring Woodbrook lands. Details of this proposed infrastructure is included in Appendix 16.1 and it is confirmed in Chapter 16.0 Water Services that adequate capacity is proposed to accommodate the entirety of the Woodbrook development and the proposed development as presented in this EIAR.

The Woodbrook development proposes to pump foul water to the existing Irish Water system at St. Anne's Park Housing Development to the north of Shanganagh Park via a proposed rising main. The rising main is to be constructed by Aeval Unlimited Company as part of the Woodbrook residential development, in agreement with the applicant. A letter of consent is attached to the application for approval and is detailed in Appendix 17.3 of this EIAR. Upon completion of the final rising main by Irish Water, wastewater flows will then be transferred to the new rising main and pumped to Shanganagh Waste Water Treatment Plant (WWTP) for treatment. As confirmed in the Woodbrook EIAR, Irish Water have confirmed that a final solution to provide a rising main for Woodbrook – Shanganagh Local Area

Plan direct tot Shanganagh Wastewater Treatment Plant is at design stage and that an interim solution to discharge to the St. Anne's Park residential estate to the North of the LAP area is feasible.

The extended wastewater infrastructure has been fully assessed within the Woodbrook Environmental Impact Assessment Report and any potential impacts have been mitigated through the recommendation of appropriate measures, within that EIAR and which will be implemented in compliance with any planning permission granted.

2.4 PROJET CHANGES – GROWTH & ALTERATIONS

Very few projects remain unaltered throughout their existence and have the potential to grow or even cease operation. As per the draft EPA guidelines and in the interests of proper planning and sustainable development it is important to consider the potential future growth and longer-term expansion of a proposed development in order to ensure that the geographical area in the vicinity of the proposed development has the assimilative carrying capacity to accommodate future development.

It is not envisaged that the proposed development comprising the provision of residential units will grow in the future. It is possible, however, that there could be changes to the proposed scheme in the future should market demand not exist for a particular use proposed on site. However, any such change or modification will need to receive a separate consent process and which will be independently assessed at a given time in the future.

It is likely that the adjoining land to the north east, namely that land including and surrounding Shanganagh Castle will be developed in the future for community and recreation purposes in line with the objectives of the LAP. A multi-disciplinary steering group has been assembled to manage the integration and refurbishment of the Shanganagh Castle and building. Currently the team is gathering site / building analysis information and is developing a strategy of reuse and integration for the Castle and its building that accords with the objectives of the Local Area Plan in the context of the wider community, the proposed Shanganagh residential development and the surrounding high amenity park lands.

As detailed in Section 2.2.2 of this Chapter, much of the land immediately surrounding the subject site is zoned "*to preserve and provide for open space with ancillary active recreational amenities*" (Objective F in the LAP). Shanganagh Park and its associated sports facilities are located adjoining the subject site to the south east. A masterplan has been prepared for the park, to facilitate its development into a regional park for the benefit of not only the local community but also the wider area. The masterplan provides for a significant number of playing pitches, playground, access routes and links and facilitates increased levels of tree planting and is likely to be developed in the near future as resources permit.

2.5 DESCRIPTION OF THE RISK OF ACCIDENTS – HAVING REGARD TO SUBSTANCES OR TECHNOLOGIES USED

The risk of accidents can arise during construction and operation phases as part of normal construction measures and day to day living and activities. The risk of accidents and mitigation measures considered

necessary to address same, has been considered and is presented under an assessment of each environmental variable assessed in this EIAR, where relevant.

Operation of the proposed development as a new mixed use commercial and residential neighbourhood is relatively benign and not likely to give rise to any significant impacts.

2.6 OTHER RELATED PROJECTS AND POTENTIAL FOR EX-SITU EFFECTS

Aside from the proposal to connect into the Woodbrook wastewater infrastructure, which has yet to be constructed, as detailed in Section 2.3.11, the proposed development does not involve or rely on any other related projects or give rise to significant ex-situ effects that should be considered as part of this EIAR.

Notwithstanding that a separate EIAR was undertaken for the Woodbrook scheme, which includes assessment of potential effects of the proposed wastewater infrastructure, the cumulative impacts associated with the proposed development and the Woodbrook scheme continue to be assessed in each chapter throughout this EIAR.

CHAPTER THREE SPATIAL PLANNING POLICY

3.1 INTRODUCTION

There is significant policy at national, regional and local level which supports the development of a high-density residential scheme at this location. The proposed development has been carefully considered and designed in the context of such policy and guidelines.

This chapter of the EIAR provides an overview of the policy which is supportive of the proposed development and demonstrates a plan – led approach to development. It rationalises the overall approach to development on the site and will assist in consideration of a balanced approach to development and environmental factors on the site.

The following outlines high level planning policy of relevance to the future development of the subject lands. The policy is reviewed from a general residential perspective without necessarily having regard to the proposed Build to Rent (BTR) Model. A separate report, “Sustainable Residential Development & BTR Justification” has been prepared by HRA Planning chartered town planning consultants in support of that particular element of the development proposal and accompanies the application for approval.

3.2 STRATEGIC PLANNING POLICY

3.2.1 National Planning Framework

The National Planning Framework (NPF) published in February 2018 sets out a strategic development strategy for the country up to 2040. Amongst its key messages is the need to provide the highest possible quality of life for people and communities via well designed and managed built and natural environments. It highlights that this will also require significant greenfield development, on sites that can be integrated with the existing built up area of the city and serviced by high capacity public transport. The NPF sets high level planning objectives for Dublin in order to meet the national objectives including the delivery of key rail projects set out in the Transport Strategy for the Greater Dublin Area including Metro Link, DART expansion and the LUAS green line link to Metro Link. The emphasis within the NPF with regard future development relates to managing the sustainable growth of compact cities, towns and villages to achieve effective density and consolidation supported by effective public transport infrastructure.

The NPF provides for a number of National Policy Objectives (NPO) which must be adhered to in the advancement of development throughout the State. The NPF seeks to “*deliver at least 40% of all new homes nationally, within the built-up footprint of existing settlements*” (NPO 3a) and seeks to “*deliver at least half (50%) of all new homes that are targeted in the five Cities and suburbs of Dublin, Cork, Limerick, Galway and Waterford, within their existing built-up footprints*” (NPO 3b).

The NPO’s promoting consolidation are further supported by NPO 11 which states that “*in meeting urban development requirements, there will be a presumption in favour of development that can*

encourage more people and generate more jobs and activity within existing cities, towns and villages, subject to development meeting appropriate planning standards and achieving targeted growth”.

The infill/brownfield targets set out in NPOs 3a, 3b and 3c of the NPF recognises the necessity for significant and sustained increase in urban housing output and in particular apartment type development. The NPF states that this is necessary, in order to avoid a continuation of the outward expansion of cities and larger urban areas. The NPF states that *“in many European countries, it is normal to see 40%-60% of households living in apartments”.*

NPO 33 seeks to *“Prioritise the provision of new homes at locations that can support sustainable development and at an appropriate scale of provision relative to location.”*

The proposed development complies with a number of the NPO’s within the NPF with particular regard to development within the existing built up footprint of a settlement. The proposed development is strategically located on residentially zoned greenfield lands. The site is serviceable and well connected to the road network. The site has been identified as a prime location for future residential development at a sustainably high density. A future train station is proposed on land south of the subject site on the existing line between Dublin and Bray and a BusConnects corridor is proposed along the Old Dublin Road (R119) to the west of the site. This will result in the site being within a 10 minute walk of high frequency public transport.

The proposed scheme features a variety of dwelling types designed to a high standard, and with easy access to a wide range of amenities of which future residents can avail including Shanganagh Public Park located directly to the south of the site. It is submitted to the Board that the proposed development is wholly compliant with the policies of the National Planning Framework.

3.2.2 Rebuilding Ireland – Action Plan for Housing and Homelessness

The Woodbrook – Shanganagh site was identified as a ‘Major Urban Housing Delivery Site’ by the Department of Housing Planning Community and Local Government (DHPCLG) under Pillar 3 - Building More Homes of the Government’s “Rebuilding Ireland – an Action Plan for Housing and Homelessness”.

It envisaged the delivery of 1,500 units in the medium term, with a potential total yield of 2,300 units. The intention at the time was that these sites would be advanced for fast track housing delivery, within the context that they can often need additional investment and co-ordination to get development underway.

3.2.3 Sustainable Urban Housing: Design Standards for New Apartments 2018

The *Sustainable Urban Housing: Design Standards for New Apartments 2018* seek to promote high density and high quality apartment developments on residentially zoned land in appropriate locations in line with the above referenced NPF. The Guidelines acknowledge that apartment developments are most appropriately located within urban areas and that the scale and extent of apartment development should increase in relation to proximity to core urban centres.

The subject site would appear to be most akin to a “Central and/or Accessible Urban Location” as per the Guidelines, located on residential zoned land within 400m from the Dublin Road (bus stops) and 800m (10 minute walking distance) across Shanganagh Park from the proposed new DART Station.

The provision of the planned DART Station at Woodbrook will provide direct access to the Suburban Rail Network and wider heavy rail network as defined in the NTA's Transport Strategy for the Greater Dublin Area. The Guidelines confirm that these locations are generally suitable for higher density developments, comprising wholly of apartments in more central locations. The proposed development provides for 597 no. units on a site of 9.69 hectares resulting in a gross density of 62 dwellings per hectare or a net density of 85 dwellings per hectare when the Dublin Road, Woodland areas and proposed greenway link are deducted from the overall site area. The proposed development therefore complies with the requirement for higher densities and the need for greater apartment living.

Section 2.23 of the Guidelines note that publication of The National Planning Framework (NPF) has signaled a move away from rigidly applied, blanket planning standards in relation to building design, in favour of performance-based standards to ensure well-designed high quality outcomes. In particular, general blanket restrictions on building height or building separation distance that may be specified in Development Plans, should be replaced by performance criteria, appropriate to location.

3.2.4 Sustainable Residential Development in Urban Areas Guidelines 2009

The Sustainable Residential Development in Urban Areas Guidelines 2009 advocate the use of 'Universal Design', whereby a development is accessible and usable by as many people as possible, regardless of abilities or age. National policy makes it clear that sustainability is not confined to the physical environment. Sustainable neighbourhoods require a range of community facilities, and each district/neighbourhood will need to be considered within its own wider locality.

In this regard, the Woodbrook – Shanganagh Local Area Plan 2017 – 2023 (LAP) considers the holistic development of the subject lands and the neighbouring Woodbrook lands to the south in the context of necessary and proposed infrastructure with a view to creating an attractive and walkable residential neighbourhood with high-quality residential, community, civic and recreational amenities. The proposed development has been advanced in the context of the LAP. In addition to the proposed residential units, provision shall be made for a childcare facility on site, a local retail unit and cafe. A Masterplan has been prepared to elevate Shanganagh Park to Regional Park status serving a wider hinterland with sports and community facilities, whilst a steering group has been assembled to advance community & recreation proposals for Shanganagh Castle in the future.

The Guidelines encourage the sustainable and efficient use of land and seek to ensure that sustainable travel patterns are encouraged. It recommends a number of qualitative standards regarding open space provision, design, accessibility, shared use and SUDs. All of these elements have been incorporated into the proposed design approach. Whilst some 39% (3.31 hectares) of the site has been allocated to open space, it is the quality of that open space which is considered to be most important. In this regard the landscaping plan seeks to enhance the quality of open space whilst retaining the landscape demesne and providing for local pocket parks and play facilities. Further Shanganagh Park will provide significant recreational and sporting facilities adjoining the site.

Section 5.8 of the Guidelines seeks to maximise the return on public transport investment, and states that it is important that land use planning underpins the efficiency of public transport services by sustainable settlement patterns – including higher densities – on lands within existing or planned transport corridors. It recommends that increased densities should be promoted within 500 metres walking distance of a bus stop, or within 1km of a light rail stop or a rail station and in general, minimum

net densities of 50 dwellings per hectare, subject to appropriate design and amenity standards, should be applied within public transport corridors. The proposed development with a gross density of 62 dwellings per hectare and a net density of 85 dwellings per hectare is well above such minimum densities.

3.2.5 Urban Development and Building Heights – Guidelines for Planning Authorities 2018

The Urban Development and Building Heights – Guidelines for Planning Authorities 2018 recognises that our cities and towns must grow upwards and not outwards. Overall there is a presumption in favour of buildings of increased height in town/city cores and in other urban locations with good public transport accessibility.

Section 2.3 of the Guidelines states that *“increased building height is a significant component in making optimal use of the capacity of sites in urban locations where transport, employment, services or retail development can achieve a requisite level of intensity for sustainability. Accordingly, the development plan must include the positive disposition towards appropriate assessment criteria that will enable proper consideration of development proposals for increased building height linked to the achievement of a greater density of development”*.

Section 3.6 of the Guidelines states that development should include an effective mix of 2, 3 and 4-storey development which integrates well into existing and historical neighbourhoods and 4 storeys or more can be accommodated alongside existing larger buildings, trees and parkland, river/sea frontage or along wider streets. The proposed development comprises a mix of 2 - 6 stories with a seventh storey set back on one building fronting the Dublin Road. The development is within a parkland setting and within the curtilage of a protected structure, Shanganagh Castle.

The Guidelines state in Chapter 3.0 that planning authorities must apply the following broad principles in considering development proposals for buildings taller than prevailing building heights in urban areas in pursuit of these guidelines. These broad principles are assessed in the context of the proposed development.

Broad Principle	Response
Does the proposal positively assist in securing National Planning Framework objectives of focusing development in key urban centres and in particular, fulfilling targets related to brownfield, infill development and in particular, effectively supporting the National Strategic Objective to deliver compact growth in our urban centres?	The subject site comprises a zoned site for residential use in the Woodbrook – Shanganagh Local Area Plan, adjoining existing residential development within 400m of a bus stop, 900m of a proposed DART Station, 1.4km of the town centre and within 1.2km of 3 no. primary schools. The proposed development positively assists in securing NPF objectives relating to development on public transport nodes and facilitating compact growth within existing settlements.
Is the proposal in line with the requirements of the development plan in force and which plan has taken clear account of the requirements set out in Chapter 2 of these guidelines?	The LAP was adopted in 2017 in advance of these Guidelines. However, the development is proposed in line with the general requirements and priorities of the LAP. The massing strategy within the proposed development generally accords with the detailed

	provisions of the LAP, as provided for within Objective SC5.
Where the relevant development plan, local area plan or planning scheme pre-dates these guidelines, can it be demonstrated that implementation of the pre-existing policies and objectives of the relevant plan or planning scheme does not align with and support the objectives and policies of the National Planning Framework	The pre-existing policies and objectives of the LAP do not conflict with the objectives and policies of the NPF. Accordingly, this third issue does not necessarily apply.

Table 3.1 Compliance with Broad Principles in Building Height Guidelines

Section 3.2 of the Guidelines states that the applicant shall demonstrate to the satisfaction of the Planning Authority/ An Bord Pleanála, that the proposed development satisfies the following criteria:

Criteria	Satisfaction with Criteria
At the scale of the relevant city/town	
The site is well served by public transport with high capacity, frequent service and good links to other modes of public transport.	The site is currently well served by public bus connections with a bus stop fronting the site on Dublin Road. The site is also within 2.1km of an existing DART Station. A new DART station is proposed within (900m) of the site at Woodbrook and there are proposals for an enhanced bus network in the area with BusConnects Pedestrian and bicycle links between Woodbrook and Shanganagh are to be facilitated through the existing park.
Development proposals incorporating increased building height, including proposals within architecturally sensitive areas, should successfully integrate into/ enhance the character and public realm of the area, having regard to topography, its cultural context, setting of key landmarks, protection of key views. Such development proposals shall undertake a landscape and visual assessment, by a suitably qualified practitioner such as a chartered landscape architect.	The proposed development has been assessed in the context of the surrounding landscape and its cultural heritage setting. A landscape and visual assessment has been undertaken and is contained within Chapter 14.0 of the EIAR, whilst the cultural setting and key landmarks have been assessed in Chapter 13.0 under the title Architecture and Cultural Heritage. The Architectural Design Statement prepared by ABK and accompanying the application for approval demonstrates how the development has been successfully integrated into the existing landscape demesne.
On larger urban redevelopment sites, proposed developments should make a positive contribution to place-making, incorporating new streets and public spaces, using massing and height to achieve the required densities but with sufficient variety in scale and form to respond to the scale of adjoining developments and create visual interest in the streetscape.	The proposed development has sufficient variety in scale and form to respond to the scale of neighbouring 2 storey developments. In this regard the development decreases in scale towards the northern site boundary to two storey form, increasing in scale on approach to the parkland setting and the Dublin Road. The scale also increases fronting the public road contributing to its visual presence. Importantly, the form and scale of the development has been guided by existing policies and objectives within the LAP.

At the scale of district/ neighbourhood/ street	
The proposal responds to its overall natural and built environment and makes a positive contribution to the urban neighbourhood and streetscape	The development has been designed in accordance with the design framework principles set out in the adopted LAP. It respects the setting of the castle (see Chapter 13.0 of the EIAR) and overlooks the parkland setting of Shanganagh Park. It opens up this part of the parkland to the public and provides the opportunity for the redevelopment and reuse of Shanganagh Castle in the future.
The proposal is not monolithic and avoids long, uninterrupted walls of building in the form of slab blocks with materials / building fabric well considered.	The proposed development has been effectively broken into 8 distinct blocks with traditional two storey typologies fringing the northern site boundary. The materials and building fabric have been well considered and are detailed in the Architectural Design Statement.
The proposal enhances the urban design context for public spaces and key thoroughfares and inland waterway/ marine frontage, thereby enabling additional height in development form to be favourably considered in terms of enhancing a sense of scale and enclosure while being in line with the requirements of <i>“The Planning System and Flood Risk Management – Guidelines for Planning Authorities”</i> (2009).	The site is not subject to flooding and is situated removed from marine frontage. The site does however adjoin Shanganagh Park, an area subject to significant redevelopment proposals to enhance recreation and sports provision. The scale of development increases to overlook and naturally police the adjoining parkland insofar as possible. As well as preserving part of the landscape demesne through enhancement of the pond, the proposed development provides for a new Urban Square and enhanced connectivity through the parkland
The proposal makes a positive contribution to the improvement of legibility through the site or wider urban area within which the development is situated and integrates in a cohesive manner.	The development breaks from the monolithic two storey form of the adjoining Castlefarm development and sensitively introduces scale into a suburban area which traditionally was planned around low density development. The adjoining parkland provides an opportunity to increase scale whilst at the same time respecting neighbouring two storey form and Shanganagh Castle.
The proposal positively contributes to the mix of uses and/ or building/ dwelling typologies available in the neighbourhood.	The predominant house type in the area comprises 2 storey own door residential units. There are limited apartment typologies and the proposal positively contributes to the mix of dwelling typologies in this regard.
At the scale of the site/building	
The form, massing and height of proposed developments should be carefully modulated so as to maximise access to natural daylight, ventilation and views and minimise overshadowing and loss of light.	The blocks are modulated to maximise access to natural daylight. Apartment buildings have been carefully positioned to ensure no overshadowing and loss of light to the adjoining two storey residential units in Castlefarm
Appropriate and reasonable regard should be taken of quantitative performance approaches to daylight provision outlined in guides like the Building Research Establishment’s <i>‘Site Layout Planning for Daylight and Sunlight’</i> (2nd edition) or BS 8206-2: 2008 – <i>‘Lighting for Buildings – Part 2: Code of Practice for Daylighting’</i> .	Appropriate regard has been had to relevant standards thereby ensuring that the proposed buildings do not adversely impact on third party properties or within the scheme of development itself. The Daylight & Sunlight Assessment which has influenced the design of the

	scheme is detailed within the Architectural Design Statement.
Where a proposal may not be able to fully meet all the requirements of the daylight provisions above, this must be clearly identified and a rationale for any alternative, compensatory design solutions must be set out, in respect of which the planning authority or An Bord Pleanála should apply their discretion, having regard to local factors.	This criterion is not applicable. The Architectural Design Statement prepared by ABK Architects justifies and rationalises the design approach.

Table 3.2 Compliance with Development Management Criteria – Building Height Guidelines

3.3 REGIONAL PLANNING POLICY

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

The Regional Spatial and Economic Strategy for the Eastern & Midland Region (RSES) sets out a twelve year strategic development framework for the Eastern and Midland Region. It establishes a broad framework for development and the way in which society, environment, economy and the use of land should evolve and works towards a broad vision of the Region's future, identifying key priorities for investment.

The Metropolitan Area Strategic Plan (MASP) for Dublin Metropolitan area sets out large scale strategic residential, employment and regeneration development opportunities and any infrastructure deficits or constraints that need to be addressed. It seeks amongst other things, to target growth along high quality public transport corridors and nodes linked to the delivery of key public transport projects including expansion of the DART and its facilities. The MASP specifically identifies the North – South Corridor (DART Expansion) as growth facilitator and states that the DART Expansion Programme will increase capacity to support ongoing development of lands to the south to Woodbrook – Shanganagh. The MASP further supports rail infrastructure at Woodbrook (RPO 5.2). The MASP states that the North – South Corridor, inclusive of Shanganagh and Woodbrook has a population capacity of 31,000 in the short term.

A dynamic approach to land-use within the footprint of existing settlements is sought by the RSES in order to maximise the opportunity of urban regeneration and infill sites to contribute to sustainable compact growth and revitalisation of existing settlements of all scale. The RSES supports infill development and the regeneration of key sites with higher densities through the provision of a number of key objectives including:

- Objective RP05.4 which seeks, *“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 B=Housing: Design Standards for New Apartment Guidelines; and Urban Development and Building Heights Guidelines for Planning Authorities*
- Objective RPO5.5 which states that *“future residential development within the Dublin Metropolitan Area shall follow a clear sequential approach, with a primary focus on the consolidation of Dublin and suburbs, supported by the development of Key Metropolitan Towns in a sequential manner.....”*

The RSES confirms that Shanganagh – Woodbrook, within the Dublin Metropolitan Area has been strategically planned for development at a regional level, with its development planned having regard to integrated landuse and transport uses and infrastructure.

3.3.2 Greater Dublin Area Transportation Strategy 2016-2035

Colloquially referred to as ‘2030 Vision’ this strategy sets out an integrated and balanced sustainable transportation framework for the wider Dublin Region and embraces all sustainable travel modes (walking, cycling, bus, rail and Luas) and road transportation and seeks to address such issues as road safety, traffic management, accessibility, social inclusion and guidance on complementary land use policies.

It sets out a strategy for heavy rail infrastructure that is proposed to be delivered up to 2035. In this regard it seeks to implement the DART Expansion Programme an initiative that will create a full Metropolitan area DART network for Dublin with all of the lines linked and connected. This integrated rail network will provide the core high capacity transit system for the region and will deliver a very substantial increase in peak-hour capacity on all lines from Drogheda, Maynooth, Hazelhatch and Greystones.

In relation to heavy rail and light rail infrastructure projects, the design of these projects will future-proof their ability to serve the needs of the region for the long term.

3.4 LOCAL PLANNING POLICY

3.4.1 Dún Laoghaire-Rathdown County Development Plan 2016 - 2022

In the Dún Laoghaire-Rathdown County Development Plan 2016 - 2022 (CDP) Shanganagh - Woodbrook is identified as a future development area in the core strategy settlement structure. The CDP states that there is potential for an additional 2,300 residential units in Woodbrook – Shanganagh having regard to the extent of land that is zoned.

The CDP references land located in the greenbelt area between Bray and Shankill that are within a major multi-modal transport corridor which includes the M11 which can be easily accessed and which, in turn, provides access to the M50. The lands referenced include the subject lands at Shanganagh. The CDP references the Old Dublin Road QBC which fronts the development lands and the DART line, with proposed access from a planned new station at Woodbrook, in proximity to the subject lands.

The CDP proposes a neighbourhood framework based on the provision of a high-density urban form that maximises the use of existing and proposed transport infrastructure and aims to reduce the need to travel. It states that two distinct urban nodes are proposed - one at Woodbrook, which includes a new neighbourhood centre, and the second at Shanganagh Castle which will essentially be a reinforcement of the existing urban form immediately to the south of Shankill village. It confirms that the lands, when fully developed, will accommodate an additional 5,000 to 6,000 persons in approximately 2,000 to 2,300 units. These figures are based on net densities of 80 to 100 units per hectare at Woodbrook and 65–75 units per hectare at Shanganagh Castle. Objective 54 of the CDP seeks to implement and develop the lands at Woodbrook and Shanganagh in accordance with the Woodbrook/Shanganagh Local Area Plan.

Policy RES5 facilitates development on institutional lands stating that it is Council policy to retain the open character and/or recreational amenity of these lands wherever possible. Policy RES7 encourages the establishment of sustainable residential communities by ensuring that a wide variety of housing and apartment types, sizes and tenures is provided whilst Policy RES9 supports the concept of independent and/or assisted living for older people and people with disabilities/mental health issues.

In relation to Table 2.2.5 Shanganagh Road is included in the six year road objectives programme although the extent of works proposed to Shanganagh Road is not detailed.

Policy OSR8 states it is the Council's policy to develop a comprehensive network of County Greenways linking parks and public open spaces and to liaise with adjoining local authorities and other stakeholders to achieve and improve wider external linkages and corridors. A greenway route from Shanganagh Park to the coast has been identified and a phased programme of works is being initiated,

Policy EL3 requires that a Sustainable Drainage System (SuDS) is applied to any development and that site-specific solutions to surface water drainage systems are developed.

Policy CC6 of the CDP seeks to promote innovative building design that demonstrates a high level of energy conservation, energy efficiency and use of renewable energy sources in existing buildings, whilst Policy CC7 seeks to ensure that all new buildings will be required to meet the passive house standard or equivalent, where reasonably practicable.

Chapter 6.0 deals with built heritage and is particularly relevant given the presence of Shanganagh Castle, a protected structure and building listed on the National Inventory of Architectural Heritage (NIAH). In terms of archaeology the CDP seeks to preserve archaeological material in situ (Policy AH2). Policy AR1 seeks to protect structures included on the RPS from any works that would negatively impact their special character and appearance. Policy AR5 seeks to retain, where appropriate, and encourage the rehabilitation and suitable reuse of existing older buildings/structures/features which make a positive contribution to the character and appearance of a streetscape

Chapter 8.0 defines a number of development management standards for residential development and institutional lands. Of note a minimum open space provision of 25% of the total site area will be required on Institutional Lands. This provision must be sufficient to maintain the open character of the site - with development proposals built around existing features and layout, particularly by reference to retention of trees, boundary walls and other features as considered necessary by the Council. The proposed development maintains a minimum 39% of the site as open space. The overall site has been influenced by standards detailed in Chapter 8.0 and every effort has been made to ensure that all standards, in so far as being relevant, are complied with.

Chapter 9.0 of the CDP lists a number of Specific Local Objectives (SLO) relating to the Woodbrook – Shanganagh Local Area Plan area as follows:

SLO	Specific Local Objective Text
54	To implement and develop the Woodbrook and Shanganagh area in accordance with the Woodbrook/Shanganagh Local Area Plan.
56	To investigate the potential upgrading of the Wilford Interchange to provide connectivity to lands west of the M11 and Old Conna Village with any such improvements to be informed by the outcome of the TII's on-going Corridor Studies.
61	To encourage the development of a crematorium at Shanganagh Cemetery.
66	To provide pedestrian/cycle access across the M11 corridor at Allies River Road.
76	To continue the development of Shanganagh Park in accordance with the Masterplan, and to develop a sports facility and improved recreational facilities in the park.
93	To promote the development of the S2S Promenade and Cycleway as a component part of the National East Coast Trail Cycle Route. It should be noted that these coastal routes will be subject to a feasibility study, including an assessment of the route options. Any development proposals shall be subject to Appropriate Assessment Screening in accordance with the requirements of the EU Habitats Directive to ensure the protection and preservation of all designated SACs, SPAs, and pNHAs in Dublin Bay and the surrounding area.
105	To investigate, in consultation with the Department of Education and Science, the reservation of a single site for a Post-Primary School to serve the growth nodes of Woodbrook/Old Connaught areas. Note: The locations of SLO symbol 105 on Map 14 are notional only and not a geographic identification of specific sites.
127	To provide a DART Station at Woodbrook.

Many of these objectives are currently being implemented, including objectives 54, 61, 76, 105 and 127 and which have significantly influenced the approach to development on site.

The land use zoning objectives as set out within Map 10 and 14 of the CDP and affords Zoning Objective A1 to the land, which seeks “to provide for new residential communities in accordance with approved local area plans”, whilst Shanganagh Park and Cemetery are zoned Objective – ‘F’: “To preserve and provide for open space with ancillary active recreational facilities”. A ‘H’ symbol has also been afforded to the subject site, which is indicative that the subject land has been identified as a County Council Housing Programme Site.

3.4.2 Woodbrook – Shanganagh Local Area Plan 2017 - 2023

The Woodbrook – Shanganagh Local Area Plan (LAP) identifies two discrete development parcels including lands at Shanganagh Castle and Woodbrook – incorporated within a wider environs. The LAP area is identified within the County Development Plan Core Strategy as a ‘Primary Growth Node’ and also as a ‘Major Urban Housing Delivery Site’ by the Department of Housing Planning and Local Government (DHPLG). It is an objective of the Council to unlock the potential and accelerate the delivery of housing on Woodbrook-Shanganagh, working in collaboration with all relevant stakeholders (Objective H1); to promote sustainable higher densities and quality innovative housing designs (Objective H2); and to promote high quality homes and quality residential choices for a range of household needs (Objective H3).

The LAP acknowledges that the area is predominately made up of green and open spaces given the co-location of Shanganagh Park and Woodbrook Golf Club surrounded by extensive tracts of greenbelt lands. A key aim of the LAP is to protect and enhance the existing open spaces for both biodiversity

and recreational use. Shanganagh Park is presently identified as a 'Gateway Park' within the County's Green Infrastructure Strategy, offering football pitches, walking routes, play facilities and a dog park. The LAP states that the forthcoming Masterplan for the park will further improve the facilities and amenity value of the park as well as enhancing its natural ecosystems and biodiversity (Objective OR2). A key element in maximising the future potential of the Park is to provide and improve pedestrian/cycling and green/biodiversity corridors through the Park and between each of the development parcels. In this regard a Parks Masterplan has been approved by Council, which seeks to elevate the parks status to regional level with enhanced provision of community, recreation and sports facilities.

Other objectives in the LAP seek to develop a sports campus, expanding on the existing sports facility at the Castle and to deliver greater recreational opportunities for existing and new residential communities and for the wider area (Objective OR9). In this regard a multi-disciplinary steering group has been assembled to manage the integration and refurbishment of the Shanganagh Castle and building. Currently the team is gathering site / building analysis information and is developing a strategy of reuse and integration for the Castle and its building that accords with the objectives of the Local Area Plan in the context of the wider community, the proposed Shanganagh residential development and the surrounding high amenity park lands.

Having regard to the location of the park adjoining the subject site, the LAP considers that it may be appropriate to relax new public open space quantum requirements. Notwithstanding this relaxation, each development parcel will be required to provide a minimum of 15sqm of public open space per person or in default 10% of the total site area to consist of high quality public/communal open space. In this regard the proposed development exceeds open space requirements as it provides 3.31 hectares of public open space.

The LAP acknowledges that the success of the area is dependent on the availability of a good range of accessible, high quality community facilities and amenities. It states that future residential communities within the LAP area will require commensurate social infrastructure that can remain viable. It recognises that Shanganagh Castle offers an excellent opportunity to create both indoor and outdoor community space which could include a heritage function. Objective S3 of the LAP seeks to restore / rehabilitate Shanganagh Castle, as appropriate and feasible, with the provision of an appropriate mix of publically accessible community focused uses. In the interim and until such time as Shanganagh Castle falls into the ownership of the applicant and a comprehensive plan is put in place, the proposed development provides for a playground, new public Square, woodland walks and kick about areas.

Further, in accordance with Objective BH3, the proposal seeks to ensure that the architectural and historic significance of Shanganagh Castle is protected, conserved and enhanced, through the sensitive design and siting of the residential units

The LAP acknowledges that the Site Framework Strategy seeks to re-instate key views to and from Shanganagh Castle. The woodland and the pond west of the Castle are the most significant remains of the original landscaping scheme as shown on the 1837 OS Map (See Map 12) and these have been conserved and enhanced as part of the development proposal.

A site framework strategy is contained within the LAP consisting of:

- A series of Guiding Principles,

- Key Site Objectives for urban design, density, land-use, public realm and open space, community facilities and infrastructure
- A plan layout of the site which sets out the location of key routes, open spaces and facilities, and an indicative block layout (Site Framework Map).

The site framework strategy has provided the guiding principles for the proposed development and the scheme has been designed in full accordance with those principles. Careful consideration has been given to the emerging network of pedestrian and cycle linkages, to ensure that it positively contributes to and improves linkages and connectivity.

Density has been influenced on site having regard to Section 5.2.5 of the LAP and the NTA's Strategy relates to the DART Expansion Programme. Woodbrook is one such site identified as a location on the South-Eastern Line. Objective T3 of the LAP seeks the early delivery of the planned DART Station in order to establish sustainable commuting and travel patterns at the outset as an integral element of a newly emerging sustainable community. Further, the NTA's 2016-2035 Transport Strategy for the Greater Dublin Area makes provision for extension of the Luas Green Line from Cherrywood to Bray Environs as part of the longer-term strategy for Light Rail Network. It is acknowledged, however, that any extension of the Luas from Cherrywood will be contingent on, and subsequent to, the Luas Green Line being upgraded to Metro in order to provide the necessary passenger capacity, as set out in the NTA Strategy. The CDP (Table 2.2.4) and the LAP (Objective T4) also identifies an interchange between Suburban Rail (DART) and QBN (Quality Bus Network) at Woodbrook, as one of primary public transport interchanges to be developed in the County during the lifetime of the Plan

3.5 SUPPORTING POLICY SUMMARY

Residential development on the subject site has significant support at national, regional and local level. Identified as a 'Major Urban Housing Delivery Site' by the Department of Housing Planning Community and Local Government (DHPCLG), the site was earmarked for the provision of 1,500 units in the short term.

Within the Regional Spatial and Economic Strategy for the Eastern & Midland Region, the MASP specifically identifies the North – South Corridor (DART Expansion) as growth facilitator and states that the DART Expansion Programme will increase capacity to support ongoing development of lands to the south to Woodbrook – Shanganagh

At a local level, the Dún Laoghaire-Rathdown County Development Plan 2016 - 2022 (CDP) identifies Woodbrook as a future development area in the core strategy settlement structure. The CDP states that there is potential for an additional 2,300 residential units in Woodbrook – Shanganagh having regard to the extent of land that is zoned. The Woodbrook – Shanganagh Local Area Plan 2017 – 2023 further supports this approach and puts in place the necessary design and delivery parameters to guide development on the subject site. It is these design and delivery parameters that have heavily influenced the design approach to development on the site.

The assessment demonstrates how the proposed development is concurrent with land use planning and strategic planning at national, regional and local level. The documents confirm that the proposed

residential development will contribute to the economic and sustainable development of the region. The planning policy assessment brings forth the conclusion that the location, nature and function of the proposed development is in accordance with relevant plans and policies and should as a result be deemed acceptable in principle at the proposed location.

3.6 REFERENCES

Department of Housing Planning Community & Local Government, National Planning Framework 2018

Department of Public Expenditure & Reform, National Development Plan 2018

Rebuilding Ireland – Action Plan for Housing and Homelessness

Sustainable Urban Housing: Design Standards for New Apartments 2018

Sustainable Residential Development in Urban Areas Guidelines 2009

Urban Development and Building Heights – Guidelines for Planning Authorities 2018

Regional Spatial and Economic Strategy for the Eastern & Midland Region

Greater Dublin Area Transportation Strategy 2016-2035

Dun Laoghaire Rathdown County Development Plan 2016 - 2022

Woodbrook – Shanganagh Local Area Plan 2017 - 2023

CHAPTER FOUR PROJECT SCOPING & CONSULTATION

4.1 INTRODUCTION

Informal project scoping has been undertaken to inform the development project. Consultation was undertaken with statutory consultees and relevant Departments within Dún Laoghaire - Rathdown County Council to draw on local knowledge and experience of the Shankill / Shanganagh area and to identify issues of particular environmental significance.

The purpose of the informal scoping process was to establish aspects of the environment to be considered in the Environmental Impact Assessment Report (EIAR) and in particular those sensitive aspects requiring more in-depth study. The exercise has resulted in an iterative design process, such that the proposal and design has been modified to address the concerns of statutory consultees.

4.2 INFORMAL SCOPING

4.2.1 Scoping Approach

Mandatory scoping is not a requirement under the European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018, although provision is made for formal scoping with An Bord Pleanála under Article 171(1) of the Planning & Development Regulations 2001 – 2019 (the Regulations).

Formal scoping with An Bord Pleanála under Article 171(1) of the Regulations was not undertaken, although statutory authorities with a potential interest in the project were contacted. This comprises informal scoping where the sole intent is to gather as much information as possible relating to the site and development proposal.

The project was initially scoped with the applicant and within the design team based on the expertise and past experience of the EIAR contributors for similar projects. Existing structures and features on site and the cultural history of the site as detailed in Chapter 2.0 and Chapter 15.0 informed the overall approach to development.

The scope of the EIAR, conducted in respect of the proposed development, has had regard to the following statutory and guidance documents:

- Statutory requirements of the Planning and Development Act 2000, as amended and the Planning and Development Regulations 2001 - 2019;
- Environmental Impact Assessment of Projects: Guidance on Scoping, European Commission, 2017;
- Guidelines on the Information to be contained in Environmental Impact Statements and Advice Notes on Current Practice in the Preparation of an EIS both published by the Environmental Protection Agency 2003;

- Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports, August 2017;
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment August 2018, Department of Housing Planning & Local Government;
- The requirements of Dun Laoghaire Rathdown County Development Plan 2016 – 2022 (CDP);
- The requirements of Woodbrook – Shanganagh Local Area Plan 2017 – 2023 (LAP); and
- The likely concerns of other third parties.

4.2.2 Initial Scoping Request

Initial scoping by the design team was supplemented by a written request for information to a number of statutory and non-statutory consultees in January 2019. The consultees were provided with information on the site and the proposed development including a set of preliminary drawings and the overall site masterplan. The purpose was to gather any relevant information that they may have had on the site. Further they were invited to highlight any issues that they felt should be addressed within the scope of the EIAR. A copy of the letter and associated drawings is detailed in Appendix 4.1.

Contact was made with fifteen consultees as detailed in Table 4.1. Six responses were received including submission from four consultees and acknowledgements from two.

Consultee	Type of Response
1. Department of Housing, Planning and Local Government	No Response
2. Department of Communications, Climate Action and Environment	Response received from <ul style="list-style-type: none"> ▪ Geological Survey of Ireland ▪ Inland Fisheries
3. Department of Culture, Heritage & the Gaeltacht	Response Received from <ul style="list-style-type: none"> ▪ DCHG Archaeology
4. Dún Laoghaire - Rathdown County Council Planning Department	Response Received
5. Environmental Protection Agency	Acknowledgement
6. Office of Public Works	No response
7. Eastern & Midland Regional Assembly	No Response
8. Department of Transport, Tourism and Sport	No response
9. National Transport Authority	No response
10. Heritage Council	Acknowledgement
11. An Taisce	No response
12. Failte Ireland	No response
13. Transport Infrastructure Ireland	Response Received
14. Irish Water	No Response
15. Birdwatch Ireland	No Response

Table 4.1 List of Consultees

4.2.3 Initial Scoping Response

Although the scheme has evolved significantly since the original scoping requests were issued in January 2019, the responses nonetheless have informed this EIAR. A copy of the responses received are detailed in Appendix 4.2 and a summary of the issues raised are provided below.

Geological Survey of Ireland

The submission noted a County Geological Site (CGS) located within 1km of the site, namely Killiney Bay but acknowledged the development would have no impact. It requested that the sites location within an area of High Groundwater Vulnerability be considered in the EIAR.

In response the issue of High Groundwater Vulnerability has been comprehensively addressed in Chapter 9.0 Hydrology & Hydrogeology.

Inland Fisheries

The submission advises that salmonid waters constraints apply to any development in this area. The disturbance of any riparian habitats should be minimised. The EIAR should address the likely impact on the treatment process at the Shanganagh Wastewater Treatment Plant including any impacts on the Wastewater Discharge Authorisation. An Invasive Species and Biosecurity Plan should be included to treat and manage identified invasive species onsite. Best practice should be implemented at all times in relation to any activities that may impact on surface water.

In response Chapter 7.0 Biodiversity assesses the impact of development from a biodiversity perspective. Notwithstanding that no invasive species were identified on the site, Chapter 7.0 nonetheless recommends the preparation of a Biosecurity Plan to manage and control winter heliotrope on site. Chapter 16.0 Material Assets – Water Services deals with the disposal of wastewater from the site and the agreement in place from Irish Water in respect of same, which confirms capacity in the system. The Old Connaught – Woodbrook water supply and sewerage schemes which would serve the long term water supply and drainage needs of the LAP area are included in Irish Waters Capital Investment Programme 2017 – 2021.

Department of Culture Heritage & the Gaeltacht – Archaeology

An archaeological assessment of the development was recommended. Recognising the protected structure nature of the castle, the submission recommends that the effect of any development on the setting of the castle requires careful consideration in the EIA. The submission states that a major mitigatory element of the zoning in the LAP is to be the socially beneficial repair and reuse of the castle. It highlights the fact that the castle is not included in the application for approval and therefore departs from the LAP. It recognises the challenges of proposing a housing estate at Shanganagh Castle requires architectural conservation skills to be central. It also recognises that a development must genuinely protect and enhance the castle while providing an appropriate quantum of housing for local needs.

In response, Chapter 12.0 Archaeology & Cultural Heritage undertakes an archaeological assessment of the site including a Geophysical Report. In recognition of the protected structure status of the castle and its demesne landscape, Chapter 13.0 Architecture & Cultural Heritage assesses the proposed development from a cultural and built heritage perspective.

It is noted that the LAP does not require the castle to be developed in conjunction with the residential element of the site. In fact, the LAP acknowledges that the Shanganagh site which is in Council ownership will make a significant contribution to the housing stock in the county. Whilst there is an objective in the LAP to refurbish and re-use the castle, such works are not tied to the delivery of housing.

Accordingly, contrary to the submission the application for approval does not depart from the LAP. Further, the castle is not included in the current application for approval because it is not yet in the ownership of the applicant. As detailed in Chapter 17.0 Built Services & Waste Management, the castle is part of a tripartite land swop which is not likely to be resolved until Q2 2020. Until such time as the castle is in the ownership of the applicant, no development can take place. However, it should be noted that a multi-disciplinary steering group has been assembled to manage the integration and refurbishment of the Shanganagh Castle and building. Currently the team is gathering site / building analysis information and is developing a strategy of reuse and integration for the Castle and its building that accords with the objectives of the Local Area Plan in the context of the wider community, the proposed Shanganagh residential development and the surrounding high amenity park lands.

Dún Laoghaire-Rathdown County Council Planning Department

The Planning Authority's submission provides a comprehensive overview of relevant planning policy guiding development on the area and notes the sensitivities of the site. It requests that the Woodbrook scheme, which was at pre planning stage with An Bord Pleanála at the time, be taken into consideration in terms of cumulative impacts. It also advised contacting a number of internal departments within the Council.

In response Chapter 3.0 Spatial Planning Policy acknowledges the planning policy at national, regional and local level supporting the principle of development on the site. Each chapter within this EIAR assesses cumulative impacts arising from neighbouring permitted developments and includes consideration of the proposed development on the Woodbrook lands. Finally, individual specialists contributing to environmental issues within the EIAR have individually contacted various departments within the Council.

Transport Infrastructure Ireland

Transport Infrastructure Ireland's (TII) submission provided only general guidance for the preparation of EIAR. TII recommends that a Traffic & Transport Assessment (TTA) be carried out and that provision should be made for travel planning / mobility management. TII also requested that it be determined if a Road Safety Audit is required.

In response Chapter 15.0 Material Assets – Traffic & Transport confirms that a TTA and Road Safety Audit were prepared and accompany the application for approval. Further a Travel Plan has been prepared. All studies were undertaken in consultation with the Transportation Planning Section of the Council.

4.2.4 Further Scoping

Following the initial informal scoping process, the development proposal was amended to satisfy a revised development brief and to provide for greater density in accordance with national policy as detailed in the National Planning Framework (NPF) and national guidance.

Given the sensitivities of the site further consultation was undertaken with the Department of Culture Heritage & the Gaeltacht. A revised proposal accompanied by an overall masterplan approach was submitted to the Department (see Appendix 4.3). Two responses were received from the Department including Nature Conservation and from Built Heritage (see Appendix 4.4).

Department of Culture Heritage & the Gaeltacht – Nature Conservation

The Department recommends that the EIAR should include information on the occurrence of a number of protected species on the site including bats, badgers, other protected species, bird species and amphibian species.

In response Chapter 7.0 Biodiversity comprehensively surveys and assesses all protected species on site in the context of the development proposal.

Department of Culture Heritage & the Gaeltacht – Built Heritage

The Department reviewed the proposed development and commented on a number of areas. The Department recognises that the landscape has significantly changed over time. The report notes that the submission to the Department focused on archaeological heritage and age as opposed to the wider built heritage. It recommends assessment of the landscape setting as per the Architectural Heritage Guidelines for Local Authorities. The submission advises that greater regard must be had to the long term survival of Shanganagh Castle. It highlights that the loss of the parkland approach to Shanganagh Castle is of particular concern. Greater awareness of the special qualities and features of the surviving landscape are required. It recommends a number of mitigation measures.

In response, Chapter 12.0 Archaeology & Cultural Heritage and Chapter 13.0 Architecture & Cultural Heritage address both elements of the built heritage in an integrated and comprehensive manner, with a particular emphasis on Shanganagh Castle. Further a Landscape Architecture & Public Realm Design Report illustrates how and why key landscape features have been retained, enhanced and provided. Chapter 14.0 The Landscape, undertakes a landscape visual impact assessment of the development proposal.

The development proposal has also been revised to address a number of concerns raised in the submission. A significant number of trees have been retained at the entrance to the development proposal; along the castle access road; and along the eastern site boundary, thereby enhancing the parkland setting and screening the development proposal from the castle. Internal vehicular circulation has been reorganised to emphasise the curved route as the main access to the castle, which is aligned with the phasing. This allows the avenue to the south of Blocks B and C to be traffic calmed, thereby providing for an improved edge to the park. Further building heights have been reduced in contrast to the framework plan set out in the LAP.

4.3 INTERNAL DEPARTMENTAL CONSULTATION

Extensive internal consultation has been undertaken within Dún Laoghaire - Rathdown County Council at various stages throughout the development proposal. Consultation has been undertaken both formally and informally with the:

- Biodiversity Officer;
- Conservation Officer;
- Parks & Landscape Services Section;
- Drainage Planning Section;
- Transportation Planning Section;

- Infrastructure & Climate Change; and
- Planning & Human Resources Department

The proposed development has been adapted and refined in response to consultation with each of the departments and professionals detailed above. A number of additional detailed studies have been undertaken in support of the EIAR following from these consultations including the Geophysical Report (appended to Chapter 12.0) and a Hydrological Report focusing on the functioning of the Pond (detailed in Chapter 9.0); and a number of ecological studies.

Particular environmental issues further assessed on foot of these consultations include:

- Measures to protect and enhance newts;
- Restoration of the landscape demesne focused around the Pond;
- Retention of trees and in particular trees of heritage value which contribute to the landscape demesne;
- Modification to roadside boundary to allow for future provision of public transport enhancement works (Bus Connects);
- Reduced car parking provision to enforce modal shift and use of existing and future public transport; and
- Enhanced SUDS infrastructure proposals within the development.

A description of the development including the overall design approach is provided in Chapter 2.0 Project Description.

4.4 EXTENT OF STUDY

Following the informal scoping and consultation process all environmental topics have been comprehensively addressed within this EIAR including:

- Population and Human Health
- Biodiversity
- Land & Soils
- Hydrology & Hydrogeology
- Air Quality & Climate
- Noise & Vibration
- Archaeology & Cultural Heritage
- Architecture & Cultural Heritage
- The Landscape
- Material Assets - Traffic and Transport
- Material Assets – Wastewater & Surface Water
- Material Assets – Built Services & Waste Management

CHAPTER FIVE EXAMINATION OF ALTERNATIVES

5.1 INTRODUCTION

The presentation and consideration of various alternatives investigated by the project design team is an important requirement of the EIA process. This chapter of the EIAR document provides an outline of the main alternatives examined throughout the design and consultation process. This serves to indicate the main reasons for choosing the development proposed, taking into account and providing a comparison of the environmental effects.

This chapter should be read in conjunction with Chapter 3.0 'Spatial Planning Policy' as this provides the statutory and non-statutory support for development on the subject site, having regard to national, regional and local policy and objectives. It is this policy that dictates the types of use and extent of development on the site.

The Environmental Protection Agency's Advice Notes on Current Practice (in the preparation of Environmental Impact Statements) and, the Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA, 2017) suggests that 'alternatives' to the main reasons for choosing the proposed development, may be described at a number of levels including inter-alia; alternative locations, design/layout, processes and mitigation.

5.2 RATIONALE FOR THE PROPOSED DEVELOPMENT

The rationale for the proposed development is to provide for a new, high density residential neighbourhood on a site located adjoining and in proximity to existing and future public transport routes and modes. The intent is to deliver sustainable, mixed tenure units on a site identified as a 'Major Urban Housing Delivery Site' by the Department of Housing Planning Community and Local Government (DHPCLG) under Pillar 3 - Building More Homes of the Government's "Rebuilding Ireland – an Action Plan for Housing and Homelessness" and zoned, *"to provide for new residential communities in accordance with approved local area plans"* within the Woodbrook – Shanganagh Local Area Plan 2017 – 2023.

The key environmental and practical considerations which influenced the design of the proposed development and alternative locations and layouts on the landholding included the following:

- The need to achieve sustainable densities in accordance with national policy in the National Planning Framework; national guidelines Sustainable Residential Development in Urban Areas; and the objectives of the Woodbrook – Shanganagh Local Area Plan 2017 – 2023 (LAP), given the location of the subject site on the edge of Shankill Village, in proximity to Bray and proximate to existing and future public transport provision.
- The protected structure and built heritage status of Shanganagh Castle and Lodge located on adjoining lands and the importance of maintaining the integrity of both structures and the visual focal point of the Castle, notwithstanding development within the attendant grounds.

- The location of the site within and adjoining Shanganagh Park and its parkland setting. Whilst the Demesne landscape is still legible, it has been poorly maintained and is much curtailed by recent development. Nonetheless, it is these elements of cultural infrastructure, including its scenic approach, decorative pond and composed stands of trees, that underpin the development.
- The need to protect and enhance existing landscape features including the existing ornamental pond, trees of heritage significance and existing woodland, to ensure preservation and enhancement of the amenity and biodiversity of the area.
- Protection and preservation of existing natural habitats and species including bats, badger setts, birds, amphibian species (newts) and other protected mammal species, thereby preserving biodiversity.
- Protection of the residential amenities of adjoining housing in Castlefarm neighbouring the site to the north in the interest of human health.
- The quality of the urban environment to be delivered and the associated impact on human health.
- The need to maintain a riparian corridor between the proposed buildings and the boundary of the site adjoining the Dublin Road in accordance with the requirements of the LAP and specifically Objective SC31.
- Access, permeability and connectivity with surrounding areas and land uses and in particular connectivity to the proposed Woodbrook development in proximity to the site via a dedicated greenway through Shanganagh Park.
- Reduced on site car parking provision to encourage and facilitate modal shift to more sustainable modes of transport.

Notwithstanding the above, pursuant to Section 3.4.1 of the Draft 2017 EPA Guidelines, the consideration of alternatives also needs to be cognisant of the fact that *“in some instances some of the alternatives described below will not be applicable – e.g. there may be no relevant ‘alternative location’...”* The Draft 2017 Guidelines are also instructive in stating: *“Analysis of high level or sectoral strategic alternatives cannot reasonably be expected within a project level EIAR... It should be borne in mind that the amended Directive refers to ‘reasonable alternatives... which are relevant to the proposed project and its specific characteristics”*.

5.3 ALTERNATIVE LOCATIONS

Shanganagh Castle and surrounding lands of 11.3 hectares were sold by the Department of Justice following the closure of the prison in 2002. Dún Laoghaire - Rathdown County Council purchased 8.4 hectares and the 2.5 hectares housing the castle building and its gardens were sold to a private development company. As part of a long planned tripartite exchange of land within Shanganagh – Woodbrook dating back to 2006, the applicant is due to secure ownership of Shanganagh Castle and its gardens in the near future.

The landholding has been in the ownership of the applicant for a substantial period of time. The site represents a suitable location for residential development, adjoining established housing development in an accessible location, on a key arterial route into Dublin city and proximate to existing and future public transport provision. The site is well connected to Bray, Dún Laoghaire, Cherrywood and Sandyford, all of which contain large employment zones.

Woodbrook – Shanganagh is identified within the County Development Plan (CDP) Core Strategy as a 'Primary Growth Node' and also as a 'Major Urban Housing Delivery Site' by the Department of Housing Planning and Local Government (DHPLG). The land use zoning objectives as set out within Map 10 and 14 of the CDP and affords Zoning Objective A1 to the land, which seeks "*to provide for new residential communities in accordance with approved local area plans*", whilst Shanganagh Park and Cemetery are zoned Objective – 'F': "*To preserve and provide for open space with ancillary active recreational facilities*". A 'H' symbol has also been afforded to the subject site, which is indicative that the subject land has been identified as a County Council Housing Programme Site.

Prior to advancing the land for residential development, the landholding's ability to satisfy environmental criteria was considered and it was found to offer the following attributes;

- Adjoining existing residential development, within walking distance of Shankill town centre and adjoining a significant expanse of public open space in the form of Shanganagh Park, development of the landholding supported the principles of compact growth.
- The landholding's location within walking distance of established bus routes, some 2.1km from the existing DART station in Shankill and within 1km of a future station to be provided within the Woodbrook lands to the south. Residential development on the site would facilitate and encourage a modal shift from the private car to more sustainable forms of transport. This in turn would assist with achieving overarching environmental objectives such as improved air quality (CO₂, NO₂ and particulate emissions) and a reduction in noise pollution.
- The potential of the landholding to satisfactorily connect with and integrate into the existing parkland setting of Shanganagh Park and the positive impacts on human health arising from proximity of extensive recreational facilities and future benefits arising from implementation of the Park Masterplan.
- The potential of future residents to benefit from the provision of significant community facilities within Shanganagh Castle in the future as detailed in the LAP and the contribution that such facilities are likely to make to the wider community.
- The opportunity to visually unlock Shanganagh Castle to public view through the preservation of scenic vistas into the site and the potential to reintroduce and reintegrate a historic and culturally significant building back into the community.
- The landholding is not subject to any statutory nature conservation designations, but opportunities do exist to enhance biodiversity within the site.
- Given the Demesne landscape setting has already been altered and the proximity of adjoining residential development to the north, it was considered that the sites capacity to absorb development without significantly effecting the existing landscape and visual characteristics of the surrounding area is high.

- The zoned, developable area of the landholding is not located within an area identified as susceptible to flooding.

In light of the foregoing and following consideration of environmental and planning factors at a high level, including its established zoning, it was considered that the landholding is an appropriate location for residential development from an environmental perspective. The proposal adopts a plan led approach to development and seeks to provide for much needed housing, including social housing, in accordance with national, regional and local policy and guidance documents.

5.4 “DO NOTHING” ALTERNATIVE

In the event of the ‘do-nothing’ scenario, the existing use of the landholding, primarily as a Park’s Maintenance Depot, would continue.

The CDP proposes a neighbourhood framework based on the provision of a high-density urban form that maximises the use of existing and proposed transport infrastructure and aims to reduce the need to travel. It proposes two distinct urban nodes - one at Woodbrook and one on the subject site. The CDP confirms that the lands, when fully developed, will accommodate an additional 5,000 to 6,000 persons in approximately 2,000 to 2,300 units. Failure to develop the subject site would result in failure to comply with the core strategy and a key objective of the CDP and LAP to deliver new housing in proximity to existing and new public transport routes and modes.

The additional pedestrian and vehicular traffic movement that would be generated by the proposed project would not require to be catered for on the local network in a ‘do nothing scenario’. Similarly, the additional demand / support for local infrastructure, services, and businesses would not be generated by any new population on site; nor would local housing demand be catered for. Proposals to upgrade existing public infrastructure including the provision of a new DART station at Woodbrook would not be supported with additional population which may be necessary to support the viability of such infrastructure.

From an environmental perspective, beyond impact on human health from a failure to deliver sustainable residential development to meet housing and community development needs and further sustainable development based on alternatives to travel by private car, a ‘do nothing’ approach is otherwise likely to result in a neutral impact on the environment in respect of material assets, land, water, air, climate, cultural heritage, biodiversity and landscape.

Ultimately, a ‘do-nothing’ scenario was considered to represent an inappropriate, unsustainable and inefficient use of these strategically positioned, zoned, urban lands.

5.5 ALTERNATIVE PROCESSES

The proposed construction works comprise relatively standard building construction processes. As such there are no specific alternative construction processes identified in this EIAR.

No new, unusual or technically challenging operational techniques are required to ensure the development, as designed, can function as a sustainable community. The Energy Strategy for the site did explore a number of alternative processes for the site and this is detailed in Appendix 2.1. There are no other new alternative operational processes to consider.

5.6 ALTERNATIVE DESIGNS

A number of site layout and alternative designs were considered during the design process, with further minor design alterations taking place following receipt of informal consultation opinions from the Prescribed Bodies and Internal Departments within Dún Laoghaire – Rathdown County Council.

No further alternatives to the nature, design and layout of this project have been identified in the preparation of this EIAR, as a result of potential significant adverse impacts on the environment arising at planning design stage. The mitigation measures detailed within the EIAR do not require changes to the design and layout of the proposed residential scheme. The EIAR provides reasonable evidence that the proposed development can be accommodated on the subject site without predicted risk of significant adverse impact on the environment, subject to the identified mitigation measures at construction and operational stages being implemented.

5.6.1 Iterative Design Approach

The design approach for the proposed development is presented in the Architectural Design Statement prepared by the project architects, ABK Architects and it should be considered in conjunction with this chapter of the EIAR.

Cognisant of the fact that the proposed development is within the curtilage of a protected structure, the development seeks to work with the remains of the existing picturesque landscape established in the early 19th century while adhering to the design principles set out in the LAP. In summary, the design logic is intended to facilitate the establishment of a central visual axis or ‘view corridor’ focused on Shanganagh Castle together with secondary views and vistas to landscape features within and beyond the site within Shanganagh Park. The scheme design is informed by the existing landscape and topography and it is those elements of cultural infrastructure, including scenic approaches, the decorative pond and woodland setting, that underpins the development.

The subject proposal evolved during the design phase in response to input from the appointed EIAR team, advice received from internal departments within Dún Laoghaire-Rathdown County Council, consultation with Elected Representatives and compliance with statutory guidelines and legislation. This iterative process inter alia highlighted environmental matters that informed the consideration of alternative layouts and designs up to the formalisation of the final scheme which is now being submitted to An Bord Pleanála for approval. The significant issues highlighted included:

- Open space provision, landscape masterplanning and preservation of key elements of the Demesne landscape;
- Traffic and transportation and the need to encourage modal shift;
- Addressing the issues of population and human health in a city environment and the need to accommodate sufficient services and facilities;
- Biodiversity and the preservation of natural habitats including the existing newt population;

- Sensitive design respective of the significance of Shanganagh Castle.

5.6.1.1 Initial Masterplan Concept

A masterplan concept was prepared for the site as detailed in Figure 5.1 closely adhering to the development principles in the LAP.

The block plan layout was developed around a central spine road, with the scale of development ranging from 2 – 6 stories in height. The central spine road was fronted by 4 storey blocks to the north and by 5 - 6 storey apartment blocks to the south. A significant number of car parking spaces dominated the site in compliance with the car parking standards set out in the CDP. A total of 541 no. units comprising 145 no. houses and 396 no. apartments were proposed on the site at a density of 56 no. unit per hectare (gross) and 71 units per hectare (net).



Figure 5.1 Initial Masterplan Layout

Following completion of the masterplan layout, the development proposal was re-considered having regard to the need to respect the setting and context of Shanganagh Castle. Further the development proposal was required to react to the demonstrable need for housing in the area; national planning guidance and policy; and the level of infrastructure investment being made to support sustainable, residential development within the Woodbrook – Shanganagh area. The masterplan layout was not considered to make the most efficient use of valuable urban land and increased density was sought in order to achieve a sufficient density of development to sustain efficient public transport networks and viable community facilities.

Re-consideration of the masterplan layout was necessitated having regard to the need to respect the setting and context of Shanganagh Castle. Specifically, the masterplan required amendment to address the following cultural heritage and other environmental issues:

- Acknowledge and utilise the historic arching driveway route to the castle;
- Respect the ornamental and historic pond by siting buildings further away;
- Break down the grid and hard edges to the park perimeter;
- Reduce the insistence of the axial route;
- Enhance the views of pond/gate lodge/woodland/castle and reveal in a picturesque manner;
- Further seek to protect and preserve existing trees and the natural woodland setting through the redesign and re-siting of some buildings;
- Connectivity within and through the development including linkages across Shanganagh Park to Woodbrook; and
- Provision of useable open space within the development but integrated into Shanganagh Park.

5.6.1.2 Revised Design Proposal

The design was revised to take the aforementioned comments into consideration and resulted in an increase in the number of units to 598 no. including 51 no. houses and 547 no. apartments. The density of development increased to 62 units per hectare (gross) and 85 units per hectare (net). Furthermore, a creche was introduced to serve the needs of future residents, along with a local retail unit and a café.

Specifically, the development was revised to maintain the historic arching driveway to the north, whilst maintaining the central axial route as originally depicted within the LAP. The ornamental pond was afforded a greater buffer from the proposed buildings and the scheme was modified to retain more trees and woodland on site. Car parking was significantly reduced on site to reduce the dominance of the car and to encourage and facilitate a change in modal split amongst future residents.



Figure 5.2 Revised Design Proposal

Whilst the revised development proposal significantly improved the scheme from an environmental perspective and in particular from a cultural heritage perspective, there still remained some concerns from a cultural heritage and landscape perspective. These areas included:

- The elongated nature of Block C and the associated visual impact on the approach to Shanganagh Castle and on Shanganagh Park;
- Loss of prominence and status of the historic arching driveway which is one of the few remaining landscape features of the 18th century; and
- Loss of historic trees to the north of the site which are of cultural and historic value

5.6.1.3 Final Design Proposal

The scheme was modified to take the aforementioned three points into consideration and this resulted in the loss of one unit. The scheme as finalised proposes 597 no. units including 51 no. houses and 547 no. apartments. Density remains at 62 units per hectare (gross) and 85 units per hectare (net).

The long Block C has been subdivided into two separate blocks. The massing of Block B shifts back for the four storey terrace to enable further reading as three separate elements along the length of Blocks B and C. This also provides a vertical stepping and variety which is enhanced by the sloping topography along the avenue. The prominence of the historic arching driveway has been acknowledged and further promoted through prioritisation of traffic. Buildings on the northern site boundary were reconfigured to ensure the retention of 2 no. trees of cultural and historic significance.



Figure 5.3 Final Site Layout Plan

The final design presents the most effective utilisation of this significant site, fulfils the requirements of the LAP and provides for much needed social, affordable and cost effective housing. To summarise it is considered that the final layout:

- Advances the strategic and statutory objectives applicable to these lands and the wider area;
- Optimises development space within the overall site, in an efficient and sustainable manner.
- Facilitates the introduction of long-term public transport infrastructure (Bus Connects) to the area, which can be incorporated into future infrastructural networks.
- Facilitates ready access to all parts of the scheme and the future development of Shanganagh Castle for community purposes;
- Avoids significant environmental impacts;
- Enables extensive economic development through both employment created at construction and operational stages;
- Provides much-needed housing in an area characterised by very slow housing growth; and
- Encourages the use of public transport and provides pedestrian and cycle links throughout to minimise car usage within the scheme.

The final iteration of the scheme is not considered to give rise to any significant adverse environmental impacts. Mitigation measures to be implemented at construction and operation stages of the project are detailed within each Chapter of this EIAR and are summarised in Chapter 19.0 Summary of Mitigation Measures.

5.6.2 Summary of Design Amendments and Environmental Improvements

Throughout the iterative design process a number of issues were highlighted that are relevant to the environmental performance of the scheme. These are set out in Table 5.1 below.

Issues Raised	Design Response	Environmental Improvements
Redesign of scheme to provide for increased density and maximise number of units to be provided. Increase provision of useable open space and seek to retain more features of historic demesne landscape	Increase in number of apartments provided and a decrease in the number of residential units. Reconfiguration of layout and design to provide for more useable open space connected with Shanganagh Park and to afford a greater buffer between the pond and proposed buildings. Retain existing arched driveway and trees of cultural significance.	<p>Population & Human Health</p> <p>The design amendments resulted in;</p> <ul style="list-style-type: none"> ✓ Additional units with an emphasis on provision of affordable and social units to meet housing demand. ✓ Increased provision of localised play areas and public spaces which creates a sense of security and identity for future occupants and the public. ✓ enhanced quality of place and animation of the public realm and open space. ✓ Natural overlooking of green spaces and public roads thereby creating safe, healthy and useable areas. <p>Landscape & Visual</p> <p>The reorientation of buildings contributes to;</p> <ul style="list-style-type: none"> ✓ a positive streetscape character, with building frontages and entries onto the surrounding road network.

		<p>✓ Allows a greater buffer to the ornamental pond enabling integration into the overall demesne landscape</p> <p>✓ Facilitates greater retention of trees and existing woodland</p> <p>Cultural Heritage</p> <p>✓ Reinforces and strengthens the relationship between the site and Shanganagh Castle through the retention of greater elements and features within the historic demesne.</p> <p>✓ Facilitates greater screening between the proposed development and Shanganagh Castle through retention of an existing hedgerow to the east of the site along an old established field boundary.</p> <p>Biodiversity</p> <p>✓ Enhances the environment and landscape setting for newts and other sensitive species on site through the maintenance of buffer areas and the significant retention of trees and hedgerows.</p>
Reorientation and reconsideration of massing of residential blocks to maximise residential amenity and energy efficiency	Revised street and block layouts to provide a north-south alignment in so far as possible in order to maximise solar gain within the units. Provide for a centralised energy system to serve the entire apartment development.	<p>Climate Change</p> <p>✓ The incorporated design amendment improves solar gain within the proposed scheme. This in turn improves the energy efficiency of the development thus minimising energy use and in turn decreasing Greenhouse Gas Emissions associated with the combustion of fossil fuels.</p>
Provide for greater connectivity between the development, Shanganagh Park, the proposed Woodbrook Scheme and the surrounding area	Provision of a new greenway through Shanganagh Park, accommodating pedestrian and cyclists to connect the proposed development with Woodbrook. Provision is also made for links in the future with the adjoining Castlefarm development to the north.	<p>Human Health</p> <p>✓ Improved linkages and increased permeability promote walking and cycling.</p> <p>Climate Change/Air Quality</p> <p>✓ Increased connectivity allows for greater access to alternative modes of transport including cycling, walking and rail transport in the future thus reducing the need for trips by car which in turn reduces emissions and benefits local air quality.</p>
Reconsideration of the street layout and hierarchy to provide a neighbourhood with good legibility, respective of its surrounds in an area of cultural heritage significance.	<ul style="list-style-type: none"> • Reintroduction of existing arched driveway as the primary entrance to the Castle • Inclusion of a public plaza central to the development in front of Block E • Inclusion of a network of pedestrian routes through the scheme. 	<p>Population & Human Health</p> <p>✓ Inclusion of a well considered public urban square will contribute a sense of identity and place to the proposed scheme thereby enhancing quality of life for future users.</p> <p>✓ Inclusion of a network of pedestrian routes through the scheme and connecting with the wider area will have direct public health benefits.</p>

		<p>Biodiversity</p> <p>✓ The inclusion of extensive tree planting within the proposed public park and the retention of hedgerows will provide a habitat for wildlife and will enhance biodiversity within the proposed development.</p> <p>Cultural Heritage</p> <p>✓ Respects the setting and context of Shanganagh Castle and the historic demesne landscape</p>
Reduction in car parking provision to encourage more sustainable forms of public transport	Significant reduction in car parking provision from original 727no. car parking spaces to 368 no. car parking spaces and a significant increase to 1,304 bicycle spaces.	<p>Climate Change</p> <p>✓ Pedestrian and cycle routes and the future provision of enhanced public transport infrastructure will offer a more sustainable lifestyle and an alternative to the use of the car to travel to work thereby reducing greenhouse gas emissions.</p>

Table 5.1 Design Amendments & Environmental Improvements

In summary, the scheme has evolved from its original form and the consideration of alternative designs has resulted in significant environmental improvements in terms of the landscape and visual contribution that the proposed development will contribute.

The comprehensive landscape plan will contribute to improved biodiversity and mitigates against the effects of climate change. Human health will benefit from the prioritisation of pedestrian and cycle linkages to the wider area and the integration of Shanganagh public park will provide an additional level of amenity provision to those residing within the development and the wider area.

5.7 ALTERNATIVE MITIGATION MEASURES

The mitigation measures outlined in the various chapters are considered appropriate to the location, nature and extent of the project and its potential impacts. As such, no alternative mitigation measures were considered.

5.8 CONCLUSION

Having examined various reasonable alternative designs, it is considered that the proposed design is a preferable option in terms of the sustainable development of the subject site.

The juxtaposition of blocks of development, settled within existing woodlands and mature trees and sited within an urban plaza and pockets of open space will assist in the place-making of the proposal and will contribute to fostering strong connections between the new population on site and the wider community. The current design achieves a strong mix of residential units capable of accommodating a diversity of tenures. The development presents a strong urban form to the Dublin Road and achieves appropriate higher density, but yet opens up intermittent views of the Castle which were not available

heretofore. The development through the promotion of higher residential densities. will contribute to the achievement of adequate critical mass capable of supporting new public infrastructure

5.9 REFERENCES

National Planning Framework, Department of Housing, Planning & Local Government

Woodbrook – Shanganagh Local Area Plan 2017 – 2023

Environmental Protection Agency's Advice Notes on Current Practice (in the preparation of Environmental Impact Statements)

Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA, 2017)

CHAPTER SIX POPULATION & HUMAN HEALTH

6.1 INTRODUCTION

There are a wide range of issues which may impact on population and health. The purpose of this chapter is to identify and assess the potential health and wellbeing effects of the proposed development on the surrounding population, and to deliver evidence-based recommendations that maximise health benefits and reduce or remove potentially negative impacts.

The Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA, 2017) suggests that; *“the assessment of impacts on population and human health should refer to the assessments of those factors under which human health effects might occur, as addressed elsewhere in this EIAR e.g. under the environmental factors of air, water, soil etc.”*

In the application of this approach, consideration of the potential impacts of the proposed development on population and human health might therefore arise from a number of variables. For example; traffic and transportation, townscape and visual (landscape), water quality, cultural heritage and biodiversity. These aspects are dealt with in the specific chapters in this EIAR which are dedicated to those topics. This Chapter refers to the findings of those assessments included elsewhere in this EIAR which human health effects might occur.

In addition to human health considerations, this chapter will assess the impacts the proposed development will have on; (i) Demographics, (ii) Employment, and (iii) Community, with specific regard to economic activity, social considerations, land-use and health & safety.

The principal receptors that may be impacted by the proposed development include residential receptors; direct and indirect economic receptors; social and community facilities; and the transient population.

6.2 ASSESSMENT METHODOLOGY

The baseline information was gathered using desk top analysis of available mapping and aerial images; visits to the site and the surrounding area; analysis of census of population data; review of relevant documents; and a review of comments from statutory bodies and the public during the consultation process.

A desk top analysis of current census data from the Central Statistics Office (CSO) and other national databases (see Section 6.9 for references) was undertaken including an assessment of demographic and employment figures.

Census information at National, Settlement and District Electoral Division (DED) were utilised, as detailed in Figure 6.1. Data relating to the economic, demographic and social characteristics of the District Electoral District (DED) within which the subject site is located – Shankill Shanganagh, were examined. In addition, the adjoining DED's of Shankill Rathallagh and Shankill Rathmichael were

included in the data analysis, as these two electoral districts effectively encompass the entirety of the Shankill settlement area and hence provide a more accurate reflection of the current economic, demographic and social trends relevant to the subject site and development.

A land use analysis informed the location of potential receptors, whilst a study of the health and safety element of operations on adjoining lands contributed to an understanding of the potential risks associated with the proposed development.

6.3 RECEIVING ENVIRONMENT

This section provides an overview of existing demographics, health status of the area, and the location of potential receptors. It should be noted that the description of the baseline environment of those factors under which human health effects might occur has been addressed elsewhere in this EIAR, under the environmental factors of traffic and transportation, townscape and visual (landscape), water quality, cultural heritage and biodiversity.

6.3.1 Economic and Employment Activity

National Outlook

The CSO's Quarterly Labour Force Survey (which has now replaced the Quarterly Household Survey) for Q2 2019, indicated that there was an annual increase in full-time employment of 2.2 per cent or 45,000 in the year to the second quarter of 2019, bringing total employment in the State to 2,430,800. This represents an annual increase of 1.3 per cent or 31,400 in employment over the year.

Unemployment decreased by 13,600 (-9.4%) in the year to Q2 2019 bringing the total number of persons unemployed to 130,800. Employment increased in 11 of the 14 economic sectors over the year. The largest rates of increase were recorded in the *Transportation and storage* (+8.6% or +8,400) and in Education (+7.8% or 13,000) sectors.

The ESRI Quarterly Economic Commentary for Summer 2019 states that as the Irish economy is expected to grow by 4 per cent in 2019 with a slowdown in growth to 3.2 per cent anticipated in 2020. It notes that the continued strong growth in household spending is being driven by the increase in employment, increasing disposable incomes and improvement in household balance sheets.

The above sources demonstrate that the national economy and employment levels are expected to improve further through 2019 and beyond into 2020. The Government is and has been faced with the challenge of sustaining economic activity and competitiveness during a period of near full employment and high on the agenda is the supply of residential dwellings to feed the increased demand for residential dwellings particularly within the Dublin region.

Local Outlook

To understand employment and economic activity at a local level, reference is made to the Census of Population 2016. The economic status of persons aged over 15 in 2016 provides an indication of the available workforce in the area and the overall vitality of economic life in the settlement. Within the settlement of Shankill (comprising 3 DED's), of the 11,453 people that are eligible for work almost 55 per cent are recorded as being in employment. Within the ED of Shanganagh, employment levels are

high (59%) when compared to the State (53%) and the administrative area of Dún Laoghaire - Rathdown (54%).

The unemployment rate in the wider Shankill area was 6% in 2016 which was higher than the administrative area of Dún Laoghaire - Rathdown at 4.3%, but below the State average of almost 8%. The percentage of the community that is retired at 10 per cent is also substantially below the State average of 14.5 per cent and the Dún Laoghaire - Rathdown area of 17 per cent. The number of students at 13 per cent is reflective of the trend in the wider Council area but the percentage of persons that stay at home to look after family is also higher in Shankill (11%) than the wider area of Dún Laoghaire - Rathdown and the State average, both which stand at 8 per cent.

Of those that do work in Shankill, a high proportion works outside the settlement. This assumption is supported by the travel to work / school / college data, which indicates that 43.5 per cent of people in Shankill spend over half an hour travelling to work / school or college. This figure is comparable to the wider administrative area of (42%) but is significantly higher than the national average of 31%. Overall, it highlights the need for people to travel significant distances outside of the settlement to secure work.

Notwithstanding the long distances travelled to work, some 57 per cent continue to travel by car with 27 per cent using public transport and 10 per cent walking or cycling. The use of public transport in Shankill is over twice the state average but the figure for those who walk or cycle to work is substantially less. These figures are significant in the context that the urban settlement of Shankill benefits from a DART station with an additional DART station proposed at Woodbrook less than 1km from the subject site. Looking at the ED of Shanganagh on its own, the use of public transport (28%) and those travelling by bicycle and on foot (11%) is only marginally higher than the wider settlement of Shankill.

6.3.2 Social Patterns

National Outlook

The CSO data illustrates that the population of the Irish State increased between 2011 and 2016 by 3.8%, bringing the total population of the Irish State to 4,761,865. The rate of growth slowed from 8.1% in the previous census, attributable to the slower economic activity in the early part of the census period resulting in a reduced level of immigration, albeit offset to a degree by strong natural increase. The economy has recovered in recent years with consequent population growth predominantly attributed to natural increase, greater economic activity, increased job opportunities and continued immigration.

Local Outlook

The Shankill Shanganagh ED in which the subject site is located had a population of 5,488 no. persons in 2016. This represents a population percentage change of 2.8 per cent or an actual population increase of 154 no. persons from the 2011 Census figures, well below the national average of 3.8 per cent.

When one also includes the adjoining electoral districts of Shankill Rathsallagh (ED 05061), which grew at a slower rate of 0.5% and Shankill Rathmichael (ED 05060) which grew by 5.0%, the total combined population growth rate for the settlement of Shankill was 3.1% between 2011 and 2016, which still remains below the national average. The population growth rate of these electoral districts is also lower than that recorded in the Dún Laoghaire - Rathdown Area, which grew by 5.7% over the same intercensal period.

The low population growth is likely attributable to the lack of available housing in the area and in particular the low delivery of new build units having regard to historical infrastructural deficiencies.

The age structure and dependency ratio of the population within the combined Shankill DED's and the Dún Laoghaire – Rathdown area is broadly similar to that of the State. Some 25 per cent of the combined Shankill DED's population and the Dún Laoghaire - Rathdown population is 18 years old or younger, compared to 26% of the State population. Similarly, whilst 14 per cent of the populations are over the age of 65 years in comparison to over 13% of the State population. The Dependency Ratio (i.e. those not in the workforce – aged 0-18 and over 65) within Shankill is 40 per cent similar to the State average. Accordingly, the demand for housing in Shanganagh and the surrounding area would be typical of that throughout the country.

Analysis of family cycle data within the Shanganagh ED shows that there are 1,530 no. families in Shanganagh with 73 per cent of those families with children. Of those families with children 58 per cent have two children or less and 15 per cent have three children or more. Again, these figures are typical of the State average and do not present any unusual influential factors in terms of unit size.

The Pobal Deprivation Index is Ireland's most widely used social gradient metric, which scores each small area (50 – 200 households) in terms of affluence or disadvantage. The index uses information from Ireland's census, such as employment, age profile and educational attainment to calculate this score. Whilst the Shanganagh ED is categorised as a 'marginally above average' area, it is noted that the subject site is within an 'affluent' area.

6.3.3 Housing Stock & Structure

National Outlook

Property price growth continued to decelerate into 2019 and is currently at its lowest rate since late 2013¹ and as of April 2019 the growth rate was just 3.1 per cent per annum. This is a considerable decline from the growth rate of 13.3 per cent seen earlier in the year. One explanation for this drop in price growth could be the increased number of new residential properties, which has continued to increase in 2019. Figures released by the CSO² show there was a 17 per cent increase in residential unit completions in the first half of 2019 compared to the same period last year. However, the Census figures do confirm that much of the development is focused in Dublin and the mid-East of the country, with more than half the completed dwellings in this area.

Across different types of dwelling, the divergence in growth rates between house prices and apartments has again narrowed in 2019³. There has been a marked deceleration in property price growth, down by over ten percentage points in Dublin since April 2018. Property price growth in the rest of the country fell at a slower pace over the second half of 2018 and this has continued into 2019. The CSO confirms that apartment building remains the smallest component of the building activity. Just 15.4 per cent of the dwellings completed in the second quarter of 2019 were apartments.

The Government's Rebuilding Ireland – Action Plan for Housing and Homelessness set a target to construct 25,000 homes annually to 2021 after housing completions across the State plummeted following the economic crash of 2008 with completions declining from almost 90,000 no. per year in

¹ Quarterly Economic Commentary – Summer 2019

² CSO: New Dwelling Completions – Quarter 2, 2019.

³ Quarterly Economic Commentary – Summer 2019

2007 to approximately 11,000 in 2014. The National Planning Framework in addition to the baseline provision of 25,000 homes annually to 2020, anticipates the need for 30-35,000 houses annually up to 2027. Within this output 112,000 households are expected to have their housing needs met in a social housing home over the next decade.

Local Outlook

Within the Shanganagh Woodbrook Local Area Plan, there are circa 31 hectares of residential zoned lands which at sustainable density levels have the potential to deliver circa 1,600-2,300 new homes across a range of tenure types and typologies.

The low levels of growth in housing completions between 2011 and 2016 is reflected in the similarly low rates of growth in household formation across the State and in particular in Shanganagh. (See Table 6.1).

Area	2011	2016	% Change 2011 – 2016
State	1,654,208	1,702,289	2.9%
Dun Laoghaire Rathdown	75,819	78,601	3.6%
Shankill Shanganagh	1,865	1,904	2.1%
Shankill Rathallsagh	1,098	1,134	3.3%
Shankill Rathmichael	1,892	1,939	2.5%

Table 6.1 Number of Households and Household Growth Rates (Source: CSO Census, 2016 – Annotated by HRA, 2019).

Low levels of household growth, coupled with continued population growth has also resulted in an increase in the average household size across the State, where growth in average household size has increased from 2.73 persons to 2.75 persons. The average household size in the electoral division of Shankill Shanganagh which is higher than the State average, grew from 2.90 persons in 2011 to 2.92 persons in 2016.

The number of vacant households in the three DED's of Shankill stood at 156 no. in 2016 excluding holiday homes and those that were temporarily absent. This represents 1.1% of the total number of households in these combined DED's. The figure is significantly below that of the wider Dún Laoghaire - Rathdown area, where 5.8% of housing units were recorded as vacant, and also significantly below that of the State-wide figure, which stood at 10.8% in 2016.

Of the 1,904 households in Shanganagh ED, 91 per cent comprise a house / bungalow with only 9 per cent comprising a flat / apartment. Most of these units were constructed between 1981 and 1990 with only 215 no. units constructed since 2001. Some 79 per cent of the units are owner occupier with 15 per cent rented from a private landlord and almost 4 per cent rented from the local authority or a voluntary housing authority. It can be concluded that the predominant unit and tenure type in the area is that of an owner-occupied house.

Social Housing Provision & Need

The Summary of Social Housing Assessments 2018 Report prepared by the Housing Agency counts the total number of households qualified for social housing support across the country on June 11th 2018. There was a 16.2 per cent decrease in the total number of households qualifying for social

housing support and whose social housing need is not being met between 2017 and 2018, with a total of 71,858 qualified households in 2018 compared to 85,799 in 2017. Over a quarter of all households qualified for support are waiting more than seven years for a social housing support. These national figures demonstrate the need for action and the supply of social housing right across the country.

The four Dublin Authorities (Dublin City, Dun Laoghaire Rathdown, Fingal and South Dublin) account for 43.4% of the national total. Single person households are the pre-dominant household grouping in need of social housing support.

Within the administrative area of Dun Laoghaire Rathdown, the number of households qualified for social housing support and whose social housing need is not being met, decreased by 13.1 per cent between 2017 and 2018 from 3,307 households to 2,843 households^[1]. However, 45% (1,306) have been on the list for 5 years or more.

The age bracket most affected is from 30-49 years which accounts for 55% (1,587) of those on the list. Over 50% (1,449) on the waiting list in Dún Laoghaire - Rathdown are single person(s) while 29% are single parents with child / children. Currently 35% (1,011) are renting privately with 25% (712) living with their parents, relatives or friends. The number in emergency accommodation increased from 3.5% (116) in 2017 to 6.9% (198) in 2018. These figures highlight the need for social housing in the area including the provision of affordable residential units.

6.3.4 Landuse & Settlement Pattern

Settlement Pattern

Located to the south-east of Dun Laoghaire-Rathdown, the subject site is positioned between Shankill Village and the settlement of Bray. The site is located adjacent to the coastline of the Irish Sea and is on a relatively flat coastal plain, set against the backdrop of the Dublin and Wicklow Mountains. The site is situated within the grounds of Shanganagh Castle, adjacent to Shanganagh Park and Cemetery and the existing residential settlement of Castle Farm.

Located 1km to the north is the established settlement of Shankill which largely consists of a more traditional village settlement pattern with a central main street – containing more localised shops and facilities – surrounded by relatively low density housing estates constructed through the seventies and eighties. A number of newer medium to high density residential developments, however, have been constructed in Shankill including for example – Olcovar, Aubrey and The Bridge.

Potential Receptors

Key potential receptors, to be assessed in this chapter, are identified in Figure 6.1 including residential development at Castle Farm, future identified residential development at Woodbrook, community development and recreational facilities including Shanganagh Castle and Park.

Residential Receptors

The majority of the population as expressed within the DED of Shanganagh and the surrounding DED's that comprise the settlement of Shankill reside within established residential neighbourhoods. Neighbouring the application site to the north is Castle Farm, an established mid density development

of semi-detached and detached units. Across the R119 to the west are multiple lower density detached units, some with independent access from the R119, located on land that is zoned as a greenbelt. Aughmore Lane halting site is also located off the R119, adjoining St. Joseph's Residential Care Home and across the road from the proposed access road to the development.

There is a cluster of 8 no. detached dwellings within Castle Farm which directly back on to the proposed development site. These houses are closest to the proposed development. Whilst there is a row of semi-detached units adjoining the site also within Castle Farm, these units are set back from the northern site boundary, substantially separated by an internal access road and green buffer with an extensive hedgerow and boundary planting.

In addition to the houses in Castle Farm there are two further residential units which are likely to be impacted by the proposed development, as they are accessed via the existing internal roadway currently serving Shanganagh Castle. These include Shanganagh Lodge (a protected structure) adjoining the R119 and another existing two storey house located to the rear of Castle Farm and the cluster of 8 no. detached units. Whilst the development proposal seeks to retain Shanganagh Lodge, the proposal seeks to demolish the other two storey dwelling served by the access road.

Much of the land immediately surrounding the subject site is zoned as greenbelt where it is an objective to protect and enhance the open nature of the lands between urban areas (Objective GB). Immediately east of the subject site is Shanganagh Castle, a protected structure. Notwithstanding that ownership of the castle has not yet been transferred to Dún Laoghaire - Rathdown County Council (but it is anticipated to be in the near future as part of a land swap necessary to facilitate the development of residential units at Woodbrook) a multi-disciplinary steering group has been assembled to manage the integration and refurbishment of the Shanganagh Castle and building. Currently the team is gathering site / building analysis information and is developing a strategy of reuse and integration for the Castle and its building that accords with the objectives of the Local Area Plan in the context of the wider community, the proposed Shanganagh residential development and the surrounding high amenity park lands.

South of the subject site, immediately beyond Shanganagh Park and cemetery, is the Woodbrook land which is zoned for the provision of new residential communities. A planning application was recently lodged with An Bord Pleanála under the legislative provisions of Strategic Housing Development (SHD) for 685 no. residential units, creche facility, distributor road and temporary car parking to facilitate future development of a new DART station. No decision has been made on the proposed development to date.

Commercial Receptors

There are a limited number of commercial service companies located within the immediate vicinity of the site, with much of the commercial and industrial operators located in the centre of Shankill some 1km north of the site. Immediately north west of the site adjoining Castle Farm and the subject site there is however, a cluster of commercial operations with a single access arrangement off the R119. Visually the cluster is ad hoc in appearance, with the single storey units appearing more industrial than commercial in nature. Uses on site include a café, retail services (laundrette and alterations) and retail units. It is noted that this land is zoned Objective A 'to protect and improve residential amenity'.

Saint Joseph's Residential Care Home and residential units are located to the west beyond the R119. Whilst the residential care home is located in excess of 100m from the access to the proposed development, the closest residential care unit is positioned some 35m west of the proposed entrance to the application site.

A number of indirect economic receptors have also been identified to include suppliers of construction materials required to complete the proposed development. It is not possible to identify these suppliers at planning stage as use of these suppliers will be dependent on detailed construction drawings and requirements.

Recreation Receptors

Shanganagh Park and its associated sports facilities, including Shanganagh Cemetery and proposed Crematorium are located adjoining the subject site to the south. A masterplan has been prepared for the park, to facilitate its development into a regional park for the benefit of not only the local community but also the wider area. The masterplan provides for a significant number of playing pitches, playground, access routes and links and facilitates increased levels of tree planting.

In addition to Shanganagh Park, Woodbrook Golf Course lies in proximity to the site, with the closest point located some 710m east of the application site. The golf course is separated from the subject site by the existing rail line. Beyond the golf course, also separated by the rail line is the sea and Shankill beach situated some 915m from the site.

Future Receptors

To identify potential future receptors a review was undertaken of permitted development in and around Shanganagh over the last five years (including extension of duration of previous permissions). A study radius of 1km was taken from the subject site. The details of this research are mapped in Appendix 6.1 and details of the planning permission are provided in Table 6.2.

Expiry	Planning Ref. No.	Description of Development
06/06/2020	D07A/1495	348 residential units, 1 retail & cafe. 10 year permission
27/04/2021	D15A/0683	Demolish gate lodge. Build 4 apartments.
19/12/2022	D17A/0065	Specialist hospital 56 in patients
07/09/2023	D18A/0198	3 detached houses
No expiry	PC/PKS/02/16	Part 8 application for a crematorium

Table 6.2 Permitted Future Development in the Area

6.3.5 Health & Safety

The surrounding context consists of a mix of residential, transport- related, recreational and amenity related land uses. It does not include any man-made industrial processes (including SEVESO II Directive sites (96/82/EC & 2003/105/EC) which would be likely to result in a risk to human health and safety.

There is little health information available at county level and so there is a reliance on information at national level to inform on the general health of the wider Dún Laoghaire - Rathdown and Shankill area.

The Department of Health's report '*Health in Ireland, Key Trends 2016*' (Department of Health, 2016) provides summary statistics on health and health care in Ireland over the past ten years. According to the key trends, life expectancy in Ireland has increased by 2.4 years since 2005 and is now above the average for the EU. The greatest gains in life expectancy have been achieved in the older age groups reflecting decreasing mortality rates from major diseases. The proportion of life expectancy at age 65 to be lived in good health is higher for both men and women in Ireland compared with the EU-28 average. In recent decades, Ireland has consistently recorded high rates of self-evaluated good health. Population health at the national level presents a clear picture of rapid decreases in mortality rates accompanied by a rapid rise in life expectancy during the past ten years. This has a knock-on impact on housing demand and need and will influence future housing mix and structures.

At county level, the creation of County Health Profiles is one of the key actions from the Healthy Ireland strategy which is our national framework for action to improve the health and wellbeing of the people of Ireland. The County Health Profile for Dún Laoghaire - Rathdown confirms that Dún Laoghaire - Rathdown is the most affluent Local Authority in Ireland, with 11% of the population below average affluence and 89% at above average or affluent.

At a local level within Shankill-Shanganagh DED, the Census 2016 confirms that only 1% of the population stated their health was bad or very bad.

6.3.6 Risk of Major Accidents and Disasters

The 2018 EIA Guidelines state that an EIAR must include the expected effects arising from the vulnerability of the project to risks of major accidents and/or disasters that are relevant to the project.

In this respect, taking cognisance of the other chapters contained within this EIAR document, it is not considered that the proposed development site presents risks of major accidents or disasters, either caused by the scheme itself or from external man made or natural disasters.

6.4 LIKELIHOOD OF IMPACTS

This section provides an assessment of all of the potential and predicted impacts of the proposed development on population and human health. As outlined in Section 6.1, in accordance with the draft EPA guidelines, the assessment of impacts on population and human health refer to the assessments of those factors under which human health effects might occur, as addressed elsewhere in this EIAR.

A number of the likely impacts have already been 'designed out' of the development proposal. These measures have been dealt with comprehensively in respective chapters including Chapter 14.0 The Landscape; Chapter 11.0 Noise & Vibration; Chapter 9.0 Water Hydrogeology & Hydrology; Chapter 7.0 Biodiversity; and Chapter 15.0 Material Assets: Roads & Traffic.

Four different phases of development are proposed to effectively deliver the planning application on site, as detailed in Chapter 2.0 of this EIAR. Whilst 4 no. different phases are proposed some of the phases could be fast-tracked such that two phases advance together. This, however, is very much dependent on market conditions and the specific requirements of contractors. In any case, should different phases cumulatively progress together, the overall impacts are unlikely to be different.

In order to ensure an effective and conclusive environmental assessment consistent with best practise, the assessment of potential effects on the environment also examines the collective cumulative effects of the overall development if all four development phases, as detailed in Chapter 2.0, were implemented. The examination of the 'all phase' development scenario is consistent with best practice in order to examine a 'worst-case' scenario of the project effects.

6.4.1 'Do-Nothing' Scenario

A '*do nothing*' impact would result in the subject lands remaining in a green-field state and substantially undeveloped. Development to facilitate recreational use would occur on the adjoining land zoned as open space and comprising Shanganagh Park, but the subject land zoned to provide for new residential communities would remain undeveloped and not in use for any specific purpose save for the continued use of an area of land by the Parks Department as a Park Depot and the potential occupation of 1 no., existing house on site. This would be an underutilisation of the site from a sustainable planning and development perspective, particularly considering the location of the lands adjacent to high quality public transport, and within an area which is identified as a future development area within the Dublin Metropolitan Area. The status of the environmental receptors described throughout this EIAR document would be likely to remain unchanged. The potential for any likely and significant adverse environmental impacts arising from both the construction and operational phases of the proposed development would not arise.

In terms of the likely evolution without implementation of the project as regards natural changes from the baseline scenario, it is considered there would be limited change from the baseline scenario in relation to population (human beings) and human health.

However, similarly the potential for any likely and significant positive environmental impacts arising from both the construction and operational phases of the proposed development would also not arise. The site is zoned for residential purposes within the Dún Laoghaire - Rathdown Development Plan 2016-2022 with an objective to "*protect and-or improve residential amenity*", and the proposed use of the site is considered to be in accordance with the proper planning and sustainable development of the area.

6.4.2 Construction Impacts

Potential construction impacts arise from a range of issues discussed elsewhere in this EIAR: Traffic & Transport (Chapter 15.0); Noise and Vibration (Chapter 11.0); Air Quality and Climate (Chapter 10.0); and Biodiversity (Chapter 7.0). Construction impacts are generally temporary in nature.

The construction phase of the proposed development will primarily consist of demolition, site clearance, excavation and construction works, which are likely to take place over four phases. The works will largely be confined to the proposed development site, save for the provision of water infrastructure which traverses Shanagangh Park. Notwithstanding the implementation of remedial and mitigation measures there will be some minor temporary residual impacts on population (human beings) and human health most likely with respect to nuisance caused by construction activities.

It is anticipated that subject to the careful implementation of the remedial and mitigation measures proposed throughout this EIAR document any adverse likely and significant environmental impacts will be avoided. Positive impacts are likely to arise due to an increase in employment and economic activity

associated with the construction of the proposed development. As outlined above, the construction phase will have both direct and secondary positive economic impacts in this regard.

Potential impacts could occur as a result of inadequate site management or accidental spillage during construction, which would reach the waters of the pond. However, the likelihood of this happening is low given the design measures introduced as part of the development and detail included in the Preliminary Construction Management Plan prepared in support of the development and detailed in Appendix 2.4 of Chapter 2.0.

The visual landscape will change once construction commences and it will take time for the proposed landscaping treatment to mature. These impacts are likely to be significant temporary and short term in nature.

The overall predicted likely and significant impact of the construction phase will be short-term, temporary and likely to be neutral.

6.4.3 Operational Impacts

Potential operational impacts arise from a range of issues discussed elsewhere in this EIAR including The Landscape (Chapter 14.0); Traffic & Transport (Chapter 15.0); Noise & Vibration (Chapter 11.0); and Air Quality & Climate (Chapter 10.0).

The proposed development will result in a generally positive alteration to the existing undeveloped site in terms of the provision of residential units, a childcare facility, local retail unit and café, all planned to serve the growing population of the area in accordance with the objectives of the Dún Laoghaire - Rathdown Development Plan 2016-2022.

The proposed development will consist of 597 no. residential units/households including 194 no. studio and 1 bed units. Allocating a generous household size of 1.5 persons to the 1 bed units and using the local average household size indicators from Census 2016 for this DED (2.92) for the remaining units, the proposed development may result in a projected population of approximately 1,467 no. persons residing at the site. This will result in a sizeable new community within Shankill at Shanganagh. This is considered significant and positive, particularly in the context of current housing demand, but it will place significant additional strains on existing community facilities and services in the town.

Positive impacts on population and human health will include health benefits associated with the provision of a highly permeable layout which encourages walking and cycling, amenity and recreational facilities.

The implementation of the range of remedial and mitigation measures included throughout this EIAR document is likely to have the impact of limiting any adverse significant and likely environmental impacts of the operational phase of the proposed development on population and human health.

6.4.4 Cumulative Impacts

The potential cumulative impacts of the proposed development on population and human health have been considered in conjunction with the ongoing changes in the surrounding area. A planning history review was undertaken to identify any recently approved or pending developments which may have a

cumulative impact with the proposed development. These developments are mapped in Appendix 6.1 and listed in Table 6.2. The significant developments in terms of impacts on population and human health within the local area plan boundary are noted and assessed below.

The cumulative impact of the proposed development will be a further increase in the population of the wider area. The previously green-field lands will provide for 597 no. new residential units across a variety of unit and tenure types. This will have a moderate impact on the population (human beings) in the area. This impact is likely to be long term and is considered to be positive, having regard to the zoning objective for the subject lands, and their strategic location in close proximity to high quality, high frequency public transport, and the high level of demand for new housing in the area.

The recent planning application lodged for Woodbrook provides for the development of 685 no. residential units alongside ancillary units. The proposed development is stated to provide accommodation for approximately 1,884no. persons in the area⁴.

With regard to human health, the cumulative impact of the proposed development in conjunction with other nearby developments will provide for the introduction of high quality new neighbourhoods in the area with a high level of accessibility and amenity. The overall cumulative impact of the proposed development will therefore be long term, positive and permanent with regard to human health, as residents will benefit from a high quality, visually attractive living environment, with ample opportunity for active and passive recreation and strong links and pedestrian permeability, with a direct and convenient link to high frequency public transport modes.

6.5 DESCRIPTION AND SIGNIFICANCE OF IMPACTS

6.5.1 Introduction

This section provides a description of the specific, direct and indirect, impacts that the proposed development may have during both the construction and operational phases of the proposed development. Additionally, this section addresses the socio-economic and employment impacts of the proposed development. For a more detailed assessment of potential impacts please refer to specific chapters of the EIAR which assess the environmental topics outlined in the EIA Directive.

6.5.2 Economic Activity

Construction Phase

The construction phase of the proposed development is likely to result in a positive net improvement in economic activity in the area of the proposed development site particularly in the construction sector and in associated and secondary building services industries. The construction sector (including associated services) was documented as one of the most adversely impacted sectors of the Irish economy following the economic downturn in 2008. The sector has recovered in recent years and this development will help to further enhance growth.

⁴ Woodbrook Planning Application EIAR

The construction of 597 no. residential dwellings, a childcare facility, ancillary services and all associated infrastructure will precipitate a positive impact on construction-related employment for the duration of the construction phase.

It is difficult to estimate the number of employees who will be engaged on a phased residential development such as this. It is estimated that there will initially be 60 – 70 staff on site on a typical day, however during peak construction periods this is expected to fluctuate up to 250 – 350 staff and contractors on site per day. A considerable amount of the work will be undertaken by sub-contractors who will also work elsewhere on a phased basis over the construction period.

The construction phase will also have secondary and indirect ‘spin-off’ impacts on ancillary support services in the area of the site, such as retail services, together with wider benefits in the aggregate extraction (quarry) sector, building supply services, professional and technical professions etc. These beneficial impacts on economic activity will be largely temporary but will contribute to the overall future viability of the construction sector and related services and professions over the phased construction period.

The proposed development could have a slight negative impact on the surrounding area during construction phase due to traffic and associated nuisance, dust and noise. These issues and appropriate mitigation measures are addressed in Chapters 15.0 and 11.0 of the EIAR, in the Traffic and Transport Chapter and in the Noise & Vibration Chapter. The Traffic and Transport Assessment recommends that a Construction Traffic Management Plan be implemented for the site which will minimise disruption to the surrounding road network.

Operational Phase

The operational phase of the proposed development will result in the provision of 597 no. residential units, a childcare facility, ancillary services and associated open space. This will provide accommodation for approximately 1,467 persons, based upon the existing average occupancy rate of 2.9 persons per household within Dun Laoghaire Rathdown.

This increase in occupancy in the area will enhance local spending power and will assist with the delivery of a critical mass of population which will support a wide range of additional local businesses, services, transport infrastructure and employment opportunities.

6.5.3 Social Patterns

Construction Phase

The construction phase of the proposed development is unlikely to have any significant impact on social patterns within the surrounding area. Some temporary additional local populations may arise out of construction activity. However, these impacts are imperceptible, temporary in nature and therefore not considered significant.

It is acknowledged that the construction phase of the project may have some short-term negative impacts on local residents. Such impacts are likely to be associated with construction traffic and possible nuisances associated with construction access requirements. These impacts are dealt with separately and assessed elsewhere in the EIAR, including Chapter 2 - Project Description; Chapter 10 - Air Quality and Climate; Chapter 11 - Noise and Vibration and Chapter 15 Material Assets - Traffic and Transport.

Such impacts will be short term and in the longer term, the completed scheme will have beneficial impacts for local businesses, residents and the wider community. Any disturbance is predicted to be commensurate with the normal disturbance associated with the construction industry where a site is efficiently, sensitively and properly managed having regard to neighbouring activities. The construction methods employed and the hours of construction proposed will be designed to minimise potential impacts to nearby residents.

Operational Phase

The addition of circa 1,467 new residents to the area will have a significant, positive and direct impact on the existing settlement of Shankill. Importantly, the predicted increase in population has been planned in a holistic and co-ordinated manner vis a vis the Woodbrook Shanganagh Local Area Plan. The proposed development will facilitate population growth in the area, which is a positive impact having regard to the low population growth well below the national average, during the last census period. The subject site is well served by existing community support facilities such as shops and services, health facilities, and schools within proximity to the site. These existing facilities within the immediate vicinity have the capacity to be shared and augmented with additional facilities to support the development proposal.

The subject site has good public transport links to Shankill and Bray Town Centre with its range of higher order shops and services. Notwithstanding such provision it is noted that the proposed Woodbrook Masterplan includes provision for a locally scaled Neighbourhood Centre, providing for local services and facilities which will benefit the proposed development. Further, the provision of a local retail unit on site serves to enhance the immediate provision of services in the area.

Shanganagh Castle, adjoining the subject site offers an excellent opportunity to provide accessible facilities that would not only serve the future population of the proposed development, but also the wider area. The Castle has the potential to become a key focal point within Shanganagh Park and to provide for community functions subject to feasibility studies, in accordance with the objectives of the LAP

Redevelopment of Shanganagh Park for recreational purposes in accordance with the proposed Park Masterplan will significantly enhance the provision of passive and active recreational facilities in the vicinity of the site.

6.5.4 Land-Use & Settlement Patterns

The report 'Health Impacts on the Built Environment: A Review' (The Institute of Public Health in Ireland, 2006) states that deteriorating physical features of the urban environment can harm health. Architecture Ireland have also shown the link between the Built Environment and Mental Health (Architecture Ireland, 2015). The World Health Organisation (WHO) has undertaken research that show urban environments that are aesthetically pleasing and landscaped encourage people to explore and access their local community by foot or bicycle when compared to the same urban space prior to renovations (WHO, 2016).

Construction Phase

The construction phase of the proposed development will primarily consist of site clearing, excavation and construction works. It is acknowledged that the construction phase of the project may have some short-term negative impacts on local residents. Such impacts are likely to be associated with construction traffic and possible nuisances associated with construction methods and activities. These

impacts are dealt with separately and assessed elsewhere in the EIAR, including Chapter 2.0 - Project Description; Chapter 10 - Air Quality and Climate; Chapter 11 - Noise and Vibration and Chapter 15 Material Assets - Traffic and Transport.

Secondary land use impacts include off-site quarry activity and appropriate disposal sites for removed spoil. The locations for these specific activities have not yet been identified and will be identified once a contractor has been appointed on site.

The construction phase may result in a marginally increased population in the wider area due to increased construction employment in the area, however, this would be temporary in nature and the impact would be imperceptible.

Operational Phase

The operational phase of the proposed development will result in the introduction of a residential land use to the subject site which will provide much needed housing for the growing population of the immediate area and the Greater Dublin Area in general.

The proposed use once constructed will function in synergy with adjoining residential development and other commercial uses in the area with the provision of enhanced pedestrian and cycling links. Effective landscaping and public realm development will provide for an attractive and visually pleasing development.

The impact of the development on land use and settlement patterns will be permanent. Long term and positive having regard to its planned implementation as detailed in the Shanganagh Woodbrook Local Area Plan.

6.5.5 Air Quality

In order to reduce the risk to health from poor air quality, National and European statutory bodies have set limit values in ambient air for a range of air pollutants. These limit values or "Air Quality Standards" are health or environmental-based levels for which additional factors may be considered. The limit values are set for the protection of human health including the most vulnerable to health impacts due to poor air quality i.e. the infirm, elderly and children. These limit values provide short term (i.e. 24 hour or 1 hour) and long term (annual mean) limit values below which EU member states must keep the specified pollutants.

Air pollution is the single largest environmental health risk in Europe. Heart disease and stroke are the most common reasons for early death and are responsible for 80% of cases. The pollutants of most concern in Dublin with respect to human health are NO₂ and PM₁₀ as they are the two pollutants most likely to exceed the annual mean limit values (40 µg/m³).

Air quality monitoring programs have been undertaken in recent years by the EPA at a number of locations in Dublin city centre. The most recent annual report on air quality "Air Quality in Ireland 2017 – Indicators of Air Quality" (EPA 2018), details the range and scope of monitoring undertaken throughout Ireland. The background concentration accounts for all non-traffic derived emissions (e.g. natural sources, industry, home heating etc.). Long term averages for NO₂, PM₁₀, PM_{2.5}, CO and benzene indicate that concentrations in Dublin are below the limit values set for the protection of human health.

Construction Phase

As detailed in Chapter 10: Air Quality & Climate, best practice mitigation measures are proposed for the construction phase of the proposed development which will focus on the pro-active control of dust and other air pollutants to minimise generation of emissions at source. The mitigation measures that will be put in place during construction of the proposed development will ensure that the impact of the development complies with all EU ambient air quality legislative limit values which are based on the protection of human health. Therefore, the impact of construction of the proposed development is likely to be negative, short-term and imperceptible with respect to human health. Construction phase impacts on human health due to construction phase vehicles are predicted to be imperceptible as volumes fall below the scoping levels for impact.

Operational Phase

As outlined under Chapter 10: Air Quality & Climate, air dispersion modelling of operational traffic emissions was undertaken to assess the impact of the development with reference to EU ambient air quality standards which are based on the protection of human health. As demonstrated by the modelling results, emissions as a result of the proposed development are compliant with all National and EU ambient air quality limit values and, therefore, will not result in a significant impact on human health.

6.5.6 Noise & Vibration

Exposure to Excessive noise is becoming recognised as a large environmental health concern. According to the 2015 European Commission report 'Noise Impacts on Health', (European Commission, 2015), the most common effects of noise on the vulnerable include Annoyance; Sleep Disturbance; Heart and circulation problems; Quality of Life; Cognitive Process; and Hearing. It is acknowledged that humans are particularly sensitive to vibration stimuli and that any perception of vibration may lead to concern. In the case of road traffic, vibration is perceptible at around 0.5mm/s and may become disturbing or annoying at higher magnitudes.

Construction Phase

It is predicted that the construction programme will create typical construction activity related noise on site. During the construction phase of the proposed development, a variety of items of plant will be in use, such as excavators, lifting equipment, dumper trucks, compressors and generators. The closest neighbouring residential properties to the proposed development are the dwellings to the north of the site within Castle Farm. It is predicted that when construction works are in operation at the northern boundary of the site directly adjacent to Castle Farm there may be some significant impacts. However, these occurrences will only be temporary, and the vast majority of the construction works will take place at distances from the receptors where no significant impacts are predicted, for instance at distances of 50m there are no significant impacts predicted with the exception of demolition activities. A number of avoidance, remedial and reduction measures are included in of Chapter 11: Noise & Vibration.

Operational Phase

Once operational, the predicted change noise levels associated with additional traffic is predicted to be of imperceptible impact along the existing road network. In the context of the existing noise environment, the overall contribution of induced traffic is considered to be of neutral, imperceptible and long-term impact to nearby residential locations.

Noise levels associated with any mechanical and electrical plant required to service the development buildings will operate well within the adopted day and night-time noise limits at the nearest noise

sensitive properties taking into account the site layout, distance to nearest off site noise sensitive locations and the development type which is largely residential. Any plant associated with retail units or apartment buildings units will be controlled to ensure a neutral noise impact. Assuming the operational noise levels do not exceed the adopted design goals included within the EIAR, the resultant residual noise impact from this source will be of neutral, minor, long term impact. Chapter 11.0 Noise & Vibration outlines all operational phase noise and vibration impacts.

6.5.7 Traffic

The World Health Organisation Report 'Health Effects and Risks of Transport Systems: The Hearts Project' (World Health Organisation, 2006) states that road traffic is a major cause of adverse health effects – ranking with smoking and diet as one of the most important determinants of health in Europe. The report states: - "Traffic-related air pollution, noise, crashes and social effects combine to generate a wide range of negative health consequences, including increased mortality, cardiovascular, respiratory and stress related diseases, cancer and physical injury. These affect not only transport users but also the population at large, with particular impact on vulnerable groups such as children and elderly people, cyclists and pedestrians."

In the Department of Communications, Climate Action & Environment document Cleaning Our Air – Public Consultation to Inform the Development of a National Clean Air Strategy vehicle emissions are included as a key source of health impacts in Ireland (DOCCA&E, 2017). An assessment of the additional traffic movements associated with the proposed development during the construction and operational phases is presented in Chapter 15.0: Material Assets Traffic & Transport.

The location of the site in proximity to public transport mitigates environmental impacts associated with increased traffic. The site sits within a major multi-modal transport corridor of local, regional and national importance. In terms of sustainable transport modes, the existing road network in the vicinity of the site serves a number of Dublin Bus Routes which connects the subject site to the city centre and also Dun Laoghaire (Route Nos. 145 & 45A). The R119 as a part of the Quality Bus Network (QBN) also provides for cycle lanes and footpaths on both side of the road in the vicinity of the proposed development.

The South East Rail Line (Suburban Rail) runs in proximity to the site in a north-south direction along the coast. This rail line accommodates the DART connecting Shanganagh to Dublin city. The County Development Plan 2016-2022 and the Woodbrook – Shanganagh LAP includes a Specific Local Objective to provide a new DART Station at Woodbrook, less than 1km from the subject site.. This DART station will be in addition to the existing DART station located at Rathsallagh Drive located circa 2km north of the subject site.

6.5.8 Health & Safety

Construction Phase

The construction phase of the proposed development may give rise to short-term impacts associated with construction traffic, migration of surface contaminants, dust, noise and littering. Secondary impacts may include resulting increased traffic arising from hauling building materials to and from the proposed development site which are likely to affect population and human health distant from the proposed development site, including adjacent to aggregate sources and landfill sites. Construction impacts are

likely to be temporary and short term and are dealt with separately in the relevant chapters of this EIAR document.

The proposed development is designed to best industry standards, with emphasis on the health and safety of occupants, local residents and the community at large. A Project Supervisor, Design Process (PSDP), will be appointed at tender stage to coordinate the design effort and to address and minimise construction risks during the detailed design period. Notification of this appointment will be sent to the HSA by means of their Approved Form 1 (AF1).

As design advances and before construction commences, a Preliminary Health and Safety Plan will be drawn up by the PSDP and reviewed by the project team. This ultimately will be passed on to the appointed Project Supervisor Construction Stage (PSCS) to be developed into a Construction Health and Safety Plan, prior to construction commencing. Notification of this appointment and the commencement date of construction will be sent to the HSA by means of their Approved Form 2 (AF2).

Construction on site will be managed through a Construction and Environmental Management Plan. The construction methods employed and the hours of construction proposed will be designed to minimise potential impacts. The development will comply with all Health & Safety Regulations during the construction of the project. Where possible, potential risks will be omitted from the design so that the impact on the construction phase will be reduced.

Operational Phase

The operational stage of the development is unlikely to precipitate any significant impacts in terms of health and safety. The design of the proposed development has been formulated to provide for a safe environment for future residents and visitors alike. The paths, roadways and public areas have all been designed in accordance with best practice and the applicable guidelines including DMURS. The proposed residential units and childcare facility accord with the relevant guidelines and will meet all relevant safety and building standards and regulations, ensuring a development which promotes a high standard of health and safety for all occupants and visitors.

The proposed development will not result in any significant impacts on human health and safety once completed and operational. The proposed development therefore is unlikely to result in negative impacts in relation to population and human health in this regard.

6.5.9 Risk of Major Accidents or Disasters

Construction Phase

Having regard to the topography, geology and location of the subject site, and its low risk of flooding as established in the Punch Consulting Site Specific Flood Risk Assessment submitted with the application, it is not considered likely that there will be any impact related to a major accident or disaster during the construction phase of the proposed development, stemming internally from within the development, or externally.

The works proposed in proximity to roadways will be governed by best practice and appropriate safety procedures, ameliorating any risk of a major accident in those contexts.

Operational Stage

The proposed development will be located on land which is not at any significant risk of flooding.

The entrance arrangements have been designed so as to avoid any risk of a major accident associated with the surrounding road network.

6.6 REMEDIAL AND MITIGATION MEASURES

Avoidance, remedial and mitigation measures describe any corrective or mitigative measures that are either practicable or reasonable, having regard to the potential likely and significant environmental impacts.

6.6.1 Construction Phase

A range of construction related remedial and mitigation measures are proposed throughout this EIAR document with reference to the various environmental topics examined and the inter-relationships between each topic. These remedial and mitigation measures are not likely to result in any significant and likely adverse environmental impacts on population and human health during the construction phases being avoided. Chapter 19.0 of this EIAR document provides a summary of all the remedial and mitigation measures proposed.

POP & HH CONST 1: In order to protect the amenities enjoyed by nearby residents, premises and employees a Construction and Environmental Management Plan (including traffic management) should be prepared by the contractor and implemented during the construction phase.

6.6.2 Operational Phase

The operation phase is considered to have likely positive impacts on human beings in relation to the provision of additional residential units and high quality open space and pedestrian/cyclist facilities to cater for the demands of a growing population and encourage active travel modes in accordance with the principles of sustainable development and residential zoning objectives pertaining to the site

6.7 RESIDUAL IMPACTS

It is expected that the proposed development will have a positive, long-term & imperceptible impact on the human health of the local population.

There are no predicted adverse impacts with respect to health factors primarily due to the location of the proposed development and its residential characteristics.

All other environmental aspects relating to the human environment which have the potential to impact on the local population such as air quality and climate, noise and vibration, material assets and traffic are addressed in more detail in the relevant Chapters of this EIAR.

The cumulative impact of the development on the health of the surrounding area will be positive, long-term & imperceptible.

Interactions are fully addressed in Chapter 18.0: Interactions Between Environmental Factors.

6.8 MONITORING

In relation to the impact of the development on population and human health it is considered that the monitoring measures outlined in other chapters and relevant to other environmental topics such as water, air quality and climate and noise are sufficient to adequately address monitoring requirements.

6.9 REFERENCES

Guidelines on the Information to be Contained in Environmental Impact Assessment Reports Draft - (EPA, 2017)

Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA, 2002)

Environmental Impact Assessment of Projects – Guidance on the preparation of the Environmental Impact Assessment (European Commission, 2017)

Advice Notes on Current Practice in the Preparation of Environmental Impact Statements (EPA, 2003)

Central Statistics Office (CSO) website www.cso.ie

Dún Laoghaire - Rathdown County Development Plan 2016 – 2022

Regional Planning Guidelines for the Greater Dublin Area 2010 – 2022

DoHPLG (2017) – Rebuilding Ireland – Action Plan for Housing and Homelessness

Eastern and Midlands Regional Spatial and Economic Strategy

ESRI (2019) – Quarterly Economic Commentary, Summer 2019

ESRI (2018) – Ireland's Economic Outlook: Perspectives and Policy Challenges

Health Safety Authority – www.hsa.ie

Appendix 6.1 Future Receptors – Recent Permitted Developments in the Area



-  Site Boundary
-  LAP Boundary
-  400m from the site
-  1000m from the site

Planning Applications (Planning Ref. stated)



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CHAPTER SEVEN BIODIVERSITY

7.1 INTRODUCTION

7.1.1 Overview

This Chapter provides an assessment of the potential impacts and effects of the Proposed Development on the ecological environment, i.e. flora and fauna, collectively known as biodiversity.

The aims of this Chapter are to:

- establish the ecological baseline at the Site;
- identify and describe all potentially significant ecological impacts and effects associated with the Proposed Development;
- describe any other existing and/or approved plans or projects with which the Proposed Development have significant cumulative effects;
- ensure that the Proposed Development complies with relevant nature conservation legislation;
- detail the mitigation measures required to avoid or reduce potential impacts to acceptable levels;
- identify appropriate and proportionate compensation and/or enhancement measures to supplement mitigation;
- provide an assessment of the significance of any residual effects; and,
- detail monitoring measures required to verify predications relating to the performance of mitigation measures, and to inform amended or additional mitigation, as required.

This Chapter is supported by Figures 7.1 – 7.7

Throughout this Chapter, species are given their scientific names on first reference and common names only thereafter. Distances cited are shortest boundary-to-boundary measurement ‘as the crow flies’, unless otherwise stated.

7.1.2 Relevant Legislation, Policy and Guidance

This assessment has been conducted within the context of the following relevant legislative instruments, planning policies and guidance documents:

- Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (the ‘Habitats Directive’);
- Council Directive 2009/147/EC on the conservation of wild birds (the ‘Birds Directive’);
- Council Directive 2000/60/EC establishing a framework for Community action in the field of water policy (the ‘Water Framework Directive’);
- Regulation 1143/2014 on invasive alien species (‘Invasive Alien Species Regulation’);
- Convention on Wetlands of International Importance (‘Ramsar convention’);
- 1993 S.I. 14/1993 as amended, Roads Act 2007 S.I. 34/2007 as amended & Roads Act 2015 S.I. 14/2015 as amended (collectively known as the ‘Roads Acts’);

- The Planning & Development Act 2000 S.I. 30/2000 as amended; the Planning and Development (Amendment) Act 2010 S.I. 30/2010 as amended; The Planning & Development (Amendment) Act 2010 S.I. 16/2018 as amended (collectively known as the 'Planning Acts');
- European Communities (Bird and Natural Habitats) Regulations 2011 and 2015 (the 'Habitats Regulations');
- The Wildlife Act, 1976; and the Wildlife (Amendment) Act 2000 (together known as the 'Wildlife Acts');
- Flora (Protection) Order, 2015 S.I. 356/2015 (the 'Flora Protection Order');
- National Biodiversity Plan 2017-2021;
- Project Ireland 2040 National Planning Framework (NPF);
- Dún Laoghaire-Rathdown Biodiversity Action Plan 2009 – 2013;
- Dún Laoghaire-Rathdown County Council County Development Plan 2016 – 2022;
- Woodbrook – Shanganagh Local Area Plan 2017 – 2023;
- draft Environmental Protection Agency (EPA) Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA, 2017);
- relevant Irish governmental guidance such as that available online from the National Parks & Wildlife Service (NPWS);
- various National Roads Authority (NRA)¹ guidance from the 'Environmental Planning and Construction Guidelines', including the *Guidelines for Assessment of Ecological Impacts of National Road Schemes* (NRA, 2009);
- Chartered Institute of Ecology and Environmental Management (CIEEM) *Guidelines for Ecological Impact Assessment in the UK and Ireland* (CIEEM, 2018); and,
- other guidance (e.g. for field surveys) referenced throughout this Chapter as relevant.

7.2 ASSESSMENT METHODOLOGY

7.2.1 Consultation

The scope of assessment described in this Chapter has been partly informed by consultation with various statutory and non-statutory stakeholders.

The Dún Laoghaire-Rathdown County Council (DLRCC) Biodiversity Officer was consulted in the local authority offices on 26 February 2019. In summary, the Biodiversity Officer's comments made at this time related to:

- the potential for Site Investigation (SI) works, in the absence of mitigation, to cause disturbance to protected species, including nesting birds and smooth newt *Lissotriton vulgaris*;
- consultation requirements with NPWS in relation to protected species licensing (if required) as part of the SI works;
- potential for wintering birds to use the grassland pitches within the site, the value of faecal dropping counts as an additional method to visual counts of birds to identify wintering bird usage, and significance to potential wintering bird usage of intense management of the Proposed Development as playing pitches up to 2018;
- the value of consulting local birdwatchers to identify historical records of bird usage at the site;

¹ The National Roads Authority has been subsumed into Transport Infrastructure Ireland (TII) since the publication of this guidance.

- value of existing linear hedgerows and wooded features within the site to wider ecological connectivity;
- benefit of EIAR authors requesting ecological data being collected by DLRCC to inform the Shanganagh Park Masterplan, which will be the subject of a 'Part 8' planning application by DLRCC; and,
- importance of ecological surveys being completed within spring / summer 2019 (in addition to those completed in late-summer, autumn and winter 2018).

Following the meeting with the DLRCC Biodiversity Officer on 26 February 2019, AECOM wrote to the DLRCC Biodiversity Officer on 05 March 2019. AECOM requested a historical DLRCC survey report on smooth newt populations in the single pond within the site boundary, and confirmed that:

- wintering bird surveys (comprising a full 'tidal cycle' of twelve hours) had been completed in February 2019 and would be completed in March 2019;
- the NPWS Wildlife Licensing Unit (WLU) would be consulted on the potential licencing requirements for the SI works at the Proposed Development; and,
- vegetation clearance required for the SI works had been completed before the end of February 2019, following confirmation from AECOM ecologists that no nesting birds were present within the Zone of Influence of areas to be cleared.

The Department of Culture, Heritage and the Gaeltacht was consulted on 04 January and 06 September 2019. A response was received on 16 October 2019 outlining observations and recommendations in relation to heritage, as summarised below:

- bat surveys within the grounds of Shanganagh Castle should be carried out to establish usage by bats and to allow appropriate mitigation (such as use of 'bat-friendly' lighting) to be proposed;
- badger *Meles meles*, including their setts, are thought to be present within the grounds of Shanganagh Castle and should be fully surveyed for, as should other protected mammal species likely to be present such as hedgehog *Erinaceus europaeus* and Irish stoat *Mustela erminea hibernica*;
- a wintering population of curlew *Numenius arquata* is known in the area, and barn owl *Tyto alba* and long-eared owl *Asio otus* have been observed in recent years. Surveys should be conducted to investigate the potential use of the Site by these species (and for general breeding birds); and,
- smooth newt are present in the pond to the west of Shanganagh Castle. It is important that measures to protect the water quality and outflow stream of this pond are implemented.

BirdWatch Ireland was consulted on 18 February 2019 to request records of wintering bird usage of the Proposed Development and adjacent football pitches within Shanganagh Park. BirdWatch Ireland responded via email on 27 September 2019 stating that they do not hold any data relating specifically to this area. It was suggested in their email that it is unlikely that rare species would occur, but winter flocks of thrush species, including redwings *Turdus iliacus* and fieldfares *Turdus pilaris*, may use the habitats present.

7.2.2 Zone(s) of Influence

The 'zone of influence' (Zol) for a project is the area over which ecological features may be subject to significant effects as a result of the proposed project and associated activities.

The Zol is likely to extend beyond the boundary of a proposed development, for example where there are hydrological links extending beyond the site boundaries. Activities associated with the construction, operation, decommissioning (and where applicable, restoration) phases should be separately identified (where relevant).

The Zol will vary for different ecological features depending on their sensitivity to an environmental change. It is therefore appropriate to identify different Zol for different features. The features affected could include habitats, species, and the processes on which they depend. Zol are specified for different features, and types of potential impact.

It is also important to acknowledge, as per EPA draft guidance (EPA, 2017) “*that the absence of a designation or documented feature does not mean that no such feature exists within the site*”. As such, Zol should be identified for all features potentially occurring within or near to the Proposed Development, in addition to any known to occur.

As recommended by CIEEM (2018), professionally accredited or published studies have been used to determine Zol. Having considered the Proposed Development, Zol were estimated for habitats and flora and fauna species and their habitats.

7.2.3 Desk Study

A desk study was carried out to identify nature conservation designations and protected and notable habitats and species potentially relevant to the Proposed Development. The desk study areas for the Proposed Development corresponded, as a minimum, to the Zol of potentially significant effects for each ecological feature. Key resources for the desk study included:

- a previous smooth newt *Lissotriton vulgaris* survey report for wetlands within the Site (Scott Cawley, 2013);
- data on designated sites and rare or protected species held online by NPWS and the National Biodiversity Data Centre (NBDC);
- the DLRCC Green Infrastructure Strategy within the DLRCC County Development Plan 2016 – 2022;
- data on locations of notable woodlands and hedgerows in the Tree Strategy for Dún Laoghaire-Rathdown 2011 – 2015;
- information on locally significant ecological and landscape features in the Woodbrook – Shanganagh Local Area Plan 2017 – 2023;
- locations of rare, threatened and scarce vascular plants in the Dún Laoghaire Biodiversity Plan 2009 – 2013;
- conservation status of vascular plants, amphibians, reptiles, and freshwater fish, butterflies, and terrestrial mammals, as per the Irish Red Lists; and,
- data on water quality in relevant WFD catchment units and groundwater.

The following ecological records were excluded from the baseline of the EIAR:

- records located more than 5 km from the Proposed Development;
- records greater than 50 years old;
- records of species identified as Regionally Extinct in national Red Lists;

- any species listed as Least Concern on Red Lists;
- any species of marine habitats (i.e. which could not occur within the ZoI of the Proposed Development); and,
- any species exclusively of upland habitats which would not make use of the (lowland) Proposed Development.

7.2.4 Field Survey

Ecological field survey methods are summarised below. All surveys had regard for relevant guidance including, but not limited to, the NRA's *Ecological surveying techniques for protected flora and fauna during the planning of national road schemes* (NRA, 2009).

Habitat and Flora Survey

A habitat survey was carried out to map habitats using the Heritage Council classification system (Fossitt, 2000) and following Heritage Council methodology (Smith *et al*, 2011). The information gained from the survey was used to ascribe a value to habitat features, and to inform further habitat and species-specific survey work.

Habitat surveys, including searches for rare, protected, and invasive flora were carried out on 20 September 2018, 26 February 2019, 08 April 2019, and 26 June 2019. Dominant species were recorded for different habitat types, in addition to any rare or declining species identified on relevant Red Lists (Lockhart *et al*, 2008; Wyse Jackson *et al*, 2016), invasive species, or indicator species (i.e. those species which reflect particular conditions (e.g. pH or permanently wet conditions). Species listed on the EU Invasive Alien Species Regulation as being of Union concern and those listed on the Third Schedule of the Habitats Regulations were the primary focus of invasive species searches, although other invasive non-native species were recorded where they were determined to pose a threat to semi-natural habitats present.

Vascular plant nomenclature follows that of the Botanical Society of Britain and Ireland's Checklist of the Flora of Britain & Ireland (<https://bsbi.org/taxon-lists>) and as such any name changes since 2007 (including Stace, 2019) are not included. Bryophyte nomenclature follows the Checklist of British and Irish bryophytes (<http://www.britishbryologicalsociety.org.uk/>).

Bat Surveys

Bat Roost Suitability Assessment

Bat roost suitability assessment followed guidance published by the Bat Conservation Trust (BCT) (Collins, 2016). A preliminary ground level roost assessment was carried out during daylight hours, using close-focusing binoculars to identify any potential roost features (PRF) for bats in trees. This survey was conducted on 20 September 2018 and covered all trees within the Site.

Trees were assessed for the presence of PRF, including cavities, cracks, trunk and branch splits, rot holes, and hollow sections of trunk and branches with regard for technical guidance on bat usage of such features. Trees were then categorised as having Negligible, Low, Moderate, or High suitability for roosting bats in accordance with the definitions provided in the BCT guidance.

An external and internal inspection (including access to lofts) of the occupied two-storey house near the northern boundary of the site was carried out by AECOM ecologists. This was carried out on 20 September 2019 under bat roost disturbance licence DER/BAT 2017-1442. The objective of the external inspection was to identify and photograph PRF. The internal inspection of roof spaces searched for any signs of bat presence (including live bats, bat droppings, and bat feeding remains), and verified the assumptions from the external inspection. Accordingly, the building was categorised as having Negligible, Low, Moderate, or High suitability for roosting bats in accordance with BCT guidance.

Tree Climbing

Trees assessed during ground level assessment surveys as having either High or Moderate suitability for roosting bats within the Zol of the Proposed Development (five trees in total) were subject to tree climbing surveys to allow closer inspection of PRF. One tree – T4 – could not be climbed as due to its island location it was inaccessible. Trees were climbed by two suitably trained and qualified AECOM bat ecologists under licence DER/BAT 2019-13 on 22 May 2019. Following tree climbing surveys, the bat roost suitability of trees was re-assessed and re-classified, as appropriate.

Bat Roost Surveys of Trees

Following preliminary ground level roost assessments, trees with bat roost suitability and with the potential to be impacted by the Proposed Development were subject to dusk emergence surveys. One dusk survey was carried out on each of four trees on either 26 September 2018 or 26 June 2019. Surveyors stood in a position which allowed them a view of identified PRF and watched for bats leaving or returning to a roost. Elekon Batlogger M ('Batlogger') devices were used to aid in detection and identification of bats. If any bats emerged / entered a roost, the surveyors noted the roost location, identified the species (using bat detection equipment) and counted the number of bats emerging or entering (where light conditions allowed). General bat activity was also noted during the survey to provide further information on use of the Site by bats. Dusk emergence surveys commenced fifteen minutes prior to sunset and finished 1.5 hours after.

BCT guidance does not require any further investigations of Low suitability trees, therefore these were not all subject to further survey.

Bat Activity Surveys

Bat activity surveys were completed using a combination of static bat detectors (Song Meter 2+ ('SM2')), and walked activity transects.

Static bat detectors were used to capture bat activity at seven locations throughout the Site and wider Zol where bat activity was expected, based on a habitat suitability assessment. Detectors were installed at each location for a minimum of six consecutive nights. Static detectors recorded data for a minimum of four nights (less that total days installed due to technical issues) and maximum of 25 nights in the two periods between September and November 2018, and April and May 2019.

Bat recordings were analysed using Kaleidoscope Pro, Bat Classify Ireland and/or BatSound and confirmed via manual audit.

² This was updated as of November 2018 to DER/BAT 2019-13.

Two transects covering the Proposed Development were designed to include all examples of suitable bat habitat (wooded and linear features, and wetlands). Surveyors walked these pre-determined routes three times per survey visit. Two survey visits were conducted on 07 and 29 May 2019. Regular listening points were included, whereby surveyors stopped walking to allow for a five-minute continuous recording period in higher suitability habitats. Activity surveys were carried out at dusk and commenced at, or close to, sunset and ended a minimum of two hours after sunset. Surveyors listened for bats using detectors with headphones, upon hearing a bat, surveyors identified the direction and height of bat flight, the minimum number of bats, and any notable behaviour (e.g. foraging or commuting), where this was possible.

All surveys were digitally recorded using full spectrum Batlogger detectors. These detectors allow for detailed ex-situ analysis, and also automatically record location information and temperature throughout the survey. Data collected during surveys were stored and subsequently analysed using Kaleidoscope Pro and BatSound software to allow identification to species level, with manual checking by an experienced AECOM ecologist.

Otter Survey

Drainage ditches and the single pond located within the Site (this feature is hereafter referred to simply as the 'Pond') were surveyed for otter *Lutra lutra* following NRA guidance (NRA, 2006a). Surveys were carried out on 20 December 2018 by experienced AECOM ecologists. Evidence such as spraints, footprints, holts, layups, or feeding remains were searched for and recorded accurately onto GIS-enabled mobile mapping devices in the field (Panasonic Toughpad using Collector ArcGIS software).

Badger Survey

The site and wider ZOI, particularly hedgerow field boundaries and woodland, were systematically searched for evidence of badger on 20 December 2018. The badger survey methodology followed guidance set out in Harris *et al* (1989) and by NRA (2006b). Any signs of badger activity were noted including the presence of setts (which were described as active or inactive, and as main, annex, subsidiary or outlier, when this could be determined). Signs searched for included foraging evidence, access runs, hairs caught on wires and bushes, tracks and prints. Results were marked accurately using ArcGIS Collector on mobile mapping devices in the field (Panasonic Toughpad or mobile phones).

Amphibian Survey

Searches were made of the accessible areas of the Pond, the surrounding drainage ditches and any other wetland areas for spawn of common frog *Rana temporaria* on 26 February 2019, and again on 06 and 15 March 2019. The number of spawn clumps and their diameter were recorded.

A preliminary day-time survey on 08 April 2019 mapped and described suitable waterbodies for smooth newt. Features known to be positively or negatively associated with smooth newt were recorded, such as aquatic vegetation cover, broad-leaved vegetation cover, fish and waterfowl presence, and frog presence (prey for newts). The mean water depth of the suitable waterbodies and the presence of any invasive species were also recorded. Searches for suitable terrestrial refugia surrounding the Pond and drainage ditches were also completed.

A total of six smooth newt survey visits were subsequently carried out on the Pond and drainage ditches within the Site. Surveys consisted of two methods: torching and egg searches. All surveys were conducted in suitable conditions (temperature higher than 5°C, no moderate to strong winds, or persistent or heavy rain) on 08 April, 23 April and 07 May, 29 May, 19 June, and 26 June 2019. Surveys followed NRA (2009) guidelines and guidelines published in the UK for great crested newt *Triturus cristatus* (English Nature, 2001; Natural England, 2015).

Torchlight surveys, using appropriate torches (1 million candle power), were carried out on each of the six visits to assess the presence / likely absence of smooth newt and to visually count and sex adult newt (when possible).

Visual searches for smooth newt eggs on aquatic vegetation were carried out on each visit.

Bird Surveys

Wintering Bird Surveys

Wintering birds within the Site and all grassland fields in Shanganagh Park, to the south of the Proposed Development and within the potential ZOI, were surveyed at high and/or low tide over four visits in February and March 2019. High and low tide surveys, which each lasted for six hours, were conducted on 26 and 27 February 2019, high tide survey on 06 March and low tide survey on 15 March 2019 (six surveys in total). Notes were taken on all species present and any potentially disturbing activities occurring within the survey area.

Breeding Bird Surveys

Breeding bird surveys consisted of three visits on 08 April, 01 May, and 26 June 2019. Surveys were conducted in calm conditions between sunrise and 11:00, based on the Common Birds Census (CBC) method (Gilbert *et al*, 1998).

All individual birds observed and evidence of any breeding activity was recorded during field survey. Breeding evidence was recorded as defined by the British Trust for Ornithology (BTO).

No specific survey was undertaken for barn owl or long-eared owl, however if present on Site it is expected that these species would have been encountered during the bird surveys described or during bat surveys.

Limitations

Desk study information is dependent on records having been submitted for the area of interest. As such, lack of records for particular species does not necessarily mean they are absent from the area of interest. Similarly, the presence of records of a particular species does not automatically mean they still occur within the area of interest or are relevant.

Only a single dusk emergence survey was done on Trees T1, T2, T3 and T4 (see Figure 7.3). Bat Conservation Trust guidelines recommend that trees which have either Moderate or High roost suitability (which includes T1, T2 and T3) should be subject to two or three dusk emergence / dawn re-entry surveys, respectively. Trees T5 and T6, which were deemed to have High and Moderate roost suitability were not subject to further survey as the woodland block in which they are located is being

retained. All trees with bat roost suitability which are to be directly impacted by the Proposed Development will be subject to pre-construction surveys to confirm that they continue to be un-used by roosting bats.

It was only possible to survey approximately 25% of the Pond during smooth newt and common frog survey due to the presence of dense scrub around the perimeter, preventing safe access.

7.2.5 Impact Assessment Method

Baseline Conditions

EPA (2017) summarises the function of the baseline description as being “*to facilitate evaluation of the EIAR, [with] references to recognised descriptive standards and classifications ... where appropriate, as well as supporting records, information and descriptions of methodologies employed*”. Key aspects of the baseline environment identified in draft EPA guidance include context, character, significance, and sensitivity.

With reference to biodiversity, the baseline description should describe only ‘significant’ ecological features. In this regard, it is possible that features which are in and of themselves of negligible ecological value (e.g. improved grassland with low floristic diversity) may be of significant value in the resource they provide to other features (e.g. a significant earthworm feeding resource provided by an improved grassland field to a badger population). In some cases, therefore, habitats of negligible floristic value may nevertheless be considered important ecological features due to their value to protected species.

Valuing Ecological Features

Having defined the relevant baseline conditions within the Zol of the Proposed Development, it is important to value ecological features therein, in advance of commencing the assessment of potential impacts.

The geographic frames of reference employed by the NRA (2009) are employed in this Chapter when defining value of ecological features, because they provide useful examples of features at each geographic scale, and because a quantitative element (i.e. use of 1% thresholds) provides a useful scientific rule of thumb in an attempt to standardise valuations.

Ecological features which are considered to be significant by this assessment are those valued at Local Importance (Higher Value) or above. Features below this value have not been carried forward to impact assessment.

Potential Impacts

Under CIEEM (2018) guidance there is a distinction between impact and effect. An impact is an action on an ecological feature (e.g. loss of a bat roost). An effect is the outcome of that impact on an ecological feature (e.g. effect of bat roost loss on the conservation status of the bat species).

Potential impacts of the Proposed Development (both positive and negative) are predicted for all significant ecological features.

In accordance with the EPA (2017) and CIEEM (2018) guidelines, potential impacts are characterised by considering parameters shown in Table 7.1.

Potential Impact Parameter	Description
'Quality' of effects (i.e. positive or negative)	<ul style="list-style-type: none"> Positive potential impact – a change that improves the quality of the environment or slows an existing decline in the quality of the environment. Negative potential impact – a change which reduces the quality of the environment (e.g. destruction of habitat, removal of species foraging habitat).
Magnitude or extent	<ul style="list-style-type: none"> The size of the area, number of sites. Proportion of a population, or other measurable unit significantly affected by an impact.
Duration	<ul style="list-style-type: none"> Duration should be defined in relation to ecological characteristics (such as a species' lifecycle) as well as human timeframes. The EPA provides definitions for a wide range of effects for the following units of time in order of increasing duration: momentary, brief, temporary, short-term, medium-term, long-term, permanent. Note that in this Chapter, discussion focuses only on effects which are likely to be significant and as such those which are momentary, brief, or temporary are typically not defined.
Frequency and timing	<ul style="list-style-type: none"> Frequency refers to how often the impact will occur (e.g. once, rarely, occasionally, frequently, hourly, daily or constantly). Timing differs from frequency and is of particular relevance to biodiversity effects. The timing of an activity may result in a significant potential effect if it coincides with critical life-stages or seasons (e.g. bird nesting season). Outside this period, similar actions may not cause significant effects.
Probability	<ul style="list-style-type: none"> Draft EPA Guidance (2017) categorises potential effects as either likely or not likely. Only likely (and significant) effects are assessed in this Chapter.
Significance	<ul style="list-style-type: none"> Significance of effects is usually understood to mean the importance of the outcome of the impacts (the consequences of the change). This is determined by comparing the character of the predicted impact to the sensitivity of the receiving environment as defined in Draft EPA Guidance (2017).

Table 7.1. Descriptions of Potential Impact Parameters (adapted from EPA and CIEEM guidelines)

Potential impacts may occur during the construction phase (which is taken to also include enabling works such as demolition, vegetation clearance and earthworks) and/or the operational phase of the Proposed Development. Direct potential impacts are directly attributable to an action associated with a development. Indirect potential impacts are often produced away from a development, or as a result of other initial potential impacts.

As the Proposed Development is a housing scheme, it can reliably be expected to last in perpetuity, with no 'decommissioning' or 'restoration' phases. This assessment is therefore restricted to consideration only of the construction phase and the operational phase (i.e. the period during which the new houses are occupied).

Cumulative Effects

Cumulative effects can result from individually insignificant, but collectively significant, actions taking place over a period of time or concentrated in a location. Cumulative effects are particularly important as many ecological features are already exposed to background levels of threat or pressure and could be close to critical thresholds where further impact could cause irreversible decline.

The study area for cumulative effects includes at least the extent of the ZOI for distinct ecological features from the Proposed Development boundary.

Determining Effect Significance

According to EPA (2017), significance of effects is usually understood to mean the importance of the outcome of the impacts (the consequences of the change). Significance is determined by a combination of objective (scientific) and subjective (social) concerns.

The EPA further notes that *“while guidelines and standards help ensure consistency, the professional judgement of competent experts plays a role in the determination of significance. These experts may place different emphases on the factors involved. As this can lead to differences of opinion, the EIAR sets out the basis of these judgements so that the varying degrees of significance attributed to different factors can be understood”*. With this in mind, the geographic ‘frame of reference’ applied to determining effect significance by the NRA (2009) in Ireland (in a similar fashion to CIEEM in the UK) has been adopted in this assessment.

A geographic frame of reference can be a good fit to assessments of biodiversity impacts because it allows clear judgements to be made about the scale of significance, with reference to published estimates for the population size of a given species at county, national and/or international scales or areas of habitats at such scales. For example, the proportion of a known feature impacted at county scale (i.e. 1% of the known or estimated population in a given county) is measurably different from that impacted at national scale (i.e. 1 % of the known or estimated national population). A non-geographic qualitative approach can, however, also be adopted, using professional judgment as required.

7.3 RECEIVING ENVIRONMENT

7.3.1 Site Locale

The Proposed Development is located adjacent to the Shanganagh Park in southern Co. Dublin. Access to the Proposed Development is from the R119. It is bound to the west by the R119, the north by residential housing, and by the Shanganagh Park to the east and south.

The site is currently dominated by intensely managed grassland, garden allotments, greenhouses and storage sheds, an existing two-storey house, and localised areas of plantation woodland. There are no other buildings within the boundary of the Proposed Development. There is a single waterbody within the site, referred to throughout this Chapter as the Pond.

7.3.2 Sites Designated for Nature Conservation

The review of designated nationally and internationally protected sites in the wider area, including any which are potentially linked to the Proposed Development (e.g. hydrologically) revealed that the Proposed Development does not lie within any site designated for nature conservation.

The closest designated site to the Proposed Development is the Loughlinstown Woods proposed Natural Heritage Area (pNHA) which lies approximately 1.9 km to the north. The closest European designated site to the Proposed Development is the Ballyman Glen Special Area of Conservation (SAC) (and pNHA), located approximately 2.7 km to the south-west. The reasons for designation of the above-named sites are presented in Table 7.2.

Designated sites within 15 km of the Proposed Development are presented in Table 7.2. The locations of all designated sites listed in Table 7.2 are shown on Figure 7.1. Sites are presented in order of proximity to the Proposed Development.

Designated Site (and code)	Key Reasons for Designation	Distance from the Development
Loughlinstown Woods pNHA (000713)	Site specific data unavailable.	1.9 km north
Ballyman Glen SAC and pNHA (001211)	Designated for the presence of petrifying springs with tufa formation and alkaline fens.	2.7 km south-west
Bray Head SAC and pNHA (000714)	The qualifying features of this designation are vegetated sea cliffs and dry heath habitat.	3.3 km south-west
Rockabill to Dalkey Island SAC (003000)	Designated for reef habitats and harbour porpoise <i>Phocoena phocoena</i> .	3.3 km north
Knocksink Wood SAC and pNHA (000725)	Designated for woodland and wetland habitats.	4.2 km south-west
Dingle Glen pNHA (001207)	Site specific data unavailable.	4.1 km west
Dalkey Coastal Zone and Killiney Hill pNHA (001206)	Site specific data unavailable.	4.3 km north
Dargle River Valley pNHA (001754)	Site specific data unavailable.	4.5 km south
Powerscourt Woodland pNHA (001768)	Site specific data unavailable.	5.2 km south
Ballybetagh Bog pNHA (001202)	Site specific data unavailable.	5.4 km west
Kilmacanoge Marsh pNHA (000724)	Site specific data unavailable.	6.5 km south
Great Sugar Loaf pNHA (001769)	Site specific data unavailable.	6.7 km south
Wicklow Mountains SAC (002122)	Designated for a range of upland habitats and otter.	7.4 km west
Dalkey Islands SPA (004172)	Designated for three tern species <i>Sterna</i> spp.	7.5 km north
Wicklow Mountains SPA (004040)	Designated for merlin <i>Falco columbarius</i> and peregrine <i>Falco peregrinus</i> .	8.0 km west
Powerscourt Waterfall pNHA (001767)	Site specific data unavailable.	8.3 km southwest
South Dublin Bay SAC and pNHA (000210)	The qualifying features of this designated site are all coastal habitats.	8.4 km north
South Dublin Bay and River Tolka Estuary SPA (004024)	A large number of waterbird species, and the wetland habitats upon which they rely, are the reasons for designation of this site.	8.4 km north
Fitzsimon's Wood pNHA (001753)	Site specific data unavailable.	8.8 km northwest

Glen of the Downs SAC and pNHA (000719)	Designated for oak <i>Quercus</i> sp. woodlands.	9.2 km south
Booterstown Marsh pNHA (001205)	Site specific data unavailable.	9.8 km northwest
Glenree Valley pNHA (001755)	Site specific data unavailable.	10.2 km southwest
Carriggower Bog SAC and pNHA (000716)	Designated for the presence of bog habitats.	13.0 km south
The Murrrough Wetlands SAC and pNHA (002249)	Designated for a variety of coastal and wetland habitats.	14 km southeast
The Murrrough SPA (004185)	A large number of waterbird species, and the wetland habitats upon which they rely, are the reasons for designation of this site.	14.2 km southeast
Glenasmole Valley SAC and pNHA (001209)	Designated for a variety of habitats.	15.0 km west

Table 7.2. Sites with Statutory Designations for Nature Conservation

7.3.4 Habitats and Flora

Flora

Protected and rare flora species within a 5 km radius of the Proposed Development site identified by the desk study are detailed in Table 7.3.

Common Name	Scientific Name	Red Listed (Excluding Least Concern)	Flora Protection Order, Habitats Directive	Habitat Preferences
Beck pocket-moss	<i>Fissidens rufulus</i>	✓	-	Permanently or intermittently submerged rocks and stonework besides ponds, rivers, lakes, calcareous habitat, limestone or siliceous rocks.
Curved silk-moss	<i>Plagiothecium curvifolium</i>	✓	-	Soil, litter, rocks and tree bases, predominately on low-lying ground in woodland including plantations.
Petalwort	<i>Petalophyllum ralfsii</i>	-	✓	Machair and dune slacks.
Potato bryum	<i>Bryum bornholmense</i>	✓	-	Bare soil in wide ranging habitats, such as arable land, waste ground, fields, gardens and roadsides.
Spring vetch	<i>Vicia lathyroides</i>	✓	✓	Lowland calcareous heath.

Table 7.3. Protected and Rare Flora Species Returned from NBDC and NPWS Data Search Within 5 km of Proposed Development

As evidenced later in this Chapter, there is no suitable habitat for spring vetch or petalwort within the Zol of the Proposed Development. Some potentially suitable habitat exists for all other species in Table 7.3.

Surveys recorded no plant species protected under the Flora Protection Order, and no rare or threatened species identified in the national Red Lists.

No scheduled invasive plant species (i.e. those listed on the Third Schedule of the Habitats Regulations) were identified. A low impact, non-scheduled invasive species, winter heliotrope *Petasites fragrans*, was recorded during field survey in three locations. It is present within the peripheries of the mixed broadleaved woodland located in the north-west and south-east corners of the site, and within the hedgerow / tree line along the northern boundary of the Site.

Habitats

Habitats recorded within the ZoI of the Proposed Development are described below and are shown on Figure 7.2. Relevant Fossitt codes are provided.

Freshwater

FL8 Other artificial lakes and ponds

A single existing pond (the 'Pond') is located south-east of the allotments within the central area of site. The Pond is surrounded by a scrubby hedgerow and treeline perimeter and has a small (inaccessible) scrubby island in the centre.

The Pond had fluctuating water levels. In November 2018, the Pond was partly dry, with exposed mud over approximately half its area. Vegetation cover comprised scattered yellow iris *Iris pseudacorus*. By summer 2019, the macrophyte common duckweed *Lemna minor* was abundant, while brooklime *Veronica beccabunga* dominated the damp margins. Other species present included common horsetail *Equisetum arvense* and ivy-leaved duckweed *Lemna trisulca*. Use of a tracer dye as part of the site Investigations work in Spring 2019 established that the Pond outfalls to the drainage ditch immediately south of the Shanganagh Castle lands.

FW4 Drainage ditches

A dry ditch is present at the northern boundary, adjacent to the Castle Farm housing estate and was densely shaded and lacked any vegetation.

Wet ditches line the hedgerows in Shanganagh Park to the south, which are associated with the Pond (see above). In summer 2019, the ditches were generally densely vegetated with a variety of common herbs (and occasional grasses) indicative of neutral and mildly eutrophic conditions. The dominant species were creeping buttercup *Ranunculus repens*, field horsetail *Equisetum palustre*, watercress *Rorippa nasturtium-aquaticum* and water mint *Mentha aquatica*. Other species occurring included hart's tongue *Asplenium scolopendrium*, great willowherb *Epilobium hirsutum*, water starwort *Callitriche* sp., lesser water parsnip *Berula erecta* and wild angelica *Angelica sylvestris*.

Grassland

GA1 Improved agricultural grassland

Cattle-grazed grassland habitat was located southwest of the Pond. The grassland was rank, with a sward of approximately 25 cm in height. Sown perennial ryegrass *Lolium perenne* was dominant alongside abundant dandelion *Taraxacum officinale* agg., with occasional ribwort plantain *Plantago lanceolata*, common ragwort *Senecio jacobaea* and creeping thistle *Cirsium arvense*. Beaked hawk's-beard *Crepis vesicaria*, yarrow *Achillea millefolium*, curled dock *Rumex crispus*, common hogweed *Heracleum sphondylium*, common knapweed *Centaurea nigra*, greater plantain *Plantago major*, and

spear thistle *Cirsium vulgare* were present on neglected margins. Other occasional species included marsh foxtail *Alopecurus geniculatus* on damper ground approaching the Pond.

GS2 Dry meadows and grassy verges

To the north-east of the improved agricultural grassland, south of the internal access road approaching Shanganagh Castle, there is a small grassland parcel. This was tall and rank at the time of survey but is also known to be mown. In Summer 2019 this area had an abundance of red fescue *Festuca rubra* agg. with frequent ribwort plantain, cock's-foot *Dactylis glomerata*, and dandelion. Creeping buttercup, yarrow, common knapweed, and red clover *Trifolium pratense* were occasionally present. Ragwort, greater plantain, wood sage *Teucrium scorodonia*, broad-leaved dock *Rumex obtusifolius*, self-heal *Prunella vulgaris*, and spear thistle were occasional. Whilst the botanical diversity of this area was higher than the former playing pitches described above (GA2), the presence of species indicative of improvement (e.g. broad-leaved dock) suggest nutrient enrichment.

Allotments are present to the south-west of Shanganagh Castle which were neglected and overgrown at the time of survey. The species assemblages here included both native and non-native food plant species of limited conservation value. This area is not the Shanganagh Community Gardens site identified in the DLRCC Green Infrastructure Strategy, which is located approximately 1.7 km to north adjacent to the Shanganagh Waste Water Treatment Works.

Woodland and Scrub

WD1 (Mixed) broadleaved woodland

Broadleaved plantation woodland was located to the north-west of the site beside an existing coach house. The canopy was approximately 20m high and dominated by ash *Fraxinus excelsior*, with occasional wild cherry *Prunus avium* and white poplar *Populus alba*. In summer 2019, no understorey was present, reflecting the management of the woods for open space by local residents. The field layer contained a mix of broadleaved plants and sedges, with locally abundant Atlantic ivy *Hedera hibernica*, early dog-violet *Viola reichenbachiana*, wood sedge *Carex sylvatica*, and ground ivy *Glechoma hederacea*.

Plantation woodland was also present east of the Pond and is associated with a long-established woodland (LEW) (recorded on the 1829 – 1842 Ordnance Survey Ireland maps). The canopy was approximately 20 m high and dominated by (non-native) beech *Fagus sylvatica*, with frequent ash, (non-native) sweet chestnut *Castanea sativa*, and occasional (non-native) spruce *Picea* sp. Wild cherry, Norway maple *Acer platanoides*, and yew *Taxus baccata* were rare. The open understorey has been partially cleared in recent times and was dominated by holly *Ilex aquifolium*, with frequent beech regeneration. Hawthorn *Crataegus monogyna* and elder *Sambucus nigra* were rare. The field layer was dominated by Atlantic ivy, and frequent bramble *Rubus fruticosus* agg. Other species included occasional (non-native and with invasive habit) winter heliotrope *Petasites fragrans*, wood sedge *Carex sylvatica*, lords-and-ladies *Arum maculatum* and honeysuckle *Lonicera periclymenum*.

WD5 Scattered trees and parkland

There was scattered trees and parkland habitat located in front of the Shanganagh Castle. The trees were mainly beech with a field layer dominated by red fescue with frequent ribwort plantain, cock's-foot, and dandelion. Broad-leaved dock, creeping buttercup, greater plantain, knapweed, red clover, self-

heal and yarrow were occasionally present. Beaked hawk's beard, bird's-foot trefoil *Lotus corniculatus*, lady's bedstraw *Galium verum* and petty spurge *Euphorbia peplus* were recorded occasionally on the margins.

WS1 Scrub

There were several areas of scrub within the Zol of the Proposed Development. Larger areas of scrub were identified south-east of the Pond and south-east of Shanganagh Castle, adjacent to the woodland. The scrub was dominated by bramble and the ground flora included cleavers *Galium aparine*, Atlantic ivy, herb Robert *Geranium robertianum*, and nettle *Urtica dioica*.

A thin parcel of scrub is also present around the perimeter of the Pond. Bush vetch *Vicia sepium*, hart's tongue, Himalayan honeysuckle *Leycesteria formosa* and common hogweed formed the species assemblage.

WL1 Hedgerows

There were several native hedgerows within the Shanganagh Castle portion of the site. All native hedgerows are significant features due to their function as ecological corridors and the shelter and resources they provide for invertebrates, birds and other native fauna. Based on historical mapping, these hedgerows have been here since at least 1842.

One hedgerow (approximately 100m long) runs along the northern boundary with the Castle Farm residential estate, forms a connection between the beech treeline (described under WL2) to the east, and the plantation woodland (WD1) to the west. This hedgerow has been heavily pruned resulting in a canopy containing a single semi-mature ash tree at its eastern end. A shrubby understorey dominated the remainder of the hedgerow and contained four woody native species, namely ash, elder, oak and rowan *Sorbus aucuparia*. Occasional ash, a single dog rose *Rosa canina* and holly were also present. The ground layer was dominated by bramble, ivy and winter heliotrope, with occasional lords-and-ladies, herb Robert, nettle, red-veined sorrel *Rumex sanguineus*, spear thistle and wood avens *Geum urbanum*. A second hedgerow dominated by hawthorn forms the southern boundary of the Site. Elder and ash are also frequent and the understorey and ground layer are dominated by bramble and ivy.

A low ornamental hedgerow was present along the perimeter of the existing WD1 ash plantation woodland to the northeast of the site. This structure is of negligible conservation value.

WL2 Treelines

Treelines bound the site to the north, west, and south. Canopy species were predominantly hawthorn, but ash and beech were also present. The understorey comprised bramble and the field layer included Atlantic ivy, cleavers, cow parsley *Anthriscus sylvestris*, herb Robert and nettle. The ecological value of many treelines is elevated by their connectivity to existing woodland habitats.

Annex 1 Habitats

No habitats listed on Annex I of the Habitats Directive were recorded within the survey area.

Green Infrastructure

The mosaic of woodland, hedgerows, and managed grasslands within the Zol of the Proposed Development provide habitat connectivity to the wider landscape, as identified in the DLRCC Green Infrastructure Strategy. Specifically, Shanganagh Park (and Shanganagh Castle lands to the north) is included within DLRCC's Green Infrastructure designation "Corridor 1 Coastal" and is additionally identified as a "Gateway Park" for Green Infrastructure within the DLRCC boundary.

7.3.5 Fauna

Desk Study

Protected and rare fauna species within a 5 km radius of the Proposed Development site returned from the desk study are detailed in Table 7.4.

Common Name	Scientific Name	Legally Protected Species	Red Listed (Excluding Least Concern)	Habitat Preference
Badger	<i>Meles meles</i>	✓	-	Deciduous or mixed woodlands near farmland or open ground.
Brown long-eared bat	<i>Plecotus auritus</i>	✓	-	Open deciduous and coniferous woodland, parkland, gardens and orchards.
Common frog	<i>Rana temporaria</i>	✓	-	Lakes and ponds, grassland, marsh, wet heath, peatlands, woodland and scrub, dune slacks, machair and riparian.
Common pipistrelle	<i>Pipistrellus pipistrellus</i>	✓	-	Along hedgerows and treelines, woodlands, parklands.
Dark green fritillary (butterfly)	<i>Argynnis aglaja</i>	-	-	Coastal habitats, machair, unimproved dry calcareous grassland, coastal grey dunes, dune-slacks and limestone pavement.
Daubenton's bat	<i>Myotis daubentonii</i>	✓	-	Near calm, slow-moving water. Error! Bookmark not defined.
Dingy skipper (butterfly)	<i>Erynnis tages</i>	-	✓	Generalist species found on limestone pavement and unimproved dry calcareous grassland.
Field cuckoo bee	<i>Bombus campestris</i>	✓	-	Open terrestrial habitat.
Grayling (butterfly)	<i>Hipparchia semele</i>	-	✓	Habitats with exposed rock.
Hedgehog	<i>Erinaceus europaeus</i>	✓	-	All lowland habitats where grassland is found next to mixed woodland and scrub.
Large red-tailed bumble bee	<i>Bombus lapidarius</i>	-	✓	Various habitats, such as parks and gardens.

Leisler's bat	<i>Nyctalus leisleri</i>	✓	-	Woodland, parkland, treelines, pasturelands, riparian habitats, over lakes, beaches, dunes and above streetlights in urban areas.
Marsh fritillary (butterfly)	<i>Euphydryas aurinia</i>	✓	-	Wet grasslands, bog, machair, coastal grey dunes.
Natterer's bat	<i>Myotis nattereri</i>	✓	-	Woodland, pasture, along tree lines and hedgerows and over water including white water rapids.
Otter	<i>Lutra lutra</i>	✓	-	Lakes and ponds, watercourses, riparian woodland, estuaries, sea inlets and bays, saltmarshes, swamps, riparian.
Pine marten	<i>Martes martes</i>	✓	✓	Forest or scrub.
Pygmy shrew	<i>Sorex minutus</i>	✓	-	Habitats with high ground cover, woodlands, grasslands, hedgerows and peatland.
Red squirrel	<i>Sciurus vulgaris</i>	✓	-	Woodland.
Small blue (butterfly)	<i>Cupido minimus</i>	-	✓	Unimproved dry calcareous grassland, calcareous moraine and scree. coastal grey dunes, machair, limestone pavement.
Small heath (butterfly)	<i>Coenonympha pamphilus</i>	-	✓	Unimproved dry grassland, machair and coastal grey dunes.
Smooth newt	<i>Lissotriton vulgaris</i>	✓	-	Ponds, wet heathland, bogs, in damp habitats with cover from desiccation.
Soprano pipistrelle	<i>Pipistrellus pygmaeus</i>	✓	-	Along hedgerows and treelines, woodlands, riparian.
Wall (butterfly)	<i>Lasiommata megera</i>	-	✓	Unimproved dry calcareous grassland, peatlands, vegetated sea-cliffs, coastal grey dunes, machair, limestone pavement.
Wood white (butterfly)	<i>Leptidea sinapis</i>	-	✓	Grassland habitat within forest openings and limestone pavement.

Table 7.4. Desk Study Data

Suitable habitat to support all species listed in Table 7.5 is considered to be present within the Zol of the Proposed Development, with the exception of seven butterfly species (dark green fritillary, dingy skipper, grayling, marsh fritillary, small blue, small heath, wall, and wood white) and pine marten.

Bats

Bat Roosts

The bat roost suitability assessment in September 2018 of the two-storey occupied house proposed for demolition identified no features with suitability for roosting bats. The roof was pitched with terracotta tiles which were in good condition with no missing tiles / gaps. The building exterior was well-sealed, without gaps between plastering and gables, soffits or fascias. Soffits and fascias had been recently replaced and provide no conspicuous bat entrance or exit points. The loft space of the house had been converted in preparation for use as storage. The inner walls of the loft have been recently lined with Tyvek-type insulation, preventing bat access into the loft in most places. A single tear in the Tyvek sheeting on one wall was investigated closely, but no evidence of bats was found within or adjacent to the tear. The building was therefore categorised as having Negligible bat roost suitability (see Figure 7.3).

The preliminary ground-based bat roost assessment of trees identified:

- three trees as having High suitability for roosting bats (T1, T4 and T5);
- two trees as having Moderate suitability for roosting bats (T2 and T6); and,
- three trees as having Low suitability for roosting bats (T3, T7 and T8).

Tree climbing inspection surveys recorded no roosting bats or evidence of but confirmed the above suitability assessments were appropriate given the PRF present. The locations of trees with bat roost suitability are shown on Figure 7.3.

No bats were recorded emerging from any trees with bat roost suitability during the dusk emergence surveys.

Bat Activity

Bat activity surveys were conducted in autumn 2018, and spring and summer 2019. Results of these surveys are summarised below.

Four key areas of highly suitable bat foraging habitat were identified on Site; the Pond and immediate surrounds; the two broadleaved woodland areas; and, the hedgerow running east-west along the south-western boundary of the Site. These areas are shown on Figure 7.4. In addition to these areas, the wider site and surrounding environment provide good quality bat commuting and foraging habitat, in particular the network of unlit mature hedgerows and treelines which connect areas of foraging habitat.

Autumn 2018

Between August and October 2018 four species of bat were recorded within the Zol of the Proposed Development: common pipistrelle, soprano pipistrelle, Nathusius' pipistrelle *Pipistrellus nathusii* and Leisler's bat.

Bats were recorded mostly more than an hour after sunset or an hour before sunrise, indicating that they were not emerging / re-entering roosts located nearby. Pipistrelle bat social calls were recorded during walked activity transects and by static detectors. This is possibly indicative of mating behaviour

which may be expected at the of the time of year surveys were conducted, as bats begin to breed in August / September.

Spring / Summer 2019

Between April and May 2019, three species of bat were recorded within the site: common and soprano pipistrelles, and Leisler's bat.

Data returned from static detector location S7 (see Figure 7.4) indicates Leisler's bats were often recorded before or soon after sunset. Given the location of S7 in the central area of the Site by the Pond, this data may indicate that a Leisler's bat roost is present in proximity to the Site. However, this species emerges from roost relatively early and is a strong and fast flyer. Therefore, it is feasible that bats recorded on site may be from roost locations outside of the site. Call analysis indicated that the Leisler's bats recorded were foraging within a closed environment, likely within / near the woodland and hedgerow habitats in the Pond area.

Otter

No evidence of otter was recorded during field survey. Suitable habitat for commuting / foraging by this species exists, including the Pond and drainage ditches, and habitat suitable for refuges in proximity to these features is also present (such as the wooded Pond island).

Badger

Results of badger survey are presented in a confidential appendix to this EIAR.

Other Protected Mammals

There was no optimal habitat for Irish stoat within the site (rocky scrub, as defined by Hayden and Harrington (2001)), however, suitable habitat / prey resource exists on site, and Irish stoat is common and widespread in Ireland. Therefore, Irish stoat is presumed to be present within the Zol.

Pygmy shrew may be present on site. None were observed, however, long grass / other dense vegetation and refugia such as dead logs are present for nesting within and an adequate insect food supply is likely to exist. Given the minimum territory size of 200 m² (Hayden and Harrington, 2001), and the abundance of suitable habitat available, there may be several pygmy shrew territories within the site.

No observations of or evidence of hedgehog was recorded during field surveys, however they are nocturnal and field signs are less frequently observed than for other mammals. Suitable habitat for feeding, nesting, and hibernating hedgehogs is present within the site, including grassland, hedgerows, and nearby gardens. It is considered likely that there may be several territories within the site.

Irish hare *Lepus timidus hibernicus* was not observed during field surveys. Given the presence of frequent dog walkers in Shanganagh Park nearby, and absence of suitable habitat such as tussocky grassland within which hares could shelter, this species is considered likely to be absent from the site.

Amphibians

The results of amphibian surveys are summarised below.

Smooth newt

Smooth newt were present in the Pond and in one of the associated drainage ditches (referred to as 'D1', see Figure 7.5) within Shanganagh Park.

Smooth newt were only recorded in the Pond on two of the six survey dates, as shown in Table 7.5.

Survey Date	Survey Peak Smooth Newt Count	Algae Present	Fish Observed	Common Frog Observed
08 April 2019	1	No	No	No
23 April 2019	4	No	No	No
07 May 2019	0	Yes	No	No
29 May 2019	0	No	Yes	No
19 June 2019	0	Yes	No	No
26 June 2019	0	No	No	No

Table 7.5. Results of Smooth Newt Surveys in the Pond

A pollution incident occurred in the Pond following the second survey, following which no smooth newts were recorded (i.e. on the four subsequent survey visits). An investigation following the event found that pollution was caused by a back-up in the public drainage system in the nearby residential estate of Castle Farm.

In addition to the Pond, smooth newts were also present in drainage ditch D1, with three individuals recorded on 23 April 2019 (before the pollution incident), and one on 07 May 2019 (just after the pollution incident). No smooth newts were recorded in D2 during any of the surveys. A summary of these results is provided in Table 7.6.

Survey Date	Survey Peak Smooth Newt Count	Algae Present	Fish Observed	Common Frog Observed
08 April 2019	0	No	No	Yes
23 April 2019	3	No	No	No
07 May 2019	1	No	No	No
19 June 2019	3	No	No	No
26 June 2019	0	No	No	No

Table 7.6. Results of Smooth Newt Surveys in Ditch D1

No smooth newt eggs were recorded in the Pond or either ditch during any of the surveys.

Based on the results of the field survey and following UK guidelines for great crested newt (Natural England, 2015), the smooth newt population within the Pond and drainage ditches is considered Small.

However, it should be noted that only 25% of the Pond area could be surveyed due to lack of access. It is therefore possible that additional individuals were not recorded and the population is therefore assumed, on a worst-case basis, to be Medium sized.

Terrestrial habitat suitable for smooth newt was present in the vicinity of the Pond and ditches with dense scrubby hedgerows in addition to a wide variety of structurally complex features associated with the hard-standing area adjoining the allotments (e.g. rubble, timber, litter, stored compost bags etc.).

Common frog

Twelve clumps of common frog spawn were recorded in drainage ditch D1 in Shanganagh Park. No other life stages (tadpoles / adults) were recorded and no evidence of common frog was recorded in the Pond.

Reptiles

Common lizard *Zootoca vivipara* was not observed during field surveys but some optimal habitat (e.g. woodland with suitable basking features) was present, and at least a small population is assumed according to the precautionary principle to be present.

Birds

Breeding Birds

Breeding bird surveys identified two BoCCI species as probably breeding on site: goldcrest *Regulus regulus* and robin *Erithacus rubecula* (both Amber List). Other species of conservation concern recorded, but which were not believed to breed on Site, were swallow *Hirundo rustica* and starling *Sturnus vulgaris* (both Amber List). Numerous other species of low conservation concern were recorded on Site, both breeding and non-breeding. This included mallard *Anas platyrhynchos* which was confirmed as breeding on the Pond.

The results of breeding bird survey are shown on Figure 7.6

Wintering Birds

Relatively small numbers of three gull species were recorded in the field in Shanganagh Park which is located immediately to the south-east of the Proposed Development (and therefore within the ZoI), as detailed in Table 7.7. No wintering birds were recorded using the playing fields to the immediate south of the Proposed Development.

Black-headed gull *Chroicephalus ridibundus* and herring gull *Larus argentatus* are Special Conservation Interest Species (SCI) of nearby European designated sites (South Dublin Bay and River Tolka Estuary SPA and The Murrrough SPA).

Birdwatch Ireland and local birdwatchers did not have any records to provide of wintering birds.

Common Name	Scientific Name	Conservation Status*	Peak Count (Shanganagh Castle Fields)	Peak Count (Shanganagh Park)
Black-headed gull	<i>Chroicephalus ridibundus</i>	Medium (Amber List)	0	4
Great black-backed gull	<i>Larus marinus</i>	Medium (Amber List)	0	2
Herring gull	<i>Larus argentatus</i>	High (Red List)	0	26

* Conservation status according to *Birds of Conservation Concern in Ireland (BOCCI)* (Colhoun and Cummins, 2013).

Table 7.7. Wintering Bird Survey Results

Fish

A single European eel *Anguilla anguilla* was recorded in the Pond on 29 May 2019 during amphibian surveys.

European eels are catadromous, meaning that they live in freshwater and breed in the ocean. Given that eel was only recorded on the second amphibian survey visit and none of the four subsequent visits and given the lack of previous records (the Pond has been subject to previous survey for amphibians (Scott Cawley, 2013)), it is unlikely that this species occurs regularly in this waterbody. Furthermore, given the unsuitability of the Pond for eels, any eels which migrate to the Pond (likely to be very few as the nearest suitable habitat is 600 m away) are unlikely to reside.

There is low potential for any other fish to occur due to lack of suitable waterbodies.

Invertebrates

A number of common butterflies were recorded, including green-veined white *Pieris napi*, meadow brown *Maniola jurtina*, speckled wood *Pararge aegeria*, and small copper *Lycaena phlaeas*. None of these are of conservation concern according to the Irish Red List of butterflies (Regan *et al*, 2010).

No suitable habitat was identified for marsh fritillary (the only European protected butterfly species occurring in Ireland). Marsh fritillary feed on devil's bit scabious *Succisa pratensis*, which was not recorded.

7.4 LIKELIHOOD OF IMPACTS

7.4.1 Features Excluded from Further Assessment

EPA (2017) categorises potential effects as either likely or not likely. Only likely effects on 'significant' ecological features (i.e. those valued at Local Importance (Higher Value) or above) are assessed in this Chapter. In view of the baseline data obtained through desk study and field survey and described above, the following features have been excluded from further assessment because they have been found to be likely absent from the site or because it is clear that no effect from the Proposed Development is possible.

Sites Designed for Nature Conservation

European Designated Sites

An Appropriate Assessment (AA) Screening Report has been completed (AECOM, 2019b), the purpose of which was to determine, in view of best available scientific knowledge, whether the Proposed Development, either alone or in combination with other plans or projects, could have Likely Significant Effects (LSE) on European designated sites identified within the Zol of the Proposed Development, in view of the sites' conservation objectives. Note that the designated sites detailed in the AA Screening Report have not been identified based on arbitrary distances, but individually assessed as potentially relevant in relation to potential effects from the Proposed Development based on the "*the nature size and location of the project*" as per guidance published by the Department of Environment, Heritage and Local Government (DoEHLG, 2010).

The AA Screening Report concluded that there would be no Likely Significant Effects on any European designated sites, either alone or in-combination with other plans or projects.

Nationally Designated Sites

The Proposed Development will not directly impact upon any nationally designated sites. Potential effects are therefore limited to pollution, either via surface run-off, through groundwater or via watercourses, or transmission of non-native flora into these sites.

The closest nationally designated site to the Proposed Development is Loughlinstown Woods pNHA, which is 1.9 km north. Specific data for this site was not available, however a review of aerial and street-side photography suggests the site comprises mature broadleaved woodland with a watercourse running through it. The intervening land between this site and the Proposed Development is residential housing and associated infrastructure. There is limited connectivity via narrow strips of woodland / scrub and the railway corridor (there is no connectivity via the watercourse). However, given the distances involved and likely reason for designation of the pNHA (habitats), there is no possibility of effect from the Proposed Development via this pathway. All other nationally designated sites are over 3 km distant with no connectivity given the barriers posed by intervening land use / lack of connective habitat, including watercourses. Furthermore, no sites are designated for mobile species whose range may overlap with the effect-specific Zols of the Proposed Development. The boundaries / designated reasons for many nationally designated sites identified are identical with underlying European sites, and therefore the above assessment for LSE also applies.

Flora

No species of flora listed as plants of conservation concern on Irish Red Lists were recorded. Furthermore, no suitable habitat for protected flora species returned from the desk study was recorded during field survey. Therefore protected, rare and/or notable floral species are considered to be absent.

Annex 1 habitats

No Annex 1 habitats were recorded on Site or within the Zol of the Proposed Development, therefore impacts upon them are not possible.

Fish

Eel was recorded on one occasion in the Pond. This is highly likely to be an unusual occurrence as eel was only recorded on one of six surveys of the Pond and had not been recorded during previous survey work. The habitat is sub-optimal for this species (and all important fish species) due to its isolated location and small size. Therefore, fish are not considered further in this assessment.

7.4.2 Summary of Significant Ecological Features

As per the impact assessment methodology outlined in Section 7.2.5, significant ecological features are those valued at Local Importance (Higher Value) or higher as per NRA (2009) definitions. Ecological features valued at Local Importance (Lower Value) or of Negligible value are not considered significant features and are not carried forward for impact assessment. Table 7.8 summarises all significant ecological features identified within the Zol of potentially significant impacts.

Ecological Feature		Value	Rationale
Non-Annex 1 habitats	Grassland	Local Importance (Higher Value)	Grassland habitat present is not particularly species rich, is subject to regular management (mowing) and shows signs of improvement which results in decreased biodiversity. This habitat is common and widespread in the local area. However, the grassland may be of value to some species, such as foraging badger, and therefore has importance at a Local scale.
	Woodland and scrub	Local Importance (Higher Value)	Woodland is of plantation origin and of reduced ecological value due to specifics of management (i.e. for amenity use rather than biodiversity) or composition (i.e. high dominance of non-native beech in the canopy). However, the woodland in the south-east of the site is long-established with associated biodiversity value, and woodland habitat provides a food resource and shelter to a wide variety of common and important species, including smooth newt.
	Hedgerows and trees	Local Importance (Higher Value)	Several hedgerows and treelines on Site are comprised of native species and, although not particularly diverse, form valuable connections between the Site and the wider area.
	Freshwater	Local Importance (Higher Value)	Freshwater features within the Site are limited to a small pond and isolated ditches. These habitats do not host a particularly diverse flora, but are important for important species such as smooth newt.
Non-native plant species	Winter heliotrope	Local Importance (Higher Value)	This plant is non-native and can form dense monospecific patches to the detriment of native ground flora. Given its distribution on Site and dispersal mechanism, it is considered this plant could have a negative impact on local flora only.
Fauna	Bats	County Importance	All species of bat receive legal protection in Ireland. The field survey conducted for bat roosting was limited to a single survey of trees with bat roost suitability and therefore, although the Site is unlikely to support 1% of the County population of any species, County Importance has been applied on a precautionary basis.

	Otter	Local Importance (Higher Value)	Otter receive legal protection in Ireland. Suitable habitat for otter is present, however, no evidence of otter was found.
	Badger	Local Importance (Higher Value)	Badger is legally protected in Ireland. Badger are active within the Site and the habitats present may provide resource for refuge commuting and foraging.
	Other protected mammals	Local Importance (Higher Value)	Habitat suitable for stoat, pygmy shrew and hedgehog (all protected under the Wildlife Acts) is present on Site, although these species were not recorded during field survey. These are all relatively common and widespread species and any populations at the Site are of local importance only.
	Smooth newt	County Importance	Smooth newt is protected by the Wildlife Acts. The population of smooth newt in the Pond and ditch D1 is of at least Small size, but is assumed by this assessment to be of Medium size, according to criteria developed for great crested newt in the UK. No evidence of breeding was recorded, however their presence in these features during the breeding season, and persistence of the population since initial survey in 2013 suggests there is a breeding population on Site. Breeding populations represent a critical phase of the life cycle and given an apparent lack of other waterbodies in the surrounding area, smooth newt have been valued at County Importance
	Common frog	Local Importance (Higher Value)	Common frog is protected by the Wildlife Acts and present on Site, with breeding indicated by the presence of spawn. No individuals or other evidence was recorded. The population is likely to be less than 1% of the county population.
	Common lizard	Local Importance (Higher Value)	Common lizard is protected by the Wildlife Acts. None were recorded on Site, but suitable habitat for the species exists. Given the lack of sightings, the population is likely to be less than 1% of the county population.
	Bird species	Local Importance (Higher Value)	Only small numbers of common species of breeding and wintering birds were present, although these did include two Amber Listed breeding species and two SCI species of a nearby European site.
	Invertebrates	Local Importance (Higher Value)	There were NBDC records for two invertebrate species of conservation concern identified on Irish Red Lists (field cuckoo bee (Vulnerable) and large red-tailed bumble bee (Near Threatened)). The woodland and grassland present within the Zol of the Proposed Development offer potentially suitable habitat for both species. In the absence of evidence to the contrary, and applying the precautionary principle, populations of both species are presumed to be present.

Table 7.8. Evaluation of Significant Ecological Features

7.4.3 Inherent Mitigation

Inherent (or embedded) mitigation are those measures which have been incorporated into the design of a development or project and which are designed to avoid or reduce adverse effects, including on ecological features. Embedded mitigation relevant to biodiversity will be delivered at the Proposed Development through the design and implementation of the Landscape Masterplan. The Landscape Masterplan is illustrated on drawing 60588099-SHT-20-L-1000 and is described in more detail in Chapter 14.0 The Landscape. However, key elements which will serve to act as mitigation for negative effects on biodiversity, as well as in some instances serving to provide ecological enhancement, are:

- the large woodland blocks in the north-west and south-east of the site will be retained;
- the Pond will be retained and the hydrological regime of this waterbody and the connected drainage ditches will be maintained. The landscaping works within and surrounding the Pond have been designed to benefit smooth newt and common frog. Measures include the retention of some of the existing scrub, the planting of marginal and aquatic native vegetation (which is currently lacking and is important for smooth newt egg laying) and the removal of some dense scrub and overhanging trees to reduce over-shading of the waterbody. Existing connections between the Pond and retained woodland blocks (e.g. the vegetated drainage ditches) will be maintained or will be facilitated through the creation of greenspace and the installation of amphibian tunnels;
- the hedgerow along the southern boundary of the site will be retained (with the exception of a small gap created to enable the construction of a new footpath). The hedgerow / tree line along the northern boundary, which is of low aesthetic value, is to be replaced by new tree and hedgerow planting;
- planting of trees across the Proposed Development;
- in a number of areas, meadow planting, incorporating a diversity of native flora, will take place;
- raingardens will be constructed for the sustainable treatment of surface water run-off. Whilst their primary function is to assist in pollution prevention and minimising run-off from the Proposed Development, these features also enhance biodiversity when planted with a mixture of native plant species; and,
- swales will be constructed as a form of Sustainable Drainage System (SuDS) to further treat and manage surface water run-off from the Proposed Development during its operation.

The permanent lighting design has also given due cognisance to bats and will incorporate the following specifications made by the BCT and Institute of Lighting Professionals (BCT and ILP, 2018) to minimise disruption to bat roosting, foraging and/or commuting:

- the installation of permanent lighting features in the vicinity of key bat habitats – namely the two large woodland blocks, the Pond and the hedgerow / tree line along the southern boundary of the Proposed Development – will be avoided as far as possible. Where lighting is required, it will be designed to minimise lightspill onto these habitats / features; and,
- lighting units will lack ultraviolet (UV) elements;
- where possible, LED luminaires will be used;
- lights which emit in the red spectrum will be preferred to those which emit white light;
- the use of low-level or bollard lighting units will be investigated. Where this is not possible, column height will be minimised to reduce light spill; and,
- as a last resort, accessories such as baffles, hoods or louvres will be used to reduce lightspill.

Embedded mitigation which is achieved through the design of a development can be considered at the impact assessment stage whereas mitigation measures which are not an integral part of the design ('specific mitigation') are considered following an initial assessment of the ecological impacts, giving rise to an assessment of residual effects which would occur following the implementation of mitigation.

7.5 DESCRIPTION AND SIGNIFICANCE OF IMPACTS

This section should be read with the impact assessment methodology in Section 7.2 which defines the categories adopted in this Chapter to characterise significance of effects. Impact assessment is undertaken after considering mitigation which is inherent in the design (i.e. structural features incorporated into the engineering design for the Proposed Development and included in the planning application documentation) as described in Section 7.4.3.

Most potential impacts from the proposed development relate to the construction phase, however impacts during operation (such as increased disturbance of habitats via an increase in the local population) are also relevant. As the Proposed Development is a housing scheme and can be expected to be retained in perpetuity, no consideration is given to 'decommissioning' or 'restoration' phases.

Note that assessment of significance of effects does not preclude any legal protections and consequent mitigation requirements.

7.5.1 Impacts on Non-Annex 1 Habitats

Construction Impacts

Direct Habitat Loss

Almost all grassland habitat within the boundary of the Proposed Development will be lost during the construction phase. The Landscape Masterplan includes for the creation of areas of amenity grassland, as well as areas of meadow which will contain a mix of native flora. The overall loss of grassland habitat will therefore be minimised but will represent a permanent adverse impact on a feature of Local Importance (Higher Value). However, given the relatively low diversity of species contained within the existing grassland habitats on site, and the fact that it appears to support few other species (e.g. no evidence of badger foraging was identified, and other areas of habitat such as the woodland blocks are more important to bat species), the net loss in grassland area is deemed to result in no significant effect on biodiversity.

The large woodland blocks in the north-west and south-east of the site will be retained. Some trees will be removed from the western edge of the block to the south-east in order to create a 'softer' edge than the current straight line. In addition, a small number of trees will be removed from elsewhere across the site as part of the construction phase. However, there will be substantial re-planting of trees as part of the Landscape Masterplan, providing biodiversity benefits across the site. There is therefore no significant effect in relation to woodland loss.

The hedgerow delineating the northern boundary of the site is to be replaced as it is currently gappy and, from an aesthetic perspective, composed of low-quality trees. There will be temporary loss of this

feature while the new tree / hedgerow planting is established, but this is considered to result in no significant effect in the long-term.

The hedgerow delineating the southern boundary of the site will be entirely retained, except for a small gap which will be created to enable the construction of a new footpath. The loss of a very small section of this hedgerow is considered to result in no significant effect on biodiversity.

The Pond in the centre of the site will be retained, though with some landscaping. Drainage ditches will also be retained and the current drainage regime will be maintained. There will therefore be no significant effect on these habitats.

Pollution

There is the potential for pollution events during construction to negatively impact upon all terrestrial and freshwater habitats present (all of Local Importance (Higher Value)). This could likely be remediated in the medium-term and therefore would represent a temporary, adverse impact of high magnitude (i.e. all freshwater habitats could be affected). Given such an impact would be limited to the immediate area of the site and considering the importance of the habitats present and the species they support (principally smooth newt and common frog), this would constitute a significant negative effect on Locally Important ecological features.

Operational Impacts

Disturbance of Retained Habitats Due to Increased Footfall

The Proposed Development involves the construction of 598 no. new residential units, ranging from one to four bedrooms. The habitats to be retained (mainly woodland areas and the Pond) will represent natural areas highly accessible to residents of the new dwellings and will likely be popular for recreation (e.g. dog walking). Increased footfall is therefore anticipated in the retained habitats. This is considered highly likely to result in increased disturbance (i.e. trampling) of the habitats present, which could either destroy the ground flora or open it up to ruderal species and consequently reduce biodiversity. However, to mitigate for this, footpaths are to be provided as part of the Landscape Plan, including through the retained woodland block to the south-east of the Site. Impacts associated with increased footfall will therefore be limited and will likely be restricted to accessible areas near to footpaths and would not affect the entire area of habitats. It is concluded that such impacts would therefore result in no significant effect on biodiversity.

Pollution

Pollution of all habitats will be prevented during the operation of the proposed development through the implementation of a Sustainable Drainage System, including raingardens and swales detailed in the Landscape Masterplan. There will therefore be no significant effects on habitats as a result of pollution.

7.5.2 Impacts Associated with Non-Native Plant Species

Construction Impacts

Causing the Spread of Non-Native Species

The non-native plant winter heliotrope is present within the peripheries of the woodland in the north-west and south-east of the Site and along the northern boundary. Although these areas of habitat are

to be retained, it is possible that they may be entered during the construction phase by machinery / personnel which could then come in to contact with propagules of this species (rhizome) and transport them further on- or off-Site.

Such actions are considered to be likely and consequent spread could feasibly impact upon the local area, in which there are extensive areas which would be suitable for the establishment of this species (generally roadsides / other rough grassland and woodland edge). If this species does become further established within the local area, it could form a monoculture and reduce the biodiversity of local habitats (all of which have been valued as having Local Importance (Higher Value)). Impacts in the wider area are considered less likely due to distances likely to be covered by personnel / machinery and the persistence of material containing propagules over further distances (i.e. affected soil is likely to become dislodged earlier in any journey). It is considered unlikely that propagules could be transported to important sites (such as internationally or nationally designated sites) due to the lack of clear connectivity. Given the above, causing the spread of non-native species during construction would result in a potentially permanent impact on features valued at Local Importance (Higher Value). As the habitats which could be affected include important retained woodland habitats, and not just relatively species-poor grassland, this could result in a significant negative effect on Locally Important ecological features.

Operational Impacts

As noted above, increased footfall is anticipated in the retained habitats within and surrounding the Site due to the construction of the Proposed Development. Increased disturbance of these habitats is likely to lead to disturbance, and therefore the accidental spread, of winter heliotrope. For the reasons provided above it is only considered likely that winter heliotrope could spread, and therefore impact upon, the local area, within which all habitats have been valued as of Local importance only. Therefore, the spread of non-native plants during the operational phase of the Proposed Development is likely, will be permanent, and will impact on Locally important habitat. Therefore, a significant negative effect on Locally Important ecological features is predicted.

7.5.3 Impacts on Bats

Construction Impacts

Loss / Disturbance of Trees with Suitability for Roosting Bats

Five trees with bat roost suitability may be removed to facilitate the Proposed Development. Two trees with bat roost suitability located within the south-east woodland block and one within the north-western block will be retained but may be subject to disturbance (noise / vibration / lighting) during construction. In the absence of complete bat emergence / re-entry survey data, adopting the precautionary principle and given also the suitability of the area for foraging bats generally, it should be assumed that bat roosts are present in all trees. As two trees which will be removed were assessed as having High bat roost suitability, roosts of significant conservation value (such as breeding roosts) may be affected. Furthermore, two trees (with High and Moderate suitability) are likely to be disturbed. This would constitute a permanent impact on the local bat population, which may include impacts on roosts of high conservation value.

Four bat species were recorded on Site during field survey. Three species – common, soprano and Nathusius' pipistrelle – are identified as being Least Concern on the Irish Red List (Marnell *et al*, 2009). The fourth species – Leisler's bat – is identified as being Near Threatened.

The loss or disturbance of bat roosts during construction would therefore represent a significant negative effect on ecological feature(s) of County Importance.

Disturbance to Foraging / Commuting Bats

Survey has demonstrated that bat activity was particularly high in four key areas of the Proposed Development (the large woodland blocks, around the Pond and along the hedgerow along the southern Site boundary). During construction, disturbing activities which generate noise and artificial lighting will affect such features demonstrated to be used by bats within the Site, which, if carried out during hours when bats are active, could result in displacement of foraging or commuting bats. Further suitable habitat which is connected to the Site is present within the wider area (Shanganagh Park, Woodbrook Golf Course and the gardens of Rosedale House), which displaced bats would be likely to use.

Given the above, construction disturbance to foraging / commuting bats would represent a highly likely, temporary impact. This represents a significant negative effect on an ecological feature of County Importance.

Operational Impacts

Disturbance to Roosting, Foraging and Commuting Bats

The design of the development includes lighting which limits impacts to bats (as described in Section 7.4.3). By avoiding or minimising the use of artificial lighting in areas of key bat habitat, and using lighting units which produce the minimum required light levels, there will be no significant effects on foraging or commuting bats.

7.5.4 Impacts on Otter

Construction Impacts

Displacement of Commuting / Foraging Otter

No otter refuges or any evidence of otter was recorded during field survey. However, suitable habitat for commuting / foraging otter exists, such as the Pond and drainage ditches. Therefore, there is the potential that the Site represents a resource to otters in the area, although this is considered likely to be sub-optimal due to its isolation (there are only limited watercourses / waterbodies in the wider area and no obvious connectivity between these and the Site). The coast is approximately 600 m to the east, however again no obvious connectivity exists, and otters would have to traverse large areas of terrestrial habitat to use the Site from the coast. Otters hold large territories (approximately 24 km of watercourse (Harris and Yalden, 2008)) and the foraging resource within the Site is therefore very unlikely to represent a significant portion of that used by a particular otter. Construction activities may physically obstruct otter from using suitable features on the Site or may effectively obstruct otter from using the Site through noise, vibration or lighting disturbance.

Given the ditches and the Pond are considered unlikely to represent a key resource, potential displacement is not likely to materially affect the local otter population. Displacement via construction activities would therefore result in no significant effect on the species.

Pollution

Construction-related pollution of aquatic habitats on site could reduce the availability of prey items for otter. However, as described above, the area encompassed by the Proposed Development will represent a very small portion of the territory of an individual otter. The loss of foraging opportunity within the Site as a consequence of a pollution event would therefore result in no significant effect on this species.

Disturbance or Injury to Commuting / Foraging Otter

Otter using the Site may become trapped / injured by falling into open excavations associated with the construction phase of the Proposed Development. Direct injury may occur from construction traffic on the access route into the Site, and the likelihood of this will increase as construction activity increases the volume of traffic using the route.

As noted above, suitable habitat for otter is present on Site but is likely to be sub-optimal given its limited area and high isolation. Otters hold large territories and, given the probable low importance of the Site resource, impacts described above are not likely to affect large numbers of individuals (if otter are present on Site at all).

However, given the life history strategy of otter (i.e. individuals mature slowly, and females only generally give birth once per year), injury / death of even one individual as a result of the Proposed Development would be relevant at the County scale. Such an impact is likely to be temporary as otters are highly mobile and any suitable vacant territory (if present) is likely to be re-occupied quickly.

Given the territory size and life history of otter as discussed above, injury / death of one (or a small number) otter would result in a temporary effect which is considered to be significant negative effect on a Locally Important ecological feature.

Operational Impacts

Increased Disturbance to Foraging Otter / Effective Obstruction of Foraging Habitat

As noted above, suitable but sub-optimal habitat for foraging / commuting otter is present on site. Some of this habitat, for example the Pond, will remain during operation of the proposed development. Increased human disturbance at the site is expected as a direct result of the proposed development, as are features such as artificial lighting. Although the pond will remain, such human disturbance / lighting could result in effective obstruction of the habitat as a resource for otter. Given the resource is sub-optimal and the large territory sizes used by otter, effective obstruction of the pond is not likely to result in a substantial impact upon otter foraging resource. In the context of the Site (with cognisance of otter territory size / life history) otter are likely to be of County importance. Therefore, disturbance / effective obstruction of otter foraging habitat during operation of the Proposed Development is likely to result in a slight impact at the County scale, and no significant effect.

Pollution

Pollution of aquatic habitats will be prevented during the operation of the proposed development through the implementation of a Sustainable Drainage System, including raingardens and swales detailed in the Landscape Masterplan. There will therefore be **no significant effects** on otter as a result of pollution.

7.5.5 Impacts on Badger

Impacts on badger are considered in a separate confidential appendix to this EIAR .

7.5.6 Impacts on Other Protected Mammals

Construction Impacts

Injury to Other Protected Mammals

Habitat suitable for Irish stoat, pygmy shrew and hedgehog is present on Site. These species were not recorded during field survey but are nonetheless considered likely to use the habitats present as they are all relatively common and widespread. Such protected mammals may become trapped / injured by falling into open excavations associated with the construction phase of the Proposed Development. Direct injury / death of protected mammals may occur from construction traffic, particularly on the access route in / out of the Site. Given the life history of these small mammals (which can have several large litters per year), the most serious impact (injury or death of a small number of individuals) is unlikely to have a major impact on their overall populations in the local area. Therefore, such impacts on these species are considered to represent no significant effect.

Loss of Habitat Suitable for Other Protected Mammals

As a result of construction of the Proposed Development, there will be a net loss in grassland habitats. This will permanently negatively impact upon the foraging / commuting habitat available for other protected mammal populations. Extensive suitable habitat for such species is known to exist within the wider area of the site (such as Shanganagh Park, Woodbrook Golf Course and the gardens of Rosedale House). Therefore, permanent loss of suitable habitat during operation of the Proposed Development is likely to result in no significant effect on these species.

7.5.7 Impacts on Smooth Newt

Construction Impacts

Disturbance, Injury or Death to Smooth Newt

Although the Pond, woodland blocks and drainage ditches are to be retained, construction of the Proposed Development will directly impact upon other less valuable terrestrial habitat in which smooth newt may occur. Landscaping works within and around the Pond are also proposed. The operation of plant and machinery therefore has the potential to result in the direct mortality or injury of smooth newts. This impact is more likely at certain times of year, depending on the works being carried out, as this species generally inhabits waterbodies during the breeding season and terrestrial environments outside of this time.

Entrapment within open excavations may also cause injury / death of smooth newts. Furthermore, there is the potential for pollution events during construction to negatively impact upon all terrestrial and freshwater habitats present, which may also negatively affect this species.

Direct construction impacts themselves are temporary, but their effects may be longer-term. As the smooth newt population on Site is relatively small and seasonally restricted to distinct areas of habitat, a large proportion could be affected by a relatively minor impact (e.g. via a pollution event on the Pond during the breeding season). Such effects are regarded as permanent as it could not be guaranteed that the population would recover.

Indirect disturbance from construction activities, particularly artificial lighting illuminating the Pond / ditch habitats, may also negatively impact upon the smooth newt population. Depending on the timing of works, disturbance may negatively impact upon the breeding success of the population by deterring newts from displaying which is a critical part of the breeding cycle. In addition, artificial lighting of the Pond may make newts more vulnerable to predation by making them easier for predators to see.

A review of aerial photography indicates that smooth newt habitat, particularly freshwater breeding habitat, is limited in the wider area and no smooth newt records were returned from the desk study. This may suggest that this population is isolated (which increases its vulnerability to extinction) and that the individuals on Site may represent a large proportion of the Local population.

Employing the precautionary principle and assuming a worst-case scenario, construction of the Proposed Development could result in a permanent negative effect on a large proportion of the smooth newt population. This would represent a significant negative effect on an ecological feature of County Importance.

Operational Impacts

Loss of Smooth Newt Habitat

As part of the Landscape Masterplan, the Pond will be subject to works which are designed to both increase its amenity value, whilst also providing benefits for smooth newt. Details of the relevant aspects of the Landscape Plan are provided in Section 7.4.3. In particular, the retention of some scrub around the Pond and on the island will ensure that sufficient cover is left for this species out of the aquatic environment. The provision of aquatic and marginal vegetation will also benefit smooth newts by providing additional egg laying opportunity, which is currently limited. The edge of the Pond will in places be graded which will facilitate access / egress for smooth newts.

In addition, the other key areas of habitat for smooth newt on site – namely the vegetated drainage ditches and adjacent hedgerows and the larger woodland blocks, will all be retained. These are likely to be critically important to the local population in providing green connections and terrestrial habitat and hibernation opportunities.

The loss of the relatively low-value grassland habitat is unlikely to be of significance to smooth newts as such areas provide limited shelter and/or foraging opportunities.

With the implementation of the Landscape Masterplan, therefore, there is expected to be no significant effect on smooth newt as a result of habitat loss.

Injury or Death of Smooth Newt

Although existing green connections will be retained by the Landscape Plan, enabling smooth newt to continue to move between the Pond and the woodland block to the south-east, there is the potential for individuals to be injured or killed should they traverse the hard-standing areas of the Proposed Development, in particular roads. This may occur, for example, if individuals try to move between the Pond and the north-western woodland block.

Newts and other amphibians are known to be susceptible to becoming trapped and dying in drainage infrastructure, principally gully pots.

Given the small size of the population on Site, the death of smooth newts would likely result in a significant negative effect on a feature of County Importance.

7.5.8 Impacts on Common Frog

Construction Impacts

All impacts described for smooth newt, above, are more or less considered to apply to common frog. However, as this species is more common and widespread, such impacts are likely to result in **no** significant effect on common frog, at any geographic scale.

Operational Impacts

All impacts described for smooth newt, above, are more or less considered to apply to common frog. However, as this species is more common and widespread, such impacts are likely to result in **no** significant effect on common frog, at any geographic scale.

7.5.9 Impacts on Common Lizard

Construction Impacts

Disturbance, Injury or Death of Common Lizard

Suitable habitats for common lizard, such as rough grassland and scrub, are present within the Proposed Development area. No common lizard were observed during field survey and populations are likely to be small if present. Comparable suitable habitat is also present within the wider area, including the large area of open grassland in Shanganagh Park. Direct impacts (injury or death) to common lizard during works in suitable habitat are possible, although this is dependent time of year of works as reptiles favour certain habitat on a seasonal basis. Entrapment within open excavations and/or collision with construction traffic may also cause injury / death and there is the potential for pollution events during construction to negatively impact upon all terrestrial and freshwater habitats present, which may also negatively affect common lizard.

Habitat destruction will be permanent. Other construction impacts are likely to be temporary.

Given the common lizard population which may be affected is likely to be small, and further suitable habitats (and therefore reptile populations) are present within the wider area (and will remain, see cumulative assessment below), the construction impacts described above are not likely to affect the local common lizard population and therefore no significant effect is anticipated.

Operational Impacts

Loss of Habitat

As described above, small common lizard populations may be present and suitable habitat for this species will be permanently lost to the proposed development. However, further suitable habitat is known to exist in the wider area and it is highly likely that sustainable populations will remain in the local area (if present in the first instance). Therefore, no significant effect upon common lizard is anticipated during operation.

7.5.10 Impacts on Birds

Construction Impacts

Displacement of Breeding Birds and Destruction / Disturbance of Nests

Small numbers of common bird species are highly likely to breed on Site. Such species may include Amber or Red Listed species which are of conservation concern, and robin and goldcrest (both Amber listed) probably bred on Site. Suitable breeding habitat may include rank improved agricultural grassland, scrub and woodland / trees.

Construction activities within / adjacent to such habitats immediately prior to and throughout the bird nesting season (March to September, inclusive) may disturb birds and deter them from nesting within the area. Such impacts will be temporary and extensive alternative habitat to accommodate displaced birds is known to exist in the wider area.

Construction activities within suitable habitat during the bird nesting season may destroy or effectively obstruct active nests which would result in direct killing / injury of adult birds and/or nestlings.

Given that only two species of conservation concern were determined to be probably breeding on Site during surveys, and direct impacts will affect only a small proportion of the Local bird populations, no significant effect on breeding birds are anticipated.

Note that this assessment of effect does not remove legal obligations regarding the obstruction / destruction of active bird's nests.

Displacement of Wintering Birds

Small numbers of wintering gulls (including Amber / Red Listed species) were recorded within amenity grassland to the south-east of the Proposed Development. This area will not be directly impacted and this, plus extensive similar habitat (improved grassland), will continue to exist in the wider area. No wintering bird flocks were recorded within the boundary of the Proposed Development.

It is therefore concluded that there will be no significant effect on wintering birds. Further consideration on the impacts on wintering bird species which are Special Conservation Interest species (SCI) of nearby SPA is given in the Appropriate Assessment Screening Report (AECOM, 2019b) for the Proposed Development.

Operational Impacts

Loss of Bird Habitat

The Proposed Development will result in the permanent loss of a relatively small area of breeding bird habitat. No wintering bird habitat will be lost. Extensive areas of suitable comparable alternative breeding bird habitat are known to exist in the wider area (for example within Shanganagh Park, Woodbrook Golf Course and the gardens of Rosedale House). Therefore, impacts upon the breeding bird population of the local area are considered to be minor and will result in no significant effect.

7.5.11 Impacts on Invertebrates

Construction Impacts

Injury / Death of Important Invertebrates

Field cuckoo bee and large red-tailed bumble bee may be present on Site as records of these species were returned from NBDC and suitable habitat for them (grassland, woodland and scrub) exists. These species are identified on the Irish Red List (Fitzpatrick *et al*, 2006) as Vulnerable and Near Threatened, respectively. They are, however, common and widespread within suitable habitats (and, for the parasitic field cuckoo bee, where there are populations of the host species common carder bee *Bombus pascuorum*), although declines in population have been noted. Suitable habitat for these bee species is also known to exist within the wider area of the Site (Shanganagh Park, Woodbrook Golf Course and the gardens of Rosedale House), however data on the home ranges of these species is not well understood.

Construction activities in suitable habitat may destroy active nests of these species (or their host), or kill overwintering queen bees, both vulnerable stages of the life-cycle. The duration of these impacts cannot be described with certainty as the population of the Site is not known and the lack of data on the home ranges of these species means that the geography and therefore the timeframe for recolonization of an area cannot be known with certainty. However, bee species are highly mobile, populations to facilitate re-colonisation are likely to be present in the local area and suitable habitat for recolonization will remain within the Site / the immediate peripheral area. Employing the precautionary principle, this impact may affect the population of field cuckoo bee and/or large red-tailed bumble bee for the short- to medium-term. Given the above, temporary impacts are predicted with no significant effect resulting on these species.

Operational Impacts

Loss of Foraging / Refuge Habitat

During operation of the Proposed Development, suitable habitat for both field cuckoo bee and large red-tailed bumble bee, including nesting and overwintering habitat, will be present both on Site (although there will be a reduced area) and within the wider area. Therefore, impacts upon the population of these species in the local area are considered to be minor and will result in no significant effect.

7.5.12 Cumulative Impacts

The cumulative impacts on ecological features which would arise between the Proposed Development and other projects and/or plans has also been considered. Relevant projects and plans and the potential

cumulative impacts which could arise between them and the Proposed Development, are discussed below.

Local Plans

Project Ireland 2040

The Project Ireland 2040 National Planning Framework does not list any specific plans within the vicinity of the Proposed Development.

Dún Laoghaire-Rathdown County Development Plan 2016 – 2022

The Dún Laoghaire-Rathdown County Development Plan 2016 – 2022 refers to the Woodbrook area in which the proposed development is located. This area is described in the Plan as having the potential for major development and scope to yield approximately 2,300 new residential units. The Proposed Development at Shanganagh Castle will consist of approximately 600 units, and one other known development within the Woodbrook area (the Woodbrook Strategic Housing Development, see below) will consist of 685 units. Therefore, there is the potential for construction of approximately 1,000 further residential units within the Woodbrook area under the Dún Laoghaire-Rathdown County Development Plan. The remaining land allocated for this potential further development bounds the Proposed Development area to the west. Existing residential housing bounds the Proposed Development to the north, however the land immediately to the south and east will remain as cemetery / park land (described further below).

Woodbrook – Shanganagh Local Area Plan 2017 – 2023

Two parcels of land are identified for further development in the Woodbrook – Shanganagh Local Area Plan 2017 – 2023 (LAP), including the Proposed Development at Shanganagh Castle. The second parcel, named the Woodbrook Development parcel in the LAP, is located approximately 250 m south of the Proposed Development and currently consists of arable fields / field boundaries and a small area of golf course. This is the proposed location of the Woodbrook Strategic Housing Development, a planning application for which has been submitted to the Local Authority (see below for more information regarding the Woodbrook Strategic Housing Development). As noted above, the land in between the Proposed Development and the Woodbrook Development parcel is designated in the LAP as 'Park and Cemetery' land. As such this area will remain as per the receiving environment which is the Shanganagh Cemetery / Shanganah Park open grassland area.

Planning Applications

Four developments were identified using the National Planning Application Map Viewer and An Bord Pleanála website which could result in cumulative impacts, as listed in Table 7.9.

Development Name	Description	Distance from Proposed Development	Status
Woodbrook Strategic Housing Development	685 residential units and a childcare facility plus associated ancillary works (hard and soft landscaping, roads and car parking).	250 m south	Application submitted 06 November 2019
The Aske House	Development of a Specialist Hospital for 56 in-patients, out-patient care and teaching unit.	700 m south	Consented
Churchview Road Strategic Housing Development	Demolition of three existing dwellings known as Culgrenagh, Briar Hill, and Hayfield, and the construction of 210 residential units (apartments) in three blocks. The proposal also includes a childcare facility and resident's amenity facility.	4 km north	Consented
Southern Cross Road Strategic Housing Development	Mixed use residential development comprising 208 residential units and a neighbourhood centre.	4.5 km south	Application submitted 02 August 2019

Table 7.9. Other Developments Which May Result in Cumulative Impacts

Assessment of Cumulative Effects

The developments described in Table 7.9, should they all be consented (all are included within the remit of the Local Area Plan), will increase the number of residential units within the immediate area of the Proposed Development by approximately 2,300. The Proposed Development is currently bound by existing residential housing to the north, and this is predicted to remain in the long-term. Based on the LAP, further residential areas may bound the Proposed Development to the west, but the area to the immediate south (Shanganagh Cemetery and Park), east (Woodbrook Golf Course) and north-east (Rosdale House and gardens) are designated in the LAP as Park / Cemetery land. Therefore, a significant area of open land, including habitats such as grassland, woodland and scrub, will remain in the immediate vicinity of the Proposed Development, maintaining significant areas of suitable habitat, and connectivity, for important species.

Given the above strategic approach to development in the Local Area Plan, and with mitigation applied as relevant to all of those developments, it is considered that there will be no significant cumulative effects beyond those already identified as occurring from the Proposed Development in isolation

7.6 REMEDIAL & MITIGATION MEASURES

7.6.1 Additional Mitigation, Compensation and Enhancement

The embedded mitigation contained within the design of the Proposed Development is described in Section 7.4.3.

Specific mitigation measures will also be implemented to minimise the significant effects on the important ecological features identified by this assessment. Note that although mitigation is not required where effects are not considered to be significant, in some cases measures will be implemented where these can be readily achieved and where it may lead to ecological enhancement.

The implementation of mitigation does not negate the requirement to comply with relevant ecological legislation applying to protected species.

Standard Mitigation Measures

The following are standard mitigation measures which will be implemented by the Proposed Development. These will serve to mitigate possible effects on a range of ecological features:

BIO CONST 1: A Construction Environmental Management Plan (CEMP) shall be prepared by a suitably qualified consulting engineer and further developed by the main contractor prior to commencement of the proposed development. The CEMP will set out general environmental management measures, including in relation to pollution prevention, and the roles and responsibilities of Site personnel. The CEMP will include, as a minimum, Construction Method Statement(s), Pollution Prevention Plan (PPP) and Species Protection Plan (SPP).

BIO CONST 2: Controls and contingency measures will be provided to manage run-off from construction areas and to manage sediment in accordance with the proposed surface water management plan proposed as part of the development. No untreated run-off will be allowed to directly enter the Pond or the existing drainage ditches.

BIO CONST 3: All oils, fuels, lubricants or other chemicals will be stored in an appropriate secure container in a suitable storage area, with spill kits provided at the storage location and at places across the Site. There will be no storage of any oils, fuels, lubricants or other chemicals within 10 m of the Pond or existing drainage ditches.

BIO CONST 4: In order to avoid potential pollution impacts to waterbodies, soils or vegetation from machinery during construction, all refuelling and servicing of vehicles and plant will be carried out in a designated area which is bunded and has an impermeable base. This will be situated at least 10 m from the Pond and existing drainage ditches.

BIO CONST 5: During the construction phase, no artificial lighting will be used within 10 m of the Pond, drainage ditches, hedgerows or retained woodland blocks. Any artificial lighting used elsewhere (e.g. that which is required for security purposes) will be directed on to required areas and light spill will be minimised by the use of beam deflectors. Lighting will not be used such that there is lightspill on to the waterbodies or retained habitats which could be used for foraging or commuting by protected species.

BIO CONST 6: All site personnel involved in the construction and operation of the proposed development will be made aware of the ecological features present and the mitigation measures and working procedures which must be adopted.

BIO CONST 7: Root protection zones will be clearly demarcated by a suitably experienced arborist around retained trees and/or woodland. No machinery will enter these areas, nor will any material be stored within them;

BIO CONST 8: Sightings of protected species within the site or immediate surrounds by any operator / staff member during the construction phase will be recorded. If any evidence of protected species occur within 30 m of works, then works in that area will stop immediately.

BIO CONST 9: Any excavations will be left with a method of escape for any animal that may enter overnight, and will be checked at the beginning of each working day to ensure no animals are trapped within them.

BIO CONST 10: Any pipes will be capped or otherwise blocked at the end of each working day, or if left for extended periods of time, to ensure no animals become trapped;

BIO CONST 11: As far as possible, construction works will be carried out in daylight to minimise the risk of disturbing protected species such as bats and smooth newt; and,

BIO CONST 12: Wherever possible, tree felling works and works which will directly impact upon areas of vegetation which could be used by nesting birds will be undertaken outside of the breeding season, this being between March and August, inclusive. Where this cannot be achieved, a pre-works check for the presence of nesting birds will be conducted by a suitably experienced ornithologist. Each new construction / felling area will be checked not more than 72 hours prior to commencement of works as nests can be quickly established. Where any active nests are identified, suitable species-specific exclusion zones must be implemented and these must be maintained until the breeding attempt has concluded.

Specific Mitigation

Non-Native Plant Species

As a non-scheduled invasive species, there is no legal requirement to manage or control winter heliotrope on site.

BIO CONST 13: A Biosecurity Management Plan (BMP) will be prepared and included as part of the Development CEMP to manage and control winter heliotrope on site. This will outline the measures required to prevent the spread of non-native plant species from the Site (namely winter heliotrope). Where possible, the approach to managing non-native plant species on site will be to bury them beneath up-fill material to a depth of at least 5 m and to construct on top of this. Where this is not possible and soils which could be contaminated with the seeds or vegetative material of invasive non-native species need to be removed, they may be stockpiled on site. Stockpile(s) will then be monitored and treated for any re-growth of non-native species, before being seeded according to the Landscape Masterplan.

BIO CONST 14: To prevent invasive species from being taken off site, the footwear of all site personnel who have worked in areas affected by these species will be washed thoroughly prior to leaving site. All machinery and plant working in infested areas and/or which transport contaminated soil will also be thoroughly pressure-washed before leaving Site. Any water generated as a result of washing footwear, plant or machinery will be collected and disposed of appropriately.

BIO CONST 15: Prior to the commencement of construction, update surveys will be carried out on all trees which were identified as having either Moderate or High suitability to support a bat roost. This will be done in accordance with BCT guidelines and should be done as close to construction commencement as possible. These surveys will serve to confirm that trees continue to be unused by bats. Where a bat roost is identified, this will be dealt with through the appropriate licensing mechanism with National Parks & Wildlife Service.

BIO CONST 16: The southern boundary hedgerow / tree line will be retained (the small gap created for the footpath construction is highly unlikely to interrupt the flight of the strong-flying, generalist species of bats identified as using the site). This will ensure that connectivity between the site and habitats within the wider surrounds to the south remain available. The woodland blocks and the Pond, which are used by foraging bats, will all also be retained and/or enhanced.

BIO CONST 17: The use of artificial lighting during the construction phase of the Proposed Development will be limited, and no lighting will be used within 10 m of key bat habitats.

BIO CONST 18: As mitigation for the loss of trees identified as having bat roost suitability, a total of six bat boxes will be installed, either on new buildings or on retained trees. This will include one box which is suitable for use by maternity (breeding) colonies and one which aims to provide conditions needed for hibernation. The remaining four shall be Schwegler 1FD woodcrete type, or similar. The boxes shall be placed so that they face a variety of aspects to create conditions suitable for use at different times and in different weather.

Badger

BIO CONST 19: A pre-construction survey of the badger sett on the island within the Pond will be carried no more than three months prior to commencement of construction. This may involve the use of motion sensitive infrared trail camera(s) to confirm occupancy. Should the sett be found to be in use by badgers, a licence application will be prepared and submitted to NPWS to allow for their exclusion. The purpose of this will be to remove the risk of badger becoming trapped in the sett following commencement of construction. This is deemed to be a reasonable approach given that the sett is very unlikely to be of high importance to local badgers, especially given the known presence of a larger sett to the south of the Proposed Development.

Smooth Newt

BIO CONST 20: To reduce the risk of injury or mortality of smooth newt during the construction phase, it will be necessary to ensure that all individuals are retained within a safe 'refuge area'. The precise method by which this will be achieved has not been devised (and is not necessary) as part of this assessment and will instead be detailed in a Species Protection Plan which will be required as part of the licensing process with NPWS.

BIO CONST 21: It will be necessary to install newt fencing around the entirety of the Proposed Development during the construction phase. At least one further 'ring' of newt fencing will be installed around the Pond and its immediate surrounds and along the existing green connection via the drainage ditches between the Pond and the retained woodland to the south-east. This area will be left for the duration of the construction phase as a 'refuge' for smooth newts. Trapping will be carried out, following guidance published in the UK for great crested newt, to remove all smooth newts from elsewhere on site and to relocate them to the 'refuge area'. On completion of construction works, the smooth newt fencing will be removed and these animals will be free to move around. The 'refuge area' will encompass areas of habitat required by smooth newts at all times of year, including the waterbody for breeding and terrestrial areas, with connectivity retained between the Pond, the drainage ditches and the woodland block to the south-east. It is considered that the size of the refuge area will be sufficient for the small population of smooth newts present on Site.

BIO CONST 22: Landscaping works involving plant and/or machinery which are required in the Pond and immediately surrounding area will be carried out following a pre-works hand search by a suitably experienced ecologist, who will seek to confirm that no newts are present. To minimise the risk of smooth newt being present, landscaping works within 20 m of the Pond will be carried out during the winter period (taken to be November to January, inclusive), when newts are likely to be hibernating in locations away from the waterbody.

BIO CONST 23: A tunnel suitable for use by smooth newts (and other small animals, including common frog and hedgehog) will be installed beneath the road at the entrance to the proposed development. This location has been selected as it lies on an existing network of trees / hedgerows / drainage ditch, which links the Pond to the woodland block to the north-west of the site. The connectivity between these areas will be retained by the Landscape Plan and will in fact be enhanced by the planting of trees along the western Site boundary. The tunnel will allow smooth newts to cross beneath this road without risk of injury or mortality. No such structure is considered necessary between the Pond and the south-eastern woodland block, as these two areas will be separated by greenspace with footpaths only.

BIO CONST 24: Gully pots which form part of the drainage of the proposed development will all be provided with an 'amphibian ladder' which allows smooth newt (and other amphibians and small mammals) a means of escape should they fall in. In addition, at all gully pots, an 'inset' kerb will be installed, rather than a typical kerb, as amphibians will follow this and, in doing so, the chance of their falling in to the gully pot is reduced.

BIO CONST 25: Finally, to enhance the proposed development for smooth newt, a minimum of three refuge features will be constructed in the retained woodland block to the south-east of the Pond. These can include large piles of rubble, log piles and/or earth banks with fissures amongst them. At least two of the constructed features will be designed so as to provide conditions suitable for hibernation and will be:

- at least 2 m long, 1 m wide and 1 m high;
- be surrounded by rough vegetation;
- have exposed edges for access; and,
- be capped with topsoil and ideally covered with turf.

Whilst being specifically installed for smooth newts, these features are also likely to benefit other small animals, including common frog, common lizard and hedgehog.

7.7 RESIDUAL IMPACTS

The only significant effects predicted prior to the implementation of mitigation were on the following ecological features:

- non-Annex I habitats as a result of pollution incident during the construction phase;
- non-native plant species, as a result of their spread during the construction or operational phase;
- loss of bat roosts during construction and/or disturbance of roosting, foraging and/or commuting bats during construction and/or operation;

- otter, as a result of mortality during the construction phase;
- badger, as a result of mortality during the construction phase; and,
- smooth newt, due to disturbance or mortality during the construction or operational phase.

However, with the implementation of the mitigation measures described in Section 7.6, it is concluded that all significant negative effects can be addressed, and that as a consequence there are no residual significant effects from the Proposed Development, at any stage.

7.8 MONITORING

Monitoring of smooth newt will be required during the construction phase of the Proposed Development. This will be necessary to ensure that mitigation measures are operating as required (e.g. that newt fencing remains intact). In addition, the effectiveness of operational phase mitigation for this species, namely the tunnel beneath the entrance road, and the gully pot ladders, will be subject to monitoring. This could be achieved using a motion sensitive camera at both entrances to the tunnel, and by periodic checking of gully pots for the presence of trapped newts.

An Ecological Clerk of Works (ECoW) will be appointed for the duration of the construction phase to monitor the implementation of all ecological mitigation and to confirm compliance with relevant ecological legislation.

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Project Title:
SHANGANAGH CASTLE
DEVELOPMENT

Client:
ABK ARCHITECTS

LEGEND

-  Proposed Development Site
-  Island
-  Pond
-  Winter Heliotrope
-  Dark Zone for Bats
-  Newt Refugia
-  Badger Sett
-  Pyramidal Orchid
-  High Potential Bat Roost Tree
-  Moderate Potential Bat Roost Tree

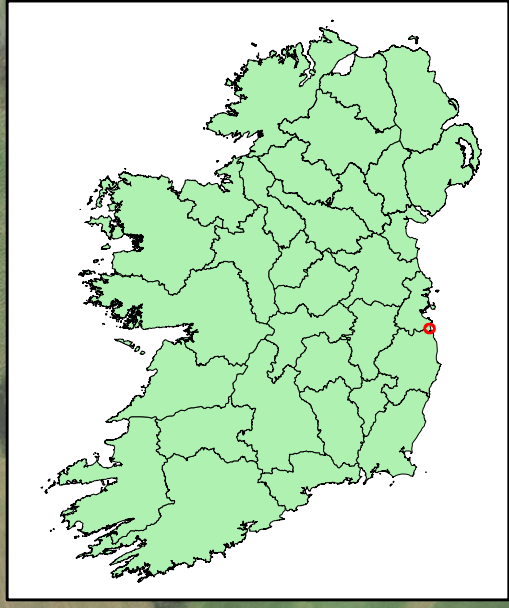
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AECOM Internal Project No:
60586614

Drawing Title:
SHANGANAGH CASTLE
DEVELOPMENT
CONSTRAINTS MAP

Scale at A3: 1:2,500
Drawing No:

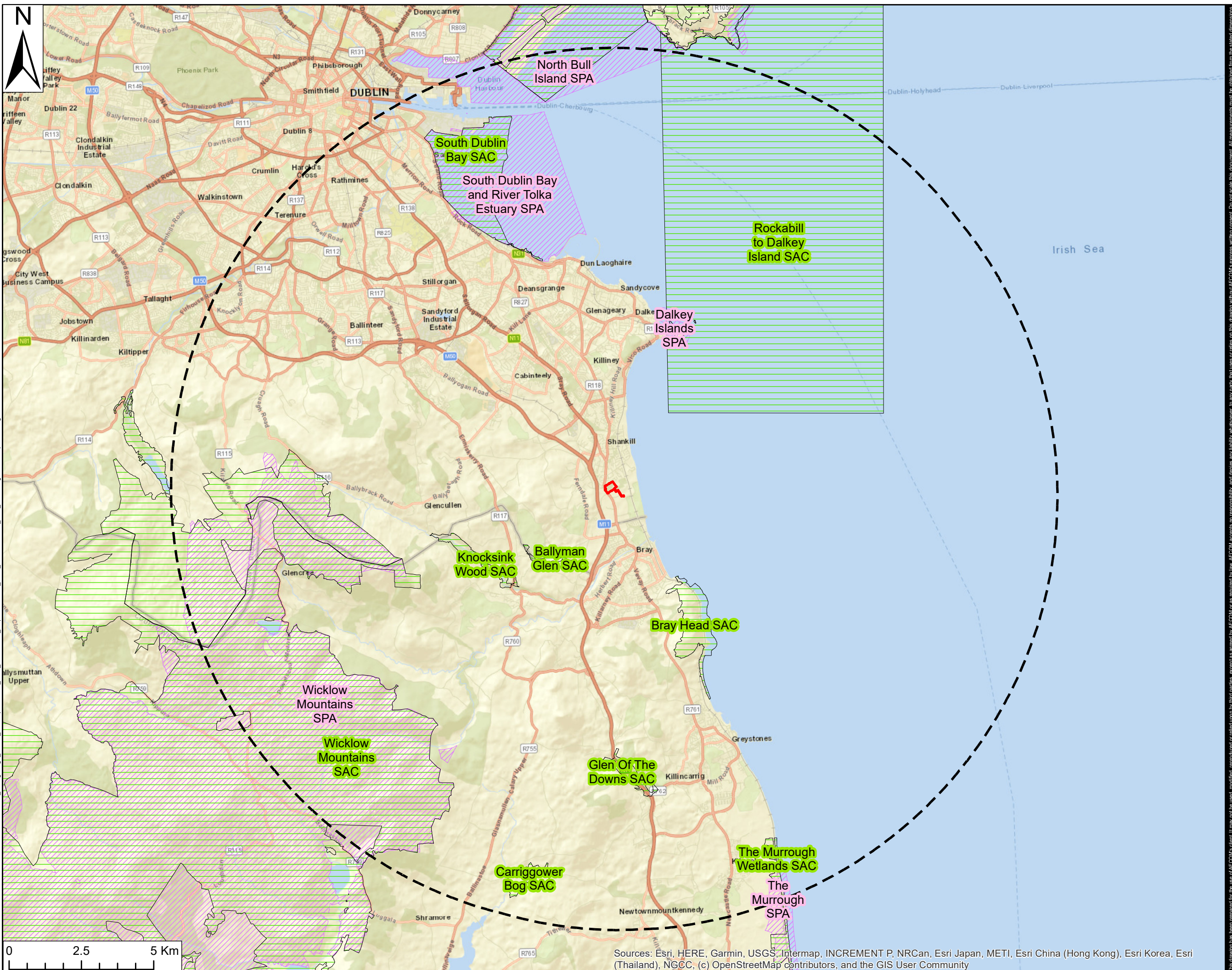
FIGURE 1. CONSTRAINTS
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DG RF RF 20/01/20



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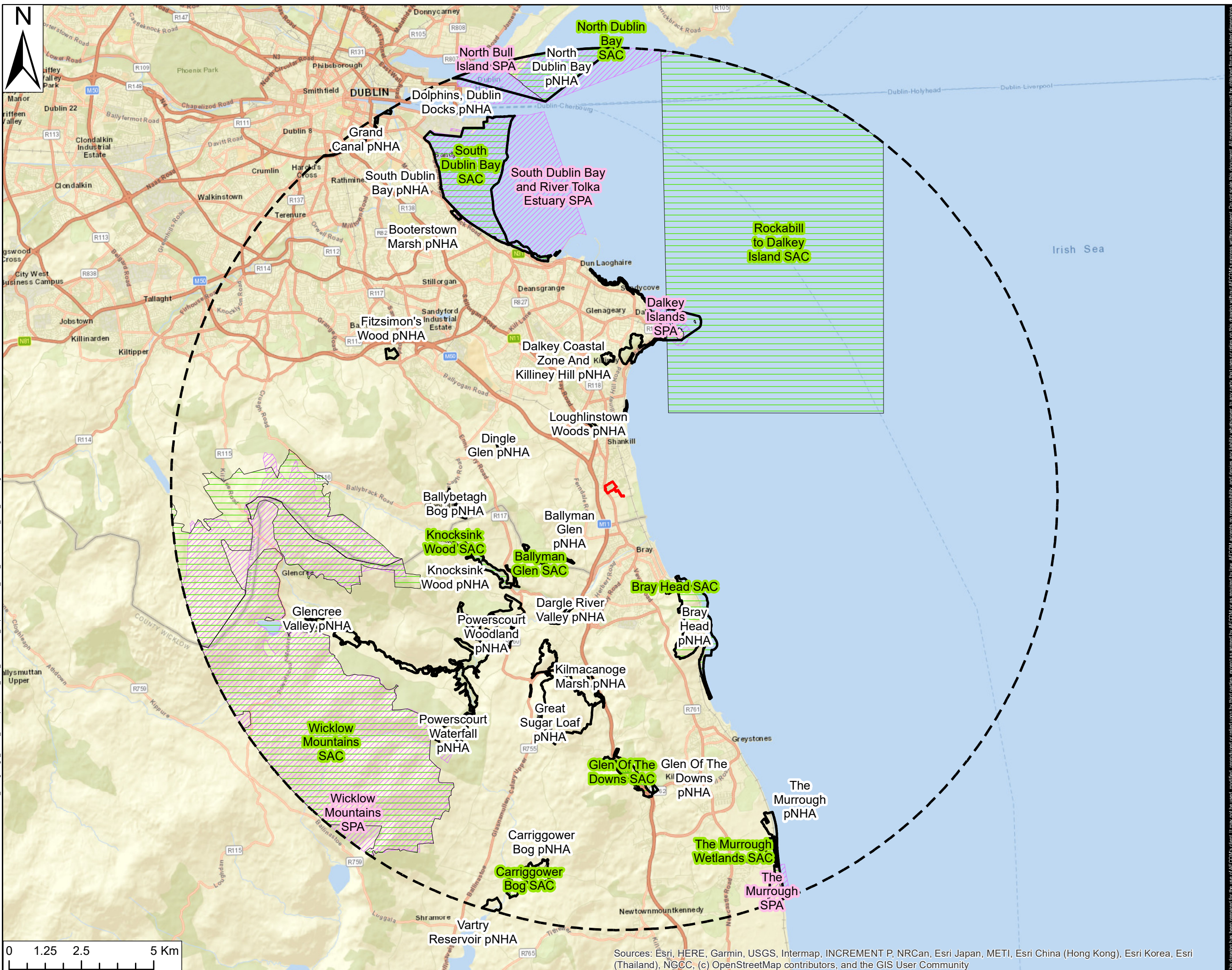


- LEGEND**
- Proposed Development Site
 - Study Area (15km)
 - Special Areas of Conservation (SACs)
 - Special Protection Areas (SPAs)

Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community

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Project Title:
 SHANGANAGH CASTLE
 DEVELOPMENT

Client:
 ABK ARCHITECTS

- LEGEND**
- Proposed Development Site
 - 15km Study
 - Proposed Natural Heritage Areas (pNHA)
 - Special Areas of Conservation (SACs)
 - Special Protection Areas (SPAs)

AECOM Internal Project No:
 60588099

Drawing Title:
 DESIGNATED SITES
 WITHIN 15 KM OF THE
 PROPOSED
 DEVELOPMENT

Scale at A3: 1:120,000

Drawing No:
 FIGURE 7.1

Drawn: Chk'd: App'd: Date:
 DG RF TM 20/01/20

Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community

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Project Title:
SHANGANAGH CASTLE
DEVELOPMENT

Client:
ABK ARCHITECTS

LEGEND

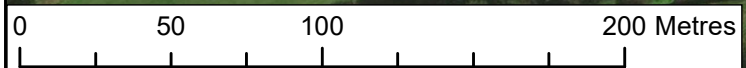
Proposed
Development Site

**Habitat Type (Fossitt)
Linear Features:**

- FW4: Drainage ditches
- WL1: Hedgerows
- WL2: Treelines

**Habitat Type (Fossitt)
Polygon Features:**

- FL8: Other artificial lakes and ponds
- GA1: Improved agricultural grassland
- GS2: Dry meadows and grassy verges
- WD1: Mixed broadleaved woodland
- WD5: Scattered trees and parkland
- WS1: Scrub
- BL3: Buildings and artificial surfaces
- ED2: Spoil and bare ground
- ED3: Recolonising bare ground



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

AECOM Internal Project No:
60588099

Drawing Title:
HABITAT SURVEY
RESULTS

Scale at A3: 1:2,500

Drawing No:

FIGURE 7.2

Drawn: Chk'd: App'd: Date:

DG SW TM 20/01/20

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LEGEND

- Proposed Development Site
- Key Areas of Bat Habitat
- Trees With Bat Roost Suitability:**
 - High
 - Moderate
 - Low



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

AECOM Internal Project No:
60588099

Drawing Title:
BAT ROOST
SURVEY RESULTS

Scale at A3: 1:2,000

Drawing No:

FIGURE 7.3

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DG	RF	TM	20/01/20

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- LEGEND**
- Proposed Development Site
 - Key Areas of Bat Habitat
 - ★ Bat Detector Locations



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LEGEND

- Proposed Development Site
- Drainage Ditches
- Island
- Pond



Filename: \\eu.aecomnet.com\emal\UK\IEDBL\ubos\PR-289236_Shanganagh_Castle_Development\900_CAD_GIS\GIS02_Map\2020116_NEW_RLB\2020120_RLB_FINAL\Figure_7.5_Amphibian_Survey_Results_2020120.mxd

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Project Title:
SHANGANAGH CASTLE
DEVELOPMENT

Client:
ABK ARCHITECTS

LEGEND

— Proposed
Development Site

**Bird Breeding and
Conservation Status:**

-  Goldcrest, Breeding Status: Probable
-  Robin, Breeding Status: Probable
-  Mallard, Breeding Status: Confirmed

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AECOM Internal Project No:
60588099

Drawing Title:
BREEDING BIRDS
SURVEY RESULTS

Scale at A3: 1:2,000

Drawing No:

FIGURE 7.6

Drawn: Chk'd: App'd: Date:
DG RF TM 20/01/20



Project Title:
SHANGANAGH CASTLE
DEVELOPMENT

Client:
ABK ARCHITECTS

- LEGEND**
- Proposed Development Site
 - Black-headed Gull (BH)
 - Great Black-backed Gull (GB)
 - Herring Gull (HG)



Filename: \\eu.aecomnet.com\terminal\UK\IEDBL\ubos\PR-289236_Shanganagh_Castle_Development\100_CAD_GIS\GIS\02_Maps\2020\1016_NEW_RLB\2020\120_RLB_FINAL\Figure_7.7_Wintering_Bird_Survey_Results_2020\120.mxd

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AECOM Internal Project No:
60588099

Drawing Title:
WINTERING BIRD
SURVEY RESULTS

Scale at A3: 1:2,000

Drawing No:

FIGURE 7.7

Drawn:	Chk'd:	App'd:	Date:
DG	RF	TM	20/01/20

CHAPTER EIGHT LAND & SOILS

8.1 INTRODUCTION

This chapter assesses the impact of the project on the surrounding land, soil and geological environment.

The objectives of this chapter are as follows:

- Produce a study of the existing geological landscape (land, soil and geology) within the site boundary.
- Identify the possible effects of the development on the surrounding land and soils over the lifetime of the project (Construction phase and Operational phase).
- Propose measures to mitigate, eliminate or remediate any possible impacts from this development.

8.2 ASSESSMENT METHODOLOGY

8.2.1 Relevant Guidance

This chapter has been carried out in accordance with the relevant EIA legislation and guidance listed in Chapter 1.0 Introduction and further takes account of the following documents.

- National Roads Authority (2008): Guidelines on Procedures for the Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes
- Institute of Geologists of Ireland (2013): Guidelines for the Perpetration of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements
- Development Management Guidelines (DoEHLG, 2007)

The principal attributes (and impacts) to be assessed include the following:

- Geological heritage sites in the vicinity of the perimeter of the subject site;
- Landfills, industrial sites in the vicinity of the site and the potential risk of encountering contaminated ground;
- The quality, drainage characteristics and range of agricultural uses of soil around the subject site;
- Quarries or mines in the vicinity, the potential implications (if any) for existing activities and extractable reserves;
- The extent of topsoil and subsoil cover and the potential use of this material on site or requirement to remove it off-site as waste for disposal or recovery;

8.2.2 Desktop Study

A desk study of the proposed site and the surrounding study area was largely completed in advance of undertaking a site survey. The desk study involved collecting all the relevant geological data for the Proposed Development and study area. This included consultation with the following:

- Environmental Protection Agency database (www.epa.ie);
- Geological Survey of Ireland - National Draft Bedrock Aquifer map;
- Geological Survey of Ireland - Groundwater Database (www.gsi.ie);
- Bedrock Geology 1:100,000 Scale Map Series. Geological Survey of Ireland (GSI, 2003);
- Geological Survey of Ireland – 1:25,000 Field Mapping Sheets;
- General Soil Map of Ireland 2nd edition (www.epa.ie).

8.2.3 Site Investigation

Site specific data was derived from the following geotechnical investigations which were carried out from January to March 2019 by Causeway Geotech Ltd. The investigation consisted of the following:

- Eighteen light cable percussion boreholes;
- Five boreholes by dynamic (windowless) sampling methods;
- Thirteen boreholes by rotary drilling methods;
- Standpipe installations in twenty-five boreholes;
- Forty-three machine dug trial pits;
- Infiltration tests performed in eight trial pits;
- Plate bearing tests at four locations; and
- Indirect CBR tests at four locations.

A copy of extracts of the report is detailed in Appendix 8.1.

8.2.4 Site Visits

Site visits were undertaken by the PUNCH team between September 2018 and October 2019 to assist in the identification and assessment of the project on features of geological interest and on the geological environment.

8.3 RECEIVING ENVIRONMENT

8.3.1 Site Location and Context

The application site is located in Shankill, Co. Dublin. The site is bordered by residential areas to the north, the R119 Dublin Road to the west, Shanganagh Castle to the east and parkland to the south. The site is currently primarily a greenfield site with one area previously used as allotments. There is an existing pond located in the south of the site. The site is approximately 9.69 hectares in area.

8.3.2 Proposed Development

The proposed development is described in Chapter 2.0 Project Description. In summary it comprises a residential development consisting of 597 no. residential dwellings, a creche, minor commercial and café units together with all associated infrastructure. Two underground attenuation tanks are proposed, one near the centre of the site (invert level: 23.54 mAOD, volume: 1,616m³) and one south of the existing pond (invert level: 23.13 mAOD, volume: 830m³). There is one small area with a lowered ground floor within one block – Block B which houses services. There are no basements proposed within the remainder of the development.

8.3.3 Land Use and Site History

A review of the site history using Ordnance Survey Ireland historical maps indicates that the site was wooded in the 1800's. The site has been cleared of trees since 1995 and there were allotments on the site from 2012 onwards. The existing pond has been present on site since the 1800's. More detailed information on the site history is provided in Chapter 12.0 Archaeology & Cultural Heritage.

8.3.4 Soils

The GSI soils map indicates that the soil type in development area is made ground. The lands to the north of the site are also shown as made ground. The lands to the east, west and south are mapped as shallow well drained mineral (mainly basic) as shown in Figure 8.1.

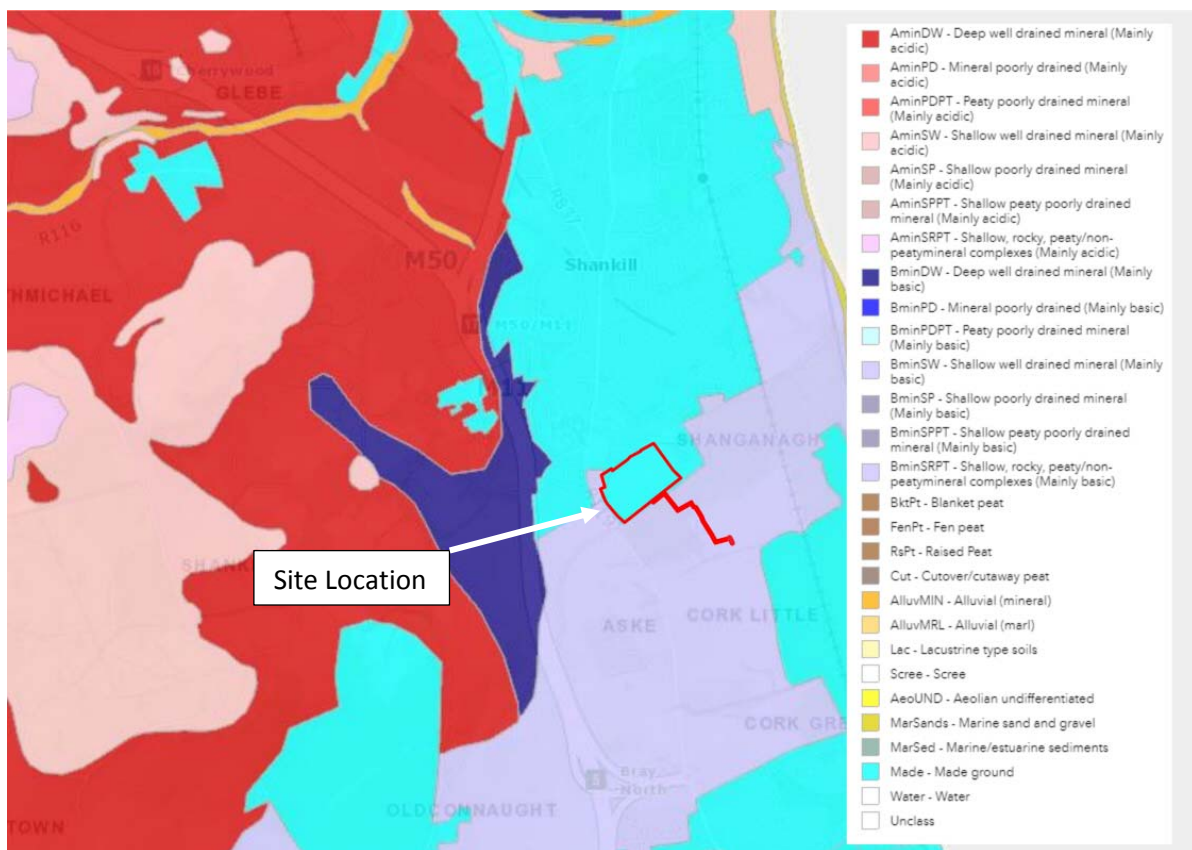


Figure 8.1: Soils Geology of the surrounding area (source: Geological Survey of Ireland (www.gsi.ie))

8.3.5 Subsoil (Quaternary) Geology

The GSI quaternary maps for the region indicate that the soil type for the region is till derived from limestones (boulder clay) as shown in Figure 8.2.

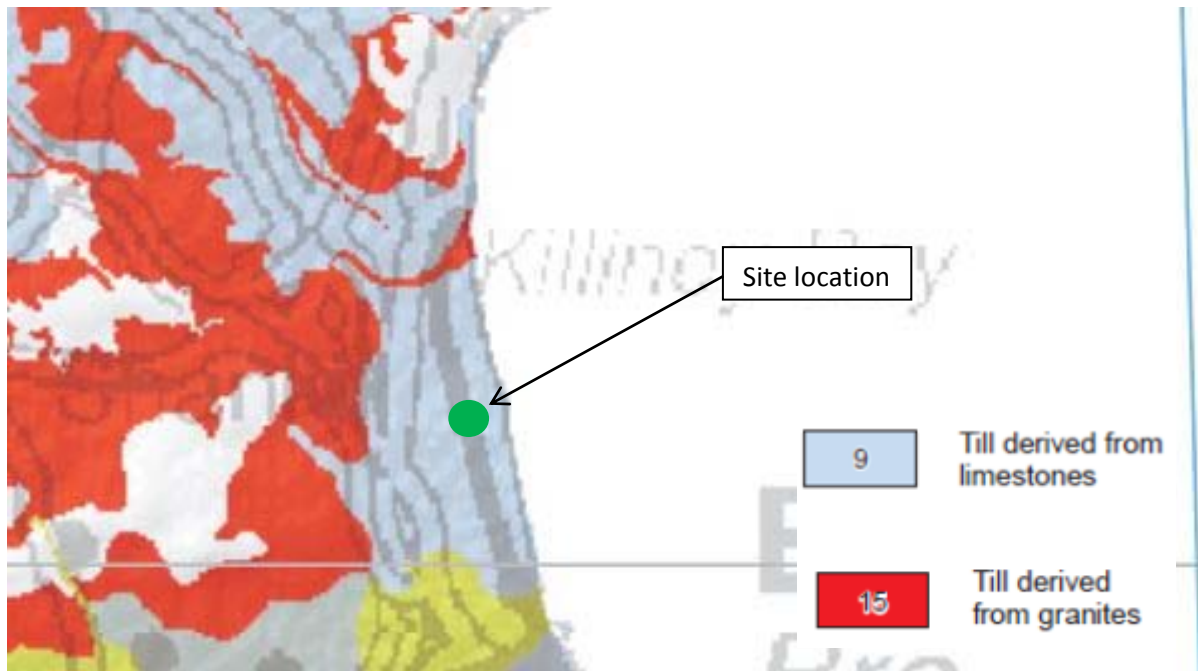


Figure 8.2: Map extract from Quaternary Map issued by Geological Survey of Ireland

8.3.6 Bedrock

The bedrock geology underlying the site comprises the Maulin Formation. This formation is characterised “*Penetratively cleaved dark blue grey slates and phyllites which are commonly striped with pale siltstone laminae. Bands of garnetiferous quartzite that are 20m thick occur in the granite aureole. There are also thick lenses of orthoquartzite*”. The average thickness reported to be 900mm.

The surrounding area is primarily made up of the maulin formation with a small area to the north-west comprised of the Bray Head Formation. The Bray Head formation is characterised as Greywacke & quartzite as shown in Figure 8.3. There are no karstified features mapped in the vicinity of the site.

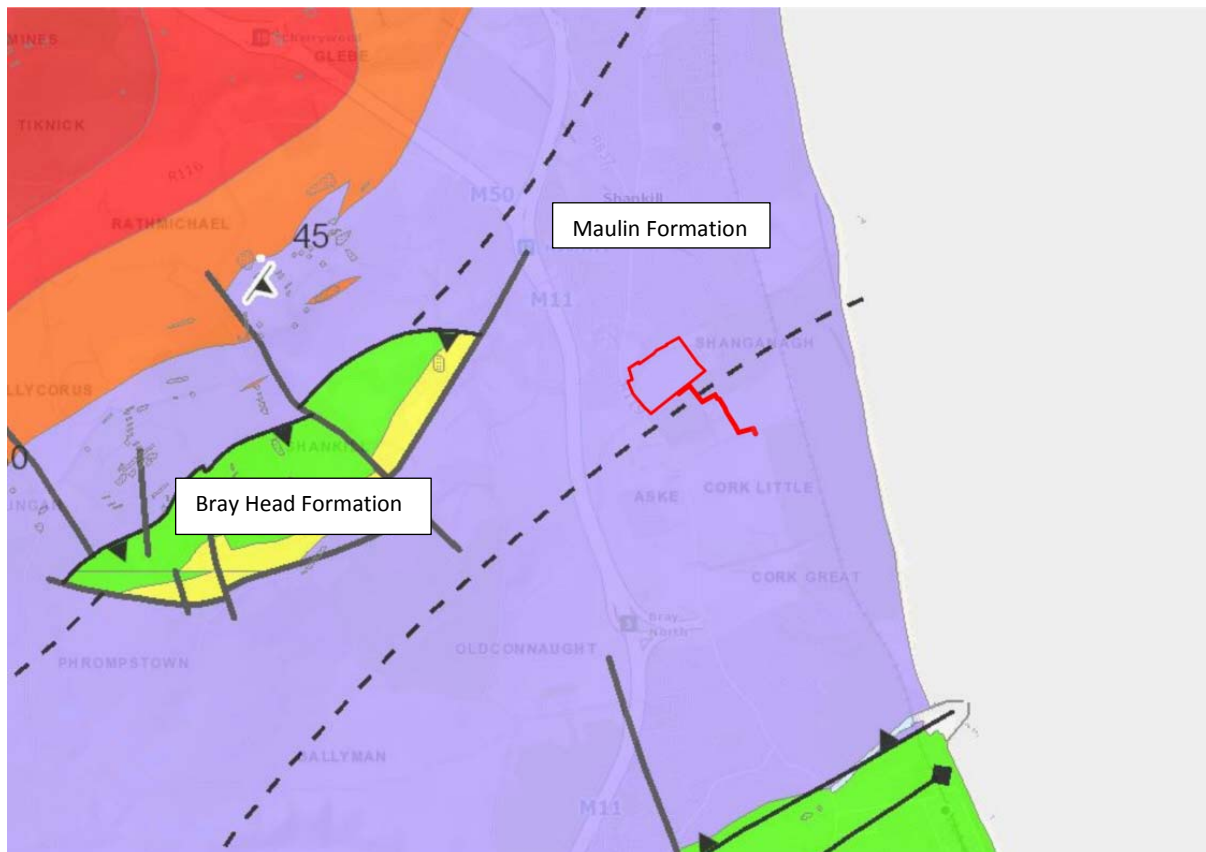


Figure 8-3: Bedrock Geology of the surrounding area (source: Geological Survey of Ireland (www.gsi.ie))

8.3.8 Designated Protected Areas

The proposed site is not located within a Special Area of Conservation (SAC) or Special Protection Area (SPA). The closest designated site to the Proposed Development is the Loughlinstown Woods proposed Natural Heritage Area (pNHA) which lies approximately 1.9 km to the north. The closest European designated site to the Proposed Development is the Ballyman Glen Special Area of Conservation (SAC) (and pNHA), located approximately 2.7 km to the south-west.

8.3.9 Areas of Geological Heritage Importance

The Geological Survey of Ireland (GSI) provides scientific appraisal and interpretative advice on geological and geomorphological sites and is responsible for the identification of important sites that are capable of being conserved as Natural Heritage Area (NHA). The National Parks and Wildlife Service (NPWS) have the responsibility of designation and management of sites, with appropriate advice from GSI.

At present, the GSI has compiled a list of sites proposed for designation as Natural Heritage Areas (pNHAs). The GSI has also determined a secondary list of County Geological Sites (CGS), which may be considered for protection at local authority functional control level (i.e. may be included in county development plans). A submission from the GSI confirms that the closest County Geological Site (CGS) is located within 1km of the site, namely Killiney Bay. However, it acknowledged the development would have no impact on the CGS given its distance relative to the site.

8.3.10 Radon

Radon is a radioactive gas which is naturally produced in the ground from the uranium present in small quantities in all rocks and soils. RPS has produced a Radon Map of Ireland based on the results of the National Radon Survey where radon measurements were carried out in a number of houses in each 10 km grid square of the OS national grid.

The results were used to predict the percentage of homes in each 10km grid square with radon concentrations in excess of the national reference level of 200 Bq/m³ (Becquerels per cubic metre). The radon map has five categories: less than 1%, 1-5%, 5-10%, 10-20% and greater than 20%. These categories refer to the number of homes in the 10km grid square that are likely to have radon concentrations above the reference level.

This map was accessed online at <http://www.epa.ie/radiation/radonmap/> on the 22nd November 2019 and the 10km grid encompassing the proposed development indicated that 5-10% of the homes surveyed in this area had radon concentrations above the Reference Level.

The EPA has issued specific guidelines with respect to underground residential and commercial developments. In relation to the proposed development, following construction the risk of radon impact is considered to be imperceptible.

8.3.11 Site Investigation

The site investigation for the site, completed in March 2019 by Causeway geotechnical engineers indicates the following ground types are present on site:

- Topsoil within range 100mm – 400mm thickness;
- Made ground (subbase) located at one trial pit;
- Made ground (fill) with variable thickness to a maximum depth of 1.8m. Some apparent builder's debris present in some locations;
- Glacial till: sandy gravelly clay, frequently with low cobble content, typically soft or firm in upper horizons, becoming stiffer with increasing depth;
- Fluvio-glacial deposits: typically, medium dense to dense sands and gravels encountered at various locations.

Appendix 8.1 of this chapter provides details of the Site Investigation Factual Report.

8.4 LIKELIHOOD OF IMPACTS

The proposed development in relation to soils and geology will comprise:

- Excavation for proposed buildings
- Excavation for installation of services, pavements and landscaping on existing soil is required and as such there is an impact. Refer to Section 8.5 for details.

It is anticipated that the main environmental factors associated with the soils and geology underlying the site and within its immediate environs are not likely to be significantly affected by the proposed project.

8.4.1 Demolition Phase

The proposed demolition works will require small quantities of soil removal, as well as the exposure of subsoils.

8.4.2 Construction Phase

Excavation is proposed for the following constructed elements:

- Construction of platform under building slab and gravel build up layers below
- Excavation for proposed building foundations
- Excavation for proposed in ground services, including attenuation tanks
- Excavation for propose external roads and pavements

There are variable depths of excavation proposed for the above elements within the site. The depth of principal excavation varies from 2m fill to 3.5m cut below the underside of topsoil. The deepest excavation is proposed at the new attenuation tank areas. The estimated volumes of cut and fill of subsoils are 36,000 m³ cut and 13,300m³ fill. The excess 22,700m³ of subsoil will be disposed of offsite. There is an additional excavation of topsoil amounting to 15,000m³ of which 3,000m³ will be reused around the site, with the surplus being disposed of offsite. These figures exclude arisings from excavation of foundations and services. Final volumes may change subject to final site layout and earthworks assessment.

The following is noted in relation to these volumes:

- Volumes are solid volumes and do not account for expansion or compaction of soil during excavation or placement.
- Volumes allow for comparison between underside of topsoil and underside of bulk earthworks platform. Bulk earthworks platform comprises underside of structural build up.
- Excavation for services, foundation excavation, detail landscape excavation is estimated and subject to proposed methods of construction.
- The assumed average topsoil thickness is 250mm based on a variation between 100mm and 400mm across the site, from the site investigation

There is some nominal apparent builders waste material noted within some of the shallow sections of soil. This buried waste is anticipated to have a low level risk to human health and the environment. This material would not be suitable for use under any building or road area and shall be disposed of at a suitable licensed waste handling facility. Chapter 17.0 Resources & Waste Management provides further details regarding disposal of waste soil material.

There will be imported gravel materials that will form part of the proposed road and building structural design.

There is no expected imported fill.

The nature of the development dictates that the greatest potential impact on the underlying geology (including soil, subsoil and bedrock) associated with the proposed development will be during the construction phase. Any limited extent of proposed piling required for structural foundations will have an impact on deeper geology. This is expected to be limited in scope and extent. The depths of excavation are generally quite shallow, and as a result, there is a limited risk of impact on the deep geological material.

8.4.3 Operational Phase

At operational phase, impacts on land and soils from the development will largely be limited to the limited risk of fuel leaks from parked cars leaking into the ground. Road surface runoff and poorly designed drainage system being channelled to subsoils before infiltrating to groundwater can result in contamination of the surrounding subsoils. The proposed provision of pervious pavers within car park areas with a proposed impervious liner will provide a treatment mechanism to address this.

8.5 DESCRIPTION AND SIGNIFICANCE OF IMPACTS

8.5.1 Demolition and Construction Phase

Stripping of Topsoil

Topsoil removal and replacement will be required to implement the required works. Some topsoil could be reused on site; in rear gardens of houses, adjacent to the existing pond and in proposed soft landscape areas. The impact on topsoil is a significant long term effect.

Excavation of Subsoil Layers

Significant subsoil cut and fill will be required to modify the site levels to suit the proposed buildings, roads and other paved areas. It will be necessary to remove excess subsoil from the site to enable the works. The impact of this will be a moderate, long term effect in nature.

Construction Traffic

Construction traffic will be in operation during the proposed works. This will comprise construction workers, temporary special construction vehicles, cranes, and excavation machinery. Their impact on the land and soil is expected to be limited to their operations related to the construction works, and therefore is expected to be short term in nature. Chapter 15.0 Material Assets – Traffic & Transport provides further details on traffic.

Accidental Spills and Leaks

During construction of the development, there is a potential risk from accidental pollution incidences from the following sources: spillage or leakage of oils and fuels stored on site; spillage or leakage of oils and fuels from construction machinery or site vehicles; spillage of oil or fuel from refuelling machinery on site; and the use of concrete and cement during appropriate foundation and sub-structure construction.

Accidental spillages may result in contamination of soils and groundwater underlying the site should contaminants migrate through the subsoils and impact underlying groundwater. Soil stripping and

excavation for drainage lines will also reduce the thickness of subsoils in localised areas. Concrete (specifically, the cement component) is highly alkaline and any spillage which migrates through the subsoil would be detrimental to groundwater quality. If spills and leaks are not mitigated, the impact on the surrounding soil will be significant.

8.5.2 Operational Phase

There is a possible impact from potential oil leaks into the soils. The proposed provision of pervious pavers within car park areas with a proposed impervious liner provides a treatment mechanism to address this. The resulting impact is likely to be long term and insignificant.

8.5.3 'Do Nothing' Scenario

If the site was not adjusted, it would remain in its current condition as greenfield site. The land and soils would remain in their original state. There would be no adverse impact.

8.5.4 Cumulative Impacts

There is a cumulative impact associated with the removal of soils from the proposed site in parallel with the adjacent constructed Shanganagh Park to the east and north as well as the currently proposed Woodbrook estate to the south. The cumulative impact is that there is progressive natural soil removal from the wider area. The soil removal is primarily from the upper layers (topsoil and subsoil). The impact is considered long term and low.

8.6 REMEDIAL AND MITIGATION MEASURES

The implementation of the mitigation measures will ensure that the soils geology and hydrogeological environment is not adversely impacted during normal and/ or emergency conditions during the construction and operational phase.

8.6.1 Demolition and Construction Phase

L & S CONST 1: Any temporary storage of topsoil required will be carefully stored away from any surface water drains to minimise possibility of loose unseeded material eroding into adjacent water bodies. Movement of material will be minimised in order to reduce degradation of soil structure and generation of dust. Shaping of storage bunds will be carried out in accordance with landscape architect's requirements to ensure the integrity of the material is retained.

L & S CONST 2: Removed topsoil will be re-used at various landscaping locations on site, including proposed re-levelling of any proposed landscape areas and rear gardens to houses onsite and offsite.

L & S CONST 3: All excavated materials will be visually assessed for signs of possible contamination such as staining or strong odours. Should any unusual staining or odour be noticed, samples of this soil will be analysed for the presence of possible contaminants in order to ensure that historical pollution of the soil has not occurred at the proposed development site. Should it be determined that any of the soil excavated is contaminated, this will be managed according to best practice and disposed of accordingly by a licensed waste disposal contractor.

L & S CONST 4: Construction traffic will be controlled using stabilisation of soils to mitigate any significant effect on the ground. Works will need to be undertaken in accordance with local authority requirements.

L & S CONST 5: To minimise any impact on the underlying subsurface strata from material spillages, all oils, solvents and paints used during construction will be stored within temporary bunded areas. Oil and fuel storage tanks shall be stored in designated areas, and these areas shall be bunded to a volume of 110% of the capacity of the largest tank/ container within the bunded area(s) (plus an allowance of 30 mm for rainwater ingress). Drainage from the bunded area(s) shall be diverted for collection and safe disposal.

L & S CONST 6: Refuelling of construction vehicles and the addition of hydraulic oils or lubricants to vehicles, will take place in a designated area (or where possible off the site) which will be away from nearby surface water gullies or drains. In the event of a machine requiring refuelling outside of this area, fuel will be transported in a mobile double skinned tank. An adequate supply of spill kits and hydrocarbon adsorbent packs will be stored in this area. All relevant personnel will be fully trained in the use of this equipment. Guidelines such as “Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors” (CIRIA 532, 2001) will be complied with.

L & S CONST 7: All ready-mixed concrete will be brought to site by truck. It is recommended that a suitable risk assessment for wet concreting will be completed prior to works being carried out which will include measures to prevent discharge of alkaline wastewaters or contaminated storm water to the underlying subsoil. The pouring of concrete will take place within a designated area using a geosynthetic material to prevent concrete runoff into the soil/ groundwater media. Wash down and washout of concrete transporting vehicles will take place at an appropriate facility off site.

L & S CONST 8: In the case of drummed fuel or other chemicals which may be used during construction, containers should be stored in a dedicated internally bunded chemical storage cabinet and labelled clearly to allow appropriate remedial action in the event of a spillage.

L & S CONST 9: Potentially contaminated groundwater and polluted surface water generated during construction activities will not be discharged directly to ground or surface drainage. Welfare facilities will be provided for construction operatives but are only likely to comprise individual ‘portaloos’ with no connection to the foul sewer expected.

8.6.2 Operational Phase

Based on the proposed development design and recommended mitigation measures recommended as part of the construction works, it is considered that no further mitigation measures are required during the operational phase of the development to ensure that the risks posed to the underlying subsoils and geology are imperceptible.

8.7 RESIDUAL IMPACTS

8.7.1 Construction Phase

The predicted impact at construction phase is limited to the excavations required to install proposed works. Soil removal is required however the effect on the retained soil layers below is not significant.

If mitigation measures are implemented, then the risk of impact is negligible.

8.7.2 Operational Phase

If relevant impact mitigation measures are implemented, the impact on the operational phase would be negligible.

8.8 MONITORING

Construction stage elements should be monitored by the contractor for compliance with all relevant standards as well as the planning consent. Regular inspection of surface water run-off and any sediment control measures e.g. silt traps will be carried out during the construction phase. Regular auditing of construction/mitigation measures will be undertaken e.g. concrete pouring, refuelling in designated areas etc.

8.8 REFERENCES

National Roads Authority (2008): Guidelines on Procedures for the Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes

Institute of Geologists of Ireland (2013): Guidelines for the Perpetration of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements

Development Management Guidelines (DoEHLG, 2007)

Environmental Protection Agency database (www.epa.ie)

Geological Survey of Ireland - National Draft Bedrock Aquifer map

Geological Survey of Ireland - Groundwater Database (www.gsi.ie)

CHAPTER NINE HYDROLOGY & HYDROGEOLOGY

9.1 INTRODUCTION

This chapter of the EIAR assesses the impact on the hydrogeological and hydrological environments of the proposed development. The objectives are to provide a review of baseline conditions across the footprint of the site, to assess the potential impact of the proposed development on the hydrological and hydrogeological environments and to provide appropriate mitigation measures for any identified potential impacts, if deemed necessary.

9.2 ASSESSMENT METHODOLOGY

The assessment was undertaken as follows:

- A desktop study of soils, bedrock, groundwater and surface water data sources;
- A review of available water levels monitoring and site investigation data;
- A desktop review of sensitive receptors in the area; and,
- Interpretation of all data and reporting.

A site investigation was undertaken across the site between 28th January and the 26th March 2019 (see Section 9.3.2). The geological and hydrogeological information from the site investigation report were used in the compilation of this report. A hydrogeological assessment of Shanganagh Pond and its environs was also undertaken in 2019 (Ref: Shanganagh Castle Phase 2 Hydrogeological Site Assessment, BlueRock Environmental Limited, 2019¹) and the findings of this report are utilised in this chapter. The full Hydrogeological Site Assessment is provided in Appendix 9.1.

The following sources of information were used in the compilation of this assessment:

- Ordnance Survey of Ireland, Discovery Series, Sheet 50 & 56;
- Ordnance Survey of Ireland (OSI) online historical maps and aerial photographs (<http://map.geohive.ie/mapviewer.html>);
- Geology of Kildare-Wicklow, Geological Survey of Ireland (GSI) (1:100,000), Sheet 16;
- GSI On-line Groundwater Database. Aquifer Classification & Vulnerability; karst features and groundwater resources; groundwater recharge; source protection areas; and subsoil data.
- GSI Wicklow Groundwater body (GWB);
- Soil Map of Ireland (Second Edition, 1980), National Soil Survey of Ireland, An Foras Talúntais.
- National Parks and Wildlife Service on-line database; (www.npws.ie);
- WFD online water quality mapping; (<http://wfdireland.ie/maps.html>);
- Office of Public Works (OPW) Flood Risk Maps (<https://www.floodinfo.ie/map/floodmaps/>);
- OPW hydro-data (<http://www.opw.ie/hydro-data>); and

¹ Phase 2 Hydrogeological Site Assessment, Shanganagh Castle Residential Neighbourhood, BRE18013Rp01A02, 3rd December 2019

- Met Eireann - met.ie – monthly climatological data.

In addition to the guidance outlined in Chapter 1.0, the methodology used in this assessment includes:

- Geology in Environmental Impact Statements a Guide, (IGI, 2002);
- Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes, NRA Document;
- Guidelines for the preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements (IGI, 2013); and,
- Institute of Geologists Ireland (2002): Geology in Environmental Impact Statements – A Guide; and, Draft EPA revised Guidelines on information to be contained in Environmental Impact Statements; and Advice Notes for preparing EIS, 2015.

9.3 RECEIVING ENVIRONMENT (BASELINE SITUATION)

9.3.1 Site Location and Context

The site is located less than 1 km south of Shankill village centre. Fronting onto the R119 old Dublin Road, the development site is situated between the existing private residential estate of Castle Farm and Shanganagh Park, which covers circa 36 hectares.

Within the footprint of the proposed development is an old pond/wetland that is to be maintained as a visual amenity as part of the development. A site location map is provided in Figure 9.1.

The site comprises open grassland, an area of allotments (disused) and a DLRCC gardens/landscape/storage depot. The site is bounded by Shanganagh Park to the east and south, Shanganagh Castle to the north east, the old Dublin Road to the west and Castle Farm Housing development to the north.

Regional topography in the area is dominated by the Dublin and Wicklow Mountain range to the west of the site. Two Rock, Three Rock and Glencullen peaks (Dublin Mountains) are located approximately 9 km to the west of the site and they range in elevation from approximately 460 mOD to 550 mOD. Nearby in the townland of Shankill, 2.6 km to the west of Shanganagh, the lower hills of the Dublin Mountains range in elevation from 140m to 260m.

Based on a topographical survey completed in January 2019 ground elevations across the site broadly fall from northwest to southeast ranging between 28.9 mOD and 24.1 mOD. The pond is located within a slight topographical low area across the site with ground levels to the south and southeast levelling off.

A review of the online historical maps (<http://map.geohive.ie/mapviewer.html>) indicates that Shanganagh Castle and the pond were in existence in the 1830s as can be seen on the 6-inch Cassini map. The historical maps indicate the land cover in the 1800s had more tree cover and at some point, in the 1900s the land cover was cleared for agricultural use.

Anecdotal reports suggest that the pond has been impacted by human interactions over time. It has been reported that the pond has been de-sludged utilising an excavator on at least two (2 no.) occasions. It was also potentially extended slightly as part these works.

The island within the centre of the pond was reported to have been previously used for breeding turkeys.



Figure Error! No text of specified style in document..1 Site Location and Setting

9.3.2 Previous Site Investigations

A site investigation was undertaken across the site by Causeway Geotech between the 28th January 2019 and 26th March 2019 detailed in Appendix 8.1 and entailed the following:

- 12 no. rotary boreholes (RC01 – RC05, RC07 – RC11A);
- 18 no. cable percussion boreholes (BH01 – BH19) of which 5 no. boreholes were completed by dynamic (windowless) sampling methods (i.e. BH12, BH17 BH08 and BH08A, and BH19);
- 43 no. of trial pits (TP01 to TP30 and TP33 to TP45); and,
- 8 no. soakaway test pits (SC01 to SC08) in accordance with BRE365 'Soakaway Design' and CIRIA Report C697-The SUDS Manual.

Two (2 no.) cross-sections of the site are provided in the Phase 2 Hydrogeological Site Assessment (see Figures 9.14 and 9.15 within this report). A summary of the findings of this assessment are provided in the following sections.

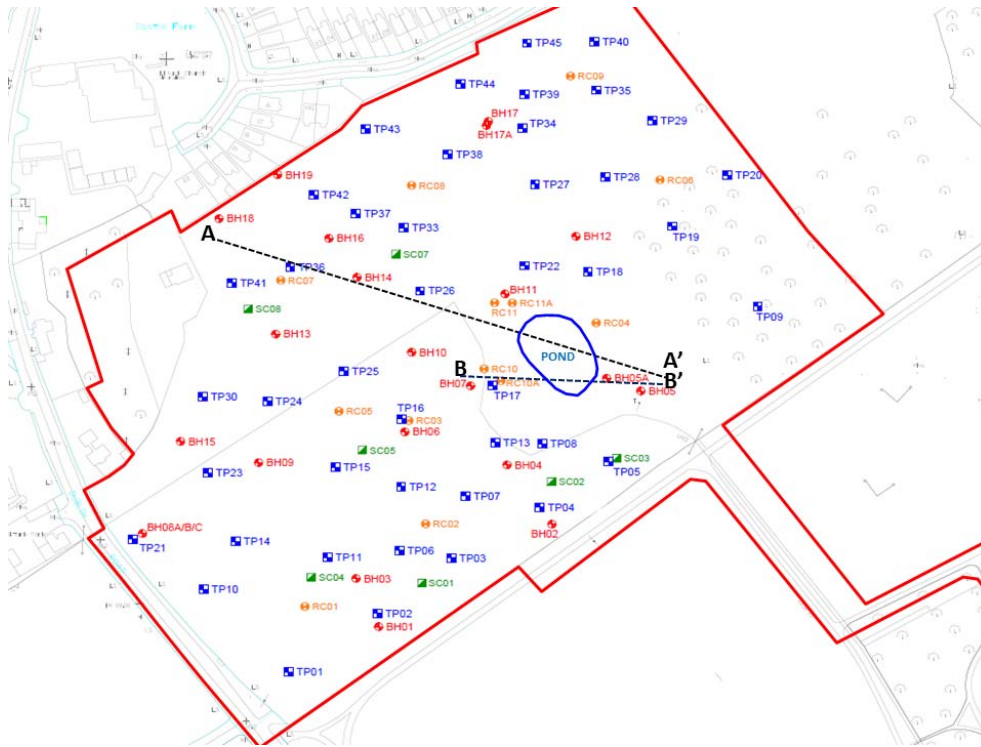


Figure Error! No text of specified style in document..2 Site Investigation Locations and Line of Cross Sections Source: BREL Phase 2 Hydrogeological Assessment Report

9.3.3 Regional & Site-Specific Subsoils & Bedrock

A detailed description of the regional and site-specific geology is provided in Chapter 8.0 Land & Soils.

In summary the following salient point relevant to this chapter are as follows:

- Soils across the entire site are classified as Made Ground that are underlain by glaciofluvial sands and gravels, shallow well drained mineral soils and Irish Sea Till derived from limestones.
- A review of the drilling logs from the recent site investigation indicate that this till is characterised as being soft to very stiff sandy gravelly clay. The sand is fine to coarse and the cobbles are sub-angular and of mixed lithologies.
- The underlying bedrock geology is mapped as the Maulin Formation which is comprised of dark blue-grey slates, commonly laminated with pale siltstones.
- The closest fault line to the site is trending northeast to southwest along an outcrop of Bray Head and Quartzite Formations located at a distance of 1 km to the west of the site with a separate fault line from northwest to southeast cutting through the outcrop.
- Shallow or exposed bedrock is not mapped in the vicinity of the site.
- The top layer of topsoil across the site comprises a brown slightly sandy topsoil in most trial pits with a thickness of between 0.1 to 0.3m recorded. Made ground consisting of reworked firm gravelly clay was recorded at several locations i.e. within trial pits TP03, TP04 and TP07 (in the south-central region of the site) with a thickness of between 0.4 to 0.6m recorded. Reworked coarse sandy gravels and stiff yellowish/brown gravelly clay with brick fragments were recorded within TP18. Made ground consisting of soft reworked sandy gravelly clay was recorded at locations BH05, BH05A, BH11, BH19 and RC04 (limestone fill) with a thickness of between 0.1 and 1.8m recorded.

- The shallow subsoils comprise a combination of made ground and natural brown firm slightly sandy gravelly clays with a thickness of between 0.3 to 1.65 metres recorded across the site. Occasional soft to very soft conditions were recorded in particular areas (i.e. within trial pits TP30, TP34, TP35, TP38, TP40 and TP44 in the northern and western regions of the site).
- The 'mid-level' subsoils comprise soft to firm and firm to stiff sandy gravelly clays with low cobble content across much of the site. Soft gravelly clays were recorded within trial pits TP30 and TP37. Clayey sandy fine to coarse gravels were recorded within trial pits TP06, TP17, TP22, TP24, TP25, TP40 and TP43 ranging in thickness between 0.5 and 5.2m.
- The deeper subsoils transitioned to very stiff grey sandy boulder clays with depth up to 20 mbgl recorded. Permeable and water bearing sand and gravel horizons were recorded at depth within 10 no. of boreholes along Section A-A' (see Figure 14) with a thickness of between 1.1 to 4.3m recorded. These permeable horizons were recorded at depths ranging between 3.8 and 16.1 mbgl.
- Limestone and granite boulders were recorded in 15 no. of boreholes with a thickness of between 0.1 and 3.0 m recorded.

All trial pit and borehole locations are presented in Figure 9.2 and relevant logs provided in the 2019 Site Investigation report – see Appendix 8.1 of this EIAR.

9.3.4 Regional Aquifer Classification and Vulnerability

The Shanganagh Site is located on the boundary between the Dublin Urban GWB (IE_EA_G_005) and the Wicklow East GWB (IE_EA_G_004). The topography is mountainous, comprising the Wicklow and Dublin Mountains. Elevations range from sea level along the coast to high elevations along the western boundary between the Eastern and Southeastern River Basin Districts. This GWB consists of three main aquifer lithologies, namely The Leinster Granites, Ordovician Metasediments and the Cambrian Metasediments.

The site is underlain by the Ordovician Metasediments, classified as being a locally important bedrock aquifer which is moderately productive only in local zones (LI). According to the GSI online database the closest borehole to the site (3221NWW004) was drilled to a depth of 107 m with a yield of 10.5 m³/d recorded. This considered to be a poorly productive well.

Groundwater vulnerability is dictated by the nature and thickness of the material overlying the uppermost extent of the saturated zone. The GSI classifies the aquifer underlying the site to have a classification of 'High' which infers groundwater or bedrock is present within 3 to 5 metres in the site (see Figure 7). The recent 2019 site investigation confirmed that shallow groundwater is present across the site (see Appendix 8.1) and the classification of 'High' is deemed appropriate.

9.3.5 Groundwater Water Framework Directive Status

The Shanganagh Site is located on the boundary between the Dublin Urban GWB (IE_EA_G_005) and the Wicklow East GWB (IE_EA_G_004). The WFD Water Maps (<http://wfdireland.ie/maps.html>) indicate that the:

- Dublin Urban GWB has 'Good' overall status (based on the final River Basin Management Plan (RBMP) 2009-2015). The WFD risk category is 1a 'At risk of not achieving good status'.
- Wicklow East GWB has 'Good' overall status (RBMP 2009-2015). The WFD risk category is 1b 'Probably at risk of not achieving good status'.

9.3.6 Groundwater Recharge

The GSI has published Groundwater Recharge Mapping for almost all of Ireland. Potential or effective rainfall is the amount of rainfall that is available to infiltrate the ground and that will not evaporate or be taken up by plants. The effective rainfall for the area is 642 mm/yr.

GSI maps also indicate a recharge cap of 200 mm across the area. The recharge mechanisms will reject a portion of potential recharge due to low permeability tills in the low-lying area (diffuse recharge) and in the higher areas of the Dublin and Wicklow Mountains due to rocks with low storage and a rapid surface runoff component.

9.3.7 GSI Well Database

The GSI online map identifies several boreholes within 2 km of the proposed development (see Table 9.2). It is noted that the mapped location accuracy of most of these boreholes may place them at a greater distance than 2 km from the site. These data indicate that 'good' yielding wells are possible in the top 30 m of the Ordovician Metasediments aquifer. Higher permeability is expected close to the surface with decreasing permeability with increasing depth below ground level. Only flow in isolated fractures is expected below 30m.

No karst features have been identified within 10km of the site. There are no source protection areas within 10km of the site.

GSI Name	Depth (m)	Easting	Northing	Well Use	Yield Class	Yield m ³ /d	GSI Name	Depth (m)
3221NWW004	106.6	324,300	220,300	Unknown	Poor	10.5	3221NWW004	106.6
3221SWW026	5.6	326,220	218,070	Unknown	Unknown	Unknown	3221SWW026	5.6
3221SWW027	7.6	326,210	218,030	Unknown	Unknown	Unknown	3221SWW027	7.6
3221SWW028	4.4	326,210	218,010	Unknown	Unknown	Unknown	3221SWW028	4.4
3221SWW029	60.9	326,520	219,230	Unknown	Poor	30	3221SWW029	60.9
3221SWW069	15.2	326,320	219,400	Domestic	Good	300	3221SWW069	15.2
3221SWW070	30.5	326,640	219,160	Domestic	Good	300	3221SWW070	30.5

Table Error! No text of specified style in document..1 Groundwater use within 2 km of the site

9.3.8 Regional Groundwater Levels and Flow Direction

The GSI online map identifies several boreholes within 2 km of the proposed development. It is noted that the mapped accuracy of the majority of these boreholes suggests that many are located most likely at a greater distance than 2 km from the site. This data indicates that 'good' yielding wells are possible within the top 30 m of the Ordovician Metasediments aquifer. Higher permeability is expected close to the surface with reducing permeability with increasing depth below ground level. Flow in isolated fractures is expected below 30m.

The majority of groundwater flow within the bedrock aquifer is typically within the upper 3m of the bedrock and via permeable horizons in the overburden with lateral flow towards discharge points such as rivers and streams and toward the coast.

Groundwater typically follows the regional topographical relief and is expected to be flowing in an east to southeasterly direction across the site towards the Irish Sea.

9.3.9 Site Specific Water Levels

Groundwater seepages were noted in many trial pits at depths ranging between 0.9 and 2.65 mbgl. Water strikes were encountered within these same pits ranging between 1.2m (i.e. TP28) and 2.6m (i.e. TP27). The water strikes predominantly correlated with sandy gravelly clays or sandy gravel horizons within the shallow subsoils.

Water strikes were recorded during borehole drilling at depths ranging between 0.8 and 11.4m within the percussive shell and auger boreholes and between 1.8 and 20.0m within the rotary boreholes.

Twenty-four (24 no.) standpipes were installed in selected boreholes to facilitate long-term observation of groundwater levels at various depths across the site.

The boreholes selected for monitoring well installations included shell and auger boreholes BH01, BH03, BH05A, BH06, BH07, BH08, BH09 and BH11 to BH17A, and within rotary boreholes RC01, RC03, RC04, RC07, RC09, RC10 and RC11A.

The installation details of each monitoring well included a 50 mm nominal diameter HDPE well pipe, with screened sections generally positioned across three different water bearing units across the site i.e. at shallow depth (1.5 to 6.0m), at intermediate depths (i.e. 6.0 to 11.0m) and at deeper depths (i.e. 11.0 to 20.0m). All monitoring well locations are provided in Figures 12 and 13. The positioning of the screened intervals was based on geological and hydrogeological conditions encountered during the drilling activities.

A summary of monitoring well depths, well screens and water strikes encountered is provided in Table 9.2 below and within Chapter 6 of the Phase 2 Hydrogeological Assessment report.

BH ID	Total depth (m)	Water strike(s) (mbgl)	Rose to (mbgl)	Response zone depth (mbgl)	Screened horizon depth
BH01	7.0	1.8	-	4.5 to 7.0	Intermediate depth - gravels and clay
		2.3	2.1		
BH03	14.1	3.0	2.8	6 to 10.0	Intermediate depth - clay
		7.8	2.0		
BH05A	10.6	3.5	2.8	2.5 to 7.5	Intermediate depth - clay and gravels
		7.3	4.1		
		9.0	0.3		
BH06	3.3	1.2	0.8	1 to 3.0	Shallow depth - clay
BH07	12.0	3.0	2.6	6 to 10.5	Shallow depth - clay
		6.6	6.25		
BH08	8.7	0.8	0.6	0.8 to 5.0	Shallow depth – clay
		6.5	n/a		

BH ID	Total depth (m)	Water strike(s) (mbgl)	Rose to (mbgl)	Response zone depth (mbgl)	Screened horizon depth
BH09	10.4	3.5	3.0	2 to 6.0	Shallow depth - clay
		7.5	4.2		
BH11	11.5	1.8	-	6.0 to 9.5	Intermediate depth - gravels
BH12	3.0	-	-	1.5 to 3.0	Shallow depth - silt and clay
BH13	9.9	2.5	2.0	2.0 to 5.0	Shallow depth - gravels and clay
		7.6	3.0		
BH14	8.1	4.2	3.7	6.1 to 8.1	Intermediate depth clay
		6.1	5.2		
BH15	11.8	0.8	0.6	6.0 to 10.0	Intermediate depth - clay
		2.3	1.5		
		11.4	7.5		
BH16	13.0	4.5	3.4	4.0 to 9.0	Intermediate depth - sands and gravels
BH17	3.0	-	-	1.5 to 3.0	Shallow depth - silt
BH17A	15.0	3.5	3.3	16.0 to 11.0	Deeper depth - clay
		9.0	-		
RC01	17.6	5.6	-	11.3 to 16.3	Deeper depth - sands and gravels
		11.3	-		
RC03	20.0	2.8	-	15.0 to 20.0	Deeper depth - sands and gravels
		15.8	5.3		
RC04	17.0	3.8	-	11.0 to 17.0	Deeper depth - clays and silt
RC07	20.0	5.6	-	14.0 to 18.0	Deeper depth - sands and gravels
RC09	20.0	19.3	-	12.5 to 18.5	Deeper depth - clays with gravel band
RC10	20.0	1	0.8	13.0 to 20.0	Deep / sands and gravels
		5.6	5.6		
		6.8	6.8		
		13	9.3		
RC10A	5.0	-	-	1.5 to 4.0	Shallow / clay
RC11	17.6	1.8	-	12.0 to 17.6	Deep / sands and gravels
		7.5			
		15.1			
RC11A	5.6	2	-	1.5 to 3.75	Shallow / clay

Table Error! No text of specified style in document..2 Monitoring Well Screens and Water Strikes

Six (6 no.) manual groundwater level monitoring rounds were undertaken by Causeway Geotech in 2019 on the 14th March 2019, 26th March 2019, 10th May 2019, 13th May 2019, 24th June 2019 and 1st August 2019 (see Table 9.2 above). Groundwater levels across the site ranged from 21.7 mOD to 27.4 mOD.

Based on these groundwater levels, the shallow and deep groundwater flow is interpreted to be in an east and south-easterly direction across the site towards the Irish Sea. Groundwater contour maps (Figure 12 and Figure 13 within the 2019 Phase 2 Hydrogeological report) were created using the surveyed groundwater levels from 26th March 2019 and are provided below in Figures 9.3 and 9.4.

Interpretation of groundwater levels suggests that the pond is receiving some form of groundwater baseflow from shallow groundwater (see Figure 9.5). Given that the pond is present within a slight local topographical depression, groundwater baseflow to the pond is not unexpected.

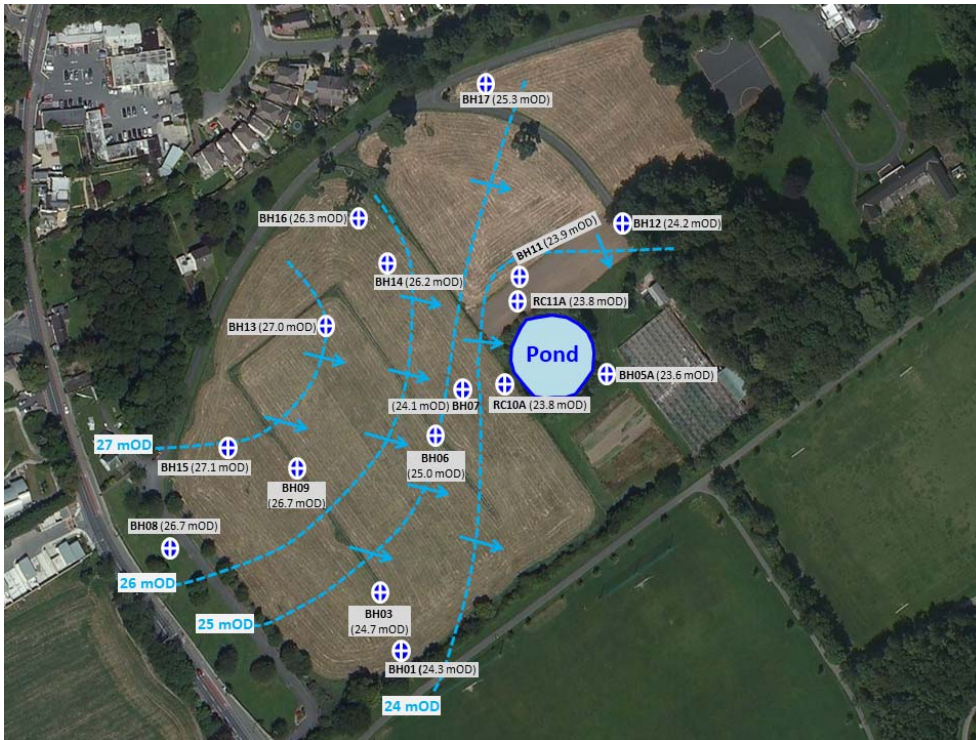


Figure Error! No text of specified style in document..3 Shallow Groundwater Contours – 26th March 2019

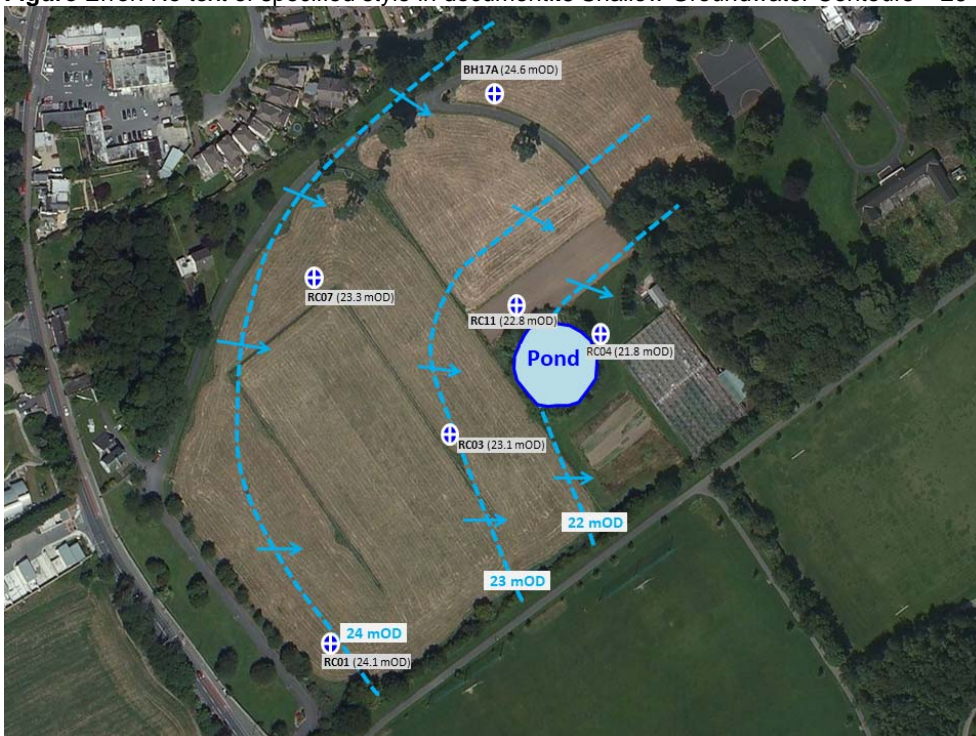


Figure Error! No text of specified style in document..4 Deeper Groundwater Contours – 26th March 2019

Automated data loggers were installed in 4 no. shallow monitoring wells (i.e. BH07, BH11, BH15 and BH16) and 5 no. deeper monitoring wells (i.e. RC04, RC07, RC10, RC10A and RC11). In addition, a data logger was installed within Shanganagh pond to record surface water level variations over time (i.e. between the 26th March 2019 and 20th June 2019).

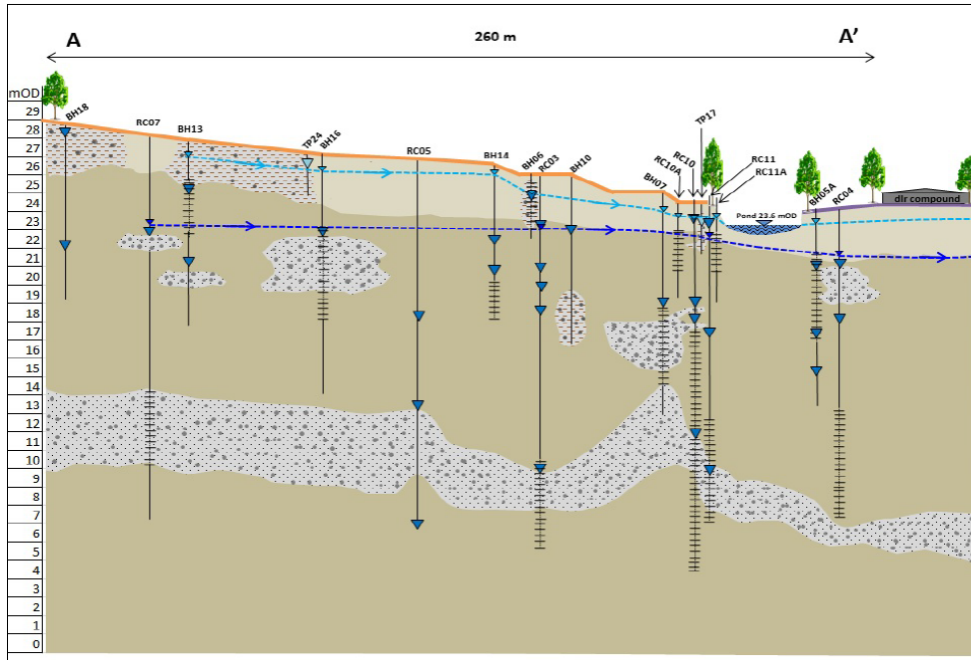


Figure Error! No text of specified style in document..5 Schematic Cross Section A-A'

Date	14-Mar-19		26-Mar-19		10-May-19		13-May-19		24-Jun-19		01-Aug-19		Max Level – manual dips and data loggers	Min Level – manual dips and data loggers	Max Variation
	BH	mbgl	mOD	mbgl	mOD	mbgl	mOD	mbgl	mOD	mbgl	mOD	mbgl	mOD	mOD	mOD
BH01	2.45	22.43	0.59	24.29	-	-	0.79	24.09	0.95	23.93	-	-	24.29	22.43	1.86
BH03	0.76	25.07	1.10	24.73	-	-	1.51	24.32	1.80	24.03	-	-	25.07	24.03	1.04
BH05A	0.57	23.62	0.60	23.59	-	-	0.63	23.56	0.69	23.50	-	-	23.62	23.50	0.12
BH06	0.66	25.30	0.96	25.00	-	-	1.44	24.52	1.71	24.25	-	-	25.30	24.25	1.05
BH07	0.86	24.22	0.94	24.14	1.30	23.78	1.30	23.78	1.27	23.81	1.50	23.58	24.22	23.58	0.64
BH08	0.74	26.98	1.00	26.72	-	-	1.25	26.47	1.54	26.18	-	-	26.98	26.18	0.80
BH09	0.23	27.18	0.68	26.73	-	-	1.12	26.29	1.48	25.93	-	-	27.18	25.93	1.25
BH11	1.00	23.94	1.08	23.86	1.15	23.79	1.16	23.78	1.15	23.79	1.28	23.66	23.94	23.66	0.28
BH12	1.30	24.31	1.41	24.20	1.43	24.18	1.45	24.16	1.50	24.11	-	-	24.31	24.11	0.20
BH13	0.58	27.41	1.02	26.97	-	-	1.55	26.44	1.92	26.07	-	-	27.41	26.07	1.34
BH14	-	-	0.51	26.19	-	-	0.97	25.73	1.25	25.45	-	-	26.19	25.45	0.74
BH15	0.28	27.41	0.62	27.07	0.86	26.83	0.94	26.75	1.20	26.49	1.62	26.07	27.41	26.07	1.34
BH16	0.95	26.49	1.14	26.30	1.49	25.95	1.53	25.91	1.79	25.65	2.00	25.44	26.49	25.44	1.05
BH17	0.40	25.56	0.70	25.26	0.81	25.15	0.90	25.06	1.18	24.78	-	-	25.56	24.78	0.78
BH17A	1.10	24.90	1.37	24.63	1.63	24.37	1.72	24.28	2.05	23.95	-	-	24.90	23.95	0.95
RC01	2.03	24.28	2.20	24.11	-	-	2.54	23.77	2.79	23.52	-	-	24.28	23.52	0.76
RC03	2.75	23.25	2.90	23.10	-	-	3.18	22.82	3.31	22.69	-	-	23.25	22.69	0.56
RC04	-	-	2.79	21.77	2.69	21.87	2.70	21.86	2.68	21.88	2.84	21.72	21.92	21.72	0.20
RC07	4.81	23.45	4.98	23.28	5.22	23.04	5.28	22.98	5.39	22.87	5.57	22.69	23.45	22.69	0.76
RC09	19.50	6.88	19.52	6.86	18.95	7.43	18.58	7.80	18.54	7.84	-	-	7.84	6.86	0.98
RC10	1.03	23.76	1.11	23.68	1.28	23.51	1.31	23.48	1.40	23.39	1.58	23.21	23.76	23.21	0.55
RC10A	0.71	23.87	0.79	23.79	0.88	23.70	0.90	23.68	0.94	23.64	1.05	23.53	23.87	23.53	0.34
RC11	2.06	22.94	2.19	22.81	2.33	22.67	2.36	22.64	2.35	22.65	2.50	22.50	22.94	22.50	0.44
RC11A	1.04	23.85	1.13	23.76	1.17	23.72	2.18	22.71	1.20	23.69	-	-	23.85	22.71	1.14

Table Error! No text of specified style in document..3 Groundwater Levels at Shanganagh

9.3.10 Infiltration & Hydraulic Conductivity Testing

Eight (8 no.) infiltration tests were undertaken by Causeway Geotech within trial pits SC01 to SC08 on the 5th February 2019 in accordance with BRE Digest 365 'Soakaway Design' and CIRIA Report C697- The SUDS Manual was used to obtain a measure of the infiltration rate of the subsoils across the site. These pits ranged in depth from 1.2 to 1.3m. At ground level, topsoil (brown slightly sandy clay) was recorded in most trial pits with a thickness of between 0.15 to 0.3 (SC06 consisted of reworked made ground with a thickness of 0.4 m). Neither gravel beds nor groundwater were encountered in any of these pits which were all dry when excavated.

All tests failed due to the low permeability firm to stiff sandy gravelly clay present at shallow depths in these pits.

Hydraulic conductivity (falling head) testing was undertaken by BREL on the 18th August 2019 within a select number of shallow monitoring wells. These included monitoring wells BH07, RC10A, BH13 and BH11. The testing was undertaken in accordance with BS5930 (2015) Code of Practice for Ground Investigations.

Calculated K-values ranged between 3.91×10^{-4} m/sec and 8.42×10^{-5} m/sec.

9.3.11 Hydrogeological Interpretation

A detailed description of the interpreted hydrogeological regime across the site is provided in Chapter 6 of the Phase 2 Hydrogeological Assessment Report – see Appendix 9.1. A summary of this interpretation is provided below:

- Groundwater is present within the shallow relatively permeable subsoils across the site and appears to be underlain by lower permeability soft to firm gravelly clays. Groundwater is also present at depth within the deeper permeable clayey sands and gravels subsoils.
- Shallow groundwater is broadly flowing in a southeasterly direction across the site mimicking the topographical relief of the area and the site. This shallow water body appears to be continuous across the site and flowing under unconfined conditions.
- Groundwater within the deeper sands and gravels is broadly flowing in an east to southeasterly direction across the site. Groundwater within these deeper horizons appears to be flowing under confined conditions and does not appear to be hydraulically connected with shallow groundwater or Shanganagh Pond
- As expected, due to its proximity to the surface, shallow groundwater levels vary throughout the monitoring period across the site. The highest water level variation was recorded within monitoring well BH01 (southwestern region of the site) with a variation of 1.86m recorded. The lowest water level variation recorded was within monitoring well BH05A (eastern region of the site) with a variation of 0.12m recorded over the same period of time.
- During the monitoring period groundwater levels within the deeper groundwater body recorded a reduced reaction to rainfall events as expected. The deeper groundwater signature is also dissimilar to the shallow groundwater signature. This data provides further evidence that both water bodies are hydraulically separate underlying the site.
- Water levels within Shanganagh Pond ranged between 23.59 and 23.71 mOD (i.e. a depth of water ranging between 0.52 and 0.64 metres above the base of the pond). The variation in levels recorded is considered to be relatively low and is likely to be partially attributed to the controlling

influence of the water outlet point along the south-eastern bank of the pond. The maximum variation recorded was 120mm over the monitoring period.

- A review of groundwater contour maps and groundwater levels across the site (see Figures 12 and 13) indicates that shallow groundwater is providing a baseflow component to the functioning of the pond. The deeper confined groundwater body appears to be a separate water body that flows under the pond and is not hydraulically connected to the pond.
- Water level variations recorded in the pond often correlate with rainfall events although the signature is not considered to be particularly 'flashy'. On other occasions the response to rainfall events is not notable.
- The shallow groundwater signature is slightly similar to the pond water level signature on particular occasions and at variance on other occasions. This suggests that groundwater baseflow to the pond is contributing to the functioning of the pond although surface water input remains the dominant component to functioning of the pond based on the water levels recorded to-date. The influence of the discharge point from the pond is likely to be a controlling factor.
- The correlation between rainfall events and water levels in the pond is an indication that runoff and direct recharge via rainfall is an important component of the water that sustains the Shanganagh Pond (see Figure 6.2).
- In summary, it would appear that water levels within the pond are a function of surface water ingress via the land drain, general rainfall runoff from across the site and shallow groundwater baseflow. Accurate fluxes from each component are unclear without longer term monitoring data and surface water monitoring from the land drain over time. However, it is anticipated based on the data recorded to-date that shallow groundwater fluxes provide a notable input component to maintaining water levels within the pond during much of the year; however, the recorded data suggest that the surface water components are dominant over time.

9.3.12 Hydrological Catchment Description

The EPA Maps indicate there are no rivers or streams which flow across the Shanganagh site and this was confirmed during the site investigation. The closest flowing surface water feature is the Rathmichael Brook which rises in the Rathmichael Woods approximately 2 km to the west of the site and flows south-eastwards where it discharges into the Irish Sea near Bray (see Figure 9.6). The Rathmichael Brook is approximately 330 m from the western site boundary at its closest point to the site. Further south the River Dargle rises in the Wicklow and Dublin Mountains and flows into the Irish Sea at Bray. To the North the Shanganagh River rises in the Dublin Mountains and flows into the Irish Sea at Loughlinstown

Within the footprint of the proposed development is an old pond/wetland that is to be maintained as a visual amenity as part of the development.

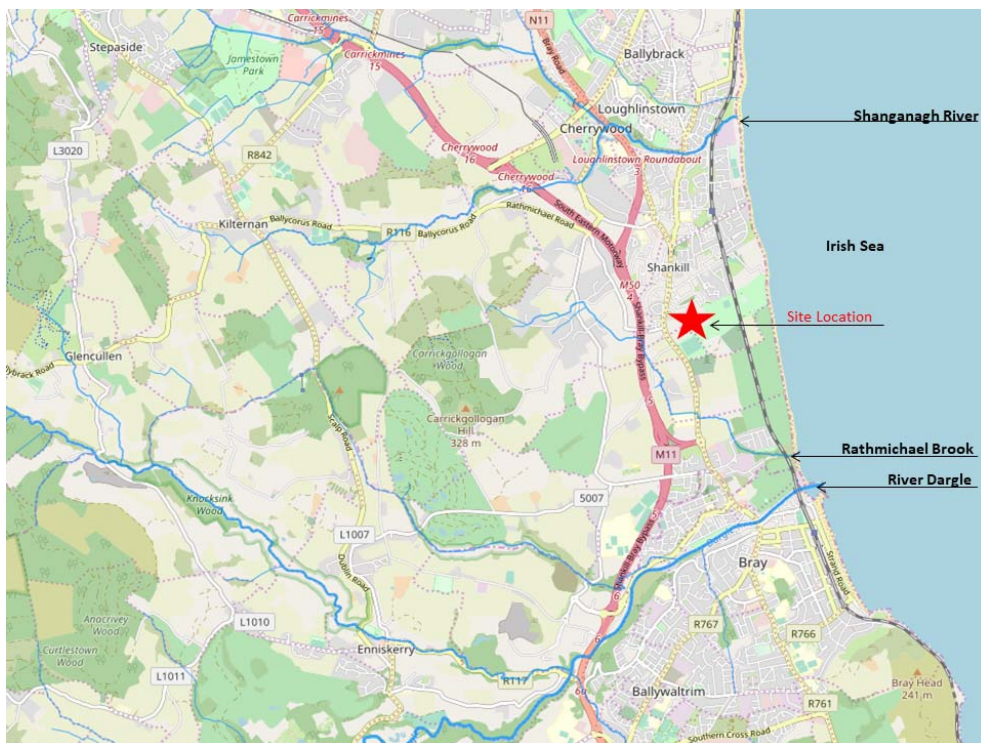


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9.3.13 Site Drainage

Shanganagh Pond is located in the central/southeastern region of the site. It is broadly circular in shape with a 35-40 metre diameter. An island is present in the south-central area of the pond (see Figure 9.7 and Figure 9.8).

A walkover of the site identified an old cut-and-cover drain along the northern boundary of the pond with water flowing from the north into the pond via this drain. A smaller drain in the direction of the DLRCC depot was previously mapped but the discharge location was not identified by BREL during site visit.

Previous assessments of the northern boundary drain suggest that the water is sourced in the vicinity of Castle Farm housing estate (located approximately 150 metres north of the headwall of the drain) with open jointed construction providing land drainage along the low point of the site. The true source of the water is unconfirmed at this stage and is likely to be connected to an historical drainage system in the area. BREL understands that Castle Farm estate is drained by a separate surface water drainage

system and does not appear to be connected to the this cut-and-over drain. The outfall of the pond discharges to a drain along the southern site boundary of the pond and flows in a southeasterly direction within an underground old stone drain before discharging into the drainage network of Shanganagh park.



Figure Error! No text of specified style in document..7 Shanganagh Site Drainage



Figure Error! No text of specified style in document..8 View of reduced water levels in Pond (Sept 2018)

9.3.14 Surface Water WFD Status

The WFD water Maps (<http://wfdireland.ie/maps.html>) indicate the current Water Framework Directive (WFD) status for the following surface waterbodies:

- River Dargle Lower (IE_EA_10_1275) is 'Moderate' (based upon the final RBMP, 2009-2015). The WFD risk category is 1a 'At risk of not achieving good status'. The overall objective is to restore the river to good status by 2027.
- The Ratmichael Brook is not a designated water body under the WFD but most of the water course flows inside the River Dargle Lower waterbody.
- The Shanganagh River (IE_EA_10_1220) WFD status is 'Good' (based upon the final RBMP, 2009-2015). The WFD risk category is 1a 'At risk of not achieving good status'.

9.3.15 Flood Risk

The Shanganagh site is not mapped within any river flood extents. The risk of flooding at the site is very low (<https://www.floodinfo.ie/map/floodmaps/>). A Site-Specific Flood Risk Assessment was produced for the site by Punch Consulting Engineers - see Appendix 9.2 of this EIAR.

The site-specific flood risk assessment was undertaken in accordance with "The Planning System & Flood Risk Management Guidelines" published by the Department of the Environment, Heritage and Local Government in November 2009 and the Dún Laoghaire-Rathdown Local Area Plan.

Flood Maps produced as part of the Eastern CFRAMS were consulted to establish the Flood Zone. It was determined that the proposed development is currently located in Flood Zone C for fluvial flooding.

A review of PFRA mapping shows portions of the site to be within Flood Zone A for pluvial flooding. However, it was considered that the pluvial risk will be managed through the construction of a new surface water drainage network, and therefore the site will be in Flood Zone C for pluvial flooding. The site is not affected by coastal or groundwater flooding.

Site-specific measures have been incorporated into the development design to ensure that the proposed development will not be at risk of flooding. The lowest proposed finished floor levels are set at 25.4 mAOD, which is above the 1 in 1000-year flood level of 23.24 mAOD. Storm drainage for the development have been designed such that there will be no pluvial flooding at the site of the proposed development. The proposed attenuation storage will be utilised to ensure that stormwater runoff from the site does not exceed the greenfield runoff rate. This reduction in flow rate will ensure that the risk of flooding downstream of the site is not worsened by the proposed development. No development will take place in the floodplain; as such no floodwaters will be displaced during extreme flood events.

9.3.16 Designated / Protected Areas

There are no Designated Protected Areas in the immediate vicinity of the site (see Figure 9.9). The following designated areas are within 5 - 10 km of the Shanganagh site:

- Special Areas of Conservation (SAC) - Ballyman Glen, Knocksink Woods, Bray Head and Rockabil to Dalkey Islands;
- Special Protection Areas (SPA) – Dalkey Islands and Wicklow Mountains; and,

- Proposed Natural Heritage Areas (pNHA) – Dalkey Coastal Zone & Killiney Hill, Loughlinstown Woods, Dingle Glen, Ballybetagh Bog, Knocksink Wood, Ballyman Glen, Powerscourt Woodland and Bray Head.

Information of each of these protected areas are provided in detail in Chapter 7.0 Biodiversity of this EIAR. BREL understands that Shanganagh pond is not an Annex I habitat under the Habitats Directive but does have a habitat value for bats and breeding newts. The breeding season for these newts is between March and October.

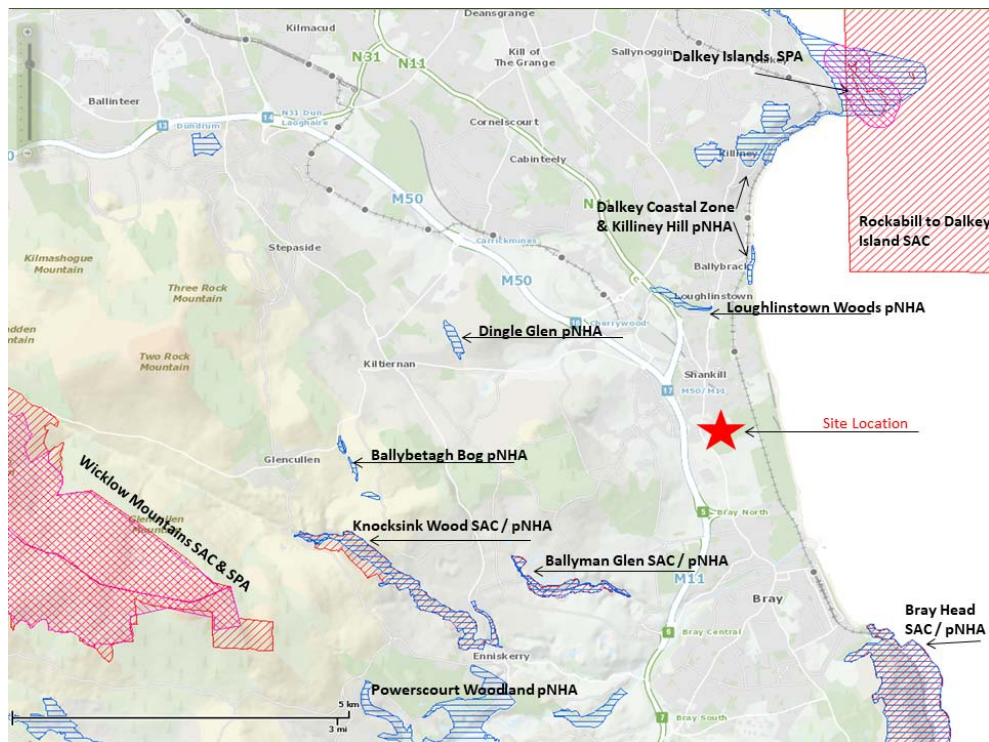


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9.4 LIKELIHOOD OF IMPACTS

As described in detailed in Chapters 1.0 and 2.0 of this EIAR, details of the proposed development relevant to this chapter include the following:

- Construction of 1-6 storey residential unit and other general amenities including a gym, lounge areas, a function room, a gallery/community room, a creche, a local shop and café, business pods and co-working office units.
- Provision of water services, foul and surface water drainage and associated connections across Shanganagh Park to the proposed Woodbrook residential scheme with attenuation proposals including permeable paving, green roofs & swales.
- Extensive landscaping and public realm works including (a) remediation of the existing pond within the Demense; (b) provision of playground and kick about areas; and (c) new pedestrian and cycle connections through the adjoining parkland to the south.
- No underground basements have been proposed.

A detailed description of the proposed surface water drainage system is detailed in Chapter 16.0. The design and function of the system is considered in terms of the possible impacts on recharge to groundwater and the associated impact to Shanganagh Pond.

The surface water drainage is to be collected across the site and reduced to a greenfield equivalent rate for the 1% AEP return period before discharging to Shanganagh Pond which is connected to the existing surface water drainage ditch along the southern boundary of the site.

The drainage system will incorporate SuDS measures such as green roofs, permeable paving, rain gardens, an oil-water interceptor and swales to improve quality and reduce run off rates from the site development. The new surface water drainage network within the development will also include two in-ground attenuation tanks with associated pipework and flow controls and a number of manhole sumps to provide additional attenuation measures within the system.

It is anticipated that based on the proposed site development activities the likelihood of impact to the hydrogeological and hydrological regimes underlying, and in proximity to the site, is considered to be low.

The main environmental factors associated with the risk to the hydrogeological and hydrological environments relate to general construction activities including uncontrolled sediment runoff from exposed soils, fuel and chemical storage, localised excavation of subsoils increasing the vulnerability of the aquifer to pollution events and encountering possible buried waste at the site (albeit somewhat unlikely). If any contaminated soils or buried waste are encountered, they are anticipated to be very localised with a low-level risk posed to human health and the water environment posed.

The importation of the fill material is a necessary activity for the development and every effort will be made to utilise previously reworked or excavated inert and geotechnically suitable material. The raising of land will ensure additional protection is provided to the underlying aquifer.

9.5 DESCRIPTION AND SIGNIFICANCE OF IMPACTS

9.5.1 Assessment Criteria

The significance of potential impacts on the hydrogeological and hydrological receptors was estimated by implementing a *Design Manual for Roads and Bridges (DMRB)* and IGI Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements (2013) style of assessment using hydrogeological type attributes and measures to determine the magnitude of the impact on the attribute. Table 9.4 illustrates the criteria for determining the importance of the sensitive receptors identified at the site, Table 9.5 demonstrates the criteria for estimating the magnitude of the impact on an attribute and Table 9.6 presents the resulting estimation of significant potential impacts.

Importance	Criterion	Typical Examples
Very High	Attribute has a high quality and rarity on regional or national scale.	River, wetland or surface water or groundwater body ecosystem protected by EU legislation. Aquifer providing a regionally important drinking water resource or supporting site protected under wildlife legislation.
High	Attribute has a high quality and rarity on local scale.	Aquifer providing locally important resource or supporting peat ecosystem – undesignated.
Medium	Attribute has a medium quality and rarity on local scale.	Aquifer providing water for agricultural or industrial use with limited connection to surface water. Eroding bog.
Low	Attribute has a low quality and rarity on local scale.	Non-aquifer. Cutover blanket bog.

Table Error! No text of specified style in document..4 Estimation of Importance of Sensitive Attributes

Magnitude	Criterion	Typical Example
Major Adverse	Results in loss of attribute and/or quality and integrity of attribute. Severe.	Loss of aquifer water supply by dewatering or major contamination event. Potential high risk of pollution to groundwater from routine run-off.
Moderate Adverse	Results in effect on integrity of attribute, or loss of part of attribute. Major.	Partial loss or change to aquifer characteristics. Potential medium risk of pollution to groundwater from routine run-off. Loss in peat margins or loss in recharge to a potential SAC Annex 1 habitat.
Minor Adverse	Results in some measurable change in attributes quality or vulnerability. Minor.	Potential low risk of pollution to groundwater from routine run-off. Risk of pollution from accidental spillages. Localised peat extraction on bog.
Negligible	Results in effect on attribute, but of insufficient magnitude to affect the use or integrity. Not significant.	No measurable impact upon aquifer and no perceivable risk of pollution from accidental spillages. Slight impact on peat by animal hoofs etc.
Minor Beneficial	Results in some beneficial effect on attribute or a reduced risk of negative effect occurring.	Insignificant risk of contamination to groundwater due to surface sealing.

Table Error! No text of specified style in document..5 Estimation of the Magnitude of a Potential Impact on an Attribute

A qualitative approach was used in this evaluation, generally following the significance classification in Table 9.6 and through professional judgement. The significance of a predicted impact is based on a combination of the sensitivity or importance of the attribute and the predicted magnitude of any effect.

Importance of Attribute	Magnitude of Potential Impact			
	Negligible	Minor Adverse	Moderate Adverse	Major Adverse
Extremely High	Imperceptible	Significant	Profound	Profound
Very high	Imperceptible	Significant / Moderate	Profound/ Significant	Very Large
High	Imperceptible	Moderate / Slight	Significant/ Moderate	Profound/Significant
Medium	Imperceptible	Slight	Moderate	Significant
Low	Imperceptible	Imperceptible	Slight	Slight / Moderate

Table Error! No text of specified style in document..6 Estimation of the Significance of Potential Impact

The prediction of potential impacts from the proposed development are summarised in the following tables, using the headings discussed under the criteria for determination of impacts. The impacts are separated into construction stage impacts and operational stage impacts.

The prediction of potential impacts by the proposed development are summarised in the following sections and tables. The impacts are separated into construction stage impacts and operational stage impacts.

9.5.2 Potential Cumulative Impacts

The EU Guidelines² define cumulative impacts as:

“Impacts that result from incremental changes caused by other past, present or reasonably foreseeable actions together with the project. For example:

- Incremental noise from a number of separate developments;
- Combined effect of individual impacts, e.g. noise, dust and visual, from one development on a particular receptor; and
- Several developments with insignificant impacts individually but which together have a cumulative effect.”

The EPA Guidelines on the Information to be contained in Environmental Impact Assessment Reports Statements mirrors this approach and defines cumulative impacts as “The addition of many small impacts to create one larger, more significant, impact”. Therefore, the assessment of cumulative impacts considers the total impact associated with the proposed development when combined with other past, present, and reasonably foreseeable future developments.

An examination of the potential for other projects to contribute cumulatively to the impacts from the proposed development was undertaken during the preparation of this EIAR.

Given the scale of the proposed development and the capacity of the surrounding environment to accommodate a development of this nature and size, it is considered that the overall cumulative development will have a slight and long term impact on the underlying groundwater body, through the construction of additional buildings, infrastructure and hardstanding required for a development of this nature. Potential impacts on groundwater levels and quality from untreated stormwater runoff are considered in addition to potentially reduced rainfall infiltration/recharge to groundwater from low permeability hardstanding areas. However, provided sufficient mitigation measures are in place, as required under this EIAR, the overall impact on groundwater will be imperceptible.

A proposed residential development is currently being considered as part of the Strategic Housing Development (SHD) by An Bord Pleanála. The development is located in Woodbrook, to the south of the site and comprises a residential-led development comprising 685 no. residential units and 1no. childcare facility in buildings ranging from 2 to 8-storeys. The site is generally bounded by the Old Dublin

² Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions, May 2009, EC DG XI Environment, Nuclear Safety & Civil Protection Ref: NE80328/D1/3

Road (R119) and St. James (Crinken) Church to the west, Shanganagh Public Park and Shanganagh Cemetery to the north, Woodbrook Golf Course to the east and Corke Lodge and woodlands and Woodbrook Golf Clubhouse and car park to the south. The development is considered to be downgradient of Shanganagh Castle site and overall the cumulative impact of this Woodbrook development and Shanganagh Castle development on the hydrogeological and hydrological environments is considered to be slight and long term.

9.5.3 'Do Nothing' Impacts

If the proposed development did not proceed, based on existing site investigation data to-date, there would be no impact on the underlying aquifer or Shanganagh pond. It is envisaged that the land use would remain relatively unchanged (based on historical maps) as open grassland, disused allotments, and a DLRCC depot with mature trees along the site boundaries.

9.5.4 Potential Impact Risk

Tables 9.7 and Table 9.8 outline the range of potential impacts associated with the construction and operational phases of the proposed development. Table 9.9 details site-specific mitigation measures that shall be incorporated into the operations of the construction works. No site-specific mitigation measures have been proposed for the operation stage of the development given the proposed surface water drainage system that has been incorporated into the design of the development. Flood risk mitigation measures have been incorporated into the design of the development by ensuring the proposed finished floor levels are set 2.16 metres above the 1 in 1000-year flood level of 23.24 mAOD.

Activity No.	Construction Activity	Attribute	Character of Potential Impact	Importance of Attribute (see Table 9.4)	Magnitude of Potential Impact (see Table 9.5)	Significance of Potential Impact (see Table 9.6)
1	Excavation Activities	Groundwater Surface Water	<p>The removal of topsoil and localised excavations across the site will potentially increase the vulnerability of the underlying groundwater body. However, given the high vulnerability rating for the site, as mapped by the GSI, in accordance with Table 9.1, the vulnerability status of the site will not increase to a higher vulnerability status.</p> <p>The risk to the Rathmichael Brook is considered to be imperceptible due to it being upgradient of the site and with no direct connection to the site via drainage.</p>	Very High	Negligible	Imperceptible
2		Shanganagh Pond	The risk of sediment-laden uncontrolled runoff from the construction works poses a risk to the quality and functioning of the pond as a sensitive ecological habitat.	Very High	Moderate Adverse	Profound/ Significant

Activity No.	Construction Activity	Attribute	Character of Potential Impact	Importance of Attribute (see Table 9.4)	Magnitude of Potential Impact (see Table 9.5)	Significance of Potential Impact (see Table 9.6)
3	Excavation Dewatering Works	Surface Water / Shanganagh Pond	<p>In general, it is anticipated that the development site works and excavation proposals will not be deep enough to require significant dewatering activities to facilitate the construction of the proposed development.</p> <p>Localised deeper excavations may require temporary dewatering activities (e.g. attenuation tank, lift shafts etc.) to lower water levels within excavations and to remove rainfall ingress to the excavation. The main risk posed by any dewatering activity relates to the discharge of silt-laden water to proximate surface water features thereby impacting on the ecological sensitive of any surface water features.</p>	Very High	Minor Adverse	Significant/ Moderate
4		Groundwater Levels	The impact on surrounding groundwater levels across the site from localised dewatering activities are expected to be imperceptible.	Very High	Negligible	Imperceptible
5	Fuel storage/usage on site	Groundwater	Accidental spillage of contaminants during construction works may cause short to long term, moderate to significant impacts to soils and groundwater if not stored and used in a an environmentally safe manner.	Very High	Moderate Adverse	Profound/ Significant

Activity No.	Construction Activity	Attribute	Character of Potential Impact	Importance of Attribute (see Table 9.4)	Magnitude of Potential Impact (see Table 9.5)	Significance of Potential Impact (see Table 9.6)
6		Surface Water / Shanganagh Pond	<p>Accidental spillage of contaminants during construction works may cause short to long term, moderate to significant impacts to Shanganagh Pond and downstream surface waters within Shanganagh park.</p> <p>The Rathmichael Brook is located approximately 330m west of the site and is at no risk from a fuel spill.</p>	Very High	Moderate Adverse	Profound/ Significant
7	Waste Arisings from excavation and demolition activities	Groundwater Surface Water / Pond	Contaminated waste material generated from construction activities may require disposal off-site if not suitable for reuse on site. Temporary storage on site may be required and impacts to exposed groundwater and Shanganagh Pond from direct runoff during rainfall events may occur.	Very High	Moderate Adverse	Profound/ Significant
8	Contaminated land/buried waste	Groundwater / Shangangh Pond	Disturbance and release of potential pollutants within the subsurface during site works. Although contaminated land or illegally deposited waste material has not been encountered to-date during the detailed site investigation completed across the site, there exists a residual risk of encountering unexpected contamination or waste material within particular locations e.g. in the allotments or the DLRC depot. The Rathmichael Brook is located upgradient approximately 330m west of the site which minimises the risk posed by any potential buried waste or contaminated material within the subsurface when disturbed by construction works.	Very High	Moderate Adverse	Profound/ Significant

Activity No.	Construction Activity	Attribute	Character of Potential Impact	Importance of Attribute (see Table 9.4)	Magnitude of Potential Impact (see Table 9.5)	Significance of Potential Impact (see Table 9.6)
9	Vandalism	Groundwater / Shangangh Pond	Pollution due to vandalism of stores or plant poses a risk to soils, groundwater and surface waters.	Very High	Minor Adverse	Significant/ Moderate
10	Contaminated imported fill	Groundwater / Shangangh Pond	The importation of unsuitable or contaminated fill material for the purpose of reinstatement works or access road may also pose a risk to the underlying groundwater body and subsequently to downgradient surface water features.	Very High	Moderate Adverse	Profound/ Significant
11	Concrete Wash Water	Groundwater / Shangangh Pond	It is not anticipated that significant concrete wash water will be generated on site. However, inappropriate disposal or uncontrolled runoff of wash water from concrete trucks or wash down facilities has the potential to impact on the quality of the underlying aquifer.	Very High	Minor Adverse	Significant/ Moderate

Table Error! No text of specified style in document..7 Potential Impacts during Construction Phase

Activity No.	Operational Activity	Attribute	Character of Potential Impact	Importance of Attribute (see Table 9.4)	Magnitude of Potential Impact (see Table 9.5)	Significance of Potential Impact (see Table 9.6)
1	Hydrocarbon laden surface water runoff from roads, car parks and general hardstanding	Groundwater / Shanganagh Pond	<p>Road surface runoff and poorly designed drainage system being directly channelled to groundwater can result in contamination of the groundwater aquifer. Accidental spillages could contaminate the aquifer by direct percolation or via the superficial water network. The risk posed to the Rathmichael Brook by a poorly designed drainage system is considered to be notably lower with an imperceptible impact considered likely.</p> <p>However, the given the design of the proposed drainage system for the site the risk posed by the surface water drainage system is considered to be low with site-specific mitigation measures not deemed necessary.</p>	Very High	Negligible	Imperceptible
2	Reduced infiltration of rainwater to the underlying aquifer	Groundwater / Shanganagh Pond	The increased presence of hard standing across a large area will potentially reduce the amount of infiltration of rainwater to the underlying shallow groundwater body thereby potentially reducing groundwater baseflow to Shanganagh Pond. However, given the low infiltration characteristics of the shallow subsoils recorded across the site, the impact is not considered to be significant.	Very High	Negligible	Imperceptible
3	Wastewater Disposal	Groundwater Surface water	All foul water is proposed to be discharged to mains sewer network with no foul water discharge to groundwater or surface water proposed.	Very High	Negligible	Imperceptible

4	Underground structures impacting on groundwater flow	Groundwater Surface water	The presence of a number of underground attenuation tanks and proposed piled foundations in particular areas of the site, although may have a minor and localised impact on groundwater flow in the immediate vicinity of each entity, the overall impact on groundwater flow across the site is considered to be imperceptible and will not impact on natural groundwater flows towards Shanganagh Pond.	Very High	Negligible	Imperceptible
5	Risk of Pluvial flooding at the site	Surface water	A review of PFRA mapping shows portions of the site to be within Flood Zone A for pluvial flooding and therefore poses a potential risk of flooding at the site and/or downgradient of the site	High	Moderate	Significant/ Moderate

Table Error! No text of specified style in document..8 Potential Operational Impacts

9.6 REMEDIAL AND MITIGATION MEASURES

Details of all recommended remediation and mitigation measures to address the risks identified in Table 9.7 and 9.8 are provided in Table 9.9 below.

Based on the proposed development design and recommended mitigation measures recommended as part of the construction works, BREL consider that no further mitigation measures are required during the operational phase of the development to ensure that the risks posed to groundwater and surface waters are considered to be imperceptible.

It is considered that the proposed development will have a long-term and imperceptible impact on the hydrogeological and hydrological conditions at the site and the surrounding area.

Activity No.	Construction Activity	Attribute	Character of Impact	Mitigation	Residual Impact
2	Excavation Activities	Shanganagh Pond	The risk of sediment-laden uncontrolled runoff from the construction works poses a risk to the quality and functioning of the pond as a sensitive ecological habitat.	<p><u>H&H CONST 1:</u> A suitably designed water runoff drainage system will be incorporated into the workings of the construction site through the use of settlement ponds, appropriate stockpile locations, stockpile covering and silt fences. These measures are detailed in the site-specific Construction and Environmental Management Plan (CEMP) for the site.</p> <p><u>H&H CONST 2:</u> In addition, a buffer zone of 10 metres surrounding Shanganagh pond will be maintained throughout the construction works with silt fences installed around the perimeter of the pond.</p>	Imperceptible
3	Excavation Dewatering Works	Surface Water / Shanganagh Pond	<p>In general, it is anticipated that the development site works and excavation proposals will not be deep enough to require significant dewatering activities to facilitate the construction of the proposed development.</p> <p>Localised deeper excavations may require temporary dewatering activities (e.g. attenuation tank, lift shafts etc.) to lower water levels within excavations and to remove rainfall ingress to the excavation. The main risk posed by any dewatering activity relates to the discharge of silt-laden water to proximate surface water features thereby impacting on the</p>	<p><u>H&H CONST 3:</u> All dewatering operations at the site are anticipated to be temporary and low level. All rainwater and groundwater ingress into any excavations will be pumped from the excavation into the construction site drainage system before being discharged off-site into the surface water drainage network in Shangangah Park. No discharged to Shanganagh Pond will occur.</p> <p><u>H&H CONST 4:</u> All discharge waters will be appropriately monitored on a daily basis and sampled at regular intervals for water quality parameters with site-specific thresholds agreed with DLRCC prior to the commencement of the works.</p> <p><u>H&H CONST 5:</u> All monitoring data will be collated and compiled within a site-specific Construction Environmental Management Plan for the development and available for inspection by DLRCC when required.</p>	Imperceptible

Activity No.	Construction Activity	Attribute	Character of Impact	Mitigation	Residual Impact
			ecological sensitive of any surface water features.		
5	Fuel storage/ usage on site	Groundwater	Accidental spillage of contaminants during construction works may cause short to long term, moderate to significant impacts to soils and groundwater if not stored and used in a an environmentally safe manner.	<p><u>H&H CONST 6:</u> Waste fuels and materials will be stored in designated areas that are isolated from surface water drains or open waters (e.g. excavations). Skips will be closed or covered to prevent materials being blown or washed away and to reduce the likelihood of contaminated water leakage. Hazardous wastes such as waste oil, chemicals and preservatives, will be stored in sealed containers and kept separate from other waste materials while awaiting collection by a registered waste carrier. Fuelling, lubrication and storage areas and site offices will not be located within 25m of drainage ditches, surface waters or open excavations. Fuel interceptor tanks will be installed on the site to treat any runoff.</p> <p><u>H&H CONST 7:</u> All waste containers (including all ancillary equipment such as vent pipes and refuelling hoses) will be stored within a secondary containment system (e.g. a bund for static tanks or a drip tray for mobile stores and drums). The bunds will be capable of storing 110% of the tank capacity. Where more than one tank is stored, the bund must be capable of holding 110% of the largest tank of 25% of the aggregate capacity (whichever is greater). Drip trays used for drum storage must be capable of holding at least 25% of the drum capacity. Where more than one drum is stored the drip tray must be capable of holding 25% of the aggregate capacity of the drums stored.</p>	Imperceptible
6		Surface Water / Shanganagh Pond	Accidental spillage of contaminants during construction works may cause short to long term, moderate to significant impacts to Shanganagh Pond and downstream surface waters within Shanganagh park.		Imperceptible

Activity No.	Construction Activity	Attribute	Character of Impact	Mitigation	Residual Impact
				<p>H&H CONST 8: Back-up plans to deal with the possibility of contamination or fuel spills, e.g. pumping of wells or sumps to collect contaminated groundwater for treatment shall be undertaken and included in an overall Construction & Demolition Waste Management Plan (C&DWMP) and Emergency Operation Plan (EOP).</p> <p>WH&H CONST 9: Monitoring prior to, during and post construction works of surface water and groundwater quality shall be undertaken to ensure minimum disturbance of water quality in the general vicinity of the site. During the construction phase, the monitoring programme will include daily checks, weekly inspections and monthly audits to ensure compliance with the Construction Environmental Management Plan. This will be undertaken in consultation with the wishes of DLRC.</p>	

Activity No.	Construction Activity	Attribute	Character of Impact	Mitigation	Residual Impact
7	Waste Arisings	Groundwater Surface Water / Pond	Contaminated waste material generated from construction activities may require disposal off-site if not suitable for reuse on site. Temporary storage on site may be required and impacts to exposed groundwater and Shanganagh Pond from direct runoff during rainfall events may occur.	<p><u>H&H CONST 10:</u> Soil removal during the construction phase of the project will be an unavoidable consequence of the development and would apply for virtually any form of site redevelopment. Where possible the soils will be reused on site.</p> <p><u>H&H CONST 11:</u> Chemical analysis will be carried out to assess whether the made ground or fill material presents a risk to human and/or environmental receptors and to determine suitable on-site or off-site disposal routes.</p> <p><u>H&H CONST 12:</u> All waste material (both soils and other) generated will be temporarily stored in secure bunded areas thereby preventing the migration of leachate or contaminating substances from impacting on the surrounding environment.</p>	Imperceptible
8	Contaminated land/buried waste	Groundwater / Shanganagh Pond	Disturbance and release of potential pollutants within the subsurface during site works. Although contaminated land or illegally deposited waste material has not been encountered to-date during the detailed site	<p><u>H&H CONST 13:</u> A predevelopment site investigation will be undertaken within the footprint of the DLRCC depot to assess the identified potential sources of contamination.</p> <p><u>H&H CONST 14:</u> Special and site-specific environmental and human health contingency plans and procedures,</p>	Imperceptible

Activity No.	Construction Activity	Attribute	Character of Impact	Mitigation	Residual Impact
			investigation completed across the site, there exists a residual risk of encountering unexpected contamination or waste material within particular locations e.g. in the allotments or the DLRC depot.	following best-practice guidance, shall be developed for the unexpected discovery of contaminated or illegally deposited waste materials. These may include detailed site investigation, contamination delineation, risk assessment and appropriate remediation under the design and supervision of an experienced contaminated land engineer/hydrogeologist. <u>H&H CONST 15:</u> All excess fill and material considered unacceptable for reuse on site in terms of the residual risk posed to human health and to the environment shall be appropriately remediated in accordance with the relevant Waste Management Regulations.	
9	Vandalism	Groundwater / Shangangh Pond	Pollution due to vandalism of stores or plant poses a risk to soils, groundwater and surface waters.	<u>H&H CONST 16:</u> Adequate security measures shall be installed on the construction site. Early assessment of the sensitivity of the project and identifying potential locations at risk will assist in the design of the site layout and security measures required. Security measures will include secure fencing, secure site access, securing site plant and equipment, secure storage of materials, sufficient warning signage, and security lighting.	Imperceptible
10	Contaminated imported fill	Groundwater / Shangangh Pond	The importation of unsuitable or contaminated fill material for the purpose of reinstatement works or access road may also pose a risk to the underlying groundwater body and	<u>H&H CONST 17:</u> All imported soils and stones shall be sourced from a licenced/permitted facility with suitable documentation to confirm the material is inert and fit for purpose. The contractor shall satisfy themselves that the material is fit for use before importing to the site.	Imperceptible

Activity No.	Construction Activity	Attribute	Character of Impact	Mitigation	Residual Impact
			subsequently to downgradient surface water features.		
11	Concrete Wash Water	Groundwater / Shangangh Pond	It is not anticipated that significant concrete wash water will be generated on site. However, inappropriate disposal or uncontrolled runoff of wash water from concrete trucks or wash down facilities has the potential to impact on the quality of the underlying aquifer.	<p><u>H&H CONST 18:</u> All grout/concrete washout facilities will be established away from exposed excavations and into dedicated skips on site. The activities will be monitored and the skips will be appropriately located and secured.</p> <p><u>H&H CONST 19:</u> In the event of a major spillage the contractor's Emergency Operating Plan (EOP) will be followed. The first action is to stop the source of pollution and contain the spillage.</p>	Imperceptible
12	Risk of Pluvial flooding at the site	Surface water	A review of PFRA mapping shows portions of the site to be within Flood Zone A for pluvial flooding and therefore poses a potential risk of flooding at the site and/or downgradient of the site	<p><u>H&H CONST 20:</u> FFLs for the site have been set so there is a freeboard of greater than 2 m above the CFRAMS Q1000 flood level of 23.24 mAOD.</p> <p><u>H&H CONST 21:</u> All surface water drains will be sized such that they will prevent flooding in the proposed development and convey surface water flows from the site without causing pluvial flooding.</p> <p><u>H&H CONST 22:</u> Surface water attenuation tanks will be provided within the site and has been sized to ensure that runoff from the site does not exceed the level of the greenfield (pre-development) runoff rate. This will ensure that the runoff rate from the site will not increase as a result of the proposed development.</p>	Imperceptible

Activity No.	Construction Activity	Attribute	Character of Impact	Mitigation	Residual Impact
				H&H CONST 23: A non-return valve will be located at the downstream point of the drainage network to prevent any surcharging from the adjacent drainage network.	

Table Error! No text of specified style in document..9 Construction Mitigation Measures

The nature of the development dictates that the greatest potential impact on the underlying hydrogeology and hydrology associated with the proposed development will be in the construction phase. It is predicted that the impacts to the hydrogeological and hydrological environments will be imperceptible and short term.

With regard to the operational phase of the development, although the discharge of pollutants from runoff to the aquifer could pose a potential risk to groundwater, the proposed drainage system design in conjunction with natural subsoil protection of the sand and gravel aquifer across the site will ensure that no significant impacts on the local hydrogeological and hydrological environment are predicted.

9.7 MONITORING

As part of the site-specific Construction Environmental Management Plan for the construction works, the following monitoring works shall be implemented:

1. Some geotechnically unsuitable soils may be excavated during the construction phase but will be reused elsewhere on site for landscaping or land raising purposes.
2. Monitoring of any hazardous material stored on-site will form part of the proposed Construction & Demolition Waste Management Plan or Construction Environmental Management Plan.
3. A dust management/monitoring programme shall be implemented during the construction phase of the development. The quantities of topsoil, subsoil and rock removed off site shall also be recorded.
4. The construction phase shall be monitored, particularly in relation to the following;
 - i. Protection of topsoil stockpiled for re-use;
 - ii. Adequate runoff control of potential stockpiles of subsoils;
 - iii. Cleanliness of adjoining road network;
 - iv. Prevention of oil and diesel spillages;
 - v. Dust control.
5. Monitoring prior to, during and post construction works of surface water quality in Shanganagh Pond and the construction works site drainage system shall be undertaken to ensure minimum disturbance of water quality in the general vicinity of the site. During the construction phase, the monitoring programme shall include daily checks, weekly inspections and monthly audits to ensure compliance with the Construction & Demolition Waste Management Plan (C&DWMP) and the CEMP. This shall be undertaken in consultation with the requirements of DLRCC.

9.8 REFERENCES

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CHAPTER TEN AIR QUALITY AND CLIMATE

10.1 INTRODUCTION

This chapter assesses the likely air quality and climate impacts, if any, associated with the proposed development. A full description of the development can be found in Chapter 2.0 of this EIAR.

10.2 ASSESSMENT METHODOLOGY

When considering a development of this nature, the potential air quality and climate impact on the surroundings must be considered for each of two distinct stages:

- construction phase, and;
- operational phase.

During the construction stage the main focus in relation to air quality impacts will be from potential fugitive dust emissions from site activities. Emissions from construction vehicles and machinery have the potential to impact climate. The construction phase impacts will be short-term in duration.

The primary potential sources of air and climatic emissions during the operational phase of the proposed development are deemed long-term and will involve a change in traffic flows on road links nearby the proposed development.

10.2.1 Local Air Quality Assessment – Impact from Road Traffic (DMRB Assessment)

The air quality assessment has been carried out following procedures described in the publications by the EPA (2015, 2017) and using the methodology outlined in the guidance documents published by the UK DEFRA (2016; 2018). The assessment of air quality was carried out using a phased approach as recommended by the UK DEFRA (2018). The phased approach recommends that the complexity of an air quality assessment be consistent with the risk of failing to achieve the air quality standards. In the current assessment, an initial scoping of possible key pollutants was carried out and the likely location of air pollution “hot-spots” identified. An examination of recent EPA and Local Authority data in Ireland (EPA, 2019a) has indicated that SO₂, smoke and CO are unlikely to be exceeded in the majority of locations within Ireland and thus these pollutants do not require detailed monitoring or assessment to be carried out. However, the analysis did indicate potential issues with regards to nitrogen dioxide (NO₂), PM₁₀ and PM_{2.5} at busy junctions in urban centres (EPA, 2019a). Benzene, although previously reported at quite high levels in urban centres, has recently been measured at several city centre locations to be well below the EU limit value (EPA, 2019b). Historically, CO levels in urban areas were a cause for concern. However, CO concentrations have decreased significantly over the past number of years and are now measured to be well below the limits even in urban centres (EPA 2019a; 2019b). The key pollutants reviewed in the assessments are NO₂, PM₁₀, PM_{2.5}, benzene and CO, with particular focus on NO₂ and PM₁₀.

Key pollutant concentrations will be predicted for nearby sensitive receptors for the following scenarios:

- The Existing Scenario (2019), for model verification;
- Opening Year Do-Nothing Scenario (2024) (DN), which assumes no development in place;
- Opening Year Do-Something Scenario (2024) (DS), which assumes the proposed development is in place;
- Design Year Do-Nothing Scenario (2039) (DN), which assumes no development is in place; and
- Design Year Do-Something Scenario (2039) (DS), which assumes the proposed development is in place.

The assessment methodology involved air dispersion modelling using the UK DMRB Screening Model (Version 1.03c, July 2007), the NO_x to NO₂ Conversion Spreadsheet (Version 7.1, 2019) (UK DEFRA, 2019), and following guidance issued by the TII (2011), UK Highways Agency (2007), UK DEFRA (2016; 2018), UK DETR (1998) and the EPA (2015; 2017).

The TII guidance (2011) states that the assessment must progress to detailed modelling if:

- Concentrations exceed 90% of the air quality limit values when assessed by the screening method; or
- Sensitive receptors exist within 50m of a complex road layout (e.g. grade separated junctions, hills etc).

The UK DMRB guidance (UK Highways Agency, 2007), on which the TII guidance was based, states that road links meeting one or more of the following criteria can be defined as being 'affected' by a proposed development and should be included in the local air quality assessment:

- Road alignment change of 5 metres or more;
- Daily traffic flow changes by 1,000 AADT or more;
- HGV flows change by 200 vehicles per day or more;
- Daily average speed changes by 10 km/h or more; or
- Peak hour speed changes by 20 km/h or more.

Concentrations of key pollutants are calculated at sensitive receptors that have the potential to be affected by the proposed development. For road links which are deemed to be affected by the proposed development and within 200 m of the chosen sensitive receptors inputs to the air dispersion model consist of: road layouts, receptor locations, annual average daily traffic movements (AADT), percentage of heavy goods vehicles, annual average traffic speeds and background concentrations. The UK DMRB guidance states that road links at a distance of greater than 200 m from a sensitive receptor will not influence pollutant concentrations at the receptor. Using the input data the model predicts the road traffic contribution to ambient ground level concentrations at the worst-case sensitive receptors using generic meteorological data. The DMRB model uses conservative emission factors, the formulae for which are outlined in the DMRB Volume 11 Section 3 Part 1 – HA 207/07 Annexes B3 and B4. These worst-case road contributions are then added to the existing background concentrations to give the worst-case predicted ambient concentrations. The worst-case predicted ambient concentrations are then compared with the relevant ambient air quality standards to assess the compliance of the proposed development with those standards.

The TII Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes (2011) detail a methodology for determining air quality impact significance criteria for road schemes, which can be applied to any project that causes a change in traffic flows. The degree of impact is determined based on both the absolute and relative impact of the proposed development. The TII significance criteria have been adopted for the proposed development and are detailed in Appendix 10.1, Table A10.1 to Table A10.3. The significance criteria are based on PM₁₀ and NO₂ as these pollutants are most likely to exceed the annual mean limit values (40 µg/m³). However, the criteria have also been applied to the predicted 8-hour CO, annual benzene and annual PM_{2.5} concentrations for the purposes of this assessment.

Update to NO₂ Projections using DMRB

In 2011 the UK DEFRA published research on the long-term trends in NO₂ and NO_x for roadside monitoring sites in the UK. This study marked a decrease in NO concentrations between 1996 and 2002, after which the concentrations stabilised with little reduction between 2004 and 2010. The result of this is that there now exists a gap between projected NO₂ concentrations which UK DEFRA previously published and monitored concentrations. The impact of this 'gap' is that the DMRB screening model can under-predict NO₂ concentrations for predicted future years. Subsequently, the UK Highways Agency (HA) published an Interim advice note (IAN 170/12) in order to correct the DMRB results for future years.

Conversion of NO_x to NO₂

NO_x (NO + NO₂) is emitted by vehicles exhausts. The majority of emissions are in the form of NO, however, with greater diesel vehicles and some regenerative particle traps on HGVs the proportion of NO_x emitted as NO₂, rather than NO is increasing. With the correct conditions (presence of sunlight and O₃) emissions in the form of NO, have the potential to be converted to NO₂.

Transport Infrastructure Ireland states the recommended method for the conversion of NO_x to NO₂ in "Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes"(2011). The TII guidelines recommend the use of DEFRA's NO_x to NO₂ calculator (2019) which was originally published in 2009 and is currently on version 7.1. This calculator (which can be downloaded in the form of an excel spreadsheet) accounts for the predicted availability of O₃ and proportion of NO_x emitted as NO for each local authority across the UK. O₃ is a regional pollutant and therefore concentrations do not vary in the same way as concentrations of NO₂ or PM₁₀.

The calculator includes Local Authorities in Northern Ireland and the TII guidance recommends the use of 'Armagh, Banbridge and Craigavon' as the choice for local authority when using the calculator. The choice of Craigavon provides the most suitable relationship between NO₂ and NO_x for Ireland. The "All Non-Urban UK Traffic" traffic mix option was used.

Impacts on Local Air Quality

There is the potential for a number of emissions to the atmosphere during the operational phase of the development. In particular, the traffic-related air emissions may generate quantities of air pollutants such as NO₂, CO, benzene, PM₁₀ and PM_{2.5}.

Cumulative effects have been assessed, as recommended in the EU Directive on EIA (Council Directive 97/11/EC) and using the methodology of the UK DEFRA (2016, 2018). Firstly, background concentrations (EPA 2019b) have been included in the modelling study. These background concentrations are year-specific and account for non-localised sources of the pollutants of concern (EPA 2019b). Appropriate background levels were selected based on the available monitoring data provided by the EPA (EPA 2019b) (see Section 10.3.3). Traffic flow information was obtained from Punch Consulting Engineers (the traffic consultant for this project) on 11/11/19 and has been used to model pollutant levels under various traffic scenarios and under sufficient spatial resolution to assess whether any significant air quality impact on sensitive receptors may occur. Projected traffic data used in the assessment includes for additional traffic associated with planned and permitted developments in the vicinity of the proposed development where such information was available. These include the Aske Hospital, Bray Golf Club and the Woodbrook development. This allows a robust and worst-case assessment with regard to air quality to be conducted.

The impact of the proposed development has been assessed by modelling emissions from the traffic generated as a result of the proposed development. The impact of emissions of CO, benzene, NO₂, PM₁₀ and PM_{2.5} for the baseline, opening and design years was predicted at the nearest sensitive receptors to the road links impacted by the development. This assessment allows the significance of the development, with respect to both relative and absolute impact, to be determined.

The receptors modelled represent the worst-case locations close to the proposed development and were chosen due to their close proximity (within 200 m) to the road links impacted by proposed development. The projected traffic data used for the local air quality assessment is shown in Table 10.1, with the percentage of HGVs shown in parenthesis below the AADT. Three worst-case air sensitive receptors (R1 – R3) in the vicinity of the proposed development have been assessed (see Figure 10.1).

Road Name	Speed (kph)	Base	Do Nothing	Do Something	Do Nothing	Do Something
		2019	2024		2039	
R119	50	9,500 (1.5%)	10,300 (1.7%)	18,300 (0.9%)	11,900 (1.95%)	20,700 (1.1%)

Note 1 Projected traffic data used for the purpose of this assessment includes committed and planned developments in the vicinity of the project site as listed in Chapter 2 of this EIAR.

Table 10.1- Traffic Data used in Modelling Assessment



Figure 10.1 Locations of Worst-case Air Sensitive Receptors selected for Modelling

10.2.2 Regional Air Quality and Climate Impact Assessment

The impact of the proposed development at a national / international level has been determined using the procedures given by Transport Infrastructure Ireland (2011) and the methodology provided in Annex 2 in the UK Design Manual for Roads and Bridges (2016). The assessment focused on determining the resulting change in emissions of volatile organic compounds (VOCs), nitrogen oxides (NO_x) and carbon dioxide (CO₂) associated with the proposed development. The Annex provides a method for the prediction of the regional impact of emissions of these pollutants from road schemes and can be applied to any development that results in a change in traffic volumes. The inputs to the air dispersion model consist of information on road link lengths, AADT movements and annual average traffic speeds.

10.2.3 Ecological Assessment

For routes that pass within 2km of a designated area of conservation (either Irish or European designation) the TII requires consultation with an Ecologist (2011). However, in practice the potential for impact to an ecological site is highest within 200 m of the proposed scheme and when significant changes in AADT (>5%) occur.

Transport Infrastructure Ireland's *Guidelines for Assessment of Ecological Impacts of National Road Schemes* (2009) and *Appropriate Assessment of Plans and Projects in Ireland – Guidance for Planning Authorities* (DEHLG, 2010) provide details regarding the legal protection of designated conservation areas.

If both of the following assessment criteria are met, an assessment of the potential for impact due to nitrogen deposition shall be conducted:

- A designated area of conservation is located within 200 m of the proposed development; and
- A significant change in AADT flows (>5%) will occur.

There are no designated areas of conservation within 200m of the proposed development site, therefore, an assessment of the impact of the proposed development on NO_x concentrations and nitrogen deposition is not required.

10.2.4 Assessment Criteria and Background Information

Ambient Air Quality Standards

In order to reduce the risk to health from poor air quality, national and European statutory bodies have set limit values in ambient air for a range of air pollutants. These limit values or “Air Quality Standards” are health or environmental-based levels for which additional factors may be considered. For example, natural background levels, environmental conditions and socio-economic factors may all play a part in the limit value which is set (see Table 10.2 and Appendix 10.2).

Air quality significance criteria are assessed on the basis of compliance with the appropriate standards or limit values. 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 NO₂, PM₁₀, PM_{2.5}, benzene and CO (see Table 10.2). Although the EU Air Quality Limit Values are the basis of legislation, other thresholds outlined by the EU Directives are used which are triggers for particular actions (see Appendix 10.2).

Pollutant	Regulation ^{Note 1}	Limit Type	Value
Nitrogen Dioxide	2008/50/EC	Hourly limit for protection of human health - not to be exceeded more than 18 times/year	200 µg/m ³
		Annual limit for protection of human health	40 µg/m ³
		Critical level for protection of vegetation	30 µg/m ³ NO + NO ₂
Particulate Matter (as PM ₁₀)	2008/50/EC	24-hour limit for protection of human health - not to be exceeded more than 35 times/year	50 µg/m ³
		Annual limit for protection of human health	40 µg/m ³
Particulate Matter (as PM _{2.5})	2008/50/EC	Annual limit for protection of human health	25 µg/m ³
Benzene	2008/50/EC	Annual limit for protection of human health	5 µg/m ³
Carbon Monoxide	2008/50/EC	8-hour limit (on a rolling basis) for protection of human health	10 mg /m ³ (8.6 ppm)

^{Note 1} EU 2008/50/EC – Clean Air For Europe (CAFÉ) Directive replaces the previous Air Framework Directive (1996/30/EC) and daughter directives 1999/30/EC and 2000/69/EC

Table 10.2 - Ambient Air Quality Standards

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 (PM_{2.5}) and the EU ambient air quality standards outlined in Table 10.2 have set ambient air quality limit values for PM₁₀ and PM_{2.5}.

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 in respect of this development.

With regard to dust deposition, the German TA-Luft standard for dust deposition (non-hazardous dust) (German VDI, 2002) sets a maximum permissible emission level for dust deposition of 350 mg/(m²*day) averaged over a one year period at any receptors outside the site boundary. Recommendations from the Department of the Environment, Health & Local Government (DOEHLG, 2004) apply the Bergerhoff limit value of 350 mg/(m²*day) to the site boundary of quarries. This limit value can also be implemented with regard to potential dust impacts from construction of the proposed development.

Climate Agreements

Ireland ratified the United Nations Framework Convention on Climate Change (UNFCCC) in April 1994 and the Kyoto Protocol in principle in 1997 and formally in May 2002 (UNFCCC, 1997; UNFCCC, 1999). For the purposes of the EU burden sharing agreement under Article 4 of the Doha Amendment to the Kyoto Protocol, in December 2012, Ireland agreed to limit the net growth of the six Greenhouse Gases (GHGs) under the Kyoto Protocol to 20% below the 2005 level over the period 2013 to 2020 (UNFCCC, 2012).

The UNFCCC is continuing detailed negotiations in relation to GHGs reductions and in relation to technical issues such as Emission Trading and burden sharing. The most recent Conference of the Parties to the Convention (COP24) took place in Katowice, Poland from the 4th to the 14th of December 2018 and focussed on advancing the implementation of the Paris Agreement. The Paris Agreement was established at COP21 in Paris in 2015 and is an important milestone in terms of international climate change agreements. The Paris Agreement was agreed by over 200 nations and has a stated aim of limiting global temperature increases to no more than 2°C above pre-industrial levels with efforts to limit this rise to 1.5°C. The aim is to limit global GHG emissions to 40 gigatonnes as soon as possible whilst acknowledging that peaking of GHG emissions will take longer for developing countries. Contributions to greenhouse gas emissions will be based on Intended Nationally Determined Contributions (INDCs) which will form the foundation for climate action post 2020. Significant progress was also made on elevating adaption onto the same level as action to cut and curb emissions.

The EU, in October 2014, agreed the “2030 Climate and Energy Policy Framework”(EU 2014). The European Council endorsed a binding EU target of at least a 40% domestic reduction in greenhouse gas emissions by 2030 compared to 1990. The target will be delivered collectively by the EU in the most cost-effective manner possible, with the reductions in the ETS and non-ETS sectors amounting to 43% and 30% by 2030 compared to 2005, respectively. Secondly, it was agreed that all Member States will participate in this effort, balancing considerations of fairness and solidarity. The policy also outlines, under “Renewables and Energy Efficiency”, an EU binding target of at least 27% for the share of renewable energy consumed in the EU in 2030.

Gothenburg Protocol

In 1999, Ireland signed the Gothenburg Protocol to the 1979 UN Convention on Long Range Transboundary Air Pollution. The initial objective of the Protocol was to control and reduce emissions of Sulphur Dioxide (SO₂), Nitrogen Oxides (NO_x), Volatile Organic Compounds (VOCs) and Ammonia (NH₃). To achieve the initial targets Ireland was obliged, by 2010, to meet national emission ceilings of 42 kt for SO₂ (67% below 2001 levels), 65 kt for NO_x (52% reduction), 55 kt for VOCs (37% reduction) and 116 kt for NH₃ (6% reduction). In 2012, the Gothenburg Protocol was revised to include national emission reduction commitments for the main air pollutants to be achieved in 2020 and beyond and to include emission reduction commitments for PM_{2.5}.

European Commission Directive 2001/81/EC, the National Emissions Ceiling Directive (NECD), prescribes the same emission limits as the 1999 Gothenburg Protocol. A National Programme for the progressive reduction of emissions of these four transboundary pollutants has been in place since April 2005 (DEHLG, 2004; 2007). The data available from the EPA in 2019 (EPA, 2019c) indicated that Ireland complied with the emissions ceilings for SO₂ and NH₃ but failed to comply with the ceiling for NO_x and NMVOCs. Directive (EU) 2016/2284 “On the Reduction of National Emissions of Certain Atmospheric Pollutants and Amending Directive 2003/35/EC and Repealing Directive 2001/81/EC” was published in December 2016. The Directive will apply the 2010 NECD limits until 2020 and establish new national emission reduction commitments which will be applicable from 2020 and 2030 for SO₂, NO_x, NMVOC, NH₃, PM_{2.5} and CH₄. In relation to Ireland, 2020 emission targets are 25.5 kt for SO₂ (65% on 2005 levels), 66.9 kt for NO_x (49% reduction on 2005 levels), 56.9 kt for NMVOCs (25% reduction on 2005 levels), 112 kt for NH₃ (1% reduction on 2005 levels) and 15.6 kt for PM_{2.5} (18% reduction on 2005 levels). In relation to 2030, Ireland’s emission targets are 10.9 kt (85% below 2005 levels) for SO₂, 40.7 kt (69% reduction) for NO_x, 51.6 kt (32% reduction) for NMVOCs, 107.5 kt (5% reduction) for NH₃ and 11.2 kt (41% reduction) for PM_{2.5}.

10.3 RECEIVING ENVIRONMENT

10.3.1 Meteorological Data

A key factor in assessing temporal and spatial variations in air quality is the prevailing meteorological conditions. Depending on wind speed and direction, individual receptors may experience very significant variations in pollutant levels under the same source strength (i.e. traffic levels). Wind is of key importance in dispersing air pollutants and for ground level sources, such as traffic emissions, pollutant concentrations are generally inversely related to wind speed. Thus, concentrations of pollutants derived from traffic sources will generally be greatest under very calm conditions and low wind speeds when the movement of air is restricted. In relation to PM₁₀, the situation is more complex due to the range of sources of this pollutant. Smaller particles (less than PM_{2.5}) from traffic sources will be dispersed more rapidly at higher wind speeds. However, fugitive emissions of coarse particles (PM_{2.5} - PM₁₀) will actually increase at higher wind speeds. Thus, measured levels of PM₁₀ will be a non-linear function of wind speed.

The nearest representative weather station collating detailed weather records is Dublin Airport which is located approximately 25km north of the site. For data collated during five representative years (2014 - 2018), the predominant wind direction is westerly to south-westerly, with generally moderate wind speeds (see Figure 10.2).

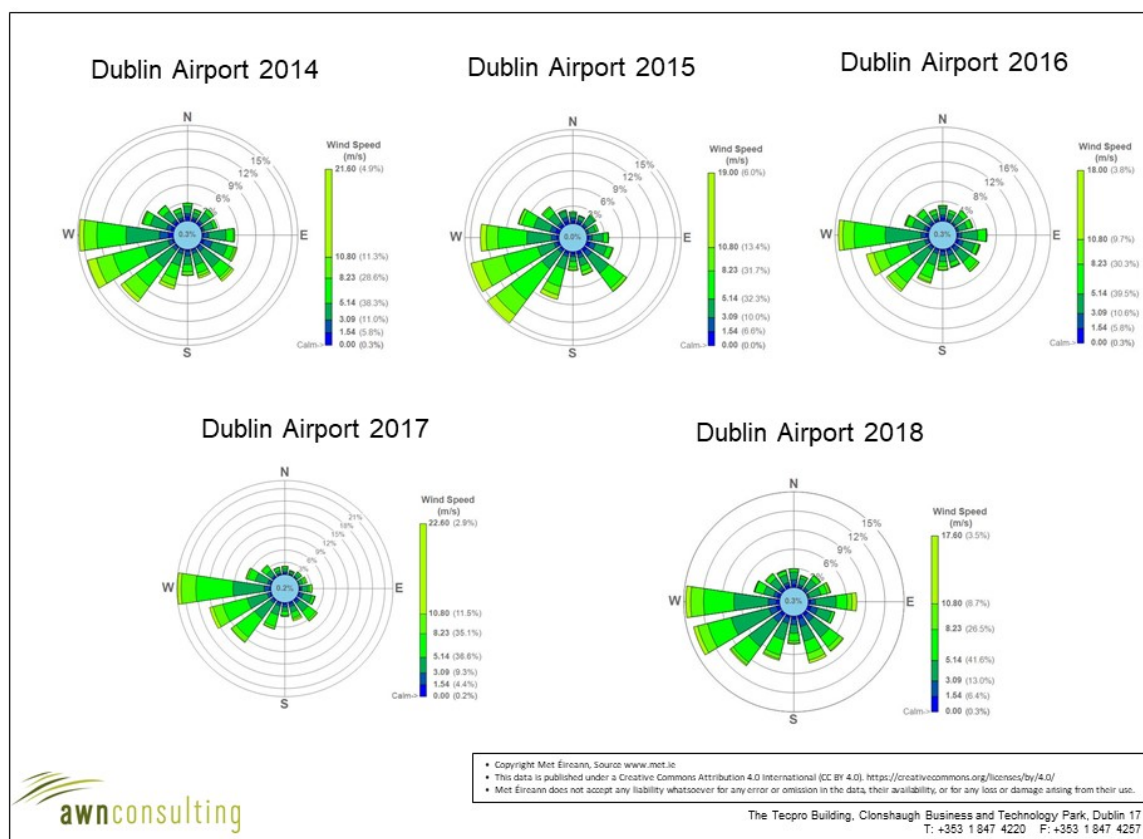


Figure 10.2 Dublin Airport Windrose 2014 – 2018 (Data source: www.met.ie)

10.3.2 Trends in Air Quality

Air quality is variable and subject to both significant spatial and temporal variation. In relation to spatial variations in air quality, concentrations generally fall significantly with distance from major road sources (WHO, 2006). Thus, residential exposure is determined by the location of sensitive receptors relative to major roads sources in the area. Temporally, air quality can vary significantly by orders of magnitude due to changes in traffic volumes, meteorological conditions and wind direction.

In assessing baseline air quality, two tools are generally used: ambient air monitoring and air dispersion modelling. In order to adequately characterise the current baseline environment through monitoring, comprehensive measurements would be required at a number of key receptors for PM₁₀, NO₂ and benzene. In addition, two of the key pollutants identified in the scoping study (PM₁₀ and NO₂) have limit values which require assessment over time periods varying from one hour to one year. Thus, continuous monitoring over at least a one-year period at a number of locations would be necessary in order to fully determine compliance for these pollutants. Although this study would provide information on current air quality it would not be able to provide predictive information on baseline conditions (UK DETR, 1998), which are the conditions which prevail just prior to opening in the absence of the development. Hence, the impacts of the development were fully assessed by air dispersion modelling (UK DETR, 1998) which is the most practical tool for this purpose. The baseline environment has also been assessed using modelling, since the use of the same predictive technique for both the 'do-nothing' and 'do-something' scenario will minimise errors and allow an accurate determination of the relative impact of the development.

10.3.3 Baseline Air Quality

Air quality monitoring programs have been undertaken in recent years by the EPA and Local Authorities. The most recent annual report on air quality in Ireland is “Air Quality In Ireland 2018” (EPA, 2019b). The EPA website details the range and scope of monitoring undertaken throughout Ireland and provides both monitoring data and the results of previous air quality assessments (EPA, 2019a).

As part of the implementation of the Air Quality Standards Regulations 2002 (S.I. No. 271 of 2002), four air quality zones have been defined in Ireland for air quality management and assessment purposes (EPA, 2019a). Dublin is defined as Zone A and Cork as Zone B. Zone C is composed of 23 towns with a population of greater than 15,000. The remainder of the country, which represents rural Ireland but also includes all towns with a population of less than 15,000, is defined as Zone D.

In terms of air monitoring and assessment, Shankill is within Zone A (EPA, 2019a). The long-term EPA monitoring data has been used to determine background concentrations for the key pollutants in the region of the proposed development. The background concentration accounts for all non-traffic derived emissions (e.g. natural sources, industry, home heating etc.).

Long-term NO₂ monitoring was carried out at the Zone A suburban background locations of Rathmines, Dún Laoghaire, Swords and Ballyfermot for the period 2014 - 2018 (EPA, 2019b). Long term average concentrations are significantly below the annual average limit of 40 µg/m³, average results range from 13 – 20 µg/m³ for the suburban background locations. There were at most 4 exceedances of the hourly limit value of 200 µg/m³ in Swords in 2014. The NO₂ annual average for this five year period suggests an upper average limit of no more than 19 µg/m³ (Table 10.2) for an urban background location. Based on the above information and keeping regard for the further distance from the city centre, a conservative estimate of the current background NO₂ concentration for the region of the proposed development is 19 µg/m³.

Station	Averaging Period ^{Notes 1,2}	Year				
		2014	2015	2016	2017	2018
Rathmines	Annual Mean NO ₂ (µg/m ³)	17	18	20	17	20
	Max 1-hr NO ₂ (µg/m ³)	112	106	102	116	138
Dun Laoghaire	Annual Mean NO ₂ (µg/m ³)	15	16	19	17	19
	Max 1-hr NO ₂ (µg/m ³)	105	103	142	153	135
Swords	Annual Mean NO ₂ (µg/m ³)	14	13	16	14	16
	Max 1-hr NO ₂ (µg/m ³)	325	170	206	107	112
Ballyfermot	Annual Mean NO ₂ (µg/m ³)	16	16	17	17	17
	Max 1-hr NO ₂ (µg/m ³)	128	142	127	148	217

Note 1 Annual average limit value - 40 µg/m³ (EU Council Directive 2008/50/EC & S.I. No. 180 of 2011).

Note 2 1-hour limit value - 200 µg/m³ as a 99.8th percentile, i.e. not to be exceeded >18 times per year (EU Council Directive 2008/50/EC & S.I. No. 180 of 2011).

Table 10.3 - Trends In Zone A Air Quality - Nitrogen Dioxide (NO₂)

Continuous PM₁₀ monitoring was carried out at five Zone A locations from 2014 - 2018, Rathmines, Dún Laoghaire, Tallaght, Ballyfermot and Phoenix Park. These showed an upper average limit of no more than 15 µg/m³ (Table 10.3). Levels range from 9 - 16 µg/m³ over the five year period with at most 2 exceedances (in Rathmines) of the 24-hour limit value of 50 µg/m³ in 2018 (35 exceedances are

permitted per year) (EPA,2019b). Based on the EPA data, a conservative estimate of the current background PM₁₀ concentration in the region of the proposed development is 15 µg/m³.

Station	Averaging Period	Year				
		2014	2015	2016	2017	2018
Ballyfermot	Annual Mean PM ₁₀ (µg/m ³)	11	12	11	12	16
	24-hr Mean > 50 µg/m ³ (days)	2	3	0	1	0
Dún Laoghaire	Annual Mean PM ₁₀ (µg/m ³)	14	13	13	12	13
	24-hr Mean > 50 µg/m ³ (days)	2	3	0	2	0
Tallaght	Annual Mean PM ₁₀ (µg/m ³)	15	14	14	12	15
	24-hr Mean > 50 µg/m ³ (days)	2	4	0	2	1
Rathmines	Annual Mean PM ₁₀ (µg/m ³)	14	15	15	13	15
	24-hr Mean > 50 µg/m ³ (days)	3	5	3	5	2
Phoenix Park	Annual Mean PM ₁₀ (µg/m ³)	12	12	11	9	11
	24-hr Mean > 50 µg/m ³ (days)	0	2	0	1	0

Note 1 Annual average limit value - 40 µg/m³ (EU Council Directive 2008/50/EC & S.I. No. 180 of 2011).

Note 2 24-hour limit value - 50 µg/m³ as a 90.4th percentile, i.e. not to be exceeded >35 times per year (EU Council Directive 1999/30/EC & S.I. No. 180 of 2011).

Table 10.4 - Trends In Zone A Air Quality - PM₁₀

Average PM_{2.5} levels in Rathmines over the period 2014 - 2018 ranged from 9 - 10 µg/m³, with a PM_{2.5}/PM₁₀ ratio ranging from 0.60 – 0.68 (EPA, 2019b). Based on this information, a conservative ratio of 0.7 was used to generate an existing PM_{2.5} concentration in the region of the development of 10.5 µg/m³.

In terms of benzene, the annual mean concentration in the Zone A monitoring location of Rathmines for 2018 was 0.3 µg/m³. This is well below the limit value of 5 µg/m³. Between 2014 - 2018 annual mean concentrations at the Zone A site ranged from 0.30 – 1.01 µg/m³. Based on this EPA data a conservative estimate of the current background benzene concentration in the region of the proposed development is 1.0 µg/m³.

With regard to CO, annual averages at the Zone A, locations of Winetavern Street and Coleraine Street over the 2014 – 2018 period are low, peaking at 0.5 mg/m³ (EPA, 2019b). Based on this EPA data, a conservative estimate of the current background CO concentration in the region of the proposed development is 0.5 mg/m³.

Background concentrations for the Opening Year and Design Year have been calculated using current estimated background concentrations and the year-on-year reduction factors provided by Transport Infrastructure Ireland in the *Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes* (2011) and the UK Department for Environment, Food and Rural Affairs guidance LAQM.TG(16) (2018).

10.3.4 Climate Baseline

Anthropogenic emissions of greenhouse gases in Ireland included in the EU 2020 strategy are outlined in the most recent review by the EPA which details emissions up to 2017 (EPA, 2019d). Agriculture was the largest contributor in 2017 at 33.3% of the total, with the transport sector accounting for 19.8% of emissions of CO₂ (EPA, 2019d).

2017 is the fifth year where compliance with the European Union's Effort Sharing Decision "EU 2020 Strategy" (Decision 406/2009/EC) was assessed. Ireland had total GHG emissions of 60.74 Mt CO₂eq in 2017. This is 2.94 Mt CO₂eq higher than Ireland's annual target for emissions in 2017 (EPA, 2019d). Emissions are predicted to continue to exceed the targets in future years, therefore, reduction measures are required in all sectors.

The EPA 2019 GHG Emissions Projections Report for 2018 – 2040 (EPA 2019e) notes that there is a long-term projected decrease in greenhouse gas emissions as a result of inclusion of new climate mitigation policies and measures that formed part of the National Development Plan (NDP) which was published in 2018. Implementation of these are classed as a "*With Additional Measures scenario*" for future scenarios. A change from generating electricity using coal and peat to wind power and diesel vehicle engines to electric vehicle engines are envisaged under this scenario. While emissions are projected to decrease in these areas, emissions from agriculture are projected to grow steadily due to an increase in animal numbers. However, over the period 2013 – 2020 Ireland is projected to cumulatively exceed its compliance obligations with the EU's Effort Sharing Decision (Decision No. 406/2009/EC) 2020 targets by approximately 10 Mt CO₂eq under the With Existing Measures scenario and 9 Mt CO₂eq under the With Additional Measures scenario (EPA, 2019e).

10.4 LIKELIHOOD OF IMPACTS

The proposed development is described in Chapter 2. When considering a development of this nature, the potential air quality and climate impact on the surroundings must be considered for each of two distinct stages:

- construction phase, and;
- operational phase.

10.4.1 Construction Phase

The key elements of construction of the proposed development with potential for air quality and climate impacts are:

- Potential fugitive dust emissions from general site preparation and construction activities;
- Potential fugitive dust emissions from trucks associated with construction;
- Engine emissions from construction vehicles and machinery.

The construction phase impacts will be short-term in duration.

10.4.2 Operational Phase

The key elements of operation of the proposed development with potential for air quality and climate impacts are:

- A change in traffic flows on road links nearby the proposed development.

The potential sources of air and climatic emissions during the operational phase of the proposed development are deemed long-term.

10.5 DESCRIPTION OF SIGNIFICANCE OF IMPACTS

10.5.1 Do Nothing Scenario

The Do Nothing scenario includes retention of the current site without the proposed residential development in place. In this scenario, ambient air quality at the site will remain as per the baseline and will change in accordance with trends within the wider area (including influences from potential new developments in the surrounding area, changes in road traffic, etc). The “Do Nothing” scenario is modelled within the local air quality impact assessment, regional air quality impact assessment and climate impact assessment (see section 10.5.3) based on projected traffic data for the local road links assuming the proposed development is not in place in future years.

10.5.2 Construction Phase

Air Quality

The greatest potential impact on air quality during the construction phase of the proposed development is from construction dust emissions and the potential for nuisance dust and PM₁₀/PM_{2.5} emissions. The proposed development can be considered moderate in scale as a worst-case and therefore there is the potential for significant dust soiling 50m from the source (TII 2011) (Table 10.5). While construction dust tends to be deposited within 200m of a construction site, the majority of the deposition occurs within the first 50m. There are a number of sensitive receptors, predominantly residential properties and recreational areas in close proximity to the site. In order to minimise dust emissions during construction, a series of mitigation measures have been prepared in the form of a dust minimisation plan. Provided the dust minimisation measures outlined in the plan (see Appendix 10.3) are adhered to, the air quality impacts during the construction phase will be short-term and not significant.

Source		Potential Distance for Significant Effects (Distance From Source)		
Scale	Description	Soiling	PM ₁₀	Vegetation Effects
Major	Large construction sites, with high use of haul roads	100m	25m	25m
Moderate	Moderate sized construction sites, with moderate use of haul roads	50m	15m	15m
Minor	Minor construction sites, with limited use of haul roads	25m	10m	10m

Table 10.5 - Assessment Criteria for the Impact of Dust from Construction, with Standard Mitigation in Place (TII, 2011)

Climate

There is the potential for a number of greenhouse gas emissions to atmosphere during the construction of the development. Construction vehicles, generators etc., may give rise to CO₂ and N₂O emissions. However, based on the short-term duration and moderate scale of the proposed development, the impact of the construction phase on climate is considered to be short-term and imperceptible.

Human Health

Best practice mitigation measures are proposed for the construction phase of the proposed development which will focus on the pro-active control of dust and other air pollutants to minimise generation of emissions at source. The mitigation measures that will be put in place during construction

of the proposed development will ensure that the impact of the development complies with all EU ambient air quality legislative limit values which are based on the protection of human health. Therefore, the air quality impact of construction of the proposed development will be short-term and imperceptible with respect to human health.

10.5.3 Operational Phase

Local Air Quality Modelling Assessment

Transport Infrastructure Ireland *Guidelines for the Treatment of Air Quality during the Planning and Construction of National Road Schemes* (TII, 2011) detail a methodology for determining air quality impact significance criteria for road schemes and has been adopted for this assessment, as is best practice. 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.

NO₂

The results of the assessment of the impact of the proposed development on NO₂ in the opening year 2024 and design year 2039 are shown in Table 10.6 **Error! Reference source not found.** for the Highways Agency IAN 170/12 and Table 10.7 using the UK Department for Environment, Food and Rural Affairs technique, respectively. The annual average concentration is within the limit value at all worst-case receptors using both techniques. Levels of NO₂ are 55% of the annual limit value in 2024 using the IAN technique, while concentrations are 54% of the annual limit value in 2024 using the UK Department for Environment, Food and Rural Affairs technique. Levels of NO₂ are 53% of the annual limit value in the design year of 2039 using the more conservative IAN technique. The hourly limit value for NO₂ is 200 µg/m³ and is expressed as a 99.8th percentile (i.e. it must not be exceeded more than 18 times per year). The maximum 1-hour NO₂ concentration is not predicted to be exceeded using either technique in both the opening and design years (see Table 10.8).

The impact of the proposed development on annual mean NO₂ levels can be assessed relative to "Do Nothing (DN)" levels in 2024 and 2039. Relative to baseline levels, some imperceptible to small increases in pollutant levels are predicted as a result of the proposed development. With regard to impacts at individual receptors, the greatest impact on NO₂ concentrations will be an increase of 3.4% of the annual limit value at Receptor 2 (R2). Thus, using the assessment criteria outlined in Appendix 10.1, Tables A10.1 – A10.3, the impact of the proposed development in terms of NO₂ is negligible. Therefore, the overall impact of NO₂ concentrations as a result of the proposed development is long-term and imperceptible at all of the receptors assessed.

PM₁₀

The results of the modelled impact of the proposed development for PM₁₀ in the opening year 2024 and design year 2039 are shown in Table 10.9 **Error! Reference source not found.** Predicted annual average concentrations at the worst-case receptor in the region of the development are at most 40% of the limit value in 2024 and 2039. It is predicted that the worst case receptors will not experience any exceedances of the 50 µg/m³ 24-hour mean limit value either with or without the proposed development in place (35 exceedances are permitted per year).

Relative to baseline levels, some imperceptible increases in PM₁₀ levels at the worst-case receptors are predicted as a result of the proposed development. The greatest impact on PM₁₀ concentrations in the region of the proposed development will be an increase of 0.97% of the annual limit value at Receptor 2. Thus, the magnitude of the changes in air quality are negligible at all receptors based on the criteria outlined in Appendix 10.1, Tables A10.1 – A10.3. Therefore, the overall impact of PM₁₀ concentrations as a result of the proposed development is long-term and imperceptible.

PM_{2.5}

The results of the modelled impact of the proposed development for PM_{2.5} are shown in Table 10.10. Predicted annual average concentrations in the region of the proposed development are 45% of the limit value in 2024 and 2039 at the worst-case receptor.

Relative to baseline levels, imperceptible to small increases in PM_{2.5} levels at the worst-case receptors are predicted as a result of the proposed development. None of the receptors assessed will experience an increase in concentrations of over 1.1% of the limit value. Therefore, using the assessment criteria outlined in Appendix 10.1, Tables A10.1 – A10.3, the impact of the proposed development with regard to PM_{2.5} is negligible at all of the receptors assessed. Overall, the impact of increased PM_{2.5} concentrations as a result of the proposed development is long-term and imperceptible.

CO and Benzene

The results of the modelled impact of CO and benzene are shown in Table 10.11 and 10.12, respectively. Predicted pollutant concentrations with the proposed development in place are below the ambient standards at all locations. Levels of benzene are 22% of the limit value in 2024 and 2039 with levels of CO reaching 28% of the limit value in 2024 and 29% of the limit in 2039.

Relative to baseline levels, some imperceptible increases in pollutant levels at the worst-case receptors are predicted as a result of the proposed development. The greatest impact on CO and benzene concentrations will be an increase of 1.3% of the CO limit and 0.8% of the benzene limit value at Receptor 2. Thus, using the assessment criteria for NO₂ and PM₁₀ outlined in Appendix 10.1 and applying these criteria to CO and benzene, the impact of the proposed development in terms of CO and benzene is long-term and imperceptible.

Summary of Local Air Quality Modelling Assessment

Levels of traffic-derived air pollutants from the proposed development will not exceed the ambient air quality standards either with or without the proposed development in place. Using the assessment criteria outlined in Appendix 10.1, Tables A10.1 – A10.3, the impact of the proposed development in terms of PM₁₀, PM_{2.5}, CO, NO₂ and benzene is long-term, localised and imperceptible.

Regional Air Quality Impact

The regional impact of the proposed development on emissions of NO_x and VOCs has been assessed using the procedures of Transport Infrastructure Ireland (TII, 2011) and the UK Department for Environment, Food and Rural Affairs (2018). The results (see Table 10.13) show that the likely impact of the proposed development on Ireland's obligations under the Targets set out by Directive EU 2016/2284 "On the reduction of national emissions of certain atmospheric pollutants and amending Directive 2003/35/EC" are imperceptible and long-term. For the opening year 2024, the predicted impact

of the changes in AADT is to increase NO_x levels by 0.00035% of the NO_x emissions ceiling and increase VOC levels by 0.00017% of the VOC emissions ceiling to be complied with from 2020. For the design year 2039, the predicted impact of the changes in AADT is to increase NO_x levels by 0.00065% of the NO_x emissions ceiling and increase VOC levels by 0.00021% of the VOC emissions ceiling to be complied with from 2030.

Therefore, the impacts on regional air quality during the operational stage of the proposed development are predicted to be imperceptible and long-term.

Climate

The impact of the proposed development on emissions of CO₂ impacting climate were also assessed using the Design Manual for Roads and Bridges screening model (see Table 10.13). The results show that the impact of the proposed development will be to increase CO₂ emissions by 0.00043% of Ireland's EU Target in the opening year of 2024 and by 0.00048% in the design year of 2039. Thus, the impact of the proposed development on national greenhouse gas emissions will be insignificant in terms of Ireland's obligations under the EU 2020 Target (EU, 2017).

Therefore, the impacts on climate during the operational stage of the proposed development are predicted to be imperceptible and long-term.

Human Health

Air dispersion modelling of operational traffic emissions was undertaken to assess the impact of the development with reference to EU ambient air quality standards which are based on the protection of human health. As demonstrated by the modelling results, emissions as a result of the proposed development are compliant with all National and EU ambient air quality limit values and, therefore, the impact on human health will be long-term and imperceptible.

10.5.4 Cumulative Impacts

Construction Phase

Should the construction phase of the proposed development coincide with the construction of any other permitted developments within 350m of the site (IAQM, 2014), including the proposed Woodbrook development to the south, then there is the potential for cumulative dust impacts to the nearby sensitive receptors. The dust mitigation measures outlined in Appendix 10.3 should be applied throughout the construction phase of the proposed development, with similar mitigation measures applied for other permitted developments which will avoid significant cumulative impacts on air quality. With appropriate mitigation measures in place, the predicted cumulative impacts on air quality and climate associated with the construction phase of the proposed development are deemed short-term and not significant.

Operational Phase

If additional medium to large scale developments are proposed in the future, in the vicinity of the proposed development, this has the potential to add further additional vehicles to the local road network. Traffic data provided for the assessment included for existing, permitted and proposed developments where this information is available. As the traffic impact for the proposed development has an imperceptible impact on air quality, it is unlikely that other future developments of similar scale would

give rise to a significant impact during the operational stages of those projects. Future projects of a large scale would need to conduct an EIAR to ensure that no significant impacts on air quality will occur as a result of those developments.

Receptor	Impact Opening Year 2024					Impact Design Year 2039				
	DN	DS	DS-DN	Magnitude	Description	DN	DS	DS-DN	Magnitude	Description
R1	20.0	21.2	1.15	Small	Negligible Increase	19.5	20.4	0.89	Small	Negligible Increase
R2	20.5	21.8	1.36	Small	Negligible Increase	20.0	21.1	1.04	Small	Negligible Increase
R3	17.7	17.9	0.12	Imperceptible	Negligible Increase	17.0	17.1	0.10	Imperceptible	Negligible Increase

Table 10.6 - Annual Mean NO₂ Concentrations (µg/m³) (using IAN 170/12 V3 Long Term NO₂ Trend Projections)

Receptor	Impact Opening Year 2024					Impact Design Year 2039				
	DN	DS	DS-DN	Magnitude	Description	DN	DS	DS-DN	Magnitude	Description
R1	19.9	21.0	1.14	Small	Negligible Increase	20.3	21.2	0.92	Small	Negligible Increase
R2	20.4	21.7	1.35	Small	Negligible Increase	20.8	21.9	1.08	Small	Negligible Increase
R3	17.6	17.7	0.12	Imperceptible	Negligible Increase	17.6	17.7	0.10	Imperceptible	Negligible Increase

Table 10.7 - Annual Mean NO₂ Concentrations (µg/m³) (using Defra's Technical Guidance)

Receptor	IAN 170/12 V3 Long Term NO ₂ Trend Projections Technique				Defra's Technical Guidance Technique			
	Opening Year 2024		Design Year 2039		Opening Year 2024		Design Year 2039	
	DN	DS	DN	DS	DN	DS	DN	DS
R1	70.1	74.1	68.3	71.4	70.1	74.1	68.3	71.4
R2	71.6	76.4	70.2	73.8	71.6	76.4	70.2	73.8
R3	62.1	62.5	59.4	59.8	62.1	62.5	59.4	59.8

Table 10.8 - 1 Hour 99.8thile NO₂ Concentrations (µg/m³)

Receptor	Impact Opening Year 2024					Impact Design Year 2039				
	DN	DS	DS-DN	Magnitude	Description	DN	DS	DS-DN	Magnitude	Description
R1	15.4	15.8	0.33	Imperceptible	Negligible Increase	15.6	15.8	0.28	Imperceptible	Negligible Increase
R2	15.6	15.9	0.39	Imperceptible	Negligible Increase	15.7	16.0	0.33	Imperceptible	Negligible Increase
R3	14.9	14.9	0.03	Imperceptible	Negligible Increase	14.9	14.9	0.03	Imperceptible	Negligible Increase

Table 10.9 - Annual Mean PM₁₀ Concentrations (µg/m³)

Receptor	Impact Opening Year 2024					Impact Design Year 2039				
	DN	DS	DS-DN	Magnitude	Description	DN	DS	DS-DN	Magnitude	Description
R1	10.8	11.0	0.23	Imperceptible	Negligible Increase	10.9	11.1	0.20	Imperceptible	Negligible Increase
R2	10.9	11.2	0.27	Small	Negligible Increase	11.0	11.2	0.23	Imperceptible	Negligible Increase
R3	10.4	10.5	0.02	Imperceptible	Negligible Increase	10.4	10.5	0.02	Imperceptible	Negligible Increase

Table 10.10 - Annual Mean PM_{2.5} Concentrations (µg/m³)

Receptor	Impact Opening Year 2024					Impact Design Year 2039				
	DN	DS	DS-DN	Magnitude	Description	DN	DS	DS-DN	Magnitude	Description
R1	2.68	2.79	0.106	Imperceptible	Negligible Increase	2.71	2.81	0.092	Imperceptible	Negligible Increase
R2	2.72	2.84	0.125	Imperceptible	Negligible Increase	2.75	2.86	0.108	Imperceptible	Negligible Increase
R3	2.52	2.53	0.011	Imperceptible	Negligible Increase	2.52	2.53	0.009	Imperceptible	Negligible Increase

Table 10.11 - Maximum 8-hour CO Concentrations (mg/m³)

Receptor	Impact Opening Year 2024					Impact Design Year 2039				
	DN	DS	DS-DN	Magnitude	Description	DN	DS	DS-DN	Magnitude	Description
R1	1.04	1.08	0.034	Imperceptible	Negligible Increase	1.05	1.09	0.037	Imperceptible	Negligible Increase
R2	1.05	1.09	0.040	Imperceptible	Negligible Increase	1.06	1.10	0.044	Imperceptible	Negligible Increase
R3	1.00	1.01	0.003	Imperceptible	Negligible Increase	1.01	1.01	0.004	Imperceptible	Negligible Increase

Table 10.12 - Annual Mean Benzene Concentrations (µg/m³)

Year	Scenario	VOC	NO _x	CO ₂
		(kg/annum)	(kg/annum)	(tonnes/annum)
2024	Do Nothing	134	372	229
	Do Something	230	610	394
2039	Do Nothing	156	441	267
	Do Something	262	705	449
Increment in 2024		96.5 kg	237.1 kg	165 Tonnes
Increment in 2039		106.5 kg	263.7 kg	182.2 Tonnes
Emission Ceiling (kilo Tonnes) 2020		56.8	66.2	37,943
Emission Ceiling (kilo Tonnes) 2030		51.5	40.2	37,943
Impact in 2024 (%)		0.00017 %	0.00035 %	0.00043 %
Impact in 2039 (%)		0.00021 %	0.00065 %	0.00048 %

Table 10.13 - Regional Air Quality and Climate Impact Assessment

10.6 REMEDIAL & MITIGATION MEASURES

10.6.1 Construction Phase

Air Quality

AIR QLTY & C CONST 1: The pro-active control of fugitive dust will ensure the prevention of significant emissions, rather than an inefficient attempt to control them once they have been released. The main contractor will be responsible for the coordination, implementation and ongoing monitoring of the dust management plan. The key aspects of controlling dust are listed below. Full details of the dust management plan can be found in Appendix 10.3.

- The specification and circulation of a dust management plan for the site and the identification of persons responsible for managing dust control and any potential issues;
- The development of a documented system for managing site practices with regard to dust control;
- The development of a means by which the performance of the dust management plan can be monitored and assessed;
- The specification of effective measures to deal with any complaints received.

At all times, the procedures within the plan will be strictly monitored and assessed. In the event of dust nuisance occurring outside the site boundary, movements of materials likely to raise dust would be curtailed and satisfactory procedures implemented to rectify the problem before the resumption of construction operations.

Climate

Construction traffic and embodied energy of construction materials are expected to be the dominant source of greenhouse gas emissions as a result of the construction phase of the proposed development. Construction vehicles, generators etc., may give rise to some CO₂ and N₂O emissions. However, due to short-term nature and small scale of these works, the impact on climate will not be significant.

Nevertheless, some site-specific mitigation measures can be implemented during the construction phase of the proposed development to ensure emissions are reduced further. In particular the prevention of on-site or delivery vehicles from leaving engines idling, even over short periods. Minimising waste of materials due to poor timing or over ordering on site will aid to minimise the embodied carbon footprint of the site.

AIR QLTY & C CONST 2: Systems should be developed by the appointed Contractor to ensure that on-site or delivery vehicles do not leave their engines idling for even short periods of time.

10.6.2 Operational Phase

No additional mitigation measures are required during the operational phase of the proposed development as it is predicted to have an imperceptible impact on ambient air quality and climate.

10.7 RESIDUAL IMPACTS

10.7.1 Construction Phase

Air Quality

When the dust minimisation measures detailed in the mitigation sections of this Chapter (Section 10.6 and Appendix 10.3) are implemented, the impact of fugitive emissions of dust from the site will be short-term and not significant.

Climate

Impacts to climate during the construction phase are considered imperceptible and therefore no residual impacts of significance are predicted.

10.7.2 Operational Phase

The results of the air dispersion modelling study demonstrate that the impact of the proposed development on air quality and climate is predicted to be imperceptible with respect to the operational phase. Therefore, no residual impacts of significance for air quality and climate are predicted for the operational phase of the proposed development.

10.8 MONITORING

10.8.1 Construction Phase

Monitoring of construction dust deposition at the site boundary during the construction phase of the proposed development is recommended to ensure the mitigation measures are providing adequate dust minimisation. This shall be carried out using the Bergerhoff method in accordance with the requirements of the German Standard VDI 2119. The Bergerhoff Gauge consists of a collecting vessel and a stand with a protecting gauge. The collecting vessel is secured to the stand with the opening of the collecting vessel located approximately 2m above ground level. The applicable limit value is the TA Luft limit value of 350 mg/(m²*day) for a monitoring period of between 28 - 32 days.

10.8.2 Operational Phase

There is no monitoring recommended for the operational phase of the development as impacts to air quality and climate are predicted to be imperceptible.

10.9 REFERENCES

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CHAPTER ELEVEN NOISE & VIBRATION

11.1 INTRODUCTION

This chapter assesses the potential noise & vibration impacts associated with the proposed development. A full description of the development can be found in Chapter 2.0 of this EIAR.

This section of the EIAR has been prepared by AWN in the context of current relevant standards and guidance.

This chapter includes a description of the receiving ambient noise climate in the vicinity of the subject site and an assessment of the potential noise and vibration impacts associated with the proposed development during both the short-term construction phase and the long-term operational phase on its surrounding environment and on the development itself. The assessment of direct, indirect and cumulative noise and vibration impacts on the surrounding environment have been considered as part of the assessment.

Mitigation measures are included, where relevant, to ensure the proposed development is constructed and operated in an environmentally sustainable manner in order to ensure minimal impact on the receiving environment.

The assessment has been undertaken with reference to the most appropriate guidance documents relating to environmental noise and vibration which are set out within the relevant sections of this chapter and included in the references section.

11.2 ASSESSMENT METHODOLOGY

The study has been undertaken using the following methodology:

- Detailed baseline noise monitoring has been undertaken across the development site to determine the range of noise levels at varying locations across the site;
- A review of the most applicable standards and guidelines has been conducted in order to set a range of acceptable noise and vibration criteria for the construction and operational phases of the proposed development;
- Predictive calculations have been performed during the construction phase of the project at the nearest sensitive locations to the development site;
- Predictive calculations have been performed to assess the potential impacts associated with the operational phase of the development at the most sensitive locations surrounding the development site;
- An inward noise impact assessment has been completed to determine the potential noise impact from environmental noise on the residential amenity of the development, and;

- A schedule of mitigation measures has been proposed to reduce, where necessary, the identified potential inward and outward impacts relating to noise and vibration from the proposed development.

11.3 RECEIVING ENVIRONMENT

11.3.1 Site Area Description

The site is located in Shankill, County Dublin. The site is bounded to the west by the Dublin Road and the surrounding lands are a mixture of residential housing and open fields.

11.3.2 Survey Details

Baseline noise monitoring has been undertaken across the development site to determine the range of noise levels at varying locations across the site and to establish the existing noise climate the nearest noise sensitive locations and across the development site itself.

The survey was conducted in general accordance with *ISO 1996: 2017: Acoustics – Description, measurement and assessment of environmental noise*.

11.3.3 Instrumentation

AWN performed the measurements during the survey periods. Measurements were made using Brüel and Kjær Type 2250 and a RION NL52 Sound Level Meters. Sample periods were 15 minutes. Before and after the survey the measurement instruments were check calibrated using a Brüel & Kjær Type 4231 Sound Level Calibrator.

11.3.4 Weather Conditions

Weather conditions were generally calm with some sporadic rainfall throughout the survey. Conditions were considered typical for the season and locale over the duration of the survey.

11.3.5 Choice of Measurement Positions

Measurement positions and noise sensitive locations are identified as shown in Figure 11.1 below.

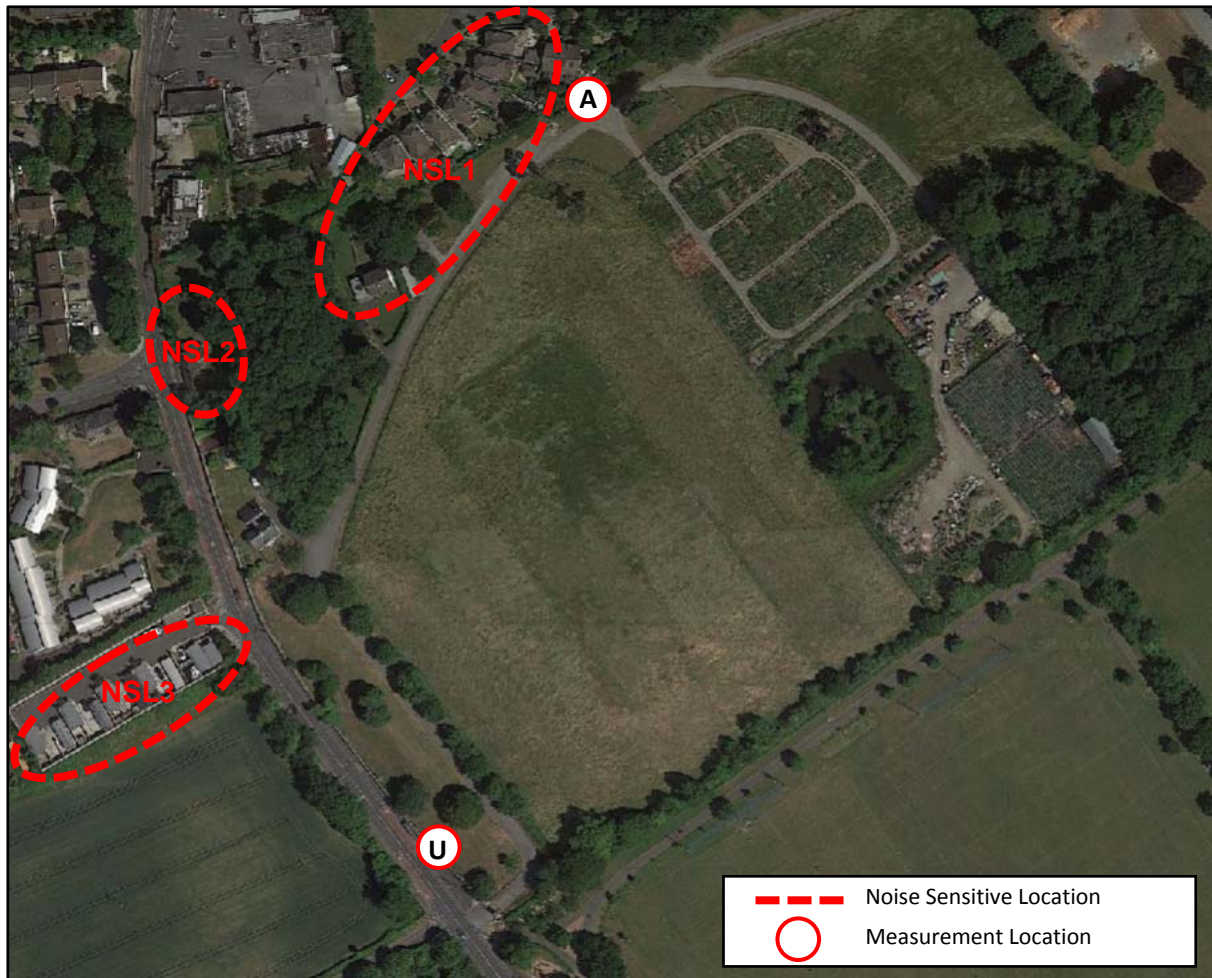


Figure 11.1 – Map Showing Measurement Positions and Noise Sensitive Locations

11.3.6 Measurement Parameters

The noise survey results are presented in terms of the following parameters.

L_{Aeq} is the equivalent continuous sound level. It is a type of average and is used to describe a fluctuating noise in terms of a single noise level over the sample period.

L_{AFmax} is the instantaneous maximum sound level measured during the sample period using the 'F' time weighting.

L_{A90} is the sound level that is exceeded for 90% of the sample period. It is typically used as a descriptor for background noise.

The "A" suffix denotes the fact that the sound levels have been "A-weighted" in order to account for the non-linear nature of human hearing. All sound levels in this report are expressed in terms of decibels (dB) relative to 2×10^{-5} Pa.

11.3.7 Measurement Results

The results of the noise monitoring completed at the various locations are summarised in the following sections.

Location U

Date	Period (T)	Measured Noise Levels	
		L _{Aeq,T}	L _{A90,T}
17/10/2019	Day (07:00 – 23:00hrs)	70	59
	Night (23:00 – 07:00hrs)	62	46
18/10/2019	Day (07:00 – 23:00hrs)	69	57
	Night (23:00 – 07:00hrs)	63	47
19/10/2019	Day (07:00 – 23:00hrs)	70	58
	Night (23:00 – 07:00hrs)	63	46
20/10/2019	Day (07:00 – 23:00hrs)	68	56
	Night (23:00 – 07:00hrs)	60	44
21/10/2019	Day (07:00 – 23:00hrs)	70	59

Table 11.1 - Summary of Measured Noise Levels at U

Figure 11.2 presents the distribution of the magnitude of L_{AFmax} events during the night period at noise monitoring location U.

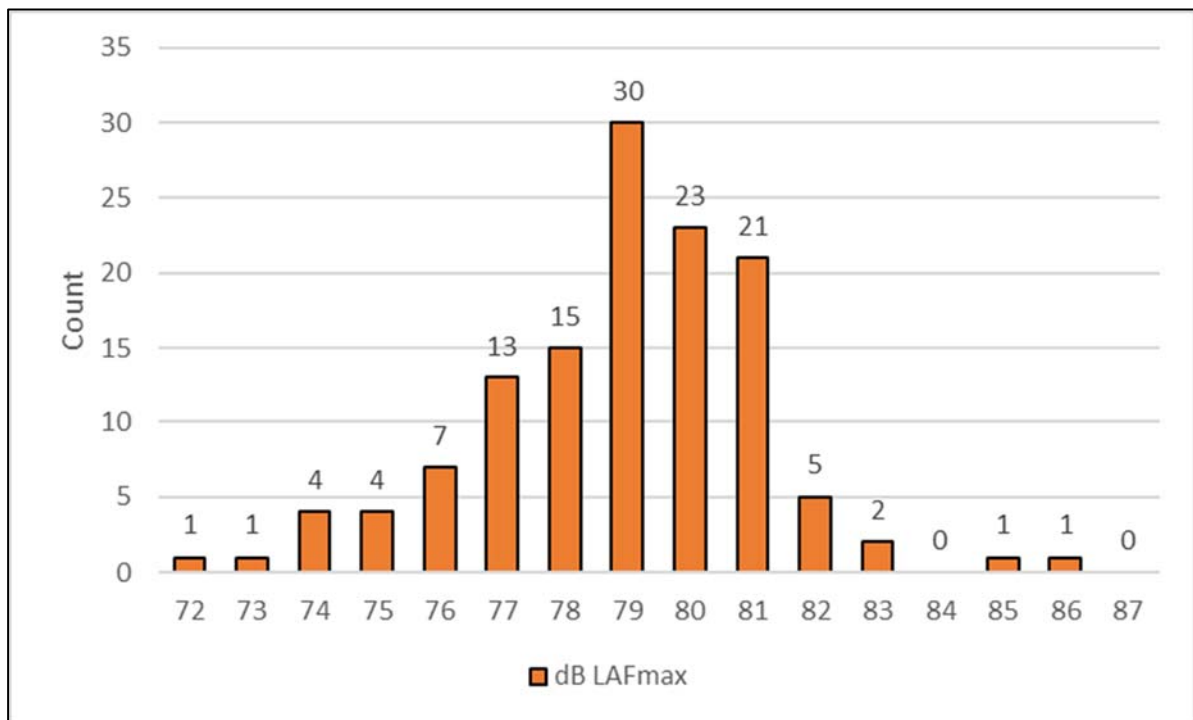


Figure 11.2 - Distribution of the Magnitude of Night Time Noise Events at Location U

Location A

Date	Time (hrs)	Measured Noise Levels (dB re. 2x10 ⁻⁵ Pa)		
		L _{Aeq}	L _{AFmax}	L _{A90}
29/01/2019	15:05	56	63	55
	15:20	58	76	55
	16:30	55	71	52
	16:45	55	60	54

Table 11.2 - Summary of Measured Noise Levels at Location A

Summary of Noise Measurements

Road traffic noise from the Dublin Road was the dominant source of noise at Location U. Construction trials were ongoing within the site during the attended measurements at Location A, consequently it is expected that the measurements for this location are higher than is typical.

11.4 LIKELIHOOD OF IMPACTS

11.4.1 Construction Criteria

There is no published statutory Irish guidance relating to the maximum permissible noise level that may be generated during the construction phase of a project. County Councils typically control construction activities by imposing limits on the hours of operation and consider noise limits at their discretion.

In order to set appropriate construction noise limits for the development site, reference has been made to BS 5228 2009 +A1 2014 *Code of practice for noise and vibration control on construction and open sites*. Part 1 of this document *Noise* provides guidance on selecting appropriate noise criteria relating construction works. BS 5228 sets out guidance on permissible noise levels relative to the existing noise environment. The approach adopted here calls for the designation of a noise sensitive location into a specific category (A, B or C) based on exiting ambient noise levels in the absence of construction noise. This then sets a threshold noise value that, if exceeded at this location, indicates a significant noise impact is associated with the construction activities.

Table 11.3 sets out the values which, when exceeded, signify a potential significant effect at the facades of residential receptors.

Assessment category and threshold value period (L _{Aeq})	Threshold value, in decibels (dB)		
	Category A ^A	Category B ^B	Category C ^C
Night-time (23:00 to 07:00hrs)	45	50	55
Evenings and weekends D	55	60	65
Daytime (07:00 – 19:00) and Saturdays (07:00 – 13:00)	65	70	75

Table 11.3 - Example Threshold of Potential Significant Effect at Dwellings

- A) *Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are less than these values.*
- B) *Category B: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are the same as category A values.*
- C) *Category C: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are higher than category A values.*
- D) *19:00 – 23:00 weekdays, 13:00 – 23:00 Saturdays and 07:00 – 23:00 Sundays.*

For the appropriate periods (i.e. daytime) the ambient noise level is determined and rounded to the nearest 5 dB. Baseline monitoring carried out as part of this assessment would indicate that Category A is appropriate for all identified noise sensitive locations.

If the construction noise exceeds the appropriate category value, then a significant effect is deemed to occur. It is assumed that construction works will take place during normal daytime working hours only.

For this development receptors NSL1 & 2 are considered category A, with NSL 3 considered Category C.

In terms of vibration, BS 5228 Part 2 (2009) recommends that, for soundly constructed residential property and similar structures that are generally in good repair, a threshold for minor or cosmetic (i.e. non-structural) damage should be taken as a peak component particle velocity (in frequency range of predominant pulse) of 15mm/s at 4Hz increasing to 20mm/s at 15Hz and 50mm/s at 40Hz and above. The standard also notes that below 11.5 mm/s PPV the risk of damage tends to zero. It is therefore common, on a cautious basis to use this lower value. Taking the above into consideration the vibration criteria in Table 11.4 are recommended.

Allowable vibration (in terms of peak particle velocity) at the closest part of sensitive property to the source of vibration, at a frequency of:-		
Less than 15Hz	15 to 40Hz	40Hz and above
12 mm/s	20 mm/s	50 mm/s

Table 11.4 - Recommended Vibration Criteria during Construction Phase

11.4.2 Operational Phase – Additional Vehicular Traffic Noise Criteria

In order to consider the potential noise impact associated with the proposed development introducing additional traffic onto the existing road networks, and given that vehicle movements on public roads are assessed using a different parameter (the ten percentile noise level; L_{A10}), it is appropriate to consider the increase in traffic noise level that arises as a result of vehicular movements associated with the development in terms of the L_{A10} parameter.

In order to assist with the interpretation of the noise associated with vehicular traffic on public roads, Table 11.5 offers guidance as to the likely impact associated with any particular change in traffic noise level (Source DMRB, 2011).

Change in Sound Level (dB L_{A10})	Subjective Reaction	DMRB magnitude of Impact	EPA Classification Magnitude of Impact
0	Inaudible	No Change	Imperceptible
0.1 – 2.9	Barely Perceptible	Negligible	Not Significant
3 – 4.9	Perceptible	Minor	Slight, Moderate
5 – 9.9	Up to a doubling of loudness	Moderate	Significant
10+	Doubling of loudness and above	Major	Very Significant

Table 11.5 - Likely Impact Associated with Change in Traffic Noise Level

11.4.3 Operational Phase – Residential Inward Noise Impact Criteria

The *Professional Guidance on Planning & Noise* (ProPG) document was published in May 2017. The document was prepared by a working group comprising members of the Association of Noise Consultants (ANC), the Institute of Acoustics (IOA) and the Chartered Institute of Environmental Health (CIEH). Although not a government document, since its adoption it has been generally considered as a best practice guidance and has been widely adopted in the absence of equivalent Irish guidance.

The ProPG outlines a systematic risk based 2 stage approach for evaluating noise exposure on prospective sites for residential development. The two primary stages of the approach can be summarised as follows:

- Stage 1 - Comprises a high-level initial noise risk assessment of the proposed site considering either measured and or predicted noise levels; and,
- Stage 2 – Involves a full detailed appraisal of the proposed development covering four “key elements” that include:

Element 1 - Good Acoustic Design Process;

Element 2 - Noise Level Guidelines;

Element 3 - External Amenity Area Noise Assessment

Element 4 - Other Relevant Issues

The initial noise risk assessment is intended to provide an early indication of any acoustic issues that may be encountered. It calls for the categorisation of the site as a negligible, low, medium or high risk based on the pre-existing noise environment. Figure 11.3 presents the basis of the initial noise risk assessment. It provides appropriate risk categories for a range of continuous noise levels either measured and/or predicted on site.

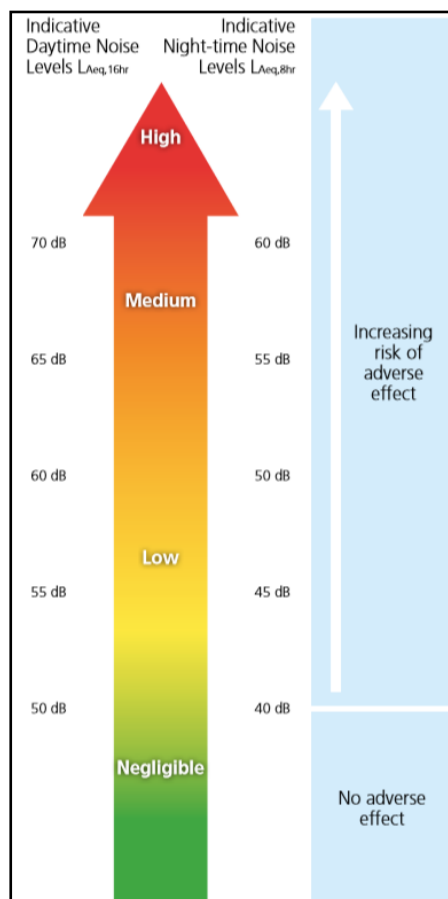


Figure 11.3 - ProPG Stage 1 - Initial Noise Risk Assessment

It should be noted that a site should not be considered a negligible risk if more than 10 L_{AFmax} events exceed 60 dB during the night period and the site should be considered a high risk if the L_{AFmax} events exceed 80 dB more than 20 times a night.

Element 2 of the ProPG document sets out recommended internal noise targets derived from BS 8233 (2014). The recommended indoor ambient noise levels are set out in Table 11.6 and are based on annual average data, that is to say they omit occasional events where higher intermittent noisy events may occur.

Activity	Location	Daytime (07:00 to 23:00hrs)	Night (23:00 to 07:00hrs)
Resting	Living room	35 dB $L_{Aeq,16hr}$	-
Dining	Dining room/area	40 dB $L_{Aeq,16hr}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16hr}$	30 dB $L_{Aeq,8hr}$ 45 dB $L_{Amax,T}^*$

Table 11.6 - ProPG Internal Noise Levels

*Note The document comments that the internal $L_{AFmax,T}$ noise level may be exceeded no more than 10 times per night without a significant impact occurring.

In addition to these absolute internal noise levels ProPG provides guidance on flexibility of these internal noise level targets. For instance, in cases where the development is considered necessary or desirable, and noise levels exceed the external noise guidelines, then a relaxation of the internal L_{Aeq} values by up to 5 dB can still provide reasonable internal conditions.

11.4.4 Operational Phase – Creche Inward Noise Impact Criteria

The British Standard BS 8233: 2014: *Guidance on Sound Insulation and Noise Reduction for Buildings* also sets out recommended internal noise levels for several different non-domestic building types from external noise sources such as road and air traffic. The guidance is primarily for use by designers, hence BS8233 may be used as the basis for the development of an appropriate schedule of noise control measures.

The recommended indoor ambient noise levels in non-domestic buildings are as follows:

Objective	Typical Situations	Design range dB $L_{Aeq,T}$
Typical noise levels for acoustic privacy in shared spaces	Restaurant	40 – 55
	Open plan office	45 – 50
	Night club, public house	40 – 45
	Ballroom, banqueting hall	35 – 40
	Living room	35 – 40

Table 11.7 - Indoor ambient noise levels in spaces when they are unoccupied, and privacy is important

Objective	Typical Situations	Design range dB $L_{Aeq,T}$
Speech or telephone communications	Department Store Cafeteria, canteen, kitchen	50 – 55
	Concourse Corridor, circulation space	45 – 55
Study and work requiring concentration	Library, gallery, museum	40 – 50
	Staff/meeting room, training room	35 – 45
	Executive office	35 – 40
Listening	Place of worship, counselling, meditation, relaxation	30 – 35

Table 11.8 - Typical Noise Levels in Non-Domesticated Buildings from BS8233

Based on a review of the BS 8233 standard and considering the proposed usage of the proposed development a criterion for internal noise levels for the crèche has been identified for each of the following rooms:

Room	Activity	Design Criterion dB $L_{Aeq,T}$
Quiet Room	Daytime Resting & Sleeping	35
Preschool Room	Study and Work requiring concentration	40
Office		40

Table 11.9 - Recommended Design Criteria for Rooms

11.4.5 Operational Phase – Mechanical Plant Criteria

Once a development of this nature becomes fully operational, a variety of electrical and mechanical plant will be required to service the development. Most of this plant will be capable of generating noise to some degree. Some of this plant may operate 24 hours a day, and hence would be most noticeable during quiet periods (i.e. overnight). Noisy plant with a direct line-of-sight to noise sensitive properties would potentially have the greatest impact. Plant contained within plantrooms has the least potential for impact once consideration is given to appropriate design of the space.

BS 4142:2014 +A1:2019 – *Methods for Rating and Assessing Industrial and Commercial Sound* describes methods for rating and assessing sound of an industrial and/or commercial nature. The methods described in this British Standard use outdoor sound levels to assess the likely effects of sound on people who might be inside or outside a dwelling or premises used for residential purposes upon which sound is incident. This guidance is appropriate in relation to external services plant noise to off-site noise sensitive locations.

For an appropriate BS 4142 assessment it is necessary to compare the measured external background noise level (i.e. the $L_{A90,T}$ level measured in the absence of plant items) to the rating level ($L_{Ar,T}$) of the various plant items, when operational. Where noise emissions are found to be tonal, impulsive in nature or irregular enough to attract attention, BS 4142 also advises that a penalty be applied to the specific level to arrive at the rating level.

The subjective method for applying a penalty for tonal noise characteristics outlined in BS 4142 recommends the application of a 2dB penalty for a tone which is just perceptible at the noise receptor, 4dB where it is clearly perceptible, and 6dB where it is highly perceptible.

The following definitions as discussed in BS 4142 as summarised below:

“ambient noise level, $L_{Aeq,T}$ ”	is the noise level produced by all sources including the sources of concern, i.e. the residual noise level plus the specific noise of mechanical plant, in terms of the equivalent continuous A-weighted sound pressure level over the reference time interval [T].
“residual noise level, $L_{Aeq,T}$ ”	is the noise level produced by all sources excluding the sources of concern, in terms of the equivalent continuous A-weighted sound pressure level over the reference time interval [T].
“specific noise level, $L_{Aeq,T}$ ”	is the sound level associated with the sources of concern, i.e. noise emissions solely from the mechanical plant, in terms of the equivalent

- continuous A-weighted sound pressure level over the reference time interval [T].
- “rating level, $L_{Ar,T}$ ” is the specific sound level plus any adjustments for the characteristic features of the sound (e.g. tonal, impulsive or irregular components);
- “background noise level, $L_{A90,T}$ ” is the sound pressure level of the residual noise that is exceeded for 90% of the time period T.

If the rated plant noise level is +10 dB or more above the pre-existing background noise level then this indicates that complaints are likely to occur and that there will be a significant adverse impact. A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.

The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact.

Noise Sources Generally

For non-traffic related noise sources impacting on the proposed development appropriate guidance on internal noise levels for dwellings is contained within BS 8233: 2014: *Guidance on Sound Insulation and Noise Reduction for Buildings*. This British Standard sets out recommended noise limits for indoor ambient noise levels in dwellings as summarised in Table 11.9.

Typical situations	Design Range, $L_{Aeq,T}$ dB	
	Daytime $L_{Aeq,16hr}$ (07:00 to 23:00hrs)	Night-time $L_{Aeq, 8hr}$ (23:00 to 07:00hrs)
Living / Dining Rooms	35 / 40	n/a
Bedrooms	35	30

Table 11.9 - Recommended Indoor Ambient Noise Levels

For the purposes of this study, it is appropriate to derive external limits based on the internal criteria noted in the paragraph above. This is done by factoring in the degree of noise reduction afforded by a partially open window and typical 15 dB attenuation is noted in this British Standard. Using this correction value across an open window, the following external noise levels would achieve the internal noise levels noted in Table 11.9 above.

- Daytime / Evening (07:00 to 23:00 hours) 50 – 55 dB $L_{Aeq,1hr}$
- Night-time (23:00 to 07:00 hours) 45 dB $L_{Aeq,15min}$

There are no expected sources of vibration associated with the operational phase, therefore, vibration criteria have not been specified for this phase.

11.4.6 ‘Do Nothing’ Scenario

In the absence of the proposed development being constructed, the noise environment at the nearest noise sensitive locations and across the development site itself will remain largely unchanged. The noise levels measured/noted during the baseline studies are considered representative of the Do-Nothing scenario. The Do-Nothing scenario is therefore considered neutral impact.

11.4.7 Cumulative Impacts

As discussed further in Section 11.5.2, this assessment already considers the cumulative operational impact for all known permitted sites.

In terms of construction noise, it is considered that the distances to permitted developments is such that there are unlikely to be any additional construction phase impacts due to cumulative noise.

11.5 DESCRIPTION AND SIGNIFICANCE OF IMPACTS

11.5.1 Construction Impact

It is predicted that the construction programme will create typical construction activity related noise on site. During the construction phase of the proposed development, a variety of items of plant will be in use, such as excavators, lifting equipment, dumper trucks, compressors and generators. The proposed general construction hours are 08:00 to 19:00hrs, Monday to Friday and 08:00 to 14:00 on Saturdays.

Due to the fact that the construction programme has been established in outline form only, it is difficult to calculate the actual magnitude of noise emissions to the local environment. However, it is possible to predict typical noise levels using guidance set out in BS5228-1:2009+A1:2014. Table 11.10 outlines typical plant items and associated noise levels that are anticipated for various phases of the construction programme at a standard reference distance of 10 metres from the various plant items.

Construction Phase	Item of Plant (<i>BS 5228-1:2009+A1:2014</i> Ref)	BS5228 Reference Noise Level dB LAeq at 10m
Site Preparation	Wheeled Loader Lorry (D3 1)	75
	Track Excavator (C2 22)	72
	Dozer (C2.13)	78
	Dump Truck (C4.2)	78
Demolition	Pulveriser on Tracked Excavator (C1.5)	72
	Tracked Crusher (C1.14)	82
	Breaker Mounted on Backhoe (C1.2)	92
	Dump Truck (C4.2)	78
Foundations	Tracked Excavator (C3.24)	74
	Concrete Pump (C3.25)	78
	Compressor (D7 6)	77
	Poker Vibrator (C4 33)	78
	Large Rotary Bored Piling Rig (C3.14)	83
General Construction	Hand tools	81
	Crane (C4.48)	76
	Pneumatic Circular Saw (D7.79)	75
	Internal fit – out	70
Landscaping	Dozer (C2.13)	78
	Dump Truck (C4.2)	78
	Surfacing (D8.25)	68

Table 11.10 - Typical Noise Levels Associated with Construction Plant Items

For the purposes of the assessment we have assumed that standard good practice measures for the control of noise from construction sites will be implemented. These issues are commented upon in further detail in the mitigation section of this chapter.

Table 11.11 presents the predicted daytime noise levels from an indicative construction period on site at the nearest off-site receptor. Note construction noise sources for site are assumed to be running 50% of the time and a nominal 5 dB reduction has been applied to the results to account for partial screening of construction plant with barriers. The predictions have been prepared for a distance of 10m, 20m and 50m from the site works. The 10m distance predictions represents the noise levels at the closest facades of residential receptors on Castle Farm Road (NSL1), it is a worst-case situation where all plant is considered operational on the boundary closest to the receptors.

Construction Phase	Item of Plant (BS 5228-1:2009+A1:2014 Ref)	Predicted at Receiver (10m distance) dB LAeq	Predicted at Receiver (20m distance) dB LAeq	Predicted at Receiver (50m distance) dB LAeq
Site Preparation	Wheeled Loader Lorry (D3 1)	67	61	53
	Track Excavator (C2 22)	64	58	50
	Dozer (C2.13)	70	64	56
	Dump Truck (C4.2)	70	64	56
Site Clearance Total		74	68	60
Demolition	Pulveriser on Tracked Excavator (C1.5)	-	58	50
	Tracked Crusher (C1.14)	-	68	60
	Breaker Mounted on Backhoe (C1.2)	-	78	70
	Dump Truck (C4.2)	-	64	56
Demolition Total		-	79	71
Foundations	Tracked Excavator (C3.24)	66	60	52
	Concrete Pump (C3.25)	70	64	56
	Compressor (D7 6)	69	63	55
	Poker Vibrator (C4 33)	70	64	56
	Large Rotary Bored Piling Rig (C3.14)	-	-	61
Foundations Total		75	69	64
General Construction	Hand tools	73	67	59
	Crane (C4.48)	68	62	54
	Pneumatic Circular Saw (D7.79)	67	61	53
	Internal fit – out	62	56	48
General Construction Total		75	69	61
Landscaping	Dozer (C2.13)	70	64	56
	Dump Truck (C4.2)	70	64	56
	Surfacing (D8.25)	60	54	46
Landscaping Total		73	67	59

Table 11.11 - Predicted Noise Levels for Construction Phases

Note: Where there is no predicted noise level it is expected that these items of plant will not operate at the respective distance to the sensitive receptors.

It is predicted that when construction works are in operation at the boundary of the site directly adjacent to NSL1 there may be some significant impacts. However, these occurrences will only be temporary, and the vast majority of the construction works will take place at distances from the receptors where no significant impacts are predicted, for instance at distances of 50m there are no significant impacts predicted with the exception of demolition activities. Figure 11.4 indicates the approximate areas where the majority of construction works are likely to cause a significant impact.

It should be noted that where potential significant impacts are predicted, these are worst case scenarios that assume all plant for an activity will operate along the boundary line opposite a sensitive receptor. Under real world conditions this is unlikely to occur, hence significant impacts are expected to occur infrequently during the general construction phase. It should also be noted that the predicted noise levels are expected to occur for only short periods of time at a limited number of properties. Construction noise levels will be lower than these levels for the majority of the time at the majority of properties in the vicinity of the proposed development.



Figure 11.4 – Areas Where Construction Activities are Predicted to Cause a Potential Significant Noise Impact

Construction Vibration

The main potential source of vibration during the construction programme is associated with piling and excavation activities depending on the methodologies used.

In order to assess potential vibration impacts at the closest sensitive buildings to the site works, a range of typical level of vibration during augured piling have been determined through reference to published empirical data within BS 5228 – Part 2. The following vibration magnitudes associated with rotary bored piling using a 600mm pile diameter for bored piling into soft ground over rock are summarised below:

- 0.54mm/s at a distance of 5m, for auguring;
- 0.22mm/s at a distance of 5m, for twisting in casing;
- 0.42mm/s at a distance of 5m, for spinning off, and;
- 0.43mm/s at a distance of 5m, for boring with rock auger.

Considering the low vibration levels at very close distances to augured piling rigs, vibration levels at the nearest buildings (i.e. NSL1 at distances of 50m) are not expected to pose any significance in terms of cosmetic or structural damage. In addition, the range of vibration levels is typically below a level which would cause any disturbance to occupants of the closest buildings.

During ground breaking in the excavation phase, there is also potential for vibration to be generated through the ground. Empirical data for this activity is not provided in the BS 5228- 2:2009+A1:2014 standard, however the likely levels of vibration from this activity is expected to be significantly below the vibration criteria for building damage on experience from other sites. AWN Consulting have previously conducted vibration measurements under controlled conditions, during trial construction works, on a sample site where concrete slab breaking was carried out. The trial construction works consisted of the use of the following plant and equipment when measured at various distances:

- 3 tonne hydraulic breaker on small CAT tracked excavator
- 6 tonne hydraulic breaker on large Liebherr tracked excavator

Vibration measurements were conducted during various staged activities and at various distances. Peak vibration levels during staged activities using the 3 Tonne Breaker ranged from 0.48 to 0.25 PPV (mm/s) at distances of 10 to 50m respectively from the breaking activities. Using a 6 Tonne Breaker, measured vibration levels ranged between 1.49 to 0.24 PPV (mm/s) at distances of 10 to 50m respectively.

The range of values recorded provides some context in relation typical ranges of vibration generated by construction breaking activity likely required on the proposed site. The range of vibration magnitudes indicate vibration levels at the closest neighbouring buildings noted in Figure 11.1 are likely to be orders of magnitude below the limits set out in Table 11.4 to avoid any cosmetic damage to buildings. Vibration levels are also expected to be below a level that would cause disturbance to building occupants.

Demolition of existing structures will involve careful deconstruction using controlled techniques. There may be a requirement for breaking ground as part of specific demolition procedures, depending on the structure. Vibration levels associated with this activity will be of similar or lower magnitude to ground breaking discussed above.

In this instance, taking account of the distance to the nearest sensitive off-site buildings and the range of vibration levels typically encountered at close distances to the works, vibration levels at the closest neighbouring buildings are expected to be orders of magnitude below the limits set out in Table 11.4 to

avoid any cosmetic damage to buildings. Vibration levels are also expected to be below a level that would cause disturbance to building occupants.

Notwithstanding the above, any construction activities undertaken on the site will be required to operate below the recommended vibration criteria set out in Table 11.4 during all activities. Further discussion on mitigation measures during this phase are discussed in Section 11.6.

11.5.2 Operational Impact – Vehicular Traffic

A traffic impact assessment relating to the proposed development has been prepared by the traffic consultants as part of this EIAR. The results of this assessment have been reviewed to predict any impact of the development on traffic flows in the area.

Tables 11.12 and 11.13 below display the predicted change in noise level at different road links in the vicinity of the site taking account of the traffic data provided by the traffic consultants. Note that these traffic volumes take into account traffic for all surrounding permitted developments, hence the results present a worst case scenario.

Location	AADT Do Nothing	AADT Do Something	Change in noise Level, dB (all vehicles)
	Opening Year (2024)		
R119 (Dublin Road)	10,300	18,300	2.5

Table 11.12 - Summary of Change in Noise Level (Opening Year)

Location	AADT Do Nothing	AADT Do Something	Change in noise Level, dB (all vehicles)
	Future Design Year (2039)		
R119 (Dublin Road)	11,900	20,700	2.4

Table 11.13 - Summary of Change in Noise Level (Future Design Year)

For both the opening and future design years the predictions indicate that the increase in noise level will be approximately 2.5 dB. Referring to Table 11.5 the cumulative traffic noise impact is characterised as Not Significant.

11.5.3 Operational Impact – Outward Noise Impact

Once operational, if building services plant items are required to serve the development, the cumulative operational noise level at the nearest external noise sensitive location out-with the development will be designed/attenuated to meet the relevant BS 4142 noise criteria for day and night-time periods.

Given the baseline noise levels measured in Section 11.3.7 appropriate criteria for plant noise levels at the nearest off-site sensitive noise receptors is considered to be 52 dB $L_{Aeq,1hr}$ for the day period and 42 dB $L_{Aeq,15min}$ for the night period.

For residential dwellings within the development itself external plant noise levels will be controlled to ensure the internal noise levels from BS8233 (2014) for residential dwellings are not exceeded. These

were previously presented in Table 11.9. To ensure that these levels are not exceeded external plant noise at sensitive facades within the development will be constrained to the following levels:

- Daytime / Evening (07:00 to 23:00 hours) 50 – 55 dB $L_{Aeq,1hr}$
- Night-time (23:00 to 07:00 hours) 45 dB $L_{Aeq,15min}$

Taking account of the site layout, location of plant areas below ground level and distance to nearest noise sensitive locations, the potential noise impact from these sources are expected to be well controlled and the adopted criteria readily achieved.

Noise Breakout from Gymnasium, Café and other Ancillary Communal Spaces

Breakout noise from within the café or function room should be controlled to ensure that it is not audible inside the nearest residences, particularly during night time operational hours. Noise breakout should typically be limited to an external level of 35 dB $L_{Aeq,5min}$ at the façade of any nearby noise sensitive location. In addition, there should be no clearly audible tonal or impulsive component to the noise build-up at nearby noise sensitive locations.

The nearest off-site noise sensitive locations to these areas are residential properties located approximately 80m to the north of the site. Given the distances involved it is not expected that noise emissions from these facilities will cause any impacts at external noise sensitive receptors.

Care will be given at the design stage to ensure breakout noise to sensitive receptors within the development will not cause annoyance.

Noise Breakout from Creche

Measurement of noise levels generated by children playing outdoors at several crèches and kindergartens indicate typical noise levels in the order of 56 dB $L_{Aeq,1hr}$ at distance of 5 metres. The nearest noise sensitive properties are located within the development, approximately 13m from the creche. Considering the usage of the creche area (e.g. external areas are only expected to be in use for a small portion of the 16 hour period) and the standard noise insulation of the façade, it is predicted that the internal criteria in Table 11.6 will be met in all proposed dwellings and the resultant noise impact due to the creche is not significant.

11.5.4 Operational Impact – Inward Noise Impact

The development lands in question are in proximity to the Dublin Road which lies to the west of the site. Potential impacts on the proposed development as a result of noise from the road is considered in this section.

Existing Noise Climate

The existing noise and vibration climate within the development lands was surveyed and the results summarised in Section 11.3 of this chapter. The results of the survey have indicated that the Dublin Road contributes significant noise levels at the measurement locations on the north-east boundary of the site. In addition to this it was noted that noise emissions from the service station and car wash on the south-west boundary contributed to overall noise levels during the day period.

In order to determine the inward noise impact for noise sensitive properties proposed as part of the development, it is necessary to determine the internal noise levels within the proposed buildings. These can then be compared against appropriate internal noise criteria from BS 8233, as summarised in Section 11.4 (Table 11.6).

It is possible to calculate internal noise levels within the residential properties proposed within the site, taking account of the existing and future potential noise environment, proposed constructions and the relevant sound insulation provided by the building elements (i.e. walls, roof, glazing etc.).

Noise Model of Site

In order to calculate noise levels across the site, an acoustic model was developed in order to initially calibrate against noise survey data recorded on site. Proprietary noise calculation software was used for the purposes of establishing the prevailing noise levels on the proposed site. The selected software, Brüel & Kjær Type 7810 Predictor, calculates noise levels in accordance with the selected source.

The following information was included in the model:

- Site layout drawings of proposed development;
- Topographical survey of the development site, and;
- OS mapping of surrounding environment.
- Calibration of Noise Model.

Noise levels recorded during the unattended survey location U were used to calibrate the noise model. Noise levels are calculated at the same location using the developed noise model. The results are presented in Table 11.14 below for daytime periods, i.e. 07:00 to 19:00hrs, evening periods (19:00 to 23:00hrs) and night-time periods, 23:00 to 07:00hrs and compared against those measured on site.

Location	Time Period	Measured Noise Level, dB	Predicted Noise Level, dB
U	Day	68 - 70	70
	Night	60 - 63	62

Table 11.14 - Predicted & Measured Noise Levels at Development Site

The model results are considered an accurate representation of noise levels across the site.

Noise Risk Classification of the Site

Following the methodology outlined in ProPG, as discussed in Section 11.4.3, the noise model has been used to predict noise levels across the site. The noise model takes into account the proposed removal of the existing wall bounding Dublin Road, this is replaced by a 0.5m high wall. The results of this exercise are presented in Figures 11.5 and 11.6 for day and night periods respectively.



Figure 11.5 - Predicted Existing Noise Contour Across the Cleared Development Site – Day



Figure 11.6 - Predicted Existing Noise Contour Across the Cleared Development Site – Night

Road traffic noise levels have been calculated across the site at a height of 4m. During daytime periods, where buildings are proposed, noise levels are less than 60 dB $L_{Aeq,16hr}$. Night time noise levels where buildings are proposed are less than or equal to 53 dB $L_{Aeq,8hr}$.

Giving consideration to the measured and predicted noise levels presented in the previous sections the initial site noise risk assessment has concluded that the level of risk across the site varies from negligible to low noise risk.

Additionally, the Stage 1 Noise Risk Assessment requires analyses of the L_{AFmax} noise levels. In the case of the AWN survey the L_{AFmax} noise levels ranged from 72 – 86 dB L_{AFmax} during the night, taking into account the distance from the measurement location to the proposed building locations an attenuation of approximately 15 dB would be expected at the nearest façade, hence a maxima range of 57 – 71 dB L_{AFmax} at the façade of the buildings closest to the road. ProPG guidance considers 20 night events over 80 dB to be a high risk, this site is not predicted to meet that threshold and therefore is not considered high risk in terms of maxima noise events.

ProPG states the following with respect to low risks:

Low Risk As noise levels increase, the site is likely to be less suitable from a noise perspective and any subsequent application may be refused unless a good acoustic design process is followed and is demonstrated in an ADS which confirms how the adverse impacts of noise will be mitigated and minimised, and which clearly demonstrate that a significant adverse noise impact will be avoided in the finished development.

Given the above it can be concluded that a portion of the development site may be categorised as Low Risk and as such suitable care and attention should be applied in mitigating and minimising noise impact to such an extent that an adverse noise impact will be avoided in the final development.

It should be noted that ProPG states the following with regard to how the initial site noise risk is to be used,

“2.12 It is important that the assessment of noise risk at a proposed residential development site is not the basis for the eventual recommendation to the decision maker. The recommended approach is intended to give the developer, the noise practitioner, and the decision maker an early indication of the likely initial suitability of the site for new residential development from a noise perspective and the extent of the acoustic issues that would be faced. Thus, a site considered to be high risk will be recognised as presenting more acoustic challenges than a site considered as low risk. A site considered as negligible risk is likely to be acceptable from a noise perspective and need not normally be delayed on noise grounds. A potentially problematical site will be flagged at the earliest possible stage, with an increasing risk indicating the increasing importance of good acoustic design.”

Façade Noise Levels

Noise levels have been predicted across the development site during day and night-time periods using the noise model developed to include the development buildings. Where façade noise levels are less than 55 dB $L_{Aeq,16hr}$ during the day and 50 dB $L_{Aeq,8hr}$ at night it is possible to achieve reasonable internal

noise levels while also ventilating the dwellings with open windows. Therefore, for those properties where the façade noise levels are less than 55 dB $L_{Aeq,16hr}$ during the day and 50 dB $L_{Aeq,8hr}$ at night no further mitigation is required.

Where façade levels are above these levels the sound insulation performance of the building façade becomes important and a minimum sound insulation performance specification is required for windows and vents to ensure the internal noise criteria are achieved.

For this project, noise levels on some of the building facades facing west are predicted to be higher than these levels. All other facades are expected to be below the levels and therefore will be able to meet the internal noise criteria with open windows.

Figure 11.7 identifies those facades where the noise levels are higher and where mitigation in the form of enhanced glazing and ventilation will be required. The specification of this enhanced façade is discussed in Section 11.10.



Figure 11.7 - Locations Requiring Acoustic Façade Specification

Creche

The noise model indicates that the highest noise level of 50 dB $L_{Aeq,16hr}$ will be incident on the façade of the creche. Given that the lowest recommended internal noise level within the creche is 35 dB $L_{Aeq,T}$ and that an open window provides 15 dB of attenuation, it is expected that the creche will meet the

recommended internal noise levels with open windows and will therefore not require any enhanced glazing or ventilation specifications.

External Noise Levels

External noise levels within the vast majority of public open spaces and private gardens across the development site are generally within the recommended range of noise levels from ProPG of between 50 – 55 dB $L_{Aeq,16hr}$ as illustrated in Figure 11.8. It is considered that the objectives of achieving suitable external noise levels is achieved within the overall site, therefore no further mitigation is required to control external noise levels across amenity areas.



Figure 11.8 - Predicted Noise Levels Across External Areas (1.5m above ground)

11.6 REMEDIAL AND MITIGATION MEASURES

11.6.1 Construction Phase

With regard to construction activities, best practice control measures for noise and vibration from construction sites are found within BS 5228 (2009 +A1 2014) Code of Practice for Noise and Vibration Control on Construction and Open Sites Parts 1 and 2. Predictions indicate that significant construction noise impacts are expected to occur when work is ongoing at boundary locations adjacent to noise sensitive locations, hence the contractor will ensure that all best practice noise and vibration control methods will be used. In this regard, various mitigation measures can be considered and applied during the construction of the proposed development.

N & V CONST 1: Limit the hours during which site activities likely to create high levels of noise or vibration are permitted.

N & V CONST 2: Establish channels of communication between the contractor/developer, Local Authority and residents

N & V CONST 3: Appoint a site representative responsible for matters relating to noise and vibration.

N & V CONST 4: Monitor typical levels of noise and vibration during critical periods and at sensitive locations.

N & V CONST 5: All site access roads will be kept even so as to mitigate the potential for vibration from lorries.

Furthermore, it is envisaged that a variety of practicable noise and vibration control measures will be employed.

N & V CONST 6: Select plant with low inherent potential for generation of noise and/ or vibration.

N & V CONST 7: Erect barriers as necessary around noisy processes and items such as generators heavy mechanical plant or high duty compressors.

N & V CONST 8: Place noisy / vibratory plant as far away from sensitive properties as permitted by site constraints and the use of vibration isolated support structures where necessary.

N & V CONST 9: Erect site hoarding at least 2.4m high along the boundary adjacent to the noise sensitive receptors NSL1.

11.6.2 Operational Phase – Inward Noise Impact

As is the case in most buildings, the glazed elements and ventilation paths of the building envelope are typically the weakest element from a sound insulation perspective. In general, all wall constructions (i.e. block work or concrete and spandrel elements) offer a high degree of sound insulation, much greater than that offered by the glazing systems. Therefore, noise intrusion via the wall construction will be minimal.

Residential

N & V OPER 1: In this instance the facades highlighted in Figure 11.7 will be provided with glazing and ventilation that achieves the minimum sound insulation performance as set out in Table 11.12 and Table 11.13. Other facades in the development have no minimum requirement for sound insulation.

Façade	Octave Band Centre Frequency (Hz)						R _w
	125	250	500	1k	2k	4k	
RED	20	19	29	38	36	45	33
ORANGE	Standard Double Glazing						

Table 11.12 - Sound Insulation Performance Requirements for Glazing, SRI (dB)

Façade	Octave Band Centre Frequency (Hz)						D _{ne,w}
	125	250	500	1k	2k	4k	
RED	30	31	31	32	28	28	31
ORANGE	Standard Ventilation						

Table 11.13 - Sound Insulation Performance Requirements for Ventilation, SRI (dB)

The overall R_w and $D_{ne,w}$ outlined above are provided for information purposes only. The over-riding requirement is the Octave Band sound insulation performance values which may also be achieved using alternative glazing and ventilation configurations. Any selected system will be required to provide the same level of sound insulation performance set out in Tables 11.12 and 11.13 or greater.

It is important to note that the acoustic performance specifications detailed herein are minimum requirements which apply to the overall glazing and ventilation systems. In the context of the acoustic performance specification the 'glazing system' is understood to include any and all of the component parts that form part of the glazing element of the façade, i.e. glass, frames, seals, openable elements etc.

The assessment has demonstrated that the recommended internal noise criteria can be achieved through consideration of the proposed façade elements at the design stage. The calculated glazing and ventilation specifications are preliminary and are intended to form the basis for noise mitigation at the detailed design stage. Consequently, these may be subject to change as the project progresses.

11.7 MONITORING

11.7.1 Construction Phase

The contractor will be required to ensure construction activities operate within the noise and vibration limits set out within this assessment. The contractor will be required to undertake regular noise and vibration monitoring at locations representative of the closest sensitive locations to ensure the relevant criteria are not exceeded.

Noise monitoring should be conducted in accordance with the International Standard ISO 1996: 2017: Acoustics – Description, measurement and assessment of environmental noise.

Vibration monitoring should be conducted in accordance with BS 6472 for human disturbance and BS ISO 4866:2010 for building damage.

11.7.2 Operational Phase

Noise or vibration monitoring is not required once the development is operational.

11.8 RESIDUAL IMPACTS

11.8.1 Construction Noise

Construction activities are predicted to exceed the noise threshold for potential significant effect when they occur at the closest proximity to the dwellings located on the boundary of the site. However, it should be noted that the assessment can be considered worst case and it is unlikely that all items of plant assessed will be in operational simultaneously. Additionally, the predictions only indicate a potential significant effect (based on a worst-case scenario) when working at the closest location to the dwellings, with lesser impacts predicted at all other locations across site.

Residual impacts associated with construction activities within 50m of sensitive receptors, or demolition activities at higher distances are categorised as:

<i>Quality</i>	<i>Significance</i>	<i>Duration</i>
Negative	Significant	Temporary

At distances over 50m the majority of construction activities are categorised as:

<i>Quality</i>	<i>Significance</i>	<i>Duration</i>
Negative	Moderate	Short-term

11.8.2 Construction Vibration

It is expected that vibration from construction activities may be perceptible at receptor locations. The impacts are predicted to be as follows:

<i>Quality</i>	<i>Significance</i>	<i>Duration</i>
Negative	Not Significant	Short-term

11.8.3 Additional Traffic on Roads

All impacts are predicted to be as follows:

<i>Quality</i>	<i>Significance</i>	<i>Duration</i>
Neutral	Not Significant	Permanent

11.8.4 Operational Outward Noise Impact

All impacts are predicted to be as follows:

<i>Quality</i>	<i>Significance</i>	<i>Duration</i>
Neutral	Not Significant	Permanent

11.8.5 Operational Inward Noise Impact

In terms of the inward noise impacts, specification of noise mitigation has been recommended so that internal noise criterion may be met. With mitigation measures in place the impacts are categorised as:

<i>Quality</i>	<i>Significance</i>	<i>Duration</i>
Neutral	Not Significant	Permanent

11.9 REFERENCES

Dublin Agglomeration Noise Action Plan 2018 – 2023 (NAP). BS 8233: 2014: Guidance on sound insulation and noise reduction for buildings.

British Standard BS 4142: 2014: Methods for Rating and Assessing Industrial and Commercial Sound Design Manual for Roads & Bridges – Volume 11 Section 3.

British Standard BS 5228 (2009 +A1 2014): Code of Practice for Control of Noise and Vibration on

Construction and Open Sites Part 1: Noise & Part 2: Vibration.

British Standard BS 7385 (1993): Evaluation and measurement for vibration in buildings Part 2: Guide to damage levels from ground borne vibration.

Calculation of Road Traffic Noise, Department of Transport Welsh Office, HMSO, 1988.

ISO 1996: 2017: Acoustics – Description, measurement and assessment of environmental noise.

ISO 9613 (1996): Acoustics – Attenuation of sound during propagation outdoors, Part 2: General method of calculation.

EPA Guidelines on the Information to be contained in Environmental Impact Statements, (EPA, 2002).

EPA Advice Notes on Current Practice (in the preparation of Environmental Impact Statements), (EPA, 2003).

EPA Guidelines on the Information to be contained in Environmental Impact Assessment Reports, (Draft August 2017).

EPA Advice Notes for Preparing Environmental Impact Statements, (Draft, September 2015).

Professional Guidance on Planning & Noise (ProPG), (IoA, 2017).

CHAPTER TWELVE ARCHAEOLOGY & CULTURAL HERITAGE

12.1 INTRODUCTION

This chapter of the Environmental Impact Assessment Report (EIAR) describes the archaeological and cultural heritage importance of the land under consideration for a proposed residential neighbourhood comprising of 597 residential units and a crèche on the former demesne landscape of Shanganagh Castle, Shankill, Co. Dublin.

The main purpose of this chapter is to assess the potential significance and sensitivity of the existing archaeological and cultural heritage environment, and in turn to evaluate the likely and significant impacts of the proposed development on this environment. Ameliorative (remedial or reductive) measures are proposed where necessary to safeguard any monuments, features or finds of antiquity or features of local cultural heritage interest that are identified during the course of the assessment.

12.2 ASSESSMENT METHODOLOGY

The assessment of archaeological and cultural heritage effects is based on a desktop study of relevant archaeological and cultural heritage sources, supported by a field inspection of the proposed development, and the results of archaeological test excavation carried out under licence 18E0664. Licence 18E0664 was issued by the Department of Culture, Heritage and the Gaeltacht to licensee Thaddeus C. Breen of Shanarc Archaeology Ltd., who carried out test excavation in November 2018. The results of a Geophysical Survey carried out in November 2019 under licence 19R0529 by J.M. Leigh Surveys Ltd. were also taken into consideration.

12.2.1 Legislation, Standards and Guidelines

The assessment is guided by relevant legislation, standards and guidelines in respect of archaeology and cultural heritage. Ireland has ratified several international and European conventions on the protection of cultural heritage, principally:

- UNESCO World Heritage Convention 1972;
- Charter for the Conservation and Restoration of Monuments and Sites (Venice) 1964;
- European Convention on the Protection of the Archaeological Heritage (Valetta Convention) 1992;
- European Convention on the Protection of the Architectural Heritage (Grenada Convention) 1985;
- EIA Directive.

National legislation protecting cultural heritage sites comprises:

- National Monuments Act 1930, amended 1954, 1987, 1994 and 2004;
- Heritage Act 1995;
- Architectural Heritage (National Inventory) and Historic Monuments (Miscellaneous Provisions) Act 1999; and

- Planning and Development Acts 2000 (as amended).

In addition to standards and guidelines relating to the preparation of EIAR's, the following were also consulted as part of this assessment:

- Frameworks and Principles for the Protection of the Archaeological Heritage (1999), Department of Arts, Heritage, Gaeltacht & the Islands;
- Policy and Guidelines on Archaeological Excavation (1999), Department of Arts, Heritage, Gaeltacht & the Islands;
- The Heritage Council, 2000. Archaeology & Development: Guidelines for Good Practice for Developers (2000), The Heritage Council;
- Guidelines for the Assessment of Archaeological Heritage Impacts of National Road Schemes (2005), National Roads Authority;

12.2.2 Desktop Study

The following were the principal desk-based sources consulted.

National Monuments

Under the National Monuments Act 1930 – 2004, archaeological sites in the ownership or guardianship of the State or a local Authority and sites under Preservation Orders are designated as National Monuments. Such sites are offered the highest level of protection under Irish legislation.

Record of Monuments & Places and Sites & Monuments Record

The Record of Monuments and Places (RMP) was established under Section 12 of the 1994 National Monuments (Amendment) Act. The statutory RMP is a list of archaeological monuments known to the National Monuments Service, and is based on the earlier Sites and Monuments Record (SMR) files housed at the National Monuments Service. The record is updated on a constant basis.

Topographical Files of the National Museum of Ireland

The topographical files of the National Museum of Ireland (NMI) are the national archive of all known antiquities recorded by the NMI. These files relate primarily to artefacts but also include references to monuments and contain a unique archive of records of previous excavations. The NMI's files present a catalogue of objects reported to the institution. The find-spots of artefacts can be an important indication of the archaeological potential of an area.

Archaeological Inventory of County Dublin

The Archaeological Survey of Ireland was initiated after the National Monuments Act 1930 and remains ongoing. The inventory for Co. Dublin, under which this area is covered, is as yet unpublished.

Excavations Bulletin and Excavations Database

The Excavations Bulletin is a published annual directory and an on-line database that provides summary accounts of all the excavations carried out in Ireland – north and south – from 1969. The on-line database has been compiled from the published Excavations Bulletins from the years 1970-2010, with additional online-only material from 2011 onwards.

Dún Laoghaire-Rathdown County Development Plan 2016-2022

Each City and County Development Plan is compiled in accordance with the requirements of the Planning and Development Acts 2000 (as amended) and contains lists of national monuments, recorded monuments, a Record of Protected Structures (a list of buildings which cannot be materially altered or demolished without grant of permission under the Act) and Conservation Areas and Architectural Conservation Areas (to protect and enhance the special character of an area). Local Area Plans (LAPs) compiled under the City/County Development Plan are also consulted.

Cartographic Sources

Information gathered from cartographic sources is fundamental to the identification of archaeological and architectural heritage sites, including cultural landscapes e.g. demesne landscapes, which, based on the level of landscape change, are now often identified from cartographic records alone. The earliest Ordnance Survey maps date to the late 1830s and early 1840s, but much change has occurred in the use and treatment of the landscape in the intervening years, particularly during the second half of the 20th century, making these a valuable resource in tracing the development of a study area.

Toponymy Sources

A townland name may preserve information relating to its archaeology, history, folklore, ownership, topography or land use. Most placenames were anglicised by the Ordnance Survey, which began in the 1830's. Despite some inaccuracies in translation, the Gaelic, Viking, Anglo-Norman and English origins of placenames are generally recognisable. The Placenames Database of Ireland website (www.logainm.ie) hosts online bi-lingual placename research and archival records for townlands.

Documentary Sources

Documentary sources are a valuable means of completing the written archaeological and cultural heritage record of an area and gaining insight into the history of the receiving environment. The various sources consulted are listed in the bibliography.

12.2.3 On-Site Inspection

On-site inspection offers the opportunity to examine a study area in light of desk-based research and evidence. Inspection is essential in determining the nature and extent of any surviving above-ground evidence, and in predicting the potential effects of a proposal on potential below-ground remains. A site inspection was conducted by Shanarc Archaeology Ltd. on Monday 15 October 2018.

12.2.4 Archaeological Test Excavation

Archaeological investigation, in the form of targeted test excavation, was carried out by Thaddeus Breen of Shanarc Archaeology Ltd. on 16 and 17 November 2018, to establish if sub-surface demesne features or hitherto unrecorded archaeological features or deposits are present in the proposed development area. The results of the test excavation are detailed in Section 12.3.6 and in Appendix 12.1. In addition, Geotechnical Works, the results of which are detailed in Chapter 8.0, were archaeologically monitored, and the results of this monitoring are contained within Appendix 12.2.

12.2.5 Geophysical Survey

A Geophysical Survey was carried out on the site under prospection licence 19R0259 by Joanna Leigh, with the view that potential significant archaeological remains may have presented a magnetic signature that could be separated from the modern ground disturbance. The results of the geophysical survey are detailed in Section 12.3.6 and in Appendix 12.3.

12.2.6 Impact Assessment Criteria

The impact assessment undertaken in this chapter is based on the methodologies presented in the Guidelines on the information to be contained in Environmental Impact Assessment Reports (EPA, Draft August 2017), and detailed in Chapter 1.0 Introduction of this EIAR.

A potentially significant impact in terms of archaeology and cultural heritage is described as an impact to a potential feature/area of archaeological or cultural heritage that could be significant without mitigation measures being implemented, e.g. potential sub-surface archaeological remains.

12.2.7 Scoping responses

Scoping responses have been sought from relevant heritage bodies and associations in the area, and these are presented in Chapter 4.0 Project Scoping and Consultation. A heritage-related response from the Development Applications Unit, on behalf of the Department of Culture, Heritage and the Gaeltacht (dated 13 February 2019) states that ‘the archaeological assessment should include the results of archaeological geophysical survey and archaeological test excavations. There should be a description of all archaeological impacts and likely impacts should planning permission be granted for the development. The assessment should also include details of the proposed mitigation of any such impacts’. A description of all likely archaeological impacts is provided below (12.5) while remedial measures are also detailed (12.6). The results of archaeological test excavations, monitoring of Geotechnical Investigations and results of Geophysical Survey are presented in Appendices 12.1, 12.2 and 12.3 respectively. A later scoping response from the Department of Culture, Heritage and the Gaeltacht, dated 21 November 2019, highlights the discernible planned cultural landscape associated with Shanganagh Castle, while acknowledging the encroachment upon the same by existing suburban development. This document focuses on the architectural heritage element of the site, and is more fully addressed in Chapter 13.0, Architectural and Cultural Heritage.

A response received from the Heritage Council stated it was unable to comment on this application (dated 7 January 2018). The Dún Laoghaire-Rathdown and Rathmichael Historical Societies have been contacted to request a response to this development but have not commented.

12.3 RECEIVING ENVIRONMENT

12.3.1 Site Area Description

A full description of the proposed development is presented in Chapter 2.0 Project Description of this EIAR and the plans and supporting documents included with the application should be read in conjunction with this chapter.

The development site is an area of approximately 9.69 ha in the townland of Shanganagh, in south County Dublin. The land is currently in use for recreational purposes, with allotments, sports facilities and Parks Maintenance Depot. It is a level site with mature trees planted along the boundaries and also in clusters to the east of the site. Shanganagh Castle is situated to the east of the proposed development. It is bounded to the west by the R119 Dublin Road, to the north by residential developments, to the south by sport club facilities, and to the east by further parkland.

The proposed development comprises 597 no. residential units, arranged along a central spine road and ranging between 2 and 6 storeys with a 7th storey set back; a child care facility; a local retail unit; café; and ancillary services and facilities. A greenway, comprising a 5m wide shared tarmac surface with lighting, running north-south through Shanganagh Park, is also proposed. This will facilitate pedestrian and cycle access, and is provided to facilitate access to future facilities in Woodbrook, including the new DART station and neighbourhood centre. Provision of water services, foul and surface water drainage and associated connections across Shanganagh Park to the proposed Woodbrook residential scheme is also incorporated in the design. It is proposed that foul water will be drained from the development using a 225mm diameter gravity system through Shanganagh Park. More information regarding this drainage strategy is provided in Chapter 16.0 Material Assets – Water Services.

12.3.2 Archaeological and Historical Background

Mesolithic c. 7000-4000BC

The earliest evidence of human occupation in Ireland can be seen in the remains of Mesolithic hunter-gatherers, who arrived in Ireland c. 7000BC, in the form of flint scatters and shell middens. The earliest evidence of human activity in the Dublin area is largely found at coastal sites. Wooden fish traps dating to 6100 – 5760 BC were found on the Mesolithic shoreline at Spencer Dock, Dublin 1 (McQuade 2008, 8-11). Bann Flakes, flint tools used during the Mesolithic era, have been found in large numbers, along with sea shells, bones of sea creatures, birds and mammals including brown bear recovered through excavations on Dalkey Island, approximately 9.5km north-east of the proposed development, providing evidence of a hunter-fisher-gatherer society (Corlett 1999, 9). These have been dated to c. 3340BC (ibid, 11). Additional examples of Bann flakes have been recovered at Dún Laoghaire, Rathfarnham and Loughlinstown (ibid, 10).

Neolithic c. 4000-2500BC

The transition from the Mesolithic to the Neolithic periods is marked by the shift from a hunter-gatherer lifestyle to the introduction of an agricultural economy. Neolithic monuments, evidence of communal funerary and ritual activity, represent a change in burial practices and socio-religious activities during this era, as well as being emblematic of an increasingly settled style of occupation. A Late Neolithic single cist burial (DU018-037) was excavated at Drimnagh (Kilbride-Jones 1939). It was covered with a mound of clay and stone, into which Bronze Age cremation burials were later inserted. These megalithic tombs are well represented in the area of Rathdown, with several situated approximately 9.5km north-west of the proposed development, in the upland territory of the townland of Ballybrack. The recorded monument DU025-025 is a passage tomb, DU025-044 is a megalithic structure referred to as 'The Giant's Cave' and also '*Leabana Saigh*' or 'The Greyhounds bed'. A wedge tomb (DU025-045) is situated in the adjacent townland of Ballyedmonduff. Amongst the Mesolithic archaeological material recovered on Dalkey Island were domesticated cattle bones and pottery sherds, indicating concurrent hunter-gatherer and early farmer activity, at least for a few hundred years (Corlett 1999, 13).

Bronze Age c. 2500-800BC

Activity during the Bronze Age is characterised by the introduction of metalworking technology, as is evidenced by changes in material culture as well as the nature of sites and monuments of this era. The first metal artefacts were made of copper, before it was mixed with tin to form bronze. However, Stone tools continued in production and use. An Early Bronze Age burnt mound dated to c.1938-1744 cal BC was excavated at a multi-period site (Bronze Age, Viking, medieval and post-medieval) at Hammond Lane, Dublin 7 (Cryerhall 2006).

Several examples of copper and bronze tools have been recovered in the wider survey area, including a finely decorated copper axehead and a Palstave found at Bray, a halberd found at Rathfarnham Castle, and a bronze rapier from Featherbed Mountain (Corlett 1999, 23). Stone tools were also identified as part of the artefactual assemblage. A barbed and tanged quartz arrowhead recovered on Powerscourt Mountain, between Lough Bray Upper and Lower, and a flint example near Lough Bray Lower, date to this era (ibid, 21). Beaker pottery, which is dated to the Bronze Age, has been recovered from Ballyedmonduff, Rathdown Lower and Dalkey Island.

The megalithic tombs of the Neolithic era were replaced by a variety of burial traditions, including cremations and the burial of disarticulated skeletons, and often incorporated a range of grave goods. Cist burials were simple stone-lined graves, such as those found at Stillorgan Park and Ballybrew (ibid, 27). A megalithic tomb (DU026-132--) has been identified in the townland of Shankill, during excavations along the Bord Gáis pipeline (licence 98E0445). It resembled the typology of a wedge tomb, but could not be definitively ascribed to this class, having no burial remains and an atypical orientation. A wedge tomb (DU026-059--) is situated in the townland of Shankill, at the foot of Carrickgollogan. A pit-burial (DU026-113) has been excavated in the townland of Ballyman, 2km north-west of the proposed development, comprising two cordoned urns containing the remains of one and two individuals respectively, which have been dated to the late Bronze Age. A mound (WI007-023) at Monastery, and a cairn (WI003-038) at Ballybrew, approximately 4.3km from the proposed development, is also thought to date to the Bronze Age. *Fulacht fiadh* are generally associated with this period. Horseshoe- or oval-shaped mounds, formed of burnt stone and charcoal, debris removed from water pits or troughs, commonly thought to have been used for cooking, although more recently a range of alternative theories have been proposed, including suggestions that these pits were employed for brewing or for sweat-houses. There is several of this site type situated in the wider survey area. One example is at Glencormick South (WI007-072), just west of an example in the townland of Kilmacnoge North (WI007-079) which was excavated in 2001 (01E0571). Both of these are located just over 2km south of the proposed development. An example at Shankill (DU026-139--) is situated 1.3km west of the area of development, and one is situated immediately to the north of the proposed area of development (DU026-116--), in Castle Farm, in the townland of Shanganagh.

There is a dearth of monuments which can be definitively dated to the Iron Age, although ring-barrows, simple earthen mounds encircled by a ditch and outer bank, are thought to date to this era. These occur at Ballyremon and at Newton Hill, although they have not been excavated (Corlett 1999, 32). A Hillfort (DU026-048001-), a monument class which is thought to have served as a defensive structure for a tribal rather than a family unit, were used predominantly during the Iron Age. This is situated in the townland of Rathmichael. In this example at Rathmichael, a ringfort (DU026-048002-) is contained within the defensive monument which is likely later in date (early – late medieval).

Work in advance of the construction of houses on the sea front in Bray in 1835 revealed a series of inhumations thought to be Roman. The human skeletons were placed regularly, separated by lines of stone. Roman coins, which had no monetary value in Ireland, had been placed on or beside the breast of each of the bodies (Corlett 1999, 33). There is no historical evidence of a Roman military expedition to Ireland, however, these burials provide evidence of their having landed on our shores.

Historic Era

The introduction of Christianity to Ireland occurred during the 5th century A.D., and settlement during this era is largely represented by the ringfort, alternatively referred to as 'Rath' 'Lios' or 'dún' to indicate an earthen bank and exterior ditch enclosing a central area, or 'cashel' to indicate a stone-walled enclosure. Usually circular or sub-circular and often sited on raised ground, there are over 45,000 currently identified in Ireland, making this the most common site type in the country. Smaller, 'univallate' examples were homesteads for lower ranks of society, while larger bi- or tri-vallate examples were used by lords or wealthy landowners. The parish name of Rathmichael indicates that it derives from the presence of such a monument, and historical records indicate that Rathsalchan as a historic name for the land to the north of what is now Shanganagh. A ringfort (DU026-053--) is situated on the north slopes of Carrickgollogan, within the townland of Shankill, just over 2km from the proposed development area. An example in Rathmichael (DU026-047--)

Several early ecclesiastical remains are recorded in the wider vicinity of the area of the proposed development. An ecclesiastical enclosure is situated at Rathmichael (DU026-050001-), comprising the remains of a church, dedicated to St Michael the Archangel (DU026-05002-) and thought to possibly be pre-Norman in date (O'Brien 1988, 519) surrounded by a cashel-like enclosure, in places built on a bank, and having a visible entrance to the northeast. A round tower (DU026-050004-); a cross (DU026-05007-); a holed granite slab (DU026-050008-); and a bullaun stone (DU026-050010-) are amongst the ancillary features within the enclosure. In the immediate vicinity of the area of development are the remains of Kiltuc church (DU026-054001-), of a foundation mentioned in the Bull 1179, which defined the extent of the dioceses of Dublin and Glendalough (Ball 1906, 93-94). A 12th century Fassaroe-type cross (DU026-051-) came from this site, and is now located at St Ann's Church in Shankill (Corlett 1999, 137). Rathdown slabs refer to graveslabs which bear a distinctive type of decoration, and are found at Church sites throughout this area. Motifs resemble local Viking art styles and include herringbone design, cupmarks, and concentric circles (ibid, 45). Several examples of this are situated at Rathmichael (eg DU026-050015-, DU026-05009-).

When the Anglo-Normans arrived in 1169, as mercenaries under Dermot Mac Murrough, the landscape changed dramatically, the influx of new settlers signified by the construction of several new types of homesteads, defensive and ecclesiastical sites. A medieval borough (DU026-052---) was founded at Shankill in the early 13th century (Bradley & King 1988, 298-305), in a low-lying area at the foot of the Dublin Mountains, possibly situated between a tower house (DU026-052001-) and church (DU026-052002-). A permit was granted in 1229 to clear the woodland on the manor (McNeill 1950, 62).

In the thirteenth century the part of Shanganagh in which the proposed development area is situated was in the ownership of the Priory of the Holy Trinity. It was then known as Rathsalchan (to the north) and Kiltuck (to the south) (Ball 1917, 82)

According to Friar John Clyn¹, the Black Death reached Ireland in 1348 through the port of either Howth or Dalkey. It devastated the population of Dublin city, and re-occurred in 1362, late in the 14th century (Foley 2013, 177-8) and again in 1605 (Ball 1917, 92).

From the 13th century the Lawless family were placed at the lands of Shankill, a garrison having been stationed at Bray to protect the surrounding district from the native Irish. Thomas Lawless held the seigniorship of Shanganagh from the Vicars-Choral of St Patrick's Cathedral in 1408 (Ball 1917, 84). Thomas built a castle on the lands at this time, and some portion of that structure may remain extant in the present day Shanganagh Castle. He was followed by Richard Lawless in 1432 and by John Lawless in 1482. However Edmund Walsh is recorded as having been leased the seigniorship of Shanganagh in 1447, and Richard and Charles Walsh are recorded as holding the land in the early part of the 16th century (ibid). Under the Walshes the castle of Shanganagh was probably enlarged.

A tower house is situated in the townland of Shankill (DU026-052001-). Shankill Castle was besieged by Cromwell, and coins of James 1 and Charles 1, as well as skeletons, were found in the environs of the castle.

Medieval – Late Medieval Period

A more detailed history of this period is contained within Chapter 13.0 Architectural and Cultural Heritage.

The county boundary between Dublin and Wicklow was established in 1609, dividing the Barony of Rathdown in two (Corlett 1999, 83).

The Eleven Years' War began in 1641, with the rising of the MacHugh O'Byrnes of the Wicklow Mountains, joined by Catholic gentry of the Pale, such as the Walshes of Carrickmines. The Walsh Castle was attacked by Sir Simon Harcourt and Lieutenant-Colonel Gibson, using large cannons. The castle wall was demolished and the rebel occupants were slaughtered.

The Civil Survey of 1654 lists Shanganagh as the property of John Walsh, Irish papist. In addition to the castle, a large thatched hall, a mill, two orchards, a garden and an ash grove 'set for ornament' are included as part of the demesne. The Down Survey (1656-58), describes the Dublin half Barony of Rathdown as a prosperous area, benefitting from the proximity of Dublin city, having '*many Improvements as Stately Seates and Howses Benyfitts of Fishing and Fowling Many Mills both for Corne, and Cloathing by Reason that the City of Dublin is Sittuatedsoeneere it*'.

Following Cromwell's exploits in the area, Walter Cheevers of Monkstown Castle was dispossessed and exiled to Connaught. General Ludlow, Cromwell's master of the horse in Ireland, was awarded the castle and lands. After Cromwell's death, Ludlow became commander-in-chief of the army in Ireland. Upon the restoration of Charles II in 1660, many of the Cromwellian exiles were permitted to return to their homes (Corlett 1999, 85). The adjacent Loughlinstown Castle reverted to the Crown, and was awarded to Sir William Domville, the attorney general.

¹A 14th century Franciscan friar and annalist who lived in Kilkenny during the Black Death.

Rocque's 1760 Map of the area (Figure 12.5) depicts Shanganagh as a predominantly agricultural area. The building which later became known as Shanganagh Castle, although not denoted as such in this depiction, was a double bow-ended house, denoted as occupied by Snow, Esq. (Taylor and Skinner 1777, Figure 12.6).

Lewis (1837) describes the parish of Rathmichael as having good soil, the system of agriculture improved'. Country houses such as Beauchamp (NIAH Ref. 60260168) built c.1800 for Sir William Stamer, erstwhile Lord Mayor of Dublin, with its ancillary gate lodge (NIAH Ref. 60260169) represent the last of the demesne developments in the area. Shanganagh (NIAH Ref. 60260146) was the seat of Sir G. Cockburn, built 1803-1805, around the more modest 18th century predecessor, to designs by Sir Richard Morrison. It is described as a 'spacious and handsome castellated mansion... the interior contains many elegant apartments, an extensive and well-selected library, a fine collection of paintings by the best masters, a variety of marbles, antique casts, and bronzes...the views from the house are very rich and finely diversified...and the grounds are ornamented with a variety of statuary tastefully disposed' (Lewis 1837).

Fourteen Martello towers were constructed between Bray and Sandymount from 1804 to 1805, in response to the fear of a potential Napoleonic invasion (Corlett 1999, 93). An example is situated in the townland of Shanganagh, set overlooking a headland just over 1km northeast of the proposed development. Additionally a military camp at Laughlinstown was maintained.

The Harcourt Street Railway Line, which linked Bray with Harcourt Street in Dublin city centre, opened in 1854 and passed less than half a kilometre north of Shanganagh Castle. The Bray extension of the Dublin & Kingstown Railway ran south along the coast, becoming the Dublin & South eastern Railway, to the east of Shanganagh. The railway facilitated commuting to the city centre, and well-to-do families moved outwards as a result, with suburban development occurring in the hinterland of seaside towns such as Kingstown. Fashionable residences such as Crinken House (NIAH Ref. 60260150) are representative of the beginning of this suburban development. The seaside town of Bray was established by railway entrepreneur William Dargan as 'the Brighton of Ireland', a leisure resort for the middle and upper classes of the city (Corlett 1999, 96).

Chantilly or Tilly's Town, on the site of present-day Shankill village, was developed at the end of the nineteenth century as a result of Benjamin Tilly granting quarter-acre holdings to tenants who had been evicted by Sir Charles Compton William Domville, the owner of Shankill and Rathmichael.

The house at Shanganagh was used as a Church of Ireland college in the early twentieth century, and later taken over by the Irish state as an open prison for young offenders. The surrounding area, particularly to the north, has seen huge amounts of suburban development in the latter half of the twentieth century.

12.3.3 Sites & Monuments Record and Record of Monuments and Places

The Record of Monuments and Places (RMP) lists 10 sites within a 1km radius of the proposed development. The closest of these, Shanganagh Castle (DU026-120), is situated to the east of the proposed development outside of the red line boundary of the proposed development. The associated zone of archaeological potential around the Castle extends into the proposed development area. An

additional 6 RMP sites are situated within a 150m radius, associated with a complex of sites at Kiltuc Church (DU026-054001-DU026-054005) and a nearby fulacht fia (DU026-116).

Table 12.1 lists the recorded monuments within a 1km radius of the proposed development; the location of the monuments within a 150m radius and associated zones of archaeological potential is shown on Figure 12.1.

RMP No.	Class	Townland	Irish Grid Reference (E,N)	Proximity to Development (m)
DU026-054001-	Church	Shanganagh	725266, 721184	90
DU026-054002-	Graveyard	Shanganagh	725287, 721181	61
DU026-054003-	Cross	Shanganagh	725278, 721188	90
DU026-054004-	Cross	Shankill	725220, 721208	136
DU026-054005	Building	Shanganagh	725266, 721196	106
DU026-116--	Fulacht fia	Shanganagh	725388, 721220	48
DU026-120--	Castle- unclassified	Shanganagh	725603,721202	50
DU026-055001-	Martello Tower	Shanganagh	726274,721843	945
DU026-055002-	Defensive redoubt	Shanganagh	726274,721843	945
DU026-067-	Burial	OldConnaught	725262, 720030	855

Table 12.1 Recorded Monuments within a 1km radius of the proposed development

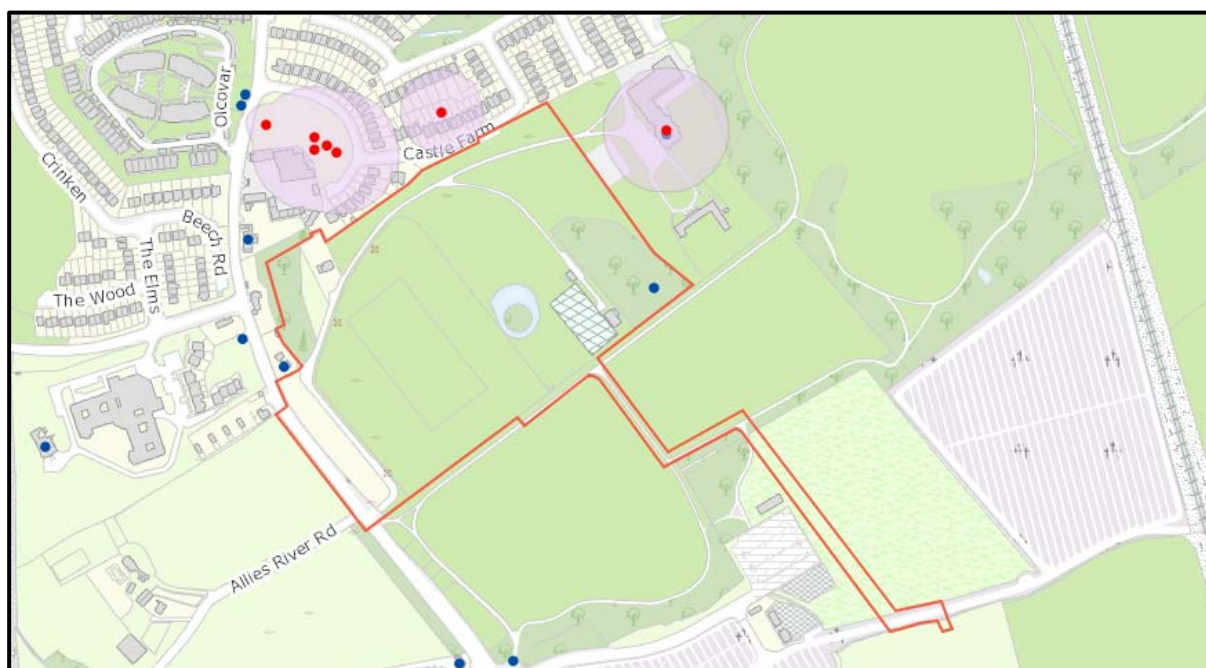


Figure 12.1 - Distribution map of sites listed in the Record of Monuments and Places (red dots) with zones of archaeological potential (shaded pink) relative to the proposed development (outlined in orange)

12.3.4 Cartographic Record

Relevant extracts are presented from the following historic maps:

- Down Survey Map of County Dublin, 1656-58 (Figure 12.2); Down Survey map of Barony of Rathdown, 1656-68 (Figure 12.3);
- Rocque's 1760 Map of Dublin (Figure 12.4);
- Taylor & Skinners' 1777 Map 140 of the Road from Dublin to Wexford and Taghmon to Clongall and Carnew by Rathdrum (Figure 12.5);
- Duncan's 1821 Map of Dublin (Figure 12.6);
- First edition Ordnance Survey 6" map, 1837-43 (Figure 12.7); and
- Third edition Ordnance Survey 25" map, 1912 (Figure 12.8).



Figure 12.2 - Down Survey Map of County Dublin

The county maps of Sir William Pettys' Down Survey (Figure 12.2) show topographical features such as rivers, hills and select townland names. Shanganagh Castle is depicted adjacent to the border of that part of the barony of Rathdown which is situated in Co. Dublin, although this castle more probably relates to a second tower house situated further north in Shanganagh (DU026-031001-).

The 'Down Survey' map of the Barony of Rathdown (Figure 12.3) depicts the townland of Shanganagh and the castle therein, again more probably relating to tower house DU026-031001-), in part of the parish of *Rathmichell*. The Barony is described as having '*many Improvements as Statelý Seates and Howses Benyfitts of Fishing and Fowling Many Mills both for Corne, and Cloathing by Reason that the City of Dublin is Sittued soe neere it.*'

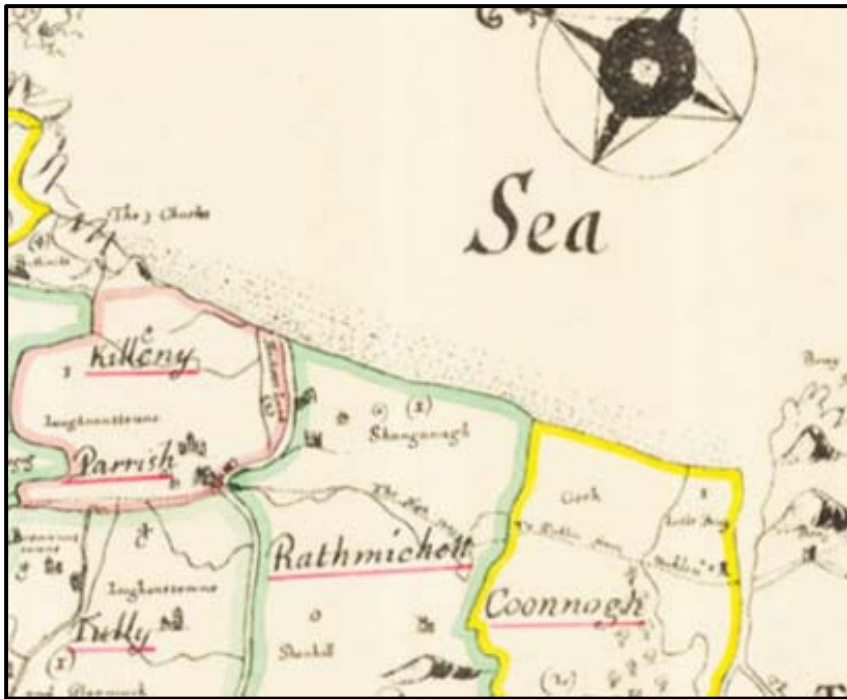


Figure 12.3 - Extract from 1656-58 'Down Survey' map of the Barony of Rathdown

Rocque's 1760 'An Actual Survey of the County of Dublin' (Figure 12.4) records the area to the south of the city in great detail. The townland of '*Shana-ugh*' is depicted as being rural and agricultural in nature, its land divided into small and irregular fields with planted boundaries. A rectangular structure is depicted within this area. The road leading from Dublin to Wexford is shown for the first time. A structure marked '*S. Cattle*', having an L-plan footprint, is shown, although this again may be the tower house of Shanganagh (DU026-031001-), situated further north.



Figure 12.4 - Extract from Rocque's 1760 'An Actual Survey of the County of Dublin'

Taylor & Skinner's 1777 map (Figure 12.5) depicts 'Shanangh' as the property of *Roberts Esq*, in addition to the adjacent seats at Shankill and Loughlinstown, and their owners. To the south, adjacent to Crinkin, a substantial unnamed house is depicted as being occupied by Snow Esq. This is likely to represent the predecessor to the present Shanganagh Castle, which had been constructed at this point.

The 'Lands of Shangannagh' are depicted, with Shanganagh Castle, on Duncan's 1821 Map of Dublin (Figure 12.6). Several other country houses have also been constructed by this time, including Woodbrook House, Mount Eden, Springfield and Woodlawn House. The field system previously shown on Rocque's map is shown to have been regularised, with the boundaries extended and straightened, displaying evidence of improvement in the landscape, probably associated with the construction of these large residences.



Figure 12.5- Taylor & Skinner 1777, Map 140



Figure 12.6 - Duncan's 1821 Map of Dublin

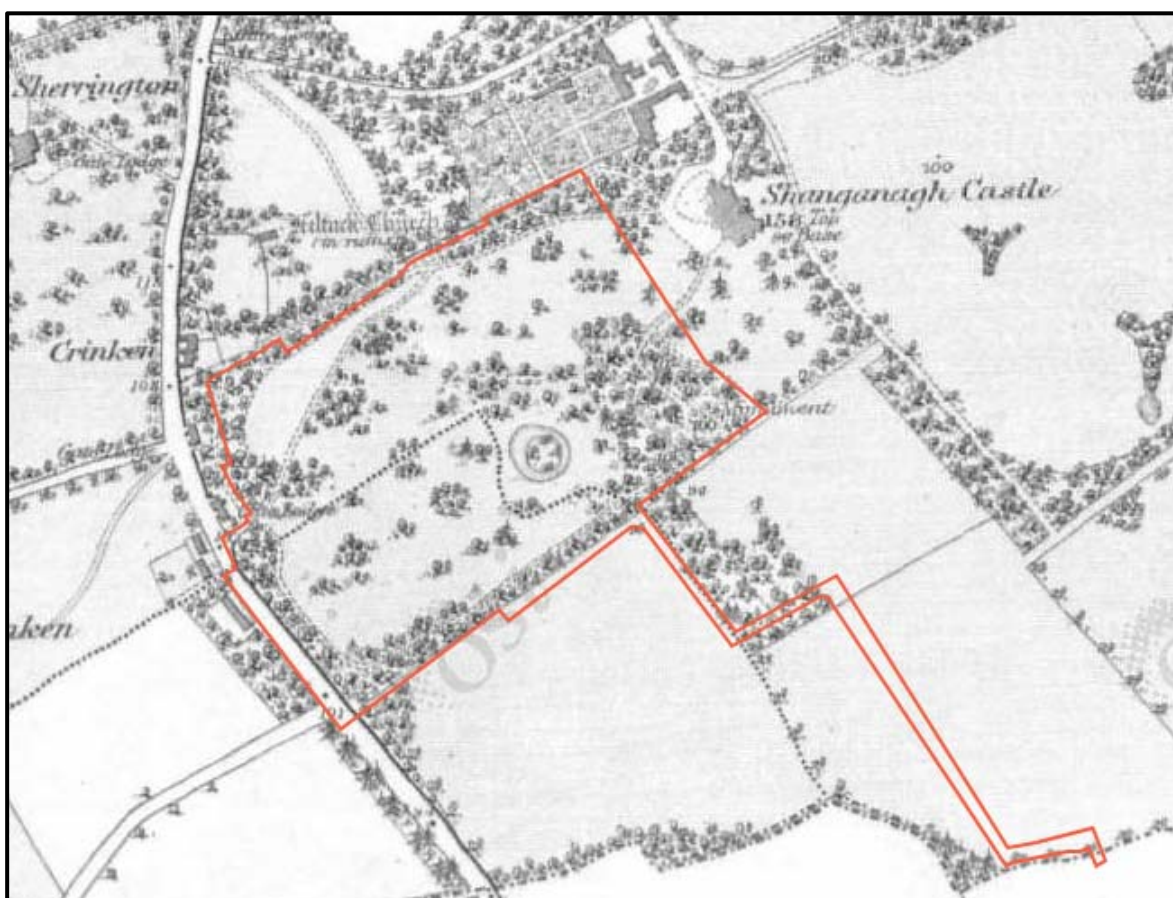


Figure 12.7 - 1837-43 First Edition Ordnance Survey Map, showing the outline of the proposed development (in red)

The first edition Ordnance Survey map (Figure 12.7) is the first to depict the area in considerable detail. The footprint of Shanganagh Castle and its associated demesne landscape are shown, with a complex of outbuildings and a formally laid-out garden to the northwest, and parkland to the southwest, in the area of the proposed development. Two gate lodges are shown to provide access to the estate from the road. The northernmost drive turned southwards and forked, one lane providing access to the stable yards, the other connecting with the apparent principal access lane, which arrived from the southernmost gate lodge, having passed the ruins of Kiltuc Church and views of the ornamental gardens through strategic tree planting. From the second gate lodge, situated to the north of the present day entrance to the site, the driveway turned north, providing a side-long view of the Castle before travelling along a tortuous avenue which again provided vistas towards the façade of the castle, the ornamental pond, and the wider landscape which was the setting for the demesne, notably the Sugarloaf Mountain. A 'monument' and pathways around the parkland area are also depicted. In the wider vicinity the parish remains rural and agricultural in nature.

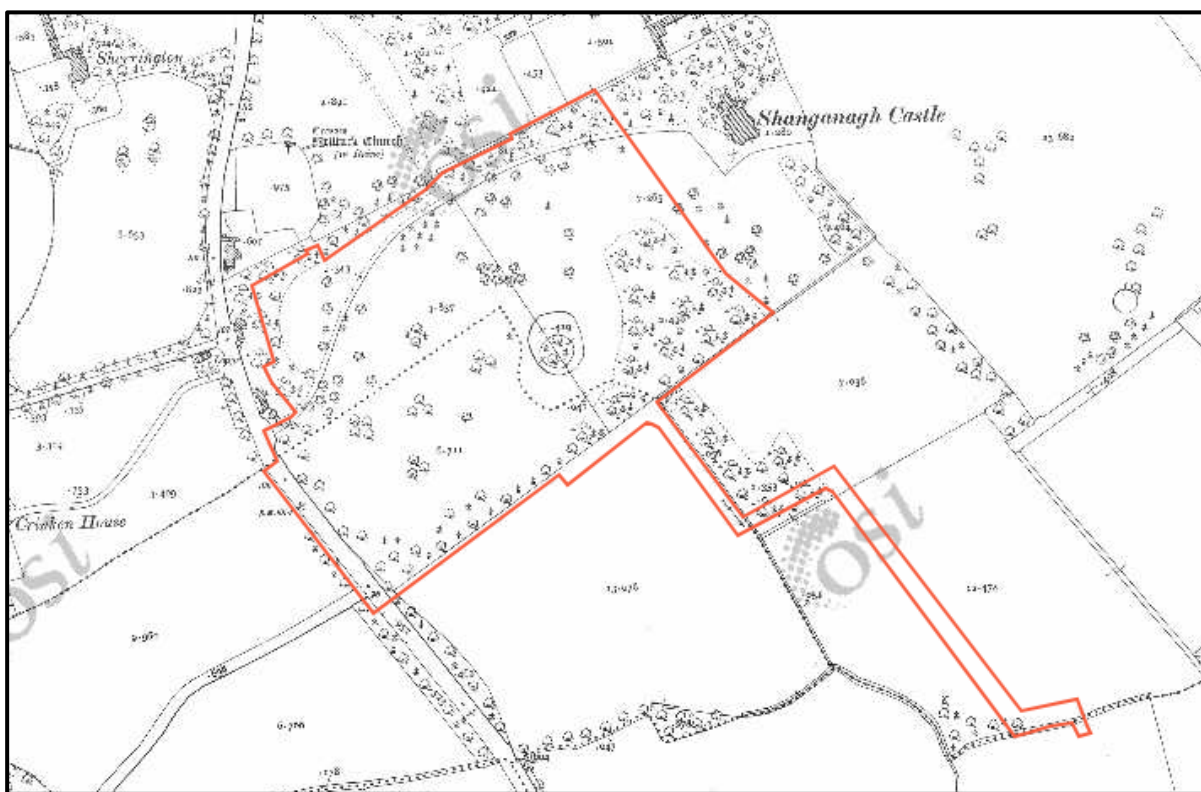


Figure 12.8 - Location of proposed development (outlined in red) on 1912 third edition Ordnance Survey Map

The 1912 edition 25" Ordnance Survey map (Figure 12.8) illustrates the demesne landscape as being largely unchanged. The entrance and associated avenue remain centrally situated at the southwest border of the site. The wooded areas to the northwest corner of the site, as well as that to the east of the pond, and significant planting around the borders of the site, are depicted. The building complex which comprises Castle Farm, northwest of Shanganagh Castle, are shown, accessed via their own avenue and lodge situated north of *Kiltuc Church (in ruins)*. Crosses are indicated adjacent to the Church.

12.3.5 Toponymy

A townland name may preserve valuable information relating to its archaeology, history, folklore, previous ownership, topography or land use. Many placenames were anglicised by the Ordnance Survey which begun in the 1830's. Despite some inaccuracies in translation, the Gaelic, Viking, Anglo-Norman and English origins of placenames are generally recognisable.

F.E. Ball asserts that Shanganagh refers to 'the place of shangans or ants,' while Shankill derives from 'the old church' (1906, p79).

12.3.6 Previous Archaeological Investigations

A search of the Excavations Bulletin website for previous archaeological investigations within the proposed development area produced no results. A number of previous archaeological investigations have been undertaken in the wider vicinity. These are listed in Table 12.2.

Excavation No.	Licence No.	Location-	Site Type	Author
2005:530	05E0392	Shanganagh/Cork Little/Aske/Cork Great/Little Bray/ Bray Commons	No archaeological significance	Richard Clutterbuck
2005:1703	02E1717ext	Cork Great and Ravenswell	Medieval	Colm Moriarty
2006:572	06E0828	Cabinteely	Environs of early medieval cemetery	Edmond O'Donovan
2006:701	06E0794	Mill Lane, Shanganagh	Testing	Franc Myles
1995:102	94E0201	Lehaunstown Military Camp	18 th century military camp	Margaret Gowan
2008:491	05E0392ext	Shanganagh	Urban	David J O'Connor
1996:066	96E0236	Carrickmines Great	Post-medieval	Anne Connolly
2010:835	05E0392ext	Bray	No archaeological significance	David J O'Connor
2011:228	11E0304	Ravenswell/Cork Great/Cork Little/Shanganagh	No archaeological significance	Faith Bailey
2013:44	13E114	Grounds of 'Shanganagh Castle'	19 th -century demesne	Antoine Giacometti
2012:658	12E0114	The Park, St Bridgid's Girls National School, Cabinteely	Bronze Age settlement	Linzi Simpson
2014:481	14E041	Shanganagh Castle at Beechlands and Barn Close	Medieval, suburban	Linzi Simpson
1997:085	97E0279	Cherrywood/Lehaunstown/Loughlinstown	Neolithic/post-medieval	Edmond O'Donovan
1999:257	99E0181	Shanganagh, Loughlinstown	Geophysical anomalies	Avril Purcell
2002:0619	02E1133	Site 78 Loughlinstown	Prehistoric	Matthew Seaver
2002:1960	02E1717	Corke Abbey, Bray	Urban Medieval	Margaret Gowan

Table 12.2 Previous archaeological investigations in the vicinity of the proposed development

As part of the proposed development, targeted archaeological test-excavation was undertaken across the site by Thaddeus Breen under excavation licence No. 18E0664, issued by the Department of Culture, Heritage and the Gaeltacht. 12 test trenches measuring 2 metres in width, and ranging from 45m to 110m in length, were excavated across the site (Figure 12. 9). Trenches 1 and 2 were situated to the northeast of the site, on a lawn and area of mown grass sited to the west of Shanganagh Castle. Trenches 3, 4 and 5 were placed on an area to the centre of the site, previously used for allotments. Trenches 6 and 7 were placed to the northwest corner of the site, adjacent to the Castle driveway. Trenches were placed to investigate some slight variations in the ground surface, discerned during a previous site visit, which possibly described the line of the field boundary which formed the townland boundary between Shanganagh and Shankill, removed by 1843. Trenches 8-11 were placed within a large field in which the grass is kept short but not developed into a lawn. Trench 12 was placed to the southwest boundary of the site, perpendicular to the driveway. No evidence of any archaeological features, finds or deposits, including sub-surface remains associated with a townland boundary, was identified during test-excavation. The result of test-excavation is attached to this chapter as Appendix 12.1.

Geotechnical Site Investigation works, which were undertaken by Causeway Geotech across the proposed development site, were also subject to archaeological monitoring. These comprised 43 trial pits (TP), 8 soak-away pits (SC) and 5 boreholes (BH), and were monitored by Shanarc Archaeology Ltd. between 21 January and 8 February 2019. Nothing of archaeological interest was noted, confirming the results of archaeological testing. The result of geotechnical site investigation is attached to this chapter as Appendix 12.2.

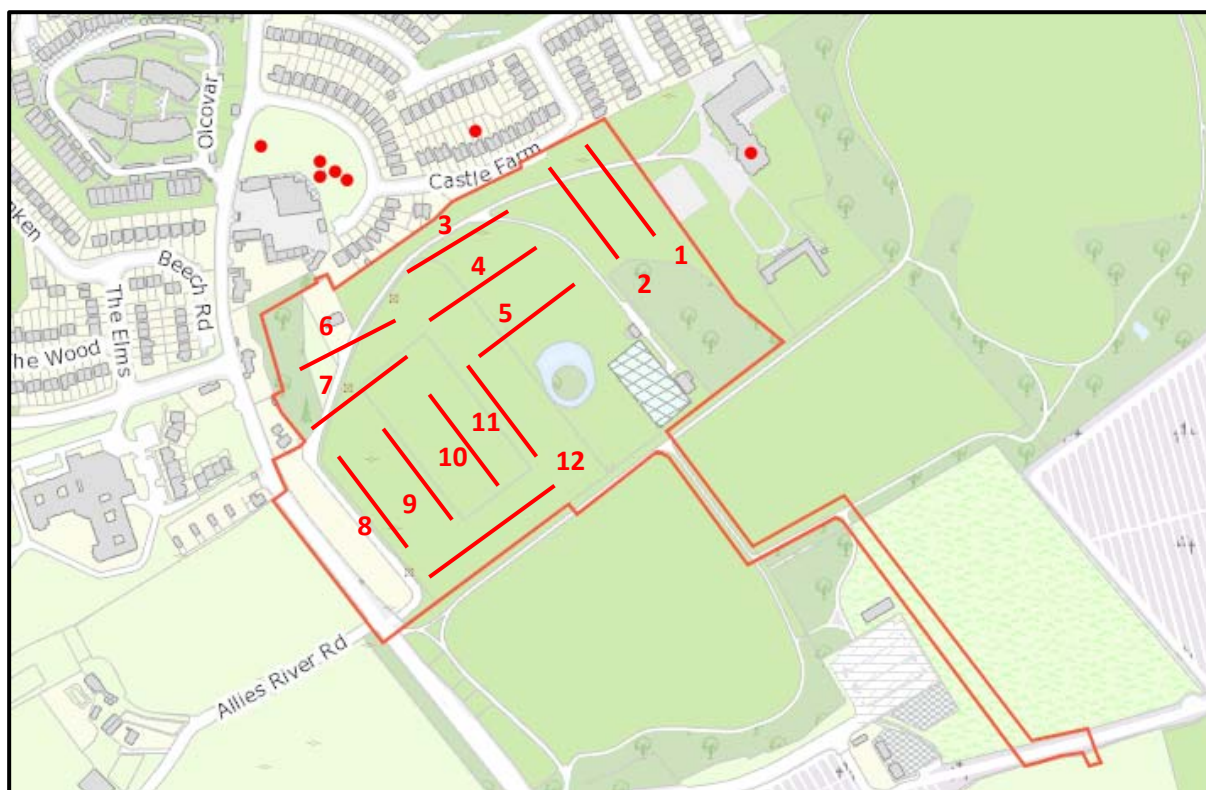


Figure 12.9 - Layout of test trenches within the proposed development

The results of test excavation and geotechnical site investigations indicated ‘a significant amount of modern ground disturbance with concentrations and spreads of modern material’ (Leigh 2019, 1) at the

site. A Geophysical Survey was subsequently carried out on the site under prospection licence 19R0259 by Joanna Leigh, with the view that potential significant archaeological remains may present a magnetic signature that could be separated from the modern ground disturbance. The full Geophysical Survey report is attached to this chapter as Appendix 12.3.

Four areas, labelled Areas A, B, C and D were subject to detailed survey, with Area D focussed on Shanganagh Castle. The results of the Geophysical Survey confirmed the results of test excavation and geotechnical site investigations. Modern magnetic disturbance dominated the data sets, resulting from modern landscaping, probable made ground and/or other ground disturbance. The only response of potential archaeological interest relates to a north-south linear ditch type response in Area B, which most likely relates to a former field division or drainage ditch - a former field division on the identified alignment is not shown on Ordnance Survey maps. The survey in the vicinity of the Castle was magnetically disturbed from modern landscaping and underlying service pipes and no archaeological features were discernible in this area.

12.3.7 Previous Archaeological Finds

The topographic files list no finds from Shanganagh townland. One find is listed from Shankill townland (1999:4, a possible plough coulter) but this was actually determined to have been located in Barnaslingan townland, nowhere near Shanganagh.

12.3.8 On-Site Inspection

A visual inspection of the proposed development site was carried out by Shanarc Archaeology Ltd. on 15 October 2018. The visual inspection included the area immediately surrounding Shanganagh Castle, outside the proposed development boundary. While areas of planting at the northwest and to the east of the pond survive, as well as some hedgerows and trees having been more recently introduced along the borders of the site, much of the planting evident on the Ordnance Survey maps (Figures 12.7 and 12.8), particularly the incidental groupings situated intermittently around the site, has been removed.

The modern driveway begins at the southernmost corner of the site, connecting with the original route of the entrance avenue to the northwest of the site. From this point, it follows the route of the historic driveway in a sweeping curve around the north of the site towards the Castle, outside the eastern boundary. In the grassy area to the west of the site, some slight variations in the surface could be discerned, comprising higher and lower areas running approximately SW-NE, following the orientation of the site. This has most recently been in use as football pitches. It was considered that one of these linear features might constitute the line of the field boundary, forming the townland boundary between Shanganagh and Shankill.

To the east of the football pitches, an area of the site has been in use as allotments, while southeast of here is a maintenance area.

An ornamental pond, having an island to the centre, was examined. An ornamental landscape feature probably of 18th or 19th century construction, its scale is similar to that of a ringfort. It is possible that this is an example of a fosse being greatly enlarged in order to create a more impressive landscape feature. In the grassy area to the south of the driveway, just west of the Castle, some slight irregularities were noted, including a linear feature, possibly the remains of a bank with a ditch either side. As this does not correspond with any feature represented on historic mapping, it is considered to be a field

boundary of no great significance. Lawns, trees and paths dominate the area immediately to the front of the Castle. The lawn continues around the south and rear of the Castle buildings. A linear raised area was noted to the south-east of the building, and the ground to the rear sloped down to the floor level of the basement, indicating that the construction of the present building may have involved extensive ground disturbance.

Of the area to the north of Shanganagh Castle, hitherto occupied by a complex of outbuildings and formal gardens making up an integral part of the demesne landscape, no trace remains, a housing development having been constructed in the latter part of the twentieth century. The site of Kiltuc Church has been preserved as a lawn, but no surface trace of the church, graveyard or crosses remain extant. No definite features of archaeological interest were noted during the site inspection. A series of images of the application area is presented below.



Plate12.1 View from original entrance at west, looking northeast



Plate 12.2 View from current entrance avenue, towards allotments to east



Plate 12.3 View along avenue towards Shanganagh Castle, from west

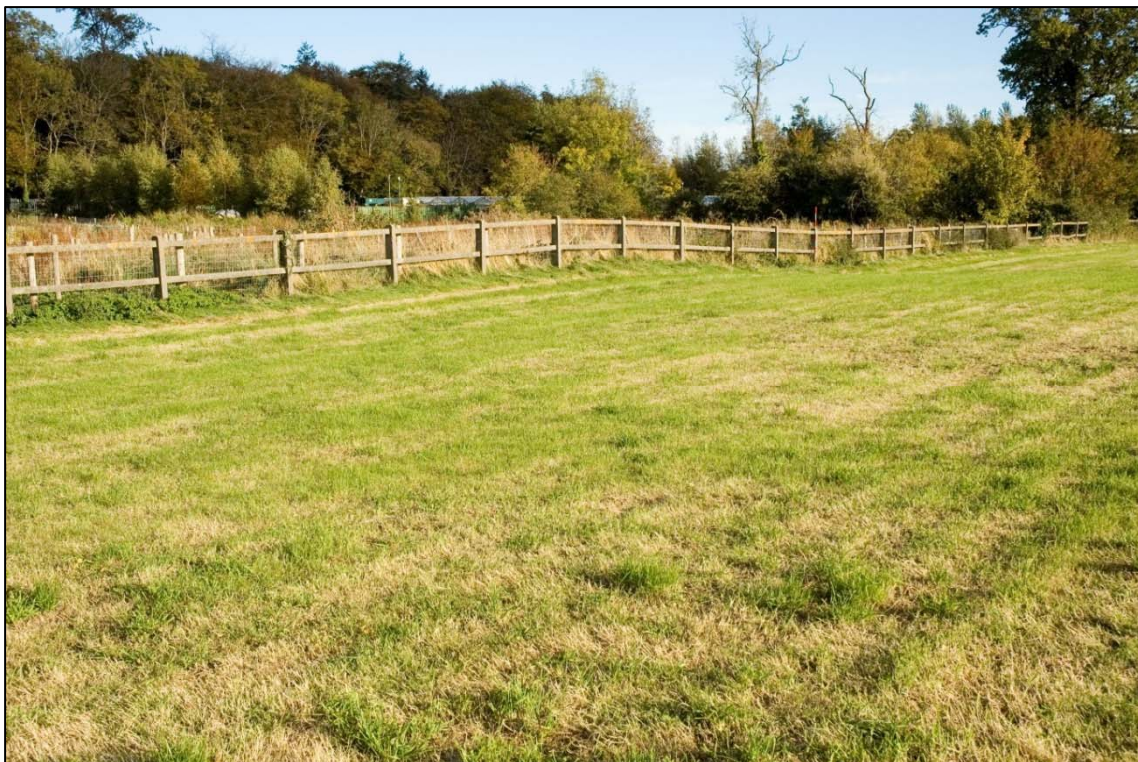


Plate 12.4 View to southeast from avenue, allotments to background behind fence



Plate 12.5 View to south from avenue

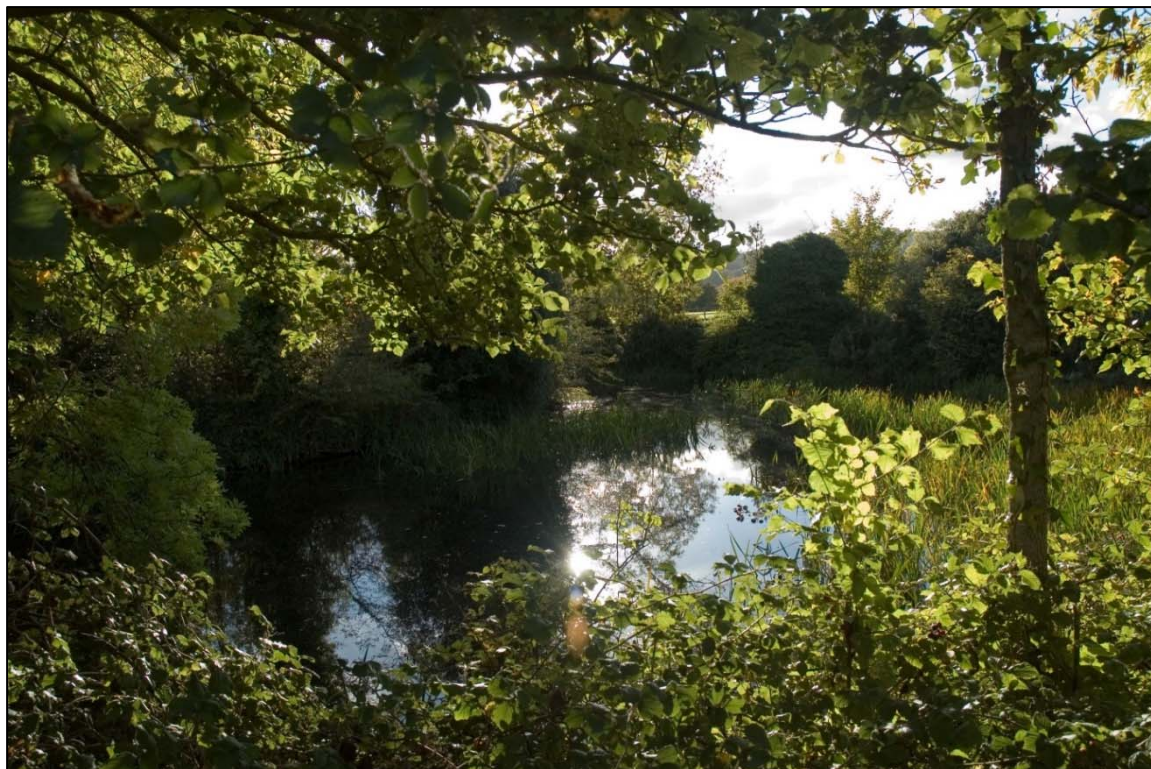


Plate 12.6 Ornamental pond and island, viewed from North



Plate 12.7 Grassy area to east of allotments, view from avenue at west



Plate 12.8 Grassy area to east of allotments, view from north

12.3.9 Cultural Heritage

Cultural heritage comprises aspects of heritage, such as folklore and cultural associations, which are less tangible than archaeological or architectural heritage sites and structures. Dún Laoghaire-Rathdown has a rich cultural heritage, expressed physically through archaeological monuments, architecture, and designed landscapes.

Dún Laoghaire-Rathdown County Development Plan 2016-2022

It is the policy of the council to protect archaeological sites and if possible, promote access to and provide signposting of these (Policy AH1). Where archaeological material is encountered, it is the policy of the council to seek preservation in situ where possible, or as a minimum, preservation by record, with decisions regarding development proposals affecting known sites having regard to the advice/recommendations of the Department of Culture, Heritage and the Gaeltacht (Policy AH2).

The County Development Plan provides the Record of Monuments and Places for the county therein. Those in close proximity to the proposed development area are listed above (Section 12.3.3, Table 12.1).

Woodbrook-Shanganagh Local Area Plan 2017-2023

The Local Area Plan (LAP) acknowledges the importance of the 'adaptive re-use of heritage assets' in the area, as well as acknowledging the opportunity 'to increase public awareness of the legacy and inherent value of the area's rich archaeological and architectural heritage' (Section 3.5.3. p 29, policy BH6). The plan purports to adopt an 'over-arching conservation approach' to ensure that the aforementioned heritage 'is protected, conserved and enhanced, leveraging opportunities for historic

structures to become focal points and/or sensitively integrated to any future development proposals (section 3.5.4.i., p29) (Policy BH3).

Shanganagh Castle is envisaged as part of the LAP as being a 'focus of a new residential neighbourhood and with a future active community use', seeking to ensure that 'any new development will respect the historic context, in particular any impact on the Castle, its immediate landscaped spaces, distant landmarks and views' (*ibid*).

The pond and woodland west of the Castle are noted as being worthy of conservation as part of any development proposals in the LAP, comprising 'the most significant remains of the original landscaping scheme' as shown on the first edition map (Policy BH5) (Figure 12.7).

The cumulative development of the LAP incorporates the Redevelopment of Shanganagh Park, Shanganagh Crematorium; Shanganagh DART station; Woodbrook Residential Development Phase 1 and Phase 2; a new Primary School; and Dublin-Bray Bus Corridor.

Areas of Archaeological Potential

The proposed development area is traversed by the townland boundary between the townland of Shanganagh, in which the predominant part of the proposed development is contained, and that of Shankill to the southwest. The physical boundary ditch has been removed, and is not evident on the first edition Ordnance Survey map (Figure 12.7). No trace of this boundary was identified during testing in the area (Archaeological Testing Report, Trenches 8-11, Appendix 12.1), and it is possible that more recent ground disturbance associated with the use of the area as a sports and recreation area, as well as the laying of an underground telephone cable may have removed sub-surface remains signifying the presence of a ditch.

12.3.10 Inventory of archaeological sites and areas of archaeological potential

The following inventory details all identified sites of archaeological and cultural heritage significance both within and in direct proximity to the proposed development area. It consists of 7 archaeological sites (1-7) and one area of archaeological potential (AP). Entries provide locational information, a description of each site, an outline of the potential impact of the development, and recommendations towards the mitigation of this impact.

Shanganagh Castle (DU026-120--) is situated 50m to the east of the proposed development. In addition, the proposed development is located within the erstwhile demesne landscape and the curtilage of Shanganagh Castle. There are 6 further RMP sites within 150m of the proposed development. 4 of these form part of the complex of Kiltuc Church, to the northwest of the proposed development. A building (DU026-054005-) is also recorded within this complex, and a pair of fulachta fia (DU026-116--) were allegedly² excavated in Shanganagh, prior to the construction of a housing development at Castle Farm.

The proposed development is situated predominantly in the townland of Shanganagh, forming the southwest extent of the civil parish of Rathmichael. The proposed development also sits within the

² Description of RMP notes: 'According to Rob Goodbody (pers.comm) Paddy Healy excavated two fulacht fia sites in Castle Farm in 1990'. There is no report available on the excavations database.

townland of Shankill, which belongs to the civil parish of Old Connaught. No evidence of a ditch or other boundary or defence feature between the townlands (**AP**) has been identified at the site, although the boundary is partially surviving along the proposed greenway and the foul water pipeline running across Shanganagh Park to the proposed Woodbrook SHD.

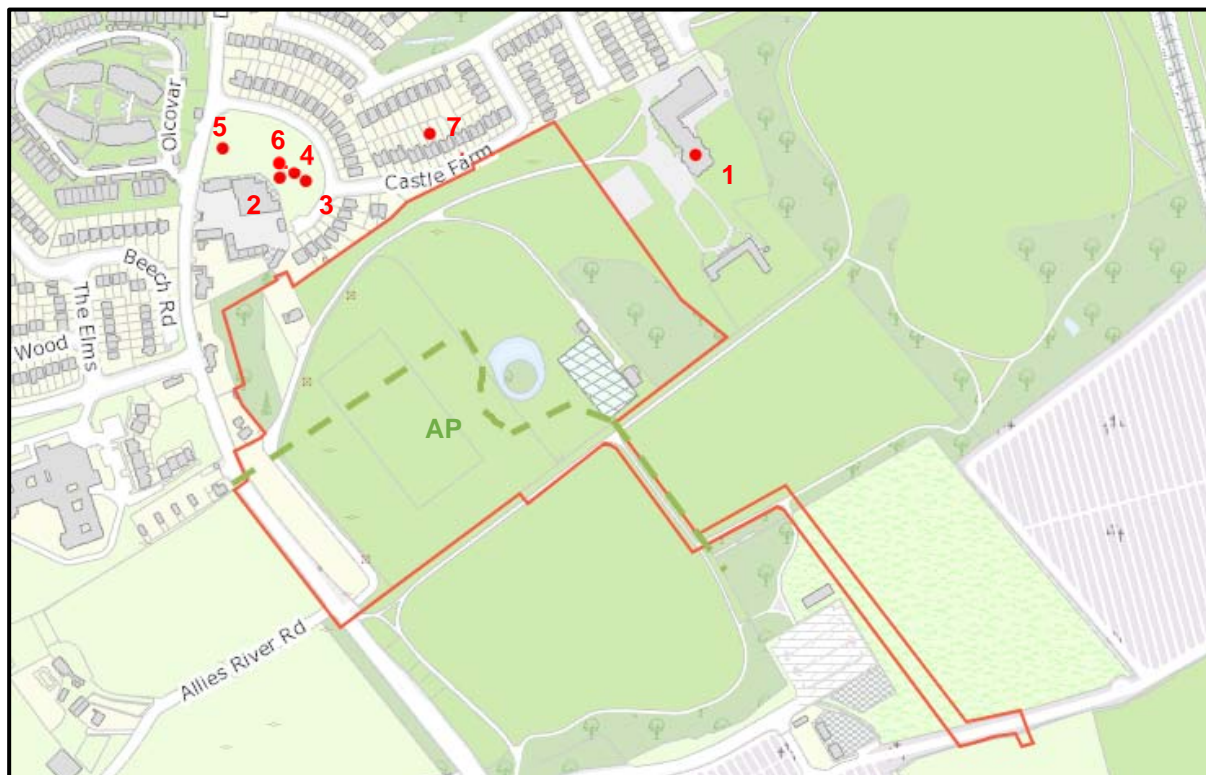


Figure 12.10 - Location of archaeological sites (1-7, in red) and area of archaeological potential (AP, in green) in relation to proposed development area (outlined in red)

SITE 1	Figures 12.1, 12.4, 12.5, 12.6, 12.7, 12.8, 12.9 and 12.10
TOWNLAND	Shanganagh
COUNTY	Dún Laoghaire-Rathdown
GRID REFERENCE	725603,721202
IDENTIFICATION	Documentary
SITE TYPE	Castle
SITE NAME	Shanganagh Castle
RMP Ref. NO.	DU026-120--
REFERENCES	Turner 1987, 58
PROXIMITY	50
DESCRIPTION:	
Nineteenth century correspondence relating to alterations being undertaken at Shanganagh Castle mentions the remains of an old castle. Two cannon shot were recovered from the site prior to its re-building (Turner 1987, 58). The castle is located east of Kiltuc Church (DU026-054001-) at the foot of the Dublin Mountains. Compiled by: Geraldine Stout and Padraig Clancy. Revised upload on: 21 April 2018.	

SITE 2	Figures 12.1, 12.7, 12.8, 12.9 and 12.10
TOWNLAND	Shanganagh
COUNTY	Dún Laoghaire-Rathdown
GRID REFERENCE	725266, 721184
IDENTIFICATION	Cartographic, Documentary
SITE TYPE	Church
SITE NAME	Kiltuc Church
RMP Ref. NO.	DU026-054001-
REFERENCES	Ball 1906
PROXIMITY	90m

DESCRIPTION:

All that survives of Kiltuc church are the overgrown foundations of a rectangular building defined on three sides by rough large boulders (L 9.2m, Wth 5m, E-W, H 0.065m). This foundation is mentioned in the Bull 1179, which defined the extent of the dioceses of Dublin and Glendalough (Ball 1906, 93-94). There are no graveslabs visible. There were formerly two small crosses at the church. One of these crosses was moved to the laneway at Shankill (DU026-051001-). The other cross-head was moved to the church grounds of St. Annes, Shanganagh. Compiled by: Geraldine Stout and Padraig Clancy. Revised upload on: 19 April 2018. (Denoted as 'Kiltuck' on OS maps).

SITE 3	Figures 12.1, 12.7, 12.9 and 12.10
TOWNLAND	Shanganagh
COUNTY	Dún Laoghaire-Rathdown
GRID REFERENCE	725287, 721181
IDENTIFICATION	Cartographic, Documentary
SITE TYPE	Graveyard
SITE NAME	Kiltuc Graveyard
RMP Ref. NO.	DU026-054002-
REFERENCES	Ball 1906
PROXIMITY	61m

DESCRIPTION:

This site is located in a low-lying urbanised landscape at east of the Dublin mountains. There are no upstanding remains of Kiltuc graveyard. A recent aerial photograph of the site (OS 9 2202) shows a cropmark of a large rectangular enclosure (L 25m, Wth 20m). The present church remains form the NW corner of this enclosure site (DU026-054007-). This maybe the levelled remains of the graveyard Compiled by: Geraldine Stout and Padraig Clancy. Revised upload on: 21 April 2018.

SITE 4	Figures 12.1, 12.7, 12.9 and 12.10
TOWNLAND	Shanganagh
COUNTY	Dún Laoghaire-Rathdown
GRID REFERENCE	725278, 721188
IDENTIFICATION	Documentary
SITE TYPE	Cross
SITE NAME	-
RMP Ref. NO.	DU026-054003-
REFERENCES	OPW files
PROXIMITY	90m

DESCRIPTION:

This site is located in a low-lying urbanised landscape at east of the Dublin mountains. In 1979 a cross base lay along the E wall of the Kiltuc church (DU026-054001-). This has since disappeared. This was a round boulder (diam.0.70m) with a level upper surface and socket (OPW files). Compiled by: Geraldine Stout and Padraig Clancy. Revised upload on: 21 April 2018.

SITE 5	Figures 12.1, 12.7, 12.9 and 12.10
TOWNLAND	Shankill
COUNTY	Dún Laoghaire-Rathdown
GRID REFERENCE	725220, 721208
IDENTIFICATION	Extant (removed); Documentary
SITE TYPE	Cross
SITE NAME	The Shankill Cross
RMP Ref. NO.	DU026-054004- (original location)
REFERENCES	Turner, K. 1983; Ó hÉailidhe, P. 1958
PROXIMITY	136m
DESCRIPTION:	
<p>The Shankill Cross (DU026-051----) was formerly located in Kiltuc Church (DU026-054001-) but was re-erected c. 1901 at a base in the laneway between Rathmichael and Shankill Castle. This site is located in a low-lying urbanised landscape at east of the Dublin mountains. Compiled by: Geraldine Stout and Padraig Clancy. Revised upload on: 21 April 2018.</p> <p>Record for present location: The cross now stands at the bottom of a garden, accessed by a short laneway N of where it is marked on the OS 1937 ed. It was formerly located in Kiltuc Church (DU026-054001-) but was re-erected c. 1901 on a base in the laneway between Rathmichael and Shankill Castle. The base was marked on the map as 'Cromlech'. It is a round granite boulder with a level top and a socket cut into the centre to receive the cross (H 0.3m, diam 0.7m). On the SE corner is a cupmark. The cross is formed from granite with an oval head and short arms. It is chamfered all around on both faces. The SE face bears a crucifixion scene in relief and the figure of Christ is naked. The NW face contains a similar figure outlined by a broad incised line (H 0.68m, Wth 0.43m); (Ó hÉailidhe 1958, 106; Turner 1983, 64-65, 73). Compiled by: Geraldine Stout and Padraig Clancy. Revised upload on: 19 April 2018.</p>	

SITE 6	Figures 12.2, 12.10 and 12.11
TOWNLAND	Shankill
COUNTY	Dún Laoghaire-Rathdown
GRID REFERENCE	725266, 721196
IDENTIFICATION	Documentary
SITE TYPE	Building
SITE NAME	-
RMP Ref. NO.	DU026-054005-
REFERENCES	-
PROXIMITY	106m
DESCRIPTION:	
No descriptive details supplied	

SITE 7	Figures 12.2, 12.10 and 12.11
TOWNLAND	Shanganagh
COUNTY	Dún Laoghaire-Rathdown
GRID REFERENCE	725388, 721220
IDENTIFICATION	Pers.comm.; Excavation
SITE TYPE	Fulacht Fia
SITE NAME	-
RMP Ref. NO.	DU026-116--
REFERENCES	-
PROXIMITY	48m
DESCRIPTION:	
According to Rob Goodbody (pers. comm.), Paddy Healy excavated two fulacht fia sites in Castle Farm in 1990 in advance of a housing development. This site is located to the east of Kituc Church (DU026-0054001-). Compiled by: Geraldine Stout and Padraig Clancy. Revised upload on: 21 April 2018.	

AP1	Figures 12.8, 12.10 and 12.11
TOWNLAND	Shanganagh-Shankill
COUNTY	Dún Laoghaire-Rathdown
GRID REFERENCE	725413,721059
IDENTIFICATION	Cartographic
SITE TYPE	Townland and Civil Parish Boundary
SITE NAME	-
RMP Ref. NO.	-
REFERENCES	-
PROXIMITY	within
DESCRIPTION:	
The townland boundary between Shanganagh (in the Civil Parish of Rathmichael) and Shankill (in the Civil Parish of Old Connaught) runs across the south corner of the site: entering south of the gate lodge, it runs in a northeast direction before turning sharply southeast, veering in a curvilinear direction around the demesne feature depicted on the first and third edition OS maps.	

Table 12.3 Inventory of Archaeological Sites and Area of Archaeological Potential

12.4 LIKELIHOOD OF IMPACTS

Following an assessment of readily available archaeological records, cartographic and documentary sources, a visual inspection of the site, and perusal of the results of archaeological testing and geophysical survey, it is concluded that the proposed development will not directly impact any known archaeological monuments or features.

One known archaeological monument, Shanganagh Castle (RMP DU026-120--), originally constructed in 1769 (1), and fabric of which may survive in part within the present Castle structure, is situated at a distance of 50m from the proposed development. There is no likely direct impact upon the upstanding archaeological fabric of this monument, which has been considerably altered. The zone of archaeological potential (ZAP) which extends from the monument is not traversed by the outline of the proposed development. A likely potentially significant impact upon hitherto unknown, related sub-surface features was considered. Test excavation and a geophysical survey were carried out to assess

for the presence of sub-surface remains. No archaeological features, finds or deposits were identified and it is concluded that the likelihood of impact on sub-surface remains associated with the site is low.

There is likely impact upon the setting of Shanganagh Castle, as the proposed development is set within the designed 'picturesque' landscape associated with the same. This setting has previously been compromised, with the development of Castle Farm on the former demesne grounds to the north, as well as the establishment of an allotment community garden and council depot to the front of Shanganagh Castle. The impacts upon the setting are addressed in Chapter 13.0 Architecture and Cultural Heritage.

There are 6 further RMP sites situated within 150m of the proposed development. These are illustrated on Figure 12.10 and detailed in Table 12.1, and relate to a complex of sites at Kiltuc Church (DU026-054001-DU026-054005) and a nearby fulacht fia (DU026-116). While there is no likely direct impact upon the sites arising as a consequence of the proposed development, a likely potentially significant impact upon hitherto unknown, related sub-surface features was considered. Test excavation and a geophysical survey were carried out to assess for the presence of sub-surface remains. No archaeological features, finds or deposits were identified and it is concluded that the likelihood of impact on sub-surface remains associated with the sites is low.

The proposed development is likely to impact one Area of Archaeological Potential (**AP**), namely the townland and civil parish boundary between Shanganagh townland (Rathmichael civil parish) and townland (Old Connaught Civil Parish). This **AP** may take the form of the remains of a ditch which would have formed the boundary marker. No trace of this boundary ditch was identified during archaeological testing or geophysical survey. The route of both the proposed greenway and the foul water pipeline running across Shanganagh Park to the proposed Woodbrook SHD also follows the townland boundary in a south-eastern direction for approximately 135m, a boundary which is marked by a hedgerow and may conceal a ditch.

12.4.1 Do Nothing Scenario

There will be no impacts on identified archaeological and cultural heritage characteristics if the proposed development is not undertaken. However, the proposed development area is zoned 'to provide for new residential communities in accordance with approved local area plans' (*County Council Housing Programme Site, Map 14, Dún Laoghaire-Rathdown County Development Plan 2016-2022*) and it is likely that residential development would occur, and in this case the impacts would thus be similar to those described in the impact assessment above.

12.4.2 Cumulative Impacts

A number of neighbouring schemes are proposed adjacent to and associated with the Shanganagh Castle Housing Scheme. These are considered in terms of a cumulative impact on archaeology and cultural heritage in the area. A scheme has been lodged with An Bord Pleanála regarding a prospective SHD (strategic housing development) comprising 685 residential units and a creche at Woodbrook, also incorporating a new DART station. Part 8 planning applications for the remodelling of Shanganagh Park and for Shanganagh Castle Community Facilities are also proposed.

The current planning applications which are situated in close proximity (within 1km of the proposed development) comprise;

- i) A Part 8 scheme (Ref/PC/PKS/02/16) for a new crematorium facility at Shanganagh Cemetery was put forward and approved in March 2017; this facility will be located on vacant land between two existing burial areas, a short distance to the south-east of the proposed development. Planning permission is not subject to an expiry date;
- ii) The demolition of a gate lodge and construction of four apartments (D15A/0683), for which planning will expire 27 April 2021;
- iii) The construction of a specialist hospital with capacity for 56 inpatients (D17A/0065), for which planning will expire 19 December 2022;
- iv) The construction of three detached houses (D18A/0198) for which planning will expire 7 September 2023;
- v) The construction of 348 No. residential units comprising 46 No.1 bed apartments 171 no. 2 bed apartments; 1 retail & café (D07A/1495) with 10 year permission which will expire 06/06/2020.

In the cases of PC/PKS/02/16, D18A/0198, D07A/1495 and D15A/0683, no conditions or mitigation measures are proposed with regard to archaeology or cultural heritage. In the case of the latter application, the demolition of the gate lodge represents a loss of relict demesne landscape features in the area.

In the case of D17A/0065, a submission made on behalf of the then Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs notes the proximity of the proposed development to a cemetery cairn (RMP DU026-067--), and the requirement for pre-development testing to be included as a condition in any grant of planning permission. This development additionally incorporated The Aske House, a protected structure.

The Woodbrook-Shanganagh Local Area Plan has envisaged that Shanganagh Castle would become the focus of a new residential neighbourhood, itself having an active community use, and seeks to ensure that such a development would respect the historic context of the Castle and erstwhile demesne landscape. The LAP illustrates likely historic routes, as well as RMP and RPS sites in the vicinity.

The cumulative effect upon the archaeological and cultural heritage of the overall area by the proposed developments at Shanganagh and at Woodbrook, is that the heritage landscape character of the area will be altered considerably, these comprising the last remaining demesnes in an area once characterised by these. Thus there is a significant and negative cumulative effect to the cultural heritage of the area. This effect is mitigated against by the preservation of historic vistas, and by the use of opportunities to educate and inform the public regarding the heritage of the area. The proposed refurbishment and re-use of Shanganagh Castle as a community facility, as proposed in the Local Area Plan, is considered in more detail in Chapter 13.0 Architectural and Cultural Heritage.

12.5 DESCRIPTION AND SIGNIFICANCE OF IMPACTS

12.5.1 Impacts upon recorded monuments

Most of the proposed development area is notable as a relict demesne landscape. The original structure of Shanganagh Castle is thought to date to the mid-eighteenth century, although it was considerably

expanded in the early nineteenth century, as illustrated on the first edition Ordnance Survey Map (Figure 12.7). This map illustrates several similar properties in the vicinity, many of which have since been lost, the demesne lands broken up for redevelopment. A significant proportion of the original demesne landscape to the north has been lost, with late twentieth-century housing developments having been constructed to the north of Shanganagh Park, on land which was previously occupied by associated outbuildings, stables and a walled garden (Figures 12.7, 12.8). The proposed development, situated as it is within the curtilage of and in close proximity to the Recorded Monument, will have a significant, direct and negative impact on the cultural landscape, i.e. the remaining demesne landscape and setting of Shanganagh Castle. This is addressed in greater detail in Chapter 13.0, Architectural and Cultural Heritage.

The proposed development offers the opportunity to retrieve knowledge about Shanganagh Castle (1) and demesne landscape through archaeological mitigation that has been undertaken. It is proposed also to provide an opportunity to raise awareness of the history of the site, which is considered to be a positive impact. The six RMP sites (2-7) situated immediately to the north of the proposed development relate to the remains of Kiltuc church, a building, and a pair of fulachta fia, the latter identified prior to the construction of the Castle Farm Development. Each of these sites is located in the erstwhile demesne landscape of Shanganagh Castle. The potential risk to these sites has been mitigated reducing the risk from significant to slight.

The existing late twentieth-century suburban housing on the former Castle Farm has already blocked the view to the site of Kiltuc church from the proposed development site, ensuring that there is no increased visual impact thereon resulting from the proposed development.

12.5.2 Impacts upon area of archaeological potential

The proposed development posed a potentially significant direct impact, permanent in duration, to the townland boundary between Shanganagh and Shankill (AP). Mitigation has established that the impact on this boundary within the proposed development area is reduced from potentially significant to imperceptible. As the route of the proposed greenway and pipeline follows the line of the townland boundary to the south, there is a potentially significant direct impact on the boundary in this location.

12.5.3 Interactions

The archaeological potential of the site is referenced in Chapter 13.0, Architectural & Cultural Heritage, and vice versa. Consultation with the author of Chapter 13.0 has been ongoing, in order to ensure that recommendations are compatible. Chapter 14.0 Landscape and Visual has also been consulted as regards the impact upon the landscape. The Interactions are discussed further in Chapter 18.0, Interactions with the Foregoing. Ongoing dialogue with the design team and monitoring onsite will ensure that all interactions are identified and mitigated appropriately.

12.6 REMEDIAL AND MITIGATION MEASURES

Mitigation measures, both at pre-construction and construction phases, are required to be undertaken in compliance with national policy guidelines and statutory provisions for the protection of archaeological heritage, including the National Monuments Acts 1930 – 2004 and the Planning and Development Act 2000 (as amended).

12.6.1 Avoidance of Impact

Avoidance of direct and indirect impacts and their effect on archaeology and cultural heritage sites is preferable with regards to the proposed development. As this is not always feasible due to the nature of the development, pre-construction, during and post-construction recommendations are offered to provide ameliorative measures when avoidance and preservation *in situ* are not possible.

12.6.2 Construction Phase Mitigation

No evidence of archaeological remains associated with the above mentioned recorded monuments or previously unrecorded monuments was identified during targeted test excavation or during geophysical survey at the proposed development site. Based on the results of geophysical survey (Appendix 12.3), it is considered unnecessary to undertake additional test excavation at the proposed development site. However, it is considered that due to the proximity of several recorded monuments to the site, and the scale of the proposed development, there is a potential for archaeological features and/or deposits to exist within the development area. Therefore the proposed development merits further archaeological mitigation in the form of archaeological monitoring. Monitoring is recommended during any works that may impact the line of the townland boundary on the proposed greenway and the foul water pipeline running across Shanganagh Park to the proposed Woodbrook SHD.

The following mitigation is proposed:

ARCHAE CONST 1: In the event of archaeological features or material being uncovered during construction phase, it is crucial that machine work cease in the immediate area to allow the archaeologist to assess, excavate and record any such material.

ARCHAE CONST 2: Should archaeological features or material be uncovered during construction phase, adequate funds to cover excavation, fencing (if required), post-excavation analysis and reporting, and conservation work should be made available. This work should be done under licence in accordance with Section 26 of the National Monuments Acts 1930 – 2014, and with a method statement agreed in advance with the National Monuments Service (Department of Culture, Heritage and the Gaeltacht) and the National Museum of Ireland.

12.6.3 Operational Phase Mitigation

ARCHAE OPER 1: In accordance with Policy BH3 of the Woodbrook-Shanganagh Local Area Plan 2017-2023, a local awareness of the history of the site should be fostered. This would be achieved through signage at Shanganagh Castle, and by the retention of the historic name of the demesne in the naming and marketing of the development.

12.7 RESIDUAL IMPACTS

The final or intended impact is that which occurs after the proposed mitigation measures have taken effect. When the recommended mitigation measures are taken into consideration, the level of impact and the effects are considerably reduced. The residual impacts on archaeology and cultural heritage sites are detailed in Table 12.4

Impact Phase	Archaeological and Cultural Heritage Feature/Site/ Structure	Likelihood	Impact Type	Quality	Significance	Extent	Duration	Mitigation	Residual Impact
Construction	1Shanganagh Castle, including zone of arch potential	Low likelihood	Direct (upon potential subsurface remains)	Negative	Significance of impact reduced from potentially significant to slight as mitigation implemented .	Local	Permanen nt	Test excavation and Geophysical survey already complete. Monitoring during construction phase.	No residual impact on subsurface archaeology as this will be mitigated to full resolution if exposed during construction.
		High likelihood	Direct (upon setting/demesne landscape) - Addressed in Chapter 13 Architectural and Cultural Heritage	Addressed in Chapter 13	Addressed in Chapter 13			Addressed in Chapter 13	Addressed in Chapter 13
	2Kiltuc Church	Low Likelihood	Indirect	Negative	Significance of impact reduced from potentially significant to slight as mitigation implemented .			Local	Permanen nt

Impact Phase	Archaeological and Cultural Heritage Feature/Site/ Structure	Likelihood	Impact Type	Quality	Significance	Extent	Duration	Mitigation	Residual Impact
	3 Kiltuc Graveyard	Low Likelihood	Indirect	Negative	Significance of impact reduced from potentially significant to slight as mitigation implemented .	Local	Permanent	Test excavation and Geophysical survey already complete. Monitoring during construction phase.	No residual impact on subsurface archaeology as this will be mitigated to full resolution if exposed during construction.
	4 Cross	Low Likelihood	Indirect	Negative	Significance of impact reduced from potentially significant to slight as mitigation implemented .	Local	Permanent	Test excavation and Geophysical survey already complete. Monitoring during construction phase.	No residual impact on subsurface archaeology as this will be mitigated to full resolution if exposed during construction.
	5 Shankill Cross	Low likelihood (new location)	Indirect	Negative	Significance of impact reduced from potentially significant to slight as mitigation implemented .	Local	Permanent	Test excavation and Geophysical survey already complete. Monitoring during construction phase.	No residual impact on subsurface archaeology as this will be mitigated to full resolution if exposed during construction.

Impact Phase	Archaeological and Cultural Heritage Feature/Site/ Structure	Likelihood	Impact Type	Quality	Significance	Extent	Duration	Mitigation	Residual Impact
	6 Building	Low Likelihood	Indirect	Negative	Significance of impact reduced from potentially significant to slight as mitigation implemented .	Local	Permanent	Test excavation and Geophysical survey already complete. Monitoring during construction phase.	No residual impact on subsurface archaeology as this will be mitigated to full resolution if exposed during construction.
	7 Fulachta Fia	Low Likelihood	Indirect	Negative	Significance of impact reduced from potentially significant to slight as mitigation implemented .	Local	Permanent	Test excavation and Geophysical survey already complete. Monitoring during construction phase.	No residual impact on subsurface archaeology as this will be mitigated to full resolution if exposed during construction.
	AP Possible townland boundary	Low likelihood	Direct	Negative	Significance of impact reduced from potentially significant to slight as mitigation implemented .	Local	Permanent	Test excavation and Geophysical survey already complete. Monitoring during construction phase.	No residual impact on subsurface archaeology as this will be mitigated to full resolution if exposed during construction.

Impact Phase	Archaeological and Cultural Heritage Feature/Site/Structure	Likelihood	Impact Type	Quality	Significance	Extent	Duration	Mitigation	Residual Impact
Operation	1Shanganagh Castle	High Likelihood	Direct Visual - Addressed in Chapter 13 Architectural and Cultural Heritage	Addressed in Chapter 13	Addressed in Chapter 13	-	-	Addressed in Chapter 13	Addressed in Chapter 13
	2-7	Unlikely	Visual	Neutral	Imperceptible due to existing buildings	Local	-	None proposed	No impact

Table 12.4 Summary of impacts and residual impacts

12.8 MONITORING

No post-development monitoring is anticipated in respect of archaeology and cultural heritage as all identified impacts will be mitigated at the pre-construction and construction phases of the Proposed Development.

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www.downsurvey.tcd.ie/down-survey-map retrieved 23 January 2019

Cartographic Sources

Down Survey Map of County Dublin, 1656-58

Down Survey map of Barony of Rathdown, 1656-58

Rocque's 1760 'An Actual Survey of the County of Dublin'

Taylor & Skinners' 1777 Map 140 of the Road from Dublin to Wexford and Taghmon to Clongall and Carnew by Rathdrum

Duncan's 1821 Map of Dublin

First edition Ordnance Survey 6" map, 1837-43

Third edition Ordnance Survey 25" map, 1912

CHAPTER THIRTEEN ARCHITECTURAL & CULTURAL HERITAGE

13.1 INTRODUCTION

This chapter of the Environmental Impact Assessment Report (EIAR) is concerned with the designed, cultural and architectural heritage of the extant demesne at Shanganagh Castle, Shankill, Co. Dublin, which relates to surviving architecture, designed monuments and vernacular structures on and around the development site. It also includes elements of the designed landscape, which may entail site or landscape features, historic feature planting, paths, avenues, and intangible designed heritage in the form of key or contributing vistas and views. This chapter should be read in tandem with Chapters 12.0 and Chapter 14.0 relating to Archaeology & Cultural Heritage and the Landscape Visual Impact Assessment.

This chapter is dedicated to assessing the history, development and extent of surviving features related to the aforementioned heritage, as well as that of the immediate adjoining areas and/or the areas with historic associations with the development site. It also sets out the potential vulnerability of these heritage assets and analyses the possible impacts of the proposed residential and community development at the site and recommends mitigation measures for same.

It should be clarified at the outset that there was a separate, medieval structure called Shanganagh Castle in addition to the country house located approximately 50m to the east of the proposed development site, which is post-medieval and shares the same name.

13.2 ASSESSMENT METHODOLOGY

Work on this chapter was undertaken in two phases. The initial phase consisted of a paper / desktop survey, including review of historic maps, primary and secondary research resources, built heritage records, surveys, and relevant legislative and guidance documents. The second phase entailed a field inspection of the proposed development site. The outcomes and findings of each of these steps informed the content of this chapter.

13.2.1 Desktop Study

The desktop study was conducted in order to review the existing, available information on the historic demesne and of the documents that should inform the assessment of impacts. The following resources were referenced as part of this exercise in order to establish a full and complete understanding of the site, its development, surviving features and the criteria for impact assessment insofar as possible.

Cartographic Sources

Historic mapping is crucial to determining the chronology and development of the site, and to identifying historic site features as well as intangible heritage such as key views and vistas, which inform the core heritage significance of the development area. Topographical features are also reviewed and identified on historic maps. As considerable changes have taken place in the land use and density of the area in the twentieth century, it is essential to have this information to hand prior to conducting phase two, the

field assessment, in order to search for, identify, record and assess the integrity and significance of surviving features. Modern mapping is also essential to understanding the planning, protection and legislative parameters of the area. The following historic cartographic resources were reviewed as part of this exercise:

- Sir William Petty, 'Down Survey Map,' Barony of Rathdown, Parish of Rathmichael, 1354-1356
- John Rocque's Map of County Dublin, 1760
- George Taylor and Andrew Skinner, Maps of the Roads of Ireland, 1777 (pg. 140)
- John Taylor, Map of the Environs of Dublin, 1813
- William Duncan, Map of the County of Dublin, 1821
- Ordnance Survey map, 1st Edition (6" map), 1837-1843
- Ordnance Survey map, 3rd Edition, (25" map), 1912
- Dun Laoghaire Rathdown Development Plan 2016-2022, Maps 10 & 14

Record of Monuments & Places and Sites & Monuments Record

The Archaeological Survey of Ireland (ASI) is a unit of the National Monuments Service. The Sites and Monument Record (SMR) contains details of all monuments and places (sites) where it is believed there is a monument known to the ASI pre-dating AD 1700 and also includes a selection of monuments from the post-AD 1700 period. See Chapter 12.0 Archaeology & Cultural Heritage for more information.

National Inventory of Architectural Heritage

The Council of Europe, in Article 2 of the 1985 Convention for the Protection of the Architectural Heritage of Europe, known as the Granada Convention, states that 'for the purpose of precise identification of the monuments, groups of buildings and sites to be protected, each Party undertakes to maintain inventories of that architectural heritage'. The National Inventory of Architectural Heritage (NIAH) was established in 1990 to fulfil Ireland's obligations under the Granada Convention through the establishment and maintenance of a central record documenting and evaluating the architectural heritage of the country. The NIAH was established on a statutory basis by the enactment of the Architectural Heritage (National Inventory) and Historic Monuments (Miscellaneous Provisions) Act, 1999. The NIAH includes in its surveys a broad range of structures and sites covering the period from 1700 to the present day. These include structures of simple design and function, such as postboxes and waterpumps, to grand architectural statements including cathedrals and country houses. The survey also includes the assessment and richness indexing of historic gardens and designed landscapes. Categories of special interest are assessed in the case of built heritage, and include: architectural, historical, technical, social, cultural, artistic, scientific and archaeological significance. The buildings surveys of Dún Laoghaire-Rathdown County Council boundaries were carried out from October 2012 to March 2016, from October 2014 to November 2017, and from February to April 2019. The garden survey was carried out as a desktop study. Non-archaeological built heritage sites are included in the SMR and amount to 13 no. sites within 300m of the development site boundary.

Dún Laoghaire-Rathdown Development Plan 2016-2022

In Ireland, each local authority sets out a development strategy in accordance with the Planning and Development Acts 2000 (as amended). The aim of the current Dún Laoghaire-Rathdown Development Plan is "to continue to facilitate appropriate levels of sustainable development predicated on the delivery of high quality community, employment and recreational environments - allied to the promotion of sustainable transportation and travel patterns - but all the while protecting Dún Laoghaire-Rathdown's unique landscape, natural heritage and physical fabric, to ensure the needs of those living and working

in the County can thrive in a socially, economically, environmentally sustainable and equitable manner.” The Plan sets out policies and objectives for the protection of historic sites and structures by which an assessment of impacts of the proposed developments may be partially derived. The Plan also contains a list of Conservation Areas, Architectural Conservation Areas, a list of National and Recorded Monuments in the area, and the Record of Protected Structures. There are 6 no. Protected Structures within 300m of the development site boundary or within the site itself. There are no Architectural Conservation Areas or Conservation Areas in the immediate vicinity.

As a subset of the Development Plan, the area is also subject to the *Woodbrook-Shanganagh Local Area Plan 2017-2023*. It was effected by the Dún Laoghaire-Rathdown County Council on 1st August 2017. The plan sets out a wide range of policies, protections, parameters, vision, aims and strategic framework for the development of two parcels of land for residential housing; these relate to the grounds within the demesne of Shanganagh Castle, and those within the grounds of the former Woodbrook Estate, at a short distance to the south.

The feasibility study, “Shanganagh Park and Cemetery: Draft Site Analysis” by Dún Laoghaire-Rathdown County Council was also consulted.

National Monuments in State Care

This list includes all National Monuments in the care of the State. There are no National Monuments in State care in the vicinity of the proposed development.

Preservation Orders List

Under the Preservation Orders Act of 1930 and the Temporary Preservation Orders Act of 1954, National Monuments may be subject to preservation orders if they are deemed to be in danger of loss or damage. Works at or near such sites require Ministerial consent. There are no Preservation Orders in the immediate vicinity of the proposed development site.

Aerial Photographic Mapping

Aerial photography and satellite imagery is an essential tool in the investigation of historic sites and landscapes. This resources aids in identifying site features which may less visible to the naked eye when viewed at ground level. It also aids in establishing the proximity and relationship of heritage sites or features to and within the development boundary. Newly-available 3D imagery also aids in identifying topographical and terrain features as well as the status of key vistas. Both Google Earth and Apple Maps imagery were reviewed as part of this exercise.

Previous Architectural Heritage & Conservation Reports

In the case of many historic sites, previous reports have been professionally prepared for a variety of purposes and focuses. These may relate to the condition or repair requirements of historic structures, the assessment of historic integrity of historic demesnes, development impact assessments, or others. The diverse intention of such reports makes them a rich repository of information as well as additional bibliographical sources. They also contain assessments by other professionals which amount to an *ad hoc* collaboration or discussion of assessment. These studies should be reviewed with interest and with consideration. A list of such resources is listed in the bibliography at the end of this chapter.

Documentary Sources

Literary sources include both primary and secondary research resources which contain historical or otherwise pertinent information about the development, associations, history and background to the receiving environment. They are vital to establishing the documented heritage of the site. Research was undertaken at the Irish Architectural Archive and a full list of sources is included in the bibliography at the end of this chapter.

Standards and Guidelines

In addition to the policies and guidelines related to built and designed landscape heritage contained within the Dún Laoghaire-Rathdown Development Plan 2016-2022, there are a variety of other protective, legislative documents. Many of these documents are statutory, and/or provide best practice guidance on the protection of and assessment of development within the vicinity of heritage assets. Several international and European conventions on the protection of cultural heritage have been ratified by and apply to Ireland, most notably:

- UNESCO World Heritage Convention 1972;
- Charter for the Conservation and Restoration of Monuments and Sites (Venice) 1964;
- European Convention on the Protection of the Archaeological Heritage (Valetta Convention) 1992;
- European Convention on the Protection of the Architectural Heritage (Granada Convention) 1985;
- European Council Directive on Environmental Impact Assessment (85/337/EEC) 1995 and amending Directive by (97/11/EC) 1997 and (2003/35/EC) 2003.

Nationwide legislation regarding the protection of cultural heritage sites comprises:

- National Monuments Act 1930, amended 1954, 1987, 1994 and 2004;
- Heritage Act 1995;
- Draft Guidelines for Landscape and Landscape Assessment, Department of Environment & Local Government (2000)
- A National Landscape Strategy for Ireland – Strategy Issue Consultation, Department of Arts, Heritage and the Gaeltacht (2011)
- Architectural Heritage (National Inventory) and Historic Monuments (Miscellaneous Provisions) Act 1999; and
- Planning and Development Acts 2000 - 2014

The following standards and guidelines were also consulted as part of this assessment:

- Guidance on the preparation of the EIA Report, 2017 European Commission.
- Guidelines on the information to be contained in Environmental Impact Assessment Reports (Draft) (August 2017), Environmental Protection Agency;
- Advice notes on current practice in the preparation of Environmental Impact Statements (2003), Environmental Protection Agency;
- Guidelines for the Assessment of Architectural Heritage Impacts of National Roads Schemes (2005), National Roads Authority.
- Architectural Heritage Protection Guidelines for Planning Authorities (2011), Department of Arts, Heritage and the Gaeltacht.

- Historic Landscape Characterisation in Ireland: Best Practice Guidance (2016), The Heritage Council.

Impact Assessment Criteria

The impact assessment undertaken in this chapter is based on the methodologies presented in the Guidelines on the information contained in Environmental Impact Assessment Reports (EPA, Draft August 2017), and detailed in Chapter 1.0 Introduction of this EIAR.

13.2.2 Field Inspection

After completion of the desktop study, a dedicated site visit was undertaken in March 2019 with a view to reviewing the extent of the surviving built and landscaped heritage sites and features as identified in Phase One. The findings of this exercise are set out in Sections 13.3.7 to 13.3.9.

13.3 RECEIVING ENVIRONMENT

13.3.1 Site Area Description

The development is more fully described in Chapter 2.0 of this EIAR, and includes plans, drawings and other supporting documentation, which should be read in full alongside this chapter.

The receiving environment comprises a proposed development site of roughly 9.69ha, located approximately 775m south of the village of Shankill, in the townland of Shanganagh, and 885m from the Irish Sea. The area forms part of the historic Shanganagh Castle Demesne, and is entered from the Dublin Road via a twentieth century gateway to the south-west. The approaching avenue turns immediately to the north to approach a c.1925 gate lodge before veering east and following part of the historic entry drive. The castle sits roughly 410m from the Dublin Road and is located approximately 50m east of the development site boundary. The fields immediately to the south and east of the castle have been developed as recreational areas within Shanganagh Park. The former stable buildings and support areas of the estate to the north of the castle were razed and redeveloped in the late-twentieth century to allow development of the Castle Farm housing estate. A modern belt of trees separates the castle from the development site. Some historic site features including paths, woodlands, monuments, ponds and other amenities remain legible within the estate. The castle served more recently as a juvenile prison but has lain vacant since 2002. The development site contains a depot run by the local authority, as well as agricultural allotments, now disused, and some recreational spaces.

The proposed residential development will comprise 597 no. residential units, contained within buildings ranging from two to six storeys in height (with a seventh storey set back on one block), some in blocks, terraces and detached, of variable configuration, and with the castle forming a *vista terminus* to a central processional avenue within the development.

13.3.2 Sites & Monuments Record and Record of Monuments and Places

There are 2 no. sites included on the Record of Monuments and Places that also contain substantial architectural fabric within an approximate 300m radius of the principle development site boundary constituting the area in the foreground of Shanganagh Castle. This includes the medieval fabric of the pre-1700 dwelling(s) incorporated within the extant structure of Shanganagh Castle. The castle is the

only structure to also be recorded by both the NIAH and to be a Protected Structure. The other RMP site relevant to this chapter is Kiltuc Church, which is located within the former demesne and now part of the Castle Farm development to the north of the subject site. Though neither are discernible from within the development boundary due to the presence of the modern development or incorporation into the later castle structure, this does not preclude potential direct or indirect impacts on same.

The history, significance and location of these sites will be set out more fully in Section 13.3.5, where relevant. There are other RMP sites within relative proximity of the development, which can be found in Chapter 12.0 Archaeology & Cultural Heritage.

Number on Map 13A	RMP / SMR no.	Classification	ITM Co-ordinates (E, N)	NIAH No.	RPS No.	Townland	Distance to Site (m)
1	DU026-120	Castle	725603, 721202	60260146	1845	Shanganagh	50
2	DU026-054001	Church	725266, 7211184	-	-	Shanganagh	90

Table 13.1: Architectural SMR / RMP Sites within 300m of Development Boundary



Figure 13.1: Map 13A Record of Monuments & Places sites within 300m of Development Site (outlined in red). Refer to Figure 12.2 of Chapter 12: Archaeology & Cultural Heritage.

13.3.3 Dún Laoghaire-Rathdown Protected Structures

There are 6 no. Protected Structures within an approximate 300m radius of the principle development site boundary constituting the area in the foreground of Shanganagh Castle. The c.1925 gate lodge,

anganagh Castle and Crinken Cottage (nos. 1-3 in Table 13.2) have direct historic links to the site, whilst the remaining structures are a former parochial hall, house and milestone dating the nineteenth century are not associated with the demesne. These latter three structures are located at least 225m to the south of the site. It should be noted that the gate lodge is given the same RPS reference as Shanganagh Castle, owing to its location within the curtilage of the castle, but it is also given its own listing on the RPS.

The history, significance and location of these sites will be set out more fully in Section 13.3.5, if / where relevant.

Number on Map 13B	RPS no.	Classification	Irish National Grid (E,N)	NIAH No.	RMP / SMR No.	Townland	Distance to Site (m)
1	1845	Country house	725604, 721195	60260146	DU026- 120	Shanganagh	50
2	1845	Gate lodge	725238, 720975	60260148	-	Shanganagh	10
3	1850	Cottage	725604, 721195	60260145	-	Shanganagh	25
4	1860	House	725388, 720596	60260170	-	Aske	236
5	1858	Railings, gates and granite milestone	725462, 720617	60260172	-	Aske	248
6	1858	Former church	725441, 720634	60260173	-	Aske	225

Table 13.2: Dún Laoghaire-Rathdown Protected Structures within 300m of Development Boundary



Figure. 13.2: Map 13B Record of Protected Structure sites within 300m of Development Site (outlined in red)

13.3.4 National Inventory of Architectural Heritage Sites

The NIAH recorded 13 no. sites within an approximate 300m radius of the principle development site boundary constituting the area in the foreground of Shanganagh Castle. All of the Protected Structures listed in Table 13.2 formed part of the survey. One further structure, a monument erected by Sir and Lady Cockburn (ref. 60260147) is located within the development site. The additional 6 no. structures are all located at least 140m away (approximately) from the site boundary, with the exception of some gate piers (ref. 60250151) which are located across the Dublin Road from the site.

The history, significance and location of these sites will be set out more fully in Section 13.3.5, where relevant.

Number on Map 13C	NIAH no.	Classification	ITM Co-ordinates (E,N)	RPS No.	RMP / SMR No.	Townland	Distance to Site (m)
1	60260145	Cottage	725604, 721195	1850	-	Shanganagh	25
2	60260146	Country house	725604, 721195	1845	DU026-120	Shanganagh	50
3	60260147	Monument	725591, 721049	-	-	Shanganagh	Within
4	60260148	Gate lodge	725238, 720975	1845	-	Shanganagh	10
5	60260149	Gates	725456, 720692	-	-	Cork Little	181
6	60260150	House	725005, 720897	-	-	Shanganagh	230
7	60260151	Gates	725198, 721001	-	-	Shanganagh	40
8	60260152	Gate lodge	725199, 721235	-	-	Shankill	143
9	60260153	Gates	725194, 721225	-	-	Shankill	139
10	60260170	House	725388, 720596	1860	-	Aske	236
11	60260172	Railings, gates and granite milestone	725462, 720617	1858	-	Aske	248
12	60260173	Former church	725441, 720634	1858	-	Aske	225
13	60260175	Gate lodge	725408, 720690	-	-	Aske	156

Table 13.3: National Inventory of Architectural Heritage Sites within 300m of Development Boundary



Figure 13.4 Map 13C: NIAH sites within 300m of Development Site (outlined in red)

13.3.5 Protected Views and Vistas

The Woodbrook-Shanganagh Local Area Plan 2017-2023 is a subsidiary document to the Dún Laoghaire-Rathdown County Development Plan 2016-2022. Both documents require the protection of significant, identified views and vistas (CDP Policy LBH6). Map 13D of this chapter is taken from the LAP, Section 3.6 relating to Open Space, Recreation and Green Infrastructure. Three views are identified on the map as being worthy of protection (of which only three are identified with arrows given the prolific nature of the third view):

- 1) Views west towards Carrickgollogan and the lead mines chimney (Long Distance View / Preserved Prospect in CPD- County Development Plan)
- 2) View towards Shanganagh Castle & Lodge (Local Views / Vistas)
- 3) Views of Shanganagh Castle from within the Castle Lands and Park (Local Views / Vistas)



Figure. 13.5 Map 13D: Protected Views and Vistas as per Woodbrook-Shanganagh Local Area Plan. To be read in conjunction with Section 13.3.5. The red line seen in this map denotes the extent of the LAP boundary. Note that this image is an incomplete view of the LAP boundary.

13.3.6 Trees & Woodlands to be Retained

Map 14 of the Dún Laoghaire-Rathdown County Development Plan 2016-2022 indicates that there are four areas within the red line development boundary for which there is an objective “to preserve and protect trees and woodlands.” These areas are noted in Map 13E of this chapter and are signified by a tree canopy icon. These include:

- 1) the copse of trees to the north-east of the gate lodge
- 2) tree no. 616 of the Arborist's Report (a mature Scots Pine likely seen on the 1837 OS map)
- 3) the trees associated with the Ornamental Pond (no tree tag no. is given due to inaccessibility)
- 4) the woodland south-west of the castle



Figure 13.6 EIAR Map 13E: Trees and woodlands to be protected as per Map 14 of the Dún Laoghaire-Rathdown County Development Plan 2016-2022, as adopted in Map 3 of the Woodbrook-Shanganagh Local Area Plan 2017-2023.

13.3.7 Landscape Character Area

Policy LBH2 of the CDP requires the preservation and enhancement of the character of the county's landscapes in accordance with the recommended strategies as originally outlined in the Landscape Character Assessment. Shanganagh is listed as Landscape Character Area No. 12. The enclosure is defined as "essentially the area between Shankill and Bray which takes in the cemetery at Shanganagh, Shanganagh Park and Woodbrook gold course. This enclosure also includes the land to the west between the Dublin Road and the N11. The Dublin Road from Shankill to Bray traverses this enclosure. Big houses include The Aske, Beauchamp, Wilford, Woodbrook and Shanganagh House. When viewed from Killiney Hill and also from Carrickgollogan this area belt is effectively indistinguishable from the overall plain. The entire expanse appears to be dominated by low-density housing. When viewed from the Dublin Road, the trees prevent any sense of a vista but instead provide for a tree lined Avenue."

13.3.8 Historical Background & Cartographic Records

Late-Medieval Period

In the sixteenth century, the area was in control of three major families, the Walshes, Aspolls and Harrolds (Civil Survey, xxxv). The county boundary between Dublin and Wicklow was established in 1306, thus separating the Barony of Rathdown into two. John Walsh, an Irish Papist (Roman Catholic) held a castle at Shanganagh at the time of the 1654 Civil Survey, comprising 400 acres including 10 acres of meadows and 10 of pasture. The Barnewells were related by marriage and held over 830 adjoining acres.

The Walsh family was dispossessed of their lands after the Cromwellian wars, though many exiles were rejoined with their possessions on the restoration of King Charles II. Walsh may have indeed been one such person, prior to his death c.1670. More information on the medieval history of the development

location and the surrounding area, including evidence of previous structures and sites, is contained within Chapter 12.0: Archaeology & Cultural Heritage of this EIAR.

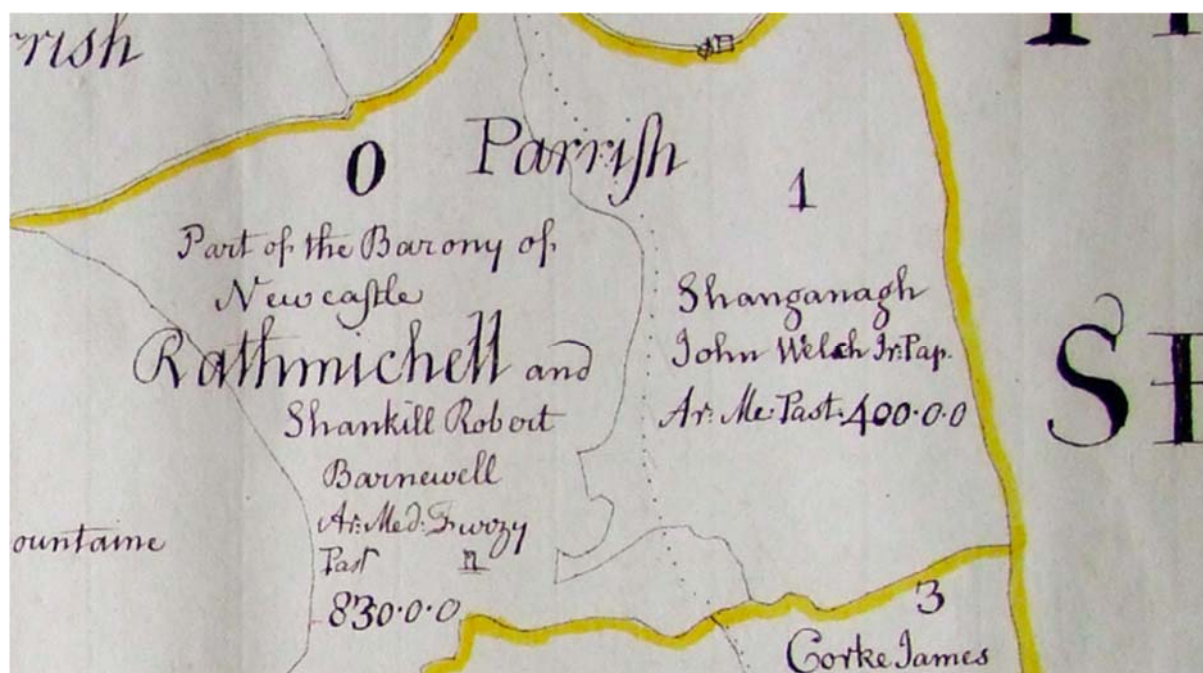


Figure 13.7: The Down Survey of c.1355 indicates that John Walsh was in possession of over 400 acres in Shanganagh, which undoubtedly included the lands of the subject demesne. For further information, refer to Chapter 12: Archaeology & Cultural Heritage.

Eighteenth Century

There appeared to be no building on site at the time of John Rocque's survey of County Dublin in 1760 (figure 13.8). However, John Taylor and Andrew Skinner's "Map of the Roads of Ireland" in 1777 (figure 13.9) depicts the agricultural lands of these outlying areas between Killiney and Bray. "Part of this land had been leased to Joseph Kathrens in 1759, whose widow completed the house he had started and, in 1769, sold her interested to George Roth who named the house Fairview. The house was subsequently let to a succession of tenants, the name of one of them, (Sydenham) Snow" (Meredith, 128). At Crinken, which is known to be adjacent to the development site, a house is shown on Taylor and Skinner's map as set off of the Dublin Road to the east and occupied by a Snow, Esq. Therefore, though not titled Shanganagh Castle, the early, double bow-ended house that would later take up this name appears to have been constructed c.1769 and is diagrammatically depicted on the Maps of the Roads of Ireland. In this period the hinterland of South County Dublin was a sylvan landscape and a bastion of large, landed estates with principal country houses dotted around the countryside. Some of these included Old Connaught, Shankill, Little Cork, Loughlinstown and others in addition to Shanganagh Castle. Woodbrook House was also located to the south of the Shanganagh demesne.¹

Sir George Cockburn is the castle's most notable resident and first leased the lands upon which the Georgian property stood c.1780. He later purchased the land in three lots between 1800 and 1801 (Meredith, 128; Pearson, 157). Improvements had begun in the last two decades of the eighteenth

¹ Some sources alternatively suggest that the Roberts family owned and developed the lands at Shanganagh Castle in the 18th century. Further research is required; however, all indications are that the original core of the existing house were constructed c.1760.

century, after which Cockburn would engage the services of one of Ireland's most celebrated Gothic Revival architects to bring his vision to fruition.

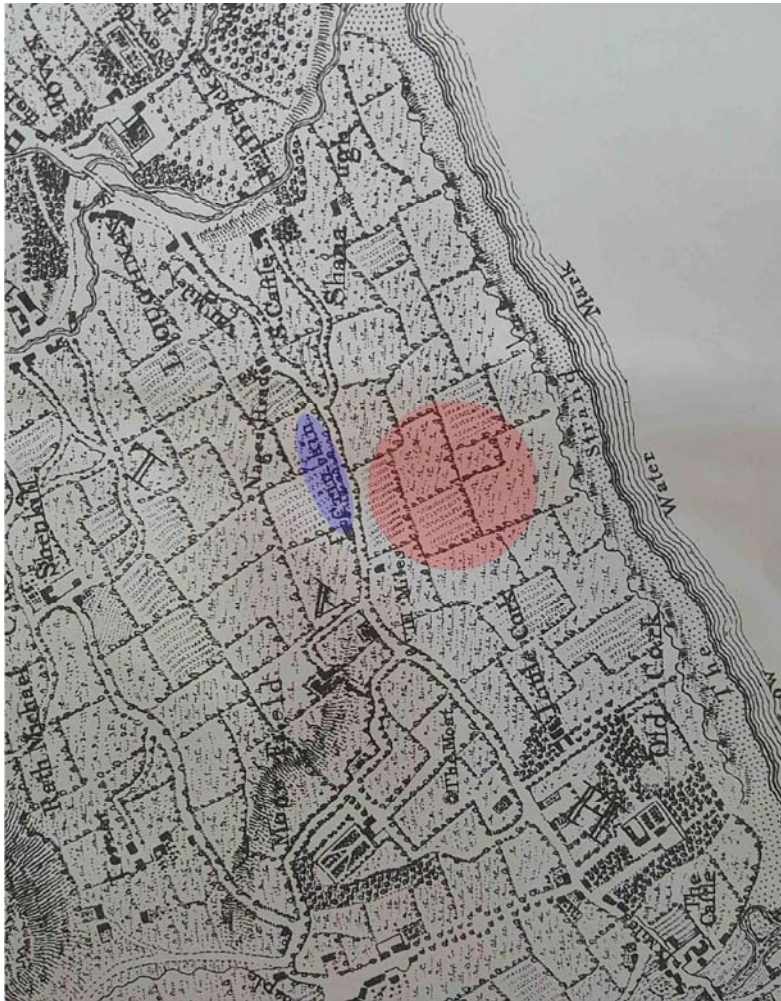


Figure 13.8: Rocque's Survey of the County of Dublin in 1760 shows the place-name Crimken, which is located immediately adjacent to the development site and is depicted here in blue. The extrapolated, approximate location of the development site is shown in red. Despite references to "S Castle" and "Shanagh Castle" farther to the north near the Loughinstown River, there appears to be no building on site of the subject development, though later records suggest that a ruinous building was present.



Figure 13.9: Taylor and Skinner's map of 1777 is shown oriented south to north (west is located to the righthand side, above, and east is on the lefthand side). As with Rocque's map of 17 years previous, Shanaugh Castle is depicted as located just south of Loughlinstown. A Snow, Esq. is located at Crinkin, which, according to secondary research resources and comparison with Duncan's map of 1821, appears to be the original, double bow-ended house contained within the present-day Shanganagh Castle.

Nineteenth Century

An initial construction date from the mid-eighteenth century would coincide with the relative peace enjoyed by the countryside at that time, and its popularity as a place of sylvan respite. The considerable development noted between Taylor & Skinner's exercises of 1777 and John Taylor's map of 1816 (alongside William Duncan's work of 1821) depicts a number of other country houses in the area that sprang up at the same time that Cockburn put his plans in motion, including Woodbrook House, Mount Edden, Springfield, Woodlawn House and others.

Other than the diagrammatic view of the 1777 survey, Taylor's map is the first to depict the modern-day Shanganagh Castle with both its name and extensions by RichardM Morrison intact (see below). Set to the south-east of the ruins of Kiltuc Church, the house is shown as being set back from the road, with tree-lined approaches from two gate lodges to the south and north leading directly to the house and to the stable complex to the north, respectively.

Born in Dublin in 1763 to a Scottish immigrant of the same name, Cockburn enlisted in the British army in 1781 and quickly rose through the ranks, eventually becoming a Major General (Astbury, 1). He was

renowned for his bravery during the Napoleonic Wars, and was an avid antiquarian. As his military assignments took him to foreign shores throughout Europe, he “assembled an impressive collection of antiquities, sculpture, painting and armoury” (Pearson, 157). It included “tables of Mosaic and of Egyptian granite and numerous volcanic specimens from Mounts Vesuvius and Aetna” (Rowan, 130).



Figure 13.10: John Taylor’s map of 1816 is the first to depict “Shangannon” Castle, which by then had been considerably altered and updated by Sir Richard Morrison.

Such a collection was one reason behind Cockburn’s decision to engage Sir Richard Morrison to extend the house. The “bottle letter,” a letter that Cockburn wrote during refurbishment works in 1818 and concealed in a bottle within a tower wall for later patrons to find, set out, in addition to his political and religious views, the works being undertaken. This included the construction of a dedicated picture gallery to display the many acquisitions from his travels.

Morrison remains one of the most celebrated and accomplished of Irish architects, which shall be further discussed. He remodelled the existing house in the Georgian Gothick idiom of the day, adding “a profusion of battlement and turrets,” with the end result confining “to the outward portion of the building all allusions to the gorgeous but rude manners of times long past while adapting the interior to the habits of refined life – to the customs of society intent on intellectual pleasure as well as hospitable entertainment... By the time the work was finished, the original house would hardly have been recognisable” (Meredith, 128). “On the east-facing entrance front a three-storey octagonal tower was built between two-storey bows. The garden front, a plain bow-ended classical block, was given a slender tower and turret in the centre, and the sash windows were embellished with hood moulds. A new wing on the north accommodation a sculpture gallery.” Furthermore, he “resolved the problem of retaining so much of the existing building, including a difference in floor level between the entrance and front gardens, by an ingenious, though not always felicitous, arrangement of apsidal rooms, interlocking bows and columnar divisions” (Rowan, 159).



Figure 13.11: Fernando Cavalleri's portrait of George Cockburn

That Morrison, renowned for his works on some of Ireland's most notable country houses including Ballyfin and Fota, undertook these additions in the aforementioned manner is not unusual given this particular period in his career. The Act of Union in 1800 had diminished the need for new Dublin townhouses, and the importance of the grand country house as a family seat was thereby elevated. The aforementioned growth in the villas constructed in the vicinity of Shanganagh and Shankill in the first decades of the nineteenth century exemplifies the point. Morrisons' career began in designing Classical edifices in the late-eighteenth century, but undoubtedly his work was influenced by the renowned Gothic architect, James Wyatt, who was prolific from the 1770s. Wyatt's work seems to have informed Morrison's careful interpretation of the "farm house," a typology well-established by the mid-eighteenth century. Most of Morrison's Gothic works as well as his Picturesque machinations were carried out in the 1810s and 1820s, alongside his son, William, who was born in 1794, making his utilisation of both at Shanganagh Castle as early as 1802 of critical importance (Rowan, 6-7). Alistair Rowan notably observed,

"His earliest known Gothic scheme is an alternative design for Castlegar, produced in 1801, while the first to be executed was probably Shanganagh Castle... Like Shanganagh, most of his Gothic buildings contain classical rooms; indeed most of his Gothic buildings were remodellings of existing classical houses. The theoretical excuse for a mixture of styles – Gothic with classical, or castle with abbey, or abbey with Tudor mansion – was the idea that a building should express the fact (or the fiction) that it had developed over different periods, an idea which came to be seen as a hallmark of the Morrisons' work" (Rowan, 8).

Morrison's work at Shanganagh therefore embodies the spirit of much of his other work throughout the country, combining both Gothic and Classical overtures with great aplomb. It is a testament to the work yielded by great Irish architects and their learned patrons.

Duncan's map of 1821 was completed after Morrison's works were finalised. By that time, the historic northern drive that terminated in front of the castle was noted. A small structure is seen to the south of the castle at a right angle, whilst the two quadrangular blocks of the stable yard are more clearly captured. The demesne is labelled, though its extent is less defined than would appear on the first Ordnance Survey map. The field boundaries had been regularised and streamlined since the time of Rocque's survey, indicating both intervention in and concern with the landscape. The cluster of woodlands to the south-west of the site was also indicated as a feature of the landscape at this time.

Samuel Lewis in his *Topographical Dictionary of Ireland* (1837) describes the parish of Rathmichael as having “good soil, the system of agriculture improved. Country houses such as Beauchamp (NIAH Ref. 60260138) built c.1800 for Sir William Stamer, erstwhile Lord Mayor of Dublin, with its ancillary gate lodge (NIAH Ref. 60260139) represent the last of the demesne developments in the area. Shanganagh Castle (NIAH Ref. 60260146) was described as a “spacious and handsome castellated mansion... the interior contains many elegant apartments, an extensive and well-selected library, a fine collection of paintings by the best masters, a variety of marbles, antique casts, and bronzes...the views from the house are very rich and finely diversified...and the grounds are ornamented with a variety of statuary tastefully disposed.”

Here it should be noted that the timing of Cockburn’s interventions into the estate coincided with an important era of landscape design aesthetic in Ireland. Fionnuala O’Kane astutely notes in her publication on the Picturesque movement in Ireland that:

“By the last few decades of the eighteenth century... most men were introduced to the pleasures [of tourism] by the traditional European grand tour that completed their education. The relatively new fashion for touring one’s own country contained an undercurrent of nationalism... Other factors also influenced the popularity of indigenous landscape. Edmund Burke’s seminal definition of the sublime and the beautiful encouraged many to seek out examples of their immediate environment... Books of views, and the theoretical publications of William Gilpin and others, taught people how to be tourists, and the correct appreciation of landscape scenes became at least as important as the scenes themselves” (O’Kane, 1).

The views of Thomas Roberts, James Malton and others who captured the inherent, and subtly designed, attributes of the natural and man-made environments embodied the Picturesque movement in their paintings. Thus, balance became a key feature of the Picturesque view, with a careful ratio to be achieved between the sky, sea, mountains and other natural features alongside the “artistic” or the carefully designed works of man. Ruins, as the epitome of interaction between man’s constructive efforts and forces of nature, became popular both in painting as well as in landscape design. For the latter, jagged and irregular lines affected a more pleasing aesthetic. Instead of smoothness, “the Picturesque eye would turn the lawn into a piece of broken ground” (O’Kane, 12-13). The interplay and conflict between the beautiful and the grotesque, the natural and the contrived, thus came to define the Picturesque in Ireland, as well as to challenge and confuse its very essence.

Cockburn was well educated and rather extensively travelled – and was aware of these cultural and artistic trends. Between Duncan’s survey and the first Ordnance Survey of c.1837, many other landscape and demesne features either arose on the Shanganagh Estate or were more accurately captured by surveyors. Most notable is the appearance of an ornamental pond with a planted island, located conspicuously between the castle and the road. Two gate lodges are depicted, providing dual means of access into the estate as previously noted; one arrived from the north adjacent to the present-day Claremount development. This drive moved southward and forked, with one lane sweeping eastward to access the stable yards. Otherwise, it continued south and took in views of the ruins of Kiltuc Church, with perspectives of the adjacent ornamental gardens and stable yards screened by strategic plantings. This lane broke through the planted treeline that separates the modern-day development site from the Castle Farm housing estate and intersected with the access lane on axis with the pond. The latter gate lodge was located north of the present-day entrance to the site; entering

via this entrance provided a sidelong view of the castle set within the centre of its impressive demesne, before turning north. As the lane bent east and south, it provided oblique views to the south-west giving pride of place to the irregularly-shaped ornamental pond, specimen trees, planted woodland and the impressive Wicklow landscape, with its jewel in the form of the sweeping peak of Sugarloaf Mountain in the distance. Crinken Cottage (NIAH ref. 60260145, RPS ref. 1850) had also been constructed by this time, most likely as a dedicated caretaker's cottage for the estate; that it seemed to enjoy immediate access to the approach drive underscores this supposition, along with its similar castellated battlements and Gothic overtures.

Dedicated paths led in undulating routes from the castle toward planted paths that took in the open fields of the demesne, and likewise lead toward the planted woodland where a monument (NIAH ref. 60260147) had been erected as a feature destination along the walk by the mid-nineteenth century. The treeline between the castle and the stableyard held a walking path that would provide a dedicated means of access to the Martello Tower along the coast. The demesne enjoyed plentiful walled gardens to the north, substantial support structures in the farmyard, large, open expanses, and views of the outlying landscape as well as intimate, enclosed walks designed to draw attention to specific features of the estate.

The bands of trees to the east were thinner and more dispersed than at present, providing largely unmitigated views from the castle toward the sea and to Bray Head. The site was, as it is today, cradled between Killiney Hill to the north, Carrickgollogan and the Dublin Mountains to the west, and the Sugarloaf and Wicklow Mountains to the south.

Though the ruins were not retained, Cockburn demonstrated an appreciation for the decaying beauty of his homestead by incorporating the stones of the previous tower house on site into the tower of his new edifice, and even relocated cannon shot discovered within the walls into the new structure at the same height. In effect, Shanganagh Demesne came to exemplify the application of the Picturesque in Ireland at the turn of the nineteenth century, with its Gothic flourishes playing a central role in its ancient, idyllic character, alongside polite, Classical amenity and informal ruggedness.

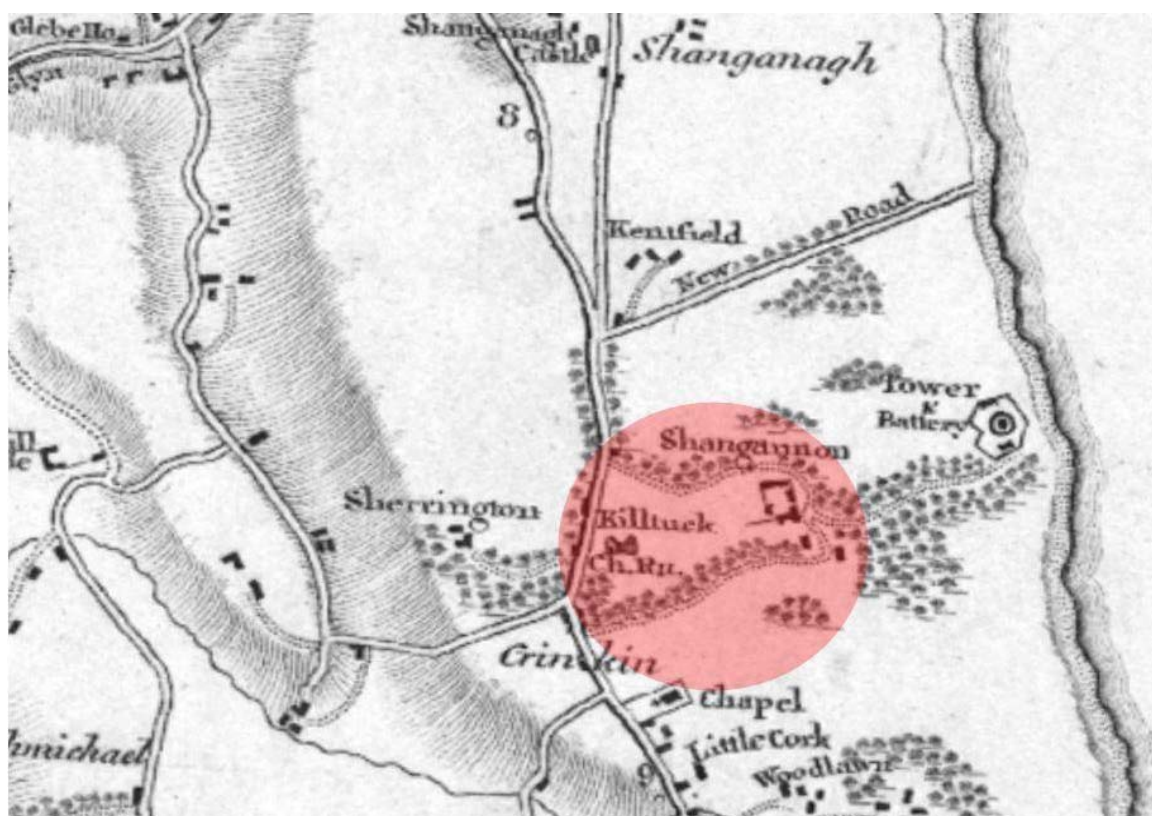


Figure 13.12: Duncan's survey of 1821 depicts Shanganagh Castle, then titled Shanganagh (the separate entities of Shanganagh and Shanganagh Castle farther to the north, near the Loughlinstown River, should be noted and aid in reading previous cartographic evidence). Cockburn had acquired the property at the end of the eighteenth century and completed refurbishments in the early decades of the nineteenth century, prior to Duncan's survey.

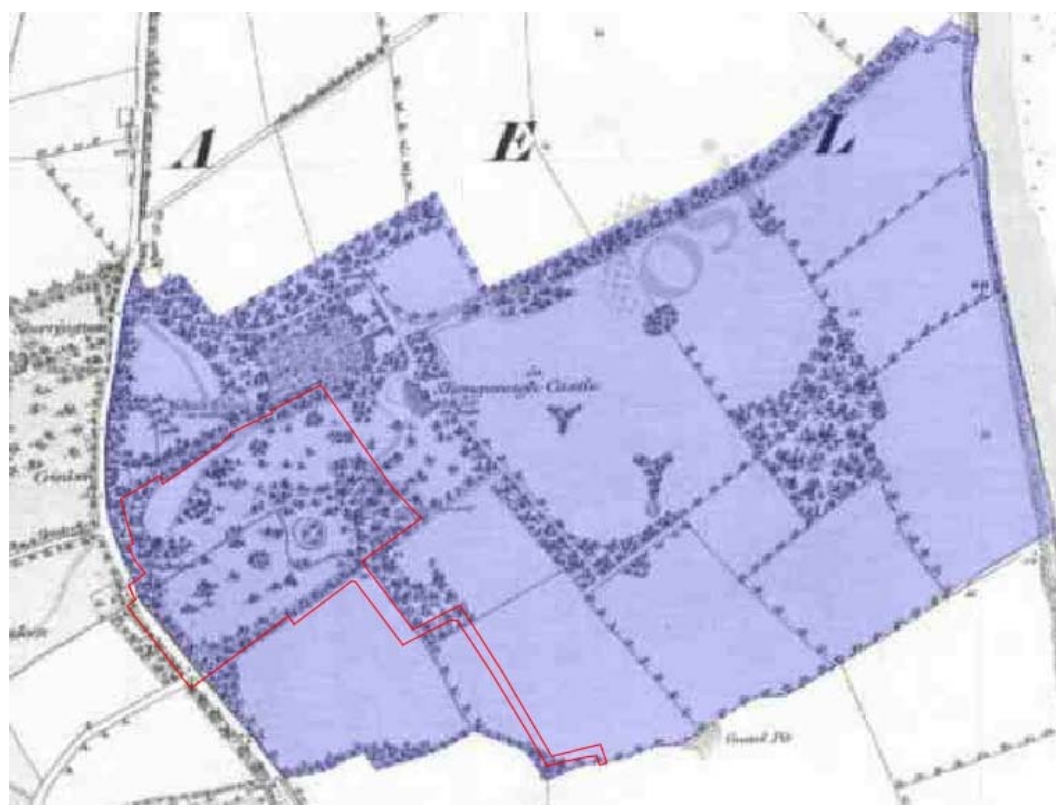


Figure 13.13: The 1837 Ordnance Survey is the first to capture in detail the designed, Picturesque setting of the estate, along with its principal structures and landscape features. The extent of the demesne is shown in blue, with the proposed development boundary outlined in red.



Figure 13.14: This rather romantic view of Shanganagh Castle was created by an unknown artist in 1857, and shows the building from the viewpoint of the planted woodland to the south-west. Courtesy of the Irish Architectural Archive.

By the time of the 1866 Ordnance Survey map, one notable addition was the erection of a monument in front of the house. This monument was formed of stacked Greek and Roman columns, relics collected by Cockburn on his travels, and were intended to commemorate the passing of the Great Reform Bill of 1832. This monument has since been removed by the descendants of later estate owners and its elements displayed at Sissinghurst Castle in Kent (Bence-Jones, 256). A statue was also added along one of the walking paths between the planted woodland and the road; these paths were more numerous by the mid-nineteenth century, which also took in the aforementioned monument in the woodland that was erected posthumously by Cockburn and his wife in 1852 (NIAH ref. 60260147; Cockburn passed at aged 83 in 1847). Crinken Cottage was then in use as Rathmichael Dispensary. Perhaps most notable on the map is the continued presence of particular specimen trees throughout the demesne, which were differentiated by intentional clumping, grouping and ordering. Some particular species were depicted as needle pines and others.

The construction of the Dublin, Wicklow and Wexford Railway in 1856 as well as the Harcourt Street line in 1859 caused a drastic change in the landscape of the demesne. These lines bisected the estate to the east of the castle. Levelling works along with the developments themselves severed the early relationship between the estate and the sea. Greater means of transport between South County Dublin and Dublin City also facilitated the development of Shankill, a small village just north of the castle, along with other small manor houses, thus causing a sharp departure in the isolated, sylvan character of Cockburn's former residence.

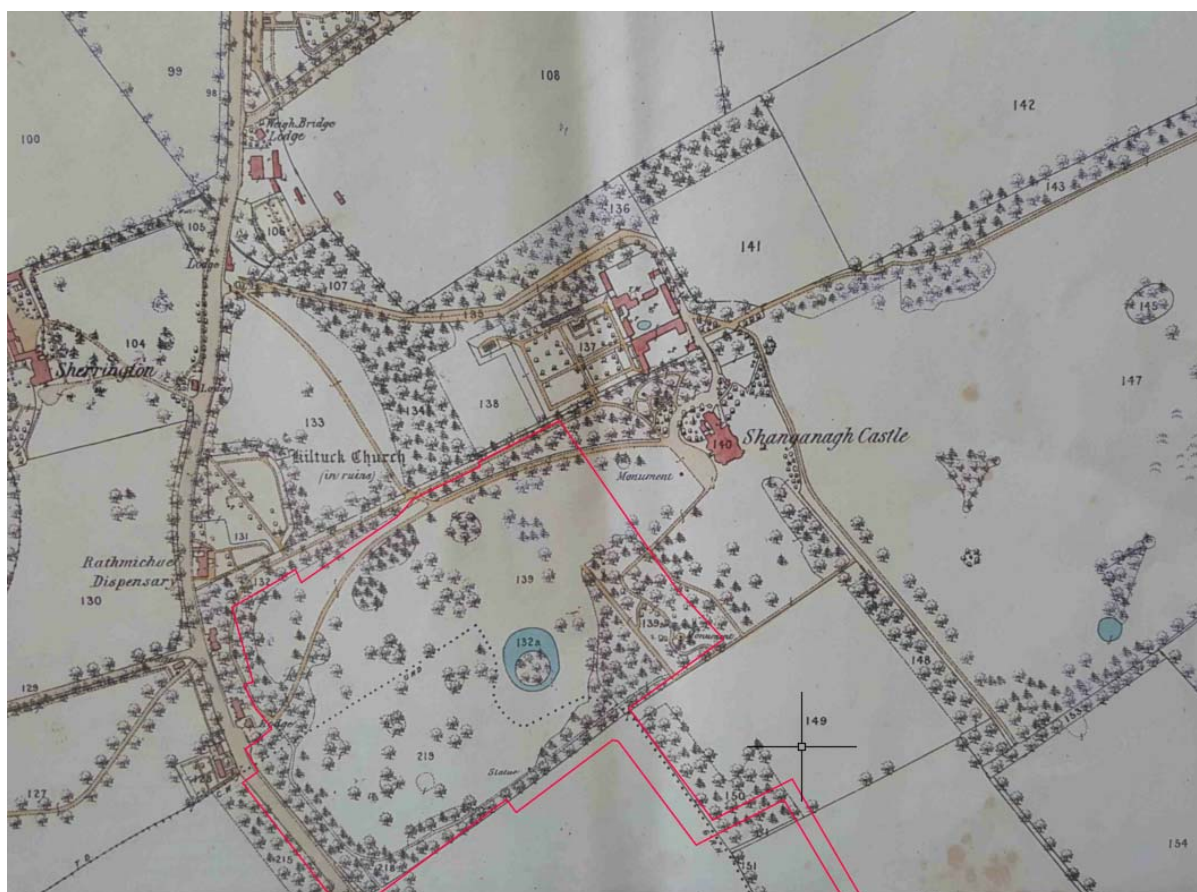


Figure 13.15: By the time of the 1866 Ordnance Survey, the detailed development of the Romantic landscape and the related, principal estate structures can be seen. To the east of the confines of the image above, the Dublin to Wicklow Railway cut through the estate and truncated the previously unfettered access to the sea. See Figure 13.16.

Twentieth Century & Modern Era

The depictions of site features within the 1908 Ordnance Survey map are rather inconsistent. Some elements, such as the particular plantings and route of the walking paths, remain intact. Other, previous features that are known to remain today are not picked up by the survey, thus confusing some of the development of the estate. The ornamental gardens are no longer shown, but whether they survived until this date is now uncertain. Furthermore, the gates that accessed Crinken House to the west were known to have been constructed around the 1870s, but they are not depicted on the map (NIAH ref. 60260151).

After Cockburn's death in 1847, the estate passed to Commander G.W.R. Rowan-Hamilton via marriage to Cockburn's daughter, Catherine. Rowan-Hamilton was at one time the High Sheriff of County Down. The estate passed out of the hands of the family in 1919 and Cockburn's extensive collection of ancient relics and *objets d'art* were sold at auction. The breakup of such historic demesnes was common at the end of World War I, as changing socio-economic circumstances made the upkeep of the estates difficult for many.

The most notable alteration to the estate just after the sale to Wentworth and Suzanna Allen was the demolition of the southern gate lodge and the construction of a new one c.1925, as seen on the 1938 Ordnance Survey map. The lodge was designed by architect Ralph Henry Byrne, and was executed in a design that pleasingly combined the Arts and Crafts movement with a Gothic Revival display that was

both of its time as well as commensurate with the overarching character of the established estate (NIAH ref. 60260148, RPS ref. 1845).

By this time, the northernmost stable buildings had been demolished, but additional conservatories had also been constructed. The northern gate lodge remained, and Crinken Cottage had been returned to residential use. A small cottage was by then constructed south-east of the castle, within the estate grounds. Many of the outlying plantings appeared thinner by this time, though the most salient and strategic ornamental features in the immediate vicinity of the castle remained. If the statue near the road survived at that time, it was not shown on the map.

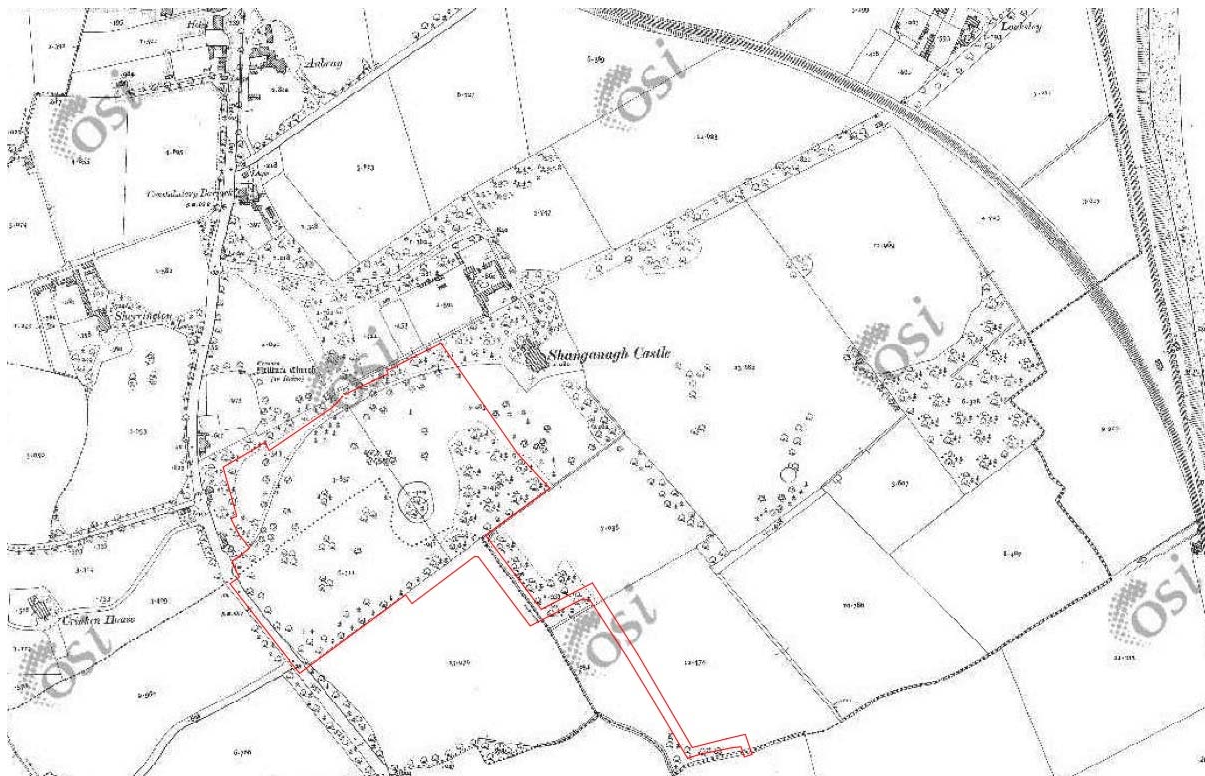


Figure 13.13: The 1908 Ordnance Survey map picked up the minor alterations to the stable complex, though little other interventions are noted. The railways connecting Dublin and Wicklow were constructed in the 1850s and notably bisected the demesne to the east of the castle. Their construction brought greater settlement and residential development to the area.

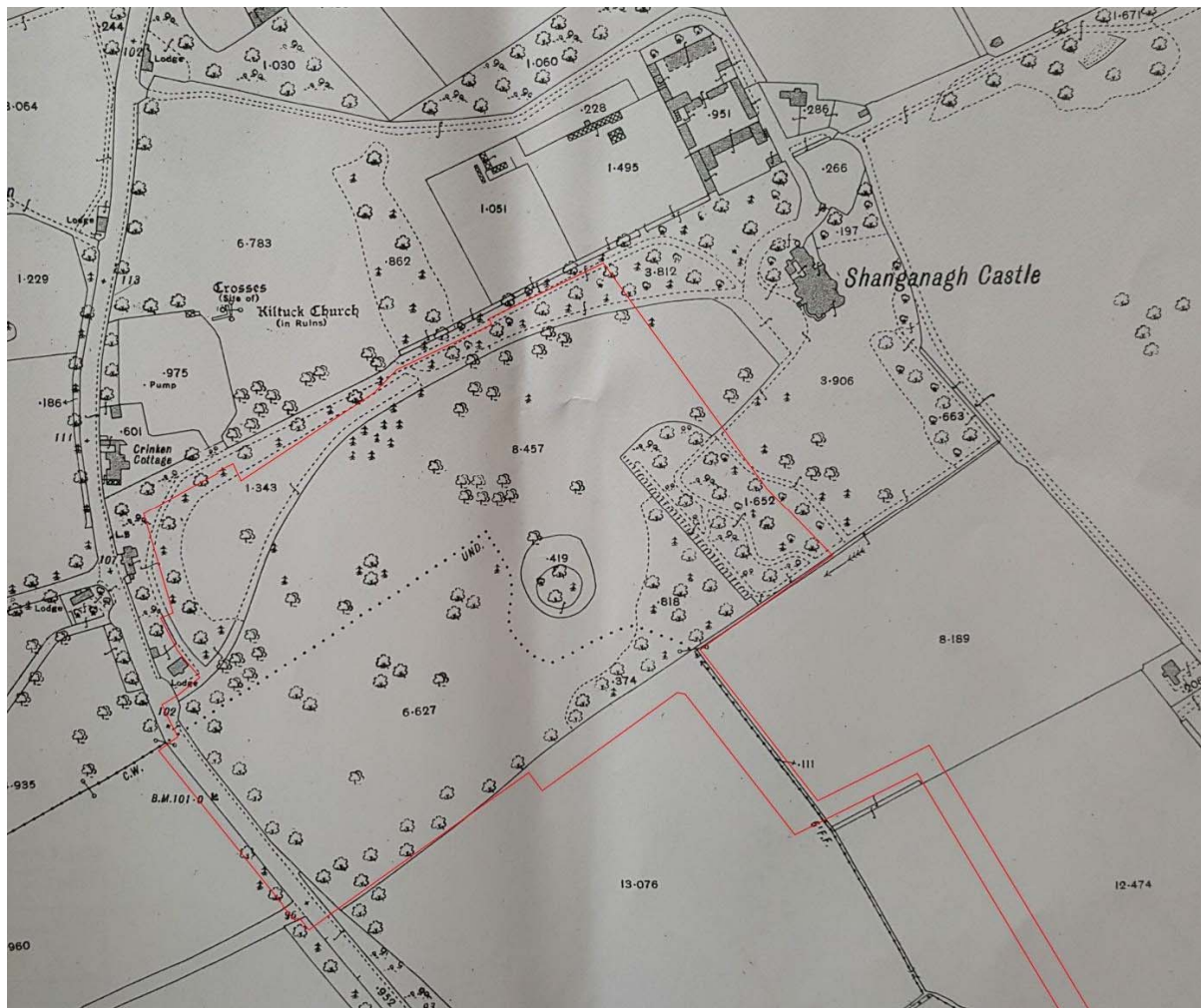


Figure 13.17: Before the 1938 Ordnance Survey the estate had been sold to the Allen family who demolished the original gate lodge and constructed a new one to the designs of Ralph Henry Byrne. Note the thinning along the south-western edge of the woodland located to the east of the ornamental pond.

The Allen family owned the building until c.1936 when it was sold to the State. In the 1950s, the castle was rather unflatteringly extended for the College of Education, with a four-storey block being constructed immediately to the north. This extension is seen on the 1968 Ordnance Survey map, along with a single-storey block with an arcaded front that was set away from the castle, due south. The stable yard still survived at that time. Although some of the ornamental plantings and trees appear to survive from that time period, the inclusion of these features in the survey appears to have been incomplete.

From 1969 until c.2002, the property was converted to use as a juvenile prison, which had a deleterious impact on the interior and exterior of the castle. The sculpture gallery was dismantled, and some of its turrets and other key roofline elements were removed (Rowan, 130). A substantial block was built to the east of the previous extension, forming an L-shape with the castle, but it was of poor-quality construction and design. Most drastic was the realignment of the entrance to the estate to the south, via a new Gothic-style gateway, which appears to have coincided with the leasing of the 1925 gate lodge as a private residence. The former gateway that stood adjacent to the lodge was likewise blocked up and the boundary wall was rebuilt along the Dublin Road. Further contributing to the altered character of the estate was the demolition of the stable yard in favour of the development of these fields and enclosures as the Castle Farm housing estate.

The adjoining fields to the south and east were developed as Shanganagh Park from 1982, containing football pitches and paved paths for walking. The current red line development boundary contains land purchased by Dun Laoghaire–Rathdown County Council in 2016. A depot was constructed to the south of the planted woodland. Some of the grounds immediately to the north of the ornamental pond were also converted to use as public allotments for gardening, which have since been discontinued. A number of surviving trees and copses noted in the 1938 Ordnance Survey map were also removed. The grounds between the gate lodge and allotments were for a time used as a football pitch, whose use is now defunct. During the construction of the M50, ground spoil was spread over areas of the subject development site, as noted in the geophysical testing and archaeological test trenches whereby a depth of made ground was noted at the surface. This diluted the extent of the Picturesque undulations of the site grading. Despite this, a seemingly historic and gradual fall of the landscape toward the Ornamental Pond remains and it does not appear to have been heavily built up around its banks. The historic drive does also not appear to have been significantly altered regarding its grading. The principal, open nature of the subject development site largely remains.

To the north of Crinken Cottage and behind the Kiltuck Church ruins, a small commercial development was constructed, most likely to serve the Castle Farm development.

On the west side of the Dublin Road between Crinken and Shankill is a series of housing estates and commercial buildings, however, much of the area to the south retains historic field boundaries and some small heritage buildings as well as small-scale housing development such as Woodbrook Downs. On the eastern side of the road and to the south of the historic demesne boundary is the former Woodbrook estate. The country house remains, but part of its demesne has been developed. The Woodbrook Golf Club has been developed to the east, along the coast. To the south, the former Cork Abbey demesne has been developed as a housing estate; the country house has not survived.

Shanganagh Castle is now in separate ownership and does not form part of the development site nor the lands currently within the control of Dún Laoghaire-Rathdown County Council. However, the LAP contains integral objectives for its adaptive re-use as a community facility. Notwithstanding that ownership of the castle has not yet been transferred to Dún Laoghaire-Rathdown County Council (but it is anticipated to be in the near future as part of a land-swap necessary to facilitate the development of residential units at Woodbrook – see Chapter 17.0 for further details) a multi-disciplinary steering group has been assembled to manage the integration and refurbishment of the Shanganagh Castle and building. Currently the team is gathering site / building analysis information and is developing a strategy of reuse and integration for the Castle and its building that accords with the objectives of the Local Area Plan in the context of the wider community, the proposed Shanganagh residential development and the surrounding high amenity park lands.

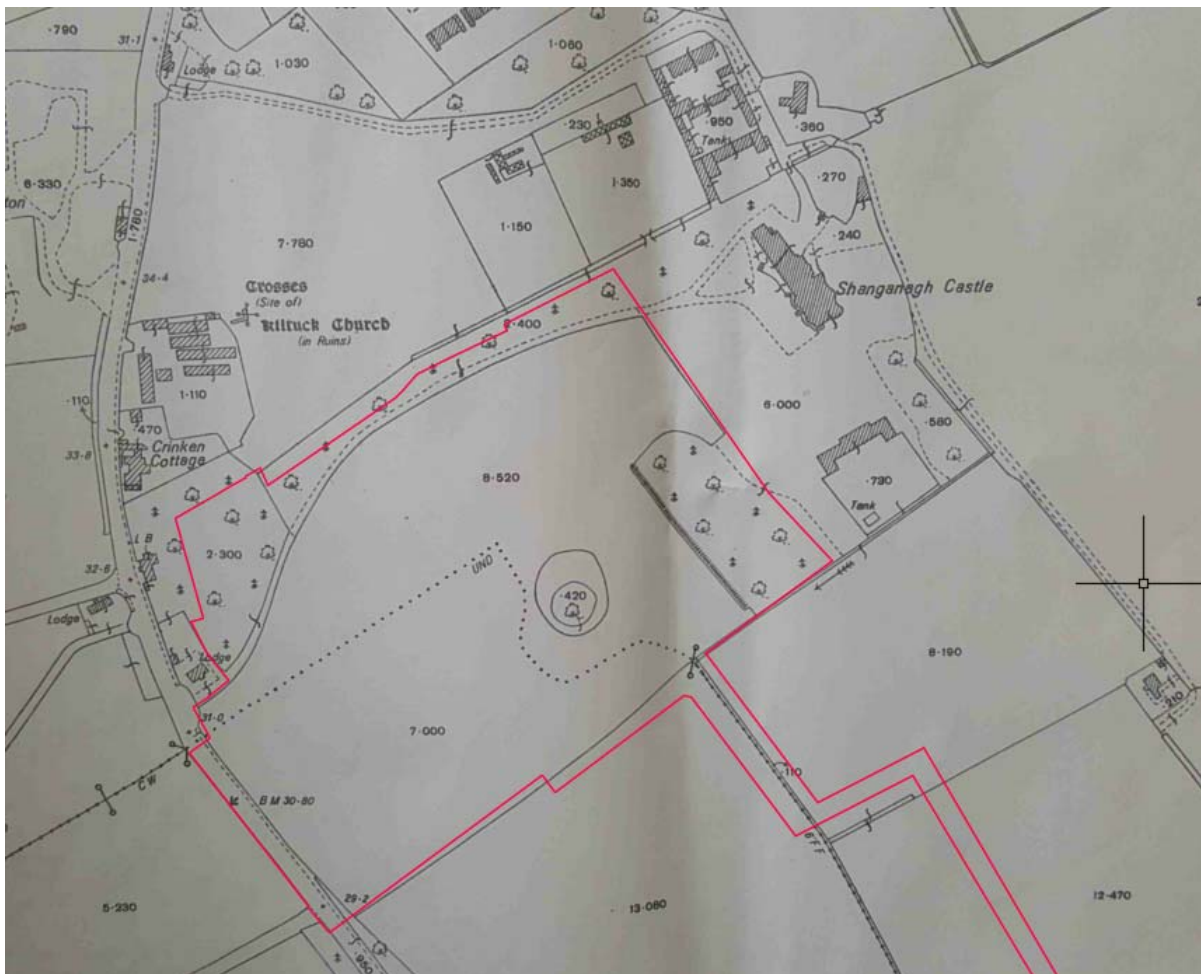


Figure 13.18: The first of the extensions to Shanganagh Castle was noted in the 1968 Ordnance Survey. Subsequent to this the castle was converted to use as a juvenile prison, and another block was added. The stable yard was also demolished in favour of the Castle Farm housing estate, and the northern gate lodge was also razed.

13.3.7 Field Inspection – General Overview

A field inspection was completed in March 2019 to undertake an inventory of the surviving historic features, structures and vistas identified by the desktop study, and to assess their condition insofar as they contribute to the setting or heritage of the area. As no direct development proposals relate to the fabric of the identified, salient historic structures themselves, interior access was not sought.

The development site and indeed the whole of the Shanganagh Demesne is set roughly on a SW-NE axis. The entrance to the demesne is within a modern rubble granite boundary wall to the eastern side of the Dublin Road. The recent castellated gateway is not located at the historic entrance to the demesne, but rather approximately 150m to the south-east. Upon entering the site the driveway turns sharply to the north-west, where it again turns north-east at the c.1925 gate lodge to joint with the historic entry route first seen on the c.1837 Ordnance Survey map (Figure 13.10). To the north, the Castle Farm housing estate is seen at close proximity across the granite boundary wall which roughly follows the line of the driveway and forms the northern development boundary. None of the stable buildings survive, as they were razed to facilitate the development. The ruins of Kiltuc Church are located to the south-west of the Castle Farm development.

To the south of the development boundary is an open GAA pitch, to the north of which is the ornamental pond. Between the drive and the pond are a series of public gardening allotments, now disused. A depot

owned by the local authority is set to the south-east of the pond. The planted woodland survives to the east of the pond, on the other side of the depot. Whilst much of the area between the castle and the Dublin Road is open, dottings of trees, shrubs and other plants are interspersed, including flanking the driveway to the north.

An opening in a screen of trees (which forms the eastern development boundary) and through which the driveway proceeds provides access into the area immediately in the context of Shanganagh Castle. The area to the front is paved in tarmacadam.

The castle itself is comprised of five principal bays containing vertical rows of fenestration, and two storeys over a part-raised basement. In plan it consists of two bows to the front (south-west) elevation, with a central, canted bay entry. Further apsidal bows to the north-west and south-east terminate the ends of the original building, with a turret providing an additional storey and towering over the rear elevation.

A three-storey 1950s block is attached to the castle's north-west elevation, with a later single-storey block and ancillary additions to the north-east. A short distance to the rear, a modern steel security fence separates the castle from the rest of the demesne. Another single-storey, 1950s freestanding range is located to the south of the castle.

To the south of the GAA pitch, a ditch and stands of trees provide some order to the expanse between the castle and the Shanganagh Cemetery, which is comprised of two fields that were once part of the open demesne. Part of this area is comprised of fields and further sports pitches that form Shanganagh Park. These fields stretch out to the east and north-east, and are marked by paved walking paths. Most of the soft, historic field boundaries survive, but the bands of trees have been thinned and/or amended. The railway line runs north to south through the fields to the east, between the demesne and the Irish Sea.



Image 13.1: Late-20th century gateway at entrance to demesne.



Image 13.2: View to north-east within recent gateway, with c.1925 gate lodge to background at lefthand side of image.



Image 13.3: View from front garden of c.1925 gate lodge toward castle, where modern entry drive meets historic entry drive, to left, above. The turret of the castle is notable along the far treeline.



Image 13.4: View to former allotments from entry drive (pond marked by tall tree to centre, above).



Image 13.5: View from road leading to depot toward former allotments and to north-west, including the long-range protected view towards the Carrickgollogan lead mines chimney.



Image 13.6: Treeline marks eastern boundary of development site. Shanganagh Castle to background.



Image 13.7: View to Shanganagh Castle from from historic entry drive.



Image 13.8: View to Shanganagh Castle from north-west of forecourt.



Image 13.9: Front (south-west) elevation of Shanganagh Castle.



Image 13.10: Shanganagh Castle as viewed from eastern boundary of development site, with 1950s extension to north (left).



Image 13.11: View to planted woodland to south, from entrance to Shanganagh Castle.



Image 13.12: Freestanding 1950s range to south of Shanganagh Castle.



Image 13.13: Rear (north-east) elevation of Shanganagh Castle with later extensions.



Image 13.14: Entrance to Shanganagh Park to south of development site, adjacent to recent castellated gateway.



Image 13.15: View of field to south of development site, looking north-west toward the lead mine chimneys.



Image 13.16: View of woodlands and open fields to east of Shanganagh Castle. This later belt of trees severs the castle from views toward the sea and Bray Head.



Image 13.17: View of Shanganagh Cemetery, set within former demesne fields approx. 300m south of Shanganagh Castle.

13.3.8 Field Inspection - Surviving Landscape Features & Vistas

Historic Trees

The area in front of the castle that is proposed for development historically consisted of open parkland, dotted with strategic groupings of trees and other plantings, as well as by individual trees and walking paths. Many of the groups of trees have been disposed with, in particular along the original entry drive and the copses within the middle of the development site seen on the historic maps, but some individual trees appear to remain. As aforementioned in Section 13.2, the trees protected under Map 3 of the LAP are: the copse of trees to the east of the gate lodge, tree no. 616 of the Arborist's Report (a mature Scots Pine likely seen on the 1837 OS map), the tree associated with the Ornamental Pond (no tree tag no. is given due to inaccessibility), and the woodland south-west of the castle.

Other trees survive which are in similar locations as those seen on some of the historic maps and may be part of the cultural landscape of the site, owing to their potential age. One example is a large, albeit damaged, Scots pine tree east of the former allotments which appears to be in the same location as a tree on the 1837 Ordnance Survey map (Figure 13.10). This is tree tag no. 791. Its impressive stature may have formed a key historic vista, notably with the Sugarloaf Mountain visible in its immediate background. Another notable Scots pine is no. 615, along with the Cedar tree at tree tag no. 620, both of which are large specimens mid-way along the entry drive. Conspicuously, both tree tag no. 791 (Image 13.18) and the line of trees to the north-west (Image 13.19, tree tag nos. 615 and 620) are depicted as specimen trees on the 1908 Ordnance Survey map.



Image 13.18: Pine tree (tree tag no. 791) set to the centre of the parkland fronting Shanganagh Castle within the development site. Note the strategic view of Sugarloaf Mountain in the direct background as well as a line of trees in the background to the right of the tree which are located behind the boundary wall along the Dublin Road. See Image 13.21 for their location overlaid with the 1908 Ordnance Survey map.



Image 13.19: Pine trees in the background of this photo of tree tag no. 791 are set along the south of border of the entry drive (tree tag nos. 615 and 620), spanning from the c.1925 gate lodge halfway into the development site. These trees appear to be lone survivors of the clumps of pine trees seen on the 1908 Ordnance Survey map, and which are likely on the first survey map of 1837. See Image 13.21.



Image 13.20: The large tree trunk to the right in the foreground is tree tag no. 620, which appears to also be on the 1908 Ordnance Survey map, and possibly the first Ordnance Survey survey map of 1837. See Image 13.21.

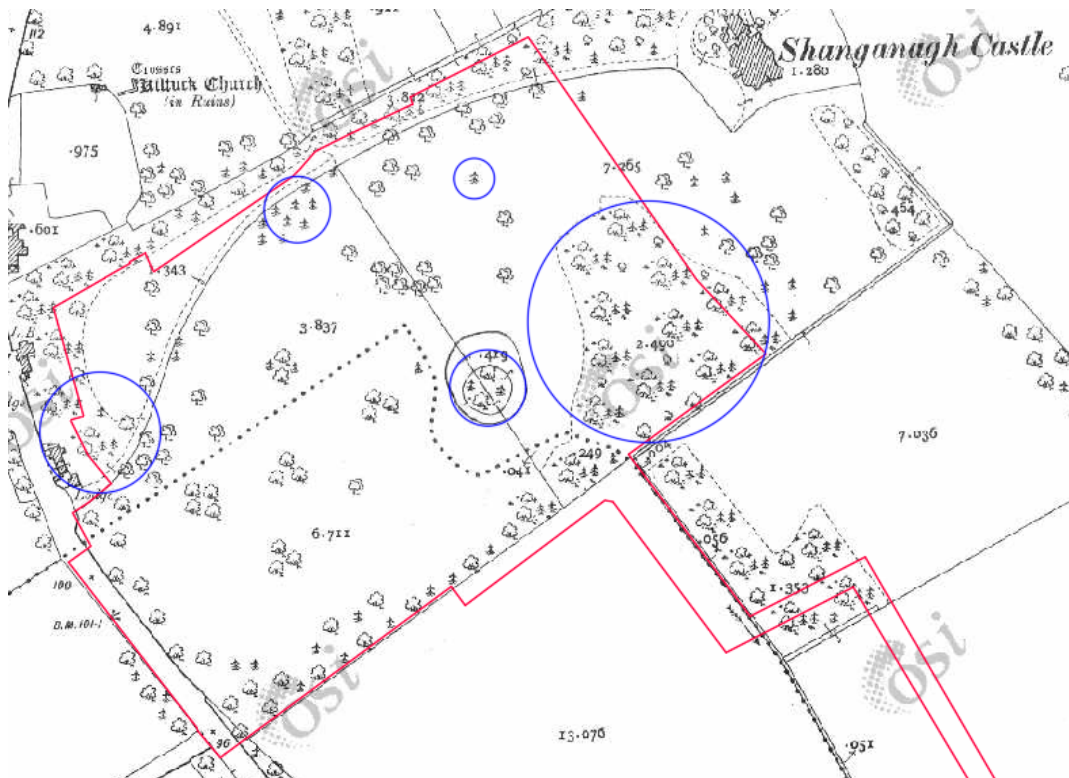


Image 13.21: The trees set out in Images 13.18-13.20 and those protected by the LAP are overlaid in blue with the 1908 Ordnance Survey map, as well as the proposed development boundary shown in red.

Historic Paths & Routes with Key Designed Features

Whilst many of the historic walking routes and access paths within the demesne have been lost, some particular features remain (see Woodbrook-Shanganagh Local Area Plan Map 12 for illustration of all

former historic path locations). For example, whilst the path between the castle and the planted woodland to the south-west has been lost, the paths within the woodland itself have been retained. These paths are not paved, and overgrowth has impacted the immediate setting. At the meeting of these dual access paths through the north and south sides of the woodland is a granite monument, erected posthumously for Sir George Cockburn and his wife in 1852, thereby underpinning the historic associations of the demesne. It is comprised of an octagonal base with cylindrical and fluted tiers on top and a granite date stone and inscription on three sides. It is a clear demonstration of the widespread tradition of monument-making in this time period. It is well-designed and enhances the character of the surviving historic walking paths as well as of the woodland itself. The monument has retained much of its character which has been only marginally diluted by virtue of the construction of the depot, which is largely concealed from view at the site of the monument. The monument has been poorly maintained and vandalised; opportunity exists for improving its character and contribution to the site.

See Image 13.25 for the location of the extant woodland paths and the previous and present monuments' location on the 1837 Ordnance Survey map.



Image 13.22: NIAH ref. 60260147. This granite monument dates to c.1852, as per the date plaque. A previous monument is also noted on the first Ordnance Survey map. See Image 13.25 for its location.

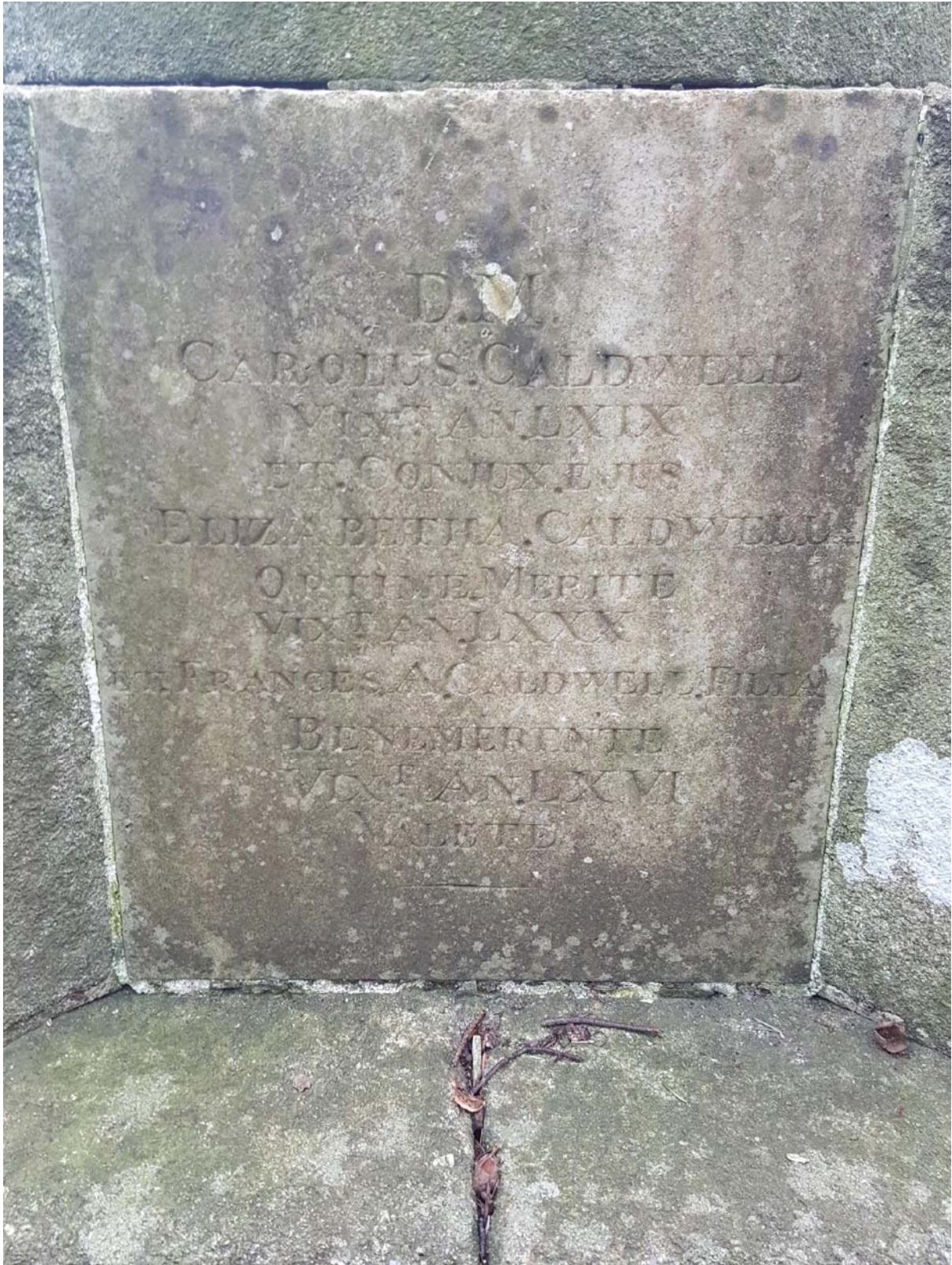


Image 13.23: Inscription and date stone to granite monument within planted woodland.



Image 13.24: A historic path survives within the planted woodland to the south-west of Shanganagh Castle.

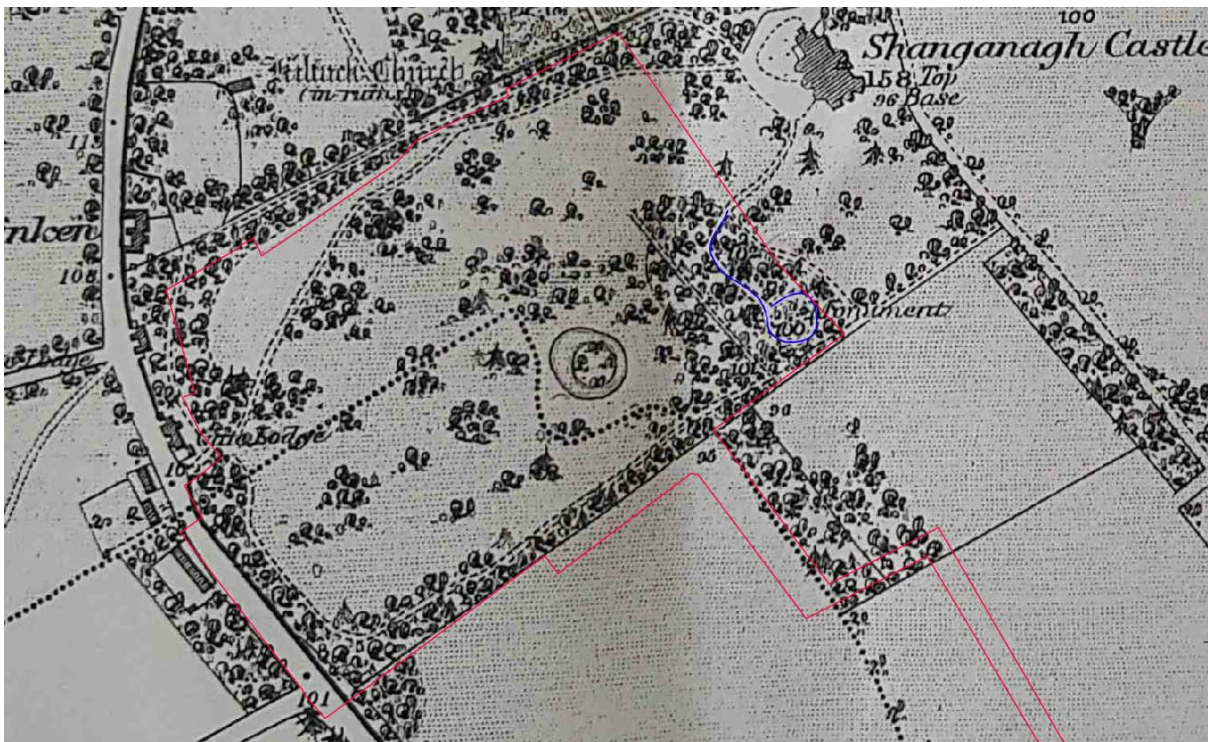


Image 13.25: The location of the path within the planted woodland and the location of the historic monument overlaid on the 1837 Ordnance Survey map. The development boundary is shown in red.

Other critical historic paths survive in the form of a substantial portion of the formal entry drive, as well as a north-westerly path in front of the castle which previously led to the stable buildings, but which now proceeds past the 1950s extensions. Although the realignment of the westernmost portion of the entry drive in the twentieth century obliterated part of the original, formal access route, these remaining routes date to at least the time of Duncan's survey in 1821 and offer information about the intentional experience offered to visitors of the historic demesne. See Image 13.28 and Section 13.3.8 for further details.



Image 13.26: View of entry drive from in front of c.1925 gate lodge, where recent, realigned drive meets the historic route (left, above).



Image 13.27: This fork of the entry drive that turns northward in front of the 1950s block once lead to the stable yard.



Image 13.28: The blue line above outlines the surviving extent of the historic entry drive from the time of Duncan's survey of 1821. Note that the fork in this path is outside of the red line of the development boundary.

Large Landscape Features

That the historic woodland south-west of the castle survives is of central importance, as one of the oldest landscape features remaining on site. It is first noted in Duncan's map of 1821, and contains a wealth of old-growth trees that have formed a central part of the setting of the castle since at least its refurbishment under Richard Morrison. See Image 13.29 and the section "Strategic Plantings" above.



Image 13.29: The planted woodland to the south-west of the castle survives from at least the time of Duncan's survey in 1821. It contains historic walking routes and monuments seen in the nineteenth-century Ordnance Survey maps.

The Ornamental Pond is a designed landscape feature which was first shown on the Ordnance Survey map of 1837. It is roughly 50m wide north-south and 40m wide east-west and contains an island planted with tall trees and shrubs, which is now heavily overgrown. It is an important feature indicative of the Picturesque design with which the castle and the wider landscape were executed in the early-nineteenth century and is largely intact, although it has become heavily silted. Both the woodland and the pond are identified in various legislative and feasibility study documents as core remainders of the early landscape character of the demesne. Indeed, the Shanganagh Park and Cemetery Draft Site Analysis notes that, "the grounds feature remnants of the historic garden. The pond, the woodland and the individual specimen lawn trees are the main legacy features.



Image 13.30: View of the ornamental pond and island from its north banks.

Views & Vistas

The castle originally enjoyed largely unmitigated views eastward toward the sea and southward to Bray Head, hence the historic title of this site as “Fair View.” The later, dense planting of the tree belt to the east of the castle has significantly reduced these views, along with alterations in the grading of Shanganagh Park to the east and the construction of the railways in the mid-nineteenth century.

Views from the castle and from along the entrance drive to Sugarloaf Mountain and to the rolling hills of County Dublin to the west of the site still contribute centrally to the intangible cultural heritage of the site. That these views were part of the siting and, later, the established Picturesque character of the estate is clear from the cartographic evidence, the historic planting patterns and the location and form of structures, paths and approach avenues.

Views to the castle from within Shanganagh Park and the demesne are protected under the LAP (see LAP Table 9, EIAR Chapter 13 Map 13D).

Views to the gate lodge from within Shanganagh Park are protected under the LAP (see LAP Table 9, EIAR Chapter 13 Map 13D).

The views toward Carrickgollogan from within the development site are protected under the LAP (see LAP Table 9, EIAR Chapter 13 Map 13D) and form part of the sylvan setting of the vast expanse in the front portion of the castle parkland. See Images 13.31 and 13.32.

Views of the enclosure between Shankill and Bray include the Shanganagh Demesne and forms a Landscape Character Area under the CDP (No. 12). It is noted that when viewed from Killiney Hill, the area is indistinguishable due to expansiveness of low-density housing. Under the Landscape Character Area, the sylvan character of the area when viewed from the Dublin Road is also to be retained; the proximity of the area to the Dart line informed the reassessment of the functioning of this area, but its development is to have regard to the policies of the Woodbrook-Shanganagh Local Area Plan.

The National Inventory of Architectural Heritage notes a feature richness index level of 5 in the surviving landscape character, albeit with some loss of integrity. Whilst the survey did not note the survival of woodland avenues, walks or other avenues, it should be noted that some of these do survive as previously set out.



Image 13.31: Views of the Sugarloaf Mountain (left, above) rise behind the ornamental pond from the entry drive which would have formed key, idyllic views for both arriving and departing guests. Views to the west towards the rolling hills of County Dublin (right, above) appear to rise up from the pines dotting the entry drive. The latter form protected views to Carrickgollogan and the lead mine chimneys.

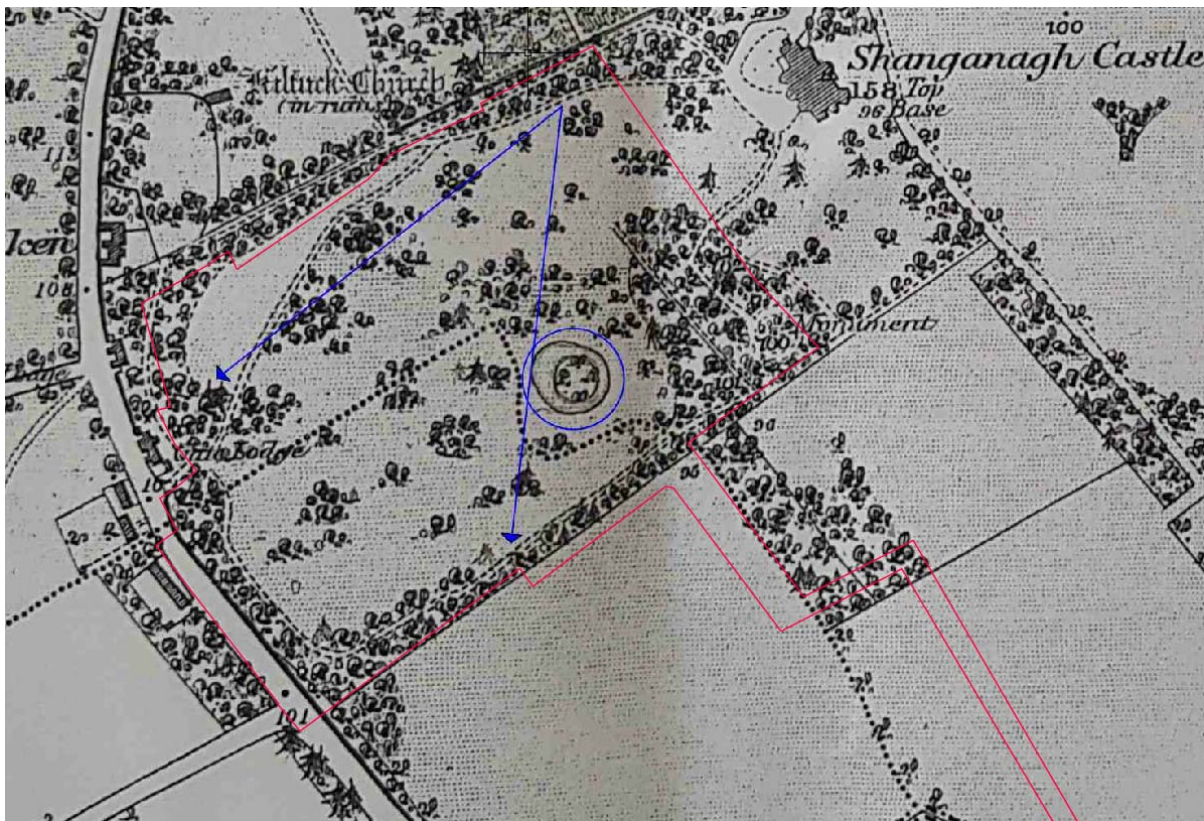


Image 13.32: The location of the ornamental pond is circled on the first Ordnance Survey map of 1837. Arrows roughly indicating the views to the Sugarloaf Mountain to the south, to the gate lodge and to the hills of County Dublin to the west are also noted in blue. The development boundary is shown in red. Also note the open nature of the views eastward from the castle and the sparse trees planted to the south-east of the castle which would have allowed visual access to the sea and to Bray Head.

Boundary Walls

The western boundary of the development site coincides with the rubble granite wall of the demesne. This wall has been rebuilt. Outside of the red line boundary there is a small section to the north-west corner of the demesne that appears to have survived. The height of this wall likely suggests the general height of the replacement wall along the western boundary of the site is as it was historically, providing a secluded parkland setting to the demesne. Rubble granite walls characterise the treatment of the public realm along much of the Dublin Road, along with mature stands of trees and other shrubbery that form a close envelope to the road.

There is also a section of limestone boundary wall which formed a division between the immediate curtilage of the castle and the fields to the east and the service areas behind the stable yard. This small section is approximately 5m in length and is located due north of the castle. It has been amended with some breezeblock vertical extensions. These locations can be seen Image 13.37. This is also outside of the red line boundary but forms part of the site context or receiving environment.

A portion of the former stableyard wall also survives in the Castle Farm development. See Image 13.35.



Image 13.33: A portion of the original boundary wall survives just behind the extent of the development boundary. The historic wall is seen to the lefthand side, above.



Image 13.34: To the north of the castle, a portion of the original field boundary wall survives. This is outside the development boundary.



Image 13.35: Part of the stable yard boundary wall survives adjacent to Castle Farm housing estate. This is outside the development boundary.



Image 13.36: Rubble limestone boundary walls on the western side of the road, across from the development site and in the vicinity of the development remain as an important part of the historic public realm, along with mature trees, hedgerows and shrubbery that create a close envelope edging the public paths and support the sylvan character of the Dublin Road.

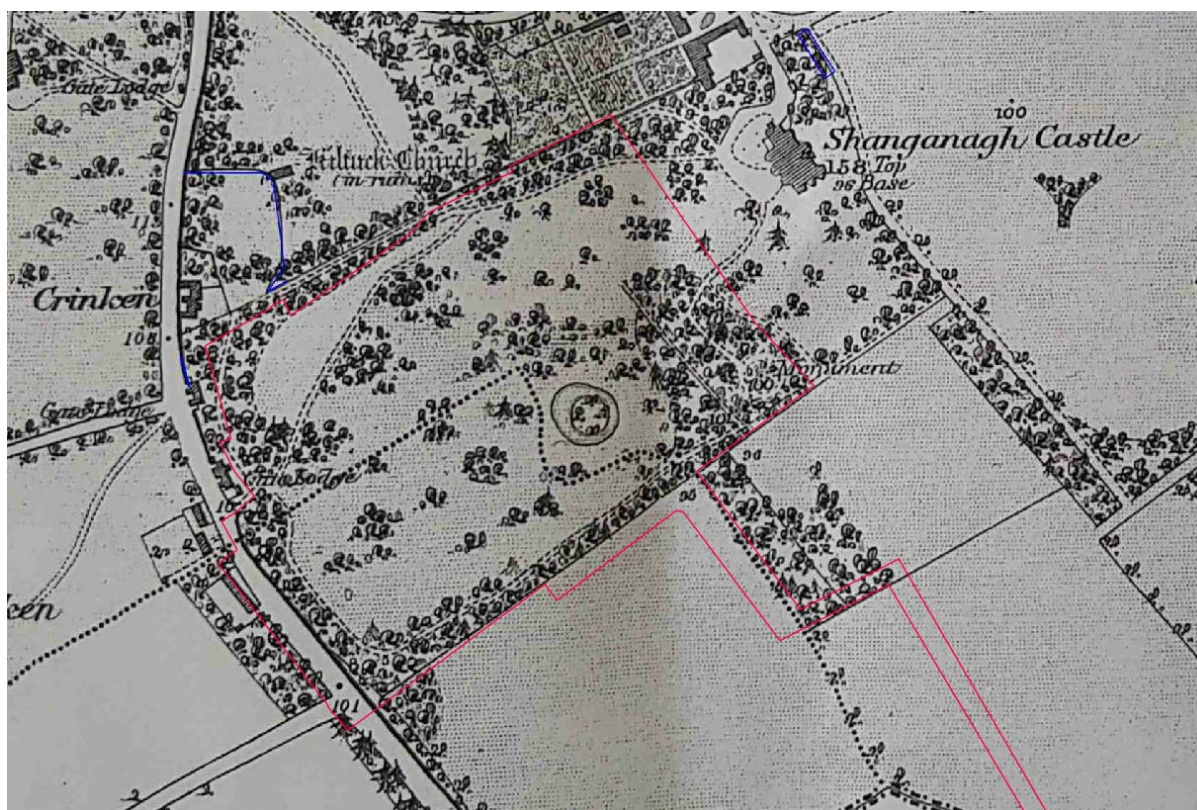


Image 13.37: Elements of original boundary walls within the immediate context of the historic Shanganagh Castle demesne are shown in blue, above. Dense trees and undergrowth may conceal other original sections.

Open Spaces & Surrounding Context

The grounds immediately around the western, eastern and southern elevations of Shanganagh Castle remain open, although the extensions to the north have encroached upon the setting and character of the structure. Tarmacadam laid to the forecourt has also impacted the rural setting. The open views in front of the castle towards the Dublin Road across the planted, bucolic landscape also largely survive, with the exception of a more recent line of trees which forms part of the eastern development site boundary and provide a degree of screening. It is noted that the original character of the foreground of the castle, located in the development site, has been altered by the re-grading of the land due to the introduction of spoil from the M50, the construction of the football pitch and the allotments. Despite this, much of the original, open character and some of the principal historic plantings survive as part of the designed, Picturesque setting, albeit with some loss of integrity.

The construction of the depot between the ornamental pond and the planted woodland has impacted the character of both these features as well as of the wider setting.

The most significant impact on the setting of the wider landscape has been the demolition of the stable complex and the construction of the Castle Farm housing estate. The removal of the low-lying curtilage structures and the development of a small group of commercial shops to the north of Cricken Cottage has impacted views from within the historic demesne boundaries as well as the understanding of the former setting and use of the area when viewed from the public realm. Development north of Castle Farm is a continuation of the arising pattern of suburban development in the immediate vicinity of Shankill village.

Although many of the southern fields have been developed as sports pitches and therefore have reduced the quality and character of the cultural aspects of the demesne, the relative field boundaries remain the same. Bands of trees that aided in these plot demarcations survive along the southern border of the development site, and many locations throughout the former estate grounds. However, the strip of land within which new civils routes to connect the Shanganagh Development to the proposed Woodbrook development scheme contains no cultural heritage features of note, and the previous tree lines have been somewhat altered (see Image 13.13).

Views towards the sea and to Bray Head from the east of the castle have been impeded by dense plantings of trees, but the use of the estate as walking paths, pitches and general outdoor recreation has enabled much of the original open landscape to be retained in a wider context, albeit in a more regimented fashion and less as part of a holistic designed landscape.



Image 13.38: The open expanses within the immediate context of Shanganagh Castle remain to the western, southern and eastern elevations.



Image 13.39: To the north, twentieth-century extensions have encroached upon the immediate “villa” setting of the Georgian house.



Image 13.40: Views from the castle to the Dublin Road once were largely open to the rolling hills of County Dublin, but a proximate line of trees now mitigates these views. Despite this, the visual relationship between the castle, the foreground to the Dublin Road and views of Carrickgollogan largely remain.



Image 13.41: The depot (background, above) is situated between the planted woodland and the ornamental pond and impacts the setting of both features.



Image 13.42: The proximity of the Castle Farm development to the immediate castle grounds is shown here, with the housing estate to the right and the 1950s extensions to the left.



Image 13.43: A line of commercial shops to the rear of Crinken Cottage are constructed against part of the earlier enclosure around Kiltuc Church, located to the left, above, along with part of the former walled garden walls, in the immediate background, above.



Image 13.44: The sports pitches in the large open fields to the south have assisted in maintaining part of the open character of the parkland landscape which is still marked by historic bands of trees, although some historic field boundaries and walking paths have been lost. The line of trees to the left forms the southern boundary of the current development site and is noted in Taylor's map of 1813. A narrow band of the red line boundary will traverse the path above and continue southward to link with the Woodbrook development. The treeline above (right) does not appear to be populated with the same plantings as noted in the historic maps, but no loss of these trees is proposed.



Image 13.45: The dense woodland to the east of the castle has obscured views from the fields closest to the sea back towards the country house and from the castle to the sea. The former residence can barely be made out but is located in the background of the above image. This band of trees was historically far thinner, according to cartographic evidence.



Image 13.46: The southernmost fields of the demesne are no longer open, but have been developed as a cemetery, though the relatively open and low-lying features retain views to the Sugarloaf and Bray Head. A narrow band of land to the right (west) of this image will be developed for civis and related works. The Woodbrook development area is seen to the background of this image.



Image 13.47: From the south of the development site, protected views across the open expanses toward Carrickgollogan Summit remain. The treelines seen throughout the demesne are largely historic, or are later replacements of pre-existing field boundaries marked by planted borders.

13.3.9 Field Inspection - Surviving Architectural Heritage

Photos of the most proximate structures, those with direct ties to the estate or which may be impacted by the proposed development are set out in this section, along with their NIAH, RPS or SMR / RMP numerical reference. See Sections 13.1 to 13.3 for a full list of surviving historic buildings in the area and maps indicating their location within the context of the development site.

Shanganagh Castle & Extensions

Shanganagh Castle is the principal structure of significance in immediate proximity to the development site. The original, core of the structure which consisted of a dual bow-ended house likely dates to the 1760s. The overarching effect however is the result of works undertaken in the first two decades of the nineteenth century by Sir George Cockburn to the designs of renowned Irish architect Sir Richard Morrison.

The façade is finished in a wetdash render, with strategic elements behind set off by napped render finishes. The eastern half of the structure, set to the rear, is largely intact, whilst the western front, containing projecting turrets and bays, was altered by Morrison and sits at a lower level. Crowning the Gothic idiom are the castellated parapets that were added to the original house. Unfortunately many of the windows have been boarded over with metal sheeting as a means of security, but it is noted that the stair tower, found in the turret to the south elevation, was altered and lit by a neo-Gothic stained glass window (Blackwood, 6). Slit windows abound to underpin the intentional nod to early fortified

structures, along with further Gothic embellishments in the pointed-arch windows. Tudor arches survive in a single-storey, arcaded canopy to the south-east. Several late-eighteenth century windows are noted to survive at the lower levels. To the rear or east the original dwelling can be read more succinctly, with embellishments consisting of a projecting apsidal return surmounted by a tall, cylindrical turret.

Unfortunately, there were once further castellated chimneys, turrets and parapets which appear to have been removed in the twentieth century, thereby marring Morrison's intentions for the building, along with the general air of disrepair noted throughout and the siting of industrial equipment to the forecourt. Further unsettling to the original character of the building are the 1950s and later extensions to the north and north-east.

The principal 1950s three-storey block is also rendered and has a shallow pitched roof with overhanging eaves. Its casement windows are set out largely in a bipartite arrangement, which amounts to an unsuccessful and shallow attempt at replicating some of the Gothic Revival detail so eloquently executed in the main house. The single-storey extension that forms an L-shape with this building is located to its east elevation. It is in a very poor state of repair and is of no design merit, having only clerestory lights set to breezeblock walls. These structures mar the setting and character of the Protected Structure and the Registered Monument.

Although set at a further distance, the additional 1950s, single-storey range set a short distance to the south is also of poor quality. This clapboard building is fronted by an arcade of circular timber columns and appears as a recreational hall or similar. Having been poorly maintained, the building has no architectural or other evident merit.

The LAP notes that "Shanganagh Castle and its immediate grounds are important both architecturally and historically and merit classification as a significant site, albeit with some loss of integrity." However, the castle is in need of repair and additions of poor quality, overbearing massing and of limited design merit have been constructed over time, all of which has impacted its original character. Despite this, the former house retains a considerable amount of its mid-eighteenth century fabric, as well as architectural importance embodied in fabric associated with Sir George Cockburn. Cockburn's own importance as a decorated Irish military hero and author of the "bottle letter" imbues the site with further historical significance. The medieval remains within the fabric of the castle are of archaeological significance, particularly as the building is a recorded monument.

Furthermore, that Sir Richard Morrison executed his first Gothic designs at Shanganagh Castle is of substantial importance. The castle serves as a salient part of the design history of the country as a whole, acting as an important milestone in the saga of the shaping of the nation's built heritage. Morrison would, along with his son, go on to establish perhaps the most important and famed architectural legacy in Ireland, executing works of national importance. The castle shows the evolution of Morrison's design sensibilities and his application of his appreciation for both the classical and the Gothic, owing to his devotion to the work of both James Gandon and James Wyatt.

The design of the castle is integrally linked to the romantic design of the Picturesque landscape and its features. That most of the grounds immediately surrounding the property and the those stretching outward to Dublin Castle remain undeveloped has assisted in retaining some of the original context of the building, though the loss of the farmyard, walled gardens, some walking paths and aspects of the

parkland setting has diluted the original setting of the site. This structure is outside of the red line and blue line boundaries of the proposed development.



Image 13.48: Front (south-west) elevation of Shanganagh Castle, developed c.1765 and altered by Sir Richard Morrison c.1805-1818. (RPS ref. 1845, RMP ref. DU026-120, NIAH ref. 60260146).



Image 13.49: Historic windows survive at the lower levels.



Image 13.50: The entrance, set to the western half of the building, is at a lower level than the areas to the east, owing to Morrison's extensions. Note the panellled shutters seen to the interior.



Image 13.51: South-east elevation of the castle. The short turret noted above was rebuilt in its upper portions in the 1950s, wherein the bottle letter was discovered.



Image 13.52: Further Gothic iterations are noted in the Tudor arch arcade to the south-east corner.



Image 13.53: The rear (north-east) elevation of the castle more readily presents the original, double bow-ended house, with the central turrets being added by Morrison.



Image 13.52: The 1950s three-storey block is located to the north and is of poor quality.



Image 13.53: The low-lying late-twentieth century extension adds nothing to the setting of the castle.



Image 13.54: The low-lying extensions to the rear of the castle and of the 1950s extension are in poor condition. Some of these elements date to Morrison's refurbishment of the 18th century castle, whilst others are 20th century interventions.



Image 13.55: The abutment of the 1950s block to the original building is clearly noted from the north-east.



Image 13.56: The low clapboard building to the south of the castle does not contribute to the architectural heritage of the site.

Gate Lodge

The gate lodge is a Protected Structure and was recorded by the NIAH (see Tables 13.2 and 13.3). Although not original to the Georgian development of the estate, the c.1925 gate lodge survives from the tutelage of the Allen family. The cottage is now owned by the local authority and is leased to an individual. Byrne's is astoundingly articulate; the tactility of the Arts & Crafts movement lent itself well to the rather vernacular features and forms of the Gothic Revival, thus allowing the cottage to be both a product of its time and sympathetic to the overarching character of the established estate. The cottage appears as both a quaint and yet self-conscious work that brings considerable artistic as well as architectural significance to the estate, in addition to holding the principal of an established gate lodge in this location. With the exception of a single residence along the approach drive to the castle, there are no other structures between the gate lodge and the castle. Along with the driveway connecting the two buildings, the direct, historic relationship between the two structures has been maintained.

This structure is outside of the red line boundary of the proposed development and is not included in the boundary of the Local Area Plan.



Image 13.57: Byrne's c.1925 gate lodge contributes to the architectural integrity of the demesne, despite its later provenance. It effects both an Arts & Crafts as well as a Gothic idiom that makes it a creative but sympathetic part of the landscape (RPS ref. 1845; NIAH ref. 60260148).



Image 13.58: The gate lodge is located in the same location as its predecessor, marking the former entrance into the estate at the junction between the historic drive and modern entry drive.



Image 13.59: The modern boundary wall adjacent to the gate lodge is the former site of the southern entrance into the demesne. It was enclosed when the site entrance was moved to the south in the 20th century. Note Carrickgollogan Summit in the background.

Crinken House Gates

A pair of gates just to the north-west of the development boundary were recorded by the National Inventory of Architectural Heritage (ref. 60260151). They are fine quality cut granite gate piers with decorative cast-iron railings which date to the fourth quarter of the nineteenth century. This sweeping entrance provided access to Crinken House (60260150), a single-storey-over-basement villa dating to the first quarter of the nineteenth century. Though not seen from the development site, together with its gates that open onto the Dublin Road, this assemblage contributes to the architectural merit of the area despite the later development of the landscape fronting the lodge.



Image 13.60: The cut granite piers and cast-iron railings located just to the north of the gate lodge and on the western side of Dublin Road mark the later entrance to Crinken Lodge (NIAH ref. 60260151).



Image 13.61: Crinken House appears on the first Ordnance Survey map of 1837, though the place name is seen on Taylor & Skinner's map of 1777 (NIAH ref. 60260150; photo courtesy NIAH).



Image 13.62: Between the c.1925 gate lodge and Crinken Cottage stands a small cottage that was not recorded by the NIAH nor placed on the Record of Protected Structures, but it does appear as early as the Ordnance Survey of 1837. Its roof weatherings and windows have been replaced, but its form, siting and immediate context are retained, thereby contributing to the historic character of the area.



Image 13.63: The cottage noted above is seen on the 1837 Ordnance Survey map.

Crinken Cottage

Crinken Cottage is a Protected Structure and was recorded by the NIAH (see Table 13.2 and Table 13.3, as well as its location in Image 13.63). The asymmetrical front façade, hood mouldings, crenellated parapet and pointed-arch windows are hallmarks of the Gothic Revival, relate principally to Shanganagh Castle's design, and it has much to offer the sylvan setting of the street. It was purportedly constructed at the direction of Sir George Cockburn to house the caretaker of Shanganagh Castle Estate in the first quarter of the nineteenth century. It therefore retains connections to Cockburn, and potentially to Morrison himself either directly or via the Gothic idiom with which the renewed castle was executed. It appears as an idyllic jewel box in the heart of the historic landscape of Shankill.



Image 13:64: Crinken Lodge (RPS ref. 1850, NIAH ref. 60260145) is directly related to the history of Shanagh Castle estate and has much to offer the historic streetscape.

The ruins of Kiltuc Church are on the RMP (see Table 13.1) and are set within the confines of the Castle Farm estate. Though in poor condition, the ruins are a significant part of the historic setting of the estate and of the local area. They survive as clear indications of the area's early history, which no doubt overlapped with the initial settlement of the Shanganagh Estate and the former castle whose fabric was incorporated into Cockburn's residence. The church formed a key part of the Picturesque approach to the castle via the northern gate lodge and drive. It is also a direct embodiment of the medieval history that pre-dates much of the upstanding development seen today and offers archaeological as well as architectural heritage to the vicinity. The Castle Farm development has impacted the setting of the church, though the retention of the area immediately to the north of the ruins has aided in retaining some understanding of its early context. This structure is outside of the red line boundary of the proposed development.



Image 13.65: Kiltuc Church (right, above) is set within the Castle Farm estate boundary (RMP ref. DU026-054001).



Image 13.66: Kiltuc Church is an important part of the archaeological and architectural heritage of the Shanganagh Castle Estate and the wider Shankill area.

13.4 LIKELIHOOD OF IMPACTS

The character and significance of the aforementioned historic features and structures within and directly in the vicinity of the proposed development site at the Shanganagh Castle Demesne have been analysed in accordance with the criteria set out by the National Inventory of Architectural Heritage in order to provide context for assessing the heritage impacts of the proposed development. These criteria were established by the Granada Convention of 1985 and were codified by the Planning and Development Act, 2000. Those categories are as follows:

- Architectural
- Historical
- Archaeological
- Artistic
- Social
- Cultural
- Technical
- Scientific

Chapter 1.0 of the EIAR sets out the assessment criteria for the assets described in this chapter and for all of the EIAR.

The Woodbrook- Shanganagh Local Area Plan 2017-2023 seeks to create new communities within the development boundary, in order to provide significant residential accommodation which has been identified to meet projected housing growth in the area. As part of this development, the LAP seeks to create a green tourism destination with a heritage focus in the Woodbrook-Shanganagh site boundary by facilitating new residential and community facilities and amenities along with walking and cycling paths, within the context of the rich history of the area.

As set out in Section 3.5.3 of the LAP, “a key challenge [of providing a residential community on the proposed site] will be to balance the special character and significant architectural heritage of the area with (i) its development and growth and (ii) the delivery of densities necessary to underpin a sustainable residential community.” The LAP also states that the required approach to development on this site is one that “strikes a balance between protecting the visual context or setting, re-instating important elements of the demesne landscape and creating linkages to the park, securing viable contemporary uses and delivering high quality new homes at scale.”

The LAP sets out a number of structures listed for protection (See Maps 12 & 13 and Appendix 3 of LAP). These buildings are to be retained as part of any future development proposals. It will also be an objective to seek to retain, as far as possible, other elements of the historic landscape which contribute to the character of the area, including the planted woodland and the Ornamental Pond which are deemed by the LAP to be the most significant elements of the historic landscape seen on the 1837 Ordnance Survey map.

The initial perceived impacts of the development proposals on the remaining architectural and cultural significance of the site are set out in Sections 13.5.1 to 13.5.9. Where mitigation measures already exist as an integral part of the proposals, they are included there. If additional mitigation measures are proposed, they are set out in Section 13.6. This is followed by the most salient aspect of the

assessment, which is the sum total of residual impacts assessed after initial impacts and mitigation measures are considered together. Table 13.5 contains this information in a cohesive manner.²

In summary, following an assessment of readily available historic records, cartographic and documentary sources, a visual inspection of the site and a review of the surviving architectural and cultural heritage and its significance, it is asserted that the proposed development will directly, significantly and negatively impact a number of identified architectural and cultural or landscape heritage assets in and surrounding the development site, largely due to the heritage importance and sensitivity of the site.

In taking account of all proposed mitigation measures, it is concluded that the impacts are generally reduced to significant and moderate, negative impacts. There are a number of positive impacts on heritage interpretation and building conservation as well as historic landscape management as outcomes of the proposed development which will have benefit to the cultural legacy of the site and surrounding environment, which they do not currently enjoy.

13.4.1 Do Nothing Scenario

There will be no direct impacts on identified architectural and cultural heritage characteristics if the proposed development is not undertaken.

However, the proposed development area is zoned “to provide for new residential communities in accordance with approved local area plans” as per Map 14 of the Dún Laoghaire-Rathdown County Development Plan 2016-2022 (“CDP”). It is therefore likely that residential development would occur, and in that case the impacts would be similar to those described in the impact assessment above.

Furthermore, the creation of a residential development with a large variety of amenities on the grounds of the historic demesne, along with other proposed developments in the immediate vicinity (see Section 13.4.2) is intended under the Woodbrook-Shanganagh Local Area Plan 2017-2023 to form an impetus for the adaptive re-use of Shanganagh Castle for public access. In the absence of sufficient footfall to the area, it is possible that the castle would remain in obsolescence.

There has to date been little dedicated interpretation of the historic significance or cultural heritage of the castle or the demesne, which may be less likely to change in the Do Nothing Scenario. The proposed development offers a catalyst for bringing greater awareness to the rich history of the Shanganagh Demesne by incorporation of interpretive plaques, historic walking paths and access to Shanganagh Castle which is intended as a separate development being pursued under the objectives of the LAP.

The Arborists’s report also suggests that a number of historic trees would perish regardless of the development of the site, owing to their age, previous damage and their natural life cycle. Proper woodland management is likely to arise from the proposed development, along with the preservation and clarification of the Ornamental Pond, which may otherwise continue in the present pattern of degradation caused by natural forces.

² Not all sites recorded on Tables 13.1, 13.2 and 13.3 are explored in detail in this section. Those with close association with the historic demesne, in close proximity to the site or with a greater susceptibility to impacts from the proposed development are addressed. A summary of impacts on all remaining sites can be found in Table 13.4 and Table 13.5.

13.4.2 Cumulative Impacts

In addition to the proposed residential development at Shanganagh Castle, there are a number of proposed schemes in the surrounding area which may have a cumulative effect on the built and cultural heritage of the area. Principally, a new SHD (strategic housing development) is proposed at the neighbouring Woodbrook site. Part of this development includes a new DART station, which is meant to serve and has informed the landscaped connections with the subject development at Shanganagh Castle. Additional applications include a Part 8 proposal for improvements and alterations to Shanganagh Park. As set out in the LAP, it is proposed to introduce community and potential sports facilities at Shanganagh Castle.

The current planning applications which are situated in close proximity (within 1km of the proposed development site) comprise;

- A Part 8 scheme (Ref/PC/PKS/02/16) for a new crematorium facility at Shanganagh Cemetery was put forward and approved in March 2017; this facility will be located on vacant land between two existing burial areas, a short distance to the south-east of the proposed development site. Planning permission is not subject to an expiry date;
- The demolition of a gate lodge and construction of four apartments (D15A/0683), for which planning will expire 27 April 2021;
- The construction of a specialist hospital with capacity for 56 inpatients (D17A/0065), for which planning will expire 19 December 2022;
- vi) The construction of three detached houses (D18A/0198) for which planning will expire 7 September 2023.

It is notable that the former farmyard and walled gardens of Shanganagh Castle were previously developed in the 1990s to form the Castle Farm housing estate. Much of the remaining demesne was previously remodelled as Shanganagh Park, wherein some field boundaries were amended, walking routes and plantation belts were removed or altered, and the landscape was ironed out to form football pitches, dog runs and other positive public amenities.

The Woodbrook-Shanganagh LAP 2017-2023 seeks to make Shanganagh Castle the central point of a green corridor that reconnects the castle with the coast, and draws the public to the area to enjoy outdoor and sport amenities within the context of a heritage-focused interpretive area. The LAP contains many objectives and policies that seek to protect strategic views, vistas, historic walking paths and routes, structures and the sylvan landscape of the demesne whilst achieving the above aims.

Whilst the castle, landscape features and other elements of the demesne have significance and special interest in their own right, the castle, landscape, curtilage structures, key contributing views and vistas as well as historical associations are inextricably linked. Country estates and demesnes were intricate integrations of both form and function, with each part contributing to the nature, purpose and appearance of the whole. Though impacted in part by GAA and other sports pitches as well as the cemetery and Castle Farm development, to date most of the historic fields of the Shanganagh demesne remain open, without buildings in the landscape. There are few remaining country houses in the local authority catchment area, and even fewer with a sizeable portion of their historic demesnes still partially or notably undeveloped. In light of other nearby developments of a similar scale, the cumulative impacts of the construction of the Shanganagh Castle residential development will constitute a further loss of the dwindling historic demesnes of South County Dublin which is therefore very significant and negative.

However, together the interdependent developments at Shanganagh and Woodbrook offer opportunities for much-needed heritage interpretation and awareness of the area, the strategic featuring of some key vistas and views, and respect for and improvement of landscaped features such as the Ornamental Pond. The impacts of development are partially mitigated by good quality materials that respect that tonality of the existing setting. The proposals also provide a greater impetus for appropriate historic woodland management and the appropriate repair and adaptive re-use of Shanganagh Castle. The grading and new planting to the site east of the castle and the construction of the railway, which severed the connection between the castle and the sea, is a cultural heritage loss. As above, it is understood that the local authority Masterplan which is to be implemented as part of a joined-up scheme with the LAP seeks to reinstate this connection and provide interpretation of the heritage of the area, which are positives for the cultural inheritance of the site. These mitigation measures reduce the residual impacts of the cumulative effects to significant, which should be considered alongside the positive outcomes as outlined above.

13.5 DESCRIPTION AND SIGNIFICANCE OF IMPACTS

13.5.1 Shanganagh Castle

The original house and Morrison's improvements were conceived as regal yet whimsical architectural statements within a landscape of equal romanticism and careful design at the behest of an important Irish military hero; it is noted that alterations to the demesne have already reduced the original patrons' intention for the holistic character of the house within its setting. The red line of the LAP terminates roughly 50m to the west of the castle's front elevation, which would make many kinds of possible development within the site boundary impactful upon the sensitive setting, special interest and character of the castle.

Whilst the scale of the proposed buildings around the castle has been reduced through the iterative design process, the extent of new construction on the proposed site and in proximity to the castle will adversely impact upon the architectural character of this principal building due to the inherent nature of the site. It is noted that the existing trend of some visual separation along the eastern development boundary via the planted tree line will be reinforced, which will somewhat reduce the current visual connectivity of the castle from its associated landscape, but this permeable screen will also simultaneously serve as a visual mitigation measure in light of the proposed development.

The proposed axial route, or Avenue, through the centre of the site is in keeping with Guiding Principle No. 4 of the LAP. Whilst it is divergent from the tradition of sweeping views to the castle, it is noted that its presence will help to maintain a relationship, in light of the surrounding development, between the castle, the foreground and the Dublin Road, by leading from the front of the site directly to the permeable screen of trees in front of the castle and its entrance. In this manner the castle will maintain an important visual presence in the landscape without overly conspicuous and formal views of the front elevation. The proposed traffic patterns within the site will also only allow pedestrians and cyclists to move toward the castle on the central Avenue in a slow and informal manner, whilst all principal, vehicular traffic must approach by the traditional and curved northern, realigned drive (the Crescent), thereby retaining sidelong views of the castle on approach (refer to Section 13.5.8).

It is also observed that the external cladding of the new buildings within the development will be largely of grey brick; this will serve to make the appearance of the new build less conspicuous in the landscape

and will provide a measure of visual recession through the screen of trees. It respects the existing material tonality of the castle which is comprised of a grey-toned roughcast render and cut granite architectural details. It is accepted that the buildings clad in red brick may be more visually impactful on the castle, although the traditional nature of this material is a mitigating factor. The planted woodland and its intentional relationship with the setting of the castle will be retained as a central objective of the LAP and the proposed development. By virtue of considering the impacts and mitigation measures in tandem, the impact on the sensitivity of the castle is reduced from direct, negative, very significant, local and permanent to significant.

There is no direct impact on the character of the medieval fabric nor on its associated setting by virtue of the proposed development. However, the development is to serve as an impetus for future redevelopment of the castle as a space for public access and amenity as per the LAP objectives and the Masterplan prepared by the local authority. In that event, direct impacts on the medieval fabric have a low likelihood of being negative, significant and permanent. Refer to Section 13.6 for further proposed mitigation measures which include positive associated outcomes for heritage interpretation, and which reduces the residual impacts.

Shanganagh Castle is currently in private ownership, and therefore is excluded from the development boundary. This puts the building at risk of being isolated within its setting and its consolidation relegated to a later date. Consideration of the castle in partial isolation and/or delay of its refurbishment has a high likelihood of causing an indirect, negative, significant, regional and possibly long-term impact on the castle. However, it is understood that a tripartite agreement is in place to facilitate transfer of ownership of the castle to Dun Laoghaire – Rathdown County Council in the very near future. Chapter 17.0 of this EIAR provides further details on this agreement. It is further noted that a multi-disciplinary steering group has already been assembled to manage the integration and refurbishment of the Shanganagh Castle. This is a central objective informing the aims of the LAP. As of the time of this chapter, the local authority is gathering site / building analysis information and is developing a strategy of reuse and integration for the Castle and its building that accords with the objectives of the LAP in the context of the wider community, the proposed Shanganagh residential development and the surrounding high amenity park lands. These actions reduce the risks to a moderate likelihood and the impacts may thereby be mitigated to moderate. Refer to Section 13.6 for further proposed mitigation measures.

Refer to Sections 13.5.6 to 13.5.9 for further assessment of impacts on Shanganagh Castle regarding the proposed landscape plan and general development within the approach to the castle.

13.5.2 Gate Lodge

It is noted in the attendant Design Statement submitted with the EIAR that the gate lodge is part of the curtilage of Shanganagh Castle. This is underscored by assignment of the same RPS record number to both structures. This curtilage area between the castle and the gate lodge has been zoned for residential development under the LAP. Any large-scale development in the shared attendant grounds will by its nature dilute the open visual relationship between the gate lodge and the castle, for which the former was constructed as a subservient, service building. Sight lines between the two buildings, which have largely been the only two located in the area between the castle and the road, will be lost along with the principal, historic connection between the structures. The proposed development will constitute a high likelihood of a direct, negative, very significant, local and permanent impact on the relationship between the gate lodge and the castle.

It is however noted that one house has been constructed along the northern driveway to the castle, that the Castle Farm development comes close to the northern site boundary along the driveway, and that the gate lodge is a replacement of the original structure. This somewhat reduces the historic relationship between two isolated structures in an otherwise bucolic setting, although it is also notable that the c.1925 gate lodge continued to serve the castle until the latter fell out of residential use in the 1950s. Furthermore, the Picturesque, historic entry drive that lead directly from the original (and current) gate lodge to the castle via a sweeping, northern and oblique route will be altered. However, it will be retained in principle and largely in a similar location. There will therefore remain an arcing, physical route of connectivity between the gate lodge and the castle. These mitigation measures reduce the impacts on this relationship from very significant to significant.

The proposed new buildings of the more civic Urban Quarter (see Section 13.5.6) will come within approximately 60m of the gate lodge, and new hard and soft landscaping and access routes will be introduced in front of the gate lodge. The gate lodge originally opened onto the Picturesque, planted landscape that was in keeping with its architectural character. The extent of the new development, its location and urban qualities have a high likelihood of creating a direct, negative, very significant, local and permanent impact on the character and setting of the gate lodge itself. In order to mitigate this, the Landscape Design Masterplan proposes that new trees will be planted alongside the existing in order to provide a measure of screening and to retain a portion of the natural setting. The buffer zone along the western boundary will also retain a semblance of informality with irregular plantings of trees, along with the casual nature of the nearby pedestrian / cyclist entrance. The protected copse of trees to the north-east of the gate lodge will also be retained. In consideration of the above, it is assessed that the impacts are reduced to very significant-significant. See Section 13.6 for further information on proposed mitigation measures which reduce the residual impacts.

See Sections 13.5.6 to 13.5.9 for further assessment of the impacts of and mitigation measures integrated into the landscape and development proposals.

13.5.3 Cockburn Monument

It is proposed to remove a band of trees along the western boundary of the woodland, owing in part to the condition of the trees according to the arborist's report detailed in Appendix 2.2 of this EIAR, and also in order to allow for additional open landscaping and to improve connections with the Shanganagh Park development to the south. A number of new trees are proposed in the open parkland between the pond and the woodland, which will assist in screening visual access to the new residential buildings from the monument, though some increased visual access to the area just outside the woodland may be allowed. Therefore, the thinning of this band of trees along with the aforementioned mitigation measures will create a moderate likelihood of a direct, negative, moderate, local, and reversible impact on the monument by virtue of reducing the secluded nature of its setting.

However, the woodland is partially congested with undergrowth and it has been poorly maintained. The development offers an impetus for improved woodland management which will enhance the setting and character of the monument. The addition of new trees along the eastern boundary will also assist in diluting the current visual access to the 1950s addition which adversely impacts the experience of the woodland walk and the monument. The residual impact is therefore reduced to moderate-slight and neutral, with positive outcomes also noted for the cultural heritage of this feature. Refer to Section 13.6 for further proposed mitigation measures which reduce the residual impacts.

13.5.4 Crinken Cottage & House

This structure is outside of the red line boundary of the proposed development and is in private ownership. Owing to the existing screening afforded by a belt of trees to the east and south of the cottage, to the curvature of the Dublin Road, and to the cottage's private ownership and location away from the principal setting of the demesne, there is considered to be no direct or indirect impacts on Crinken Cottage by virtue of the proposed development. The same is also likely true for the unrecorded cottage to the south of this site.

Although the gate piers associated with Crinken House (NIAH ref. 60260151) are approximately 40m from the site boundary, their location to the north-east of the site and the screening offers by the natural bend in the Dublin Road, the existing / retained trees and the gate lodge are likely to prevent any notable visual impacts on same. Crinken House is not visible from the development site and is unlikely to have views of the new build owing to its siting.

13.5.5 Kiltuc Church Ruins

Kiltuc Church ruins contribute to the early vernacular and architectural milieu of the area. Its character and setting has been diluted by low-density residential development within its immediate environs. The largely two-storey massing of these structures mitigates the impact on the setting to a degree. Though outside of the development boundary, the proximity to same will allow for views of multi-storey residential accommodation from the grounds of the church ruins. In review of 3D renderings afforded by the LVIA, there is a high likelihood of direct, negative, moderate and permanent impacts on the setting and character of the ruins. Proposed mitigation measures include the interpretation of the site, which in this case can offset the impacts and reduce them to slight. See Section 13.6.

13.5.6 Landscape Features & Vistas

At its most intrinsic level, the development site was originally intended to be and was characterised by an undulating, open and idyllic landscape containing key focal features and approach paths located specifically to form dedicated vistas and views for the visitor. There has been some loss of integrity of this landscape with the construction of the allotments, depot, football pitch and the single residence along the entry drive. The open nature and key historic vistas of the castle foreground remain, along with the Ornamental Pond and planted woodland and a portion of the northern entry drive. As with the castle, many kinds of possible development within the site boundary would be impactful upon the significance inherent within the landscape.

The foreground and formal approach to the castle via the southern gate entrance were designed to provide an initial long-distance view of the castle within its wider setting, and to then sweep northward to provide sidelong views of the unfolding Picturesque landscape, taking in the woodland and Ornamental pond at a distance, between copses of large specimen trees. As the drive continued eastward oblique views of the Sugarloaf and the Wicklow Mountains were opened. Upon arrival at the castle forecourt, a dramatic western view of Carrickgollogan and the Dublin Mountains enclosed the setting, with the impressive, immediate stature of Shanganagh Castle dominating the eastern view. Despite the relocation of the entrance to the site and the evolution of transportation from horse-drawn carriages, with sideways outward views to forward-facing vehicles, the majority of the entry drive remains to the northern aspect of the development site, along with the open expanse of the foreground and its principal vistas within and beyond the demesne. These characteristics allow the historic intention of the designed landscape and its relationship with the estate structures to still be readily understood.

The construction of buildings between the Dublin Road and the castle forecourt will dilute the understanding of those intentions by partially cutting off views along the traditional entry approach to the principal remaining landscape features of the Pond, woodland, and to the Wicklow Mountains. However, the proposed development seeks to mitigate this by providing a central Avenue with high quality hard and soft landscaping through the site, onto which blocks are constructed on the north side only in order to address and focus upon the retained parkland setting of the woodland and open expanses of 1.4ha around the Pond. An opening in the southern site boundary to connect the development to Shanganagh Park will maintain views of the Wicklow Mountains from several areas within the site boundary. The central historic features comprising the Pond, the woodland and the substantial open areas around these sites also aid in reducing the insistence of the Avenue by providing a more informal context to its southern flank. In addition, the reduction of the flanking blocks to four storeys rather than the six allowed by the LAP is also a mitigating factor of the proposed development.

A scoping response from the Built Heritage section of DAU under the Department of Culture, Heritage & the Gaeltacht on 21 November 2019 expressed that the development should seek to respond to the character of the site. The Architectural Design Statement prepared by ABK Architects submitted alongside this EIAR notes the character areas of the new build proposed across the site: The Urban Quarter, located to the western end of the site, and the Residential Quarter, relegated to the north-eastern aspect of the development. The Urban Quarter is to entail buildings of a larger scale with a more regimented grid-like pattern to address the hard edge of the site. It will contain a Square which will serve civic functions near the entry to the development, around which the buildings will generally be orientated. At the vehicular entrance to the development along the western boundary, the Pond will form a direct and purposeful visual orientation point before the drive turns northward into the site. In the Urban Quarter plantings are also slightly more linear, which may differentiate the modern interventions from the historic, whilst some interspersions of irregular tree lines will soften the impact. The Residential Quarter, closer to the castle, will generally contain structures of a lower, more domestic scale which will address the open parkland to be retained around the Pond, with a visual focus on same and on the woodland as well as views toward to wider demesne and the Wicklow Mountains. This area is characterised by more informal perforations in the streetscapes, irregular blocking patterns and less regimented street and planting patterns which is intended to soften the grid lines of the development, and has come about as part of the iterative design process that has responded to the salient character of the Pond and the surrounding landscape.

In addition, the paths that provide access around the Pond landscape will be at irregular angles to aid in retaining the informal nature of the terrain in this area. Views from and within the area around the Pond and the woodland are retained as significant historic features of the landscape and form a focus of outdoor amenity within the development. Buildings will be pulled back from the Pond in order to protect this designed and ecological amenity, and previous proposals for structures that blocked views across the parkland have been removed. This assists in mitigating the impacts of urban / suburban elements and the attendant impacts on the grading of the site by retaining a significant proportion of the open terrain. In total, 39% of the main development site will be retained as open space. That geophysical testing and archaeological test trenches have identified a depth of spoil infill within the landscape aids in mitigating the associated civil services works, which will have some impact where the attenuation tank is intended for construction.

Furthermore, the use of high-quality landscaping materials alongside rain gardens and other strategic plantings will assist in beautifying the landscape, along with the removal of the allotments, football pitch

and depot. These mitigation measures are designed as an integral part of the lengths of roadway and paved systems of interconnectivity which are important to the function of the development.

It is noted however that the extent and scale of site grading, new paving and suburban streets required to facilitate the residential nature of the new development will mark a distinct departure from the character of the existing site and on the relict, historic character of the parkland landscape. Taken all together and with an appreciation for the quality of proposed materials and designs, the proposed new construction and landscape proposals will have a high likelihood of causing a direct, negative, significant, local and permanent impact on the historic parkland setting and character of the castle foreground.

The Ornamental Pond is currently overgrown and poorly managed; silting has encouraged the pond to dry out, which has affected its character and form. It is intended to be connected to a new surface stormwater drainage system, and to an attenuation tank. The pond will also lose part of its current context within the wide open landscape. This will entail a moderate likelihood of some moderate, negative impacts during construction with the potential for causing some impacts on the form or natural fabric of the pond, and significant, moderate impacts during operation. However, the civils works will also prevent the pond from overflowing in the event of heavy rain and the potential for erosion along its banks, or conversely from drying out. The proposed flora will provide a better visual amenity to the pond edge than is currently noted. As before, a generous buffer zone around the Pond with irregular paths and informal plantings will aid in retaining part of its setting beside the protected woodland. The development will also provide an impetus for proper landscape management. These factors reduces the civils impacts to slight, and the development impacts to moderate, with both having positive outcomes for this important feature. Further mitigation measures are proposed in Section 13.6.

The permeable treeline to the eastern boundary that is intended to mitigate impacts of the new development on the immediate setting of the castle will by default reduce, but not sever, the visual relationship between the castle and the protected views from the castle to Carrickgollogan. The siting of Block A, B, C E, F G and H will also reduce the clarity of these views. However, partial views from the castle's immediate site as well as from areas within the development site such as the Avenue, the Crescent and aspects of the open space around the Pond are likely to be retained due to the strategic siting of the proposed blocks. Protected views to the castle from within the parkland will be impacted by the siting of the new development, though views or glimpses will be maintained from the north-east of the woodland, Avenue and from portions of the northern entry drive or Crescent, as well as from some of the buildings themselves. The proposals and mitigation measures taken together are assessed to have a high likelihood of causing a direct, negative, significant, local and permanent impact on the experience of the protected views of the castle and Carrickgollogan. See Section 13.6.5 regarding further mitigation of views on the castle.

Protected views of the gate lodge from within the parkland are indicated on EIAR Chapter 13 Map 13D, which show these views as being taken from west of the Ornamental Pond. It is likely that development anywhere to the north-east of the Pond within the development site will obstruct these views. In the case of the proposed development they will be interrupted by the siting of Blocks A, E, F, G and H which are located in part to provide a larger buffer zone around the Pond. Short-range views will however be retained from other areas within the site such as the buffer zone and strategic areas of the Crescent. Views to the historic gate lodge from within the remaining parkland setting of the castle foreground assist in mitigating the previous interventions into the landscape by providing a traditional point of

reference at the front of the site. These works will have a high likelihood of causing a direct, negative, very significant, local and permanent impact on these protected views, which by retention of views from some areas within the development are downgraded to significant. Refer to Section 13.6 for further proposed mitigation measures which include positive associated outcomes, and which reduce the residual impacts.

The Landscape Character Area (No. 12 - Shanganagh) notes the indistinguishable character of the development site from such locations as Killiney Hill owing to the nature of the low-density housing that defines the area. The new buildings, by virtue of their height, are likely to be viewed from this location. The grey colour of the brick cladding proposed for some of the new build will assist in the visual recession of these structures in the wider landscape. The proposed development will have a moderate likelihood of causing a direct, negative, moderate, regional and permanent impact on the character of the Landscape Character Area as viewed from the prescribed locations under the CDP.

Due to the limited area within which development is proposed to connect the civil services for Shanganagh Castle to those at the proposed Woodbrook development, the prior alterations to the fields within which the works are to be carried out and the amended tree lines, there is considered to be no heritage impact of note by virtue of these works. No loss of the trees in hedgerow No. 7, located between the two playing fields south of the planted woodland, is proposed. The roots will be protected.

The proposed residential development at Shanganagh Castle lands is in line with the policies and objectives, which are to provide for new residential communities within the proposed development site, as outlined within both the Dun Laoghaire-Rathdown County Development Plan 2016-2022 and the Woodbrook-Shanganagh Local Area Plan 2017-2023. The above has been set out in order to respond to the LAP goal to "seek to ensure a high quality public realm that subtly embodies the essence of the demesne landscape character which defines the area." The above proposals have sought wherever feasible as part of the current remit to relate to the Masterplan for the wider area as set out by the local authority.

This Section should be read in conjunction with Sections 13.5.7 to 13.5.9 which also deal with elements of the landscape or external features of the site. Also see Section 13.4.2 regarding Cumulative Impacts.

13.5.7 Protected & Historic Trees / Bands of Trees

Two of the three salient Scots pine / Cedar trees are to be retained as integral features of the development. No. 791 will be retained and set to the rear of Block C within a private, residential enclosure. The proposed buildings and services of the development have been re-aligned during the iterative development process in order to accommodate both of these trees as features within the landscape, and in response to suggestions made by the Department of Culture, Heritage & the Gaeltacht. Tree tag no. 616 is protected under the LAP, but unfortunately it has fallen into poor condition according to the Arborist's report, and is scheduled to be safely removed. Tree no. 615 will be removed to accommodate roads and utilities.

Unfortunately a number of the historic trees within the demesne have been lost due to lack of woodland management and previous alteration of the landscape in the foreground of the castle. The above proposals constitute a moderate, negative loss to the remaining tree-lined character that epitomizes the approach to the castle and a loss of some natural elements of the historic parkland.

As mitigation, the copse of trees to the north-east of the gate lodge, the trees on the Ornamental Pond and the vast majority of the trees the planted woodland, all of which come under the protection of the LAP, will be retained. Only a narrow band of trees to the western border of the woodland will be removed, partially due to their poor condition as assessed by the Arborist's report, and also to provide a wider setting to the landscape area centred around the Ornamental Pond as well as to improve connections with the Shanganagh Park development to the south. Tree no. 791 will no longer form part of the sylvan, open character of the landscape but its retention will conversely ensure the survival of part of the historic fabric of the cultural environment and provide a point of reference to the layout of the historic demesne within the new development.

A woodland management scheme will be an integral part of the new development which will aid in safeguarding trees which are currently unattended, and will assist in clarifying the overgrowth that has impacted the character of the Ornamental Pond plantings in particular, as well as that of the woodland. This will likely stave off further loss to existing trees on site. New trees will be planted in an irregular manner along the buffer zone and in the principal demesne amenity to be retained around the Ornamental Pond in order to assist in retaining elements of the informal, Picturesque character within the site. Taken together, these proposals will constitute a high likelihood of a direct, negative, slight, local, permanent impact, but the retention of the large specimen tree, extensive woodlands/copses and their improved upkeep are considered a positive outcome directly associated with the proposed development. These proposals are largely in keeping with LAP objectives SC30, SC31 and SC33.

This section should be read together with Section 13.5.6.

13.5.8 Paths & Avenues

It is proposed to retain the woodland walking path to the south-west of the castle. This is a substantial part of the Picturesque estate that will form a central amenity of the new development, with the Cockburn Monument along its route. This is compliant with LAP objective SC19 which seeks to "ensure a high quality public realm that reflects the demesne and landscape character of the site," by virtue of making the historic public realm relevant in a modern context.

In order to provide a buffer to development to the north of the site boundary, namely at the Castle Farm estate, it has been proposed to push southward the northernmost residences of the new development. They are to be constructed upon the surviving section of the northern entry drive connecting the gate lodge to the castle forecourt. This requires the realignment of the entry drive, which constitutes a significant and negative impact on the historic environment. However, as a mitigatory measure the entry drive will be realigned in close proximity to its current location. The sweeping curvature of the drive will be slightly less pronounced but largely retained in principle as part of the traditional, oblique approach to the castle, which came about during the iterative process of the current development proposals, in a conscientious attempt to respect the character of the site. The location of the junction of the drive with the eastern development site boundary will be retained as existing. That the oblique or side-long view and approach to the castle will be retained is considered to be a positive and major mitigatory factor in the context of the larger development. With these mitigation measures, this will constitute a high likelihood of a negative, significant-moderate, local and permanent impact. This section should be read together with Section 13.5.6 which also relates to landscape features.

13.5.9 Boundary Walls – Existing & Proposed

There are no proposals to alter or amend the existing, original boundary walls, all of which lie outside of the development boundary. Given their very limited, truncated, altered and isolated nature, there are considered to be only non-significant, indirect impacts on their immediate setting by virtue of the proposed development.

It is proposed to demolish the modern rubble granite boundary wall along the western border of the site, fronting the Dublin Road. In accordance with the LAP Landscape Strategy set out in Map 13, there is to be a landscaped buffer of 20-30m in width to contain historic as well as new planted trees in an irregular manner, which aims to protect the sylvan character of the road in keeping with the Landscape Character Area Plan for Area 12 – Shanganagh. It is proposed to construct a new, low-level rubble granite boundary wall set back from the road with railings, which is in keeping with LAP Objective SC32. Two entrances are to be provided: a vehicular entrance to the south-west corner of the site, and a pedestrian and cyclist entrance to the north. The former is to be roughly in the same location as the existing entrance, whilst the latter will be closer to the former historic entrance near the gate lodge. Between these two entrances and set within the site boundary will be a landscaped buffer space for pedestrians with footpaths set amongst the plantings of trees.

Blocks A, E and G will face onto the Dublin Road and are each to be between 4-6 storeys. This is compliant with Objective SC5 of the LAP which promotes buildings of said height along the “south-western quadrant to provide a strong frontage on the Dublin Road and to bookend the existing urban edge.” The character of the Dublin Road in the immediate vicinity is largely dominated by boundary walls in close proximity to the public path, backed by tall, mature trees and shrubbery, which conceal open fields and largely low-rise residential and commercial development. Buildings of such stature in relative close proximity to the road and without the screen of a tall boundary wall along the edge of the public path will visually impact upon the existing pastoral, rural character of this stretch of the thoroughfare. The enclosed, private parkland nature of the castle foreground will be reduced. There is therefore a high likelihood of a direct, negative, significant, and permanent impact on the established nature of the Dublin Road in this area and on the parkland character.

It is nevertheless assessed that the proposed treatment of the boundary will provide a sense of presence and import to the site in the surrounding area. This, along with the aforementioned set-back of the buildings and the planted screening buffer, as well as the proposed grey tonality of the some of the proposed blocks, will assist in providing visual recession and mitigation. As set out in Section 13.5.6, the central Avenue proposed to be on a direct axis with the Castle is a departure from historic, oblique approaches to the castle, it will serve to create a visual presence and import to Shanganagh Castle for passers-by on the Dublin Road. The assessed impact is downgraded to significant-moderate. The removal of late-20th century gate piers and the reinstatement of an entrance closer to the historic entry point to the estate were centrally considered as part of the design development and are positive heritage outcomes of the proposals.

A summary of all impacts is detailed in the following Table 13.4.

Impact Phase	Architectural & Cultural Heritage Feature/ Site/ Structure	Likelihood	Impact Type	Quality	Significance	Extent	Duration	Integral Mitigation	Impact
Operational	1) Shanganagh Castle – Relationship with Development Site / Wider Setting	High	Direct	Negative	Very significant	Local	Permanent	Screening, and retention of visual presence in the castle foreground and with the planted woodland	Significant
Operational	2) Shanganagh Castle – Upstanding Archaeological Significance	Low	Direct	Negative	Significant	Local	Permanent	-	Significant Refer to Table 13.5 for further Residual Impacts based on Mitigation Measures set out in Section 13.6.
Operational	3) Shanganagh Castle – Approach & Protected Views to Same	High	Direct	Negative	Very significant	Local	Permanent	Screening and retention of views from some locations within site to Ornamental Pond, Woodland and Castle	Significant Refer to Table 13.5 for further Residual Impacts based on Mitigation Measures set out in Section 13.6.

Operational	4) Gate Lodge – Relationship with Shanganagh Castle	High	Direct	Negative	Very significant	Local	Permanent	Retention of an arcing, northern driveway linking gate lodge to the castle forecourt	Significant
Operational	5) Gate Lodge – Impact of New Development on Character / Setting	High	Direct	Negative	Very Significant	Local	Permanent	Screening and informal plantings in the immediate vicinity	Very Significant - Significant Refer to Table 13.5 for further Residual Impacts based on Mitigation Measures set out in Section 13.6.
Operational	6) Cockburn Monument- Thinning of Western Boundary of Woodland	Moderate	Direct	Negative	Moderate	Local	Reversible	Planting of new trees to the west of the woodland is an integral part of the proposed development and a mitigation measure; Additional trees along the eastern boundary will mitigate current views of the 1950s extension to the castle	Moderate-Slight, Neutral; note positive outcomes are associated with these works Refer to Table 13.5 for further Residual Impacts based on Mitigation Measures set out in Section 13.6.
Operational	7) Crinken Cottage – New Development	Low	Direct/ Indirect	Neutral	Imperceptible	Local	N/A	-	Imperceptible

Operational	8) Historic Boundary Walls	Low	Indirect	Neutral	Slight	Local	Permanent	Distance from development site and Screening provides considerable mitigation	Not Significant
Operational	9) Protected Views to Carrickgollogan from within Development Site	High	Direct	Negative	Very significant	Local	Permanent	Retained views from some strategic areas within Development Site	Significant
Operational	10) Historic Parkland Setting & Character of Castle Foreground	High	Direct	Negative	Very significant	Local	Permanent	Quality of new design and materials, varying of development character to respond to environment across the site, retention and addressing of Pond, Woodland, open space and views to Wicklow Mountains from some areas within Development Site	Significant
Operational	11) Landscape Character Area 12 – View from Killiney Hill	Moderate	Direct	Negative	Significant	Local	Permanent	Tonality of new build cladding will aid in visual recession into the wider landscape when viewed from afar	Moderate

Operational	12) Ornamental Pond- Effect of Development	High	Direct	Positive	Significant	Local	Long-term	A generous buffer zone will be retained around the site. The Pond will be de-silted and the planted island improved to augment its historic character.	Significant-Moderate Refer to Table 13.5 for further Residual Impacts based on Mitigation Measures set out in Section 13.6.
Operational	13) Protected / Historic Trees – Removal & Setting	High	Direct	Negative	Moderate	Local	Permanent	-	Moderate Refer to Table 13.5 for further Residual Impacts based on Mitigation Measures set out in Section 13.6.
Operational	14) Northern Approach Drive – Realignment	High	Direct	Negative	Significant	Local	Permanent	The development proposals are to retain the arcing form of the drive near its current location, to continue to approach the castle at a northerly oblique angle, and to interface with the eastern site boundary at the same location	Significant-Moderate

Operational	15) Western Boundary Treatment / Parkland Enclosure	High	Direct	Negative	Significant	Local	Permanent	<p>Planted c.25m buffer between the Dublin Road and the new buildings, some of which are to be clad in grey brick to reduce their visual impact</p> <p>Visual connectivity with and the local presence of Shanganagh Castle to be augmented as part of the proposals</p> <p>The reinstatement of an entrance near the historic entry point, removal of the gate piers and greater awareness of the castle from the public realm are considered positive heritage / interpretation impacts</p>	Significant-Moderate;
Operational	16) 19) Remaining RPS Sites (Table 13.2, Nos. 4, 5 & 6)	Low	Indirect	Neutral	Slight	Local	Permanent	Distance from development site, screening and tonality of building cladding provides mitigation	Not Significant
Operational	17) 20) Remaining NIAH Sites (Table 13.3, Nos. 6-13)	Low	Indirect	Neutral	Slight	Local	Permanent	Distance from development site, screening and tonality of building cladding provides mitigation	Not Significant

Table 13.4 Table Summary of Impacts

13.6 REMEDIAL AND MITIGATION MEASURES

13.6.1 Pre-Construction Phase Mitigation

Arch & CH Const 1: As an outcome of the baseline study conducted as part of this EIAR as well as the numerous previous surveys of the NIAH, the local authority, professional consultants and others, the existing characteristics of the development site have been well documented. It is nevertheless recommended that some additional photographic, written and/or measured recording be undertaken prior to development, with regards to any historic trees whose condition or position informs their removal, and of the Ornamental Pond. This is to inform the historic record and to provide information to assist with protection of important features. This is a positive outcome of the associated development.

13.6.2 Construction Phase Mitigation

Arch & CH Const 2: As a further mitigation measure for impacts to the Cockburn Monument (see Section 13.5.3), it is proposed that the monument would be repaired as part of development works. The stonework and render have been impacted by graffiti, and a specialist stone and masonry conservator should be engaged to carry out cleaning. The methodology used should be only as aggressive as necessary to remove the paint, and the fabric should be protected as part of these works. The final cleaning methodology should be subject to samples for the approval of the Conservation Officer of Dún Laoghaire-Rathdown County Council prior to wholesale cleaning. The same masonry specialist should also carry out gentle cleaning of the engraved plaque, and should repair cracks and other mechanical damage to the monument. Some consideration should be given to locating and reinstating the missing original elements of the monument, such as the urn and capital which once capped the column. Undergrowth around the monument and woodland walk should be removed, subject to any natural heritage sensitivities, in order to restore its character within the woodland walk. This is considered a positive outcome of the development and reduces the impact from moderate to slight.

Arch & CH Const 3: To protect the Ornamental Pond from changes to its salient, irregular form and size, the Contractor shall be required to ensure the provision of adequate measures during construction to ensure protection of the pond from a cultural heritage perspective and such measures shall be included in the Construction Environmental Management Plan to be agreed prior to commencement of development. These mitigation measures should ensure that the irregular form of the Pond is retained, that the works do not cause any permanent visual alteration of the feature or visual access to modern interventions, and that all steps are taken to protect the pond, its banks and historic plant life from current or future losses.

13.6.3 Operational Phase Mitigation

ARCH & CH OPER 1: As a further mitigation measure to the development of a significant historic country house demesne and in a Zone of Archaeological Potential, it is recommended that a cohesive, comprehensive scheme of interpretation be incorporated into the development site upon its completion. This should include all areas of special interest embodied within the development area and the surrounding areas as outlined by the National Inventory of Architectural Heritage. It should also include sign posts near Kiltuc Church, which is compliant with CDP Policy AR1. As some areas of interpretation are outside of the current development site, this interpretive scheme should be a joined-up approach involving all stakeholders and owners, lead by the local authority.

ARCH & CH OPER 2: It is recommended that the name 'Shanganagh' or 'Shanganagh Castle' be incorporated into the name and signage associated with the subject development. This is a positive impact associated with the proposed development which would reduce the residual impacts on the castle, its demesne and the associated archaeological sites.

ARCH & CH OPER 3: It is noted that a Steering Group has been assembled to manage the integration and refurbishment of the Shanganagh Castle. Continuation of these exercises and compliance with the LAP objectives (SC35 and SC37 in particular) for the castle as an integral part of the overall plan for the Woodbrook-Shanganagh site will considerably mitigate the residual impacts on the castle. This will also offer an opportunity for discovering further information about the archaeological significance and properties of the building, which would be a positive outcome and knock-on effect of the proposed development.

ARCH & CH OPER 4: It is recommended that a joined-up scheme of woodland management should form a central part of the Development Management & Maintenance Plan. In addition to any ecological or natural heritage considerations, cultural heritage and significance of specific trees, copses and woodland areas as well as that of the Ornamental Pond should inform the contents of this plan, and it should be agreed in tandem with the Conservation Department of the local authority.

ARCH & CH OPER 5: Objective SC26 of the LAP also aims to reinstate historic views towards the coastline from Shanganagh Castle by the removal of an element of the modern tree-planting east of the castle. Whilst outside the control of the current development, its execution will be an impetus for these works. When completed, this will serve to reconnect the castle with a significant portion of the lands which once formed the demesne and help mitigate the impacts on protected views to the castle from within the surrounding landscape.

13.7 RESIDUAL IMPACTS

The final or intended impact is that which occurs after the proposed mitigation measures have taken effect. When the recommended or innate mitigation measures of the proposed development are taken into consideration, the level of impact and the effects are at times notably reduced. The residual impacts on architectural and cultural / landscape heritage are detailed in Table 13.5, below.

Impact Phase	Architectural & Cultural Heritage Feature/ Site/ Structure	Likelihood	Impact Type	Quality	Significance	Extent	Duration	Proposed Mitigation	Residual Impact
Operational	1) Shanganagh Castle – Potential for Isolation of Development	High	Indirect	Negative	Significant	Regional	Long-Term	Steering Group is currently established to address the castle's re-use in compliance with Objective SC35 of the LAP which seeks to create a new community use for the castle at the heart of the surrounding area	Moderate Likelihood and Moderate Impacts
Operational	2) Shanganagh Castle – Upstanding Archaeological Significance	Low	Indirect	Negative	Significant	Local	Permanent	Proposal to refurbish and re-use Shanganagh Castle as community facility as per LAP objectives. Proposed refurbishment may present opportunity to discern early material within structure – creating positive impact	Slight
Operational –	3) Gate Lodge – Impact of New Development on Character / Setting	High	Direct	Negative	Very Significant	Local	Permanent	Heritage interpretation is seen as a positive outcome of the proposed development	Significant
Operational	4) Cockburn Monument- Thinning of Western Boundary of Woodland	Moderate	Direct	Negative	Moderate	Local	Reversible	Repair of the monument is a further mitigation measure to improve its character That the development is an impetus for improved woodland management will augment the character of the monument's current setting and is a positive outcome	Slight, Positive

Operational	5) Kiltuc Church – Visual Impact of New Development on Setting	High	Direct	Negative	Moderate	Local	Permanent	Improved interpretation of the archaeological heritage of the area, including the church ruins despite their location outside of the development boundary, is perceived to offset the detrimental impact to the setting	Proposed mitigation measured reduce impacts to Slight
Operational	6) Shanganagh Castle – Approach & Protected Views to Same	High	Direct	Negative	Very significant	Local	Permanent	Development provides an impetus for completion of the LAP Objective SC26, to reinstate historic views from the castle eastward toward the sea, which will also reconnect the castle with a portion of the former demesne and provide further views to the castle, which is a positive.	Significant-to-Moderate
Operational	7) Protected / Historic Trees – Removal & Setting	High	Direct	Negative	Moderate	Local	Permanent	Improved landscape and woodland management will protect the remaining historic trees and is considered a positive outcome of the development.	Slight
Construction	8) Ornamental Pond- Effect of Civil Works	Moderate	Direct	Negative	Moderate	Local	Permanent	Careful management by the civils subcontractor and implementation of construction-stage mitigation measures to be agreed	Slight
Operational	9) Ornamental Pond- Effect of Development	High	Direct	Positive	Significant	Local	Long-term	The development will provide an impetus for ongoing maintenance which shall be part of a Development Management & Maintenance Plan	Moderate

Table 13.5 Table Summary of Residual Impacts

13.8 MONITORING

No post-development monitoring is anticipated in respect of architectural and cultural heritage as all identified impacts will be mitigated at the pre-construction and construction phases of the Proposed Development. The only exception to this is the interpretation of the site which should be carefully implemented during the operational phase of the development, and any new research or information that may arise on the history or significance of the site should be added to the interpretive elements as it becomes available.

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CHAPTER FOURTEEN THE LANDSCAPE

14.1 INTRODUCTION

This chapter identifies and assesses the potential effects of the proposed residential housing development at Shanganagh Castle on the landscape and visual resource of the study area. It identifies the landscape mitigation and remediation measures that will be implemented to prevent, reduce or offset potential adverse landscape and visual effects or enhance potential beneficial effects, where possible.

In the context of this project 'landscape' includes also sub-urban townscape.

This Landscape and Visual Impact Assessment (LVIA) is supported by the following technical documents, which are enclosed as Appendices:

- Appendix 14.1: Booklet of Planning Application Photomontages prepared by G-Net 3D
- Appendix 14.2: 60588099-SHNG-LA-FIG-1 / FIGURE 14.1: Landscape Designations

Please note that references to the landscape designation figure in the text will be made as 'Figure 14.1'.

14.2 ASSESSMENT METHODOLOGY

This section sets out the methodology for the Landscape and Visual Impact Assessment (LVIA) as a result of the Proposed Development.

14.2.1 Landscape and Visual Impact Assessment Criteria

This chapter has been prepared in accordance with the Environmental Protection Agency (EPA) Draft guidance document 'Guidelines on the Information to be contained in Environmental Impact Assessment Reports, 2017'¹, EPA guidance documents. Best practice guidance, such as the "*Guidelines for Landscape and Visual Impact Assessment, 3rd Edition, 2013, Landscape Institute (UK) & IEMA*" provide specific guidelines for landscape and visual impact assessments. Therefore, a combination of the draft EPA guidelines, the Landscape Institute guidelines and professional experience has informed the methodology for the assessment herein. The Landscape Institute guidelines require the assessment to identify, predict and evaluate the significance of potential effects to landscape characteristics and established views. The assessment is based on an evaluation of the sensitivity to change and the magnitude of change for each landscape or visual receptor. For clarity, and in accordance with best practice, the assessment of potential effects on landscape character and visual amenity, although closely related, are undertaken separately.

¹ EPA, (2017) EPA Guidelines on the information to be contained in Environmental Assessment Reports, Draft, August 2017; Environmental Protection Agency, Co. Wexford, Ireland

The assessment acknowledges that landscape and visual effects change over time as the existing landscape external to the Proposed Development evolves and proposed planting establishes and matures.

The significance of an effect or impact is determined by two distinct considerations:

1. The **Nature** of the receptor likely to be affected, namely:
 - o The value of the receptor;
 - o The susceptibility of the receptor to the type of change arising from the Proposed Developments; and
 - o The sensitivity to change is related to the value attached to the receptor.

2. The **Magnitude** of the effect likely to occur, namely:
 - o The size and scale of the landscape and visual effect (for example, whether there is a complete or minor loss of a particular landscape element);
 - o The geographical extent of the areas that will be affected; and
 - o The duration of the effect and its reversibility
 - o The quality of the effect – whether it is neutral, positive or negative

The table below provides the definition of the duration of both landscape and visual effects.

Table 14.1: Definition of Duration of Effects

Duration	Description
Temporary	Effects lasting one year or less
Short Term	Effects lasting one to seven years
Medium Term	Effects lasting seven to fifteen years
Long Term	Effects lasting fifteen to sixty years
Permanent	Effects lasting over sixty years

The quality of both landscape and visual effects is defined in the table below.

Table 14. 2: Definition of Quality of Effects

Quality of Effects	Description
Neutral	This will neither enhance nor detract from the landscape character or view
Positive (Beneficial)	This will improve or enhance the landscape character or view
Negative (Adverse)	This will reduce the quality of the existing landscape character or view

14.2.2 Assessment Process

The assessment is undertaken based on the following key tasks and structure:

- Establishment of the Baseline or receiving environment;
- Appreciation of the Proposed Development; and
- Assessment of effects.

14.2.3 Establishment of the Receiving Environment

A baseline study has been undertaken through a combination of desk-based research and site appraisal in order to establish the existing conditions of the landscape and visual resources of the study area.

Desk based research has involved a review of mapping and aerial photography, relevant planning and policy documents, the relevant Landscape Character Assessments and other relevant documents and publications.

14.2.4 Appreciation of the Proposed Development

In order to be able to accurately assess the full extent of likely effects on landscape character and visual amenity it is essential to develop a thorough and detailed knowledge of the Proposed Development. This includes a comprehensive understanding of its location, nature and scale and is achieved through a review of detailed descriptions of the Proposed Development and drawings (see Planning Application Drawings accompanying the application) and an on-site appraisal.

14.2.6 Assessment of Effects

The landscape and visual impact assessment seeks to identify, predict and evaluate the significance of potential effects to landscape characteristics and established views. The assessments are based on an evaluation of the sensitivity to change and the magnitude of change for each landscape or visual receptor.

The assessment acknowledges that landscape and visual effects change over time as the existing landscape internal and external to the Proposed Development evolves. The assessment therefore reports on potential effects during both construction/operation and completion of the Proposed Development. The prominence of the Proposed Development in the landscape or view will vary according to the existing screening effects of local topography, intervening existing vegetation and building structures.

14.2.7 Landscape Effects

Landscape effects describe the impact on the fabric or structure of a landscape or landscape character. The assessment of landscape effects firstly requires the identification of the components of the landscape. The landscape components are also described as landscape receptors and comprise the following:

- Individual landscape elements or features;
- Specific aesthetic or perceptual aspects; and
- Landscape character, or the distinct, recognisable and consistent pattern of elements (natural and man-made) in the landscape that makes one landscape different from another.

The assessment will identify the interaction between these components and the Proposed Development during construction and operational phases. The condition of the landscape and any evidence of current pressures causing change in the landscape will also be documented and described.

Landscape Value

Landscape value is frequently addressed by reference to international, national, regional and local designations, determined by statutory and planning agencies. However, absence of such a designation does not necessarily imply a lack of quality or value. Factors such as accessibility and local scarcity can render areas of nationally unremarkable quality, highly valuable as a local resource. The quality

and condition is also considered in the determination of the value of a landscape. The evaluation of landscape value is undertaken with reference to the definitions stated in the table below:

Table 14.3 Landscape Value

Landscape Value	Classification Criteria
High	Nationally designated or iconic, unspoilt landscape with few, if any, degrading elements.
Medium	Regionally or locally designated landscape, or an undesignated landscape with locally important landmark features and some detracting elements.
Low	Undesignated landscape with few if any distinct features or with several degrading elements.

Landscape Susceptibility

Landscape susceptibility relates to the ability of a particular landscape to accommodate the Proposed Development. Landscape susceptibility is appraised through consideration of the baseline characteristics of the landscape, and in particular the scale or complexity of a given landscape.

The evaluation of landscape susceptibility is undertaken with reference to a three-point scale, as outlined in the table below:

Table 14.4 Landscape Susceptibility Criteria

Landscape Susceptibility	Classification Criteria
High	Small scale, intimate or complex landscape considered to be intolerant of even minor change.
Medium	Medium scale, more open or less complex landscape considered tolerant to some degree of change.
Low	Large scale, simple landscape considered tolerant of a large degree of change.

Landscape Sensitivity

Landscape sensitivity to change is determined by employing professional judgment to combine and analyse the identified landscape value, quality and susceptibility and is defined with reference to the scale outlined in the table below:

Table 14.5 Landscape Sensitivity to Change Criteria

Landscape Sensitivity	Classification Criteria
High	<ul style="list-style-type: none"> • Landscape characteristics or features with little or no capacity to absorb change without fundamentally altering their present character. • Landscape designated for its international or national landscape value or with highly valued features. • Outstanding example in the area of well cared for landscape or set of features that combine to give a particularly distinctive sense of place. • Few detracting or incongruous elements.

Landscape Sensitivity	Classification Criteria
Medium-High	<ul style="list-style-type: none"> • Landscape characteristics or features with a low capacity to absorb change without fundamentally altering their present character. • Landscape designated for regional or county-wide landscape value where the characteristics or qualities that provided the basis for their designation are apparent or a landscape with highly valued features locally. • Good example in the area of a well-cared for landscape or set of features that combine to give a clearly defined sense of place.
Medium	<ul style="list-style-type: none"> • Landscape characteristics or features with moderate capacity to absorb change without fundamentally altering their present character. • Landscape designated for its local landscape value or a regional designated landscape where the characteristics and qualities that led to the designation of the area are less apparent or are partially eroded or an undesignated landscape which may be valued locally – for example an important open space. • An example of a landscape or a set of features which is relatively coherent, with a good but not exceptional sense of place - occasional buildings and spaces may lack quality and cohesion.
Medium-Low	<ul style="list-style-type: none"> • Landscape characteristics or features which are reasonably tolerant of change without detriment to their present character. • No designation present or of little local value. • An example of an un-stimulating landscape or set of features; with some areas lacking a sense of place and identity.
Low	<ul style="list-style-type: none"> • Landscape characteristics or features which are tolerant of change without detriment to their present character. • An area with a weak sense of place and/or poorly defined character /identity. • No designation present or of low local value or in poor condition. • An example of monotonous unattractive visually conflicting or degraded landscape or set of features.

Magnitude of Landscape Change

Magnitude of change is an expression of the size or scale of change in the landscape, the geographical extent of the area influenced and the duration and reversibility of the resultant effect. The variables involved are described below:

- The extent of existing landscape elements that will be lost, the protection of the total extent that this represents and the contribution of that element to the character of the landscape;
- The extent to which aesthetic or perceptual aspects of the landscape are altered either by removal of existing components of the landscape or by addition of new ones;
- Whether the effect changes the key characteristics of the landscape, which are integral to its distinctive character;
- The geographic area over which the landscape effects will be felt (within the Proposed Development site itself; the immediate setting of the Proposed Development site; at the scale of

the landscape type or character area; on a larger scale influencing several landscape types or character areas); and

- The duration of the effects (short term, medium term or long term) and the reversibility of the effect (whether it is permanent, temporary or partially reversible).

Changes to landscape characteristics can be both direct and indirect. **Direct change** occurs where the Proposed Development will result in a physical change to the landscape within or adjacent to the Proposed Development site. **Indirect changes** are a consequence of the direct changes resulting from the Proposed Development. They can often occur away from the Proposed Development site (for example, off-site construction staff parking) and may be a result of a sequence of interrelationships or a complex pathway (for example, a new road or footpath construction may increase public access and associated problems e.g. littering). They may be separated by distance or in time from the source of the effects. The magnitude of change affecting the baseline landscape resource is based on an interpretation of a combination of the criteria set out in the table below:

Table 14.6 Magnitude of Landscape Change Criteria (Landscape Effects)

Magnitude of Landscape Change	Classification Criteria
None	<ul style="list-style-type: none"> • No change.
Negligible	<ul style="list-style-type: none"> • Little perceptible change.
Low	<ul style="list-style-type: none"> • Minor change, affecting some characteristics and the experience of the landscape to an extent; and • Introduction of elements that is not uncharacteristic.
Medium	<ul style="list-style-type: none"> • Noticeable change, affecting some key characteristics and the experience of the landscape; and • Introduction of some uncharacteristic elements.
High	<ul style="list-style-type: none"> • Noticeable change, affecting many key characteristics and the experience of the landscape; and • Introduction of many incongruous developments
Very High	<ul style="list-style-type: none"> • Highly noticeable change, affecting most key characteristics and dominating the experience of the landscape; and • Introduction of highly incongruous development.

14.2.8 Visual Effects

Visual effects are determined by the extent of visibility and the nature of the visibility (i.e. how a development is seen within the landscape); for example, whether it appears integrated and balanced within the visual composition of a view or whether it creates a focal point.

Negative visual effects may occur through the intrusion of new elements into established views, which are out of keeping with the existing structure, scale and composition of the view. Visual effects may also be beneficial, where an attractive focus is created in a previously unremarkable view or the influence of

previously detracting features is reduced. The significance of effects will vary, depending on the nature and degree of change experienced and the perceived value and composition of the existing view.

Receptors

For there to be a visual impact, there is the need for a viewer. Views experienced from locations such as settlements, recognised routes and popular vantage points used by the public have been included in the assessment. Receptors are the viewers at these locations. The degree to which receptors, i.e. people, will be affected by changes as a result of the Proposed Development depends on a number of factors, including:

- Receptor activities, such as taking part in leisure, recreational and sporting activities, travelling or working;
- Whether receptors are likely to be stationary or moving and how long they will be exposed to the change at any one time;
- The importance of the location, as reflected by designations, inclusion in guidebooks or other travel literature, or the facilities provided for visitors;
- The extent of the route or area over which the changes will be visible;
- Whether receptors will be exposed to the change daily, frequently, occasionally or rarely;
- The orientation of receptors in relation to the Proposed Development and whether views are open or intermittent;
- Protection of the developments that will be visible (full, sections or none);
- Viewing direction, distance (i.e. short-, medium- and long-distance views) and elevation;
- Nature of the viewing experience (for example, static views, views from settlements and views from sequential points along routes);
- Accessibility of viewpoint (public or private, ease of access);
- Nature of changes (for example, changes in the existing skyline profile, creation of a new visual focus in the view, introduction of new man-made objects, changes in visual simplicity or complexity, alteration of visual scale, landform and change to the degree of visual enclosure); and
- Nature of visual receptors (type, potential number and sensitivity of viewers who may be affected).

Value of the View

Value of the view is an appraisal of the value attached to views and is often informed by the appearance on Ordnance Survey of tourist maps and in guidebooks, literature or art. Value can also be indicated by the provision of parking or services and signage and interpretation. The nature and composition of the view is also an indicator. The value of the view is determined with reference to the definitions outlined in the table below:

Table 14.7 Value of the View

Value	Classification Criteria
High	Nationally recognised view of the landscape, with no detracting elements.
Medium	Regionally or locally recognised view, or unrecognised but pleasing and well composed view, with few detracting elements.
Low	Typical or poorly composed view often with numerous detracting elements.

Visual Susceptibility

The GLVIA guidelines identify that the susceptibility of visual receptors to changes in views and visual amenity is a function of:

- The occupation or activity of people experiencing the view at a particular location; and
- The extent to which their attention or interest may therefore be focused on the views and visual amenity they experience at particular locations.

For example, residents in their home, walkers whose interest is likely to be focused on the landscape or a particular view, or visitors at an attraction where views are an important part of the experience often indicate a higher level of susceptibility. Whereas receptors occupied in outdoor sport, where views are not important, or at their place of work, are often considered less susceptible to change. Visual susceptibility is determined with reference to the three-point scale and criteria outlined in the table below:

Table 14.8 Visual Susceptibility

Susceptibility	Classification Criteria
High	Receptors for which the view is of primary importance and are likely to notice even minor change.
Medium	Receptors for which the view is important but not the primary focus and are tolerant of some change.
Low	Receptors for which the view is incidental or unimportant and is tolerant of a high degree of change

Visual Sensitivity

Sensitivity to change considers the nature of the receptor; for example, a person occupying a residential dwelling is generally more sensitive to change than someone working in a factory unit. The importance of the view experienced by the receptor also contributes to an understanding of the susceptibility of the visual receptor to change as well as the value attached to the view.

A judgement is also made on the value attached to the views experienced. This takes account of:

- Recognition of the value attached to particular views, for example in relation to heritage assets, or through planning designations;
- Indicators of the value attached to views by visitors, for example through appearance in guidebooks or on tourist maps, provision of facilities for their enjoyment (sign boards, interpretive material) and references to them in literature or art; and
- Possible local value; it is important to note that the absence of view recognition does not preclude local value, as a view may be important as a resource in the local or immediate environment due to its relative rarity or local importance.

The visual sensitivity to change is based on interpretation of a combination of all or some of the criteria outlined in the table below:

Table 14.9 Sensitivity to Change Criteria

Visual Sensitivity	Classification Criteria
High	<ul style="list-style-type: none"> • Users of outdoor recreational facilities, on recognised national cycling or walking routes or in nationally designated landscapes. • Residential buildings.
Medium-high	<ul style="list-style-type: none"> • Users of outdoor recreational facilities, in highly valued landscapes or locally designated • landscapes or on local recreational routes that are well publicised in guide books. • Road and rail users in nationally designated landscapes or on recognised scenic routes, likely to be travelling to enjoy the view.
Medium	<ul style="list-style-type: none"> • Users of outdoor recreational facilities including public open space in moderately valued landscapes. • Users of primary transport road network, orientated towards the Proposed Development, likely to be travelling for other purposes than just the view.
Medium-Low	<ul style="list-style-type: none"> • People engaged in active outdoor sports or recreation and less likely to focus on the view. • Primary transport road network and rail users likely to be travelling to work with oblique views of the project or users of minor road network.
Low	<ul style="list-style-type: none"> • People engaged in work activities indoors, with limited opportunity for views of the Proposed Development.

Magnitude of Visual Change

Visual effects are direct effects as the magnitude of change within an existing view will be determined by the extent of visibility of the Proposed Development. The magnitude of the visual effect resulting from the development at any particular viewpoint or receptor is based on the size or scale of change in the view, the geographical extent of the area influenced and its duration and reversibility. The variables involved are described overleaf.

- The scale of the change in the view with respect to the loss or addition of features in the view and changes in its composition, including the protection of the view occupied by the development;
- The degree of contrast or integration of any new features or changes in the landscape form, scale, mass, line, height, skylining, back-grounding, visual clues, focal points, colour and texture;
- The nature of the view of the Proposed Development, in relation to the amount of time over which it will be experienced and whether views will be full, partial or glimpses;
- The angle of view in relation to the main activity of the receptor, distance of the viewpoint from the development and the extent of the area over which the changes will be visible; and
- The duration of the effects (short term, medium term or long term) and the reversibility of the effect (whether it is permanent, temporary or partially reversible).

The magnitude of visual effect resulting from the development at any particular viewpoint or receptor is based on the interpretation of the above range of factors and is set out in the table below:

Table 14.10 Magnitude of Visual Change Criteria (Visual effects)

Magnitude of Visual Change	Classification Criteria
None	No change in the existing view.
Negligible	The development will cause a barely discernible change in the existing view.
Low	The development will cause very minor changes to the view over a wide area or minor changes over a limited area.
Medium	The development will cause modest changes to the existing view over a wide area or noticeable change over a limited area.
High	The development will cause a considerable change in the existing view over a wide area or a significant change over a limited area.
Very High	The development will cause significant changes in the existing view over a wide area or a change which will dominate over a limited area.

14.2.9 Significance Criteria

The objective of the assessment process is to identify and evaluate the potentially significant effects arising from the Proposed Development. The assessment will identify the residual effects likely to arise from the finalised design considering mitigation measures and the change over time.

The significance of effects is assessed by considering the sensitivity of the receptor and the predicted magnitude of effect in relation to the baseline conditions. In order to provide a level of consistency and transparency to the assessment and allow comparisons to be made between the various landscape and visual receptors subject to assessment, the assessment of significance is informed by pre-defined criteria as outlined in the table below. When assessing significance, individual effects may fall across several different categories of significance and professional judgement is therefore used to determine which category of significance best fits the overall effect to a landscape or visual receptor.

The significance of the effects can be adverse (negative) or beneficial (positive) according to the definitions set out in the table overleaf.

Table 14.11 Categories of Significance of Landscape and Visual Effects

Significance Category	Description of Effect
Profound	An effect that obliterates sensitive characteristics within the landscape and/or visual environment.
Very Significant	An effect which, by its character, magnitude, duration, or intensity significantly alters most of a sensitive aspect of the landscape and/or visual environment.
Significant	An effect which, by its character, magnitude, duration, or intensity alters a sensitive aspect of the landscape and/or visual environment.
Moderate	An effect that alters the landscape in a manner that is consistent with existing and emerging baseline trends.
Slight	An effect which causes noticeable changes in the landscape and/or visual environment without affecting its sensitivities.

Not Significant	An effect which causes noticeable changes in the landscape and/or visual environment but without significant landscape and/or visual consequences.
Imperceptible	An effect capable of measurement but without significant landscape and/or visual consequences.

The significance of the effect is determined by considering the magnitude of the effect and the quality of the baseline environment affected by the Proposed Development. The basis for consideration of the significance of effects is included below.

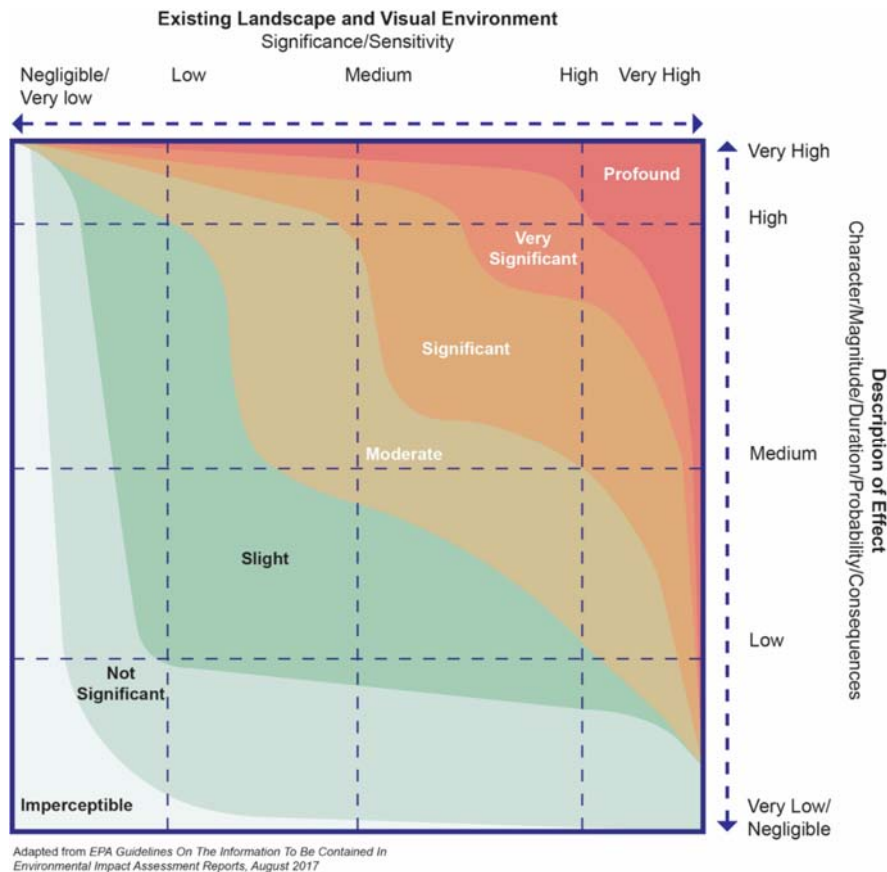


Image 14.1 Basis for consideration of significance of effects

Effects will be assessed for all phases of the Proposed Development. Construction effects are considered to be temporary, short term effects which occur during the construction/decommission phase only. Operational/residual effects are those long-term effects, which will occur as a result of the presence or operation of the development.

The quality of each effect is based on the ability of the landscape character or visual receptor to accommodate the Proposed Development, and the impact of the development within the receiving context. Once this is done, the quality of the effect is then assessed as being neutral, beneficial or adverse. A change to the landscape or visual resource is not considered to be adverse simply because it constitutes an alteration to the existing situation.

14.2.10 Cumulative Effects

The approach used to determine cumulative effects has drawn on guidance on cumulative impact assessment published by the GLVIA3. Cumulative landscape and visual effects may result from

additional changes to the baseline townscape or views as a result of the Proposed Development in conjunction with other developments of a similar type and scale.

The cumulative assessment includes developments that are consented but not constructed, that are the subject of undetermined applications, or are currently at scoping which are similar in type and scale to the Proposed Development.

Relevant cumulative developments have been reviewed from known planning applications available on 'Planning Search' of Dún Laoghaire-Rathdown County Council's website and known proposed public sector projects.

Magnitude of Cumulative Effects

The principle of magnitude of cumulative effects makes it possible for the proposed scheme to have a major impact on a particular receptor, while having only a minor cumulative impact in conjunction with other existing developments.

The magnitude of cumulative effects arising from the proposed scheme is assessed as **very high, high, medium, low or negligible, with intermediate categories**, based on interpretation of the following parameters:

- The additional extent, direction and distribution of existing and other developments in combination with the Proposed Development;
- The distance between the viewpoint, the Proposed Development and the cumulative developments; and
- The townscape setting, context and degree of visual coalescence of existing and Proposed Development and cumulative developments.

Significance of Cumulative Effects

As for the assessment of townscape and visual effects, the significance of any cumulative effects follows a similar classification and will be assessed as **major, moderate, minor or negligible, with intermediate categories**. This considers both receptor sensitivity and the predicted magnitude of change.

Limitations of Cumulative Assessment

The cumulative assessment focuses on potential cumulative effects relating to the main permanent structure of each cumulative development. This is due to the uncertainty of the timing of construction activities for each of the identified developments. As a result, temporary structures and activity relating to construction have not been considered within the cumulative assessment.

14.2.11 Fieldwork

A site survey was carried out on the 26th February 2019 and 21st August 2019. The survey examined the potential visibility of the Proposed Development within the study area and the wider landscape, considering topography, existing screening vegetation and other localised factors.

14.2.12 Selection of Viewpoints

Viewpoint selection has been carried out according to the current best practice standards and the industry guidelines: 'Visual Representation of Development Proposals', Landscape Institute, Technical Guidance Note 06/19, 17 September 2019.

It is not feasible to take photography from every possible viewpoint located in the study area. Photography has been taken from viewpoints, which are representative of the nature of visibility at various distances and in various contexts. Viewpoint photography is used as a tool to come to understand the nature of the potential residual effects. The selection process of viewpoint locations is as follows:

- The location of viewpoints within the study area is informed by desktop and site surveys;
- Identification and selection of representative viewpoints showing typical open or intermittent views within a local area, which will be frequently experienced by a range of viewers; and
- Identification and selection of specific viewpoints from key viewpoints in the landscape such as routes or locations valued for their scenic amenity, main settlements etc.

14.2.13 Photomontages

Photomontages are photorealistic visualisations produced using specialist software. They illustrate the likely future appearance of the Proposed Development from a specific viewing point. They are useful tools for examining the impact of the development from a number of critical viewpoint positions along the public road network within the study area.

However, photomontages in themselves can never provide the full picture in terms of potential effects, they can only inform the assessment process by which judgements are made. A visualisation can never show exactly what the Proposed Development will look like in reality due to factors such as; different lighting, weather and seasonal conditions which vary through time and the resolution of the image. As the photomontages are representative of viewing conditions encountered, some of them may show existing buildings or vegetation screening some or all parts of the developments. Such conditions are normal and representative.

The images provided give a reasonable impression of the scale of the development and the distance to the development but can never be 100% accurate. It is recommended that decision-makers and any interested parties or members of the public should ideally visit the viewpoints on site, where visualisations can be compared to the 'real life' view, and the full impact of the Proposed Development can be understood.

The landscape and visual impact assessment on site identified a range of viewpoints located within the study area at varying distances from the Proposed Development to show the effect of the development in key close, middle and distant views.

Viewpoints / Photomontages 1-6 show the Proposed Development including the following information for each:

- Existing View - Showing the baseline image; and

- Photomontage - Showing the Proposed Development including all visible components including landscape mitigation measures at Year 5

Photomontage images have been produced with reference to best practice and the following industry guidelines:

- 'Visual Representation of Development Proposals', Landscape Institute, Technical Guidance Note 06/19, 17 September 2019;
- Guidelines for Landscape and Visual Impact Assessment (GLVIA), Third Edition, Landscape Institute and Institute of Environmental Management and Assessment, IEMA, 2013; and
- Visual Representation of Wind Farms, Version 2.2, Scottish Natural Heritage, February 2017 (in relation to viewpoint selection, technical equipment, function and limitations of visualisations).

14.2.14 Zone of Theoretical Visibility (ZTV)

ZTV mapping does not consider the screening effects of vegetation or built structures and can omit topographical variations of up to 10m. Therefore, ZTV mapping's principal use is to identify viewing points for further analysis. Due to size and scale of the Proposed Development and extensive mature vegetation adjacent to the proposed site location, the production of mapping indicating the theoretical extend of the area from which the Proposed Development is likely to be visible has been considered as not useful as the visibility is greatly depending on vegetation cover. The assessment relied therefore on a comprehensive site survey to establish the nature of visibility within the study area and to identify key viewpoint locations.

14.2.15 Scope

Study Area

A study area of 1km radius from the boundary of the Proposed Development has been selected to identify potential significant landscape and visual effects. The extent of the study area has been identified through a review of maps, aerial photographs of the development site and subsequently verified during site surveys.

It is acknowledged that the Proposed Development may be visible from locations beyond the study area, mainly from elevated locations, and as such it is important to note that the 1km study area defines the area within which potential effects could be significant, rather than defining the extent of visibility. Photomontages have been produced to describe and illustrate views from representative viewpoints located within the study area.

Consultation

Consultations have been undertaken with Dún Laoghaire-Rathdown County Council from an early stage in the Landscape and Visual Impact Assessment (LVIA) process. This has enabled the desk study and data collection to be supplemented. An agreement was made on the list of representative viewpoints from which photomontages were produced. The table below provides an overview of consultations carried out.

Table 14.12 Consultation Overview

Consultee and Date	Consultation matter	Issue Raised	Response / Action taken
Dún Laoghaire-Rathdown County Council 21 st August 2019	Review of selection of viewpoints for photomontages	No further comments were received from Dún Laoghaire-Rathdown County Council	Production of photomontages as per originally suggested viewpoints

Temporal Scope

The type and duration of landscape and visual effects falls within two main stages as follows:

Construction (temporary and of short duration)

- Potential physical effects arising from construction of the development on the landscape resource within the development application boundary area;
- Potential effects to landscape character or visual amenity within the wider study area as a result of visibility of construction activities or the development during construction;
- Effects of temporary site infrastructure such as – site traffic; construction compounds; and
- Potential effects of partially built development in various stages of construction.

Operational

- Potential effects of the Proposed Development on landscape resources and landscape character, including the perceptual qualities of the landscape;
- Potential effects of the Proposed Development on views and visual amenity; and
- Potential cumulative effects of the development in combination with other planned and Proposed Developments of a similar type and scale upon the landscape and visual resource of the study area.

Effects Scoped Out

The Proposed Development will become a permanent feature in the landscape following the completion of construction works. The assessment takes account of this in the determination of residual landscape and visual effects.

14.3 RECEIVING ENVIRONMENT

14.3.1 Site Context

The Proposed Development site is located within a generally flat to gently undulating landscape within the south eastern section of Dún Laoghaire-Rathdown County Council lands, in proximity with the coastline of the Irish Sea to the east, and the boundary with Wicklow County Council lands to the south. The site is immediately bound by Castle Farm residential area to the north, Shanganagh Castle to the north east, Shanganagh Park to the south and east, and the R119 / Dublin Road to the west. Further within the study area, the village centre of Shankill lies just outside the 1km study area boundary, with

primarily residential development defining much of the land use and landscape character between Shankill and the Proposed Development site. Public and private open green space defines much of the study area within an arc from north east to south around the subject site, which includes lands associated with Shanganagh Park, Woodbrook Golf Club and Rosedale House. Further south, Shanganagh Cemetery is located to the immediate north of several agricultural fields defined by mature hedgerows, in addition to a mix of smaller residential developments along with institutional lands associated with St. James Church Crinken and Woodbrook College.

The M11 road corridor divides the landscape to the west and is bound by areas of agricultural land with mature hedgerow boundaries, parcels of open land with stands of mature tree vegetation, along with residential development to the north west of the study area. Further to the west, the land rises to form a backdrop of the Dublin and Wicklow Mountains in available views from the subject site, characterised by mainly vegetated hillsides, ridgeline and scattered residential development.

14.3.2 Landscape Character Assessment

Dún Laoghaire-Rathdown County Development Plan 2016-2022 (DLRCDP), divides the County into 14 Landscape Character Areas (LCA's). The Proposed Development site is predominantly located outside any of the designated LCA's, with a limited section of upgraded and extended footpath within Shanganagh Park extending into LCA 12 – Shanganagh to the south. The majority of the surrounding study area is located within LCA 12 – 'Shanganagh'. The Landscape Character Assessment describes this as the area between Shankill and Bray which includes the cemetery at Shanganagh, Shanganagh Park and Woodbrook golf course. In relation to the protection of Landscape Character Areas, the DLRCDP identifies *Policy LHB2: Preservation of Landscape Character Areas* in terms of the conservation and enhancement of the distinctive landscape character of the County by "...protecting landscape elements of significance that are intrinsically important or contribute to the general amenity of the County."

The following items describe the sensitivity/strategy, as contained within the Landscape Character Assessment with regards to development within LCA 12:

- *"The functioning of this area, as a green belt is reassessed in light of its proximity to the DART line and also given that the vista nature of Crinken can be retained while allowing further development"*.
- *"The sylvan character of the Old Dublin Road shall be maintained."*
- *"To have regard to the policies and objectives of the Woodbrook-Shanganagh Local Area Plan 2006-2016 adopted in November 2006."*

The western and north western sections of the study area, outside the boundary of the Proposed Development site, includes sections of LCA 10 – 'Rathmichael'. This is characterised as an area where several roads with largely intact hedgerows traverse the area, giving a rural character. The Landscape Character Assessment prescribes that the natural character of this LCA is maintained, along with the protection of deciduous tree belts.

To the west and south west, the wider study area extends to a limited section of LCA 11 – 'Ballyman'. This area, which partly falls outside of the Dún Laoghaire-Rathdown County Council jurisdiction into Wicklow County Council lands, is described as distinctively agricultural and low lying in nature with

views across to Bray Head and the Sugar Loaf. Within this LCA, it is a requirement to protect existing hedgerows as identified and categorised within the Dún Laoghaire-Rathdown hedgerow survey. Landscape Character Areas as identified within Dún Laoghaire-Rathdown County Development Plan 2016-2022 are illustrated on the map hereunder.

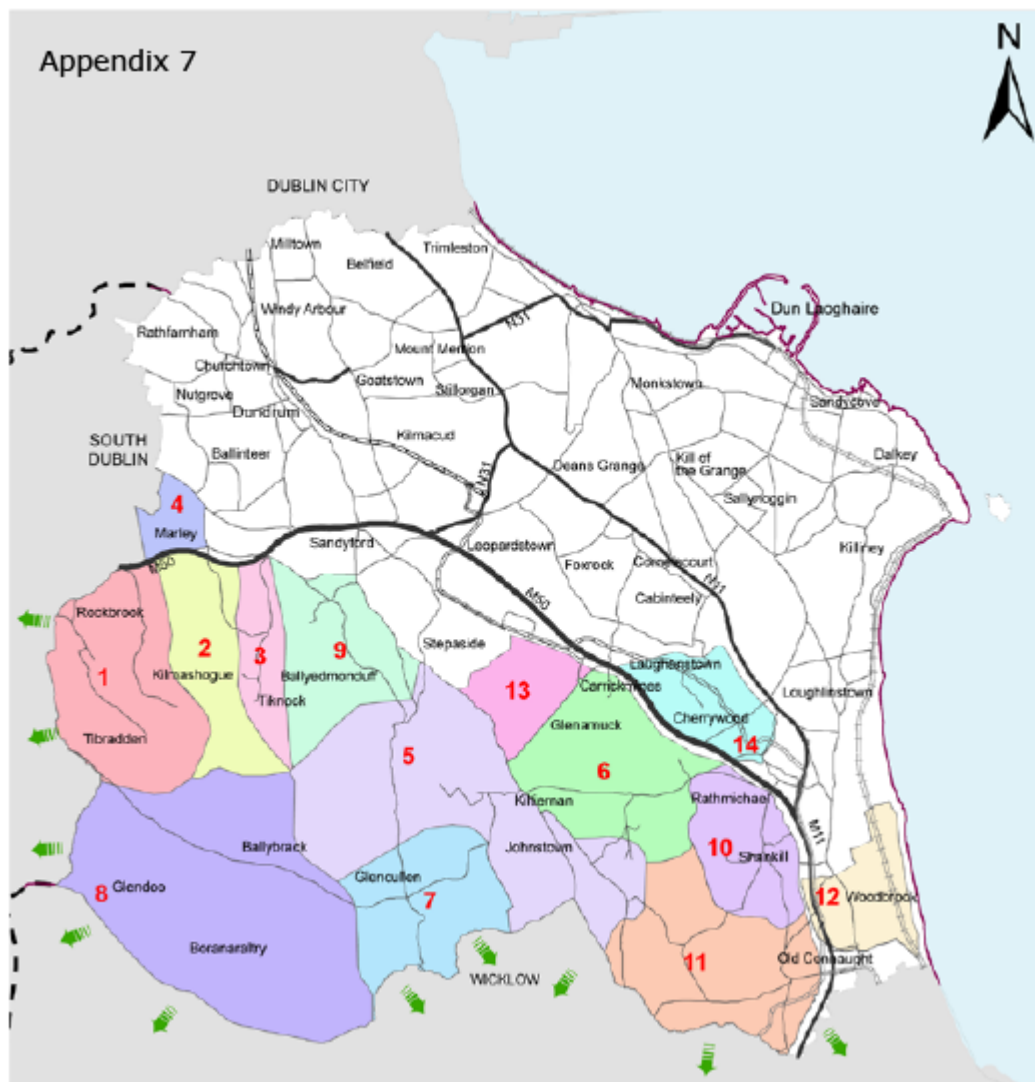


Image 14.2 Landscape Character Areas (Appendix 7, Dún Laoghaire-Rathdown County Development Plan 2016-2022)

14.3.3 Landscape Designations

The Proposed Development site is located within the boundary of the current Dún Laoghaire-Rathdown County Development Plan 2016-2022 (DLRCDP). In addition, the subject site is situated within the lands pertaining to the Woodbrook-Shanganagh Local Area Plan 2017-2023 (adopted on the 03/07/17). Both the DLRCDP 2016-2022 and Woodbrook-Shanganagh LAP 2017 have been considered in this assessment and are illustrated on Figure 14.1 Landscape Designations within Appendix 14.2.

14.3.4 Dún Laoghaire-Rathdown County Development Plan 2016-2022

The Dún Laoghaire-Rathdown County Development Plan 2016-2022 contains the Green County Strategy which is structured around 1) Landscape, Heritage and Biodiversity, and 2) Open Space and

Recreation. The strategy aims to “... promote and develop a coherent and integrated green infrastructure network across Dún Laoghaire-Rathdown which will secure and enhance biodiversity – including the protection of Natura 2000 sites – provide readily accessible parks, open spaces and recreational facilities, maintain historic and landscape character areas and provide for the sustainable management of water...”.

The Green County strategy recognises areas of significant landscape importance and in this regard, creates a distinction between “(i) Landscape and (ii) The Coast and the Mountains” in respect of policies relating to the protection of such landscape areas. Relevant policies referred to for the purposes of this assessment are identified as follows:

(i) Landscape

- **Policy LHB2: Preservation of Landscape Character Areas** (as identified above in Section 14.5.2)
- **Policy LHB4: High Amenity Zones** - “It is Council policy to conserve and enhance existing High Amenity zones and to seek to manage these and other areas to absorb further recreational uses and activity without damaging the amenities that affords them their special character”.
- **Policy LHB5: Historic Landscape Character Areas** - “In assessing development proposals and in the preparation of plans it is Council policy to have regard to the recommendations and findings of the Historic Character Assessments (HLCA) already undertaken for a number of the urban-rural fringe areas of the County most likely to come under development pressure”.
- **Policy LHB6: Views and Prospects** - “It is Council policy to protect and encourage the enjoyment of views and prospects of special amenity value of special interests”.

(ii) The Coast and the Mountains

- **Policy LHB15: Recreation Access Routes** - “It is Council policy to preserve all recreation Access Routes which contribute to general amenity”.
- **Policy LHB17: Trails, Hiking and Walking Routes** - “It is Council policy to promote the development of Regional and local networks of hiking and walking routes/trails and to develop Slí na Sláinte Routes. These should be waymarked / signposted and listed where feasible and appropriate”.

Furthermore, the Green County Strategy sets out the following relevant policies with regards to *Open Space and Recreation*:

- **Policy OSR1: Green Infrastructure Strategy** - “It is Council policy to protect existing green infrastructure and encourage and facilitate, in consultation with relevant stakeholders, the development of new green infrastructure, recognising the synergies that can be achieved with regard to the following, sustainable transport, provision of open space amenities, sustainable management of water, protection and management of biodiversity and protection of cultural and built heritage”.

A Green Infrastructure Strategy for the County was prepared in 2014, and it is intended to continue the implementation of this strategy during the time period of the current Dún Laoghaire-Rathdown County Development Plan.

- **Policy OSR2: Open Space Strategy** - “In 2009 the Council prepared a comprehensive audit of the existing and proposed open space provision in Dún Laoghaire-Rathdown. This culminated in the publication of the Open Space Strategy for the County, for the period 2012-2015. The actions

and recommendations detailed in the Strategy will be implemented as appropriate and as resources allow”.

- **Policy OSR3: Hierarchy of Parks and Open Space** - *“It is Council policy to provide a hierarchy of quality parks and public open spaces which vary in size and nature and are designed to serve the needs of all members of the community, including people with mobility impairments, by being readily accessible and at a convenient distance from their home and/or places of work”.*
- **Policy OSR7: Trees and Woodland** - *“It is Council policy to implement the objectives and policies of the Tree Strategy for the County – ‘dlr TREES 2011-2015’ - to ensure that the tree cover in the County is managed and developed to optimise the environmental, climatic and educational benefits which derive from an ‘urban forest’”.*
- **Policy OSR8: Greenways Network** - *“It is Council policy to develop a comprehensive network of County Greenways linking parks and public open spaces and to liaise with adjoining local authorities and other stakeholders to achieve and improve wider external linkages and corridors”.*

The following designations as identified within Dún Laoghaire-Rathdown County Development Plan 2016-2022 have been considered for the purpose of this assessment:

Recreation Access Routes

The current development plan identifies Recreation Access Routes (RARs) within the lands under the control of Coillte. Coillte Teoranta, the State Forestry Board, was established to manage the public forest built up since the commencement of State planting and is the largest provider of forest recreation in Ireland. It is an objective of the Council to secure the retention of those established Recreation Access Routes and to investigate the provision of additional agreed Recreational Access Routes in conjunction with the Dublin Mountains Partnership. There is one designated recreational access route within the study area approximately 500m from the proposed Development site. The route connects Ferndale Road via Rathmichael Wood to Puck’s Castle Lane.

Wicklow Way Walking Route

The Wicklow Way is a 132 km trail that winds its way south from Dublin through the Wicklow Mountains and is recognised as Ireland’s first signposted long-distance hiking trail. This route is located outside of the core study area for this assessment.

Views to be Preserved

There is one relevant designated protected viewing corridor within the core study area. This relates to eastward views from along Ferndale Road. It is a policy within the current development plan to prohibit any new development that would interfere or diminish the enjoyment of such views.

Trees and Woodland

The Council has prepared a Tree Strategy for the County, which includes the objectives and policies aimed at promoting the care and protection of existing trees, and for the planting of more trees in the right places. Significant groups of trees worthy of retention have been identified on Map 14, shown below, as contained within the Dún Laoghaire-Rathdown County Development Plan 2016-2022. A full arborist report and drawings identifying the location, condition and retention and removal of existing trees is provided within Appendix 2.2 in Chapter 2 Project Description.



Image 14.3 Landscape Strategy (Map 16, Woodbrook-Shanganagh LAP 2017-2023)

14.3.5 Woodbrook-Shanganagh Local Area Plan 2017-2023

The Woodbrook-Shanganagh Local Area Plan 2017-2023 (LAP) lands are located to the south-eastern region of the Dún Laoghaire-Rathdown administrative area, between Shankill Village and Bray. The lands are predominantly comprised of a green-belt area between the two built-up urban settlements to the north and south. Within the LAP boundary, two separate parcels are identified for future development, one of which relates to the Proposed Development site at Shanganagh Castle. The Plan Area is located adjacent to the coastline of the Irish Sea and is on a relatively flat coastal plain, set against the backdrop of the Dublin and Wicklow Mountains. The Local Area Plan Area is approximately 2.2km² in area with its boundary extending from, and incorporating, the coastline, Shanganagh Park and Cemetery, Shanganagh Castle, Woodbrook Golf Club and adjoining greenfield development lands, the existing residential settlement at Woodbrook Downs, the Wilford Interchange and Green Belt lands located to the east of the M11 and between Shankill and Bray. The Woodbrook-Shanganagh Area consists largely of undeveloped lands and contains a relatively small number of existing residential properties. The Plan Area contains one relatively small residential development at Woodbrook Downs, a number of one-off dwellings, traveller accommodation and a residential care facility.

The plan identifies two parcels of land for future residential development, one of which relates to the Proposed Development site at Shanganagh Castle lands, and in this regard the LAP states the following

“Currently, a number of temporary uses are being facilitated within the Shanganagh Castle development parcel including allotments, pitches and a Parks Depot. It is important, however, to emphasise that these uses are only temporary and that this site – which has been designated for residential development over a number of Development Plan cycles – and is a key strategic site for the delivery of much needed housing units within the County...”

There are a number of existing long-distance views from within the LAP boundary towards the mountains and the coast, as well as more localised vistas. Views 1, 2 & 4, as identified within the Woodbrook-Shanganagh LAP on *Map 15: Views and Vistas*, are the only views within the LAP boundary that is likely to experience significant adverse effects as a result of the Proposed Development. It should be noted that View 2 is located within the site of the Proposed Development. View 4 is closely aligned with Photomontage / Viewpoint 3.



Image 14.4 Local Views and Vistas (Map 15, Woodbrook-Shanganagh LAP 2017-2023)

An overview of the description of these views is included in Image 5 overleaf.

View No. from Map 15	Description	Proposed / Existing
1, 4, 8 & 10	Views west towards Carrickgollogan and the lead mines chimney	Long Distance Views / Preserved Prospect in CDP
2	View towards Shanganagh Castle Gate Lodge	Local Views / Vistas
3 & 5	Views north towards Killiney Hill and Dalkey Island	Long Distance Views
6 & 7	Views south towards the Wicklow Mountains – Sugar Loaf, Little Sugar Loaf and Bray Head	Long Distance Views
9	Views of St James Church from within the Woodbrook Lands	Local View / Vista
11	Views of the clock tower from within the Woodbrook Lands.	Local View / Vista
12	View from Ferndale Road Eastwards	Protected Views in CDP
N/A	Views of Shanganagh Castle from within the Castle Lands and the Park	Proposed / Reinstated Local View / Vista

Image 14.5 Local Views and Vistas (Table 9, Woodbrook-Shanganagh LAP 2017-2023)

14.3.6 Likely Future Receiving Environment / Do nothing scenario

All components of the environment are constantly changing due to a combination of natural and human processes. When predicting likely direct and indirect effects it is important to remember that there are two available for comparison: the existing environment and the environment as it will be in the future if no development of any kind were to take place – the ‘do nothing’ impact.

In landscape terms, if the development did not go ahead, the Proposed Development site will remain as an area of open green land, containing community allotments and a local authority depot. The existing hedgerows and mature trees on site will remain unaltered.

In visual terms, the content in available views of the development site will remain the same, although changes would occur to existing vegetation due to maturing, pruning or natural decay.

14.4 LIKELIHOOD OF IMPACTS

The following potential direct visual effects, direct and indirect landscape effects, as well as the duration and nature of effects arising from the Proposed Development, have been identified. Photomontages 1-6 illustrate the Proposed Development from representative viewpoint locations within the study area. A description of each photomontage is included in Section 14.6.5 herein.

14.4.1 Effects at Construction

Effects arising from the process of construction of the Proposed Development are considered to be of a similar nature and duration to those arising from the decommissioning process and therefore have

not been considered separately. Where this assessment refers to potential construction effects, these are also representative of predicted decommissioning effects.

Generally, construction effects will be temporary, short term effects which occur during the construction phase only. Areas experiencing visual effects during the construction stage will vary, depending on the active construction phase (refer to Chapter 2 - Project Description).

All groundworks, the construction of the buildings, road network and landscape architecture will be mainly experienced locally from within the boundary of the Proposed Development site and from areas immediately adjacent, where available views exist. Locations in close adjacency to the Proposed Development where landscape and visual effects at the construction stage are considered to be highest are areas along the R119 / Dublin Road to the west, areas of Castle Farm to the north, and from within Shanganagh Park to the south. The effects arising during construction will result from machinery, personnel, excavations, traffic and material movements. Beyond adjacent and immediately surrounding areas outside the site, intervening building structures and vegetation will quickly screen the site in distances of approximately 250m and beyond. Potential exceptions to this are open areas of Shanganagh Park to the east. Upper parts of the building works of the apartment blocks will become visible above mature tree lines within the park and from elevated areas within the wider study area to the west, where the development will be partially visible in longer distance views.

Construction effects will result in:

- Potential effects to landscape character or visual amenity within the locality or the wider study area as a result of the visibility of construction activities such as the construction of buildings, associated scaffolding and tall equipment such as cranes and containers;
- Effects of temporary site infrastructure such as site traffic and construction compounds especially those located in areas adjacent to sensitive landscape and visual receptors; and
- Potential physical effects arising from construction of the development and in particular on the landscape resource within the site area.

Landscape and visual effects and their significance at construction stage will be temporary, adverse and range from Not Significant – Imperceptible in the wider area to Moderate – Very Significant Adverse within approximately 250m radius from the Proposed Development site boundary.

14.4.2 Effects at Operation

Potential landscape and visual effects will be assessed for the Operational Stage, i.e. upon completion of the scheme. In addition, residual effects will be assessed, which consider effects arising from the development following the implementation and establishment of proposed mitigation measures.

Operational effects will result in:

- Potential and residual effects of the development on landscape resource and landscape character, including the perceptual qualities of the landscape;
- Potential and residual effects of the development on views and visual amenity of the area including likelihood of the development to alter the composition of views within the study area; and

- Potential cumulative effects of the development in combination with other planned and Proposed Developments of similar type and scale upon the landscape and visual resource of the study area.

14.5 DESCRIPTION AND SIGNIFICANCE OF IMPACTS

14.5.1 Landscape Effects

The following potential direct and indirect landscape effects have been identified, (along with their duration and nature) arising from the Proposed Development at Shanganagh Castle lands. Direct or indirect landscape effects on the fabric of the landscape and its receptors are closely related to the nature and extent of visibility.

The Proposed Development site is located within the south eastern section of Dún Laoghaire-Rathdown County Council lands, in proximity with the coastline of the Irish Sea to the east, and the boundary with Wicklow County Council lands to the south. The site is predominantly situated outside of 14 Landscape Character Areas as identified within the Landscape Character Assessment for Dún Laoghaire-Rathdown, extending the designated urban character classification of Shankill further south. A section of the Proposed Development, comprising the upgrade and extension to an existing footpath within Shanganagh Park, extends into Landscape Character Area '12 – Shanganagh' to the south. The landscape sensitivity of the site is considered Medium as the proposed development site is considered to have a good sense of place. It is also considered that the landscape characteristics have local value but have been partially eroded over time and lack quality and cohesion.

The subject site and adjacent areas are situated within a generally flat to gently undulating landscape. The site is immediately bound by Castle Farm residential area to the north, Shanganagh Castle to the north east, Shanganagh Park to the south and east, and the R119 / Dublin Road to the west. Further within the study area, the village centre of Shankill lies just outside the 1km boundary, with primarily residential development defining much of the land use and landscape character between Shankill and the Proposed Development site. A significant amount of public and private open green space defines much of the study area within an arc from north east to south around the subject site, which includes lands associated with Shanganagh Park, Woodbrook Golf Club and Rosedale House. Further south, Shanganagh Cemetery is located to the immediate north of several agricultural fields defined by mature hedgerows, in addition to a mix of smaller residential developments along with institutional lands associated with St. James Church Crinken and Woodbrook College. The M11 road corridor divides the landscape to the west and is bound by areas of agricultural land with mature hedgerow boundaries, parcels of open land with stand of mature tree vegetation, along with residential development to the north west of the study area. Further to the west, the land rises to form the Dublin Mountains which are characterised by mainly vegetated hillsides, ridgeline and scattered residential development.

A significant alteration in landscape character will occur at the site location. Direct and long-term change or modification will occur locally where the Proposed Development is physically located. Small sections of existing mature tree vegetation will be removed from within the site to facilitate the development. The largest change will relate to the transformation of an area of currently green open space character to one with a built-up suburban character. It should be noted that whilst the Proposed Development is to be located within a former historic landscape, the addition of subsequent development over the years,

which includes community allotment gardens, access roads and a council depot area, has previously compromised the quality of this historic landscape and it does not currently exist as an intact, preserved historic designed landscape anymore. While some components of the historic landscape remain, it is proposed that these features are protected, retained and incorporated into the design of the Proposed Development to form an integral part of the future character, identity and placemaking for the site. The magnitude of landscape change is considered High and the resulting landscape significance is Significant Adverse due to the loss of green open space and further suburbanisation. However, the proposed residential development at Shanganagh Castle lands is in line with the policies and objectives, which are to provide for new residential communities within the proposed development site, as outlined within both the Dún Laoghaire-Rathdown County Development Plan 2016-2022 and the Woodbrook – Shanganagh Local Area Plan 2017-2023.

Indirect change will occur outside of the proposed development site boundary within a distance of approximately 250m, where the change in landscape character will be perceptible. Considering the generally flat and gently undulating nature of the local landscape surrounding the immediate site, in addition to dense mature tree vegetation and existing settlement patterns, indirect change in landscape character is largely limited to areas south within Shanganagh Park, a limited section of the R119 / Dublin Road to the immediate west, and north from within Castle Farm Housing Estate. The sylvan character of the R119 / Dublin Road will remain largely intact, with the Proposed Development serving to reinforce and contribute to this character along the western boundary of the site. The magnitude of landscape change from within areas of Shanganagh Park is High-Medium and the resulting significance is Significant-Moderate Adverse as currently mainly open green space will become largely built-up. From areas of the R119 / Dublin Road and Castle Farm Housing Estate, the magnitude of change is also High-Medium and the significance of effects is Significant-Moderate Neutral, as the Proposed Development will be a continuation of suburban development located to either side of the R119 immediately further north of the site and south of the housing estate.

Changes to the landscape character in the remaining study area, beyond approximately 250m and up to approximately 1km are considered to range from Low to Negligible. The significance is considered to range between Slight Adverse to Not Significant Neutral. The Proposed Development will integrate into the existing prevailing suburban character particularly in views to the north. The alteration to the character of the site in views from all directions is often screened by intervening vegetation and topography at this distance. The Proposed Development will therefore not result in a material change or modification of the wider landscape character.

The landscape change at long distances (approximately 1km and beyond) will range from Negligible to None. The significance is considered Not Significant to Imperceptible Neutral as the development site will integrate in the overall pattern of the surrounding landscape.

Table 14.13 Summary of Landscape Effects

Receptor	Susceptibility	Sensitivity	Magnitude of landscape change	Direct/indirect	Significance of landscape change
Landscape Character within the Proposed Development site	Medium	Medium	High	Direct	Significant Adverse
Landscape Character within approximately 250m from the Proposed Development site	Medium	Medium	High-Medium	Indirect	Significant-Moderate Adverse & Significant-Moderate Neutral
Landscape Character within approximately 250m and 1km from the Proposed Development site	Medium	Medium	Low-Negligible	Indirect	Slight Adverse to Not Significant Neutral
Landscape Character beyond 1km from the Proposed Development site	Medium	Medium	Negligible to None	Indirect	Not Significant to Imperceptible Neutral
Landscape Character Area 12 – Shanganagh (as identified within the DLRCOCO CDP 2016-2022)	Medium	Medium-Low	Medium	Direct	Moderate Adverse
Parks / Public Open Space - Shanganagh Park (as identified within the Woodbrook – Shanganagh Local Area Plan 2017-2023)	High	Medium-High	Medium	Indirect	Significant Adverse
Key Green Corridors (as identified within the Woodbrook – Shanganagh Local Area Plan 2017-2023)	High	High	None	n/a	None

Receptor	Susceptibility	Sensitivity	Magnitude of landscape change	Direct/ indirect	Significance of landscape change
Protected Trees and Woodland (as identified within the Woodbrook – Shanganagh Local Area Plan 2017-2023)	Medium-High	High	Low	Direct	Slight Neutral
Historic Pond (as identified within the Woodbrook – Shanganagh Local Area Plan 2017-2023)	High	High	Low	Direct	Slight Beneficial
Crinken River (as identified within the Woodbrook – Shanganagh Local Area Plan 2017-2023)	High	High	None	Indirect	None

14.5.2 Visual Effects

The Proposed Development is located in a generally flat or undulating landscape and therefore intervening mature tree vegetation or buildings will provide screening to receptors. The highest visual impacts tend to occur where there are no intervening screening elements, from open areas within Shanganagh Park, from residential areas to the immediate north of the subject site, and from elevated areas located on the eastern slopes of the Dublin Mountains where visibility towards the development is achievable. Six photomontages have been prepared to illustrate the nature of visibility of the Proposed Development from key locations. Photomontages 1-6 illustrate a range of existing views from representative viewpoints within the core study area of 1km together with superimposed computer images depicting the Proposed Development. A description of visual effects on visual receptors is described herein. It should be noted that photography used for this assessment is based on summer/autumn conditions, i.e. deciduous trees have most of the foliage intact. In winter views, there may be increased visibility of the Proposed Development from viewing locations, which has been taken account for in the determination of the magnitude of visual change and resulting significance of visual effects ratings as described herein.

The Booklet of Photomontages is included in Appendix 14.1. The change of visual effects following the establishment of landscape mitigation measures is described in Section 14.8 – Residual Effects.

14.5.2.1 Viewpoint / Photomontage Descriptions

Photomontage / Viewpoint 1

This viewpoint is representative of views north east along Ferndale Road towards the Proposed Development site, and forms part of a designated viewing route to the east along the roadway as

identified within the Dún Laoghaire-Rathdown County Development Plan 2016-2022. Views along the road are generally well screened in summer views, with glimpsed and partial views available between mature tree and hedgerow vegetation. Visibility of a limited section of Shanganagh Castle is achievable from this location, however, the historic Shanganagh Castle is not an immediately noticeable feature in this view as only sections can be made out between existing dense vegetation in the middle distance. The view is terminated to the east by mature tree vegetation visible against the Irish Sea and distant horizon. The distance to the site boundary from this location is approximately 868m.

The value of this view is considered Medium as it is recognised locally within the existing Dún Laoghaire-Rathdown County Development Plan 2016-2022. Visual receptors are mainly vehicle drivers and pedestrians and are considered to have a Medium susceptibility to change. The overall sensitivity is Medium-High.

The Proposed Development will become a series of noticeable built structures within the overall composition of this view, with the mid to upper floors of several apartment buildings visible in the distance. The limited visibility that currently exists of Shanganagh Castle will be screened by the development. While the Proposed Development will introduce a new scale of buildings in this and similar views along Ferndale Road; the elevated viewing location will cause the Proposed Development to be visible against a backdrop of dense and mature tree vegetation, resulting in the existing silhouette of vegetation against the open water remaining intact. The magnitude of visual change is Medium, and the resulting significance of visual effects is considered Moderate Adverse.

Photomontage / Viewpoint 2

This view is oriented south east at the entrance to Castle Farm housing estate, located off the Dublin Road. This open view from the existing public footpath shows a section of curving roadway adjacent to both detached dormer bungalows and detached two storey houses along the north and west of the road. Green open space populated with trees to its edges forms the primary focus in this view. Several existing trees located within the Proposed Development site can be seen over the two storey residential buildings to the south east. The distance to the site boundary from this location is approximately 153m. The value of this view is considered Low as it doesn't form part of any regionally or locally recognised view, while also containing many elements typically associated with residential estates of this nature. Visual receptors are residents from private properties, pedestrians and vehicle drivers, and are considered to have a High susceptibility to change. The overall sensitivity is considered High.

The Proposed Development will redefine the visual envelope in the background in views across Castle Farm housing estate from this location with the addition of apartment buildings in the distance altering the scale of development currently experienced. While sections of some mid to upper parts of the Proposed Development will be partially visible from this location, the inherent character, and identity of Castle Farm residential estate will remain intact, with the Proposed Development legible as a clearly separate entity beyond the boundary of the residential area. The magnitude of visual change is Medium, and the resulting significance of visual effects is considered Significant-Moderate Adverse.

Photomontage / Viewpoint 3

This view is oriented to the north west and located within Shanganagh Park. It overlooks an area of playing fields and associated goal posts. This large green open space is bound by mature tree and

hedgerow vegetation. A tree lined footpath is located along the line of vegetation to the right of this image in the middle distance. To the immediate west of this open area, further playing are partially visible in this view, beyond the existing hedgerow. Beyond the boundary of the parkland, the view is contained by the largely vegetated mid to upper slopes of the Dublin Mountains which define much of the wider landscape character in available open views to the west. The distance to the site boundary from this location is approximately 165m.

The value of this view is considered Medium given the view over green open space and distant hillside. Visual receptors are pedestrians and park users and are considered to have a High susceptibility to change. The overall sensitivity is considered Medium-High.

The Proposed Development will result in a noticeable change to the existing view with the introduction of apartment buildings beyond the existing mature tree vegetation within Shanganagh Park. The addition of buildings in this instance will alter the existing character of the view, introducing a series of new buildings into a view that is currently composed of predominantly natural elements including tree lines, hedgerows and playing fields. Mainly mid to upper floors of several apartment buildings will become visible from this viewing location. The distant view of the ridgeline of the Dublin Mountains will remain largely intact. It should be noted that as park users move towards the development from this and similar locations within Shanganagh Park, the apartment buildings will extend beyond the ridgeline to the west. The magnitude of change is considered High and the resulting significance is Significant Adverse.

Photomontage / Viewpoint 4

This view is oriented north from within Shanganagh Park and overlooks an area of playing fields and associated goal posts. This large green open space is bound by mature tree and hedgerow vegetation, with noticeable building development limited to the upper parts of the glasshouse structure currently located within the Proposed Development lands, to the right of this view. The distance to the site boundary from this location is approximately 166m.

The value of this view is considered Medium given the view over green open space and mature tree and hedgerow vegetation. Visual receptors are pedestrians and park users and are considered to have a High susceptibility to change. The overall sensitivity is considered Medium-High.

The Proposed Development will result in a significant change to the existing view. The north western boundary to Shanganagh Park will be redefined in this and similar views, with the introduction of contemporary residential architecture that will be visible above the existing vegetative boundary. The Proposed Development will generate a prominent change in the existing character of the view, introducing a new scale and type of an urban development in a currently almost countryside style view that will be visible from various locations within Shanganagh Park. The magnitude of change is considered High and the resulting significance is Significant Adverse.

Photomontage / Viewpoint 5

This viewpoint is oriented south west from the front of Shanganagh Castle. Existing mature trees define the boundary between this area and the Proposed Development site, offering partial views into the site between the trees. Within the grassed area to the front of the castle, a storage area is located, which

includes several heaped piles of loose aggregate and a larger pile of organic material to the far right of this view. The distance to the site boundary from this location is approximately 53m.

The value of this view is considered Medium-Low. Visual receptors are pedestrians and staff working on the grounds and are considered to have a Medium susceptibility to change. The sensitivity is considered Medium-Low. It is recognised that Shanganagh Castle is currently in a state of ruin and is not publicly accessible. Should this historical feature and surrounding grounds be developed in the future as a tourism or community destination, the overall visual sensitivity may increase.

The Proposed Development will be partially visible above and between the existing tree vegetation in this view, most noticeably the mid to upper sections of parts of Block D. The partial visibility that exists into the Proposed Development site, currently composed of an open area of green space, will be largely screened by the development in this view. The introduction of residential apartment buildings and associated infrastructure in this and similar views from the front of Shanganagh Castle, will alter the existing landscape character currently experienced, which beyond the immediate curtilage of the castle, is largely defined by mature tree vegetation, grassland and glimpsed views towards the Dublin Mountains further west. The magnitude of visual change is High-Medium and the resulting significance of visual effects is considered Significant-Moderate Adverse.

Photomontage / Viewpoint 6

This view is oriented north east towards the existing vehicular and pedestrian entrance to Shanganagh Castle from along the R119 / Dublin Road, which joins Shankill Village to the north with Bray to south. The stone wall, which forms the existing western boundary of the Proposed Development site, is terminated in this view via a pair of castellated stone entrance piers which define the vehicular and pedestrian access to the site. Mature tree vegetation is visible above the wall to the left of this view, and the open, undeveloped interior of the site is visible through the vehicular and pedestrian access gates. Street lighting columns, overhead wires and a transmission line pole set are noticeable vertical elements within the view. The distance to the site boundary from this location is approximately 14m.

The value of this view is considered Low as it doesn't form part of any regionally or locally recognised view, while also containing common roadway elements such as lighting columns, overhead wires, railings and signage. The gate piers in a Tudoresque style dating from the early 20th Century have been relocated from the gate lodge to their current location in the 1980's, and do not fall within the protection of Shanganagh Castle which is a protected structure. Visual receptors are likely to be pedestrians and other road users including cyclists and drivers and are considered to have a Low susceptibility to change. The overall sensitivity is considered Medium.

The Proposed Development will create a significant and transformative change from this and similar viewing locations along the R119 / Dublin Road. Blocks E and G, to the left and right of the view respectively, will introduce a new residential and urban character along the road frontage, altering the existing roadway character. The realignment and modification to the existing stone wall, the removal of the gate piers, together with the setback of proposed the buildings from the R119 / Dublin Road will serve to open up the currently enclosed roadway and pedestrian footpath, providing a greater sense of openness and visual permeability from this viewpoint. The magnitude of visual change is Very High, and the resulting significance of visual effects is considered Very Significant Beneficial.

Table 14.14 Summary of Visual Effects from representative viewpoint locations

Receptor	Susceptibility	Sensitivity	Magnitude of visual change	Significance of visual change
Photomontage 1	Medium	Medium-High	Medium	Moderate Adverse
Photomontage 2	High	High	Medium	Significant-Moderate Adverse
Photomontage 3	High	Medium-High	High	Significant Adverse
Photomontage 4	High	Medium-High	High	Significant Adverse
Photomontage 5	Medium	Medium-Low	High-Medium	Significant-Moderate Adverse
Photomontage 6	Low	Medium	Very High	Very Significant Beneficial

14.5.2.2 Visual Effects on Views and Prospects

There is one relevant designated protected viewing corridor within the core study area as identified on Map 14 of the Dún Laoghaire-Rathdown County Development Plan 2016-2022. This relates to eastward views from along Ferndale Road. The magnitude of change is considered Medium and the resulting significance is Moderate Adverse (Refer to Photomontage / Viewpoint 1).

In addition, the Woodbrook-Shanganagh Local Area Plan 2017-2023 identifies a further 12 viewing locations within and adjacent to the LAP lands.

Views 1 is located adjacent to the north eastern site boundary. The content of the view will change considerably following the construction of the Proposed Development. The designated view to the west towards Carrickgollogan and the lead mines chimney will become partially screened by the proposed development. The magnitude of change is considered High and the resulting significance of effects in considered Significant Adverse. It should be noted that existing vegetation is already screening partially the view of the lead mines chimney.

View 2 is located within the proposed site and will also change significantly. The designated view towards Shanganagh Castle Gate Lodge will be screened. The magnitude of change is considered High and the resulting significance of effects in considered Very Significant Adverse.

View 4 is located within Shanganagh Park. The designated view to the west towards Carrickgollogan and the lead mines chimney will remain. While the Proposed Development will become a clearly visible component of the view, it will not block the designated view. Photomontage 3 has been taken in the vicinity of View 4. The magnitude of change is considered High and the resulting significance is Significant Adverse.

Considering the location of Views 1, 2 and 4 located within or in close proximity to the Proposed Development site, significant visual effects are to be expected, particularly when considering that the site is zoned for residential development.

The remaining designated views will not be impacted by the Proposed Development as these views are orientated into other directions.

14.5.3 Cumulative Landscape and Visual Effects

Cumulative landscape and visual effects may result from additional changes to the baseline landscape / townscape or views as a result of the Proposed Development being seen in conjunction with other developments similar in scale, type and nature. A list of cumulative schemes that have planning consent or are in the planning process is enclosed below. Developments that are currently under construction are considered to be part of the landscape and visual baseline.

Table 14.15 Cumulative Developments Identified

Planning reference	Proposal	Status	Location in relation to proposed development	Relevance to this assessment
ABP 30584419	Permission for a Strategic Housing Development consisting of a residential-led development comprising 685no. residential units and 1 no. childcare facility in buildings ranging from 2 to 8-storeys.	Submitted to ABP on 06/11/2019	South of proposed development site	Relevant
DLRCoCo D07A/1495	348 No. residential units comprising: - 46 No. 1 bed apartments, 171 No. 2 bed apartments, 124 No. 3 bed apartments, 6 No. 2 bed duplex units, 1 No. 3 bed duplex units; 1 No. retail unit; 1 No. Cafe; 368 No. car parking spaces	Permission Granted	South east of proposed development site	Not relevant due to distance from proposed development site

Planning reference	Proposal	Status	Location in relation to proposed development	Relevance to this assessment
DLRCoCo D15A/0683	Development consisting of demolition of existing gate lodge, new vehicular and pedestrian entrances, new 3-storey building comprising 4 no. apartments, new connection to existing public sewers and all associated site works.	Permission Granted	North west of proposed development site	Relevant

Cumulative effects with Woodbrook Strategic Housing Development (Ref: ABP 30584419)

The submitted Strategic Housing Development will be located within a parcel of land zoned for residential development in the southern section of the Woodbrook-Shanganagh Local Area Plan lands. In addition to the Proposed Development, should both schemes be completed, they will serve to realise the ambitions and aspirations for these lands as set out in both the Dún Laoghaire-Rathdown County Development Plan 2016-2022 and the Woodbrook-Shanganagh LAP 2017-2023. Considering the existing topography, intervening buildings and mature tree vegetation, combined views of both developments will likely be limited to distant elevated locations to the west, where open panoramic views become available between areas of dense vegetation. In combination, both developments will herald the emergence of a new suburban context situated between the urban footprints of Shankill to the north, and Bray to the south. The magnitude of cumulative effects is considered medium. The significance is considered moderate adverse as the visibility of both developments together will increase the prevalence of suburban development / character in available views.

Cumulative effects with 348 no. residential development (Ref: D07A/1495)

There will be no adverse cumulative landscape and visual effects impacts associated with both developments.

Cumulative effects with 3 storey apartment development (Ref: D15A/0683)

Development located at Sherrington Lodge, Dublin Road to the north east of the Proposed Development site. The addition of this development along the Dublin Road will serve to intensify the existing and established residential character along this part of the road, which includes the four no. residential apartment blocks located at Olcovar. Given the nature of intervening mature tree vegetation and existing buildings along the Dublin Road, it is likely that views of both developments will be limited to successive views, i.e. both developments will not be seen in the same view. The magnitude of cumulative effects is considered low. The significance is considered slight neutral as the visibility of both developments together will increase the prevalence of suburban development / character in available views.

14.6 REMEDIAL AND MITIGATION MEASURES

Mitigation is a term used to describe the measures or actions that may be taken to minimise environmental effects. The purpose of mitigation is to avoid, reduce and where possible remedy or offset, any significant adverse direct and indirect effects on the environment arising from the Proposed Development.

The principal mitigation for the Proposed Development is inherent in the design of its architecture, public realm and open space, which has evolved through an iterative process of assessment and consultation.

The embedded mitigation contained within the design of the Proposed Development is described in Section 14.4.

Specific mitigation measures will also be implemented to minimise the significant effects on the important landscape features identified in this assessment. Note that although mitigation is not required where effects are not considered to be significant, in some cases measures will be implemented where these can be readily achieved and where it may lead to landscape enhancement.

Proposed mitigation measures have been developed in tandem with the landscape masterplan, through a collaborative process between the multi-disciplinary design team throughout preliminary stages of this project and are comprised of the following avoidance, reduction and remediation measures. The main goals are described below.

14.6.1 Avoidance Measures

LAND CONST 1: Retention and protection of the existing mature woodland within the site and along the site boundary is recommended. Existing trees to be retained will be protected during the construction stage in accordance with recommendations of the Arboricultural Assessment and the BS 5837:2012. Prior to commencement of construction, existing trees which are to be retained will be protected by erection of timber post and wire fence to BS 5837:2012 to ensure no works are carried out under reach of their canopies. Unstable trees should be removed under direction of the arborist.

14.6.2 Reduction Measures

LAND CONST 2: The Proposed Development will be fenced off during the construction phase to reduce the visual impact of the works.

LAND CONST 3: Vehicles exiting site during the construction stage should be subject to wheel wash facilities or road sweepers shall be used in order to maintain clean roads.

LAND CONST 4: Any lighting used during the construction process should be kept to a minimum, providing for site safety only and shall be directed into the site and away from adjacent residential properties. Lighting shall be shielded to avoid light spill onto adjacent properties and roads.

LAND CONST 5: Disturbance of existing vegetation will be minimised where possible. Proposed planting will help integrating the proposed development into the surrounding landscape; define, protect and reinforce the historical landscape that will form an integral part of the new residential area; and provide screening where required.

Remediation Measures

LAND CONST 6: A detailed landscape masterplan has been prepared as part of this application, which includes mitigation measures within the open space design strategy and planting approach for the site including:

- Provision of semi mature tree species within the parkland to offset the removal of existing trees; and
- Enhancement of site tree cover by introduction of additional tree and woodland planting.

The Landscape Masterplan shall be implemented on a phased basis in accordance with the Phasing Plan detailed in Chapter 2.0 of this EIAR.

LAND CONST 7: A mix of both native and non-native plant species shall be used throughout the scheme to create a strong sense of place and identity, while also providing for improved biodiversity on the site.

14.6.3 Operational Measures

LAND OPER 1: Landscape management and maintenance plan shall be drawn up and approved up by qualified professional.

LAND OPER 2: A plan shall be put in place to ensure that ongoing landscape maintenance and debris cleaning is carried out during the operational period within the site.

LAND OPER 3: A maintenance plan shall be put in place to ensure that ongoing maintenance and replacement of failing or failed plant material is undertaken.

14.7 RESIDUAL EFFECTS

Following the completion of construction works and the implementation of the proposed landscape mitigation measures, the development will become a long-term feature extending the suburban fringe of Shankill south towards Shanganagh Park.

Effective execution and establishment of the proposed landscape mitigation / green infrastructure will have a positive impact and help to 'soften' landscape and visual effects associated with the Proposed Development considerably, particularly from areas along the R119 / Dublin Road which has an established sylvan character, and also from within the site with regards to the integration of the Proposed Development and the remaining historic landscape features.

14.7.1 Residual Landscape Effects

Long term residual landscape effects will arise from the change in landscape character from an area of green open space to that of a new suburban quarter with subsequent alterations to the existing landscape pattern and vegetation on the site. Significant residual landscape effects will be greatest within a distance of up to 250m, where the Proposed Development has the potential to influence the existing landscape character in available views. The development will alter significantly and permanently the landscape character within the subject site and within available views of the development from within Shanganagh Park. In addition, considering the flat to gently undulating landscape of the site itself and that of the immediately surrounding area, the landscape change will

remain recognisable from locations adjacent to the site boundaries to the north and east as well as from elevated locations to the west. Considering the nature of available views, the residual change in landscape effects will not vary greatly from the time when the development is completed due to the existing effects of intervening vegetation and topography, combined with the scale of the Proposed Development.

While it is recognised that permanent adverse residual landscape effects will arise as a result of the development, it should also be noted that the proposals align with the current policies and objectives as set out within both the Dún Laoghaire-Rathdown County Development Plan 2016-2022 and the Woodbrook – Shanganagh Local Area Plan 2017-2023, which seek to establish a new residential community on the Shanganagh Castle lands. The table below lists the residual landscape effects.

Table 14.16 Summary of Residual Landscape Effects

Receptor	Susceptibility	Sensitivity	Magnitude of landscape change	Direct/indirect	Significance of landscape change
Landscape Character within the Proposed Development site	Medium	Medium	High	Direct	Significant Adverse
Landscape Character within approximately 250m from the Proposed Development site	Medium	Medium	High-Medium	Indirect	Significant-Moderate Adverse & Significant-Moderate Neutral
Landscape Character within approximately 250m and 1km from the Proposed Development site	Medium	Medium	Low-Negligible	Indirect	Slight Adverse to Not Significant Neutral
Landscape Character beyond 1km from the Proposed Development site	Medium	Medium	Negligible to None	Indirect	Not Significant to Imperceptible Neutral
Landscape Character Area 12 – Shanganagh (as identified within the DLRCOCO)	Medium	Medium-Low	Medium	Direct	Moderate Adverse

Receptor	Susceptibility	Sensitivity	Magnitude of landscape change	Direct/ indirect	Significance of landscape change
CDP 2016-2022)					
Parks / Public Open Space - Shanganagh Park (as identified within the Woodbrook – Shanganagh Local Area Plan 2017-2023)	High	Medium-High	Medium	Indirect	Significant Adverse
Key Green Corridors (as identified within the Woodbrook – Shanganagh Local Area Plan 2017-2023)	High	High	None	n/a	None
Protected Trees and Woodland (as identified within the Woodbrook – Shanganagh Local Area Plan 2017-2023)	Medium-High	High	Low	Direct	Slight Neutral
Historic Pond (as identified within the Woodbrook – Shanganagh Local Area Plan 2017-2023)	High	High	Low	Direct	Slight Beneficial
Crinken River (as identified within the Woodbrook – Shanganagh Local Area Plan 2017-2023)	High	High	None	Indirect	None

14.7.2 Residual Visual Effects

Residual visual effects will be highest in short and middle-distance views from within Shanganagh Park and from a limited area of the R119 / Dublin Road where visibility of the Proposed Development will be

most noticeable. Residential areas to the immediate north of the subject site, namely from Castle Farm housing estate, will also experience significant residual visual effects following the establishment of mitigation planting measures along the northern boundary of the Proposed Development site. The proposed landscape design will beneficially alter the visual perception within the Proposed Development site over time as the proposed vegetation will develop and mature. However, residual visual effects outside the proposed development site will remain similar to visual effects experienced following completion of the development given the scale of the proposed buildings and existing semi-mature and mature screening vegetation surrounding the Proposed Development site.

A summary of residual visual effects from individual viewpoints is included in Table 14.17.

Table 14.17 Summary of Residual Visual Effects from representative viewpoint locations

Receptor	Susceptibility	Sensitivity	Magnitude of visual change	Significance of visual change
Photomontage 1	Medium	Medium-High	Medium	Moderate Adverse
Photomontage 2	High	High	Medium	Significant-Moderate Adverse
Photomontage 3	High	Medium-High	High	Significant Adverse
Photomontage 4	High	Medium-High	High	Significant Adverse
Photomontage 5	Medium	Medium-Low	High-Medium	Significant-Moderate Adverse
Photomontage 6	Low	Medium	Medium	Moderate Neutral

14.8 REFERENCES

The following guidance and other information sources were used in the assessment:

- EPA 'Guidelines on the Information to be contained in Environmental Impact Statements', 2002;
- EPA EIS Manual 'Advice Notes on Current Practice (in the preparation of Environmental Impact Statements)', 2003;
- EPA Draft "Revised Guidelines on the Information to be contained in Environmental Impact Statements", September 2015, where appropriate;
- EPA Draft "Advice Notes for Preparing Environmental Impact Statements", September 2015, where appropriate;
- EPA "Guidelines on the information to be contained in Environmental Impact Assessment Reports", Draft, August 2017;
- '*Guidelines for Landscape and Visual Impact Assessment*' (GLVIA), 3rd Edition, 2013, Landscape Institute (UK) & IEMA;
- '*Visual Representation of Development Proposals*', Landscape Institute, Technical Guidance Note 06/19, 17 September 2019;
- Dún Laoghaire-Rathdown County Development Plan 2016-2022;

- Woodbrook – Shanganagh Local Area Plan 2017-2023;
- National Inventory of Architectural Heritage, <https://www.buildingsofireland.ie/>;
- Irishtrails, <http://www.irishtrails.ie/>; and
- Ordnance Survey Ireland, 1:50,000 Discovery Mapping.

CHAPTER 15 MATERIAL ASSETS – TRAFFIC & TRANSPORT

15.1 INTRODUCTION

This chapter of the EIAR comprises an assessment of the likely impact of the proposed development on the surrounding road network and transport infrastructure as well as identifying proposed mitigation measures to minimize any impacts

The information contained within this chapter should be read in conjunction with the design drawings and suite of reports, which accompany this planning application.

The objectives of this chapter are as follows:

- Produce a study of the existing road network and transport infrastructure in the vicinity of the proposed development.
- Identify the possible effects of the development on the surrounding road network and transport infrastructure (Construction phase and Operational phase).
- Propose measures to mitigate, eliminate or remediate any possible impacts from this development.

A Traffic and Transport Assessment (TTA) was completed for the proposed site by PUNCH Consulting Engineers. This TTA is included in Appendix 15.1 at the end of this chapter.

15.2 ASSESSMENT METHODOLOGY

The approach to the preparation of this chapter has regard to the requirements of Transport Infrastructure Ireland and best practise guidance including the following:

- Traffic and Transport Assessment Guidelines TII May 2014
- Design Manual for Urban Roads and Streets DOEHLG 2019
- Geometric Layout of Signal Controlled Junctions and Signalised Roundabouts (DN-GEO-03044) TII November 2005 (NRA ref TD50).
- National Cycle Manual NTA
- The Road Safety Authority's website www.rsa.ie for statistics on collisions in the study area.

An initial site inspection reviewed the existing access to the surrounding road and transportation network as well as the volume of traffic on the adjacent roads.

A scoping meeting was held with DLRCC Roads Section on 30/09/19 to agree the junctions to be assessed and address parking proposals for the site.

15.3 RECEIVING ENVIRONMENT

15.3.1 Location & Network Summary

The proposed development site is located within Shankill in South Dublin. The proposed development site is currently accessed from the Dublin Road (R119) via an existing private lane which provides access to two houses, council depot and castle. It is bordered by the R119 to the west, residential properties to the north and the Shanganagh parklands to the east and south.

The development site is within Shankill, a suburban village in south-east Dublin near the Wicklow county border. It is approximately 17km from the City Centre. The site location is shown in Figure 15.1 and its relation to the wider road network is detailed in Figure 15.2 below.

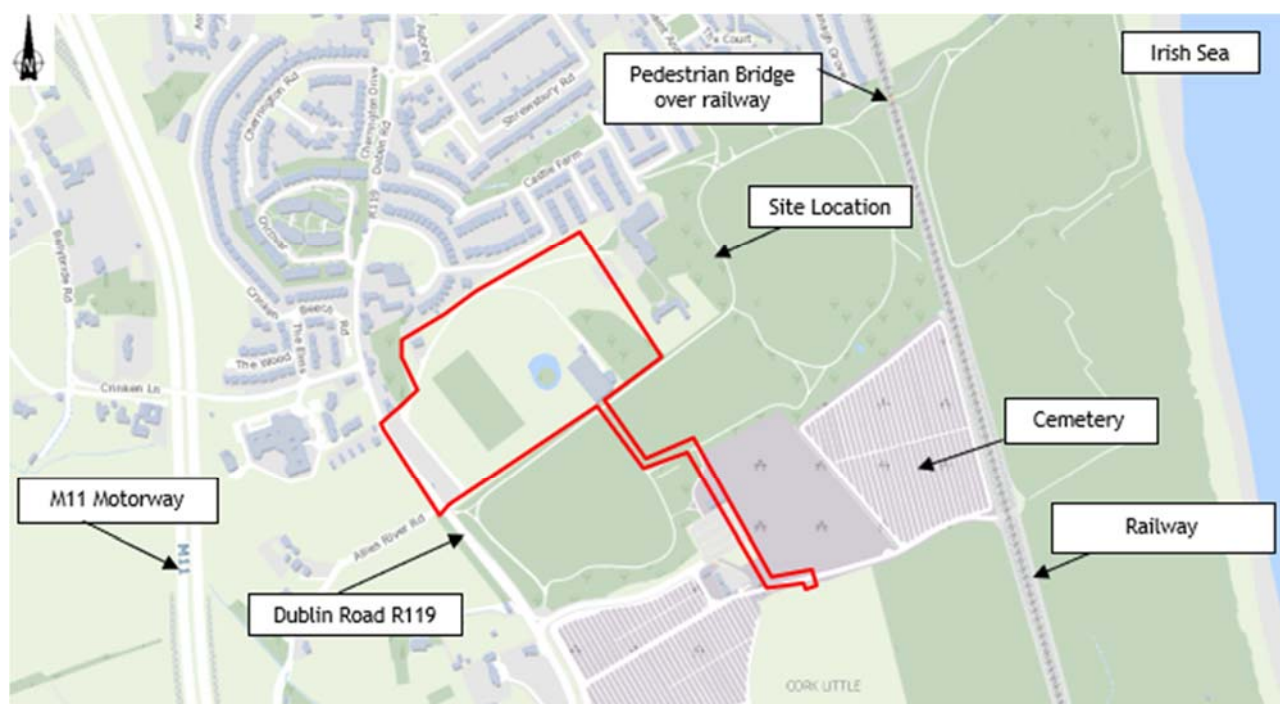


Figure 15.1 Site Location Plan



Figure 15.2 Site location and surrounding road network

The adjacent land ranges in use from parkland off to the east end of the site to town centre/community facilities off the northwest end of the site. The cemetery is to the south along with the Shanganagh golf course to the south east.

The layout of the surrounding local road network is presented in Figure 15.1. The main arterial route in the vicinity of the site is the R119 Dublin Road which passes along the western site boundary. The R119 links Bray to the south with Dublin City Centre. The nearby M11 motorway links with the M50 motorway in the north before becoming the N11. The M11 heading south continues to Wexford.

15.3.2 R119 Dublin Road

Corbawn Lane Roundabout

Approximately 1,150 metres north of the site along the R119 Dublin Road there is a four-arm roundabout referred to in this TTA as the Corbawn Lane roundabout. The roundabout arms are; R837 north to connect with the N11, R119 North to continue parallel with the coast and Corbawn lane to provide access into a residential area. Each exit road consists of a single lane carriageway in each direction. The approaches to the roundabout have clear sightlines but during normal peak times traffic flow is busy. The roundabout is approximately 29m diameter.

Quinn's Road Roundabout

Approximately 600 metres north of the site there is a 20m diameter roundabout along the R119. This roundabout facilitates traffic travelling east to Quinn's Road and west to Cherrington Road. Quinn's Road provides access to Shankill Tennis Club and a residential area. Cherrington Road is a cul-de-sac with houses on both sides.

Olcavor Road

Approximately 370 metres north of the site and west side of the R119 there is a priority junction that facilitates traffic access to the residential properties along the Olcavor Road cul-de-sac with apartments and house type development on both sides. A right turn lane is provided for access from the R119 into the junction.

Crinken Lane

Approximately 240 metres north of the site and located on the west of the R119 is the Crinken Lane priority junction. It provides access to several residential streets and Saint Joseph's Hospital. Crinken Lane traverses over the M11 providing access to individual residential properties.

Wilford Roundabout

This 53 metre diameter roundabout south of the site along the R119 provides access to Junction 6 of the M11. This roundabout facilitates traffic to/from Bray travelling north or south on the M11.

15.3.3 M11 Motorway

The M11 is accessed by heading south from the site on the R119 Dublin Road, this leads to the three arm Wilford Roundabout. The south arm on the R119 leads to/from Bray and the west arm leads on to the grade separated Junction 6 of the M11 motorway. Heading north on the M11 links with the M50 orbital motorway around Dublin. Heading south along the M11 leads to Wexford and other eastern coastal towns.

15.3.4 Public Sustainable Transport

The area also offers a variety of high frequency public transport options in the vicinity of the development.

Train Services

Shankill train station, a 20-minute walk away, is the nearest railway station to the site providing DART services and connects with Dun Laoghaire (Malin) train station that serves the Rosslare to Dublin inter-city service. From Shankill and Dun Laoghaire, train services are available to Connolly station.

Irish Rail has confirmed to DLRCC its intention to apply for planning permission and construct a new rail station for DART services at Shanganagh/Woodbrook which will provide services approximately 950 metres from the site, or approximately 12 minutes' walk from the site.

Bus Services

The local area surrounding the development has bus stops on the R139 Dublin Road that are served by

- Dublin Bus – four routes
- Go Ahead Bus two routes

- Air Coach one route

The NTA Bus Connect Route 13 proposes to improve Dublin Road to permit dedicated separate cycle and bus lanes that will further enhance the bus capacity of the area.

15.4 LIKELIHOOD OF IMPACTS

The proposed development is described fully in Chapter 2.0 Project Description. The following elements are relevant to the assessment of effects in this Chapter.

There is a single proposed vehicular entrance to and from the site onto the Dublin Road. There is also a proposed separate dedicated pedestrian/ cycle access onto the site from Dublin Road north of the new vehicular entrance. The Dublin Road R119 will be modified and upgraded to facilitate the connection of the existing road, pedestrian, and cycle network with their respective interior networks in the planned Shanganagh Castle Development.

The proposed signalised junction is designed and constructed in accordance with DMURS and the appropriate TII standards and allows for the future BusConnects provision.

The proposed development consists of 597 no. residential units, a creche, retail unit, café and ancillary facilities.. In order to estimate the likely volumes of traffic that will be generated by the proposed development, trip rates recommended by TRICS (Trip Rate Computer Information System) were extracted from the database and applied pro-rata to the relevant Gross Floor Area and number of houses and apartments within the development. Table 15.1 summarises the number of additional trips expected for the proposed development. The local shop/cafe are not predicted to generate any additional trips on the external road network.

Land use	Total Number of Trips (Based on ABK's Schedule of Accommodation)			
	08.00 – 09.00	08.00 – 09.00	17.00 – 18.00	17.00 – 18.00
	AM Arrivals	AM Departures	PM Arrivals	PM Departures
Residential	77	145	140	102
Creche	23	17	14	18
TOTAL	100	162	154	120

Table 15.1 Predicted Traffic Generated by Proposed Development using TRICS and the ABK Schedule of Accommodation

As population grows throughout Ireland, a continued increase in traffic volumes is not sustainable. As a result, an ever-increasing approach by designers and planners to providing sustainable commuting alternatives is required. The use of public transport and promotion of walking and cycling will ultimately increase the overall quality of life for the people living in the area.

The proposed development has integrated a number of measures in line with the relevant standards and guidelines, such as DMURS 2019 and the National Cycle Manual, which promotes the use of sustainable travel to and from the site. This is to reduce car dependency.

The use of the private car will still be maintained as a primary mode of transport for a portion of the visitors, staff and residents in the development. The internal roads and junctions on the development have been designed in accordance with the DMURS manual.

Due to the location of the proposed development it is expected that a significant number of trips will be by public transport, bicycle and on foot. Proposals for pedestrian and cycle pathways through Shanganagh Park to the Woodbrook Scheme and the proposed DART station are included in the application for approval.

The proposed development is located close to a number of amenities in Shankill including schools, shops, employment centres etc. Most of these amenities are within a reasonable walk or cycle of the proposed development. Pedestrians and cyclists will be facilitated with an extensive foot/cycle path network allowing easy access between the residential and other developments adjacent to the site. Foot/cycle paths will be provided through Shanganagh Park to the new Woodbrook Shanganagh train station. There are also existing footpaths and on road cycle lane infrastructure along Dublin Road into which the development infrastructure will connect.

Bus transport is accessible via the Dublin Road bus stops. Enhanced bus facilities/services will be provided by the Busconnects project, which will also improve cycle facilities on the route.

Reduced car parking will be provided for the apartment development relative to the local authority development standards as a measure to encourage use of alternative non-private means of transport. Increased cycle parking facilities – relative to the local authority standards will be provided as compensation for the reduced car parking. Additionally, ten car parking spaces will be allocated to GoCar car sharing use. These measures will contribute to reducing the number of private car journeys. An Outline Travel Plan has been prepared, that sets out measures to reduce car usage.

Construction traffic travelling to the site will initially use the existing vehicular entrance from the Dublin Road. At some stage during the construction process an alternative access approximately 120 metres north of the existing access will be constructed to facilitate the development. This access coincides with the proposed cycle/pedestrian access. The existing access will then be closed off. At a later stage the permanent site access signalised junction will be constructed and be used for access to the initial phases of development as well as the construction traffic.

There will also be a number of trips generated from the development during the construction phase. These will consist of trips generated by construction staff as well as deliveries to site and removal of excess excavated material. The exact number of trips will depend on the number of people on site and will vary over the course of the construction period.

15.5 DESCRIPTION AND SIGNIFICANCE OF IMPACTS

15.5.1 Construction Phase

Construction traffic travelling to the site will initially use the existing vehicular entrance from the Dublin Road. As set out above, alternative accesses will be constructed and used for accessing the site depending on the phase of construction.

The increase in traffic volumes as a result of construction vehicles visiting the site is not considered to be excessive and will be spread out over the duration of the construction phases of the development. As the construction works are off-line and due to the designated access point, which allows delivery vehicles to pull off into the site, there will be no significant disruption on the traffic flows on the Dublin Road as a result of the construction of the development. It is not envisaged that any diversions will be required. Existing public footpaths are unlikely to be impacted significantly by the project as work is substantially off-line, but permanent site access junction, utility and service diversions may require works to be undertaken that would necessitate a short-term diversion.

As the proposed development is to be constructed in several phases it is envisaged that construction works will be continuing in Phase 2 to the centre of the site whilst Phase 1 in the north of the site will be operational. It will be necessary for public/service traffic for Phase 1 and the castle to use the proposed signalised access from the Dublin Road and therefore the contractor will have to ensure that the access is completed to a sufficient degree to ensure the safe segregation of the construction and public/service traffic.

The Outline Construction Management Plan advises that the most onerous construction period with regards to traffic generation is expected to be the demolition, site clearance and excavation stage, which will include the removal of excavated material away from the site and the construction of the various buildings. The volumes of traffic generated during this period are unlikely to be in excess of 15 two-way trips per hour for a short period of time.

Overall the impact will be an adverse slight short-term effect on local traffic during the construction phase.

15.5.2 Operational Phase

Access to the proposed development is to be facilitated via a new signalised junction from the Dublin Road. Refer to Table 15.1 for the peak hour flows and to the Traffic and Transport Assessment (TTA), included as Appendix 15.1 for more details of the estimated traffic to be generated.

The TTA completed by PUNCH Consulting Engineers has assessed the impact of the proposed development on the existing road network for the opening year (2024), and Design years (2029, 2039). The following is a summary of the predicted impacts. For more detail refer to the accompanying TTA in Appendix 15.1.

Shanganagh Castle Residential Development (SCRD) Junction

The proposed signalised junction can cater for the design flows of all the known planned local area development as well as the proposed development and the existing traffic growth up to the Design Year. There are opportunities available for signalised junction improvements in the future by altering the cycle

time to respond to actual traffic loading. The pedestrian demand may actually be lower given the location of bus stops on the same side of the proposed development.

Corbawn Lane Roundabout

The existing traffic flows shows the junction already at theoretical capacity in 2019. This is due to the high existing peak hour flows coupled with the existing junction geometry. It may be reasonably concluded therefore that the impact of the Shanganagh Castle Residential Development on this junction would be imperceptible as it would perform poorly in future years in any case.

Quinn's Road Roundabout

The existing roundabout was found to perform poorly in the current scenario. This was due to the high peak hour flows coupled with the existing geometry of the junction. It may be reasonably concluded therefore that the impact of the Shanganagh Castle Residential Development on this junction would be imperceptible as it would perform poorly in future years in any case.

Olcavor Junction

The Olcavor Road traffic flow is comparatively low and the junction performs satisfactorily. It may be reasonably concluded that the impact of the Shanganagh Castle Residential Development on this junction would be imperceptible.

Crinken Lane Junction

The existing junction was found to perform satisfactorily.

Wilford Roundabout

The existing roundabout was found to perform well in the current scenario and into the future with the current levels of traffic assigned. Once the full local area development is in operation the existing junction will surpass the theoretical capacity. However, it is considered that in urban areas a certain level of congestion is to be expected during peak times. It is the south approach (R761 from Bray) in the AM peak that is the critical arm. This is understandable due to the commuter exodus from this dormitory town wishing to join the M11/M50 to head north. However, the Shanganagh Castle Residential Development traffic would have little impact on this movement.

Overall there will be a long-term slight impact to local traffic.

15.5.3 'Do Nothing' Scenario

If the proposed development does not proceed there would be no additional demand or loading on the existing road network other than the naturally growing baseline traffic figures.

15.5.4 Cumulative Impacts

Cumulative impacts refer to a series of individual impacts that may, in combination, produce a significant impact. The underlying rationale of this cumulative or 'in-combination' assessment is to take account of cumulative impacts from existing or proposed plans and projects and these will often only occur over time. It is assumed therefore that the Shanganagh Castle Development will proceed in isolation. The worst-case scenario is if the works proceed concurrently with the Woodbrook SHD Development.

Overall the Proposed Development is not likely to result in significant adverse impacts either alone or in combination with any likely future projects.

At operational stage the proposed Woodbrook development of 685 no. residential units as Phase 1 and 803 residential units as Phase 2 is expected to be complete. A Traffic Impact Assessment was prepared as part of the Strategic Housing Development application to An Bord Pleanála and the proposed flows from the TTA have been used in the analysis for the proposed development together with other developments which have planning permission – the Aske Hospital and Bray Golf Course development..

15.6 REMEDIAL AND MITIGATION MEASURES

15.6.1 Construction Phase

T & T CONST 1: The contractor shall prepare a Construction Traffic Management Plan (CTMP) for the construction phase. This will likely be incorporated into the overall Construction & Environmental Management Plan (CEMP) for the site. The purpose of such a plan is to outline the measures to manage the expected construction traffic activity during the construction period and will be reviewed and updated as works progress. In the interim, however, this section will provide a preliminary overview of the likely volume and routing of construction vehicles, based on a most likely scenario of construction.

The preparation of the CTMP will entail an assessment of existing nearby employment, educational, recreational and commercial facilities to establish the peak times for vehicles, cyclists and pedestrians. This information would be used to develop the optimum start/finish/delivery times to minimise impact on these existing facilities. Any CTMP should include provision that each individual contractor has to liaise and coordinate with each other to ensure there is a safe and efficacious system in place for the road network to minimise delays.

It is envisaged that construction operations on site will generally be between the hours of 08:00 and 19:00hrs, Monday to Friday, and 08:00 to 14:00hrs on Saturdays. However, it may be necessary for some construction operations to be undertaken outside these times, for example; service diversions and connections, concrete finishing and fit-out works, etc. There may be occasions where it is necessary to make certain deliveries outside these times, for example, where large loads are limited to road usage outside peak times. It is recommended that all deliveries are provided with instructions/directions on accessing the site from Dublin Road, and that deliveries will be scheduled outside of peak commuting hours.

The construction shift times will ensure construction traffic will have limited impact on the traditional peak periods of 08:00hrs-09:00hrs in the morning and 17:00hrs-18:00hrs in the evening as it is envisaged most construction staff will be at work before 08:00hrs in the morning and will leave prior to the evening peak.

It is assumed that most construction traffic approaching the site will travel via the R119 Dublin Road and the M11 motorway via Wilford Roundabout. Again, the Construction Traffic Management Plan issued at construction stage would identify haulage routes and restrictions as appropriate in discussion with the Local Authority.

T & T CONST 2: The Main Contractor must progress their works with reasonable skill, care, diligence and at all times, proactively manage the works in a manner most likely to ensure the safety and welfare of those carrying out construction works, all other persons accessing the site and interacting stakeholders including adjoining residents. As part of the Construction Health and Safety Plan for the site the contractor will be required to assess risks and thereafter eliminate, reduce and mitigate these risks.

T & T CONST 3: There will also be a requirement for comprehensive measures as part of the construction management, for the proposed development, such as:

- Temporary warning signs;
- Banksmen controlling access and egress from the site;
- All marshalling areas and site offices will be contained within the site boundary and will therefore have little impact on external roads;
- Wheel washers/judder bars to clean off vehicles exiting the site during spoil removal;
- All loads to be properly stowed and secured with a tarpaulin, where appropriate;
- Routine sweeping/cleaning of the road and footpaths in front of the site;
- No uncontrolled runoff to the public road from dewatering/pumping carried out during construction activity.

T & T CONST 4: Construction vehicle movements will be minimised through:

- a) Consolidation of delivery loads to/from the site and manage large deliveries on site to occur outside of peak traffic periods;
- b) Use of precast/prefabricated materials where possible;
- c) 'Cut' material generated by the construction works will be re-used on site where possible, through various accommodation works;
- d) Adequate storage space on site will be provided;
- e) A strategy will be developed to minimize construction material quantities as much as possible;
- f) Construction staff vehicle movements will also be minimized by promoting the use of public transport, shared use of vehicles, cycling and walking.

15.6.2 Operational Phase

The design of the site layout, roads and accesses in accordance with the relevant guidelines and codes of practice is likely to mitigate any potential impacts during the operational phase of the development.

At operational phase, there is likely to be a slight long-term impact on the surrounding roads as a result of the proposed development. The mitigation measures detailed previously will reinforce the predicted impact as set out in 15.5.3

15.7 RESIDUAL IMPACTS

15.7.1 Construction Phase

The estimated increase in traffic caused by the construction of the proposed development will be short term and temporary by nature. As such there will be no residual impact as a result of the construction phase.

15.7.2 Operational Phase

The volumes of traffic generated from the currently proposed development will have a slight effect on the road network traffic volumes and can be considered within the norms for urban developments. As such the impacts as a result of the operational stage will be slight long term effects.

15.8 MONITORING

15.8.1 Construction Phase

The contractor will be obliged to appoint a traffic liaison officer/traffic manager who will be involved in preparing the CTMP and to monitor the performance of the CTMP. The traffic liaison officer will be available to receive complaints, comments and queries about the traffic generated by the construction site, and traffic issues associated with the site. Regular meetings will be held on-site to which with all relevant stakeholders will be invited. The traffic liaison officer/traffic manager will liaise with:

- Dun Laoghaire Rathdown County Council including Elected Members
- An Garda Síochána
- Other relevant statutory bodies
- Members of the community.
- Adjacent contractors

The traffic liaison officer/traffic manager will be sufficiently senior in position and will be responsible for dealing with any complaints and remedying any non-compliance and developing solutions to prevent re-occurrence.

15.8.2 Operational Phase

The overall facilities on site such as roads and car parks will be maintained and managed by a management company and DLRCC. The management company/DLRCC will ensure necessary security and maintenance of the internal roads and car parks.

The Residential Travel Plan will be monitored and updated to ensure reduced dependency on car based trips.

15.9 REFERENCES

Traffic and Transport Assessment Guidelines TII May 2014

Design Manual for Urban Roads and Streets DOEHLG 2019

Geometric Layout of Signal Controlled Junctions and Signalised Roundabouts (DN-GEO-03044) TII November 2005 (NRA ref TD50).

National Cycle Manual NTA

CHAPTER SIXTEEN MATERIAL ASSETS – WATER SERVICES

16.1 INTRODUCTION

This chapter of the EIAR comprises an assessment of the likely impact of the proposed development on the drainage and water supply material assets, as well as identifying proposed mitigation measures to minimise any impacts.

The information contained within this chapter should be read in conjunction with the design drawings and suite of reports, which accompany this application for approval. It should also be read in conjunction with the Foul and Potable Water Engineering Planning Report submitted with the application.

The potential impacts associated with the proposed development, if any, are assessed with regards to the following proposed built services:

1. Potable Water Supply Infrastructure;
2. Waste Water Infrastructure; and
3. Surface Water Drainage infrastructure

The hydrological flow impact from surface water drainage infrastructure has been covered within Chapter 9.0 – Water Hydrogeology & Hydrology.

16.2 ASSESSMENT METHODOLOGY

The assessment of the potential impact of the activity on water and hydrology was carried out according to the methodology specified in the guidance documents listed in Chapter 1.0.

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:

- CIRIA publication C753 – SUDS Manual 2015
- Greater Dublin Strategic Drainage Study 2005
- IW Code of Practice for Wastewater Infrastructure 'IW-CDS-5030-03' Irish Water Code of Practice for Water Infrastructure 'IW-CDS-5020-03'.

The following sources of information were consulted to establish the baseline environment:

- Public Foul Drainage (Irish Water and DLRCC Records);
- Public Water Main Networks (Irish Water and DLRCC Records);
- Public Surface Water Drainage (Irish Water and DLRCC Records);
- Base maps – Ordnance Survey of Ireland;
- Site Inspections

In relation to wastewater and water supply, a pre-connection enquiry application has been submitted to Irish Water, and a confirmation of feasibility letter has been received from Irish Water (See Appendix 16.1). DLRCC have also been consulted regarding the impact on surface water drainage.

16.3 RECEIVING ENVIRONMENT

The receiving environment comprises the existing services within the vicinity of the development.

16.3.1 Foul Waste Water

The following drainage services are present adjacent to the site:

- 225 mm concrete sewers to the north of the site servicing the Castle Farm Residential Estate.
- The existing houses adjacent to the northern boundary of the site are drained via private gravity foul drains which connect to the public foul system in the adjacent Castle Farm estate.

The DLRCC depot at the south east corner of the site is drained via a septic tank.

16.3.2 Surface Water

Run off from the existing site is collected by an old cut and cover land drain and routed through the existing pond at the south-centre of the site. From there out flow is carried by another land drain and connects a ditch at the south eastern corner of the site in the adjacent Shanganagh Park. The open ditch runs south through the park and then continues through adjacent lands ultimately connecting to the Crinken Stream.

Additionally, in the vicinity of the site council records show that there is a:

- 225 mm uPVC surface water sewer running north-south along the R119 Dublin Road to the west of the site.
- Concrete Surface water sewer to the north of the site servicing the Castle Farm Residential Estate. Pipe sizes vary from 300mm to 450mm in the vicinity of the site.
- 450mm concrete surface water sewer running west-east adjacent to the northern boundary of the site. This pipe appears to be an abandoned system.

16.3.3 Potable Water

The following potable water services are present adjacent to the site:

- An existing 4" uPVC watermain traversing the site in an east-west direction serving Shanganagh Castle.
- An existing 6" cast-iron watermain running north-south along the R119 Dublin Road
- An existing 100mm uPVC watermain to the north of the site servicing the Castle Farm Residential Estate.

There is an existing building located in the north-west corner of the development.

16.4 LIKELIHOOD OF IMPACTS

16.4.1 Design Phase

The proposed development will consist of 597 no. residential units with associated creche and small commercial units. The proposed development will require new surface water sewerage, foul sewerage,

and potable water supply pipelines to service it as well as existing buildings on site. Redundant water, foul and surface water sewer connections are to be disconnected and removed as necessary.

Refer to section 16.4.2 and 16.4.3 for description of proposed works and associated likelihood of impacts

16.4.2 Construction Phase

Foul Water

The installation of the foul sewers for the development will be conducted in parallel with the other services. This will mainly involve construction of pipes and manholes using trench excavation. The site compound will require a foul connection which can be made to the existing services within the site. This likely adverse impact will be short term and slight effects. Improper discharge of foul drainage from contractor's compound could contaminate groundwater and nearby watercourses through seepage.

Water

Provision of a new water main distribution network would involve construction activities within the subject lands mainly involving trench excavations conducted in parallel with the other services.

There is a risk of contamination of the public water supply during the construction and in particular the connection of the watermain network for the scheme to the public supply. The site compound will require a water connection.

Surface Water

The installation of the surface water sewers for the development will be conducted in parallel with other services. This will mainly involve construction of pipes and manholes using trench excavation. Damage to existing underground and over ground infrastructure resulting in possible contamination of the existing systems (including watercourses) with construction related materials.

Excavations

All proposed services will require excavations to install. Please refer to EIAR Chapter 8 (Land and Soils) for further information regarding the soils impact of proposed services being constructed in ground.

16.4.3 Operational Phase

Foul Water

The proposed infrastructure will meet the requirements of Irish Water in terms of design, arrangement and clearances to other infrastructure.

Based on the development comprising 597 no. dwellings, as well as a crèche, small commercial units and cafe, the total additional foul sewerage flows as a result of the development are as summarised in the below table.

Foul Sewerage Flows from Development	
Dry Weather Flow	279.2 cu.m/day or 3.2 l/s
Peak Flow	10.15 l/s

Table 9.1 Additional Wastewater Flows

Irish Water have provided a confirmation of feasibility letter to confirm that their wastewater network can accommodate the proposed additional foul loading via the adjacent Woodbrook Development. Please refer to Appendix 16.1 for a copy of the confirmation of feasibility.

The development will be drained via a 225mm diameter gravity system through the adjacent Shanganagh Park connecting to the proposed system for the Woodbrook SHD development. From there foul water will then be pumped to the existing Irish Water system at St. Anne's Park housing estate to the north of Shanganagh Park via a proposed rising main. Upon completion of the final rising main by Irish Water as part of the Woodbrook development, wastewater flows will then be transferred to the new rising main and pumped directly to Shanganagh Waste Water Treatment Plant (WWTP) for treatment.

Please refer to the letter of consent provided by the developer of the adjacent Woodbrook development for the proposed development to be serviced via that site as detailed in Chapter 17.0 of this EIAR Appendix 17.3. The Woodbrook development is expected to have planning in early 2020. It will be necessary for Woodbrook to construct foul sewerage to service the proposed development early in construction phase to be in accordance with the provided letter of consent. Thus the foul sewerage will be available for use prior to completion of any phase of the proposed development, which is expected to commence development in early 2021.

It is proposed that the foul drainage from the gate house will be diverted to the site development drainage system.

There are various drainage services works proposed within the proposed buildings. These are not discussed in detail since it is considered that there is no additional direct effect on the environment.

Potable Water

The proposed infrastructure will need to meet the requirements of Irish Water and DLRCC in terms of design, arrangement and clearances to other infrastructure.

Irish Water have provided a confirmation of feasibility letter to confirm that the potable network can accommodate the proposed additional loading. They require that the new site main be connected to a new 355mm diameter main which was laid on Dublin Road in 2019. Continuity of supply for the castle building will be maintained via a connection to the new site main. Please refer to the Irish Water Confirmation of Feasibility included in Appendix 16.1.

Based on the development comprising 597 dwellings, as well as a crèche, minor commercial uses and café the total additional water supply flows as a result of the development are as summarised in the below table.

Water Flows from Development	
Average Daily Flow	253.86 cu.m/day or 2.9 l/s
Average Day Peak Week Flow	3.67 l/s
Peak Demand	18.37 l/s

Table 9.2 Additional Water Supply Flows

There are various water supply services works proposed within the proposed buildings. These are not discussed in detail since it is considered that there is no additional direct effect on the environment.

Surface Water

It is proposed to drain the entire site via a network of surface water pipework. This surface water pipework is to be separated from the foul pipework.

The surface water drainage is to be routed via attenuation tanks and outflow reduced to a greenfield equivalent rate (Q_{bar}) for up to the 1% AEP event, with an allowance for 20% additional flows from climate change. It is proposed to connect the development surface water discharge to existing surface water drainage ditch along the southern boundary of the site in the adjacent Shanganagh Park. The proposed Q_{bar} discharge rate from the site to the ditch is 35.5l/s. Please refer to Chapter 9.0 Water Hydrogeology & Hydrology for details regarding the hydrology of this ditch.

Surface water quality will also be treated through the use of SUDS measures. For this development, the following SuDS measures are proposed:

- **Green roof**

Green roofs are areas of living vegetation, installed on the top of buildings, for a range of reasons including visual benefit, ecological value, enhanced building performance and the reduction of surface water runoff. At least 60% of the total site roof area will be provided as green roof

- **Landscaping**

Locations as per landscape architect's drawings

- **Pervious Pavement**

Pervious pavement is proposed at all proposed car parks. Pervious pavement provides filtration of silt and pollutants, biodegradation of organic pollutants and absorption of pollutants.

- **Rain Gardens**

Rainwater is treated by evapotranspiration within the proposed rain garden. Planting is proposed to facilitate flooded water environment.

- **Use of existing Pond**

The pond will treat incoming runoff through settling and biological uptake via evapotranspiration.

- **Swales**

Swales will provide treatment via evapotranspiration within the topsoil layers. Infiltration into the ground below will not be significant due to the highly impermeable clay layers below.

Part of the surface water drainage system will be routed via the pond to ensure that it remains fed by overland runoff. Please refer to Chapter 9.0 for details regarding the hydrogeology of this pond. Please

also refer to the Stormwater Impact Assessment in Appendix 16.2 for further detail regarding surface water, including additional detail regarding SuDS measures proposed.

16.5 DESCRIPTION AND SIGNIFICANCE OF IMPACTS

16.5.1 Construction Phase

The construction of the proposed in ground services will require the excavation, removal and reinstatement of existing natural and man-made ground. This will have a moderate short-term effect on the existing ground.

The new development requires new connections to public water supply, surface water drainage and waste water networks. This may result in temporary disruption of existing services in the vicinity of the development. This disruption effect if any will be brief and not significant.

During construction, there will be a short period where the area of the proposed works cannot be used by the general public, due to construction operations being active. The impact of this is short term and slight effect.

The impact of temporary construction water supply, wastewater and surface water services are expected to be short term and negligible effects.

16.5.2 Operational Phase

Irish Water has confirmed the feasibility of the proposed development in terms of water and wastewater capacity via a confirmation of feasibility letter.

The development wastewater will add flow to the Irish Water network, via the proposed pump station at the Woodbrook development to the south. As a result, there will be a long term slight impact on the wastewater flows in Irish Water network, as well as imperceptible impact due to power consumption from the pump station.

The development surface water discharge will be reduced to greenfield equivalent rates up to the 1% AEP event. The impacts of the surface water drainage are considered negligible and long term effects in nature.

All potable water supply will be obtained from public water supply networks, all surface water drainage will discharge to existing surface water drainage networks, and all foul sewerage will discharge to public wastewater networks. The maintenance of all public infrastructure is managed by the local authority. The maintenance impact is considered slight and long term effects.

Refer to EIAR Chapter 9 (Water Hydrogeology and Hydrology) for further information in relation to the hydrological impact of the surface water discharge.

16.5.3 Do Nothing Scenario

If the proposed works are not implemented, then the existing ground and services will remain in place. Drainage flows will not be affected and the site will remain in its current condition.

16.5.3 Cumulative Impacts

The cumulative impact of the potable water supply is addressed by Irish Water providing a new 355mm watermain on Dublin Road. This watermain is expected to allow for the proposed development as well as other developments in the area. Irish Water have confirmed that their network can accommodate the development. The impact is considered be a slight and long term effect.

The cumulative impact of wastewater is that the development's wastewater is combined with the adjacent Woodbrook development waste water network and pumped to Irish Water's wastewater network. Irish water have confirmed that their network can accommodate the development. The impact is considered be a slight and long term effect.

There is no expected cumulative impact associated with surface water since the discharge is reduced to greenfield equivalent for the site.

16.6 REMEDIAL AND MITIGATION MEASURES

16.6.1 Construction Phase

WS CONST 1: The contractor is to conduct the works in accordance with all relevant local authority requirements, and health and safety legislation.

WS CONST 2: Relevant services providers are to be consulted in advance of works to ensure works are carried out to relevant standards and specifications including procedures to ensure safe working practices are implemented for works in the vicinity of services, such as live gas mains, works in the vicinity of overhead electricity lines and live electricity lines and works to distribution watermains.

WS CONST 3: Neighbouring sites are to be advised of construction methodologies in advance of works, in situations which may affect them.

WS CONST 4: All retained underground services are to be protected.

WS CONST 5: All decommissioned infrastructure will have to be sent to an accepting landfill for disposal.

WS CONST 6: A construction methodology will be required by the contractor to be tailored to reduce, where possible, dust noise and air pollution; to minimise interference with the environment and the neighbouring areas. This will be contained within the Construction Environmental Management Plan.

WS CONST 7: All infrastructure is to be appropriately tested by an approved method during the construction phase, all in accordance with Irish Water / DLRCC Requirements.

WS CONST 8: Connections to the service providers are to be carried out to the approval and / or under the supervision of the Local Authority or relevant utility service provider, prior to commissioning.

WS CONST 9: All new sewers are to be inspected by CCTV survey post construction; to identify any possible physical defects for rectification prior to operational phase.

WS CONST 10: Prior to the commencement of excavations in public areas, all utilities and public services are to be identified and checked; to ensure that adequate protection measures are implemented to minimise the risk of service disruption all in accordance with Irish Water / DLRCC Requirements.

WS CONST 11: All excavations within the public area are to be back-filled in a controlled manner and surface re-instated to the satisfaction of the Local Authority.

With the implementation of these mitigation measures, the severity of the impact of the proposed development on the built services will be minimised, with tie-ins to existing services and installation of new services completed in a satisfactory manner for the relevant service providers.

16.6.2 Operational Phase

WS OPER 1: The material assets are to be constructed in accordance with all relevant local authority standards.

WS OPER 2: Maintenance will be provided on an ongoing basis, in accordance with manufacturer and local authority requirements.

16.7 RESIDUAL IMPACTS

16.7.1 Construction Phase

The predicted impact of the development is that, during construction, there will be a short term period where the area at the development site cannot be used by the general public. Existing services diversions may mean that some on site buildings may be without services for short periods.

16.7.2 Operational Phase

The predicted operational impact would be the additional permanent infrastructure being provided in ground to service the proposed development. This is a benefit to the development.

There will be additional potable water demands impacting on the Irish Water networks. These demands have been accommodated by Irish Water. The impact is considered slight and long term effect.

There will be additional wastewater demands impacting on the Irish Water network and the adjacent Woodbrook wastewater network. These demands have been accommodated by Irish Water and by the Woodbrook waste water design. The impact is considered slight and long term effect.

16.8 MONITORING

The construction of works will be monitored to ensure compliance with Dun Laoghaire Rathdown County Council's (DLR's) requirements, and health and safety legislation.

The operational phase of public works will be monitored by DLR responsible for the respective asset.

The operational phase of private assets will be monitored by the management company for the buildings and their environs.

16.8 REFERENCES

CIRIA publication C753 – SUDS Manual 2015

Greater Dublin Strategic Drainage Study 2005

IW Code of Practice for Wastewater Infrastructure 'IW-CDS-5030-03' Irish Water Code of Practice for Water Infrastructure 'IW-CDS-5020-03'

Guidelines on the Information to be Contained in Environmental Impact Statements (Environmental Protection Agency, Draft August 2017)

Advice Notes on Current Practice in the Preparation of Environmental Impact Statements (EPA, 2003)

Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment August 2018, Department of Housing Planning & Local Government

CHAPTER SEVENTEEN MATERIAL ASSETS – RESOURCES & WASTE MANAGEMENT

17.1 INTRODUCTION

This Chapter presents the likely and significant impacts associated with the material asset (built services) environments and waste management associated with the proposed development.

The information contained within this chapter should be read in conjunction with the design drawings and suite of reports, which accompany this planning application. It should be noted that Water Services, including potable water supply infrastructure, waste-water infrastructure and surface water disposal are comprehensively dealt with in Chapter 15.0 Water Services and it is not proposed to reiterate them in this chapter. Similarly, transportation infrastructure is dealt with comprehensively in Chapter 14.0 Material Assets – Traffic & Transport. It is the remaining built services, including

- Electricity connections;
- Natural Gas Supply; and
- Telecommunications

which are assessed in this Chapter for potential impacts along with the Urban Settlement, Ownership & Access and Waste Management.

In addition to an assessment of the likely impact of the proposed development on the waste generated from the development, a separate Operational Waste Management Plan (OWMP) has also been prepared for the operational phase of the development and is included as Appendix 17.1 of this chapter. Waste management in Ireland is subject to EU, national and regional waste legislation which defines how waste materials must be managed, transported and treated. The overarching EU legislation is the Waste Framework Directive (2008/98/EC) which is transposed into national legislation in Ireland. The cornerstone of Irish waste legislation is the Waste Management Act 1996 (as amended).

17.2 ASSESSMENT METHODOLOGY

As part of a desktop study of the existing services infrastructure, serving the development site, the following data was sourced online, for information:

- Electricity Supply Networks (ESB);
- Gas Supply (Gas Networks Ireland);
- Telecommunications (Éir, Aurora, Virgin Media, BT)

A topographical survey was carried out, in order to verify the above information and identify existing built private services within the development site. All of the above information was reviewed, in order to gain an appreciation of how the development site is currently served.

A site-specific Construction and Demolition Waste Management Plan (C&D WMP) has been prepared by Punch Consulting to deal with waste generation during the construction and demolition phases of the project and has been included as Appendix 17.2. The C&D WMP was prepared in accordance with

the 'Best Practice Guidelines for the Preparation of Waste Management Plans for Construction and Demolition Projects' document produced by the National Construction and Demolition Waste Council (NCDWC) in conjunction with the Department of the Environment, Heritage and Local Government in July 2006.

A separate Operational Waste Management Plan (OWMP) has also been prepared by AWN Consulting Ltd for the operational phase of the development and is included as Appendix 17.1 of this Chapter. These documents will ensure the sustainable management of wastes arising at the development in accordance with legislative requirements and best practice standards.

17.3 RECEIVING ENVIRONMENT

17.3.1 Urban Settlements

In the Dún Laoghaire - Rathdown County Development Plan 2016 - 2022 (CDP) Woodbrook is identified as a future development area in the core strategy settlement structure. The CDP states that there is potential for an additional 2,300 residential units in Woodbrook – Shanganagh having regard to the extent of land that is zoned.

The Woodbrook – Shanganagh Local Area Plan (LAP) identifies two discrete development parcels including lands at Shanganagh Castle and Woodbrook – incorporated within a wider environs. The LAP area is identified within the County Development Plan Core Strategy as a 'Primary Growth Node' and also as a 'Major Urban Housing Delivery Site' by the Department of Housing Planning and Local Government (DHPLG).

It is an objective of the Council to unlock the potential and accelerate the delivery of housing on Woodbrook-Shanganagh, working in collaboration with all relevant stakeholders (Objective H1); to promote sustainable higher densities and quality innovative housing designs (Objective H2); and to promote high quality homes and quality residential choices for a range of household needs (Objective H3). The urban settlement and planned settlement pattern are dealt with in more detail in Chapter 3.0 Spatial Planning Policy.

17.3.2 Ownership & Access

All the land within the application site is in the ownership of the applicant, with the exception of a small area of land at the southernmost extremity of the proposed greenway. This area of land, comprising 135sqm, extends into the Woodbrook development in order to facilitate a connection to their proposed wastewater network. A letter of consent has been secured from Aeval Limited to facilitate such connection, once constructed.

The proposed development will be drained via a 225mm diameter gravity system through Shanganagh Park connecting to the proposed system to be developed by Aeval Unlimited Company as part of their proposed residential development currently before An Bord Pleanála for consideration under Strategic Housing Development (SHD) legislation. Whilst the gravity system will be laid through lands in the ownership of the applicant (Shanganagh Park), a letter of consent has been secured from Castlethorn

on behalf of Aeval Unlimited Company to facilitate the connection to the Woodbrook SHD development. See Appendix 17.3.

Vehicular access and egress to and from the application site will be provided via the Dublin Road (R119) which is a public road. The existing entrance to the castle grounds will be relocated to the north to facilitate the proposed development with upgrade works to provide a signalised junction. A separate pedestrian and cycle access is to be provided further north along the Dublin Road.

A pedestrian route is to be facilitated between the proposed development and the adjoining residential development Castle Farm, to the north. Such works will be undertaken up to a point on the northern site boundary and will be fully contained within the red line application boundary. It is envisaged that a through connection will be facilitated into Castle Farm sometime in the future.

Vehicular and pedestrian access are to be maintained to Shanganagh Castle at all time. In this regard a right of way is being accommodated through the proposed curved driveway (The Crescent) which will connect with the existing Castle route. This route has been identified in yellow on the Site Layout Plan. As part of the long planned tripartite exchange of land within Shanganagh - Woodbrook, Aeval (the applicant advancing the Woodbrook scheme) will transfer an equivalent '11 Acres' area to Dún Laoghaire - Rathdown County Council comprising of 6.29 acres at Shanganagh Castle and 2no. lots of zoned residential lands at Woodbrook with a combined area of 4.68 acres. It is understood that the tripartite agreement follows on from an original draft Heads of Agreement between the parties dating back to 2006 when Aeval originally acquired the Woodbrook lands. It is understood that upon receipt of a successful determination of the Woodbrook SHD planning application that the tripartite agreement will automatically trigger land exchanges between the parties, and the applicant will then effectively own and control Shanganagh Castle.

17.3.3 Natural Gas Supply

There is an existing 90 mm diameter PE gas main entering the site adjacent to Shanganagh Cottage from the Dublin Road. This pipework is routed approximately halfway down the existing roadway to Shanganagh Castle and terminates in the road. There is an existing 180 PE gas main on the Dublin Road in front of Shanganagh Cottage. A new gas supply will be taken from this point to serve the new centralised Energy Centre serving the apartments within the development. A gas meter will be located adjacent to the Energy Centre.

17.3.4 Electrical Supply

An existing 10 KV / 20KV MV overhead ESB supply enters the site adjacent to the existing site entrance and is routed across the site to a pole mounted transformer in the adjacent Castle Farm Estate and also to serve Shanganagh Castle. Overhead supplies serve the cottage on the site adjacent to the Dublin Road. These supplies will be re-routed / underground and coordinated with the new development site infrastructure.

Five new ESB sub-stations have been located within the development and these will be served from a new ESB MV infrastructure serving the site.

17.3.5 Information and Communications Technology (ICT)

EIR

The availability of an Eircom Network connection point has been confirmed in the area. New Eircom incomers to the development will be provided from existing Eircom infrastructure. EIR infrastructure ducts are routed along the R119 Dublin Road and within the Castle Farm Housing Estate. Cabling and metering will be routed to each unit and to a Communications Distribution Hub in each apartment block which will provide apartments with Data, Telephone and Media Services.

Virgin Media

The availability of Virgin Media Connection Point has been confirmed in the area. Ducting cross the site and with the agreement of Virgin Media, these services will be rerouted. Existing Virgin infrastructure is routed along with the R119 Dublin Road and within Castle Farm Housing Estate. Cabling / ducting will be routed to each house unit and to a Communications Distribution Hub in each apartment block which will provide apartments with Data, Telephone and Media Services.

17.3.5 Waste

In terms of waste management, the receiving environment is largely defined by Dún Laoghaire Rathdown County Council (DLRCC) as the local authority responsible for setting an administering waste management activity in the area. This is governed by the requirements set out in the Eastern Midlands Region (EMR) Waste Management Plan 2015-2021.

The waste management plan sets out the following targets for waste management in the region:

- A 1% reduction per annum in the quantity of household waste generated per capita over the period of the plan;
- Achieve a recycling rate of 50% of managed municipal waste by 2020; and
- Reduce to 0% the direct disposal of unprocessed residual municipal waste to landfill (from 2016 onwards) in favour of higher value pre-treatment processes and indigenous recovery practices.

The Regional Plan sets out the strategic targets for waste management in the region and sets a specific target for C&D waste of “70% preparing for reuse, recycling and other recovery of construction and demolition waste” (excluding natural soils and stones and hazardous wastes) to be achieved by 2020.

The Dún Laoghaire-Rathdown County Development Plan 2016 – 2022 also sets policies and objectives for the DLRCC area which reflect those set out in the regional waste management plan.

In terms of physical waste infrastructure, DLRCC no longer operates any municipal waste landfill in the area. There are a number of waste permitted and licensed facilities located in the Eastern Midlands Waste Region for management of waste from the construction industry as well as municipal sources. These include soil recovery facilities, inert C&D waste facilities, hazardous waste treatment facilities, municipal waste landfills, material recovery facilities, waste transfer stations and two waste-to-energy facilities

17.4 LIKELIHOOD OF IMPACTS

It is envisaged that the proposed development will not result in any significant long-term effects on the environment due to the built services associated with the proposed development. There is however likely to be some minor impact experienced, by way of temporary disruption, during the construction phase of this development.

17.4.1 Construction Phase

Power, Gas & Telecommunications

The new development is likely to require new connections to all service providers which may result in temporary disruption of existing services in the vicinity of the development; in order to facilitate the connection.

Waste

The main source of waste material at the site will be construction waste. There are two main types of construction waste – Hazardous and Non-hazardous. Non-hazardous wastes typically generated at construction sites include: timber waste, scrap metal, plastic, paper / cardboard, canteen waste, and litter.

The hazardous wastes that may be experienced at a development of this nature include: adhesives and sealants, chemicals, cleaning products, oil (contaminated absorbent material or debris), paints and thinner and fuels, (hydrocarbons such as diesel).

The scheme will result in waste generation from the following activities:

- Demolition of the existing park depot buildings including greenhouse and the existing house
- Removal of soil to make way for construction
- Removal of existing landscaping

Project engineers have estimated that demolition works will result in 4,420 tonnes of arisings including 2,157 tonnes of concrete; 1,152 tonnes of hardcore; 416 tonnes of masonry and 40 tonnes of steel, all generated by the removal of the existing house on site, the park depot building and the greenhouses. This will be taken for appropriate offsite reuse, recovery, recycling and/or disposal. The estimated volumes of cut and fill of subsoils are 25,000 m³ cut and 10,000m³ fill. There is an additional excavation of topsoil amounting to 13,850m³.

In addition, the project engineers have estimated that c. 51,000m³ soil (including topsoil) stone, gravel and clay from the entire site will be required to be excavated. It is envisaged that c.16,300m³ of excavated material will be reused onsite. The net surplus of the remaining excavated material (c. 34,700m³) will be taken for appropriate offsite reuse, recovery, recycling and/or disposal.

These estimates will be refined prior to commencement of construction. It should be noted that until final materials and detailed construction methodologies have been confirmed it is difficult to predict with a high level of accuracy the C&D waste that will be generated from the construction of the proposed development as the exact materials and quantities may be subject to some degree of change and variation during the construction process.

If the material that requires removal from site is deemed to be a waste, removal and reuse/recycling/recovery/disposal of the material will be carried out in accordance with the Waste Management Act 1996 (as amended), the Waste Management (Collection Permit) Regulations 2007 (as amended) and the Waste Management (Facility Permit & Registration) Regulations 2007 (as amended). The volume of waste requiring recovery/disposal will dictate whether a Certificate of Registration (COR), permit or licence is required for the receiving facility. Alternatively, the material may be classed as by-product under Article 27 classification (European Communities (Waste Directive) Regulations 2011, S.I. No. 126 of 2011).

17.4.2 Operational Phase

Power, Gas & Telecommunications

The existence of the proposed development is likely to result in an increase in the demand on all required services.

The proposed development will consist of 598 no. residential units/households including 194 no. studio and 1 bed units. Allocating a generous household size of 1.5 persons to the 1 bed units and using the local average household size indicators from Census 2016 for this DED (2.92) for the remaining units, the proposed development may result in a projected population of approximately 1,470 no. persons residing at the site. This will result in a sizeable new community within the Shanganagh area and will place significant additional demands on existing services and infrastructure in the area.

Waste

As noted in Section 17.2, an OWMP has been prepared for the development and is included as Appendix 17.2. The OWMP provides a strategy for segregation (at source), storage and collection of all wastes generated within the building during the operational phase including dry mixed recyclables, organic waste and mixed non-recyclable waste as well as providing a strategy for management of waste glass, batteries, WEEE, printer/toner cartridges, chemicals, textiles, waste cooking oil and furniture. The total estimated waste generation for the development for the main waste types based on the AWN Waste Generation Model (WGM) is presented in Table 17. And 17.2 and is based on the uses and areas as advised by the project architects (ABK).

Waste Type	Block A	Block B	Block C	Block D	Block E	Block F	Block G	Block H	Houses	Crèche
Organic	0.90	1.60	0.56	0.53	1.55	0.62	1.71	0.91	0.92	0.06
Dry Mixed Recyclables	6.56	11.69	4.13	3.88	11.33	4.55	12.56	6.64	6.77	2.32
Glass	0.17	0.31	0.11	0.10	0.30	0.12	0.33	0.18	0.18	0.01
Mixed Non-Recyclables	3.64	6.48	2.29	2.15	6.28	2.52	6.96	3.68	3.75	1.03
Total	11.27	20.07	7.10	6.67	19.46	7.82	21.56	11.2	11.63	3.42

Table 17.1 Estimated Waste Generation for Residential Waste Types (m³/week)

Waste Type	Crèche	Shop	Cafe	Gallery
Organic	0.06	0.05	0.12	0.05
Dry Mixed Recyclables	2.32	0.93	0.29	0.89
Glass	0.01	0.03	0.00	0.02
Mixed Non-Recyclables	1.03	0.39	0.38	0.37
Total	3.42	1.40	0.80	1.34

Table 17.2 Estimated Waste Generation for Commercial Main Waste Types (m³/week)

The location of the bins within the units will be within dedicated waste storage areas identified on the drawings. As required, the residents and tenants will need to bring these segregated wastes from their units to their allocated Waste Storage Areas (WSAs). All WSA's can be viewed on the plans submitted with the application. The OWMP seeks to ensure the development contributes to the targets outlined in the EMR Waste Management Plan 2015 – 2021, DLRCC waste bye-laws and the draft DLRCC waste bye-laws.

17.4.3 'Do – Nothing' Scenario

The site is appropriately zoned for development and accordingly has been 'planned' within the local area plan for the area to facilitate residential development. A '*do nothing*' impact would result in the subject lands remaining in a green-field state and substantially undeveloped. This would be an underutilisation of the site from a sustainable planning and development perspective, particularly considering the location of the lands in proximity to existing services and facilities and surrounded by existing residential and community developments. The status of the environmental receptors described throughout this EIAR document would be likely to remain unchanged. The potential for any likely and significant adverse environmental impacts arising from both the construction and operational phases of the proposed development would not arise.

In terms of the likely evolution without implementation of the project as regards natural changes from the baseline scenario, it is considered there would be no change from the baseline scenario in relation to material assets.

However, similarly the potential for any likely and significant positive environmental impacts arising from both the construction and operational phases of the proposed development would also not arise. The site is zoned for residential use purposes within the Shanganagh Local Area Plan 2019-2025 with objectives to ensure a wide range of residential types and the proposed use of the site is considered to be in accordance with the proper planning and sustainable development of the area.

17.4.4 Cumulative Impacts

The recent planning application lodged for Woodbrook provides for the development of 685 no. residential units alongside ancillary units. The proposed development is stated to provide

accommodation for approximately 1,884no. persons in the area¹. Although this development has not yet been permitted it has been considered cumulatively in conjunction with the proposed development.

Power, Gas & Telecommunications

The proposed development will increase the impact on the existing built assets. Having regard to other permitted developments in the area, which are either under construction or where construction has not yet commenced, there is potential for greater impact arising from the demand of additional population living in the area.

The permitted developments will occur on appropriately zoned residential lands and so the population growth has followed a plan led approach to development.

Waste

In a worst-case scenario, multiple developments in the area could be developed concurrently or overlap in the construction phase. Due to the high number of waste contractors in the Dublin region there would be sufficient contractors available to handle waste generated from a large number of these sites simultaneously, if required.

Similar waste materials would be generated by all the developments. There are similar existing residential developments close by, along with the neighbouring religious and sporting sites and these developments will generate similar waste types during their operational phases. Authorised waste contractors will be required to collect waste materials segregated, at a minimum, into recyclables, organic waste and non-recyclables. An increased density of development in the area is likely to improve the efficiencies of waste collections in the area. Other developments in the area will be required to manage waste in compliance with national and local legislation, policies and plans which will minimise/mitigate any potential cumulative impacts associated with waste generation and waste management. As such the effect will be a long-term, imperceptible and neutral.

17.5 DESCRIPTION AND SIGNIFICANCE OF IMPACTS

The existence of the proposed development is likely to result in an increase in the demand on all required services.

17.5.1 Construction Phase

Urban Settlements

The construction phase of the proposed development is likely to have some temporary impacts on the existing urban settlement in the vicinity of the site. This would be due to disturbance during the construction phase and some additional minor and temporary additions to the local population which may arise out of the construction activity.

These localised impacts are addressed in the relevant Chapters of this EIAR document.

¹ Woodbrook Planning Application EIAR

Ownership & Access

The subject lands are not developed at present. There will be some temporary disturbance during construction to the surrounding area, however, this will be minimised through appropriate mitigation measures as set out in the Construction & Environmental Management Plan included as a standalone report with this approval application and detailed in other relevant chapters of this EIAR.

There may be some temporary disruption to the public road network during construction to facilitate access upgrade works. Further there may be short term, temporary restrictions in place within the site which could periodically restrict access to Shanganagh Castle. These restrictions are short term, temporary and negative in nature.

Power Gas & Telecommunications

The installation of the utilities for the development will be conducted in parallel with the other services. This will mainly involve construction of ducting and chambers using trench excavation. Relocation or diversions to existing overhead ESB lines may lead to loss of connectivity to and / or interruption of supply from the electrical grid to the surrounding areas. Potential loss of connection to the Gas Networks Ireland infrastructure could occur, while carrying out works to provide service connections. This likely adverse impact may be characterised as a temporary, short term, moderate impact.

Potential loss of connection to the telecommunications infrastructure while carrying out works to provide service connections could occur. This likely adverse impact may be characterised as a temporary, short term, moderate impact. The site compound will require a power and telecommunications connection. This likely adverse impact will be temporary and negligible.

Waste

The proposed development will generate a range of non-hazardous and hazardous waste materials during the demolition, excavation and construction. General housekeeping and packaging will also generate waste materials as well as typical municipal wastes generated by construction employees including food waste.

Waste materials will be required to be temporarily stored on site pending collection by a waste contractor. Dedicated areas for waste skips and bins will be identified across the site. These areas will need to be easily accessible to waste collection vehicles. If waste material is not managed and stored correctly, it is likely to lead to litter or pollution issues at the development and on adjacent developments. The knock-on effect of litter issues is the presence of vermin within the development and the surrounding areas.

The use of non-permitted waste contractors or unauthorised waste facilities could give rise to inappropriate management of waste and result in negative environmental impacts or pollution. It is essential that all waste materials are dealt with in accordance with regional and national legislation, as outlined previously, and that time and resources are dedicated to ensuring efficient waste management practices. Wastes arising will need to be taken to suitably registered/permitted/licenced waste facilities for processing and segregation, reuse, recycling, recovery, and/or disposal as appropriate. There are numerous licensed waste facilities in the Eastern Midlands region which can accept hazardous and

non-hazardous waste materials and acceptance of waste from the proposed development would be in line with daily activities at these facilities.

At present, there is sufficient capacity for the acceptance of the likely C&D waste arisings at facilities in the region. Where possible, waste will be segregated into reusable, recyclable and recoverable materials. The majority of demolition and construction materials are either recyclable or recoverable. Recovery and recycling of C&D waste has a positive impact on sustainable resource consumption, for example where waste timber is mulched into a landscaping product or waste asphalt is recycled for use in new pavements. The use of recycled materials, where suitable, reduces the consumption of natural resources.

The potential effect of construction waste generated from the proposed development is considered to be short-term, not significant and neutral.

17.5.2 Operational Phase

Urban Settlements

The addition of circa 1,470 new residents to the area will have a significant, positive and direct impact on the existing settlement of Shankill. Importantly, the predicted increase in population has been planned in a holistic and co-ordinated manner vis a vis the Woodbrook Shanganagh Local Area Plan. The proposed development will facilitate population growth in the area, which is a positive impact having regard to the low population growth well below the national average, during the last census period. The subject site is well served by existing community support facilities such as shops and services, health facilities, and schools within proximity to the site. These existing facilities within the immediate vicinity have the capacity to be shared and augmented with additional facilities to support the development proposal.

The subject site has good public transport links to Shankill and Bray Town Centre with its range of higher order shops and services. Notwithstanding such provision it is noted that the proposed Woodbrook Masterplan includes provision for a locally scaled Neighbourhood Centre, providing for local services and facilities which will benefit the proposed development. Further, the provision of a local retail unit on site serves to enhance the immediate provision of services in the area.

Shanganagh Castle, adjoining the subject site offers an excellent opportunity to provide accessible facilities that would not only serve the future population of the proposed development, but also the wider area. The Castle has the potential to become a key focal point within Shanganagh Park and to provide for community functions subject to feasibility studies, in accordance with the objectives of the LAP. Redevelopment of Shanganagh Park for recreational purposes in accordance with the proposed Park Masterplan will significantly enhance the provision of passive and active recreational facilities in the vicinity of the site. The overall impact is long term, significant and positive.

Ownership & Access

All the land within the application site is in the ownership of the applicant and a letter of consent has been secured from Aeval Unlimited Company to connect into their waste water network on the Woodbrook lands, once constructed.

Vehicular and pedestrian access are to be maintained to Shanganagh Castle at all time, irrespective of ownership. In this regard a right of way is being accommodated through the central spine axis through the site. This route has been identified in yellow on the Site Layout Plan. As detailed in Section 17.3.2, a tripartite exchange of land is to occur whereby the applicant will ultimately own and control Shanganagh Castle. Shanganagh Park shall continue to be accessed via the existing vehicular entrance south of the site.

Having regard to the foregoing no significant ownership or access impacts shall arise.

Natural Gas Supply

The proposed development will require gas supplies during the operational phase of the scheme and these will be provided by a new incoming gas supply connecting to the existing gas mains on the R119 Dublin Road and will be routed through the site to service the new central Energy Centre. The new service will be located underground and this will result in a permanent but imperceptible effect. The new gas supply will serve gas boilers which supplement the air to water heat pumps to provide heating and hot water to the proposed NZEB compliant new apartments.

Electrical Supply

The proposed development will require a new underground electrical MV infrastructure to serve the proposed 5 no. new sub-stations within the site, all in agreement with ESB Networks. As the new services will be located underground this will result in a permanent but imperceptible effect.

Information and Communications Technology (ICT)

The provision of Eir and Virgin Media Information and Communications Technology will be made available to the site. If other providers become available within the area, facilities will also be provided for these to ensure a choice of services is available to all dwelling occupiers. As the new services will be located underground this will result in a permanent but imperceptible effect.

Waste

The potential impacts on the environment of improper, or a lack of, waste management during the operational phase would be a diversion from the priorities of the waste hierarchy which would lead to small volumes of waste being sent unnecessarily to landfill. The nature of the development means the generation of waste materials during the operational phase is unavoidable.

Networks of waste collection, treatment, recovery and disposal infrastructure are in place in the region to manage waste efficiently from this type of development. Waste which is not suitable for recycling is typically sent for energy recovery. There are also facilities in the region for segregation of municipal recyclables which is typically exported for conversion in recycled products (e.g. paper mills and glass recycling). If waste material is not managed and stored correctly, it is likely to lead to litter or pollution issues at the development and on adjacent developments.

The knock-on effect of litter issues is the presence of vermin within the development and the surrounding areas. Waste contractors will be required to service the development on a regular basis to remove waste. The use of non-permitted waste contractors or unauthorised facilities could give rise to inappropriate management of waste and result in negative environmental impacts or pollution. It is

essential that all waste materials are dealt with in accordance with regional and national legislation, as outlined previously, and that time and resources are dedicated to ensuring efficient waste management practices.

The potential impact of operational waste generation from the development is considered to be long-term, not significant and negative.

17.6 REMEDIAL & MITIGATION MEASURES

17.6.1 Construction Phase

The following mitigation measures are recommended for the construction phase of the development:

RES & WM CONST 1: Consultation with relevant services providers in advance of works to ensure works are carried out to relevant standards and specifications including procedures to ensure safe working practices are implemented for works in the vicinity of services such as live gas mains, works in the vicinity of overhead electricity lines and live electricity lines and works to distribution watermains.

RES & WM CONST 2: Prior to the commencement of excavations in public areas, all utilities and public services are to be identified and checked; to ensure that adequate protection measures are implemented to minimise the risk of service disruption.

RES & WM CONST 3: A waste manager will be appointed by the main contractor(s) to ensure effective management of waste during the excavation and construction works.

RES & WM CONST 4: A project specific C&D WMP has been prepared BY Punch Consulting and is included as Appendix 17.1. Adherence to the high-level strategy presented in this C&D WMP will ensure effective waste management and minimisation, reuse, recycling, recovery and disposal of waste material generated during the demolition, excavation and construction phases of the proposed development. Prior to commencement, the contractor(s) will be required to refine/update the C&D WMP or submit an addendum to C&D WMP to DLRCC to detail specific measures to minimise waste generation and resource consumption and provide details of the proposed waste contractors and destinations of each waste stream.

RES & WM CONST 5: On-site segregation of waste materials will be carried out to increase opportunities for off-site reuse, recycling and recovery – it is anticipated that the following waste types, at a minimum, will be segregated:-
o Concrete rubble (including ceramics, tiles and bricks).
o Plasterboard.
o Metals.
o Glass.
o Timber.

RES & WM CONST 6: Any hazardous wastes generated (such as chemicals, solvents, glues, fuels, oils) will also be segregated and will be stored in appropriate receptacles (in suitably bunded areas, where required).

RES & WM CONST 7: Any spoil or waste material generated from the construction process is to be temporarily stored at an approved location on site, before being removed to an accepting licensed waste disposal facility.

RES & WM CONST 8: All construction staff will be provided with training regarding the waste management procedures.

RES & WM CONST 9: All waste leaving site will be reused, recycled or recovered where possible to avoid material designated for disposal.

RES & WM CONST 10: All waste leaving the site will be transported by suitable permitted contractors and taken to suitably registered, permitted or licenced facilities.

RES & WM CONST 11: All waste leaving the site will be recorded and copies of relevant documentation maintained

17.6.2 Operational Phase

RES & WM OPER 1: On-site segregation of all waste materials into appropriate categories including (but not limited to):

- Organic waste.
- Dry Mixed Recyclables.
- Mixed Non-Recyclable Waste.
- Glass.
- Waste electrical and electronic equipment (WEEE).
- Batteries (non-hazardous and hazardous).
- Cooking oil.
- Light bulbs.
- Cleaning chemicals (pesticides, paints, adhesives, resins, detergents, etc.).
- Furniture (and from time to time other bulky waste).
- Abandoned bicycles.

RES & WM OPER 2: All waste materials will be stored in colour coded bins or other suitable receptacles in designated, easily accessible locations. Bins will be clearly identified with the approved waste type to ensure there is no cross contamination of waste materials.

RES & WM OPER 3: All waste collected from the development will be reused, recycled or recovered where possible, with the exception of those waste streams where appropriate facilities are currently not available.

RES & WM OPER 4: All waste leaving the site will be transported by suitable permitted contractors and taken to suitably registered, permitted or licensed facilities.

17.7 RESIDUAL IMPACTS

17.7.1 Construction Phase

The design and construction of the required services infrastructure in accordance with the relevant guidelines and codes of practice is likely to mitigate any potential impacts during the operational phase of the development, with the exception of any routine maintenance of the site services. Residual impacts

on the built services during the construction phase is considered to be temporary and occasional in nature and not significant, where service is unavoidably disrupted to facilitate the construction phase.

A carefully planned approach to waste management as set out and adherence to the C&D WMP during the construction and demolition phase will ensure that the effect on the environment will be short-term, imperceptible and neutral

17.7.2 Operational Phase

With the implementation of these mitigation measures, the severity of the impact of the proposed development on the built services will be minimised, with tie-ins to existing services and installation of new services completed in a satisfactory manner for the relevant service providers. Residual impacts on the built services during the operational phase given the new infrastructure and upgrades to the existing networks is considered to be permanent with a constant occurrence, positive and beneficial to all the end users.

During the operational phase, a structured approach to waste management as set out will promote resource efficiency and waste minimisation. Provided the mitigation measures are implemented and a high rate of reuse, recycling and recovery is achieved, the predicted effect of the operational phase on the environment will be long-term, imperceptible and neutral

17.8 MONITORING

All new infrastructure, which is to serve the proposed development, is to be routinely inspected with any maintenance carried out, as required. Any monitoring of the built services required during the operational phase of the proposed project will be as advised by the relevant services providers.

The management of waste during the construction and operation phase should be monitored to ensure compliance with relevant local authority requirements, and effective implementation of the C&D WMP including maintenance of waste documentation.

17.9 REFERENCES

Irish Water Code of Practice for Wastewater Infrastructure

Irish Water Code of Practice for Water Infrastructure

<https://www.esbnetworks.ie/staying-safe/contractor-safety/digging-and-excavation-work>

<https://www.gasnetworks.ie/corporate/freedom-of-information/make-a-request/>

<https://cbyd.emaps.eircom.ie/Eircom-CBYD/>

Draft Guidelines on the information to be contained in Environmental Impact Assessment Reports, EPA, (2017)

Eastern Midlands Region (EMR) Waste Management Plan 2015-2021

Dún Laoghaire - Rathdown County Development Plan 2016 - 2022

CHAPTER EIGHTEEN INTERACTIONS BETWEEN ENVIRONMENTAL FACTORS

18.1 INTRODUCTION

All environmental factors are inter-related and this chapter cross references the individual environmental assessment reports undertaken, including the proposed mitigation measures, having regard to current knowledge and methods of assessment. An indication is also given of the cumulative effects of the proposed development when considered with other permitted development in the area, not yet constructed.

In practice many impacts have slight or subtle interactions with other disciplines. This chapter highlights those interactions which are considered to potentially be of a significant nature. Discussions of the nature and effect of the impact is primarily undertaken within each of the relevant chapters, while this chapter identifies the most important potential interactions.

18.2 METHODOLOGY

The preparation and coordination of this EIAR ensured that each of the specialist consultants liaised with each other on an ongoing basis and dealt with the likely interactions between effects predicted as a result of the proposed development. This process ensured that appropriate mitigation measures are incorporated into the design process.

At the screening stage in the preparation of the EIAR for the proposed development, the potential for significant cumulative and indirect impacts and interactions were examined and identified. Where identified such impacts and interaction of impacts were included in the scope and addressed in the baseline and impact assessment studies for each of the relevant environmental issues of the project. The cumulative and indirect impacts and interaction of impacts are presented in each of the chapters.

The primary interactions can be summarised as follows:

- Demolition, air quality & climate, noise & vibration and road design;
- Architectural design, landscape design, cultural & built heritage and road and services design;
- Landscape design and engineering services with biodiversity and cultural & built heritage;
- Stormwater attenuation design with biodiversity and soil & geology;
- Visual impact with biodiversity and cultural & built heritage;
- Biodiversity with water and soils;
- Architectural and landscape design with noise, air quality & climate change and built & cultural heritage;
- Noise and vibration and population and human health;
- Air quality and climate and population and human health; and
- Material Assets with population and human health, water, noise and vibration, air quality and climate and built & cultural heritage.

The matrix and expert opinion approaches, as outlined in the EU Guidelines, were used in the identification of the potential for significant cumulative and indirect impacts and interactions. Refer to Table 18.1 for the matrix of potential interaction

	Population & Human Health	Biodiversity	Cultural Heritage - Archaeology	The Landscape	Land & Soils	Water Hydrogeology & Hydrology	Air Quality & Climate	Noise & Vibration	Cultural Heritage - Architecture	Material Assets Traffic & Transport	Material Assets Resources & Waste Management	Material Assets – Waste Services
Population & Human Health		O	-	O	CO	O	CO	CO	O	CO	CO	CO
Biodiversity	O		-	CO	C	CO	-	C	C	-	-	CO
Cultural Heritage - Archaeology	-	-		CO	C	-	-	-	CO	-	C	C
The Landscape	O	CO	CO		C	-	-	-	C	-	-	-
Land & Soils	-	C	C	-		-	C	-	-	-	-	C
Water Hydrogeology & Hydrology	O	CO	-	-	-		-	-	-	-	O	CO
Air Quality & Climate	CO	-	-	-	C	-		-	CO	CO	-	-
Noise & Vibration	CO	C	-	-	-	-	-		C	CO	-	-
Cultural Heritage - Architecture	O	C	CO	C	-	CO	CO	C		-	-	-
Material Assets: Traffic & Transport	CO	-	-	-	-	-	CO	CO	-		-	-
Material Assets: Resources & Waste Management	CO	-	C	-	-	O	-	-	-	-		-
Material Asset – Water Services	CO	CO	C	-	C	CO	-	-	-	-	-	

Table 18.1 Potential Interaction of Effects Matrix **C-** Construction **O** – Operation **CO** – Construction & Operation

18.3 DESCRIPTION OF THE INTERACTIONS

Each chapter of the EIAR details baseline information and identifies the significant potential and residual construction and operational effects/impacts of the proposed development. However, this Chapter details the significant interactive and inter-related effects/impacts. Table 18.2 indicates the key elements and activities of the proposed development during both the site preparation and operational phases and how they inter-act and inter-relate with the various environmental aspects considered in detail in Chapter 6.0 through to Chapter 17.0 of this EIAR.

The following Table 18.2 is indicative only and does not purport to contain or replace all or any of the issues raised in the main assessment sections of this EIAR. Their purpose is to demonstrate the main likely and significant inter-relationships and inter-actions between different environmental aspects considered. While many inter-relationships and inter-actions have been identified, it is anticipated that the mitigation measures included in the proposed development (and outlined in the other relevant sections of the EIAR) will also minimise or off-set potential for significant effects. With mitigation measures in place, no significant residual negative impacts are predicted

	Interaction With	Interaction
Population & Human Health	Landscape	The proposal has the potential to impact on the landscape and visual resources perceived by human beings. The view from the Dublin Road will substantially change reflective of urban development on surrounding lands. Landscape proposals including retention of a significant element of the landscape demesne and woodland shall mitigate and ensure that no significant adverse impact arises.
	Biodiversity	Increased footfall is anticipated in the retained habitats within and surrounding the site during construction and operation of the development. This could lead to the accidental spread, of winter heliotrope a non-native plant. The spread is likely and will be permanent, impacting on locally important habitat. Therefore, a significant negative effect on locally Important ecological features is predicted.
	Material Assets - Traffic & Transport	Traffic flow for construction vehicles in the locality has potential to impact upon road safety; Traffic flow during operation within the site has the potential to create safety risks for pedestrians and cyclists, if the design does not provide for safe pedestrian / cycling environments;
	Material Assets – Resources & Waste Management	At operational stage increased population will create a greater demand on built services, placing greater demand on networks and services, which will need to be treated and delivered.
	Architecture & Cultural Heritage	The proposed development and increased population in the area will result in greater footfall in an around existing features of built & cultural heritage, which inadvertently could result in indirect damage. The potential for impact is low and moderate.
	Air & Climate	There is potential for impact on human health arising from dust during demolition and construction and from climate change associated with greenhouse gas emissions at operational stage. Subject to the implementation of a comprehensive dust minimisation plan and mitigation measures proposed, no significant impacts occur.
	Material Assets – Water Services	At operational stage increased population will create a greater demand on built services, placing greater demand on water requirements and the public sewer, which will need to be treated and delivered.

	Noise & Vibration	Noise and vibration generated from the demolition construction and operational phases of the development have the potential to impact upon local population centres. With the proposed mitigation measures in place the noise impacts will be similar to the existing situation.
Biodiversity	Land & Soils	Excavation and soil works (i.e. through site clearance, re-profiling etc.) during the demolition and construction stage has the potential to cause impact on the biodiversity of the site, for example through disturbance of the available habitats. No potential operational interactions were identified.
	Population & Human Health	Increased footfall is anticipated in the retained habitats within and surrounding the site during construction and operation of the development. This could lead to the accidental spread, of winter heliotrope a non-native plant. The spread is likely and will be permanent, impacting on locally important habitat. Therefore, a significant negative effect on locally Important ecological features is predicted.
	Water Hydrology & Hydrogeology	Surface water contamination during demolition and construction has a potential to effect biodiversity in the area of the site. The proposed development seeks to maintain the existing status quo of the existing surface water regime serving the pond. This is important to support existing aquatic life and in particular the newt population.
	The Landscape	Vegetation and in particular the existing woodland is an important aspect with respect to providing wildlife corridors. The proposed development seeks to retain important landscape features from a visual and biodiversity perspective and to supplement with new planting thereby moderating any significant impacts.
	Noise & Vibration	Noise from demolition, construction and operational phases of the development has potential to impact on the fauna in the vicinity of the proposed redevelopment. However, the ecology chapters of the EIAR have predicted that following suitable mitigation, no significant impacts will occur.
	Material Assets – Resources & Waste Management	At demolition stage the recovery of inert waste involving crushing of concrete on site has the potential to generate noise and dust which has the potential to cause impact on the biodiversity of the site, for example through disturbance of the available habitats. No potential operational interactions were identified.
	Material Assets – Water Services	Pollution of all habitats will be prevented during the operation of the proposed development through the implementation of a Sustainable Drainage System, including raingardens and swales detailed in the Landscape Masterplan. There will therefore be no significant effects on habitats as a result of pollution.

The Landscape	Population & Human Health	The proposal has the potential to impact on the landscape and visual resources perceived by human beings. The view from the Dublin Road will substantially change reflective of urban development on surrounding lands. Landscape proposals including retention of a significant element of the landscape demesne and woodland shall mitigate and ensure that no significant adverse impact arises.
	Biodiversity	Increased footfall is anticipated in the retained habitats within and surrounding the site during construction and operation of the development. This could lead to the accidental spread, of winter heliotrope a non-native plant. The spread is likely and will be permanent, impacting on locally important habitat. Therefore, a significant negative effect on locally Important ecological features is predicted.
	Land & Soils	There is potential for impact on landscaping from the reuse of fill material and the appropriateness of available soils during construction phase; The landscape plan will impact on the quality of the private and public open spaces, which will impact on people's health and well-being.
	Archaeology & Cultural Heritage	Landscaping construction has the potential to impact upon unknown archaeological features on site. The landscaping plan has an impact upon awareness and preservation of cultural heritage within the development and impact on local monuments.
	Architecture & Cultural Heritage	Altering the landscape demesne can directly impact the curtilage and the associated context and setting of Shanganagh Castle. The proposed development and its design concept has been heavily influenced by the cultural heritage of the demesne and has sought to retain and reinstate significant influences, thereby reducing any significant adverse impacts.
Water Hydrogeology & Hydrology	Population & Human Health	Control of surface water during demolition and construction has potential to impact human health due to emissions from site to the hydrosphere or potential flooding during ground works. During the operational stage surface water management has the potential to cause flooding which may impact human health and safety;
	Biodiversity	Surface water contamination has a potential to effect biodiversity in the area of the pond if not properly controlled during construction and operation. With adequate mitigation as proposed in Chapter 9.0 of the EIAR, no significant impacts should occur
	Land & Soils	Excavation and soil works (i.e. through site clearance, re-profiling etc.) during the demolition and construction stage has the potential to cause significant impact on the hydrology and hydrogeology of the site by increasing aquifer vulnerability, deposition of silt in streams, leakage of hydrocarbons, altering the surface water characteristics.

	Architecture & Cultural Heritage	Control of surface water during construction and operation is necessary to ensure that the existing hydrological regime of the pond is impacted, given the cultural and historic significance of the ornamental pond.
Land & Soils	Landscape	Imported soils and materials necessary to undertake landscaping have the potential to impact the landscape. Any necessary imported soils will be chemically analysed and screened against generic screening values for a commercial end use to ensure that it does not pose a risk to human health.
	Biodiversity	Excavation and soil works (i.e. through site clearance, re-profiling etc.) during the demolition and construction stage have the potential to cause impact on the biodiversity of the site, for example through disturbance of the available habitats, dust and noise.
	Water Hydrology & Hydrogeology	Excavation and soil works (i.e. through site clearance, re-profiling etc.) during the demolition stage have the potential to cause significant impact on the hydrology and hydrogeology of the site by increasing aquifer vulnerability, deposition of silt in streams, leakage of hydrocarbons, altering the surface water characteristics
	Material Assets – Water Services	Excavation works to facilitate construction of services will have moderate impacts on the removal of soil. Surface water management during operation stage is proposed and will be managed through SUDs and attenuation thereby limiting discharge to greenfield run-off rates.
	Land & Soils	Disturbance of land and soils and associated excavation has the potential to impact unknown archaeological features.
	Air & Climate	Excavation works and exposure of soil during the demolition and construction phase can influence the microclimate in an area. The demolition of structures on site during the construction phase may result in the spread of dust onto surrounding land uses and public roads. The air quality assessment indicates that there is no significant impact associated with these matters.
Air Quality & Climate	Population & Human Health	The demolition, construction and operational phases of the development have the potential to generate impacts in terms of air quality upon local population centres. Chapter 10.0 Air Quality does identify dust as a potential issue but puts forward mitigation and appropriate Dust Minimisation Plans to address the issue.
	Land & Soils	Excavation works and exposure of soil during the demolition and construction phase can influence the microclimate in an area. The movement of soils during the construction phase may result in the spread of dust and mud onto surrounding land uses and public roads. The air quality puts forward adequate mitigation and indicates that there is no significant impact associated with these matters.

	Architecture & Built Heritage	Seeking to reduce CO2 emissions has resulted in a detailed Energy Strategy for the site with a centralised energy system serving the proposed apartment units. This has influenced the design of the scheme. Poor air quality resulting from the construction or operation of the development could impact on the historic fabric of the building.
	Traffic & Transport	Traffic generation has potential to result in impacts on Air Quality. Chapter 11.0 Air Quality & Climate has been prepared in close co-operation with the Traffic Consultant and has determined that no significant air quality impacts will occur due to traffic generation.
Noise & Vibration	Population & Human Health	Noise and vibration generated from the construction and operational phases of the development have the potential to impact upon local population centres. With the proposed mitigation measures in place the noise impacts will be similar to the existing situation.
	Biodiversity	Noise from construction and operational phases of the development has potential to impact on the fauna in the vicinity of the proposed redevelopment. However, Chapter 7.0 Biodiversity have predicted that following suitable mitigation, no significant impacts will occur.
	Material Assets – Resources & Waste Management	At demolition stage there is the potential to generate noise which has the potential to cause temporary elevated noise levels in proximity to adjoining housing. However, the process will be controlled via a detailed Construction & Demolition Plan to be implemented by the appointed specialist contractor.
	Traffic & Transport	Traffic generation has potential to result in noise related impacts. Chapter 12.0 Noise & Vibration has been prepared in close co-operation with the Traffic Consultant and has determined that no significant noise impacts will occur due to traffic generation.
Archaeology & Cultural Heritage	The Landscape	Landscaping construction has the potential to impact upon unknown archaeological features on site. The landscaping plan has an impact upon awareness and preservation of cultural heritage within the development and impact on local monuments.
	Land & Soils	Disturbance of land and soils and associated excavation has the potential to impact unknown archaeological features.
	Architecture & Cultural Heritage	The removal / disturbance of upstanding archaeological features has the potential to adversely impact on the architectural & cultural heritage integrity of the site.

Architecture & Cultural Heritage	Population & Human Health	The proposed development and increased population in the area will result in greater footfall in an around existing features of built & cultural heritage, which inadvertently could result in indirect damage. The potential for impact is low and moderate.
	The Landscape	Altering the landscape demesne can directly impact the curtilage and the associated context and setting of Shanganagh Castle. The proposed development and its design concept has been heavily influenced by the cultural heritage of the demesne and has sought to retain and reinstate significant influences, thereby reducing any significant adverse impacts
	Air Quality & Climate	Seeking to reduce CO2 emissions has resulted in a detailed Energy Strategy for the site with a centralised energy system serving the proposed apartment units. This has influenced the design of the scheme. Poor air quality resulting from the construction or operation of the development could impact on the historic fabric of the building.
	Archaeology & Cultural Heritage	The removal / disturbance of upstanding archaeological features has the potential to adversely impact on the architectural & cultural heritage integrity of the site.
	Water Hydrogeology & Hydrology	Control of surface water during construction and operation is necessary to ensure that the existing hydrological regime of the pond is impacted, given the cultural and historic significance of the ornamental pond.
Material Assets: Water Services	Population & Human Health	At operational stage increased population will create a greater demand on built services, placing greater demand on water requirements and the public sewer, which will need to be treated and delivered.
	Biodiversity	Pollution of all habitats will be prevented during the operation of the proposed development through the implementation of a Sustainable Drainage System, including raingardens and swales detailed in the Landscape Masterplan. There will therefore be no significant effects on habitats as a result of pollution.
	Water Hydrogeology & Hydrology	The water and sewage connections at construction and operational stages have a potential interaction with available water supply and potential emissions to hydrological cycle;
	Land & Soils	Excavation works to facilitate construction of services will have moderate impacts on the removal of soil. Surface water management during operation stage is proposed and will be managed through SUDs and attenuation thereby limiting discharge to greenfield run-off rates.

Material Assets – Resources & Waste Management	Population & Human Health	At operational stage increased population will create a greater demand on services, placing greater demand on telecommunications, electricity & gas supplies, which will need to be delivered. Increased waste will also arise which will need to be treated and recycled or disposed.
	Biodiversity	The construction and provision of services on site has the potential to impact on the flora & fauna in the vicinity of the proposed redevelopment.
	Air Quality & Climate	Construction of the site services have a potential interaction with air
Material Assets: Traffic & Transport	Population & Human Health	Traffic flow for construction vehicles in the locality has potential to impact upon road safety; Traffic flow during operation within the site has the potential to create safety risks for pedestrians and cyclists, if the design does not provide for safe pedestrian / cycling environments;
	Air & Climate	Construction and operational traffic has the potential to have a significant impact in terms of air quality and climate change due an increase of CO2 emissions from vehicles. The Air Quality & Climate Change chapter has been prepared in close consultation with the traffic consultant..
	Noise & Vibration	Demolition, Construction and operational traffic has the potential to have a significant impact in terms of noise. The Noise and Vibration chapter has been prepared in close consultation with the traffic consultant.

Table 18.2 Summary of Key Proposed Activities and Scheme Elements that Inter-Act and Cause Inter-Related Effects

18.4 CUMULATIVE EFFECTS

Cumulative effects address the long-term changes that may result from the construction and operation of the proposed development and the combined effect of this development with other developments in the area. This review is undertaken to ensure that the combined effects of the proposed development and other influences are assessed in total, and not as individual aspects of the environmental assessment.

A review was undertaken of permitted development in and around Shanganagh over the last five years (including extension of duration of previous permissions). A study radius of 1km was taken from the subject site. Details of the planning permission are provided in Table 18.2.

Expiry	Planning Ref. No.	Description of Development
06/06/2020	D07A/1495	348 residential units, 1 retail & cafe. 10 year permission
27/04/2021	D15A/0683	Demolish gate lodge. Build 4 apartments.
19/12/2022	D17A/0065	Specialist hospital 56 in patients
07/09/2023	D18A/0198	3 detached houses
No expiry	PC/PKS/02/16	Part 8 application for a crematorium

Table 18.3 Permitted Future Development in the Area

The cumulative impact of the proposed development will be a further increase in the population of the wider area. The previously green-field lands will provide for 597 no. new residential units across a variety of unit and tenure types. The recent planning application lodged for Woodbrook provides for the development of 685 no. residential units alongside ancillary units. The proposed development is stated to provide accommodation for approximately 1,884no. persons in the area¹.

Other development is likely to occur in the area whilst construction is underway on the subject site, including for example incidental road works / road improvement works and the proposed upgrade of roadways including the Old Dublin Road fronting the site to facilitate enhanced public transport.

In any event, the cumulative impact of the proposed development and other committed neighbouring developments could have potential implications on environmental variables relating to traffic, noise, air quality & climate, biodiversity and the Landscape. These 'cumulative impacts' have been addressed in Chapter 15.0 Traffic; Chapter 11.0 Noise & Vibration; Chapter 10.0 Air Quality & Climate; and Chapter 14.0 The Landscape;

Each of the developments referred to in this section, including other commercial / industrial operations have been the subject of separate statutory procedures and planning applications and have been approved in their own right. In any case the overall cumulative impact of the proposed development will result in:

- An increase in economic activity in the local area region;
- An increase in traffic on the local road network which can be adequately managed;

¹ Woodbrook Planning Application EIAR

- No significant environmental nuisance from an air quality perspective subject to implementation of the mitigation measures and adherence to good working practices; and
- A significant landscape visual effect due to the nature of the existing parkland and adjoining greenfield land, but regard must be had to the surrounding built environment and the residential zoning afforded to the land.
- A significant architectural & built heritage impact having regard to the loss of the dwindling historic demesne heritage but which has been modified and interrupted over time and which will benefit from the restoration of the ornamental pond and the active management of existing woodland planting.

18.5 REFERENCES

Guidelines on the Information to be contained in Environmental Impact Statements, EPA 2002

Advice Notes on Current Practice (in the preparation of Environmental Impact Statements), EPA 2003

Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports, EPA, 2017.

EU Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions.

CHAPTER NINETEEN SUMMARY OF MITIGATION MEASURES

19.1 INTRODUCTION

This chapter provides a summary of mitigation measures proposed in Chapters 6.0 to 18.0. The appointed contractor will be required to adhere to the mitigation contained in the EIAR for the protection of the environment and to ensure sustainable development.

19.2 INCORPORATED DESIGN MITIGATION

A number of mitigation measures have been incorporated into the design proposal, following an iterative assessment during the design stage. In a lot of instances, these mitigatory measures have shaped the design of the scheme, the juxtaposition of the buildings and the mix of uses proposed.

The design rationale and detail employed seeks to mitigate potential negative effects on a series of environmental factors and considerations.

19.2.1 Population & Human Health

- Provision of a creche, local shop and café to ensure adequate supporting facilities are provided to support the new population;
- Provision of a local playground facility and kick about area with a dedicated greenway through the adjoining parkland to ensure adequate provision of public amenity space and recreational facilities in the interest of public health;
- Provision of on site support facilities and resident services and facilities to ensure comfortable and sustainable living in a new, sustainable mixed-use community; and
- Provision of a centralised energy facility to ensure effective and efficient heating of the apartment development to reduce energy costs and in the interest of sustainable development.

19.2.2 Biodiversity

- Retention of large woodland blocks in the north-west and south-east of the site;
- Retention of the pond and the hydrological regime of this waterbody and the connected drainage ditches.
- Designing landscaping works within and surrounding the Pond to benefit smooth newt and common frog.
- Retention of the hedgerow along the southern boundary of the site (with the exception of a small gap created to enable the construction of a new footpath).
- Planting of trees and meadow planting across the proposed development and subject site; and
- Construction of rain gardens for the sustainable treatment of surface water run-off. Whilst their primary function is to assist in pollution prevention and minimising run-off from the proposed development, these features also enhance biodiversity when planted with a mixture of native plant species

- Construction of swales as a form of Sustainable Drainage System (SuDS) to further treat and manage surface water run-off from the proposed development during its operation; and
- Permanent lighting design has given due cognisance to bats and will minimise disruption to bat roosting, foraging and/or commuting:

19.2.3 Landscape & Visual

- An exclusion zone in excess of 25 meters around the existing ornamental pond is maintained for the purposes of protecting existing species;
- Facilitating a set-back of 20m of the nearest building to the Dublin Road so as to retain the sylvan character of the area in accordance with Objective SC31 of the Woodbrook - Shanganagh Local Area Plan 2017-2030 (LAP);
- Providing an avenue to maintain a view corridor from the Dublin Road to Shanganagh Castle and from the Dublin Road to the island and ornamental pond;
- Retention of some 40 per cent of the site as open parkland or restored and enhanced woodland.
- Insertion, positioning and detailed modelling of the buildings in order to assist in the visual assimilation of their mass and open the development to the parkland;
- Architectural detailing to assist in the integration of the external building facades – including the modulation of openings and fenestration;
- Facilitating increased building heights fronting onto the Dublin Road;
- Rationalisation of all services elements and any other potential visual clutter and its incorporation internally within building envelopes (as far as practically possible);
- Simplification and rationalisation of the proposed roof lines;
- Provision for enhanced connectivity within and through the site to the adjoining Shanganagh Park; and
- The use of appropriate materials to reflect the existing context and ensure a harmonious balance is achieved between the castle and the proposed development.

19.2.4 Archaeological & Architectural Cultural Heritage

- Rationalisation of the design approach in the context of the LAP requirements to ensure a more appropriate and sympathetic approach to the Picturesque landscape and existing built heritage;
- Reinstatement of the route of the romantic landscape castle approach avenue and reorganisation of traffic movement to make this route the main site circulation route;
- De-emphasised the insistent 'urban' grid to make a more open site layout that is more amenable to the sylvan character of the site; and
- Repositioned buildings to ensure views across the parkland to the south of the central axis.

19.2.5 Material Assets – Traffic & Transport

- Provision of cycle and pedestrian links throughout and within the scheme including provision of a greenway across Shanganagh Park to the neighbouring proposed Woodland development, thereby facilitating a shift in modal split to more sustainable travel modes;
- Facilitating the future provision of a pedestrian and cycle connection to the adjoining Castlefarm residential development;
- Development of an internal road network in compliance with DMURS;

- Ensuring adequate set back from the Dublin Road to facilitate the future development of Bus Connects, thereby further enhancing public transport in the area; and
- Provision cycle parking spaces in accordance with the requirements of the Dún Laoghaire-Rathdown County Development Plan 2016 – 2022, as extended.

19.3 CONSTRUCTION PHASE MITIGATION

19.3.1 Population & Human Health

POP & HH CONST 1: In order to protect the amenities enjoyed by nearby residents, premises and employees a Construction and Environmental Management Plan (including traffic management) should be prepared by the contractor and implemented during the construction phase.

19.3.2 Biodiversity

BIO CONST 1: A Construction Environmental Management Plan (CEMP) shall be prepared by a suitably qualified consulting engineer and further developed by the main contractor prior to commencement of the proposed development. The CEMP will set out general environmental management measures, including in relation to pollution prevention, and the roles and responsibilities of Site personnel. The CEMP will include, as a minimum, Construction Method Statement(s), Pollution Prevention Plan (PPP) and Species Protection Plan (SPP).

BIO CONST 2: Controls and contingency measures will be provided to manage run-off from construction areas and to manage sediment in accordance with the proposed surface water management plan proposed as part of the development. No untreated run-off will be allowed to directly enter the Pond or the existing drainage ditches.

BIO CONST 3: All oils, fuels, lubricants or other chemicals will be stored in an appropriate secure container in a suitable storage area, with spill kits provided at the storage location and at places across the Site. There will be no storage of any oils, fuels, lubricants or other chemicals within 10 m of the Pond or existing drainage ditches.

BIO CONST 4: In order to avoid potential pollution impacts to waterbodies, soils or vegetation from machinery during construction, all refuelling and servicing of vehicles and plant will be carried out in a designated area which is bunded and has an impermeable base. This will be situated at least 10 m from the Pond and existing drainage ditches.

BIO CONST 5: During the construction phase, no artificial lighting will be used within 10 m of the Pond, drainage ditches, hedgerows or retained woodland blocks. Any artificial lighting used elsewhere (e.g. that which is required for security purposes) will be directed on to required areas and light spill will be minimised by the use of beam deflectors. Lighting will not be used such that there is lightspill on to the waterbodies or retained habitats which could be used for foraging or commuting by protected species;

BIO CONST 6: All site personnel involved in the construction and operation of the proposed development will be made aware of the ecological features present and the mitigation measures and working procedures which must be adopted.

BIO CONST 7: Root protection zones will be clearly demarcated by a suitably experienced arborist around retained trees and/or woodland. No machinery will enter these areas, nor will any material be stored within them.

BIO CONST 8: Sightings of protected species within the site or immediate surrounds by any operator / staff member during the construction phase will be recorded. If any evidence of protected species occur within 30 m of works, then works in that area will stop immediately.

BIO CONST 9: Any excavations will be left with a method of escape for any animal that may enter overnight, and will be checked at the beginning of each working day to ensure no animals are trapped within them.

BIO CONST 10: Any pipes will be capped or otherwise blocked at the end of each working day, or if left for extended periods of time, to ensure no animals become trapped;

BIO CONST 11: As far as possible, construction works will be carried out in daylight to minimise the risk of disturbing protected species such as bats and smooth newt;

BIO CONST 12: Wherever possible, tree felling works and works which will directly impact upon areas of vegetation which could be used by nesting birds will be undertaken outside of the breeding season, this being between March and August, inclusive. Where this cannot be achieved, a pre-works check for the presence of nesting birds will be conducted by a suitably experienced ornithologist. Each new construction / felling area will be checked not more than 72 hours prior to commencement of works as nests can be quickly established. Where any active nests are identified, suitable species-specific exclusion zones must be implemented and these must be maintained until the breeding attempt has concluded.

BIO CONST 13: A Biosecurity Management Plan (BMP) will be prepared to manage and control winter heliotrope on site. and included as part of the Development CEMP. This will outline the measures required to prevent the spread of non-native plant species from the Site (namely winter heliotrope). Where possible, the approach to managing non-native plant species on site will be to bury them beneath up-fill material to a depth of at least 5 m and to construct on top of this. Where this is not possible and soils which could be contaminated with the seeds or vegetative material of invasive non-native species need to be removed, they may be stockpiled on Site. Stockpile(s) will then be monitored and treated for any re-growth of non-native species, before being seeded according to the Landscape Masterplan.

BIO CONST 14: To prevent invasive species from being taken off site, the footwear of all site personnel who have worked in areas affected by these species will be washed thoroughly prior to leaving site. All machinery and plant working in infested areas and/or which transport contaminated soil will also be thoroughly pressure-washed before leaving Site. Any water generated as a result of washing footwear, plant or machinery will be collected and disposed of appropriately.

BIO CONST 15: Prior to the commencement of construction, update surveys will be carried out on all trees which were identified as having either Moderate or High suitability to support a bat roost. This will be done in accordance with BCT guidelines and should be done as close to construction commencement as possible. These surveys will serve to confirm that trees continue to be unused by

bats. Where a bat roost is identified, this will be dealt with through the appropriate licensing mechanism with National Parks & Wildlife Service.

BIO CONST 16: The Landscape Masterplan will ensure that key areas of bat foraging and commuting habitat will be retained. Importantly, the southern boundary hedgerow / tree line will be retained (the small gap created for the footpath construction is highly unlikely to interrupt the flight of the strong-flying, generalist species of bats identified as using the Site). This will ensure that connectivity between the site and habitats within the wider surrounds to the south remain available. The woodland blocks and the Pond, which are used by foraging bats, will all also be retained and/or enhanced.

BIO CONST 17: The use of artificial lighting during the construction phase of the proposed development will be limited, and no lighting will be used within 10 m of key bat habitats.

BIO CONST 18: As mitigation for the loss of trees identified as having bat roost suitability, a total of six bat boxes will be installed, either on new buildings or on retained trees. This will include one box which is suitable for use by maternity (breeding) colonies and one which aims to provide conditions needed for hibernation. The remaining four shall be Schwegler 1FD woodcrete type, or similar. The boxes shall be placed so that they face a variety of aspects to create conditions suitable for use at different times and in different weather.

BIO CONST 19: A pre-construction survey of the badger sett on the island within the Pond will be carried no more than three months prior to commencement of construction.. Should the sett be found to be in use by badgers, a licence application will be prepared and submitted to NPWS to allow for their exclusion. The purpose of this will be to remove the risk of badger becoming trapped in the sett following commencement of construction.

BIO CONST 20: To reduce the risk of injury or mortality of smooth newt during the construction phase, it will be necessary to ensure that all individuals are retained within a safe 'refuge area'. The precise method by which this will be achieved has not been devised (and is not necessary) as part of this assessment and will instead be detailed in a Species Protection Plan which will be required as part of the licensing process with NPWS.

BIO CONST 21: It will be necessary to install newt fencing around the entirety of the Proposed Development during the construction phase. At least one further 'ring' of newt fencing will be installed around the Pond and its immediate surrounds and along the existing green connection via the drainage ditches between the Pond and the retained woodland to the south-east. This area will be left for the duration of the construction phase as a 'refuge' for smooth newts. Trapping will be carried out, following guidance published in the UK for great crested newt, to remove all smooth newts from elsewhere on site and to relocate them to the 'refuge area'. On completion of construction works, the smooth newt fencing will be removed and these animals will be free to move around.

BIO CONST 22: Landscaping works involving plant and/or machinery which are required in the Pond and immediately surrounding area will be carried out following a pre-works hand search by a suitably experienced ecologist, who will seek to confirm that no newts are present. To minimise the risk of smooth newt being present, landscaping works within 20m of the Pond will be carried out during the

winter period (taken to be November to January, inclusive), when newts are likely to be hibernating in locations away from the waterbody.

BIO CONST 23: A tunnel suitable for use by smooth newts (and other small animals, including common frog and hedgehog) will be installed beneath the road at the entrance to the proposed development.

BIO CONST 24: Gully pots which form part of the drainage of the proposed development will all be provided with an 'amphibian ladder' which allows smooth newt (and other amphibians and small mammals) a means of escape should they fall in. In addition, at all gully pots, an 'inset' kerb will be installed, rather than a typical kerb, as amphibians will follow this and, in doing so, the chance of their falling in to the gully pot is reduced.

BIO CONST 25: A minimum of three refuge features will be constructed in the retained woodland block to the south-east of the Pond. Whilst being specifically installed for smooth newts, these features are also likely to benefit other small animals, including common frog, common lizard and hedgehog.

19.3.3 Land & Soils

L & S CONST 1: Any temporary storage of topsoil required will be carefully stored away from any surface water drains to minimise possibility of loose unseeded material eroding into adjacent water bodies. Movement of material will be minimised in order to reduce degradation of soil structure and generation of dust. Shaping of storage bunds will be carried out in accordance with landscape architect's requirements to ensure the integrity of the material is retained.

L & S CONST 2: Removed topsoil will be re-used at various landscaping locations on site, including proposed re-levelling of any proposed landscape areas and rear gardens to houses onsite and offsite.

L & S CONST 3: All excavated materials will be visually assessed for signs of possible contamination such as staining or strong odours. Should any unusual staining or odour be noticed, samples of this soil will be analysed for the presence of possible contaminants in order to ensure that historical pollution of the soil has not occurred at the proposed development site. Should it be determined that any of the soil excavated is contaminated, this will be managed according to best practice and disposed of accordingly by a licensed waste disposal contractor.

L & S CONST 4: Construction traffic will be controlled using stabilisation of soils to mitigate any significant effect on the ground. Works will need to be undertaken in accordance with local authority requirements.

L & S CONST 5: To minimise any impact on the underlying subsurface strata from material spillages, all oils, solvents and paints used during construction will be stored within temporary bunded areas. Oil and fuel storage tanks shall be stored in designated areas, and these areas shall be bunded to a volume of 110% of the capacity of the largest tank/ container within the bunded area(s) (plus an allowance of 30 mm for rainwater ingress). Drainage from the bunded area(s) shall be diverted for collection and safe disposal.

L & S CONST 6: Refuelling of construction vehicles and the addition of hydraulic oils or lubricants to vehicles, will take place in a designated area (or where possible off the site) which will be away from

nearby surface water gullies or drains. In the event of a machine requiring refuelling outside of this area, fuel will be transported in a mobile double skinned tank. An adequate supply of spill kits and hydrocarbon adsorbent packs will be stored in this area. All relevant personnel will be fully trained in the use of this equipment. Guidelines such as “Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors” (CIRIA 532, 2001) will be complied with.

L & S CONST 7: All ready-mixed concrete will be brought to site by truck. It is recommended that a suitable risk assessment for wet concreting will be completed prior to works being carried out which will include measures to prevent discharge of alkaline wastewaters or contaminated storm water to the underlying subsoil. The pouring of concrete will take place within a designated area using a geo-synthetic material to prevent concrete runoff into the soil/ groundwater media. Wash down and washout of concrete transporting vehicles will take place at an appropriate facility off site.

L & S CONST 8: In the case of drummed fuel or other chemicals which may be used during construction, containers should be stored in a dedicated internally banded chemical storage cabinet and labelled clearly to allow appropriate remedial action in the event of a spillage.

L & S CONST 9: Potentially contaminated groundwater and polluted surface water generated during construction activities will not be discharged directly to ground or surface drainage. Welfare facilities will be provided for construction operatives but are only likely to comprise individual ‘portaloos’ with no connection to the foul sewer expected.

19.3.4 Hydrology & Hydrogeology

H&H CONST 1: A suitably designed construction works water runoff drainage system will be incorporated into the workings of the construction through the use of settlement ponds, appropriate stockpile locations, stockpile covering and silt fences.

H&H CONST 2: A buffer zone of 10 metres surrounding Shanganagh pond will be maintained throughout the construction works with silt fences installed around the perimeter of the pond.

H&H CONST 3: All dewatering operations at the site are anticipated to be temporary and low level. All rainwater and groundwater ingress into any excavations will be pumped from the excavation into the construction site drainage system before being discharged off-site into the surface water drainage network in Shanganagh Park. No discharge to Shanganagh Pond will occur.

H&H CONST 4: All discharge waters will be appropriately monitored on a daily basis and sampled at regular intervals for water quality parameters with site-specific thresholds agreed with DL RCC prior to the commencement of the works.

H&H CONST 5: All monitoring data will be collated and compiled within a site-specific Construction Environmental Management Plan for the development and available for inspection by DL RCC when required.

H&H CONST 6: Waste fuels and materials will be stored in designated areas that are isolated from surface water drains or open waters (e.g. excavations). Skips will be closed or covered to prevent materials being blown or washed away and to reduce the likelihood of contaminated water leakage.

Hazardous wastes such as waste oil, chemicals and preservatives, will be stored in sealed containers and kept separate from other waste materials while awaiting collection by a registered waste carrier. Fuelling, lubrication and storage areas and site offices will not be located within 25m of drainage ditches, surface waters or open excavations. Fuel interceptor tanks will be installed on the site to treat any runoff.

H&H CONST 7: All waste containers (including all ancillary equipment such as vent pipes and refuelling hoses) will be stored within a secondary containment system (e.g. a bund for static tanks or a drip tray for mobile stores and drums). The bunds will be capable of storing 110% of the tank capacity. Where more than one tank is stored, the bund must be capable of holding 110% of the largest tank of 25% of the aggregate capacity (whichever is greater). Drip trays used for drum storage must be capable of holding at least 25% of the drum capacity. Where more than one drum is stored the drip tray must be capable of holding 25% of the aggregate capacity of the drums stored.

H&H CONST 8: Back-up plans to deal with the possibility of contamination or fuel spills, e.g. pumping of wells or sumps to collect contaminated groundwater for treatment shall be undertaken and included in an overall Construction & Demolition Waste Management Plan (C&DWMP) and Emergency Operation Plan (EOP).

H&H CONST 9: Monitoring prior to, during and post construction works of surface water and groundwater quality shall be undertaken to ensure minimum disturbance of water quality in the general vicinity of the site. During the construction phase, the monitoring programme will include daily checks, weekly inspections and monthly audits to ensure compliance with the Construction Environmental Management Plan. This will be undertaken in consultation with the wishes of DLRC.

H&H CONST 10: Soil removal during the construction phase of the project will be an unavoidable consequence of the development and would apply for virtually any form of site redevelopment. Where possible the soils will be reused on site.

H&H CONST 11: Chemical analysis will be carried out to assess whether the made ground or fill material presents a risk to human and/or environmental receptors and to determine suitable on-site or off-site disposal routes.

H&H CONST 12: All waste material (both soils and other) generated will be temporarily stored in secure banded areas thereby preventing the migration of leachate or contaminating substances from impacting on the surrounding environment.

H&H CONST 13: A predevelopment site investigation will be undertaken within the footprint of the DLRC depot to assess the identified potential sources of contamination.

H&H CONST 14: Special and site-specific environmental and human health contingency plans and procedures, following best-practice guidance, shall be developed for the unexpected discovery of contaminated or illegally deposited waste materials. These may include detailed site investigation, contamination delineation, risk assessment and appropriate remediation under the design and supervision of an experienced contaminated land engineer/hydrogeologist.

H&H CONST 15: All excess fill and material considered unacceptable for reuse on site in terms of the residual risk posed to human health and to the environment shall be appropriately remediated in accordance with the relevant Waste Management Regulations.

H&H CONST 16: Adequate security measures shall be installed on the construction site. Early assessment of the sensitivity of the project and identifying potential locations at risk will assist in the design of the site layout and security measures required. Security measures will include secure fencing, secure site access, securing site plant and equipment, secure storage of materials, sufficient warning signage, and security lighting.

H&H CONST 17: All imported soils and stones shall be sourced from a licenced/permitted facility with suitable documentation to confirm the material is inert and fit for purpose. The contractor shall satisfy themselves that the material is fit for use before importing to the site.

H&H CONST 18: All grout/concrete washout facilities will be established away from exposed excavations and into dedicated skips on site. The activities will be monitored and the skips will be appropriately located and secured.

H&H CONST 19: In the event of a major spillage the contractor's Emergency Operating Plan (EOP) will be followed. The first action is to stop the source of pollution and contain the spillage.

H&H CONST 20: FFLs for the site have been set so there is a freeboard of greater than 2 m above the CFRAMS Q1000 flood level of 23.24 mAOD.

H&H CONST 21: All surface water drains will be sized such that they will prevent flooding in the proposed development and convey surface water flows from the site without causing pluvial flooding.

H&H CONST 22: Surface water attenuation tanks will be provided within the site and has been sized to ensure that runoff from the site does not exceed the level of the greenfield (pre-development) runoff rate. This will ensure that the runoff rate from the site will not increase as a result of the proposed development.

H&H CONST 23: A non-return valve will be located at the downstream point of the drainage network to prevent any surcharging from the adjacent drainage network.

19.3.5 Air Quality & Climate

AIR QLTY & C CONST 1: The main contractor will be responsible for the coordination, implementation and ongoing monitoring of the dust management plan as detailed in this EIAR and shall be required to put necessary systems in place to ensure that the procedures within the plan can be strictly monitored and assessed.

AIR QLTY & C CONST 2: Systems should be developed by the appointed Contractor to ensure that on-site or delivery vehicles do not leave their engines idling for even short periods of time.

19.3.6 Noise & Vibration

N & V CONST 1: Limit the hours during which site activities likely to create high levels of noise or vibration are permitted.

N & V CONST 2: Establish channels of communication between the contractor/developer, Local Authority and residents

N & V CONST 3: Appoint a site representative responsible for matters relating to noise and vibration.

N & V CONST 4: Monitor typical levels of noise and vibration during critical periods and at sensitive locations.

N & V CONST 5: All site access roads will be kept even so as to mitigate the potential for vibration from lorries.

N & V CONST 6: Select plant with low inherent potential for generation of noise and/ or vibration.

N & V CONST 7: Erect barriers as necessary around noisy processes and items such as generators heavy mechanical plant or high duty compressors.

N & V CONST 8: Place noisy / vibratory plant as far away from sensitive properties as permitted by site constraints and the use of vibration isolated support structures where necessary.

N & V CONST 9: Erect site hoarding at least 2.4m high along the boundary adjacent to the noise sensitive receptors NSL1.

19.3.7 Archaeology & Cultural Heritage

ARCHAE CONST 1: In the event of archaeological features or material being uncovered during construction phase, it is crucial that machine work cease in the immediate area to allow the archaeologist to assess, excavate and record any such material.

ARCHAE CONST 2: Should archaeological features or material be uncovered during construction phase, adequate funds to cover excavation, fencing (if required), post-excavation analysis and reporting, and conservation work should be made available. This work should be done under licence in accordance with Section 26 of the National Monuments Acts 1930 – 2014, and with a method statement agreed in advance with the National Monuments Service (Department of Culture, Heritage and the Gaeltacht) and the National Museum of Ireland.

19.3.8 Architecture & Cultural Heritage

ARCHIT & CH CONST 1: As an outcome of the baseline study conducted as part of this EIAR as well as the numerous previous surveys of the NIAH, the local authority, professional consultants and others, the existing characteristics of the development site have been well documented. It is nevertheless recommended that some additional photographic, written and/or measured recording be undertaken prior to development, with regards to any historic trees whose condition or position informs their removal, and of the Ornamental Pond. This is to inform the historic record and to provide information to assist with protection of important features. This is a positive outcome of the associated development.

ARCHIT & CH CONST 2: As a further mitigation measure for impacts to the Cockburn Monument (see Section 13.5.3), it is proposed that the monument would be repaired as part of development works. The stonework and render have been impacted by graffiti, and a specialist stone and masonry conservator

should be engaged to carry out cleaning. The methodology used should be only as aggressive as necessary to remove the paint, and the fabric should be protected as part of these works. The final cleaning methodology should be subject to samples for the approval of the Conservation Officer of Dún Laoghaire-Rathdown County Council prior to wholesale cleaning. The same masonry specialist should also carry out gentle cleaning of the engraved plaque, and should repair cracks and other mechanical damage to the monument. Some consideration should be given to locating and reinstating the missing original elements of the monument, such as the urn and capital which once capped the column. Undergrowth around the monument and woodland walk should be removed, subject to any natural heritage sensitivities, in order to restore its character within the woodland walk. This is considered a positive outcome of the development and reduces the impact from moderate to slight.

ARCHIT& CH CONST 3: To protect the Ornamental Pond from changes to its salient, irregular form and size, the Contractor shall be required to ensure the provision of adequate measures during construction to ensure protection of the pond from a cultural heritage perspective and such measures shall be included in the Construction Environmental Management Plan to be agreed prior to commencement of development. These mitigation measures should ensure that the irregular form of the Pond is retained, that the works do not cause any permanent visual alteration of the feature or visual access to modern interventions, and that all steps are taken to protect the pond, its banks and historic plant life from current or future losses.

19.3.9 The Landscape

LAND CONST 1: Retention and protection of the existing mature woodland within the site and along the site boundary is recommended. Existing trees to be retained will be protected during the construction stage in accordance with recommendations of the Arboricultural Assessment and the BS 5837:2012. Prior to commencement of construction, existing trees which are to be retained will be protected by erection of timber post and wire fence to BS 5837:2012 to ensure no works are carried out under reach of their canopies. Unstable trees should be removed under direction of the arborist.

LAND CONST 2: The Proposed Development will be fenced off during the construction phase to reduce the visual impact of the works.

LAND CONST 3: Vehicles exiting site during the construction stage should be subject to wheel wash facilities or road sweepers shall be used in order to maintain clean roads.

LAND CONST 4: Any lighting used during the construction process should be kept to a minimum, providing for site safety only and shall be directed into the site and away from adjacent residential properties. Lighting shall be shielded to avoid light spill onto adjacent properties and roads.

LAND CONST 5: Disturbance of existing vegetation will be minimised where possible. Proposed planting will help integrating the proposed development into the surrounding landscape; define, protect and reinforce the historical landscape that will form an integral part of the new residential area; and provide screening where required.

LAND CONST 6: A detailed landscape masterplan has been prepared as part of this application, which includes mitigation measures within the open space design strategy and planting approach for the site including:

- Provision of semi mature tree species within the parkland to offset the removal of existing trees; and
- Enhancement of site tree cover by introduction of additional tree and woodland planting.

The Landscape Masterplan shall be implemented on a phased basis in accordance with the Phasing Plan detailed in Chapter 2.0 of this EIAR.

LAND CONST 7: A mix of both native and non-native plant species shall be used throughout the scheme to create a strong sense of place and identity, while also providing for improved biodiversity on the site.

19.3.10 Material Assets – Traffic & Transport

T & T CONST 1: The contractor shall prepare a Construction Traffic Management Plan (CTMP) for the construction phase. This will likely be incorporated into the overall Construction & Environmental Management Plan (CEMP) for the site.

T & T CONST 2: The Main Contractor must progress their works with reasonable skill, care, diligence and at all times, proactively manage the works in a manner most likely to ensure the safety and welfare of those carrying out construction works, all other persons accessing the site and interacting stakeholders including adjoining residents. As part of the Construction Health and Safety Plan for the site the contractor will be required to assess risks and thereafter eliminate, reduce and mitigate these risks.

T & T CONST 3: There will also be a requirement for comprehensive measures as part of the construction management, for the proposed development, such as:

- Temporary warning signs;
- Banksmen controlling access and egress from the site;
- All marshalling areas and site offices will be contained within the site boundary and will therefore have little impact on external roads;
- Wheel washers/judder bars to clean off vehicles exiting the site during spoil removal;
- All loads to be properly stowed and secured with a tarpaulin, where appropriate;
- Routine sweeping/cleaning of the road and footpaths in front of the site;
- No uncontrolled runoff to the public road from dewatering/pumping carried out during construction activity.

T & T CONST 4: Construction vehicle movements will be minimised through:

- a) Consolidation of delivery loads to/from the site and manage large deliveries on site to occur outside of peak traffic periods;
- b) Use of precast/prefabricated materials where possible;
- c) 'Cut' material generated by the construction works will be re-used on site where possible, through various accommodation works;
- d) Adequate storage space on site will be provided;
- e) A strategy will be developed to minimize construction material quantities as much as possible;
- f) Construction staff vehicle movements will also be minimized by promoting the use of public transport, shared use of vehicles, cycling and walking.

19.3.11 Material Assets – Water Services

WS CONST 1: The contractor is to conduct the works in accordance with all relevant local authority requirements, and health and safety legislation.

WS CONST 2: Relevant services providers are to be consulted in advance of works to ensure works are carried out to relevant standards and specifications including procedures to ensure safe working practices are implemented for works in the vicinity of services, such as live gas mains, works in the vicinity of overhead electricity lines and live electricity lines and works to distribution watermains.

WS CONST 3: Neighbouring sites are to be advised of construction methodologies in advance of works, in situations which may affect them.

WS CONST 4: All retained underground services are to be protected.

WS CONST 5: All decommissioned infrastructure will have to be sent to an accepting landfill for disposal.

WS CONST 6: A construction methodology will be required by the contractor to be tailored to reduce, where possible, dust noise and air pollution; to minimise interference with the environment and the neighbouring areas. This will be contained within the Construction Environmental Management Plan.

WS CONST 7: All infrastructure is to be appropriately tested by an approved method during the construction phase, all in accordance with Irish Water / DLRCC Requirements.

WS CONST 8: Connections to the service providers are to be carried out to the approval and / or under the supervision of the Local Authority or relevant utility service provider, prior to commissioning.

WS CONST 9: All new sewers are to be inspected by CCTV survey post construction; to identify any possible physical defects for rectification prior to operational phase.

WS CONST 10: Prior to the commencement of excavations in public areas, all utilities and public services are to be identified and checked; to ensure that adequate protection measures are implemented to minimise the risk of service disruption all in accordance with Irish Water / DLRCC Requirements.

WS CONST 11: All excavations within the public area are to be back-filled in a controlled manner and surface re-instated to the satisfaction of the Local Authority.

19.3.12 Material Assets –Resources & Waste Management

RES & WM CONST 1: Consultation with relevant services providers in advance of works to ensure works are carried out to relevant standards and specifications including procedures to ensure safe working practices are implemented for works in the vicinity of services such as live gas mains, works in the vicinity of overhead electricity lines and live electricity lines and works to distribution watermains.

RES & WM CONST 2: Prior to the commencement of excavations in public areas, all utilities and public services are to be identified and checked; to ensure that adequate protection measures are implemented to minimise the risk of service disruption.

RES & WM CONST 3: A waste manager will be appointed by the main contractor(s) to ensure effective management of waste during the excavation and construction works.

RES & WM CONST 4: A project specific C&D WMP has been prepared BY Punch Consulting and is included as Appendix 17.1. Adherence to the high-level strategy presented in this C&D WMP will ensure effective waste management and minimisation, reuse, recycling, recovery and disposal of waste material generated during the demolition, excavation and construction phases of the proposed development. Prior to commencement, the contractor(s) will be required to refine/update the C&D WMP or submit an addendum to C&D WMP to DLRCC to detail specific measures to minimise waste generation and resource consumption and provide details of the proposed waste contractors and destinations of each waste stream.

RES & WM CONST 5: On-site segregation of waste materials will be carried out to increase opportunities for off-site reuse, recycling and recovery – it is anticipated that the following waste types, at a minimum, will be segregated:- o Concrete rubble (including ceramics, tiles and bricks). o Plasterboard. o Metals. o Glass. o Timber.

RES & WM CONST 6: Any hazardous wastes generated (such as chemicals, solvents, glues, fuels, oils) will also be segregated and will be stored in appropriate receptacles (in suitably bunded areas, where required).

RES & WM CONST 7: Any spoil or waste material generated from the construction process is to be temporarily stored at an approved location on site, before being removed to an accepting licensed waste disposal facility.

RES & WM CONST 8: All construction staff will be provided with training regarding the waste management procedures.

RES & WM CONST 9: All waste leaving site will be reused, recycled or recovered where possible to avoid material designated for disposal.

RES & WM CONST 10: All waste leaving the site will be transported by suitable permitted contractors and taken to suitably registered, permitted or licenced facilities.

RES & WM CONST 11: All waste leaving the site will be recorded and copies of relevant documentation maintained

19.4 OPERATIONAL PHASE MITIGATION

19.4.1 Population & Human Health

No mitigation proposed

19.4.2 Biodiversity

No mitigation proposed

19.4.3 Land & Soils

No mitigation proposed

19.4.4 Hydrology & Hydrogeology

No mitigation proposed

19.4.5 Air Quality & Climate

No mitigation measures proposed

19.4.6 Noise & Vibration

N & V OPER 1: The glazing performance requirement for the various facades can be confirmed by reviewing the mark up presented in Figures 11.7. The overall R_w outlined above are provided for information purposes only. The over-riding requirement is the Octave Band sound insulation performance values which may also be achieved using alternative glazing configurations. Any selected system will be required to provide the same level of sound insulation performance set out in Table 11.12 and 11.13 or greater.

19.4.7 Archaeology & Cultural Heritage

ARCHAE OPER 1: In accordance with Policy BH3 of the Woodbrook-Shanganagh Local Area Plan 2017-2023, a local awareness of the history of the site should be fostered. This would be achieved through signage at Shanganagh Castle, and by the retention of the historic name of the demesne in the naming and marketing of the development.

19.4.8 Architecture & Cultural Heritage

ARCHIT & CH OPER 1: As a further mitigation measure to the development of a significant historic country house demesne and in a Zone of Archaeological Potential, it is recommended that a cohesive, comprehensive scheme of interpretation be incorporated into the development site upon its completion. This should include all areas of special interest embodied within the development area and the surrounding areas as outlined by the National Inventory of Architectural Heritage. It should also include sign posts near Kiltuc Church, which is compliant with CDP Policy AR1. As some areas of interpretation are outside of the current development site, this interpretive scheme should be a joined-up approach involving all stakeholders and owners, lead by the local authority.

ARCHIT & CH OPER 2: It is recommended that the name 'Shanganagh' or 'Shanganagh Castle' be incorporated into the name and signage associated with the subject development. This is a positive impact associated with the proposed development which would reduce the residual impacts on the castle, its demesne and the associated archaeological sites.

ARCHIT & CH OPER 3: It is noted that a Steering Group has been assembled to manage the integration and refurbishment of the Shanganagh Castle. Continuation of these exercises and compliance with the LAP objectives (SC35 and SC37 in particular) for the castle as an integral part of

the overall plan for the Woodbrook-Shanganagh site will considerably mitigate the residual impacts on the castle. This will also offer an opportunity for discovering further information about the archaeological significance and properties of the building, which would be a positive outcome and knock-on effect of the proposed development.

ARCHIT & CH OPER 4: It is recommended that a joined-up scheme of woodland management should form a central part of the Development Management & Maintenance Plan. In addition to any ecological or natural heritage considerations, cultural heritage and significance of specific trees, copses and woodland areas as well as that of the Ornamental Pond should inform the contents of this plan, and it should be agreed in tandem with the Conservation Department of the local authority.

ARCHIT & CH OPER 5: Objective SC26 of the LAP also aims to reinstate historic views towards the coastline from Shanganagh Castle by the removal of an element of the modern tree-planting east of the castle. Whilst outside the control of the current development, its execution will be an impetus for these works. When completed, this will serve to reconnect the castle with a significant portion of the lands which once formed the demesne and help mitigate the impacts on protected views to the castle from within the surrounding landscape.

19.4.9 The Landscape

LAND OPER 1: Landscape management and maintenance plan shall be drawn up and approved up by qualified professional.

LAND OPER 2: A plan shall be put in place to ensure that ongoing landscape maintenance and debris cleaning is carried out during the operational period within the site.

LAND OPER 3: A maintenance plan shall be put in place to ensure that ongoing maintenance and replacement of failing or failed plant material is undertaken.

19.4.10 Material Assets – Traffic & Transport

No mitigation measures proposed

19.4.11 Material Assets – Water Services

WS OPER 1: The material assets are to be constructed in accordance with all relevant local authority standards.

WS OPER 2: Maintenance will be provided on an ongoing basis, in accordance with manufacturer and local authority requirements.

19.4.12 Material Assets – Resources & Waste Management

RES & WM OPER 1: On-site segregation of all waste materials into appropriate categories including (but not limited to):

- Organic waste.
- Dry Mixed Recyclables.
- Mixed Non-Recyclable Waste.
- Glass.

- Waste electrical and electronic equipment (WEEE).
- Batteries (non-hazardous and hazardous).
- Cooking oil.
- Light bulbs.
- Cleaning chemicals (pesticides, paints, adhesives, resins, detergents, etc.).
- Furniture (and from time to time other bulky waste).
- Abandoned bicycles.

RES & WM OPER 2: All waste materials will be stored in colour coded bins or other suitable receptacles in designated, easily accessible locations. Bins will be clearly identified with the approved waste type to ensure there is no cross contamination of waste materials.

RES & WM OPER 3: All waste collected from the development will be reused, recycled or recovered where possible, with the exception of those waste streams where appropriate facilities are currently not available.

RES & WM OPER 4: All waste leaving the site will be transported by suitable permitted contractors and taken to suitably registered, permitted or licensed facilities.

19.5 MONITORING

19.5.1 Population & Human Health

No monitoring proposed.

19.5.2 Biodiversity

No monitoring proposed.

19.5.3 Land & Soils

- Construction stage elements should be monitored by the contractor for compliance with all relevant standards as well as the planning consent. Regular inspection of surface water runoff and any sediment control measures e.g. silt traps will be carried out during the construction phase. Regular auditing of construction/mitigation measures will be undertaken e.g. concrete pouring, refuelling in designated areas etc.

19.5.4 Hydrology & Hydrogeology

As part of the site-specific Construction Environmental Management Plan for the construction works, the following monitoring works shall be implemented:

- Some geotechnically unsuitable soils may be excavated during the construction phase but will be reused elsewhere on site for landscaping or land raising purposes.
- Monitoring of any hazardous material stored on-site will form part of the proposed Construction & Demolition Waste Management Plan or Construction Environmental Management Plan.

- A dust management/monitoring programme shall be implemented during the construction phase of the development. The quantities of topsoil, subsoil and rock removed off site shall also be recorded.
- The construction phase shall be monitored, particularly in relation to the following;
 - Protection of topsoil stockpiled for re-use;
 - Adequate runoff control of potential stockpiles of subsoils;
 - Cleanliness of adjoining road network;
 - Prevention of oil and diesel spillages;
 - Dust control.
- Monitoring prior to, during and post construction works of surface water quality in Shanganagh Pond and the construction works site drainage system shall be undertaken to ensure minimum disturbance of water quality in the general vicinity of the site. During the construction phase, the monitoring programme shall include daily checks, weekly inspections and monthly audits to ensure compliance with the Construction & Demolition Waste Management Plan (C&DWMP) and the CEMP. This shall be undertaken in consultation with the requirements of DLRCC.

19.5.5 Air Quality & Climate

- Monitoring of construction dust deposition at the site boundary during the construction phase of the proposed development is recommended to ensure the mitigation measures are providing adequate dust minimisation. This shall be carried out using the Bergerhoff method in accordance with the requirements of the German Standard VDI 2119. The Bergerhoff Gauge consists of a collecting vessel and a stand with a protecting gauge. The collecting vessel is secured to the stand with the opening of the collecting vessel located approximately 2m above ground level. The applicable limit value is the TA Luft limit value of 350 mg/(m²*day) for a monitoring period of between 28 - 32 days.

19.5.6 Noise & Vibration

- During the construction phase noise monitoring will be undertaken at the nearest sensitive locations to ensure construction noise limits outlined in Table 12.7 are not exceeded. Noise monitoring will be conducted in accordance with the International Standard ISO 1996: *Acoustics – Description, measurement and assessment of environmental noise* Part 1 (2016) and Part 2 (2017). The selection of monitoring locations will be based on the nearest sensitive buildings to the working areas. Vibration monitoring should be conducted in accordance with BS 6472 for human disturbance and BS ISO 4866:2010 for building damage.

19.5.7 Archaeology & Cultural Heritage

No monitoring proposed.

19.5.8 Architecture & Cultural Heritage

No monitoring proposed.

19.5.9 The Landscape

No monitoring proposed.

19.5.10 Material Assets – Traffic & Transport

- The contractor will be obliged to appoint a traffic liaison officer/traffic manager who will be involved in preparing the CTMP and to monitor the performance of the CTMP.
- The overall facilities on site such as roads and car parks will be maintained and managed by a management company and DLRCC. The management company/DLRCC will ensure necessary security and maintenance of the internal roads and car parks.
- The Residential Travel Plan will be monitored and updated to ensure reduced dependency on car based trips.

19.5.11 Material Assets – Water Services

- The construction of works will be monitored to ensure compliance with Dún Laoghaire-Rathdown County Council's (DLR's) requirements, and health and safety legislation.
- The operational phase of public works will be monitored by DLR responsible for the respective asset.
- The operational phase of private assets will be monitored by the management company for the buildings and their environs.

19.5.12 Material Assets – Resources & Waste Management

- All new infrastructure, which is to serve the proposed development, is to be routinely inspected with any maintenance carried out, as required. Any monitoring of the built services required during the operational phase of the proposed project will be as advised by the relevant services providers.
- The management of waste during the construction and operation phase should be monitored to ensure compliance with relevant local authority requirements, and effective implementation of the C&D WMP including maintenance of waste documentation.