Environmental Impact Assessment Report Vol. I (Main Statement)

FORMER GALLAHERS SITE, AIRTON

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1 INTRODUCTION & METHODOLOGY

1.1 PROPOSED DEVELOPMENT

This Environmental Impact Assessment Report (EIAR) has been prepared on behalf of Greenleaf Homes Ltd. to accompany a Strategic Housing Development application to An Bord Pleanála for a new residential mixed use development on lands located at the former Gallaher's cigarette factory site, at the junction of Airton Road and Greenhills Road, Tallaght, Dublin 24.

The subject site is a vacant former industrial brownfield site at the edge of Broomhill Industrial Estate. The gross site area for this application (including works to the adjoining public roads) is c.2.79ha. The site has been vacant since the previous cigarette manufacturing use ended in 2003.

The site is located c. 9km south west of Dublin City Centre, c. 750m north of Tallaght Village, and c. 1.4km north east of The Square Tallaght Shopping Centre. The site is located directly adjoining a high quality bus route (Dublin Bus No. 27) which runs every 10 mins until 7pm Monday to Saturday and every 15 mins on Sundays. The site is also c.1.5km from the Luas Red line to the north-west.

This high profile site fronts onto Airton Road to the north and Greenhills Road to the east. To the south of the site is the Tallaght Institute of Technology Campus. The property to the immediate west/south-west is also in the ownership of the landowner of the current site. However, that property is not vacant but is being leased as a car compound by An Garda Siochana.

To the west is an Adult disability training centre (Cheerverstown Centre). To the north of Airton Road is the Kilnamanagh Tymon Primary Health Care Centre and a wide other retail/commercial/employment uses (e.g. Harvey Norman, Ford & Kia car sales, etc) within Broomhill Industrial Estate. To the north-east is Greenhills Retail Park with a range of retail services including convenience retail, take-away, and other retail services and commercial/employment uses. To the east and south-east are a range of recreational uses including Bancroft Park, Tallaght Athletics club, Westpark Fitness club, and Astro Park.

The proposal is for a mixed-use development on a site of c. 2.79ha. The proposal consists of:

- Demolition of existing factory/warehouse buildings on site
- Construction of 502 no. apartments (comprising 197 no. 1-bed; 257 no. 2-bed; and 48 no. 3-bed units) within 6 no. blocks ranging in height from 4 to 8 storeys. All residential units provided with associated private balconies/terraces to the north/south/east/west elevations.
- Provision of residential amenity facilities, 3 no. retail units, creche, and services/bin store areas
- A total of 202 no. car parking spaces (at basement and undercroft levels) and 584 no. bicycle parking spaces.
- Vehicular/pedestrian/cyclist accesses from Greenhills Road and Airton Road. Provision of road improvements and pedestrian crossings.
- All associated site development works, open spaces, landscaping, boundary treatments, plant areas, pv panels (at roof level), waste management areas, and services provision (including ESB substations).

1.2 LEGISLATIVE CONTEXT

Certain public and private projects that are likely to have significant effects on the environment are subject to EIA requirements derived from EIA Directive 85/337/EC (as amended by Council Directive 97/11/EC, Directive 2003/35/EC, Directive 2009/31/EC, Directive 2011/92/EU and Directive 2014/52/EU.

The EIA Directives have been transposed into the Irish land use planning consent system by way of the Planning & Development Acts 2000 (as amended), and the Planning & Development Regulations 2001-19.

One of the most recent amendments to the Regulations - the European Union (Planning and Development)(Environmental Impact Assessment) Regulations 2018 (S.I. No. 296 of 2018) - transposed Directive 2014/52/EU into Irish law.

Complementary to the legislation is a range of guidelines produced by the EU and government agencies to inform the carrying out of EIA:

- EU Guidance on EIA Screening (DG Environment 2001).
- Guidance on EIA Scoping (DG Environment 2001).
- EIA Review Checklist (DG Environment 2001).
- Guidelines on Information to be Contained in an Environmental Impact Statement (EPA 2002).
- Study on the Assessment of Indirect & Cumulative Impacts as well as Impact Interaction (DG Environment 2002).
- Environmental Impact Assessment (EIA), Guidance for Consent Authorities Regarding Sub-Threshold Development (DoEHLG 2003).
- Advice Notes on Current Practice (in preparation of Environmental Impact Statements) (EPA 2003).
- Development Management Guidelines (DoEHLG, 2007).
- Draft Guidelines on the information to be contained in Environmental Impact Assessment Reports (EPA 2017)
- Transposition of 2014 EIA Directive (2014/52/EU) in the Land Use Planning and EPA Licencing Systems - Key Issues Consultation Paper (Department of Environment, Community and Local Government, 2017).
- Circular letter PL 1/2017 - Advice on Administrative Provisions in Advance of Transposition (Department of Housing, Planning and Local Government, 2017).
- Environmental Impact Assessment of Projects – Guidance on the Preparation of the Environmental Impact Assessment Report (European Commission 2017)
- Environmental Impact Assessment of Projects – Guidance on Screening (European Commission 2017)
- Environmental Impact Assessment of Projects – Guidance on Scoping (European Commission 2017)
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (Department of Housing, Planning and Local Government, 2018).

1.3 DEFINITION OF EIA

Article 171A of the 2018 Regulations defines *'environmental impact assessment' as:*

"… a process
(a) consisting of:

(i) the preparation of an environmental impact assessment report by the applicant in accordance with this Act and regulations made thereunder,

(ii) the carrying out of consultations in accordance with this Act and regulations made thereunder,

(iii)the examination by the planning authority or the Board, as the case may be, of-

I) the information contained in the environmental impact assessment report,

II) any supplementary information provided, where necessary, by the applicant in accordance with section 172(1D) and (1E), and

III) any relevant information received through the consultations carried out pursuant to subparagraph (ii),

(iv)the reasoned conclusion by the planning authority or the Board, as the case may be, on the significant effects on the environment of the proposed development, taking into account the results of the examination carried out pursuant to subparagraph (iii) and, where appropriate, its own supplementary examination, and

(v) the integration of the reasoned conclusion of the planning authority or the Board, as the case may be, into the decision on the proposed development, and

(b) which includes:

(i) an examination, analysis and evaluation, carried out by the planning authority or the Board, as the case may be, in accordance with this Part and regulations made thereunder, that identifies, describes and assesses, in an appropriate manner, in the light of each individual case, the direct and indirect significant effects of the proposed development on the following:

(I) population and human health.

(II) biodiversity, with particular attention to species and habitats protected under the Habitats Directive and the Birds Directive.

(III) land, soil, water, air and climate.

(IV) material assets, cultural heritage and the landscape.

(V) the interaction between the factors mentioned in clauses (I) to (IV), and

(ii) *as regards the factors mentioned in subparagraph (i)(I) to (V), such examination, analysis and evaluation of the expected direct and indirect significant effects on the environment derived from the vulnerability of the proposed development to risks of major accidents or disasters, or both major accidents and disasters, that are relevant to that development.*

1.4 EIA SCREENING

Section 176(A) of the Act defines *'screening for environmental impact assessment'* as

".. a determination—
(a) as to whether a proposed development would be likely to have significant effects on the environment, and
(b) if the development would be likely to have such effects, that an environmental impact assessment is required."

Section 172 of the Act states that an EIA shall be carried out in respect of an application for consent for a proposed development where either of the following are relevant:

- the proposed development would be of a class specified in Part 1 of Schedule 5 of the Planning and Development Regulations.
- **the proposed development would be of a class specified in Part 2 of Schedule 5 of the Planning and Development Regulations.**
- the proposed development would be of a class specified in Part 2 of Schedule 5 of the Planning and Development Regulations 2001 but does not equal or exceed the relevant quantity, area or other limit specified in that Part, but is concluded, determined or decided that proposed development is likely to have a significant effect on the environment.

The subject development does not fall within any development classes set out in Part 1 of Schedule 5.

The following development classes set out in Part 2 of Schedule 5 are noted:

- ***10(b)(i) Construction of more than 500 dwellings***
- ***10(b)(iv) Urban development which would involve an area greater than 2 hectares in the case of a business district, 10 hectares in the case of other parts of a built-up area and 20 hectares elsewhere. (In this paragraph, "business district" means a district within a city or town in which the predominant land use is retail or commercial use.)***

The residential units within the proposed scheme in this instance is for 502 units which is over the 500-unit threshold. The application site is 2.79 ha within a business district which is greater than the 2ha criteria. Therefore, an EIAR is an automatic requirement.

1.5 EIA SCOPING

Section 173(2) (a) of the Planning and Development Act 2000 (as amended) provides that a formal request for scoping may be submitted to the planning authority. However, the *'Draft Guidelines on the Information to be contained in Environmental Impact Assessment Reports'* (2017), confirm that this is not mandatory.

The EIAR team carried out a scoping exercise to identify the key issues that may be considered likely to have a significant effect on the environment. Regard was also had to EIAR carried out for other developments in the wider area.

In accordance with the draft EPA Guidelines (2017), those issues that do not meet the threshold of significance have been 'scoped out'. The following issues have been identified in the context of the proposed development:

- Population & Human Health
- Biodiversity
- Lands, Soils & Geology
- Hydrology & Water Services
- Noise & Vibration
- Air & Climate
- Landscape & Visual
- Traffic & Transportation
- Material Assets
- Waste Management
- Cultural Heritage

1.6 EIAR OBJECTIVES

The EIA process is based on the following four principles:

- *Pursuing Preventative Action*

An assessment of anticipated likely and significant impacts was undertaken during the screening and the considerations of alternatives stages of the EIA process. This involved forming a preliminary opinion with respect to the approximate magnitude and character of the likely environmental impacts. This assessment was based on the knowledge, experience and expertise of the EIA team with reference to EIA guidance material and local information.

- *Maintaining Environmental Focus and Scope*

The EIA process has focussed on those issues where environmental impact is likely to occur and have significant effects.

- *Informing the Decision*

The EIAR has been developed and is presented in such a way as to facilitate the authority decision on the acceptability of the proposed development in the full knowledge of the project's likely significant impacts on the environment, if any.

- *Public & Stakeholder Participation*

Participation is provided through the statutory planning process which allows for public participation and consultation while receiving advice from other key stakeholders and statutory authorities with specific environmental responsibilities.

1.7 EIAR FORMAT & CONTENT

This EIAR is sub divided as follows:

• Environmental Impact Assessment Report
• Appendices to Environmental Impact Assessment Report
• Non-Technical Summary.

The EIAR has been prepared in the Grouped Format as set down in the EPA *"Guidelines on Information to be contained in an EIS"* (2002) and the *'Draft Guidelines on the Information to be contained in Environmental Impact Assessment Reports'* (2017). In general, the EIAR follows the framework presented in the EPA *"Advice Notes on Current Practice in the Preparation of Environmental Impact Statements"* (September 2003).

The structure and responsibility of the EIAR chapters is outlined below:

Chapter	Title	Consultant
1.0	Introduction & Methodology	McGill Planning Ltd.
2.0	Alternatives	McGill Planning Ltd.
3.0	Description of Development	McGill Planning Ltd.
4.0	Population & Human Health	McGill Planning Ltd.
5.0	Biodiversity	Whitehill Ecology
6.0	Lands, Soils & Geology	Barrett Mahony Consulting Engineers
7.0	Hydrology & Water Services	Barrett Mahony Consulting Engineers
8.0	Noise & Vibration	Traynor Environmental
9.0	Air Quality & Climate Impact	Traynor Environmental
10.0	Landscape & Visual	3D Design Bureau & McGill Planning Ltd.
11.0	Traffic & Transportation	Barrett Mahony Consulting Engineers
12.0	Material Assets	McGill Planning Ltd.
13.0	Waste Management	Traynor Environmental
14.0	Cultural Heritage	IAC Archaeologists
15.0	Interactions	McGill Planning Ltd.
16.0	Schedule of Mitigations Measure	McGill Planning Ltd.

Table 1.1 List of EIAR Chapters

1.8 METHODOLOGY

The preparation of this EIS requires the co-ordination and synthesis of associated yet diverse elements of the overall assessment. To facilitate this process, a schematic structure is proposed in order to provide a coherent documentation of the varied aspects of the environment considered. The grouped format structure of the Environmental Impact Assessment Report is listed below with a brief outline of each specific stage.

Methodology
The specific approach or techniques used to analyse impacts or describe environments.

Receiving Environment (Baseline Situation)
Dynamic description of the specific environment into which the proposal will fit, taking account of other developments likely to occur. The context, character, significance and sensitivity of the baseline is described. The likely evolution of baseline environmental characteristics without implementation of the proposed project.

Characteristics of the Proposed Development
Description of the physical characteristics of a project having regard to

- the site location
- the size, design and appearance of the proposed project
- the cumulation with other proposed projects
- the use of natural resources
- the production of waste
- emissions and nuisances
- the potential risk of accidents.

The description of the development should take account of the full 'life-cycle' including construction, commissioning (if relevant), operation, changes to the project and potential decommission.

Potential Impacts
The potential impact of the proposal comprises a general description of the possible types of impacts which proposals of this kind would be likely to produce. Impact assessment addresses direct, indirect, secondary, cumulative, transboundary, short, medium and long term, permanent, temporary, positive and negative effects as well as impact interactions. This includes consideration of a 'Do Nothing' impact which describes the environment as it would be in the future if the development is not carried out.

Mitigation Measures
A description of any specific remedial or reductive measures considered necessary and practicable resulting from the assessment of potential impacts described above.

Predicted Impacts
An assessment of the net specific impact of the proposal, noting the direct, indirect, secondary, cumulative, transboundary, short, medium and long term, permanent, temporary, positive and negative effects as well as impact interactions which the proposed development may have. The predicted impact assumes all mitigation measures are fully and successfully applied. A 'Worst Case' impact is also considered. A 'Worst Case' impact is an impact arising where a development or its mitigation measures substantially fail.

Monitoring
A description of any post development monitoring of effects of the environment which might be necessary.

Reinstatement
A description of any post development reinstatement measures which might be necessary.

1.9 COMPETENCY

For the preparation of this EIAR, the applicant engaged McGill Planning Ltd. to project manage and coordinate the preparation of the EIAR with a team of qualified specialists engaged to prepare individual chapters, as listed in the table below. Details of the competency, qualifications and experience of the authors is also outlined:

Chapter	Consultant	Lead Consultant	Qualifications
Introduction & Methodology	McGill Planning Ltd.	Brenda Butterly	Master of Regional & Urban Planning, RTPI, MIPI, BScSurv, Dip Prop Ec.
Alternatives			
Project Description			
Populations & Human Health			
Landscape & Visual (Written)			
Material Assets			
Interactions			
Summary of Mitigations Measure			
Biodiversity	Whitehill Ecology	Noreen McLoughlin	BA (mod) – Science MSc (Ecology)
Lands, Soils & Geology	Barrett Mahony Consulting Engineers	John Considine / Ryan Mulvaney	B Eng, MIEI, MIStructE, C Eng, FConsEI
Hydrology & Water Services			
Traffic & Transportation			
Noise & Vibration	Traynor Environmental	Nevin Traynor	BSc. Env, H.Dip I.T, Cert SHWW
Air & Climate			
Waste Management			
Cultural Heritage	IAC Archaeologists	Faith Bailey	BA (Hons) Archaeology (UW Lampeter) 2001 MA Cultural Landscape Management (UW Lampeter) 2003

Table 1.2 Qualifications of EIAR Authors

1.10 DIFFICULTIES IN COMPILING THE SPECIFIED INFORMATION

There were no significant difficulties in completing the Environmental Impact Assessment Report. Any minor difficulties are presented in each of the respective chapters. While every effort has been made to ensure that the content of this EIAR is consistent there may be instances where typographical errors and/or minor inconsistencies do occur. These are unlikely to have any material impact on the overall findings and assessment contained in this EIAR.

1.11 AVAILABILITY OF THE EIAR

A copy of this EIAR document and Non-Technical Summary of the EIAR document is available for purchase at the Council office at a fee not exceeding the reasonable cost of reproducing the document.

Additionally, prior to lodging this application, the required information has been issued for the Department of Housing, Planning and Local Government's EIA Portal.

2 ALTERNATIVES CONSIDERED

2.1 TERMS OF REFERENCE

This section of the EIAR has been prepared by McGill Planning Ltd., Planning Consultants, and examines the evolution of the proposed development through the various reasonable alternatives examined. It is a requirement of the EIA Directive as amended to present an outline of the main alternatives considered and a justification of the final proposed development.

2.2 INTRODUCTION

The *Guidelines for Planning Authorities and An Bord Pleanála on Carrying out Environmental Impact Assessment* (2018) state the following:

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

This section of the EIAR document provides an outline of the main alternatives examined throughout the design and consultation process under the following headings:

- Alternative Locations
- Alternative Uses
- Alternative Designs and Layouts
- Alternative Processes

This serves to indicate the main reasons for choosing the development proposed, taking into account and providing a comparison of the environmental effects. The type of alternatives depends on the nature of the project proposed and the characteristics of the receiving environment.

The 2018 Guidelines also note that it is generally sufficient for the developer to provide a broad description of each main alternative studied and the key environmental issues. Furthermore, a 'mini- EIA' is not required for each alternative studied.

2.3 ALTERNATIVE LOCATIONS

The 2018 Guidelines note that some projects may be "site specific" so the consideration of alternative sites may not be relevant.

This point is also made in the *Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports* (EPA 2017), which states that in some instances alternative locations may not be applicable or available for a specific project which is identified for a specific location. With regard to locations, the considerations of alternatives in many cases will already have been addressed and decided at strategic planning level during the adoption of city/county/local developments plans. Furthermore, these plans will have been subject to Strategic Environmental Assessment which will have taken into account the environmental considerations associated with, for example, the cumulative impact of an area zoned for industry on a sensitive landscape.

The 2017 Guidelines further state:

> *Note also that plan-level/higher-level assessments may have set out project-level objectives or other mitigation that the project and its EIAR should be cognisant of.*

In this regard we note that the proposed development is a brownfield site located in Tallaght and zoned for development in the current County Development Plan, 2016-22.

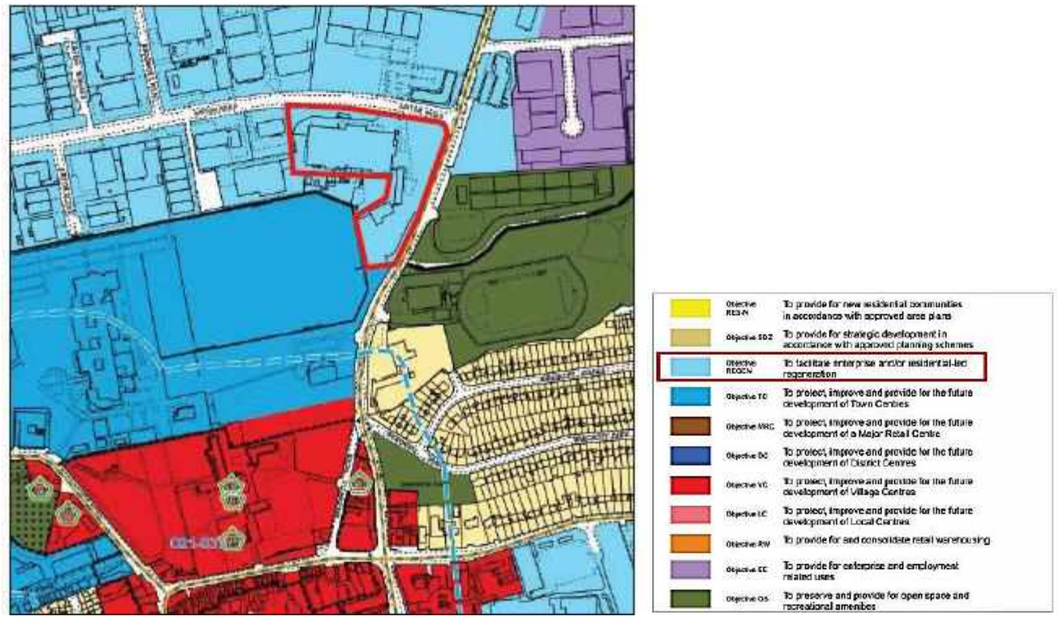


Figure 2.1 Location and zoning map for the site as per the SDCCDP 2016-22

The subject lands are zoned for REGEN to facilitate enterprise and/or residential led development. The proposed development is in line with the Development Plan policies and seek permission to build 502 residential units along with associated communal facilities, a creche and three retail outlets.

The Draft Tallaght LAP that was published in late 2019 also designates this location for residential development. The subject site is located at a key, high profile junction in the area where the Airton and Greenhills Roads meet. The site is located close to high quality public transport, local services, employment and amenities.

The location of a new, high density residential development (with ancillary services) at this nodal site is consistent with the current County Development Plan and imminent Local Area Plan for the area both of which are subject to a Strategic Environment Assessment (SEA) and which considered alternatives for this site and the wider area.

In summary, the development of high density, high quality residential development at the subject site has been pre-empted in the draft Local Area Plan and the County Development Plan.

As a result, the consideration of alternative site locations for the proposed development were not considered necessary or justified in this instance.

2.4 DO-NOTHING ALTERNATIVE

As highlighted above the site is zoned for REGEN to facilitate enterprise and/or residential led redevelopment. The consideration of an alternative location would equate to a 'do-nothing' alternative for the subject site. The zoned lands would not be developed in accordance with the objectives of the draft LAP and the County Development Plan. This long vacant site (since 2003) would continue to physically deteriorate and become a visual eyesore and susceptible to anti-social behaviour.

This in turn would have the knock-on impacts on achieving the aims of the LAP and County Development for the area. This would not be in line with national and regional planning policies which require the prompt and efficient re-use of zoned, services and accessible brownfield lands such as these.

Furthermore, this site is considered highly sustainable and suitable for immediate development due to its proximity to Tallaght Town Centre and the wide range of public transport facilities and community facilities within the area.

2.5 ALTERNATIVE USES

As noted above the site is zoned REGEN with "residential" and/or "employment" permitted in principle uses.

The draft LAP indicates the site as being suitable for residential development. The continuation, and growth of employment uses in the area, are expected with the Broomhill Industrial Estate lands to the north of Airton Road.

The location of the site proximate to public transport, and local services (e.g. primary health care centre, local retail and recreational facilities), makes it an ideal location for residential development, particularly on a briownfield site that has remained vacant for over 17 years with no alternative employment uses forthcoming.

As a result, the consideration of alternative uses for the proposed residential development were not considered necessary or justified.

2.6 ALTERNATIVE DESIGNS

The layout, scale, quantum, density and design of the proposed development has had due regard to its setting within the Metropolitan area of Dublin City, close to Tallaght Town Centre and in a mixed use area served by public transport.

The proposed layout and design have also been influenced by the site's specific topography, existing boundary conditions including the river to the south, accessibility, and the need to accommodate the proposed future bus connects corridor along Greenhills road.

A number of alternative layouts and designs have been considered on the subject site.

Alternative A : Consideration of the previous permission granted on the site (for retail warehouses, a garden centre and surface parking)

SDCC Reg Ref: SD07A/0990 Decision: Granted, 11/11/08

Permission was granted by the Local Authority for the demolition of existing buildings on site and the construction of three single storey retail warehouse units and an external garden centre:: Unit 1 - 3354sq.m., Unit 2 - 1543sq.m., Unit 3 - 1525sq.m. and garden centre - 952sq.m);

The proposal included surface car parking for 229spaces and creating a new primary access to the site from Greenhills Road. An EIAR was also included with the application. This development never commenced.

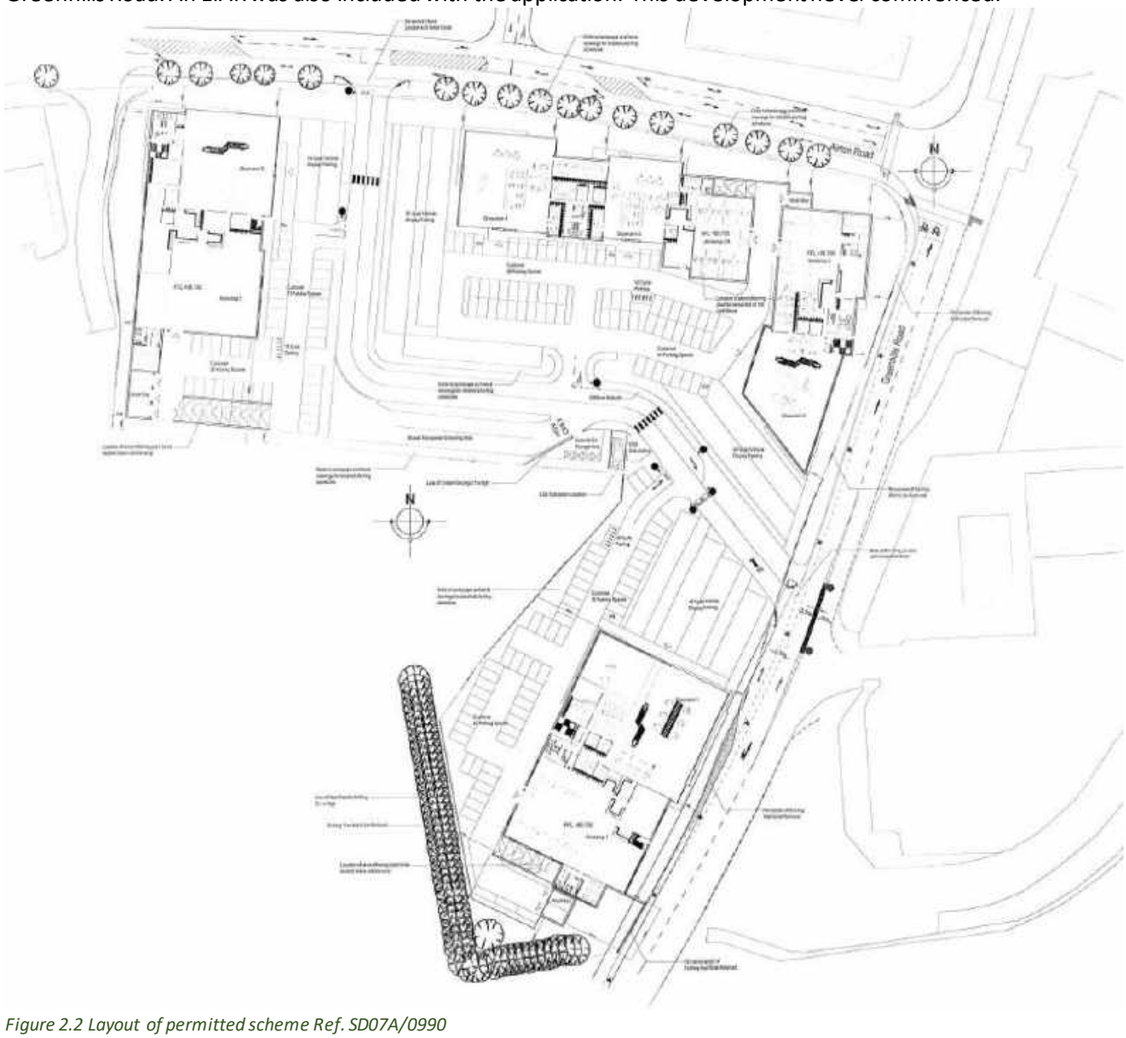


Figure 2.2 Layout of permitted scheme Ref. SD07A/0990

This proposed scheme is a low-density commercial development. The design for which is dominated by surface car parking spaces. The design and layout are similar to the existing industrial units within Broomhill Industrial Estate. This previous permitted development would now be considered contrary to the zoning for the site and the development objectives for the area. It would be an unsustainable re-use of this strategic brownfield site close to services and public transport.

Alternative B: Pre-app design proposal

An initial layout proposed for the site included a large anchor retail store and some smaller commercial outlets within the development. The floor area for the anchor store was in excess of 1575 sqm. This layout also allocated a public open space of 1320sqm towards the centre of the site, another open space of area 1100sqm to the south of the site, and 979sqm of open space along the riparian corridor.

Access to the site was proposed from Airton road with retail outlets to both sides. Parking is proposed at surface level for the blocks fronting onto Greenhills road and basement level for blocks fronting onto Airton road. Entrance to the basement carparking is from the rear of the blocks towards the centre of the site.

Blocks proposed within the adjoining site as part of the masterplan for the sites are outlined in black dashed line.

Figure 2.3 Alternative B

Environmental Effects:
This development would have resulted in disconnected green spaces which are separated by roads and large areas of car parking. The surface car parking dominated the site and resulted in lower quality open space for its residents. The prospect of residential units overlooking surface car parking is also detrimental to the quality of life of the future residents of the scheme. The large retail unit onto Airton Road was contrary to the Development Plan retail strategy and the advices given within the Future Analytics report due to the proximity of other existing large retail units in the area.

Some of the positive aspect of this initial proposal which were carried forward were the public open spaces in the centre of the scheme and beside the stream to the south.

Figure 2.4 Alternative C

Alternative C: Pre-app design proposal

Alternative C layout was for 350 units within 6 blocks ranging in height from 4-6 storeys at a density of 140 units per hectare. 200 car parking spaces provided at surface level and 150 within the basement under block C&D. 750sqm of retail floor space is provided under blocks B&C.

Access to the site is provided only from Airton road. The scheme has allocated 2500sqm of public open space in between blocks B and C with direct access from the proposed entrance to the site.

Environmental Effects:
This proposal also had a significant quantity of surface parking and road network making the open space piecemeal, disjointed and compartmentalised. This can decrease the viability of the proposed spaces. Pedestrian safety is given lower priority within the layout as the scheme is dominated by car users and parking spaces. This proposal does not include allowances to accommodate proposed Bus connects corridor for Greenhills road.

Figure 2.5 Alternative D

Alternative D: Design proposal submitted for S247 discussion with the Local Authority

The layout is for a high-density scheme that proposes 220 units per hectare. Total number of units proposed amount to 550units with one bed amounting to 34% of the total share. This layout has a limited number of surface car parking spaces proposed. The units are distributed within 6 blocks(A-F) ranging in height from 4-8 storeys. The proposed height scheme creates strong urban frontage along Greenhills road and improve site legibility.

The layout also includes provisions for the proposed bus connects corridor along Greenhills road. Primary access to the site is from Airton road with a secondary access from Greenhills Road. 10% of the site area is designated as Public open space within scheme. 285 Car parking spaces are provided at undercroft level and a limited number of spaces are provided at surface level.

Environmental Effects

The layout has an interactive design that connects to its surrounding context. The variation within the setbacks provides visual interest within the street scene. Restriction of car parking at surface level has resulted in better urban design, better connections and good quality open space within the scheme. The proposed layout safeguards the riparian strip along the southern corner of the site and enables the creation of a riverside walk. The layout also incorporates proposals for bus connects corridor along Greenhills road. This layout is an improvement to the previous scheme with better quality of open spaces and increased pedestrian permeability within the scheme.

The Local Authority raised following concerns over the following design aspects

- Protection offered to River Poddle(Tymon) within the proposed layout
- Quality and usability of proposed public open space
- Provide an emergency junction and to show emergency vehicular access.
- Revised corner element of the scheme

Figure 2.6 Alternative E

Alternative E: Design submitted SHD Stage 2 to An Bord Pleanála

This is an improved version of the previous layout that incorporates the input from the Local Authority.
The proposal is for 544 units distributed within 6 blocks(A-F) ranging in height from 4-8 storeys. Proposed scheme has a density of 217 units per hectare. The proposal has segregated pedestrian/cyclist zones from vehicular accesses to improve the pedestrian comfort and safety within the scheme. Public open space of 2043sqm is provided as a central courtyard within the scheme. Communal open spaces are provided at podium levels in between blocks A/B/C and for E/F. Total open space within the scheme amounts to 13.9% of the site area.

A second vehicular entrance is proposed from Greenhills road into the scheme.

Environmental Effects

This layout has improved pedestrian permeability throughout the scheme and good quality open spaces. Independent entrance is provided to the podium level of the scheme from the ground level. The masterplan layout for both sites under the applicant's ownership was also indicated. It shows the full development potential of the site in relation to the adjoining site under the applicants' ownerships. The masterplan includes proposals for developing a Riparian strip along the southern boundary of the site with Technological University Dublin Tallaght Campus.

An Bord Pleanála raised following concerns regarding the proposal submitted:

- Proposal should demonstrate that it is not ad hoc, piecemeal, or premature development and how the development of all the lands could be progressed
- Proposal should ensure that it makes a positive contribution to the character of the area
- Further consideration and/or justification of the documents as they relate to the ground floor uses of the proposed scheme in particular along Greenhills Road, Airton Road and surrounding the 'Courtyard Open Space' in terms of the creation of an active and vibrant streetscape at this location.

- Better relationship for the pedestrians within the development

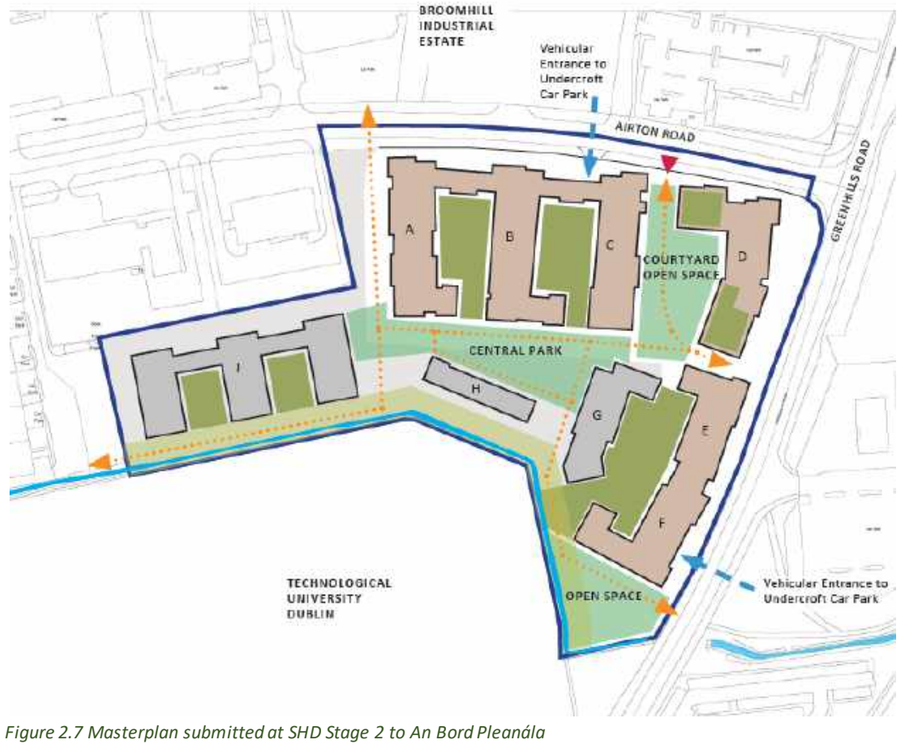


Figure 2.7 Masterplan submitted at SHD Stage 2 to An Bord Pleanála

Alternative F: Chosen Option

The layout has been subsequently updated to provide more distinct character areas and to ensure that the proposal will provide quality living spaces and urban design. The proposal in line with ABP comments provides a strong urban edge along Airton road and Greenhills road. The proposed development has re-examined the location of the retail units and the creche and how they interact with both the Greenhills Road, Airton Road and the Courtyard Open Space as well as the future masterplan site. The revised layout provides for the creche and also some interesting open spaces along the internal route which would become a street through the development in any future scheme.

Along Airton Road and Greenhills Road a strong urban edge has been retained with commercial elements at the ground floor level. These commercial units complement the existing commercial development in the area while also providing activity in these areas. It is envisaged that the relationship with the ground floor of the corner unit, the open courtyard and the creche will have a key relationship in creating activity within this space enabling a safe largely car free area for children to play in and adults to enjoy within an otherwise urban area. In blocks E and F, the car parking has been moved into a basement car park rather than in an under-croft parking area. This creates more visibility and flow between the areas, enhances the open space to the south and generally creates more of a draw through the site. This is in line with the current Regen zoning for the site.

Figure 2.8 Chosen layout within proposed Masterplan

Environmental Effects

The overall masterplan area for this development measures c. 3.8ha. An overall masterplan document for all the lands under the ownership of the applicant sets out how the overall site can develop in the future. This layout provides an improved design that includes a new centralised route though the site which will be car free, with pedestrian and cyclist priority and a series of interesting spaces as you journey through the site.

The approach to the overall layout of the masterplan area, and the application site, ensures that not only these lands but also the adjoining sites, outside of the ownership of the applicant, can come forward in a comprehensive manner and unlocks the potential of all of the surrounding sites to this application site. It is considered to be an appropriate form of development and cannot be considered piecemeal or ad hoc. This proposal will not in any way prohibit the development of any lands adjoining the site.

Figure 2.9 Current layout (Source: Landscape Masterplan, Mitchell Associates)

2.6 SUMMARY TABLE OF ALTERNATIVE SITES AND ENVIRONMENTAL IMPACTS

ALTERNATIVE	A	B	C	D	E	F(Chosen)
Population and Human Health	Negative	Neutral	Positive	Positive	Positive	Positive
Biodiversity	Negative	Neutral	Neutral	Neutral	Positive	Positive
Land, Soil and Geology	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral
Hydrology	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral
Noise and Vibration	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral
Air and Climate	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral
Landscape and Visual	Negative	Negative	Neutral	Positive	Positive	Positive
Traffic and Transportation	Negative	Negative	Negative	Neutral	Neutral	Neutral
Material Assets	Negative	Neutral	Neutral	Positive	Positive	Positive
Waste Management	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral
Cultural Heritage	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral

Table 2.1 Assessment of Design Alternatives

The above table compares each alternative layout with respect to different receptors. Each layout was assessed on how they will impact the site and the local population. Layouts that proposed better quality open spaces, reduced car parking, residential amenity, pedestrian safety etc in the designs where considered as more positive alternatives. Scenarios that had poor urban design qualities have been marked as negative to the environment.

2.7 ALTERNATIVE PROCESSES

This is a residential development located on lands whose zoning permits residential development.

The site is currently a vacant brownfield site which was formally occupied by industrial units. Alternative processes were not considered.

3 PROJECT DESCRIPTION

3.1 INTRODUCTION

This section of the EIAR has been prepared by McGill Planning Ltd. with input from the project team. The section describes the nature of the proposed development in accordance with the requirements of the relevant EIA legislation and guidance on preparation and content of EIAR.

3.2 CHARACTERISTICS OF THE SITE

The subject site is a vacant former industrial brownfield site at the edge of Broomhill Industrial Estate. The gross site area for this application (including works to the adjoining public roads) is c.2.79ha. The site has been vacant since the previous cigarette manufacturing use ended in 2003.

The site is located c. 9km south west of Dublin City Centre, c. 750m north of Tallaght Village, and c. 1.4km north east of The Square Tallaght Shopping Centre. The site is located directly adjoining a high quality bus route (Dublin Bus No. 27) which runs every 10 mins until 7pm Monday to Saturday and every 15 mins on Sundays. The site is also c.1.5km from the Luas Red line to the north-west.

This high profile site fronts onto Airton Road to the north and Greenhills Road to the east. To the south of the site is the Tallaght Institute of Technology Campus. The property to the immediate west/south-west is also in the ownership of the landowner of the current site. However, that property is not vacant but is being leased as a car compound by An Garda Siochana.

To the west is an Adult disability training centre (Cheerverstown Centre). To the north of Airton Road is the Kilnamanagh Tymon Primary Health Care Centre and a wide other retail/commercial/employment uses (e.g. Harvey Norman, Ford & Kia car sales, etc) within Broomhill Industrial Estate. To the north-east is Greenhills Retail Park with a range of retail services including convenience retail, take-away, and other retail services and commercial/employment uses. To the east and south-east are a range of recreational uses including Bancroft Park, Tallaght Athletics club, Westpark Fitness club, and Astro Park.

Figure 3.1Site boundary (Source: Google, 2019)

Existing vehicular access to the site is from Airton Road to the north. The site is close to a number of bus stops which are serviced by a number of high frequency routes including nos. 27, 54a, 65, 75, 75a, 76, 76a, 77a, and 175. These services link the area to Dublin City Centre, Liffey Valley, Blanchardstown, Dundrum, Stillorgan, Dún Laoghaire, Citywest and UCD. The subject site is located c. 1.6km south east of the Belgard Luas Stop which is serviced by the Redline Luas. As part of the Bus Connects scheme there is a proposed priority bus corridor for Greenhills Road. When this bus corridor is constructed it will significantly reduce journey times to the City Centre. This proposal will also provide excellent cycle infrastructure for the area. Currently the site is a c. 28 minute cycle to St Stephen's Green. The proposed site layout is stepped back from the eastern boundary along Greenhills Road to accommodate the Bus Connects plan.

3.3 PROPOSED DEVELOPMENT

The proposal is for a residential, mixed-use development on a site of c. 2.79ha.

A. Residential:

- 502 units, comprising of 197 no. 1-Bed; 257 no. 2-Bed; and 48 no. 3-Bed Apartments
- All units are provided with associated private balconies/terraces to the north/south/east/west elevations.
- Units are distributed across 6 no blocks. Blocks A, B & C are located to the north along Airton road. Blocks D, E & F are located to the east of the site along Greenhill's road
- Blocks A, B, & C front onto Airton Road and are linked by undercroft parking for 117 spaces and two communal open space at podium level
- Buildings A and B range in height from 4 to 7 storey rising to 8 storeys in Block C
- Block D is a standalone building which is located in the north eastern corner of the site fronting onto both Airton Road and Greenhills Road and measures 6-8 storeys in height.
- Blocks E and F are located towards the south of the site, fronting onto Greenhills Road, measuring 5-7 storeys in height.
- Blocks E and F are linked by basement car parking for 85 spaces and a shared communal courtyard

B. Non- Residential:

- Block C has a creche (c. 329sq.m), a retail unit (c. 187sq.m) and communal facilities of c. 465sq.m.
- Block D contains 2 no. retail units (Unit 1 c. 161sq.m and Unit 2 c. 134sq.m) and communal facilities (c. 93sq.m).
- Blocks E & F contains communal facilities of 146sqm.

C. Demolition and site development works:

- Demolition of existing factory/ warehouse buildings on site which extend to c.10,076.8 sqm;
- The proposal also includes road improvement works and pedestrian crossing points across Airton Road and Greenhills Road
- 2no substations located on the North End of Block B & E at Ground Level.
- Landscaping, open spaces, and boundary treatment works.
- All other site services and works to enable the development of the site

D. Layout and Design:

The layout of the proposed development is designed to create liveable areas for the existing and future residents. Within the development site, the areas have been laid out to create distinct character areas that will help create a strong sense of place and identity. In addition to the communal open areas proposed within the apartment Blocks there are 2 no. large areas of public open space proposed within the scheme. One area is located between Blocks C and D and the other is located south of Block F including the riparian strip of 10m for Tymon/Poddle river, linking into this attractive potential future riverside walk. A total of 27% of the site is public open space within the scheme.

There are also significant communal courtyards at ground, podium and roof level within Blocks A, B, C, D, E and F. All of the open spaces are overlooked by the residential units offering great passive surveillance.

The layout of the development has been designed to remove cars from within the development and to ensure that pedestrians and cyclists are given priority by limiting the vehicles through the site. While pedestrians and cyclists have multiple access to the site, only emergency vehicles can access the surface of the site.

Some trees along Airton Road are proposed for removal as part of the development to provide appropriate site lines, however, these will be replaced by new trees within the area as part of the improvements to the street.

E. Access, Parking and Public Transport

The development is accessed through 2 no. vehicular access to the north and east of the scheme leading directly into either the undercroft parking area or the basement parking area. There is no surface car parking provided within the scheme. There will be a number of pedestrian entrances along Airton Road and Greenhills Road some of which also provide access for emergency vehicles.

A new pedestrian crossing is proposed along Greenhills Road along with a further two new/ improved crossing points along Airton Road as part of this development. This will provide permeability through the site from the surrounding areas ensuring that walking and cycling are attractive modes of transport for residents of this development.

A layby for deliveries and drop offs is proposed along Airton Road. The development has also been set back from Greenhills Road to allow for the future Bus Connects Corridor in this location.

Residential			
	1bed	**2 bed**	**3 bed**
Apartments	197	257	48
	TOTAL		**502**
Non-Residential			
	Location		**Area**
Retail unit 1	**Block C**		187sqm
Retail unit 2	**Block D**		161sqm
Retail unit 2	**Block D**		134sqm
Creche	**Block C**		329sqm
Communal facilities	**Block C**		465sqm
Communal facilities	**Block D**		93sqm
Communal facilities	**Block E-F**		146sqm
Services and bin stores			324sqm
Parking			
Car parking	Under croft Block A, B and C		117
	Basement E, F		85
	TOTAL		**202**
Bike Parking	Under croft Block A, B & C		280
	Ground floor Block D and Basement Block E & F		230
	Staff		05
	Visitor		74
	TOTAL		**584**

Figure 3.2 Proposed site layout (Source: Landscape Masterplan, Mitchell Associates)

3.4 CONSTRUCTION STAGE

This section of the EIAR summarises the construction of the proposed development. The Outline Construction & Environmental Management Plan and the Construction Demolition Waste Management Plan which are submitted separately in the planning application, should also be consulted.

Hoarding, Site Set-up and Formation of Site Access/Egress

The site area will be enclosed with hoarding, details of which will be agreed with South Dublin County Council. This will involve erecting hoarding around the proposed site perimeter in line with the finished development extents. Hoarding panels will be maintained and kept clean for the duration of the works. The available site footprint will enable the Contractor to set up the site compound within the site boundary.

The Contractor will be responsible for the security of the site. The Contractor will be required to:

- Operate a Site Induction Process for all site staff;
- Ensure all site staff shall have current 'Safe Pass' cards and appropriate PPE;
- Install adequate site hoarding to the site boundary;
- Maintain site security at all times;
- Install access security in the form of turn-styles and gates for staff;
- Separate public pedestrian access from construction vehicular traffic;

The Main Contractor will be required to submit a site layout plan that will detail the proposed location of the site compound. The site compound will be used as the primary location for the storage of materials, plant and equipment, site offices and worker welfare facilities. As Project Supervisor Construction Stage (PSCS), the Contractor will be responsible for site security and they are to ensure that the site and site compound are adequately secured at all times.

As with the other construction activities that are being carried out within the County Council local authority area, activities associated with the construction compounds will be subject to restrictions to the nature and timing of operations so that they do not cause undue disturbance to neighbouring areas and communities.

The site layout plan will also include the site perimeter and the proposed detail with regards the hoarding and gate system.

Site Clearance and Demolition
The location is a brownfield site and will require demolition of existing industrial buildings on site along with the removal of some vegetation/ trees. The management of demolition waste will be as detailed in the Construction Demolition Waste Management Plan and as agreed with the County Council. The development includes proposals for a basement.

Car Parking Arrangements
Parking of construction workers vehicles will be limited to within the site extents. To minimise congestion, a traffic management plan will need to be developed by the Contractor to ensure that construction workers access the site using alternative means of transport (i.e. public transport) to negate/minimise any impacts on the local network.

Working Hours & Staff
The proposed hours of work on site will typically be 08:00 hrs to 19:00 hrs Monday to Saturday unless otherwise specified by planning conditions. Certain tasks may need to be undertaken outside of these hours. All outside of hours work will first be agreed in writing with the Local Authority. It is predicted that there may be up to 150 personnel on site during peak construction activity.

Lighting
There are no proposals to alter the existing lighting arrangements in the area. It is not envisaged that any existing public lighting will need to be disconnected as a result of the proposed works. Appropriate lighting will be provided as necessary at construction compounds. All lighting will be installed so as to minimise light spillage from the site.

Delivery and Storage
The Contractor will ensure that the delivery of materials is coordinated to minimise impacts to adjacent properties. The Contractor will ensure that all materials are adequately stored and secured in their site compound. The Contractor will ensure the roads adjacent to the site are kept clean and free of debris.

Traffic Management Procedures / Generation

The contractor will prepare a site-specific Traffic Management Plan (TMP) prior to the construction works commencing. The contractor will be responsible for the implementation of all agreements between the developer and County Council with the objective that the transportation needs for the proposed development will have a minimal impact on the road network and local communities. Adequate signage as per Chapter 8 of the Traffic Signs Manual shall be installed on approach to the proposed site entrance location advising of the presence of a 'site access ahead' and 'construction traffic ahead'. The above signage shall be removed following completion of the construction phase. Roadside planting under control of the owner shall be trimmed annually to maintain minimum sightline distances where required.

Disposal of water, wastewater and sewage
All site facilities during construction will be located entirely within the site. The facilities will include canteen, toilet block and drying room for all staff/workers. These facilities will be connected to the local authority sewage system with local authority approval**.** Throughout the construction works, all surface water (water from excavations etc.) will be pumped to a holding tank on site. From here the water will be pumped to a series of settlement tanks. These tanks will act as primary and secondary settlement. The settlement tanks will be of sufficient number and size to allow the necessary retention time for solids to settle. The discharge water from the final tank will be routed to the existing combined water system with approval from the local authority. Visual checks of the pumping and settlement system will be carried out on a routine basis.

Air Quality
There is the potential for a number of emissions to the atmosphere during the construction stage of the project. In particular, activities may generate quantities of dust. Construction vehicles, generators etc., will also give rise to some exhaust emissions. Vehicular movements to and from the site will make use of existing roads.

A dust minimization plan will be formulated for the demolition and construction phase of the project, as construction activities are likely to generate dust emissions. The potential for dust to be emitted depends on the type of activity being carried out in conjunction with environmental factors including levels of rainfall, wind speeds and wind direction. The potential for impact from dust depends on the distance to potentially sensitive locations and whether the wind can carry the dust to these locations. The majority of any dust produced will be deposited close to the potential source and any impacts from dust deposition will typically be within several hundred metres of the construction area.

In order to ensure that no dust nuisance occurs, a series of measures will be implemented. Roads shall be regularly cleaned and maintained as appropriate. Hard surface roads shall be swept to remove mud and aggregate materials from their surface. Furthermore, any road that has the potential to give rise to fugitive dust must be regularly watered, as appropriate, during dry and/or windy conditions. Vehicles delivering material with dust potential both on and off the site shall be enclosed or covered with tarpaulin at all times to ensure no potential for dust emissions.

All vehicles exiting the site shall make use of a wheel wash facility, if required, prior to entering onto public roads, to ensure mud and other wastes are not tracked onto public roads. Public roads outside the site shall be regularly inspected for cleanliness and cleaned as necessary. Material handling systems and site stockpiling of materials shall be designed and laid out to minimise exposure to wind. Water misting or sprays shall be used as required if particularly dusty activities are necessary during dry or windy periods.

At all times, the procedures put in place will be strictly monitored and assessed. In the event of dust nuisance occurring outside the site boundary, satisfactory procedures will be implemented to rectify the problem.

The dust minimisation plan shall be reviewed at regular intervals during the construction phase to ensure the effectiveness of the procedures in place and to maintain the goal of minimisation of dust through the use of best practise and procedures.

3.5 OPERATIONAL STAGE

The proposed development is a mixed-use development on appropriately zoned lands. The development includes proposals for associated infrastructural works, connections and open spaces.

It is anticipated that the primary direct significant environmental effects will arise during the construction stage. Once the development is completed, and mitigation measures employed, it is expected to operate without creating to any significant additional environmental impacts. The range of anticipated activities, materials/natural resources used, effects/emissions are not expected to result in a significant impact on the constituent environmental factors.

The primary likely and significant environmental impacts of the operation of the proposed development are fully addressed in the EIAR document; and relate to Population and Human Health, Landscape and Visual Impact and Noise and Air impacts associated with the traffic generated. There is also the potential for cumulative, secondary and indirect impacts (for instance traffic) but are unlikely to be significant and have been addressed in the EIAR.

4 POPULATION AND HUMAN HEALTH

4.1 INTRODUCTION

This chapter, prepared by McGill Planning Ltd., addresses the any impacts of the proposed mixed-use scheme at Tallaght, Dublin 24 to the population and human health.

4.2 METHODOLOGY

To establish the existing receiving environment/baseline for the subject site, the methodology included site visits to evaluate the location and likely significant potential impact upon the human sources in the area. Desk base study of the Central Statistics Office Census (CSO) data, the ESRI Quarterly Economic Commentary, and national, regional and local planning policy, school and creche enrolment figures.

Different local catchment areas were established for analysing population data, childcare demand and capacity, and school demand and capacity. These areas were chosen to gather the most relevant data for each factor.

4.3 RECEIVING ENVIRONMENT

POPULATION

The census data shows that the population of Ireland increased between 2006 and 2016 by 12.3% to a total population of 4,761,865 in 2016. Greater Dublin Area and South Dublin County did not have as significant an increase in population between 2011 and 2016 when compared to 2006 -2011, however the population has increased in each intercensal period. The subject site is located within the Tallaght Kingswood Electoral Division that showed an increase in population change over the same period of time. However, as this Electoral Division has a significant quantity of industrial land and for the purposes of this research it was also deemed appropriate to analyse a local catchment area with a 1km buffer of the site (formed by amalgamating 15 Small area statistics) in order to get a better assessment of the current demographic pattern in the locality of the site. This also showed an increase in population by 9.05% over the 2011-16 period.

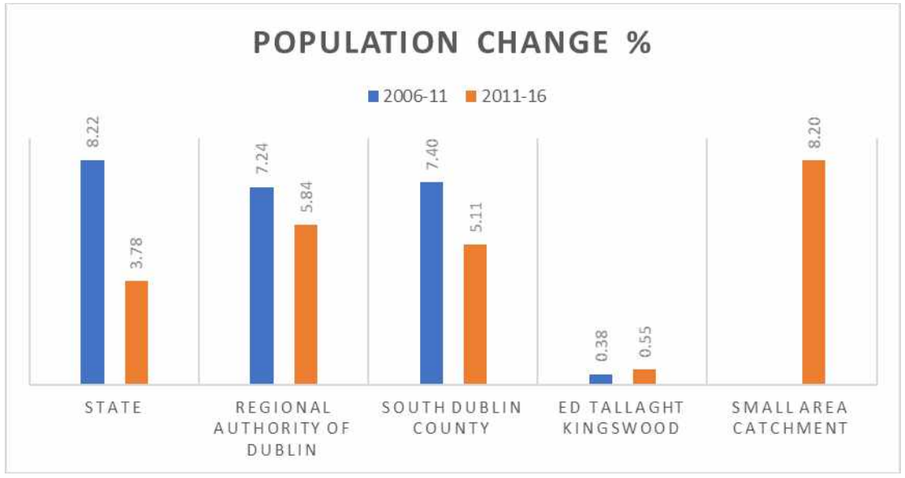


Figure 4.1 Percentage population change (Source: CSO 2016)

	2006	2011	2016
State			
Total	4,239,848	4,588,252	4,761,865
Male	2,121,171	2,272,699	2,354,428
Female	2,118,677	2,315,553	2,407,437
Regional Authority of Dublin			
Total	1,187,176	1,273,069	1,347,359
Male	582,557	619,902	658,371
Female	604,619	653,167	688,988
South Dublin County			
Total	246,935	265,205	278,767
Male	122,371	129,544	142,490
Female	124,564	135,661	136,277
ED Tallaght Kingswood			
Total	3959	3974	3,996
Male	1968	1985	1,945
Female	1991	1989	2,051
Small Area Catchment (made up of 12 small areas)			
Total	-	4073	4407
Male	-	2017	2218
Female	-	2056	2189

Table 4.1 Population change 2006, 2011, 2016

Figure 4.2 ED Tallaght Kingswood, Local Small Area Catchment

AGE PROFILE

The local catchment area (14.5%) and local ED (14%) have a lower share of school going population in the 5-18 age group in comparison to the State (19.3%) and County data (20.4%). This can be attributed to the commercial context of the site. The share of 19-34 younger adults have a stronger representation in the local catchment area

(28.7%) and Tallaght Kingswood ED (27.9%) when compared to the State average (21.9%) and South Dublin average (20.8%). The presence of third level education centre, TU Tallaght Campus may be the reason for this.

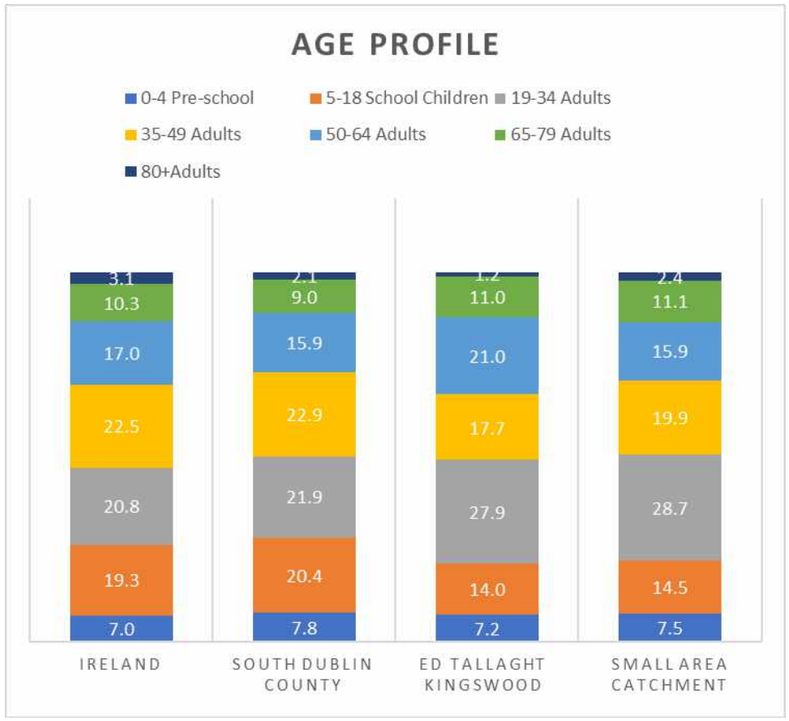


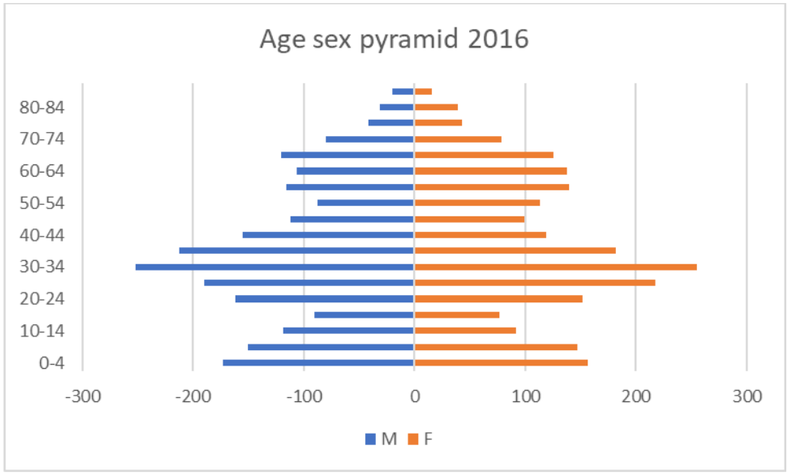
Figure 4.3 Age profile for State/County/local ED/Small Area Catchment (Source CSO 2016)

This Local Catchment Area has shown strong growth trends in the 65+ age group and a negative trend in the 19-34 young adults age group when comparing the 2011-16 census data. However, despite the rate of growth it is noted that the 19-34 category is still over double that of the 65+ age category.

Age	2011	2016	Change	% Change
0-4 Pre-school	284	329	+45	+15.8
5-18 School Children	534	638	+104	+19.5
19-34 Adults	1364	1265	-99	-7.3
35-64 Adults	1475	1580	+105	+7.1
65+ Adults	416	595	+179	+43.0

Table 4.2 Age profile for Small Area Catchment (Source CSO 2016)

The population pyramids for the local catchment area for the years 2011 and 2016 shows that there is a gap in the school going population. There is significant representation of 0-4 age group, 7.5% comparable with the state average 7% for 0-4 age group. There is a slight increase in the 35-50 age group which is likely due to the in-migration of people into the locality from elsewhere in Ireland or outside Ireland. There are a significant number of new apartment developments within the local catchment area that may have resulted in an increase in older adults. A significant increase in employment opportunities in the Tallaght town centre and in the general locality would also have caused an increase in demand for homes for people who wants to live in locations close to their workplaces.



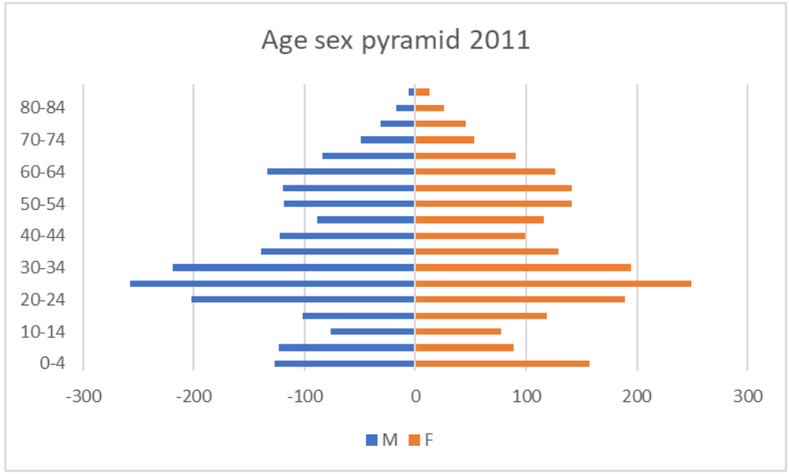


Figure 4.4 Population pyramid for Local Catchment Area 2011, 2016

EMPLOYMENT

CSOs Quarterly Labour Force Survey provide information in relation to national employment levels, unemployment level and current labour force participation rated. Data for Quarter 2 2019 shows that the number of employed people increased by 45,000 (1.9%) for the state during the 2018-19 period bringing the total employment to 2,300,000. This compares with an annual increase of 192,000 for the 2017-18 period. Unemployment decreased by 13,600 for the 2018-19 period.

	Q2 2017	Q1 2018	Q2 2018	Q3 2018	Q4 2018	Q1 2019	Q2 2019	Annual change 2018-19
Employed	2,063,000	2,220,500	2,255,000	2,273,200	2,281,300	2,301,900	2,300,000	+45,000
Unemployed	141,500	132,900	144,300	143,800	128,800	114,400	130,800	-13,600

In labour force	2,204,500	2,353,400	2,399,300	2,417,000	2,410,100	2,416,300	2,430,800	+31,400
Not in labour force	1,477,400	1,470,500	1,448,900	1,443,200	1,467,000	1,480,200	1,481,800	+32,900

Table 4.3 ILO Economic Statistics Source CSO

The Labour Force Survey Employment Series for Quarter 1 2019 gives details regarding the employment status and sectoral groups. Although all sectors had a notable increase in the number of employees within the 2013-19 period. The most notable increases were observed in the Construction sector with +102.1% and Accommodation and Food service activities with +42.1% increase within the same period. Between Q1 2013 and Q1 2019, the number of employees increased by 400,900 or 25.6% while those classified as self-employed increased by 14,900 (+4.8%). The Professional and Skilled trades occupational groups, rising by 85,100 and 60,900 respectively, showed the largest increase in the number of employees over the period. The largest increases in self-employment were in the Skilled Trades and the Caring, Leisure and Other services groups at 11,600 and 5,000 respectively.

Employment data for the Tallaght Kingswood Electoral Division indicate that there has been significant increase in the number of employed during the 5-year period from 2011-16(+6.3%). 58% of the population over 15 years of age are in employment with only 6.3% registered as unemployed. Along with a corresponding decrease in the number of unemployed persons from 2011-16 (-32.5%). The major socio economic group for the ED is Non manual (22%) followed by Employers and Managers(16%) as per the CSO 2016 data.

	2006	2011	2016	
Employed		2158	1,783	1,896
Unemployed/ Looking for Job		443	701	473
Total	2601	2,484	2,369	

Table 4.4 Employment data for Local ED Tallaght Kingswood

SOCIAL INFRASTRUCTURE

ACCESS AND TRANSPORT

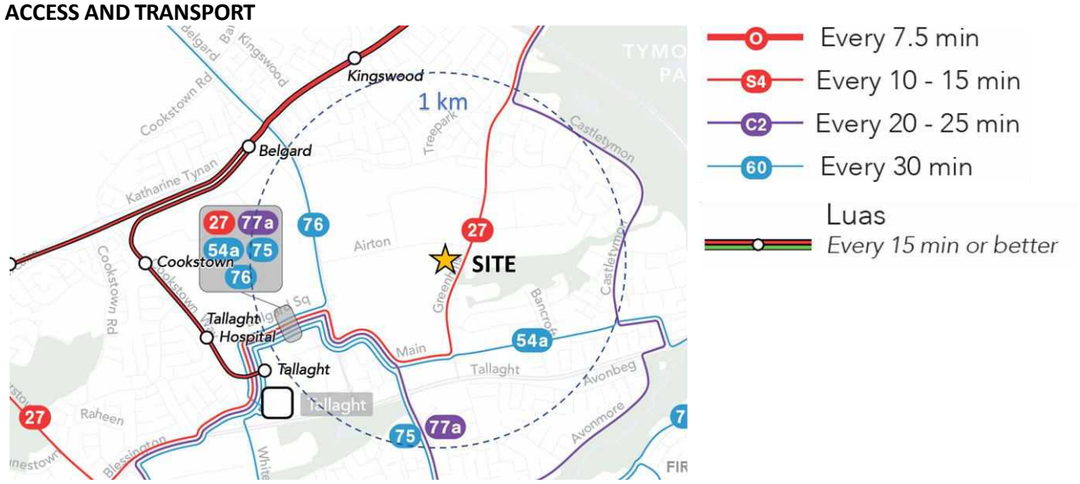


Figure 4.5Existing bus connectivity for the site (Source for base map Busconnects.ie)

The subject site is located c.9km south west of Dublin City centre. The site is well served by high quality transport networks with Red line Luas stops Tallaght square, Tallaght Hospital and Kingswood stops available at 1.3km from the site. Park and Ride facilities for 450 cars are available at the Tallaght Square stop. Bike parking racks are available at the following stops near to the site.

Kingswood:	8 racks
Belgard:	3 racks
Cookstown:	4 racks
Tallaght:	3 racks

Table 4.5 Bike parking available for Red line Luas stops in proximity to the site.

The site is close to a number of bus stops which are serviced by a number of high frequency routes including nos. 27, 54a, 65, 75, 75a, 76, 76a, 77a, and 175. These services link the area to Dublin City Centre, Liffey Valley, Blanchardstown, Dundrum, Stillorgan, Dún Laoghaire, Citywest and UCD. The proposed Bus Connects scheme there will connect the site along Greenhills road. This proposed bus priority corridor once implemented will significantly reduce the journey time to the City Centre.

Greater Dublin Area Cycle Plan proposes to upgrade the cycle paths along both Belgard Road and Greenhills road Currently the site is a c. 28-minute cycle to St Stephen's Green. The proposed site layout is stepped back from the eastern boundary along Greenhills Road to accommodate the Bus Connects plan.

RETAIL

Regarding retail services for the area the application includes proposals for three retail outlets. The proposed retail units have been proposed along the Airton road and Greenhills road junction at ground floor level in blocks C and D.

As set out in the Future Analytics Report dated March 2019and submitted with this application, an assessment of services and local amenities proximate to the subject site was undertaken to inform the secondary uses to be included in the development. The results showed there was a need for convenience retail, pharmacy, medical/ dental and personal services (barbers, hairdressers, launderette/ dry cleaning etc) within the vicinity of the site. The proposed retail elements are of an appropriate size to accommodate any one of these elements.

Although the site is served by Retail Hierarchy Level 2 ,3 and 4 zones, it can be seen from fig 2 that there is a shortage of these types of local convenience shops within the immediate surroundings. The proposed retail spaces will range between c. 124 - 213sqm are appropriately sized for these uses and are of a size which would create a demand for them.

Community and Social infrastructure

A number of churches and community facilities also service the site. To the south of the site the site is bound by third level education centre, TU Dublin Tallaght Campus. Dublin West Education Centre, located within the TU Dublin, Tallaght campus also provides rooms for hire which includes Boardrooms, Convention rooms, Theatre rooms and Computer rooms for events. There are several other community centres within a kilometre radius of the site.

The site location also benefits from the proximity of the site to extensive green areas and a wide range of active open space. The site is within 5 minutes' walk of Astro Park Tallaght, West Park Fitness and Tallaght Athletics Club. Bancroft Park which has river walks and playing pitches also provide for outdoor recreational space for residents of the area. Figure 4.7 has mapped out community, health, and recreational facilities available within 5- and 10-minutes walking areas of the site.

Figure 6.1: Amenities and services within 1km of the subject site.

Figure 4.6Extract from Future Analytics report indicating amenities and services within 1km of the subject site.

School capacity assessment

There are 36 primary schools, 10 post primary schools, 4 special schools and 1 major third level institution located within Tallaght, Dublin 24 area. Of these 11 primary schools, 3 post primary schools, and 27 Childcare centres are located within the 5-minute catchment of the site. Details of the schools are listed in the table below. A creche is also proposed within the scheme which will accommodate 44 children.

CHILDCARE CENTRES			
Sl No	**Ref No.**	**Type**	**Name**
1	19DS0449	Private	OAK VIEW TALLAGHT
2	16DS0387	Community	STARTBRIGHT GREENHILLS
3	14DS0348	Private	LITTLE LADYBIRD CRECHE & MONTESSORI LTD
4	09DS0124	Private	ASHLING NURSERY AND MONTESSORI SCHOOL
5	09DS0124	Private	ASHLING NURSERY AND MONTESSORI SCHOOL
6	14DS0348	Private	LITTLE LADYBIRD CRECHE & MONTESSORI LTD
7	09DS0044	Private	GLENVIEW MONTESSORI PRE-SCHOOL
8	09DS0032	Private	ST DOMINICS TOTS PLAYGROUP
9	14DS0347	Private	THREE LITTLE LAMBS
10	10DS0273	Community	BARNARDOS MILLBROOK FAMILY SUPPORT SERVICES
11	10DS0240	Community	TALLAGHT CHILDCARE CENTRE
12	17DS0403	Private	WOMBLES CRECHE
13	16DS0368	Private	ONCE UPON A TIME - THE ARENA
14	16DS0366	Private	LAUGH AND LEARN
15	19DS0443	Private	OAKVIEW VILLAGE TALLAGHT
16	16DS0382	Private	LITTLE FAIRIES CRECHE & MONTESSORI LTD
17	15DS0361	Private	NURTURE CHILDCARE AMNCH
18	19DS0456	Private	COACH APPROACH
19	09DS0205	Private	HAPPY DAYS PLAYGROUP
20	09DS0133	Private	KINGSWOOD PRE SCHOOL
21	09DS0036	Private	KILNAMANAGH KIDS CRECHE & MONTESSORI SCHOOL
22	09DS0166	Private	EARLY STEPS PRE-SCHOOL
23	09DS0066	Community	ST. KEVINS CHILDCARE CENTRE
24	11DS0298	Private	SCOIL IOSA SCOIL IOSA PLAYGROUP
25	09DS0227	Private	BALROTHERY CRECHE AND AFTERSCHOOL
26	15DS0362	Private	HAPPY DAYS CRECHE
27	11DS0303	Private	ADORABLES MONTESSORI AND CRECHE

Table 4.6 List of Childcare centres within5 minute catchment of site (Source Pobal.ie)

South Dublin County Council in conjunction with the Department of Education have identified a brownfield site at Fourth Avenue and Belgard Square North for the provision of 1 no. new post primary school in line with the Development Plan(Policy C9 (a) and Policy C9 (b)). The Draft Local Area Plan for Tallaght Town Centre 2020-26 has identified a greenfield site at Killinarden immediately adjacent to the southern boundary of the LAP lands to provide for 1 no. new primary school. The LAP also envisages that a second new primary school may also be provided for within the plan lands at a later date.

	Reg. No.	**Name**	**Address**	**Female**	**Male**	**Total**	**Expansion stage**
	PRIMARY SCHOOLS						
1.	18411U	ST MARYS SCHOOL	Greenhills Road	170	167	**337**	
2.	20468P	ST DOMINIC'S NATIONAL SCHOOL	Mountain Park	175	188	**363**	
3.	19646G	SCOIL SANTAIN	Bóthar na hAbhann Móire	195	141	**336**	
4.	19576L	S N AENGHUSA	Balrothery	121	97	**218**	
5.	19502F	SCOIL AENGHUSA JUN NS	Balrothery	117	115	**232**	
6.	19465C	ST KEVINS BOYS	Kilnamanagh		337	**337**	
7.	19466E	ST KEVINS GIRLS	Kilnamanagh	297		**297**	
8.	19577N	SCOIL IOSA	Tymon Road	61	51	**112**	
9.	19462T	SCOIL MAELRUAIN JUNIOR	Old Bawn	189	241	**430**	Stage 2 expansion
10.	19463V	SCOIL MAELRUAIN SENIOR	Old Bawn	207	242	**449**	Stage 2 expansion
11.	19541P	BELGARD HEIGHTS N S	Cookstown Road	204	209	**413**	
	POST PRIMARY SCHOOLS						
1.	70021D	TALLAGHT COMMUNITY SCHOOL	Balrothery, Tallaght	347	442	**789**	
2.	91335U	OLD BAWN COMMUNITY SCHOOL	Old Bawn, Tallaght	457	455	**912**	
3.	91336W	COLÁISTE DE HÍDE	Br Chaisleáin Thigh Mótháin	160	129	**289**	

	THIRD LEVEL INSTITUTES		
1.	Tallaght University Dublin Tallaght Campus	Tallaght, Dublin	Postgraduate, research. Industrial and business education
2.	Dublin West Education Centre	Tallaght, Dublin	Training and development for teachers and wider school community
3.	Synergy Centre	Tallaght, Dublin	Provides incubation space, mentoring and programmes for early stage start-ups
4.	The Priory Institutes	Main Street. Tallaght	Accredited centre for theological, biblical and philosophical studies
5.	PCI College- Dublin West Campus	Corrig House, Old Naas Road, Clondalkin	Professional counselling & psychotherapy courses

Table 4.7 List of primary and post primary schools within 5 minute catchment of site(Source Dept. of Education, www.education.ie/en/Schools-Colleges/)

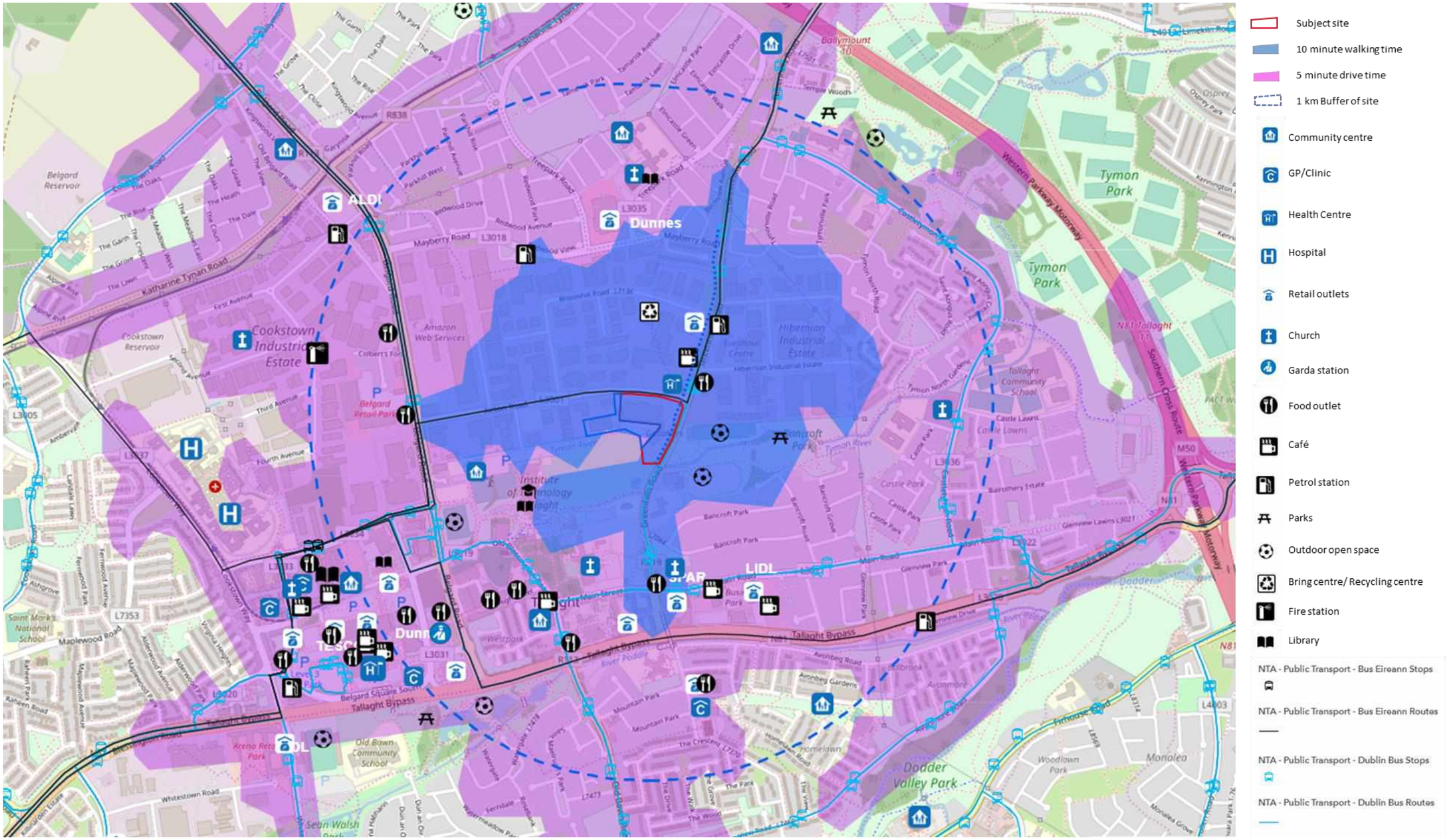


Figure 4.7 Communal and Recreational infrastructure within the site catchment (Source: Generated by McGill Planning)

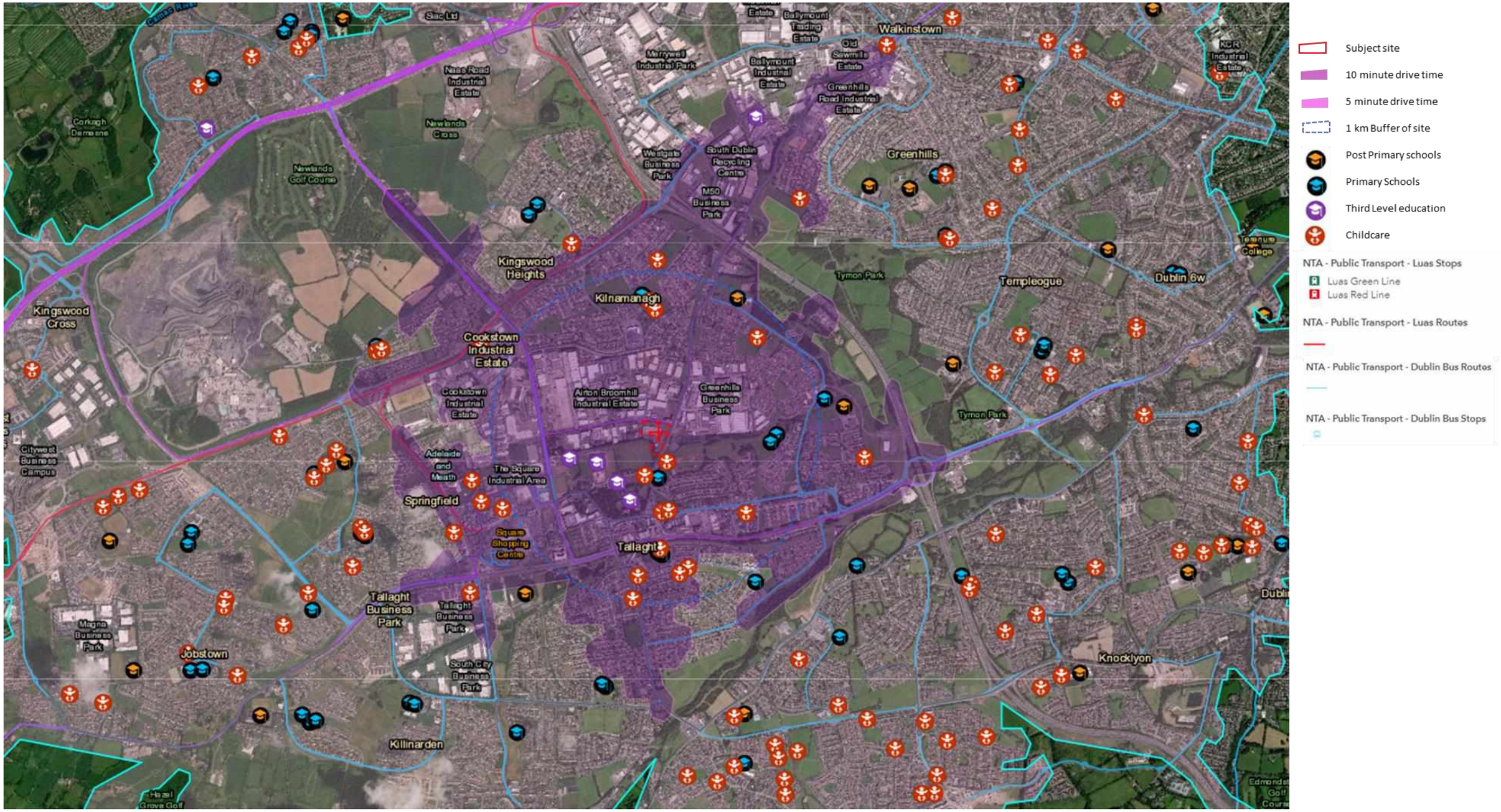


Figure 4.8 Childcare, schools and third level educational institutes located within the site catchment area (Source: Generated by McGill Planning)

4.4 LAND USE AND SETTLEMENT PATTERNS

The subject site, comprising c.2.79ha, is located approximately 9km south west of Dublin City centre and c.750m North of Tallaght Main street. Tallaght square shopping centre is located c.1.6km South west of the site. The surrounding site context is predominantly industrial with some institutional and recreational uses located within the neighbouring sites.

The lands are is zoned Objective REGEN *"to facilitate enterprise and/or residential led regeneration"* in the South Dublin County Development Plan 2016-2022. The principle of residential, childcare facilities, community facilities, and local shops are all permissible uses under this zoning.

The site currently consist of vacant industrial units that were previously part of a cigarette factory. These factory buildings will be demolished as part of this application. It is not located within a Conservation Area or an Architectural Conservation Area. The topography of the site Is generally flat.

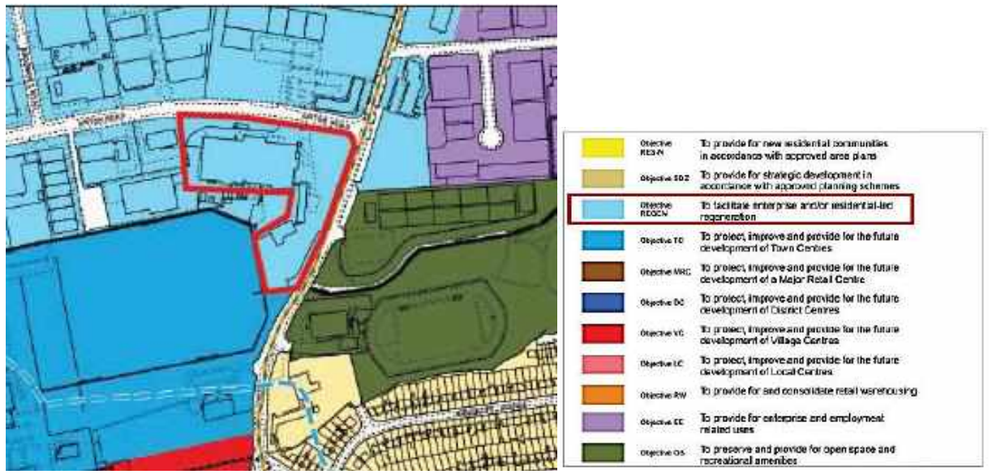


Figure 4.9 Location and zoning map for the site as per the SDCCDP 2016-22

Figure 4.10 Aerial view of the site Source: Google images 2019

4.5 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

A comprehensive description of the proposed development is presented within Chapter 3 of this EIAR and comprises the demolition of the existing buildings and the construction of 502 residential units, 3 retail units, a creche and communal facilities. Additional details regarding the design strategy and materials proposed can be found within the Architectural Design Statement produced by Ferreira Architects that is submitted with this application.

4.6 IMPACT ASSESSMENT

This section of the assessment describes those effects that are likely to arise from the proposed development to this locality in the absence of mitigation measures. Mitigation measures required to alleviate any such effects are discussed further in Section 4.8. Potential impacts are assessed under the following headings: Local business and residences, human heath, Air Quality & climate, Schools

IMPACTS ON LOCAL BUSINESSES AND RESIDENCES

Construction Phase

The construction of the proposed development is likely to have a positive effect on the local employment and economic activity. The development in the short term will provide for construction related employment during the different phases of development. In the long term the project will provide additional spend in the local shops, restaurants etc and offers good quality residential units for existing and future residents of the city. In general, the proposed development improves the built mix of houses and retail in the locality and creates better use of a vacant site at a prime location.

Businesses directly involved in the construction phase of the development would generate value and secure direct employment which in turn will contribute to the overall GDP of the economy and tax revenues.

The increase in residents to the area will also result in improving the vibrancy and vitality of the area and in the growth of the community. The development includes a good mix of residential units, community and recreational uses. The development also includes proposals for communal facilities such as gym, creche, and retail units.

Operational Phase

The proposed development will provide for 502 no. of units that includes 197no. of 1 beds, 257 no. of 2 beds and 48 no. of 3 beds. Using the national average household size of 2.7 persons for the 2 beds and 3 beds, it is likely that the development will generate a population of c.1020 people when fully occupied. This level of high density development will contribute to compacting the Growth of Tallaght. The development also includes proposals for 3 no. retail outlets that will benefit the resident population as well as the immediate site locality.

Considering the number of people in employment in the area (58%) it can be expected that c.476 of the population generated will be working. This working population will contribute significantly to the viability of existing and proposed services of the area. Increase in populations will also create new economic activities in the area and will support the surrounding residential area. Bus connects scheme includes proposals for priority bus corridor for Greenhills road along the eastern boundary of the site, which will significantly reduce journey times to the City centre.

IMPACTS ON HUMAN HEALTH

Construction Phase

The construction phase of the proposed development may give rise to short term (less than 5 years) impacts to the locality such as, construction traffic and surface contaminants, dust, exhaust emissions, noise and littering. Other impacts may include increased traffic due to hauling of building materials to and from the proposed development site which are likely to affect adjacent population. The construction impacts are dealt with in the relevant chapters of this EIAR document. Where possible potential risks will be avoided from design.

Operational Phase

The operational stage of the development is unlikely to cause any adverse impacts on the existing and future residents of the locality in terms of human health. The design of the development has been formulated to provide for a safe environment for the future residents and visitors alike. The paths, roadways and public realm have been designed in accordance with the best practice and applicable guidelines. All open areas have been designed to be inviting, safe and conveniently located.

This application is accompanied by a Daylight and Sunlight Analysis by IN2 that concludes that the proposed amenity spaces meet the daylight factor targets by greater than 97%, which exceeds the BRE guideline criteria target of 50% achieving 2-hour sunlight on March 21rst. Internal daylight assessment determines that 98% of the rooms within the apartment blocks exceed the minimum BRE requirements, with the remaining living spaces all achieving in excess of 1.0% average daylight factor ensuring no sub quality spaces throughout the development.

A Wind and Microclimate Assessment is also submitted with this application. The Computational Fluid Dynamics model predicts the wind patterns around the subject site. It concludes that the proposed development will produce a quality environmental that would be attractive and comfortable for pedestrians.

IMPACTS ON AIR QUALITY AND CLIMATE

Construction Phase

As a vacant industrial site, the construction associated with the development will cause disturbances to the site and the locality to a certain extent. The likely impacts from the disturbance includes dust emissions from demolition works, moving heavy machinery and construction traffic. If not properly mitigated this has the potential to impact the surrounding population and human health. This includes surrounding uses such as Technological University Tallaght campus to the south of the site and other commercial buildings that surround the site to the north and west.

Due to the extent of works on the site the increase in exhaust emissions will be a short-term effect and will not have any significant detrimental impacts to the air quality. The potential of an increase in exhaust emissions and dust release into the atmosphere will be managed through a Construction Management Plan. Waste generated during and after the construction phase will be dealt with in a Construction and Demolition Waste Management Plan. Any impacts to the existing population and health will be adequately addressed and mitigated.

Operational Phase

During the operational phase of the development it is susceptible that there will be a slight reduction in air quality with the growth of population on site and associated increase in the vehicular traffic. Emissions from living conditions such as heating, and kitchen may also contribute to the small increase in localised emissions.

The completion and operation of the development will also see a growth in the landscaped areas within the site. Plants, trees and other landscaping elements will see to the absorption of Carbon Dioxide from the atmosphere and releasing oxygen back. These effects are discussed in detail in Chapter 9- Air Quality and Climate. Any effects due to the development during the operational phase is not anticipated to be of significant impact to the existing or expected population of the locality.

CHILDCARE

Construction Phase

During the construction phase, the childcare facilities within close vicinity of the subject site will be temporarily impacted by construction noise, traffic and dust. Although negative, this impact will be minor, mitigated and will only continue for the construction period.

Operational Phase

The proposed development includes a creche for 44 children. Based on an average household size of 2.7 then the estimated population of the development will be 1,356. Based on the 2016 Census figures for the area then the population estimate for the 0-4 age cohort (pre-school) (7.5%) would be 95 children.

Unit mix			Projected population
1 bed	197	40%	532
2 bed	257	50.40%	694
3 bed	48	9.56%	130
Total	**502**		**1356**

Table 4.8 Population Projection for the proposed development

	Local Catchment Area population in 2016		Estimated school going population for the Development.
	Numbers	% Share	
Pre-school (0-4)	329	7.5	95
Primary (5-12)	432	9.8	80*
Post Primary (13-19)	206	4.7	38*

*Table 4.9 Projected population for the development at full occupancy * Excludes 1-bed units from population equivalent calculation*

However not all children in the 0-4 age cohort will require private childcare. The 2016 Quarterly National Household Survey (prepared by the CSO) indicates that in the Dublin region on average 25% of pre-school age children attend private childcare.

Applying this figure to the proposed development indicates that c.24 private childcare spaces would be needed (95 * 25%).

Of course, the 25% QNHS estimate for the Dublin Region is an average and one would expect the percentage to be greater in areas where there are higher instances of both parents working, and therefore requiring private childcare.

Therefore, it is also prudent to assess a "worst case" scenario where up to 40% of children aged 0-4 years in the development may require private childcare. This would be significantly greater than the 25% average for Dublin according to the QNHS. In that instance the total number of childcare spaces needed to serve the development including the current proposal would be 38. The current proposal includes a creche designed for 44 childcare places.

However, if one then also factors in the potential exclusion of 1-bed (and possibly 2-bed units) from the calculation of childcare demand (as promoted in the 2018 national apartment guidelines) then the estimated private childcare demand for the development reduces even further to between zero and 25 spaces.

In any event, regardless of what variables are used, it is evident that the demand for private childcare arising out of the development can be met by the proposed creche.

SCHOOLS AND THIRD LEVEL

Construction phase
During the construction phase of development there will be minimal impact on the surrounding schools. There are no schools immediately adjacent to the site. However, the TU Dublin boundary is to the south of the site. The third level buildings are located to the southwest, c.450m away. It is considered that this distance will mitigate any impact on this use. Any negative impact the on the educational institutes in the vicinity will be of short duration and will be mitigated appropriately.

Operational Phase

The 2016 census data for the catchment area gives the share of population in the Primary school (5-12) and Post primary school (13-19) years as per Table 4.9 above. This percentage share was used to estimate the number of primary and post-primary school children, the proposed development would generate in time.

The estimated maximum primary school going population that would be generated by the proposed development is 80 students, and 38 students for post-primary (13-19 years).

However, the proposed development will not generate this level of demand instantly given that the development will be constructed in phases and will initially be occupied by those predominantly in the early family cycle (e.g. young, singles, newlyweds).

Initially the demand will be for childcare mainly. Over the course of approximately 10 years primary school demand will increase and then secondary school demand incrementally.

In addition, the enrolment levels in schools change over time and national enrolment projections estimate decreasing enrolment numbers first at primary school and 5 years later at post primary school. These national projections are carried out by the Department of Education and Skills.

The Department of Education published *Projections of Full-Time Enrolment Primary and Second Level 2018-2036* in July 2018 which outlined 4 possible scenarios for the future enrolment in schools. Enrolment projections show that primary school enrolment numbers reached their peak in 2018 and that a continuous decline in enrolment until 2036 is expected. The projected enrolment for post-primary schools is not expected to peak until 2024 or 2025, which is then expected to be followed by a continuous decline until 2036.

Following these projections, it can then be assumed that the increase in primary school aged children caused by the development is likely to be lower than expected and will level out in the near future and will not continue to increase into the future.

As described in section 4.3, South Dublin County Council in conjunction with the Department of Education has identified sites for the provision of 1 new post primary school and 1 new primary school. A second new primary school is also projected to be provided at a later date within Tallaght town centre. Given the level of existing and proposed school facilities in the local area and considering the accessibility of site to city centre it is considered likely that the capacity will be sufficient to cater for the school place demand arising out of the proposed development over time. Also, the proposed layout offers excellent connectivity with bus/cycling transport systems that extends the accessibility of the site to ensure sufficient capacity.

4.7 POTENTIAL CUMULATIVE IMPACTS

The surrounding context of the site consists of a mix of some commercial, education, community and amenity related land uses. Established residential areas are located c.500 m from the site along Greenhills Road to the North and further south of the site. The site was previously used as a Cigarette factory. A Site Investigation study and Asbestos survey were instigated by Barrett Mahoney Consulting Engineers for the site. The results indicate very low potential risk to human health and safety once measures are taken for the safe removal and disposal of the harmful materials. There are no recent planning permissions submitted on any of the immediate adjoining sites.

Within the wider area permission was granted (Belgard Gardens SHD, Ref No. ABP-303306-18) for the construction of 438 no. apartments and 403 no. student bedspaces at a site located at the junction of Airton and Belgard road at approximately 900m from the subject site. The permitted development provides for amenity areas, creche, 6 retail/ commercial units, parking, public plaza and associated works. The building height proposed ranged from 4 to 9 storeys. Permission was also granted for the construction of a new two storey c. 23,283sqm building for use as data storage facilities containing on a site along Airton road. Permission included data storage rooms, electrical and mechanical plat rooms and support areas, 27 car parking spaces and landscaping. While the proposal is for a data centre expansion, it provides for a large building on a corner site.

There is also a current planning application before the Board for a site at the opposite end of Airton Road(Airton Plaza SHD, Ref. No. ABP -305763-19) for the construction of 328 number apartments and ancillary residential support facilities including a commercial floorspace of 31,147sqm. The cumulative impacts from these planned and permitted development to the surrounding context including the population and human health are envisaged to be positive. The significant new population will contribute to the economic viability of the area, improve the mix of units available, increase in spending and support new and existing services leading to more investment in the area. The proposed new open space and pedestrian linkages increase vibrancy and permeability of the locality. Schools, public transport, and shops etc. will benefit from the increase in population.

Residential development on the subject site is permitted in principle under the zoning proposed for the site. The surrounding site context is predominantly employment areas with very less residential uses. The increase in residential uses, both on the site the subject of this application and on the neighbouring sites (both permitted and proposed), will improve the vitality of the area, increasing night-time activities and reduce the monotony of uses within the area. This improvement in mix will also encourage more people to live close to where they work reducing the need for commuting.

4.8 MITIGATION MEASURES

Construction Phase

A Construction and Environmental Management Plan (CEMP) will be prepared by the contractor and implemented during the construction phase to reduce the detrimental effects of the construction phase on the environment and local population. The CEMP will be agreed in writing with the planning authority in writing prior to the commencement of the development (An outline Construction Management Plan by Barrett Mahony is included with this application for reference). Other items to be mitigated during the construction phase are discussed further under various environmental topics discussed in the chapters following. These measures are put forward to avoid any significant negative environmental impacts on the population and human health.

Operational Phase

The proposed development has been designed to avoid negative impacts on population and human health through the provision of various physical and social infrastructure as part of the development detailed in Chapter 3.

Mitigation measures are proposed in chapters 5-14 of this EIAR to avoid any adverse impacts from the proposed scheme. No addition mitigations measures are considered necessary.

4.9 PREDICTED IMPACTS

Construction Phase
Any adverse likely and significant environmental impacts will be avoided by the implementation of the remedial and mitigation measures proposed throughout this EIAR. Positive impacts are likely to arise due to an increase in employment and economic activity associated with the construction of the proposed development. The overall predicted likely and significant impact of the construction phase will be short-term, temporary and neutral.

Operational Phase

The proposed development will contribute to further growth and expansion of the neighbourhood contributing to the existing and future populations. The predicted impacts of the Operational Phase are considered to be long term and positive to population and human health.

4.10 CONCLUSIONS

'DO NOTHING' SCENARIO
A 'do nothing scenario' will result in the subject zoned lands remaining vacant and underutilised.

WORST CASE SCENARIO
The worst-case scenario for the development will be a situation where only a portion of the residential element is built and the associated amenities such as 'open space' and services are not completed.

4.11 MONITORING & REINSTATEMENT

The monitoring measures required for the aspects of water, air quality and climate, noise, landscape and visual impact, etc provides an appropriate response in this instance. There are no reinstatement works proposed for the proposed site.

4.12 DIFFICULTIES IN COMPILING INFORMATION

There were no difficulties experienced whilst compiling the Population and Human Health Chapter of the EIAR.

4.13 REFERENCES

CSO Labour Force Surveys- www.cso.ie.

Census Results - www.cso.ie.

Pobal Maps – www.pobal.ie

5 BIODIVERSITY

5.1 INTRODUCTION

THE AIM OF THE REPORT

This Ecological Impact Assessment (EcoIA) addresses the potential impacts of a proposed development that may occur in the future on the biodiversity of a site on Airton Road, Tallaght, Dublin 24.

This EcIA has been undertaken in accordance with the guidelines issued by the Environmental Protection Agency (EPA) and the Chartered Institute of Ecology and Environmental Management (CIEEM).

It follows a standard approach based upon the description of the existing baseline conditions within the application site. An evaluation of the likely habitats and species currently present within the application site is also given, along with the identification of the potential ecological impacts arising from the construction and operation of the proposed development. An assessment of the likely significance of the identified impacts on valued ecological receptors (VERs), both within and close to the application site is also made. Where a significant negative impact has been identified, then suitable remedial mitigation measures are provided in order to prevent, reduce or offset the impact.

Legislative and Policy Context

Legislative Context

The Irish Wildlife Act 1976 (and its amendment of 2000) provides protection to most wild birds and animals. Interference with such species can only occur under licence. Under the act it is an offence to "wilfully interfere with or destroy the breeding place or resting place of any protected wild animal". The basic designation for wildlife is the Natural Heritage Area (NHA). This is an area considered important for the habitats present or which holds species of plants and animals whose habitat needs protection. Under the Wildlife Amendment Act (2000) NHAs are legally protected from damage. NHAs are not part of the Natura 2000 network and so the Appropriate Assessment process does not apply to them.

The Flora Protection Order 1999 provides statutory protection in Ireland to a number of rare plant species from being wilfully cut, picked, uprooted or damaged. It is also illegal under this order to alter, damage or interfere with their habitats.

The EU Birds Directive (Council Directive 79/409/EEC) implies that particular protection is given to sites (Special Protection Areas) which support certain bird species listed in Annex I of the Directive and that surveys of development sites should consider the status of such species.

The EU Habitats Directive (92/43/EEC) gives protection to sites (Special Areas of Conservation) which support particular habitats and species listed in annexes to this directive. Articles 6(3) and 6(4) of this Directive call for the undertaking of an Appropriate Assessment for plans and projects likely to have an effect on designated sites.

The Water Framework Directive (WFD) (2000/60/EC), which came into force in December 2000, establishes a framework for community action in the field of water policy. The overall sim of the WFD is the eventual achievement of good status in all waterbodies. The WFD was transposed into Irish law by the European Communities (Water Policy) Regulations 2003 (S.I. 722 of 2003). The WFD rationalises and updates existing legislation and provides for water management on the basis of River Basin Districts (RBDs). RBDs are essentially administrative areas for coordinated water management and are comprised of multiple river basins (or catchments), with cross-border basins (i.e. those covering the territory of more than one Member State) assigned to an international RBD. Ireland is now within the 2nd cycle of the WFD (2015 – 2021), where previous RBDs were merged into one national RBD. This cycle will also facilitate a greater input of communities at the local catchment level.

Planning Policies

National

Nationally, the Government's commitment to sustainable development is set out in a number of documents including the National Development Plan 2007-2013, the National Spatial Strategy 2002-2020 and Sustainable Development: A Strategy for Ireland 1997.

Regional

The Regional Planning Guidelines for the Greater Dublin Area 2010 - 2022, adopted by the Dublin and Mid-East Regional Authorities in 2010, provides a planning framework covering the Greater Dublin Area, including parts of Kildare, Meath and Dublin. These guidelines contain a number of policies relevant to ecology, nature conservation and green infrastructure. These guidelines are summarised in Table 1.

Policy Reference	Policy
GIP6	To ensure the protection, enhancement and maintenance of the natural environment and recognise the health benefits as well as the economic, social, environmental and physical value of green spaces through the development of and integration of Green Infrastructure (GI) planning and development in the planning process.
GIR31	GI development should be identified at the initial stages of all planning processes and included as a material consideration in order to inform future development.

Table 5.1 Regional Policies Relevant to Ecology and Nature Conservation

Local

Planning policy at the local level is provided by the South Dublin County Council Development Plan 2016 – 2022. This plan contains a number of objectives and policies relevant to ecology, biodiversity and nature conservation. Some of these relevant measures are outlined in Table 2.

Reference	Objective / Policy
G2 Objective 1	To reduce fragmentation of the Green Infrastructure network and strengthen ecological links between urban areas, Natura 2000 sites, proposed Natural Heritage Areas, parks and open spaces and the wider regional Green Infrastructure network.
G2 Objective 2	To protect and enhance the biodiversity value and ecological function of the Green Infrastructure network.
G6 Objective 1	To protect and enhance existing ecological features including tree stands, woodlands, hedgerows and watercourses in all new developments as an essential part of the design process.
G6 Objective 2	To require new developments to provide links into the wider Green Infrastructure network, in particular where similar features exist on adjoining sites.
G6 Objective 3	To require multifunctional open space provision within all new developments that includes provision for ecology and sustainable water management.
HCL12 Objective 1	To prevent development that would adversely affect the integrity of any Natura 2000 site located within and immediately adjacent to the County and promote favourable conservation status of habitats and protected species including those listed under the Birds Directive, the Wildlife Acts and the Habitats Directive.
HCL13 Objective 1	To ensure that any proposal for development within or adjacent to a proposed Natural Heritage Area (pNHA) is designed and sited to minimise its impact on the biodiversity, ecological, geological and landscape value of the pNHA particularly plant and animal species listed under the Wildlife Acts and the Habitats and Birds Directive including their habitats.

Table 5.2 Local Policies Relevant to Ecology and Nature Conservation

Heritage and Biodiversity Plans

Ireland's National Biodiversity Plan identifies actions that need to be taken in order to understand and protect biodiversity in Ireland. It states that biodiversity and ecosystems in Ireland should be conserved and restored, to deliver benefits that are essential to all sectors of society and that Ireland should contribute to the efforts to halt the loss of biodiversity and the degradation of ecosystems in the EU and globally.

The latest South Dublin County Council Heritage Plan 2010-2015 identifies a number of objectives and policies in order to protect the natural heritage and biodiversity of the South County Dublin area.

5.2 METHODOLOGY

Statement of Competence

The site survey and report was carried out by Noreen McLoughlin. Noreen is the owner and main ecologist at Whitehill Environmental. Noreen holds a BA (Hons) in Natural Science (Mod) Zoology and an MSc in freshwater ecology (TCD, Dublin). She has been a full member of the CIEEM (Chartered Institute of Ecology and Environmental Management) for over 13 years. Noreen has over 15 years' experience as a professional ecologist in Ireland.

Study Area

The study area encompasses all the land within the area defined in the plan submitted for planning consent, i.e., the proposed application site. In addition, important ecological habitats and receptors within the zone of influence of the proposed development were also studied.

Desk Based Studies

The desk study involved the examination of aerial photographs, current and historical maps and plans and drawings of the site. In addition, information was collated on designated nature sites within a 10-15 km radius of the proposed site and on protected and rare species within the 1km square of the site.

The following websites were used to access information and data:

- National Parks and Wildlife Service – www.npws.ie
- National Biodiversity Data Centre – www.biodiversitycentre.ie
- Ordinance Survey Ireland – www.osi.ie
- Google Maps & Street View – maps.google.ie
- Bing Maps – www.bingmaps.com
- My Plan – www.myplan.ie
- Environmental Protection Ireland – www.epa.ie
- South Dublin County Council – www.sdcc.ie

Field Based Studies

A visit to the site of the proposed development at Airton Road was conducted on May 21st, 2019, when relevant field notes, species lists and photographs were taken. The site was surveyed in accordance with the Heritage Council's *Habitat Survey Guidelines* (Smith et al., 2010) and the Institute of Environmental Assessment's *Guidelines for Baselines Ecological Assessment* (IEA, 1995). Habitats within the application site were classified in accordance to Level 3 of *A Guide to Habitats in Ireland* (Fossit, 2000). These habitats are denoted in the text along with their habitat code, e.g., the habitat code for improved agricultural grassland is GA1. Any bird and mammal and bird activity was also noted

The species nomenclature for vascular plants conforms with *The New Flora of the British Isles'* (Stace, 2010).

A separate bat survey for the site was carried out on the 14th May 2019 by Donna Mullen and Brian Keely of Wildlife Surveys.

Assessment Methodology

Evaluation of Ecological Features

The methodologies used to determine the value of ecological resources, to characterise the impacts of the proposed scheme, and to assess the significance of impacts and any residual effects are described below. This approach is in accordance with the following guidelines and methodologies:

- *Guidelines for Ecological Impact Assessment in the UK and Ireland* by the Chartered Institute of Ecology and Environmental Management (CIEEM, 2018)
- *Guidelines on The Information To Be Contained In Environmental Impact* (EPA, 2002)
- *Draft Guidelines on Guidelines on the information to be contained in Environmental Impact Assessment Reports* (EPA 2017)
- *Guidelines for Assessment of Ecological Impacts of National Road Schemes.* (NRA, 2009).

CIEEM suggest that to ensure a consistency of approach, ecological features are valued in accordance with their geographical frame of reference, as defined below:

- International
- National (Ireland)
- Regional (East)
- County (Dublin)
- District (Tallaght)
- Local/Townland (Airton Road)

The above categories are then applied to the ecological features identified. Ecological features can be defined as:

- Designated sites (i.e., SACs, SPAs, NHAs, pNHAs, National Nature Reserves) or non-statutory locally designated sites and features.
- Non-designated sites and habitats and features of recognised biodiversity value, such as rivers and streams. The features being evaluated can be considered in the context of the site and locality and thus a more accurate assessment of the impacts in the locality can be made.

Assessment of Impacts

The assessment of potential ecological impacts has been carried out using guidelines published by the EPA and the CIEEM. They can be summarised as:

- The identification of the range of potential impacts which can reasonably be expected to occur should the proposed developments receive planning consent.
- The consideration of the systems and processes in place to avoid, reduce and mitigate the possible effects of these impacts.
- The identification of opportunities for ecological enhancement within the site.

Impacts are defined as being positive, negative or neutral. A significant impact is defined as an impact upon the integrity of a defined ecosystem and/or the conservation status of a habitat or species within a given area. Where a potential negative impact has been identified, mitigation measures have been formulated using best practices techniques and guidance to prevent, reduce or offset the impact.

5.3 RECEIVING ENVIRONMENT

This section provides an overview of the existing ecological conditions within the site and the surrounding environment.

Site Location & General Description

The site in question is approximately 2.5 hectares in area. It is located in Tallaght, approximately 8.2km south-west of Dublin City Centre, on the corner junction of where Airton Road meets the Greenhills Road. It is close to the Tallaght Institute of Technology, to the Tallaght Athletic Club and the Hibernian Industrial Estate. The site is surrounded by the urban areas of Tallaght and Greenhills. These areas mostly consist of mixed commercial, industrial, residential, education and amenity areas. Under the South Dublin County Council Development Plan 2016 – 20222, the site is zoned as Objective REGEN, i.e., to facilitate enterprise and / or residential-led regeneration.

Site location maps can be seen in Figures 2 and 3.

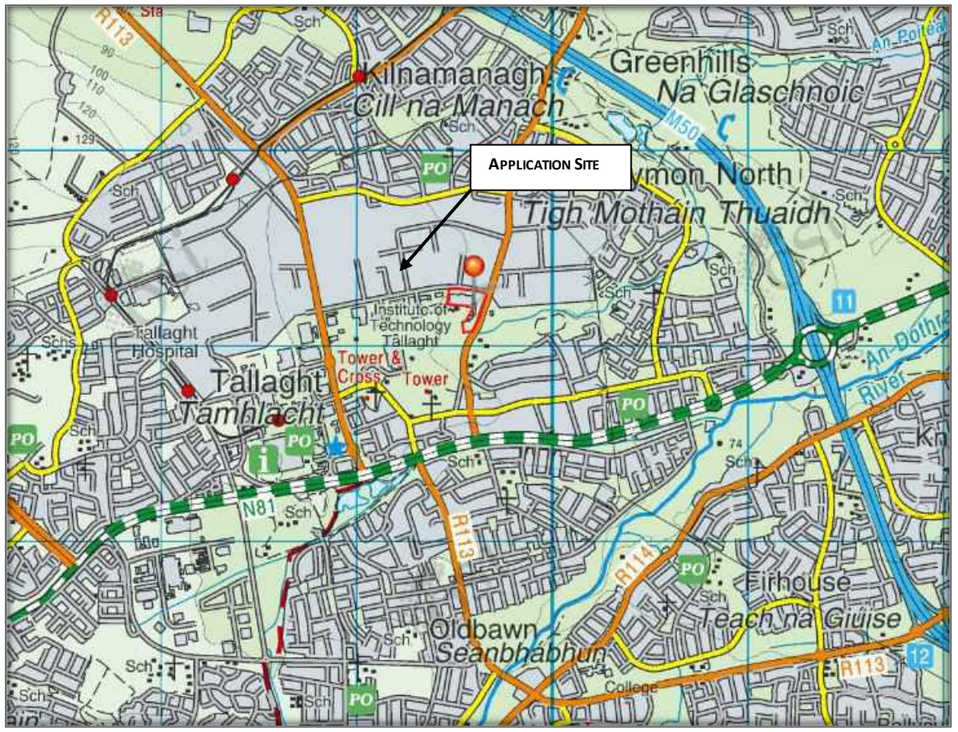


Figure 5.1Site Location Map

Figure 5.2 Site Location Map. Application Site is Outlined in Red

Using up to date aerial photographs, an overview of the habitats surrounding the application site was assessed and noted. The lands are generally urban in nature and they consist mostly of buildings and artificial surfaces, amenity grasslands and gardens and scattered trees and parkland. An overview of these habitats can be seen in the aerial photograph in Figure 4.

Figure 5.3 Aerial Photograph Showing Habitats Surrounding the Application Site.

Designated Sites

Natura 2000 Sites

The proposed application site is not within or immediately adjacent to any site that has been designated as a Special Area of Conservation (SAC) or a Special Protection Area (SPA) under the EU Habitats or EU Birds Directive.

There are nine Natura 2000 sites within 15km of this proposed development. These sites are summarised in Table 3. The location of the application site in relation to these designated areas is shown in Figure 5 and a full synopsis of these sites can be read online on the website of the National Parks and Wildlife Service (www.npws.ie).

Site Name & Code	Distance from Proposed Development	Qualifying Interests
Glenasmole Valley SAC 001209	3.9km south	• Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites) • Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae) • Petrifying springs with tufa formation (Cratoneurion)
Wicklow Mountains SAC 002122	6.3km south	• Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae) • Natural dystrophic lakes and ponds • Northern Atlantic wet heaths with *Erica tetralix* • European dry heaths • Alpine and Boreal heaths • Calaminarian grasslands of the Violetalia calaminariae • Species-rich Nardus grasslands, on siliceous substrates in mountain areas (and submountain areas, in Continental Europe) • Blanket bogs (* if active bog) • Siliceous scree of the montane to snow levels (Androsacetalia alpinae and Galeopsietalia ladani • Calcareous rocky slopes with chasmophytic vegetation • Siliceous rocky slopes with chasmophytic vegetation • Old sessile oak woods with Ilex and Blechnum in the British Isles • *Lutra lutra* (Otter)
Wicklow Mountains SPA 004040	7.2km south	• Merlin (*Falco columbarius*) • Peregrine (*Falco peregrinus*)
South Dublin Bay / River Tolka Estuary SPA 004024	10km north-east	• Light-bellied Brent Goose (*Branta bernicla hrota)* • Oystercatcher (*Haematopus ostralegus*) • Ringed Plover (*Charadrius hiaticula*) • Grey Plover (*Pluvialis squatarola)* • Knot *(Calidris canutus)* • Sanderling *(Calidris alba)* • Dunlin *(Calidris alpina)* • Bar-tailed Godwit *(Limosa lapponica)* • Redshank *(Tringa totanus)* • Black-headed Gull *(Chroicocephalus ridibundus)* • Roseate Tern *(Sterna dougallii)* • Common Tern *(Sterna hirundo)* • Arctic Tern *(Sterna paradisaea)* • Wetland and Waterbirds
South Dublin Bay SAC 000201	10.4km east	• Mudflats and sandflats not covered by seawater at low tide • Annual vegetation of drift lines • Salicornia and other annuals colonising mud and sand • Embryonic shifting dunes
Rye Water Valley/Carton SAC 001398	11km north-west	• Petrifying springs with tufa formation (Cratoneurion)

		• *Vertigo angustior* (Narrow-mouthed Whorl Snail) • *Vertigo moulinsiana* (Desmoulin's Whorl Snail)
Knocksink Woods SAC 000725	13.1km south-west	• Petrifying springs with tufa formation (Cratoneurion)* • Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae)*
North Bull Island SPA 004006	13.8km north-east	• Light-bellied Brent Goose (*Branta bernicla hrota)* • Shelduck (*Tadorna tadorna*) • Teal (*Anas crecca*) • Pintail (*Anas acuta*) • Shoveler (*Anas clypeata*) • Oystercatcher (*Haematopus ostralegus)* • Golden Plover (*Pluvialis apricaria*) • Grey Plover (*Pluvialis squatarola*) • Knot (*Calidris canutus*) • Sanderling (*Calidris alba*) • Dunlin (*Calidris alpina*) • Black-tailed Godwit (*Limosa limosa)* • Bar-tailed Godwit (*Limosa lapponica)* • Curlew (*Numenius arquata*) • Redshank (*Tringa totanus*) • Turnstone (*Arenaria interpres*) • Black-headed Gull (*Chroicocephalus ridibundus*) • Wetland and Waterbirds
North Dublin Bay SAC 000206	13.8km north-east	• Mudflats and sandflats not covered by seawater at low tide • Annual vegetation of drift lines • Salicornia and other annuals colonising mud and sand • Atlantic salt meadows (Glauco-Puccinellietalia maritimae) • Mediterranean salt meadows (*Juncetalia maritimi*) • Embryonic shifting dunes • Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) • Fixed coastal dunes with herbaceous vegetation (grey dunes) • Humid dune slacks • *Petalophyllum ralfsii* (Petalwort)

Table 5.3 Natura 2000 Sites of Relevance to the Proposed Development

The generic conservation objectives of the SACs are:

To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected.

The generic conservation objectives of the SPAs are:
To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA.

The favourable conservation status of a habitat is achieved when:

- Its natural range and area it covers within that range is stable or increasing and the specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future.
- The conservation status of its typical species is favourable.

The favourable conservation status of a species is achieved when:

- The population dynamics data on the species concerned indicate that it is maintaining itself on a long -term basis as a viable component of its natural habitats.
- The natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future.
- There is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

An Appropriate Assessment Screening Report as required under Article 6(3) of the EU Habitats Directive has been prepared in relation to this proposed application on Airton Road. This screening report concluded that the proposed development would have no impacts upon any of the Natura 2000 sites identified above.

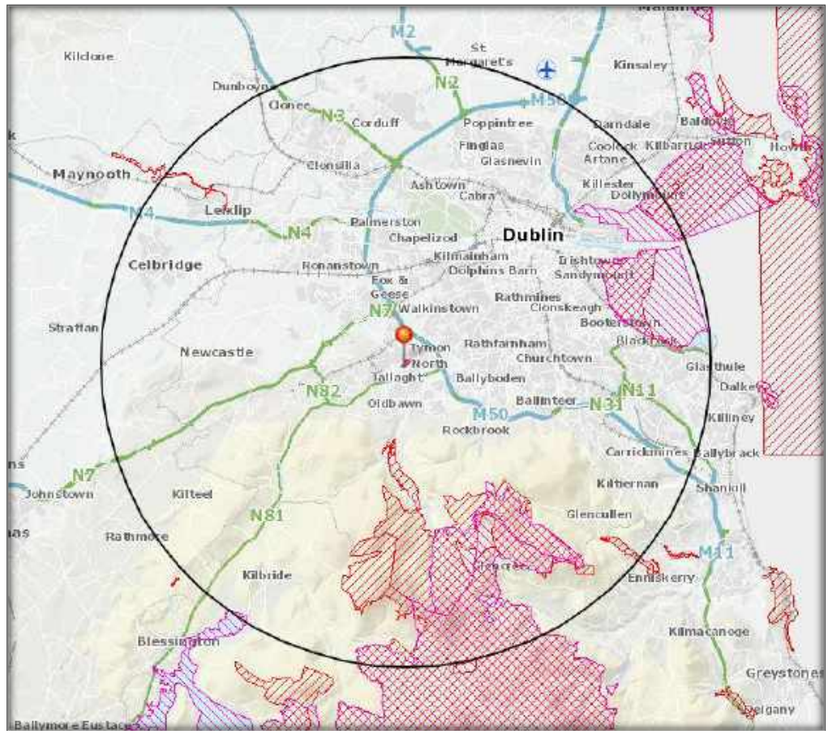


Figure 5.4 Designated Sites within 15km of the Application Site (Pinned). SACs – Red Hatching, SPAs – Pink Hatching.

Nationally Important Sites

The application site is not within or immediately adjacent to any nationally designated site, such as a Natural Heritage Area or a proposed Natural Heritage Area. It is within 15km of seventeen sites that have been designated as proposed Natural Heritage Areas. These are summarised in Table 4 and a map showing their locations relative to the application site is shown in Figure 6.

Site Name	Distance from Proposed Development
Grand Canal pNHA 002104	4.1km north
Liffey Valley pNHA 000128	6.6km north
Dodder Valley pNHA 000991	1.2km south-east
Royal Canal pNHA 002103	9.7km north
North Dublin Bay pNHA 000206	10.8km north-east
Poulaphouca Reservoir pNHA 000731	14.9km south-west
Fitzsimons Wood pNHA 001753	8.4km south-east
South Dublin Bay pNHA 000210	13.5km east
Glenasmole Valley pNHA 001209	3.7km south
Slade Of Saggart And Crooksling Glen pNHA 000211	6.5km south-west
Santry Demesne pNHA 000178	13.6km north-east
Dingle Glen pNHA 001207	13km south-east
Lugmore Glen pNHA 001212	4km south-west
Kilkeel Wood pNHA 001394	13km south-west
Glencree Valley pNHA 001755	12/7km south-east
Ballybetagh Bog pNHA 001202	12.5km south-east
Knocksink Wood pNHA 000725	12.9km south-east

Table 5.4 Nationally Important Sites within 15km of the Proposed Development

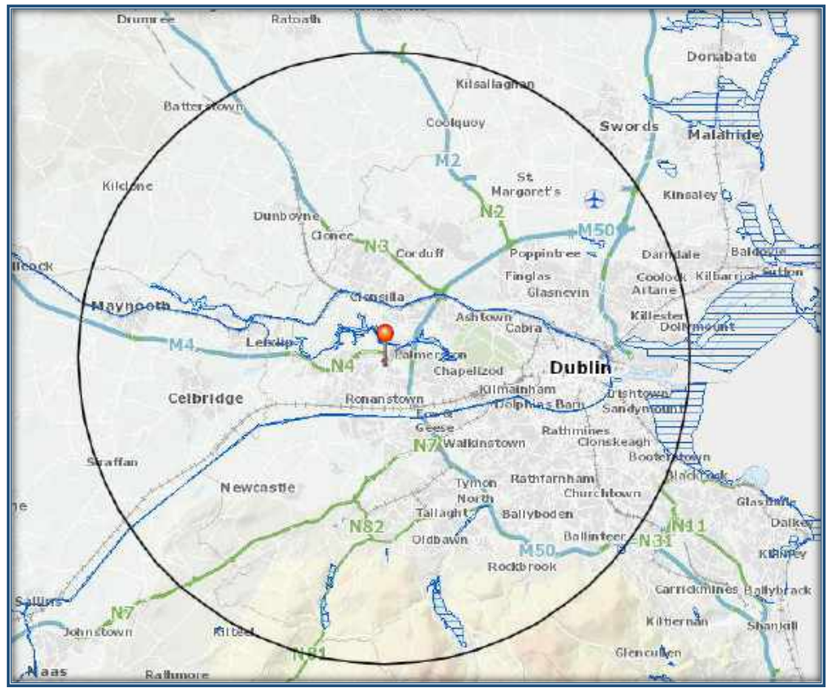


Figure 5.5 The Proposed Application Site at Airton Road in Relation to proposed Natural Heritage Areas within 15km (Blue Cross Hatching)

Flora

Habitats within the Study Area

No part of the site lies within any area that is designated for nature conservation purposes. All proposed development works within the application site will take place on areas of low biodiversity value. The natural habitats within the study area are limited and mainly consist of buildings and artificial surfaces (BL3), recolonising bare ground (ED3) and dry meadows and grassy verges (GS2). All habitats are listed in Table 5 and are described in greater detail below, whilst a habitat map is illustrated in Figure 7. A full list of the plant species recorded from the study area is shown in Appendix I and photos of the site can be seen in Appendix II.

Habitat Name	Habitat Code (Fossit)
Buildings and Artificial Surfaces	BL3
Recolonising Bare Ground	ED3
Dry Meadows and Grassy Verges	GS2
Scattered Trees and Parkland (WD5)	WD5
Scrub	WS1
Treelines / Hedgerows	WL1 / WL2
Drainage Ditch	FW4

Table 5.5 Habitats within the Application Site

Buildings and Artificial Surfaces (BL3)

This is the main habitat within the application site, and it is comprised off the derelict and burnt out factory within the site, along with the access roads, footpaths and car-parking area. It is largely devoid of vegetation.

Evaluation: This habitat has no ecological or biodiversity value, although the old buildings do provide some nesting sites for migrant bird species such as swallows. Wooden structures at the back of the building are also a potential habitat for bats.

Recolonising Bare Ground (ED3)

This habitat is scattered as small and dispersed patches throughout the site., e.g., on the verges where the grassed habitats meet the footpaths and other built surfaces, and it also occurs along the edges of the existing buildings. The species recorded from here are typical ruderal species and include groundsel *Senecio vulgaris*, dandelion (*Taraxacum* sp.), willowherbs (*Epilobium* sp.), sow thistle (*Sonchus arvensis)*, buddleja *Buddleja davidii*, tutsan *Hypericum androsaemum*, herb Robert *Geranium robertianum* and ribwort plantain *Plantago lanceolata*. In some area, plants have grown to become semi-mature shrubs (tutsan) and trees (silver birch).

Evaluation: This habitat is common on a local level and it has no biodiversity value, although some of the flowering plants offer value for pollinating insects such as hoverflies and bees.

Dry Meadows and Grassy Verges GS2

Fossit (2000) describes a dry meadow habitat as one which is rarely fertilised or grazed, and which is only mown once or twice a year. Due to intensive farming practices, this habitat is now rare, and it is largely confined to the grassy verges of roadsides, on the margins of fields, on railway embankments, in churchyards and cemeteries and in some neglected fields or gardens. In the eastern and northern section of the site, there are areas of grassland which fall into this category. This habitat has largely developed since management of the site ceased. In 2007, an ecological survey of the site (Scott Cawley 2007) was carried out to accompany an EIA for a previous planning application on this site. This habitat assessment described the grassland at this time as amenity grassland (GA2). In the intervening twelve years, the lack of management has seen this amenity grassland develop into an unmanaged grassland habitat. The sward is high and grass species include cocksfoot Dactylis glomerata, fescues Festuca sp., meadow grasses Poa so, creeping bent Agrostis stolonifera and timothy grass Phleum pratense. Herbaceous plants were also common throughout the sward and species such as germander speedwell Veronica chamaedrys, tufted vetch Vicia cracca, meadow buttercup Ranunculus acris, red clover Trifolium pratense, sheep's sorrel Rumex acetosella, hogweed Heracleum sphondylium and spear thistle Cirsium vulgare were common. Cowslips Primula veris were occasional.

Evaluation: This habitat is of limited to moderate biodiversity value on a local level. However, it should be noted that cowslips are no longer widespread in the greater Dublin area. The flowering plants also provide a source of nectar for local populations of pollinating insects.

Scattered Trees and Parkland (WD5)

Throughout the site, there are a number of scattered trees and shrubs. Most of these are non-native and consist of species such as lilac Syringia vulgaris, Pyracanthia, buddleia Buddleia davidii, tutsan Hypericum androsaemum and Rhododendron. There are some native immature species scattered throughout the site, including ash Fraxinus excelsior and silver birch Betula pendula. There is a line of trees just outside of the application site, along Airton Road. The dominant tree species along this line is Norway maple Acer platanoides, whitebeam *Sorbus* sp., and sycamore *Acer pseudoplantatus.*

Evaluation: This habitat is of limited biodiversity value. Some of the trees and shrubs would provide a source of pollen for insects, whilst they also provide suitable nesting and perching sites for small passerine birds.

Scrub (WS1)

Fossit (2000) describes scrub as being an area that is dominated by at least 50% cover of shrubs, stunted trees or bramble. Scrub frequently develops as a precursor to woodlands and it is often found in inaccessible locations.

There is an area of scrub behind the old factory building, near to the southern boundary of the application site. This area of scrub consists of immature birch Betula, poplar Populus and buddleia.

Evaluation: This habitat is of limited biodiversity value. Some of the trees and shrubs would provide a source of pollen for insects, whilst they also provide suitable nesting and perching sites for small passerine birds.

Hedgerow (WL1) / Treelines (WL2)

Fossit defines the treeline (WL2) as a narrow row or single line of trees that is greater that 5m in height that typically occurs along field or property boundaries, whilst a hedgerow (WL1) is described as a linear feature less than 5m in height. Often, these habitats grade into and out of each other along liner boundaries, making it difficult to map accurately or clearly on a habitat map.

Within the application site, there is a hedgerow along the eastern boundary of the application site, along the Greenhills Road. This hedgerow is dense, and it has a good mixture of native species including hawthorn *Crataegus monogyna*, blackthorn *Prunus spinosa*, hazel Corylus avellana, ash *Fraxinus excelsior* and dog rose *Rosa canina*.

There is a treeline dominated by tall specimens of black poplar Populus nigra along the southern and south-western site boundaries. Other species present here include weeping willow Salix x pendula. Suckers from the poplar are encroaching onto the site, coming up through the tarmacadam of the existing car park.

Evaluation: This habitat is of moderate biodiversity value, as it provides an unbroken ecological corridor in a relatively urban area that is largely devoid of these habitats. The trees would provide suitable nesting and perching sites for small passerine birds, whilst small mammals might also use the shelter provided by the trees.

Arboricultural Assessment

A Tree Survey report has been prepared to accompany this application (Tree Management Services). Within the site area, the individual trees were assessed, described and plotted. This report classified these trees into four different tree condition categories. These categories and the numbers of trees within the application site falling into these categories are listed below.

- Category A: Trees of high value and quality
- Category B: Trees of moderate value and quality
- Category C: Trees of low quality and value

- Category U: Trees of very low value which should be removed

A total of 47 trees on the site were assessed as part of this survey. A summary of the tree condition categories of these trees is presented below.

- Category A: 34%
- Category B: 38%
- Category C: 15%
- Category U: 13%

Drainage Ditch (FW4)

There is a watercourse (drainage ditch) flowing along the southern and western boundary of the application site. This ditch is heavily shaded and overgrown by the poplar treeline (described above). Aquatic and riparian vegetation in this stream is limited.

Evaluation: Although this ditch is heavily shaded and more than likely polluted, all watercourses should be considered of ecological value.

Rare and Protected Plant Species

An examination of the website of the National Parks and Wildlife Service, the National Biodiversity Data Centre and the Online Atlas of Vascular Plants for Ireland revealed that there are no records for any plant species protected under the Flora Protection Order from within the 1km square (O0928) of the proposed application sites. No protected species were found within the application site.

Invasive Species

No non-native invasive species that are listed in Schedule Three of the Birds and Habitats Regulations (2011) were recorded from within the study area. Particular attention was paid to the potential presence of Japanese knotweed *Fallopia japonica*, which is very common throughout the Greater Dublin Area.

Figure 5.6 Map Showing the Main Habitats within the Site

Fauna

Protected Mammals

Records from the National Biodiversity Data Centre reveal the presence of the following protected mammals from within the 10km square (O02) of this proposed application site:

- Badger *Meles meles**
- European Hedgehog *Erinaceus europaeus*
- Otter *Lutra lutra*
- Irish Hare *Lepus timidus subsp. Hibernicus*
- Irish stoat *Mustela 32rmine subsp. 32uratus32n*
- Pine martin *Martes martes*
- Red squirrel *Sciurus vulgaris*
- Red deer *Cervus elaphus*
- Daubenton's bat *Myotis 32uratus32niid*
- Natterer's bat *Myotis nattereri*
- Pygmy shrew *Sorex minutes*
- Pipistrelle *Pipistrellus pipistrellus sensu lato*
- Lesser Noctule *Nyctalus leisleri*
- Soprano *Pipistrelle Pipistrellus pygmaeus*
- Brown long-eared bat *Plecotus auritus*

** Relates to presence with the 1km square of this development, i.e., the northern section of this site is within O0635. This record for the badger pertains to the habitats of the parklands and amenity areas approximately 300m east of the site.*

All these species are protected under the Irish Wildlife Acts. In addition, the otter *Lutra lutra* is protected under Annex II of the European Habitats Directive. There are no suitable habitats for the otter within or adjacent to the application site.

Bats

An evaluation of the lands within the application site for potential bat roosts was carried out by Donna Mullen and Brian Keeley on May 14th, 2019. This survey was carried out in accordance with relevant guidelines. The inside of the existing buildings were checked, and the site was monitored using two EM3 time expansion detectors and one SM2 detector which were placed overnight in the south western part of the building by the wooden panelling.

It was determined that as much of the buildings are in poor repair, that they offer little by way of suitable habitat for bats. However, at the rear of the building there is some timber panelling with suitable cracks and crevices. This was determined as suitable for bats, and both common pipistrelles and Leisler's bats were seen feeding in this area. Soprano pipistrelles were also recorded in the south-western part of the site.

Overall, based on previous surveys of lands close to the application site in Tallaght IT, it was determined that the most likely species to occur roost / commute within the application site include:

- Pipistrelle *Pipistrellus pipistrellus sensu lato*
- Soprano *Pipistrelle Pipistrellus pygmaeus*
- Leisler's bat *Nyctalus leisleri*

Birds

Few species were observed or heard on the day. Traffic noise made it difficult to hear any birds that were there. Those seen / heard included:

- Magpie *Pica pica*
- Swallow *Hirundo rustica*
- Jackdaw *Corvus monedula*
- Blackbird *Turdus merula*
- Pigeon *Columba livia domestica*
- Robin *Erithacus rubecula*

Amphibians, Reptiles and Invertebrates

No frogs *Rana temporaria,* smooth newts *Lissotriton vulgaris* or viviparous lizards *Lacerta vivipara* were observed during the course of the survey. There are few habitats within the application site that are suitable for these species.

There were a range of aerial invertebrates recorded from the site during the survey, including the small white butterfly *Pieris rapae* and the common blue butterfly *Polyommatus Icarus.* Bee species observed included *Bombus lucorum, Bombus pascuorum* and *Bombus terrestris.*

Aquatic Environment

Water Features and Quality

The application site lies within the Liffey and Dublin Bay Hydrometric Area and Catchment, the Dodder Sub-Catchment and the Poddle Sub-Basin. There is a small stream / drain occurring along the western and southern site boundaries. This watercourse is referred to by the EPA as the Tymon Stream (referred to as the River Poddle / Tymon throughout the remaining planning documents). It comes from the west and it flows past the site in an easterly direction. It flows through the amenity areas of Bancroft Park to the east of the site whereupon it flows in a westerly and then northerly direction. The EPA refer to it at this stage as the Poddle. This river continues its complex and altered journey through South suburban and urban Dublin, until its confluence with the River Liffey. Much of the later stages of the Poddle though south Dublin city is underground through culverts. The confluence of the Poddle and the Liffey is visible at low tide at a grated opening in the Liffey walls at Wellington Quay.

The EPA have not classified the ecological status of the Poddle River in any area. However, it is generally considered to be At Risk of not achieving good ecological status within the required time frame. Under the requirements of the Water Framework Directive, this is unsatisfactory, and all waterbodies must achieve good status by 2021.

The application site in relation to the course of the River Poddle is shown in Figure 8 (courtesy EPA maps / Bing Maps).

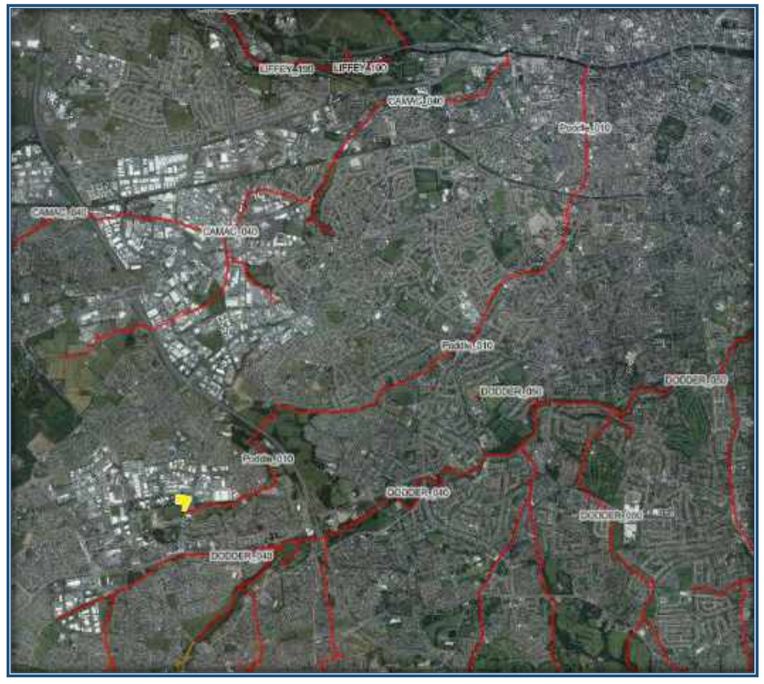


Figure 5.7 The Proposed Application Site (Highlighted in Yellow) and the Course of the River Poddle (Highlighted in Red).

Ecological Evaluation

Summary of the Value of the Application Site

An evaluation of the ecological features that were identified through desk and field based studies are summarised below:

- The site at Airton Road is within 15km of nine sites designated under the Natura 2000 network. A screening report was completed for this proposed development as required under Article 6 (3) of the Habitats Directive. This report concluded that the proposed development would not have any impacts upon any site designated under the Natura 2000 network.
- The site is also within 15km of seventeen sites designated as Natural Heritage Areas (NHAs and pNHAs). There are no potential impacts upon these sites arising from the proposed development.
- Within the application site itself, biodiversity is generally of low to moderate value, and the site is characterised by buildings and artificial surfaces and old grassland habitats. There are some scattered trees in the site, along with a treeline dominated by black poplar. Bats potentially use the wooden timbers at the back of the site. The site has limited potential for birds and other mammals. The baseline noise and human activity level is very high.

The NRA guidelines on the Assessment of Ecological Impacts on National Road schemes (NRA, 2009) provides a rationale for the evaluation of ecological receptors within a site. Table 6 lists the habitats that have been described within the site and their corresponding associated ecological value, based on the NRA guidelines. It should be noted that this is the lowest rating provided in this evaluation, however habitats within this site would have no ecological value on any level.

Habitat	Rating	Criteria
Buildings and Artificial Surfaces Recolonising Bare Ground	Not Rated / No Ecological Value	Not rated
Dry Meadows and Grassy Verges Treelines Scattered Treelines	Local Importance (Lower Value)	Limited biodiversity value although may provide some small habitat opportunities for invertebrates and birds
Drainage Ditch (Tributary of the Poddle)	County Importance	Any watercourse needs to be considered on a county wide basis due to connectivity to other watercourses locally. The Poddle is a tributary of the River Liffey.

Table 5.6 Ecological Features and their Evaluation

5.4 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

Greenleaf Homes Limited have indicated their intention to shortly apply to An Bord Pleanála for planning permission (Strategic Housing Development) for a mixed use residential development on a site of c. 2.79ha. The proposal consists of:

- Demolition of existing factory/ warehouse buildings on site.
- Construction of 502 residential units comprising of 197 no. 1-Bed; 257 no. 2-Bed; and 48 no. 3-Bed Apartments all with associated private balconies/terraces to the north/south/east/west elevations.
- Construction of 3 no. Retail Units; a creche; and communal facilities.
- The development will take place over 6 no. Blocks (A-F) ranging in height up to 8 storeys.
- The development will have 202 no. car parking spaces located at undercroft level of blocks A, B and C and at basement level of blocks E and F. 584 no. secure bike parking spaces. The site is accessed through 2 no. vehicular access to the north and east of the scheme. There will be a number of pedestrian entrances along Airton Road and Greenhills Road which also provide access for emergency vehicles.

In addition to all of the new facilities all other site services and works to enable the development of the site will also be provided including bins, ESB substations, boundary treatments and landscaping.

Wastewater
Wastewater from the proposed development site will be directed to the existing public sewer.

Proposed Surface Water Drainage
The proposed development will be designed in accordance with the principles of Sustainable Drainage Systems (SuDS) as embodied in the recommendations of the Greater Dublin Strategic Drainage Study (GDSDS) and it will significantly reduce run-off rates and improve the storm water quality discharging to the public storm water system. All rain falling on the site will be dealt with using the SuDs strategy, as outlined in the Civil Engineering Infrastructure Report prepared by Barrett Mahony Consulting Engineers. Surface water in the southern end of the site currently discharges to the Tymon/Poddle Stream. The provision of SuDs on the site of the proposed development will intercept much of the flow to the Tymon/Poddle Stream compared to current rates.

An extract from the planning drawings can be seen in Figure below.

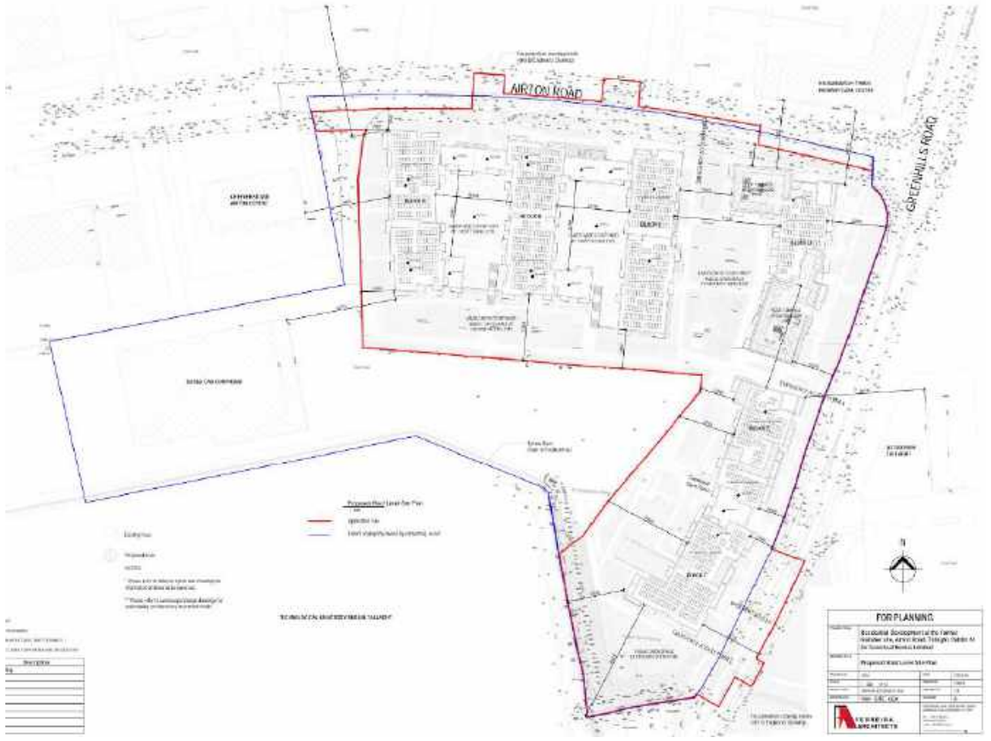


Figure 5.8 Extract from Planning Drawing (as prepared by Ferreira Architects)

5.5 POTENTIAL IMPACTS

Introduction

The information gathered as part of the desk study and field survey for this proposed application has been used to complete an Ecological Impact Assessment (EcIA). This EcIA has been undertaken following the latest guidelines set out by CIEEM (2018) and the EPA.

The identification of potential impacts and the assessment of their significance typically requires the identification of the type and magnitude of the impacts. For example, will the impacts be short term or long term, direct, indirect or cumulative and will they occur during construction or operation. This section will establish whether ecological impacts of the proposed development at Airton Road are likely to occur and whether or not they are significant. These potential impacts will be examined with respect to the ecological receptors identified in the previous section.

The emphasis in EcIA is on "significant" effects, rather than all ecological effects (CIEEM, 2018). For the purpose of EcIA, a "significant effect" is an effect that either supports or undermines biodiversity conservation objectives for important ecological features for biodiversity in general. Conservation objectives may be specific (e.g., for a designated site) or broad (e.g., national / local nature conservation policy) or more wide-ranging (enhancement of biodiversity). Effects can be considered significant at a wide range of scales from international to local.

A significant effect is an effect that if sufficiently important to require assessment and reporting so that the decision maker (i.e., Local Authority) is adequately informed of the environmental consequences of permitting the project. In broad terms, significant effects encompass impacts on structures and function of defined sites, habitats or ecosystems and the conservation status of habitats and species (including extent, abundance and distribution). (CIEEM, 2018).

Impacts upon Designated Sites

The Appropriate Assessment Screening report submitted concluded that the proposed development at Airton Road will have no direct, indirect or cumulative impacts upon any site designated as a Special Area of Conservation or Special Protection Area. It is also considered unlikely that the proposed development will have any impacts upon sites designated as a proposed Natural Heritage Areas. There will be no impacts upon these sites, their habitats or species arising from habitat loss or habitat fragmentation.

Impacts within the Application Site

Development Phase

Should the developments at Airton Road, Tallaght be allowed to proceed then the following impacts will / may occur during the site preparation and construction of the proposed development.

- Habitat loss and fragmentation – The site preparation and construction of the buildings and the associated hard surfaces and landscaping will lead to the loss and fragmentation of the majority of the habitats within the site. Overall, these habitats are of low biodiversity value. However, the loss and fragmentation of these habitats will reduce open habitats locally and it may also impact upon local populations of birds and small mammals as some nesting sites and ground cover habitats will be lost. Sources of nectar for local populations of pollinators will also be reduced.

- Impacts on pollinators – The grassland habitats of the site currently offer some resources for local pollinators. These habitats will be lost and fragmented during the construction of the development.

- Disturbance to local wildlife – During site preparation and construction, local populations of birds and mammals may be disturbed by the increase in noise, traffic and human activity. Bird nesting sites, including the loss of buildings for swallows, may also be lost. Bats also potentially roost in the timbers at the back of the building. Overall, the loss of the open land and any treelines/hedgerows may reduce the loss of nesting, roosting and foraging areas for some bird species.

- Pollution – The upper course of the River Poddle occurs along the western and southern site boundaries. The preparation and development of the site will involve the excavation of soil and the pouring of concrete for foundations and other hard surfaces. This has the potential to generate run-off into local watercourses. If appropriate mitigation measures are not taken during the construction of the proposed development, then there is the possibility that water quality in this stream may be negatively impacted upon. Possible direct impacts include the pollution of the waters during construction with silt, oil, cement, hydraulic fluid etc. This would directly affect the habitat of protected species by reducing water quality. These substances would also have a toxic effect on the ecology of the water in general, directly affecting certain species and their food supplies. In addition, an increase in the siltation levels of local waterbodies could result in the smothering of fish eggs, an increase in the mortality rate in fishes of all ages, a reduction in the amount of food available for fish and the creation of impediments to the movement of fish. Pollution of the water with hydrocarbons, cement and concrete during the construction phase of this proposed development could also have a significant negative effect on the fish and aquatic invertebrate populations.

Operational Phase

The following impacts on local habitats / wildlife may occur during the operation of the development.

- Disturbance to local wildlife – Once operational, the development at Airton Road will facilitate new buildings, all of which are associated with human activity. This will deter wildlife from the site. However, if suitable habitats are provided within the site for birds and pollinators, this will encourage a greater baseline level of biodiversity within the site.

- Landscaping – Inappropriate landscaping of the application site may inadvertently result in the introduction of non-native and invasive plant species. However, appropriate landscaping could also provide beneficial habitats for wildlife if it is done with suitable trees and shrubs that provide nesting and foraging opportunities for birds. The management of the verges for wildlife would also be beneficial for local pollinators.

5.6 POTENTIAL CUMULATIVE IMPACTS

Cumulative impacts or effects are changes in the environment that result from numerous human-induced, small-scale alterations. Cumulative impacts can be thought of as occurring through two main pathways: first; through persistent additions or losses of the same materials or resource, and second, -through the compounding effects as a result of the coming together of two or more effects (Bowers-Marriott, 1997).

There are a number of other proposed housing developments within the South Dublin County area. These developments combined will reduce the open spaces and habitat availability of the area, thereby cumulatively impacting on local bird and mammal populations. The loss of the habitats within the current application site is considered to be insignificant.

In the larger context of the Dublin City area, there are a number of other proposed developments, some of which are proposed for previously undeveloped, green field sites. These developments combined will reduce the open spaces and habitat availability of the Dublin City area as a whole, thereby cumulatively impacting on local bird and mammal populations. However, the creation of new areas of biodiversity within the application site and the retention and protection of treelines, will provide local ecological corridors and networks that will reduce the overall cumulative impact of this development in the Dublin City area.

Impact Summary

Overall, the impacts of the proposed development are summarised in Table 7, whilst Table 8 attempts to quantify these impacts in terms of magnitude, extent and likelihood *in the absence of any mitigation.*

Impact Description	Duration	Reversible?	Positive / Negative / Significance
Habitat Loss and Fragmentation (all phases)	Permanent	No	Neutral – Negative
Habitat Disturbance (all phase)	Permanent	No	Neutral – Negative
Pollution to Watercourses	None	N/A	Negative
Disturbance to Wildlife	Temporary	No	Negative
Landscaping	Permanent	No	Negative / Positive

Impacts on Designated Sites	None	N/A	Neutral
Cumulative Impacts	Permanent	No	Negative

Table 5.7 Predicted Impacts

Impact Description	**Magnitude and Extent**	**Likelihood**
Habitat Loss, Disturbance and Fragmentation	~100% of habitats Loss of Treeline / Scattered Trees	Certain Probable
Pollution of Watercourse	Pollution during site works with silt, oil, cement etc	Possible
Disturbance to Wildlife	Loss of all badger commuting routes Loss of all bird nesting sites Loss of all bat habitats	Possible
Landscaping	Introduction of Invasive / Non Native Species Use of Plants that are Beneficial for Wildlife	Possible Possible
Impacts on Designated Sites	None	Certain

Table 5.8 Quantification of Impacts

5.7 MITIGATION MEASURES

Construction Phase

In order to mitigate against the impacts listed above, then the following mitigation measures should be adhered to during all phases of the development.

- All works associated with the development should be confined to the proposed development site. All site development works should adhere to best practice.
- The techniques of SUDs (Sustainable urban Drainage Systems) should be applied to all hydrological engineering aspects of this proposed development.
- In accordance with the policies and objectives of the County Development Plan, the existing green infrastructure of the site, i.e., the existing treelines and hedgerows, should be incorporated into the development in so far as possible.
- Habitat fragmentation should be avoided where possible, especially in the treelines within the site. These areas should be cordoned off during all site preparation and construction activities on the site. There must be no dumping or storage of construction waste or machinery in these areas during construction.
- Any natural verges along treelines or hedgerows should be retained and managed appropriately for the benefit of wildlife. They should not be sprayed with herbicide and a low intensity mowing or strimming regime should be incorporated. This will benefit local pollinators.
- Tree removal should only take place outside of the bird nesting season and for the protection of bats, in late autumn.
- Tree removal must only occur under guidance of a consultant arborist and with regard to the tree constraints plan that has been prepared for the site.
- It is vital that there is no deterioration in water quality in any watercourse in the vicinity of the development. This will protect both habitats and species that are sensitive to pollution. Therefore, strict controls of erosion, sediment generation and other pollutants associated with the construction process should be implemented, including the provision of attenuation measures, silt traps or geotextile curtains to reduce and intercept sediment release into any local watercourses.
- Fuels, oils, greases and hydraulic fluids must be stored in bunded compounds. Refuelling of machinery, etc., should be carried out in bunded areas. Any bulk fuel storage tank should be properly bunded with a bund capacity of at least 110% of that of the fuel tank.
- Stockpile areas for sands and gravel should be kept to a minimum size, well away from the drains and watercourses.
- All waste associated with the development should be disposed of in an environmentally friendly manner. Registered contractors should only be used.
- The recommendations in the accompanying bat report should be followed, including:
    - ✓ The wooden panels at the rear of the building should be removed by hand prior to any demolition of the building. This should be supervised by an ecologist.
    - ✓ Two 2F and Two 1FF Schwegler bat boxes with built in timber panels should be distributed throughout the site. These should be paced on trees or posts, at least 3m high with a clear drop below (as bats need to drop to start their flight). They should be placed in a dark area of the site.
    - ✓ To mitigate against the loss of food sources for local bat populations, native species should be used when landscaping with trees and shrubs.
    - ✓ If bats are discovered at any stage of the development, building work should cease and a bat expert should be consulted immediately.
    - ✓ If the building is not demolished within 12 months, it should be resurveyed for bats prior to demolition.

Operational Phase

- The future landscaping of the site should adhere to the following recommendations:
    - Only native trees and shrubs should be used in the landscaping.

- A proportion of the grass areas should be maintained through methods that mimic traditional grassland management (low level grazing and mowing regimes). This will benefit local pollinators. Locally sourced wildflower seed would also be beneficial.
- When planting flowers, shrubs and trees native species should be used, ideally from a local source.
- Allow some areas to go 'wild' where bramble and scrub, etc. can develop.
- Garden plants that have the potential to become invasive must be avoided.
- Water features, e.g., attenuation ponds, could be incorporated into the development as additional wildlife features.

5.8 DO NOTHING SCENARIO

In the absence of the development, some trees and habitats on site may further mature to provide greater suitability for bats, invertebrates and other breeding birds. Without site management, grassland habitats on the site are likely to succeed into a scrub habitat, which would also provide additional nesting and feeding sites for small birds.

5.9 WORST CASE SCENARIO

The worst-case scenario would see the development of the site without any mitigation to reduce and lessen ecological impacts. Potential bat habitats could be lost, and bats could be directly impacted upon through habitat loss and disturbance. Pollution of the River Poddle could occur without appropriate mitigation whilst further opportunities for ecological enhancement within the site following development would be lost.

5.10 MONITORING AND REINSTATEMENT

Monitoring is generally required where there may be significant residual impacts despite the implementation of the mitigation measures. No significant residual impacts are envisioned for this site upon completion of the development to its operation stage. However, any bat boxes that are erected within the site should be monitored for bat usage.

5.11 DIFFICULTIES IN COMPILING INFORMATION

All surveys were carried out at an appropriate time of the year and there were no difficulties present in the compiling of information for this report.

5.12 RESIDUAL IMPACTS AND CONCLUSIONS

With the recommended mitigation measures, it can be concluded that the proposed development at Airton Road, Tallaght, Dublin 24 will have a negative to neutral impact upon local ecological receptors. The creation of new habitats on the site will be a positive benefit to local ecology and with proper management of the site and its green areas, then local areas of biodiversity will be allowed to develop.

5.13 REFERENCES

Bailey, M. & Rochford, J. (2006) Otter survey of Ireland 2004 / 2005. Irish Wildlife Manuals No. 23. National Parks & Wildlife Service. DoEHLG.

Bowers Marriott, B. (1997) Practical Guide to Environmental Impact Assessment: A Practical Guide. Published by McGraw-Hill Professional, 1997, 320 pp.

CIEEM (2018**)** Guidelines for Ecological Impact Assessment in the UK and Ireland. CIEEM, 2018

Cummins, S; Fisher, J; Gaj McKeever, R; McNaghten, L & Crowe, O. (2010) Assessment of the Distribution and abundance of Kingfisher *Alcedo atthis* and other riparian birds on six SAC river systems in Ireland. NPWS & Birdwatch Ireland.

Department of the Environment, Heritage and Local Government (2009) Appropriate Assessment of Plans and Projects in Ireland – Guidance for Planning Authorities.

Dwyer, (2000) *Protecting Nature in Ireland, The NGO Special Areas of Conservation Shadow List.* Published by the Irish Peatland Conservation Council, Dublin.

EPA (2001) Parameters of Water Quality - Interpretation and Standards. Environmental Protection Agency, Ireland.

EPA (2002*) Guidelines on the Information to be contained in Environmental Impact Statements*. Environmental Protection Agency, Ireland.

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

EPA (2012) Guidance on the setting of trigger values for storm water discharges to offsite surface waters at EPA licensed IPPC and waste facilities. EPA, Wexford.

Fossit, J.A. (2000) *A Guide to Habitats in Ireland*. The Heritage Council, Kilkenny.

Hayden, T. & Harrington, R. (2000) *Exploring Irish Mammals.* Dúchas the Heritage Service, Town House Dublin.

Institute of Environmental Assessment (1995) *Guidelines for Baseline Ecological Assessment*. Institute of Environmental Assessment, Great Britain.

IUCN (2003) *Red List of Threatened Species*. International Council for Conservation of Nature and Natural Resources.

Kurz, I. and Costello, M.J. (1999) An Outline of The Biology, Distribution And Conservation Of Lampreys In Ireland. F. Marnell (ed.), Irish Wildlife Manuals, No. 5.

Ó Néill L. (2008) Population dynamics of the Eurasian otter in Ireland. Integrating density and demography into conservation planning. PhD thesis. Trinity College, Dublin.

Natura Environmental Consultants (2005) Draft Habitat Survey Guidelines: A Standard Methodology for Habitat Survey and Mapping in Ireland. The Heritage Council, Kilkenny.

NPWS (2008) Conservation Status in Ireland of Habitats and Species listed in the European Council Directive on the Conservation of Habitats, Flora and Fauna 92/43/EEC

NRA (2004) *Guidelines for Assessment of Ecological Impacts of National Road Schemes.* National Roads Authority, Dublin.

Smith G. F., O'Donoghue P., O'Hora K. and Delaney E. (2010.) *Best Practice Guidance for Habitat Survey and Mapping*. Heritage Council.

Whilde, A. (1993) Threatened *Mammals, Birds, Amphibians and Fish in Ireland.* Irish Red Data Book 2: Vertebrates. HMSO, Belfast.

6 LAND, SOIL & GEOLOGY

6.1 INTRODUCTION

Author: John Considine, (B Eng MIEI MIStruct E C Eng FConsEI IEI Mem No. 022256)

This chapter of the EIAR provides a description of the existing land, soil and geology within and immediately surrounding the site of the proposed development. It will provide an assessment of the potential impacts of the proposed residential development on the land and soils during the demolition, construction and operational phases of the proposed development. It will also identify the characteristics, predicted impact and mitigation measures from the different phases.

Existing

The 2.79-hectare site is currently occupied by the disused factory/warehouse & associated hardstanding (Gallaher's cigarette production facility).

Proposed

The proposed development will consist of 502 residential apartment units in 6no. multi-storey blocks (A-F). Ground level car parking will be provided as an undercroft to blocks A-C and basement car parking will be provided below blocks E and F. The total number of car parking spaces provided is 202. 3no. retail units are with a combined total area of 482m² will be provided (187m², 161m² and 134m²). A 329m² crèche will be provided under the south eastern of Block C, within the site adjacent to the open space. The site will also include communal facilities of 704m².

As part of the development, 2no. new vehicular entrances will be created to allow access into the site for the residents. Additional infrastructure works will be undertaken to ensure that there is sufficient pedestrian and cyclist facilities to allow ingress and egress to, from and along the site.

A full description of development is set out in Chapter 3 of this EIAR and in the public site notices.

6.2 METHODOLOGY

The assessment of the potential impact of the proposed development on the land and soils was carried out according to the methodology specified by the EPA and the specific criteria set out in the Guidelines on Information to be Contained in an Environmental Impact Statement (EPA 2002 and 2017 Draft), EIA Directive 2014/EU/52, Advice Notes on Current Practice (in preparation of Environmental Impact Assessment (EIA), Guidance for Consent Authorities Regarding Sub-Threshold Development (DoEHLG 2003), Development Management Guidelines (DoEHLG, 2007) and Guidelines for Planning Authorities and An Bord Pleanála on Carrying out Environmental Impact Assessments (DoECLG, 2013).

A desktop study to assess the potential impacts of the proposed development and the following sources of information were used in the completion of this assessment.

- Geotechnical Site Investigation Report
- Geological Survey of Ireland (GSI) online maps and databases
- Eastern CFRAMS Flood Maps
- Topographical Survey
- Teagasc soil and sub-soil data.

6.3 RECEIVING ENVIRONMENT

The site is bounded to the north by Airton Road and to the east by Greenhills Road. The north west of the site is bounded by an entrance road to the adjoining property, the south west is bounded by the car park. The River Poddle/Tymon runs along the south of the site and Tallaght University sports grounds are on the other side of the river. There will be two permanent road access points to the site, one along Airton road and another on Greenhills road. The development will have no through route for vehicular traffic, and each of these entrances will enter directly into the car parking areas for the respective apartment blocks, (blocks A-C on Airton and blocks D-F on Greenhills).

Figure 6.1 – Site Location

Bedrock Geology

The bedrock geology of this area is of the Lucan Formation. The bedrock is identified as a combination of dark limestone and shale (calp), refer to **Error! Reference source not found.** below. Bedrock was not encountered during the rotary core drilling which ranged from 12.00m to 13.70m, as per the site investigation report.

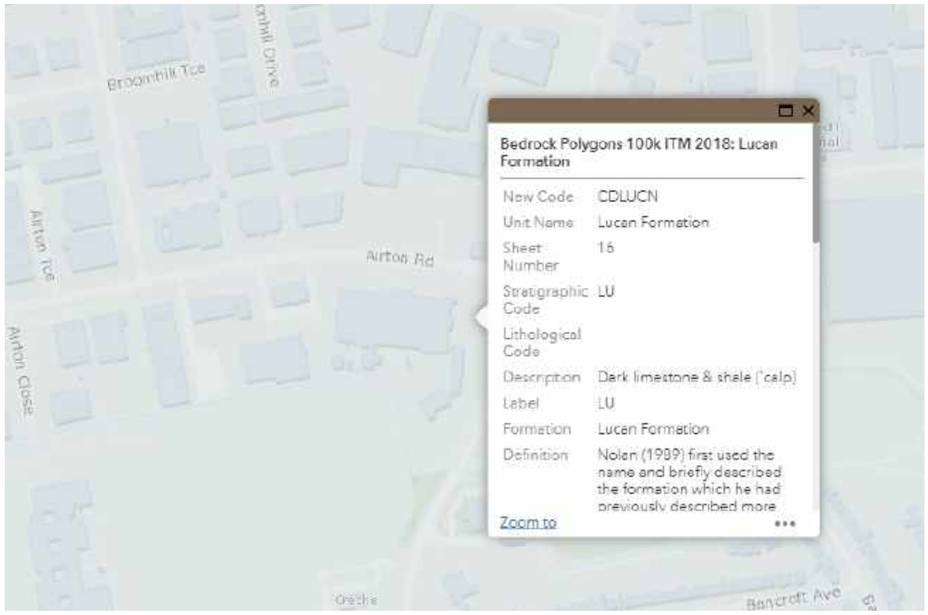


Figure 6.2 – Bedrock from GSI

Subsoil (Quaternary) Geology

As can be seen in **Error! Reference source not found.** below, the near surface subsoil is predominantly comprised of made ground.

The quaternary period is the most recent stage of the geological period. It marks the period of the Ice Age and the postglacial period which extends to the present day. Most surface deposits were deposited in the Quaternary Period and provide the parent materials for the soils in the area.

Figure 6.3 - GSI Subsoil

Soils

The GSI soils map indicates the predominant soil type in the development area to be till derived from limestones. An extract from the GSI soils map relevant to the site is detailed in Figure 6.4 below.

Teagasc soil maps classify soils beneath the site as urban, see Figure 6.5.

The site investigation identified the stratigraphy as stiff brown boulder clay and very stiff to hard black boulder clay over fill. The uppermost layer is fill varying in depth from 1.0m -1.5m but in three locations to an average depth of 2.80m. It consists of surface concrete and hardcore overlaying generally firm clay fill.

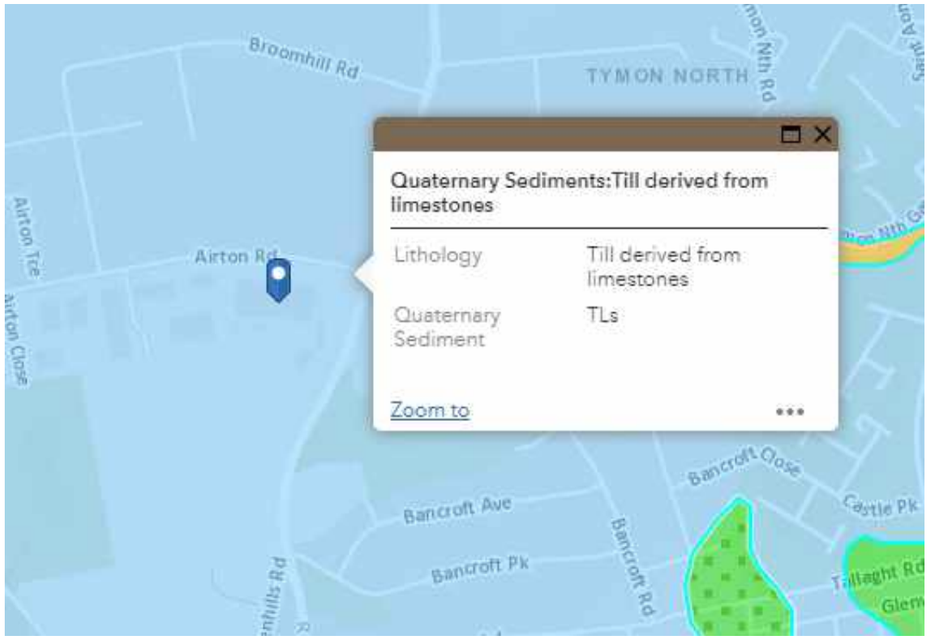


Figure 6.4 – Quaternary Sediment

Figure 6.5 – Soil association Teagasc soil maps

Hydrogeology

Regional Hydrogeology

Groundwater can be defined as water that is stored in, or moves through, pores and cracks in sub soils. Aquifers are rocks or deposits that contain sufficient void spaces, and which are permeable enough to allow water to flow through them in significant quantities. The potential of the rock to store and transport water is governed by permeability, of which there are two types, intergranular and fissure permeability.

Intergranular permeability is found in sediments, sands, gravels and clays. Fissure permeability is found in bedrock, where water moves through (and is stored in) cracks, fissures, planes and solution openings.

When considering groundwater, it is important to consider the underlying geology, its complexity including faults, the large amounts of water and rainfall available for recharge and the overlying Quaternary deposits. The bedrock geology of this area is defined in Figure 6.2 as limestone with shale, (Dublin Calp Limestone). The bedrock mapping for the area as defined in the GSI is included as above.

The Geological Survey of Ireland has devised a system for classifying the aquifers in Ireland based on the hydrogeological characteristics, size and productivity of the groundwater resource. The three main classifications are Regionally Important Aquifers, Locally Important Aquifers and Poor Aquifers.

In Figure 7.3.6 the site area is classified by the GSI as a Locally Important Aquifer which is moderately productive only in local zones. This is an aquifer with a limited and relatively poorly connected network of fractures, fissures and joints, giving a low fissure permeability which tends to decrease further with depth. A shallow zone of higher permeability may exist within the top few metres of more fractured/weathered rock, and higher permeability may also occur along fault zones. These zones may be able to provide larger 'locally important' supplies of water. In general, the lack of connection between the limited fissures results in relatively poor aquifer storage and flow paths that may only extend a few hundred metres and the site consists primarily of Till (TLs) with no karst features in this area.

There are no groundwater wells or springs recorded on the GSI Groundwater Data Viewer mapping on or near the site. Limestones with this aquifer classification typically exhibit low storability.

A site investigation was carried out in 2019 which included assessment of soil infiltration rates based on the requirements of BRE digest 365. The results of these tests are included in the site investigation report and further detail on the methodology used is included within the infrastructure report appendices.

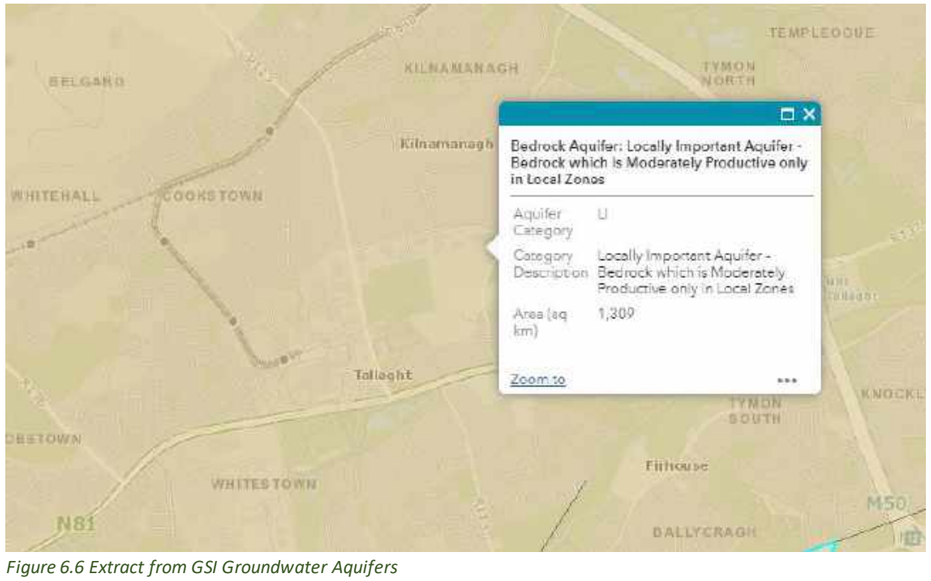


Figure 6.6 Extract from GSI Groundwater Aquifers

Groundwater Vulnerability

Aquifer or groundwater vulnerability is a relative measure of the ease with which the groundwater could be contaminated by human activity and depends on the aquifer's intrinsic geological and hydrogeological

characteristics. The vulnerability is determined by the permeability of any overlying deposits. For example, bedrock with a thick, low permeability, clay-rich overburden is less vulnerable than bedrock with a thin, high permeability, gravelly overburden.

Groundwater vulnerability categories are defined by the GSI as:

X - Extreme rock at or near surface or karst
E - Extreme
H - High
M - Moderate
L - Low

These categories are used for mapping purposes and in the assessment of risk to ground waters. The classifications are based on the thickness and permeability of the sub-soils overlying the aquifer. The GSI has classified the aquifer vulnerability underlying the site in Figure 6.7 as "L" (low) which infers the bedrock is at a depth of 10m below low permeability till. This corresponds with the ground investigation which was undertaken where bedrock was not encountered during the rotary core drilling which ranged from 12.00m to 13.70m

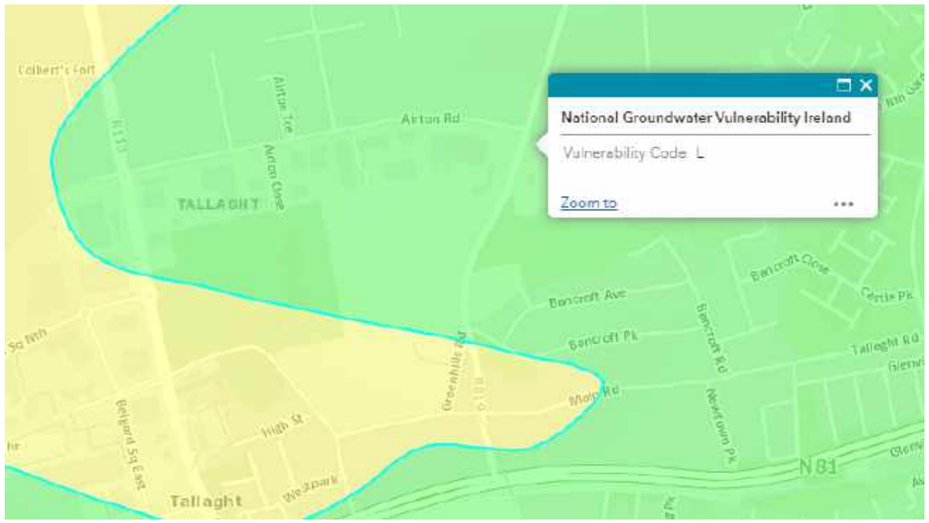


Figure 6.7 Groundwater vulnerability map

Local groundwater usage and source protection area:
The GSI online map does not identify any significant or notable abstraction wells within the vicinity of the proposed development. No groundwater protection zones are marked in proximity to the site.

Recharge
Effective rainfall is the amount of rainfall available as either recharge to ground or run-off to surface water after evaporation or taken up by plants and is 413mm/yr. The recharge coefficient, which is the proportion of effective rainfall to recharge groundwater, is estimated at 20% on the site. Recharge is the amount of rainfall that replenishes the aquifer, it is a function of the effective rainfall, the permeability and thickness of the subsoil and the aquifer characteristics. According to GSI the maximum recharge capacity to the bedrock is 200 mm/yr across the site.

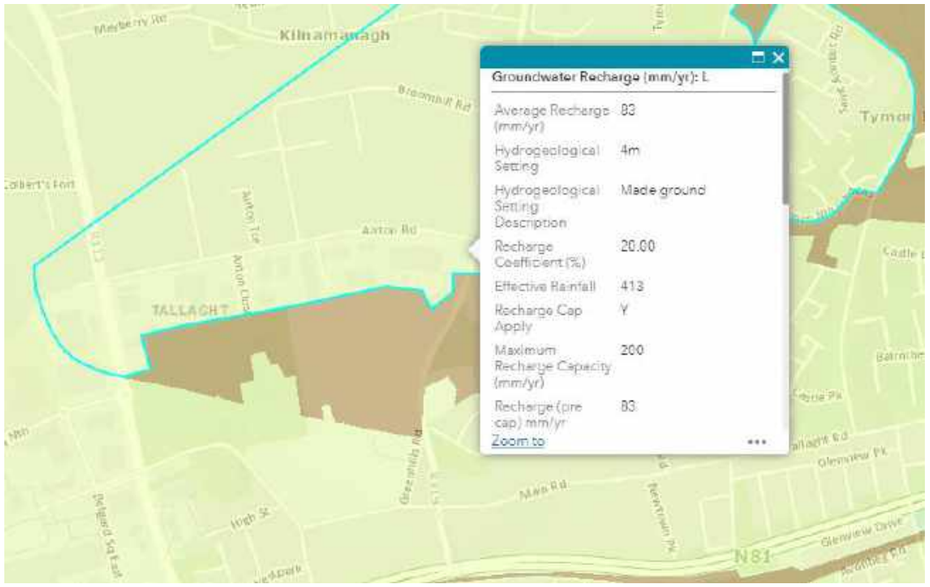


Figure 6.8 Extract from GSI Groundwater Recharge Map

Site Hydrogeology:
The characteristics of the underlying limestone bedrock and local topography appear to have a strong influence in the hydrogeology of the site. Groundwater is likely present within the upper levels of the bedrock with little or no groundwater present within the subsoils. Groundwater flows follow the topographical relief of the area and generally flow towards the nearby Tymon/Poddle Stream.

Groundwater Quality:
Under the requirements of the Water Framework Directive, the Dublin groundwater body was classified as having an overall good status for water quality and quantity 2010-2015. However, it is classified as 'at risk' of not achieving at least good ecological or good chemical status/potential by 2015. No site-specific water quality data is available from the site investigation.

Groundwater Flood Risk:

Groundwater flooding can occur during lengthy periods of heavy rainfall, typically during later winter/early spring when the groundwater table is already high. If the groundwater level rises above surface level, it can pond at local points and cause periods of flooding.

6.4 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

Consideration of the Characteristics of the Proposed Development allows for a projection of the 'level of impact' on any particular aspect of the proposed environment that could arise. For this chapter the potential impact on land and soils is discussed.

The proposed development will consist of 502 residential apartment units in 6no. multi-storey blocks (A-F). Ground level car parking will be provided as an undercroft to blocks A-C and basement car parking will be provided below blocks E and F. A full description is in chapter 3 of this EIAR and as described in the site notices.

Surface water drainage (including Sustainable Drainage Systems - SuDS), foul water drainage, water supply and road network will be constructed to service the proposed development.

It is envisaged that all structural loads will be carried via concrete foundations to either bedrock or the over-lying layers of stiff black boulder clay.

Surplus materials from these excavations will be disposed of off-site.

Figure 6.9 Site layout excerpt (Source: Landscape Masterplan, Mitchell Associates)

6.5 POTENTIAL IMPACTS

Construction Phase

It is anticipated that the development site works, and excavation proposals will not be deep enough to impact the underlying bedrock geology during the construction phase. The maximum excavation depth for foundations and lift pits are anticipated to extend to a depth of 4.5m below ground level. Bedrock was not encountered during the rotary core drilling which ranged from 12.00m to 13.70m

It is therefore considered that the greatest impact of the construction will arise from the extensive stripping and wide scale excavation of soils and sub-soils to prepare and construct the basement.

The main volume of excavation will be from the planned single-storey basement to be constructed as part of the proposed development. In addition, excavation will be necessary for the proposed underground surface water attenuation systems. Reusable excavated soils and rock will be retained on-site for backfilling or drainage purposes to reduce the total volume of imported & exported material. It is anticipated that the impact on soils arising from the construction phase will be short term and moderate.

The initial development of the site would involve extensive stripping of the topsoil (approximately the upper 300mm of soil). Excavation of subsoil layers would be required to facilitate site development works, in particular the construction of foul and surface water sewers and underground surface water storage structures (attenuation). It is envisaged that non-reusable excavated material will be removed off-site.

Removal of the upper soil layers would be necessary across a large area of the site. Top-soil will initially be stripped from the lands and stored for later re-use in the landscaping for the developments. However, given that the entire site is currently covered with hardstand, it is envisaged that there will be little, or no surplus top-soil produced by the site.

The installation of the proposed basement and surface water storage structure will require a significant quantity of subsoil to be excavated to provide sufficient storage volumes for storm events.

Earthworks and the removal of topsoil would expose subsoil layers to the effects of weathering and may result in the erosion of soil, particularly in times of adverse weather conditions. Surplus subsoil caused by excavations for foundations, roads and drainage should be stockpiled and taken off-site to a licensed landfill facility.

Increased traffic associated with the construction works would have the effect of compacting existing subsoil layers within the site. The regular movement of heavy machinery and plant to and from the site would also result in an increased risk to the integrity of the surrounding road network, as well as facilitating the unwelcome transfer of mud and dust to surrounding access routes in the absence of mitigation.

It will be necessary to import materials to the site; in particular large volumes of stone will be required for construction of the roads, foundations and services. Also, large quantities of concrete, bricks, steel, tar etc. will all be delivered to site by lorry.

Landscaping for the development will reduce the initial impact from the construction phase and will protect the exposed soils from ongoing weathering and erosion. The impacts on the underlying bedrock geology arising from the construction phase will be minimal, with maximum excavation depths terminating 4.5m above encountered bedrock levels. The greatest impact will be to the soils from the construction activity as soil levels will be greatly altered throughout. However final landscaping will reduce and address these impacts. It is anticipated that the impact on soils arising from the construction phase will be short term and moderate.

There is a potential risk of localised contamination from construction materials leeching into the underlying soils by exposure, dewatering or construction related spillages resulting in a Permanent Negative impact on the soils. In the case of soils, the magnitude of this impact is Small Adverse as it may result in the requirement to

excavate/remediate a small proportion of contamination or result in a low risk of pollution to the soils. As a result, its significance is imperceptible for all important soils features.

There is a potential risk of localised contamination of the groundwater due to construction activities i.e. construction spillages, leaks etc. resulting in a Permanent Negative impact on the groundwater, however, the low permeability Boulder Clay will effectively eliminate the potential for contamination to infiltrate into the underlying aquifer. For this reason, the impact on the groundwater contained within the bedrock aquifer is considered as Small Adverse.

The potential impact on hydrogeology during the construction phase is considered to be short term, temporary and moderate without mitigation measures in place.

Operational Phase

The day-to-day activities of the completed development would be unlikely to have any direct impact on the groundwater environment. Minor impacts may include increased infiltration and therefore slightly increased recharge volumes entering the groundwater. This is directly related to the creation of permeable development areas which, pending their arrangement will reduce run-off volumes and increase infiltration potential. The risk of spills or leaks of fuels and oils from residential vehicles may impact if the surface water system is not designed to address this.

On completion of the construction phase, it is not envisaged that there would be a further direct impact on the soil or geological structure. Ensuring appropriately designed and constructed site services will protect the soils and geology from future contamination arising from operation of the developments.

The impacts on soils and geology arising from the operational phase will be temporary and very minor.

6.6 POTENTIAL CUMULATIVE IMPACTS

Given the scale of the proposed development, and the capacity of the surrounding environment to accommodate a development of this nature, it is not likely to give rise to any significant effects cumulatively or, in combination with, other developments in the area.

6.7 MITIGATION MEASURES

Construction Phase

In order to minimise the impact of construction on the sites soils and geology the following mitigation measures should be implemented:

- In order to prevent the accidental release of hazardous materials (fuels, paints, cleaning agents, etc.) during construction site activity all hazardous materials should be stored within secondary containment designed to retain at least 110% of the storage contents. Temporary bunds for oil/diesel storage tanks should be used on the site during the construction phase of the project. Safe materials handling of all potentially hazardous materials should be emphasised to all construction personnel employed during this phase of the project.
- Sediment runoff will be minimised by standard engineering measures including sediment skirts around soil stockpiles, sediment retention barriers in surface water drains and the use of adequate construction roads.
- Construction access to the site will be from the Airton Road The provision of wheel wash areas at the construction entrances to the development will minimise the amount of soil deposited on the surrounding road network.
- Measures will be implemented throughout the construction stage to minimise the risk of contamination of the soil from accidental oil and petrol leakage from site plant. Bunding of storage areas and refuelling areas will be incorporated into the site compound. The bund walls will be designed to the appropriate level to ensure no over-spilling occurs in the event of an accidental spillage. All lock up/storage areas will have a metal or concrete leak proof floor. Any accidental chemical spillages should be cleaned up and disposed of in an approved landfill site in accordance with the chemical manufacturer's recommendations.

Operational Phase

No significant long-term impact on the soil resulting from the proposed operational phase of the development is predicted. Once the development is completed, risks to the land and soils will be from pollutants deriving from the use of the dwellings and/or from contaminated surface water run-off.

The only mitigating measures envisaged during the operational phase are to ensure regular maintenance of SuDS features.

Ensuring appropriately designed, constructed and maintained site services will protect the soils and geology from future contamination arising from operation of the developments.

In order to minimise the impact of operation on the sites soils and geology the following mitigation measures should be implemented:

- The surface water run-off from the development should be collected by an appropriately designed system. This system should ensure that contaminants are removed prior to discharge e.g. via a light liquids separator or by an appropriate treatment train of Sustainable Urban Drainage Systems as outlined in the Greater Dublin Strategic Drainage Study (GDSDS). Any separators and drainage systems should be maintained and operated by the facilities management company (prior to taking in charge by the Local Authority) in accordance with the manufacturers recommendations.
- All waste generated by the everyday operation of the development should be securely stored within designated collection areas. These should have positive drainage collection systems to collect potential run off. Operational waste should be removed from site using licensed waste management contractors.
- Foul effluent should be collected and discharged from the site via properly constructed sewers to the Public Foul Sewer.
- Fuel Storage areas, if required, should be within secured, bunded, designated areas.

6.8 PREDICTED IMPACTS

Construction Phase

Due to the implementation of the remedial or reductive measures described above, the proposed development will not give rise to significant adverse impacts with regard to soils. Any impacts during the construction phase are likely to be only short term in duration.

Operational Phase

No significant impacts are predicted for the operational phase.

6.9 'DO NOTHING' SCENARIO

Under a '*do-nothing*' scenario there would be no change to the soil environment at the application site.

6.10 WORST CASE SCENARIO

Under a '*worst case*' scenario, the accidental release of diesel fuel or similar hazardous material occurs on site during the construction phase, through the failure of secondary containment or a materials handling accident on the site. If this were to occur over open ground, then these materials could infiltrate through the soil contaminating the soil zone and any underlying groundwater. Appropriate remediation measures would be required depending on the nature and extent of any contamination caused under such a scenario. Potential remediation measures may include the excavation and treatment of contaminated soil and in-situ remediation techniques.

6.11 MONITORING & REINSTATEMENT

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

- Adequate protection of any topsoil stockpiled for re-use.
- Adequate protection from contamination of soils for removal.
- Monitoring of surface water discharged to the existing culverted watercourses in the vicinity.
- Monitoring cleanliness of the adjoining road network.
- Monitoring measures for prevention of oil and petrol spillages.
- Dust control by dampening down measures as & when required by unusually dry weather conditions.

The Construction Management Plan (CMP) prepared by the contractor will cover these mitigation measures in more detail.

6.12 DIFFICULTIES IN COMPILING INFORMATION

No particular difficulties were encountered in completing this section.

6.13 REFERENCES

- Guidelines on the information to be contained in Environmental Impact Statements (EPA 2002) and Advice Notes on Current Practice in the preparations of Environmental Impact Statements (EPA 2003).
- The Geotechnical Site Investigation Report for the Site by Causeway Geotech Ltd No. 18-1234 dated December 2018.
- The National Bedrock online data viewer produced by the Geological Survey of Ireland.

7 HYDROLOGY & WATER SERVICES

7.1 INTRODUCTION

Author: John Considine, (B Eng MIEI MIStruct E C Eng FConsEI IEI Mem No. 022256)

This chapter of the EIAR provides a description of the existing land, soil and geology within and immediately surrounding the site of the proposed development. It will provide an assessment of the potential impacts of the proposed residential development on the land and soils during the demolition, construction and operational phases of the proposed development. It will also identify the characteristics, predicted impact and mitigation measures from the different phases.

The aim of this EIAR Section is to establish the following:

- Baseline condition in relation to surface water drainage and ground water condition.
- Assessment of potential impacts to the surface water drainage and groundwater which can reasonably be expected to occur as a result of the proposed development.
- Mitigation measures to address significant adverse impacts.

Existing

The 2.79-hectare site is currently occupied by the disused factory/warehouse & associated hardstanding (Gallaher's cigarette production facility).

Proposed

The proposed development will consist of 502 residential apartment units in 6no. multi-storey blocks (A-F). Ground level car parking will be provided as an undercroft to blocks A-C and basement car parking will be provided below blocks E and F. The total number of car parking spaces provided is 202. 3no. retail units are with a combined total area of 481m² will be provided (187m², 161m² and 134m²). A 329m² crèche will be provided under the south eastern of Block C, within the site adjacent to the open space. The site will also include communal facilities, (gym, offices) of 704m². This is not a 'Build-to-Rent' (BTR) scheme.

As part of the development, 2no. new entrances will be created to allow access into the site for the residents. Additional infrastructure works will be undertaken to ensure that there is sufficient pedestrian and cyclist facilities to allow ingress and egress to, from and along the site.

7.2 METHODOLOGY

The assessment of the potential impact of the proposed development on the water bodies was carried out according to the methodology specified by the EPA and the specific criteria set out in the Guidelines on Information to be Contained in an Environmental Impact Statement (EPA 2002 and 2017 (Draft)), EIA Directive 2014/EU/52, Advice Notes on Current Practice (in preparation of Environmental Impact Statements) (EPA 2003), Environmental Impact Assessment (EIA), Guidance for Consent Authorities Regarding Sub-Threshold Development (DoEHLG 2003), Development Management Guidelines (DoEHLG, 2007) and Guidelines for Planning Authorities and An Bord Pleanála on Carrying out Environmental Impact Assessments August 2018.

The following sources of information were used in the completion of this assessment:

- Site Visit
- Geotechnical Site Investigation Report prepared by IGSL in July 2019
- Geological Survey of Ireland (GSI) online maps and databases
- Eastern CFRAMS Flood Mapping from OPW
- EPA online maps and databases
- Topographical Survey
- Local authority record drawings

All drainage (surface and foul) and water supply will be provided in accordance with the requirements of South Dublin County Council, Irish Water and in particular with the following:

- Greater Dublin Regional Code of Practice for Drainage Works
- Greater Dublin Strategic Drainage Study (GDSDS)
- Planning System and Flood Risk Management Guidelines
- Building Regulations (Part H)
- Irish Water Standard Details and Codes of Practice for Water and Wastewater Infrastructure
- CIRIA SuDS manual C753 (2015).

This chapter also encompasses knowledge obtained from site visits, drainage and water services record information received from Irish Water and the Local Authority. Additionally, information from the EPA and GSI websites has been utilised.

7.3 RECEIVING ENVIRONMENT

The subject site is currently occupied by an abandoned industrial unit, the Gallaher's Cigarette production factory. There is a small watercourse along the southern boundary of the site according to the EPA mapping of the area, Figure 7.1.

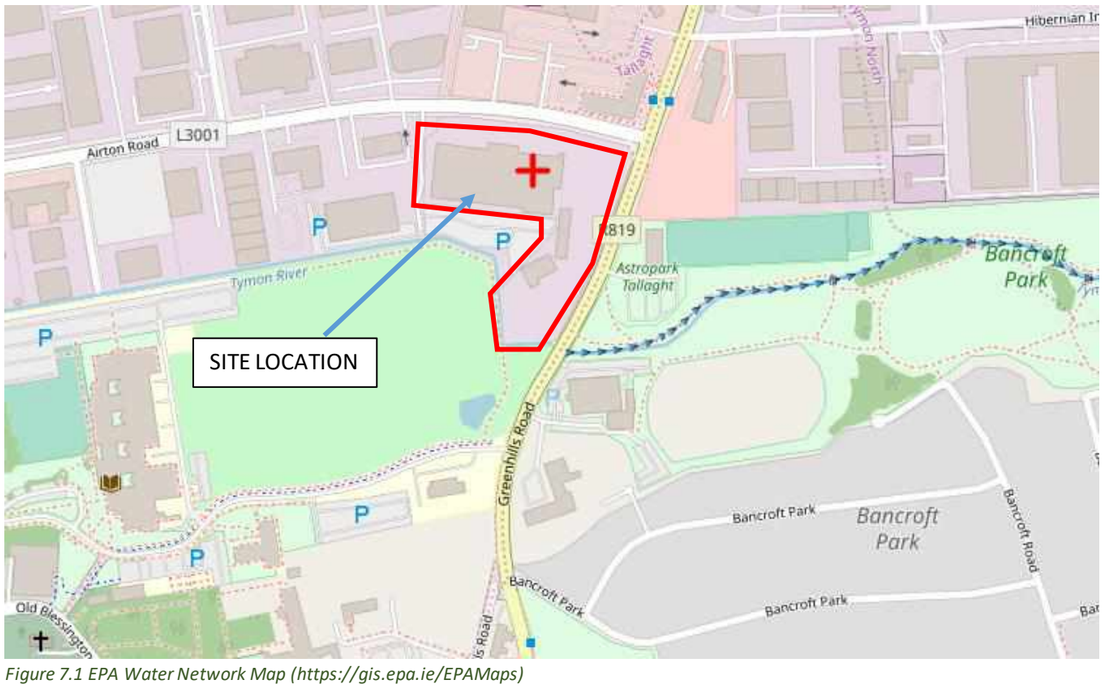


Figure 7.1 EPA Water Network Map (https://gis.epa.ie/EPAMaps)

Existing Surface Water

The existing site layout is comprised of existing buildings, hardstanding and landscaping with unattenuated surface water outflow to the public drainage network and river system. There is an existing surface water network within the site. This surface water network is divided into two different catchments. The northern network catchment discharges rainwater from the industrial unit roof, office roof and hardstanding (1.30 ha). This catchment discharges to a surface water manhole in the north east of the site and then to the surface water sewer along Airton Road. The southern network discharges the remaining hardstanding and roof area (0.35 ha) in a southerly direction on the site. There is no surface water system in this area, so it assumed that this network discharges to the Tymon stream/River Poddle which runs along the southern boundary of the site.

Watercourse

There is a watercourse running along the southern perimeter of the site, The Tymon Stream also known as River Poddle.

Surface Water Sewers

There is an existing surface water buried drainage system within the site boundary. This serves the northern portion of the site and discharges to the public network. There are no sustainable urban drainage systems (SuDS) measures within the site boundary.

Existing Foul Water Drainage

There is an existing foul sewer network on the site. This network discharges to a public foul sewer to the manhole located at the junction of Airton & Greenhills Road manhole.

The foul discharge from the site is principally from staff toilets associated with the factory building. The site is currently vacant with no discharge rate into the foul network.

Refer to Appendix 7.1 for existing public drainage and water supply infrastructure maps in the vicinity of the site.

Existing Water Supply

There was a water supply to the site to serve the existing factory & staff facilities. The site is currently vacant with no abstraction from the public watermain network.

7.4 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

Consideration of the Characteristics of the Proposed Development allows for a projection of the 'level of impact' on any aspect of the proposed environment that could arise.

Surface water drainage (including Sustainable Drainage Systems - SuDS), foul water drainage, water supply and road network will be constructed to service the proposed development.

It is envisaged that all structural loads will be carried via concrete foundations to either bedrock or the over-lying layers of stiff black boulder clay.

Surplus materials from these excavations will be disposed of off-site

Surface Water

The proposed development will be designed in accordance with the principles of Sustainable Drainage Systems (SuDS) as embodied in the recommendations of the Greater Dublin Strategic Drainage Study (GDSDS) and will significantly reduce run-off rates and improve storm water quality discharging to the public storm water system.

The GDSDS addresses the issue of sustainability by requiring designs to comply with a set of drainage criteria which aim to minimize the impact of urbanization by replicating the run-off characteristics of the greenfield site. The criteria provide a consistent approach to addressing the increase in both rate and volume of run-off, as well as ensuring the environment is protected from any pollution from roads and buildings. These drainage design criteria are as follows:

- Criterion 1 – River Water Quality Protection
- Criterion 2 – River Regime Protection
- Criterion 3 – Flood Risk Assessment
- Criterion 4 – River Flood Protection

The requirements of SuDS are typically addressed by provision of the following:

- Interception storage
- Treatment storage (commonly addressed in interception storage)
- Attenuation storage
- Long term storage (not applicable if growth factors are not applied to Qbar when designing attenuation storage)

As explained in C753 the SuDS manual, SuDS can also improve the quality of life in a new development and urban spaces by making them more vibrant, visually attractive, sustainable and more resilient to change. This manual explains the wider social context of SuDS and how SuDS can deliver high quality drainage while supporting urban areas to cope better with severe rainfall both now and in the future.

There are four main categories of benefits that can be achieved by SuDS:

- Water Quantity (mitigate flood risk & protect natural water cycle)
- Water Quality (manage the quality of the runoff to prevent pollution)
- Amenity (create and sustain better places for people)
- Biodiversity (create and sustain better places for nature)

SuDS Measure Selection

The site will be a high-density urban environment and therefore the available applicable SuDS measures are limited within the site. Below are the applicable SuDS measures which have been chosen for the site. The proposed site has been divided into two sub-catchment areas. Catchment 1 comprises of blocks A-C and is in the north west of the site. Catchment 2 comprises of Blocks D, E & F as well as the central public amenity area.

Within catchment 2 of the site, between blocks C-D there is a large green public open space, which is the only area within the site classified as "High" available space. As per the suggestion from SDCC during the S247 meeting (30/06/2019) a large portion of this will be used as a dry detention basin. There is a small bio-retention tree pit at the entrance to the site serving this catchment.

To ensure both catchments adhere to the SuDS requirements, another dry detention basin will be implemented at the south-western corner of block A, within catchment 1. This will be smaller than the other dry detention basin, however a significantly larger bio-retention tree pit will be implemented along the western boundary of block A, on the western boundary of the site.

As per the SuDS Manual, bio-retention tree pits are not applicable for usage with site drainage areas greater than 2 ha, therefore these bio-retention tree pits will be used as additional treatment areas.

Green Roofs – General
Green roofs are areas of living vegetation, installed on the top of buildings. They provide water quality, water quantity, amenity and provide biodiversity benefits. Green roofs also intercept rainfall at source reducing the reliance on attenuation storage structures.

Green Roof – Extensive:
Extensive roofs have low substrate depths and therefore low loadings on the building structure, they are lightweight and have a low cost to maintain. These systems cover the entire roof area with hardy, slow growing, drought resistance, low maintenance plants and vegetation, such as sedums. The planting usually matures slowly, with the long-term biodiverse benefits being the sought-after results. These roofs are typically only accessed for maintenance and are usually comprised of between 20mm – 150mm overall total depth.

It is proposed to cover the apartment block roofs with extensive green roofs. The apartment block roofs take up a considerable portion of the site area and therefore by utilising these for green roofs, there will be interception and treatment storage provided at source. The proposed system is the Bauder XF301 Sedum system.

Green Roof – Intensive
Intensive green roofs are designed to sustain more complex landscaped environments that can provide high amenity and biodiverse benefits. They are planted with a range of plants, including grasses, shrubs, trees and may also include water features, as well as hard landscape paved areas. They are designed to be accessible and normally require regular maintenance.

The podiums over the undercroft car parking will be covered with an intensive green roof build up and hard landscaping. The podiums will be heavily trafficked by the residents within the development and therefore extensive green roofs are not applicable here. The use of intensive of green roofs will also allow the planting of large shrubs, small trees and small water features within the podium area. These features will provide amenities for the residents, promote the growth of biodiversity and also provide interception and treatment storage at source. The podium build-up will include an interception tray to capture the first 10mm of rainfall falling on each podium.

Permeable Paving
Permeable paving provides a surface suitable for pedestrian and/or vehicular traffic, while also allowing rainwater to infiltrate through the surface and into the underlying structural layers. The water is temporarily stored beneath the overlying surface before controlled discharge. Permeable paving systems are an effective way of managing surface water runoff close to its source.

Due to the proximity of the paving to the building/building foundations, system C is considered (no infiltration) appropriate. The pathways throughout the site will be made up of permeable paving. These will be linked with the overall management train used in each respective catchment.

Porous Pavements
Porous pavements have the same benefits as permeable paving, however unlike permeable paving (which is in itself impervious to water), porous pavements allow water to infiltrate across their entire surface material.

Porous pavements will be utilised in 2no. locations within the site. The external area provided for the creche will be made up of a porous rubber, resin bound material. This material will also be utilized for the outdoor play and congregation areas for the general public.

Detention Basin / Rain Gardens
Detention basins are landscaped depressions that are normally dry except during and immediately following storm events. Detention basins can form part of the management train for surface water run-off. The outlet from this local depression can be restricted and therefore the depression will fill and provide storage of runoff and flow attenuation.

The proposed detention basin for the site is located within the centre of the site, between block C and D. It will provide storage for Catchment 2. The detention basin will be an online detention basin, receiving water from the bio-retention tree pits and excessive rainwater run-off from the Block D roof. Both areas have treatment storage incorporated and therefore the detention basin can be soft landscaped with grass and small vegetation. Due to site constraints, it is not proposed to incorporate a permanent pool within the basin, and thus will effectively act as a rain garden.

Bioretention Systems & Tree Pits
Bioretention systems are shallow landscaped depressions that can reduce the runoff rates and volumes of surface water. They treat pollution using engineered soils and vegetation. They are very effective in delivering interception and treatment storage. By including tree pits, the effectiveness of the overall system in meeting the requirements of water quality, water quantity, amenity and biodiversity is significantly improved. Trees provide benefits to the SuDS measures by:

- Transpiration – Water evaporates through the stomata on the leaf as a result of photosynthesis.
- Interception – Leaves, branches and trunk surfaces intercept and absorb rainfall reducing the amount of water that reaches the ground.
- Infiltration – Root growth increases the soil infiltration capacity and rate, ultimately reducing run-off volumes.
- Phytoremediation – When drawing up water, trees also take up trace amounts of harmful chemicals. These chemicals can be transformed into less harmful substances within the tree.

Bioretention tree-pits will be used within the site, near the main pedestrian entrance within catchment 2.

Attenuation Tanks
Attenuation tanks are used to create below-ground void space for the temporary storage of surface water before infiltration, controlled release or use. Attenuation tanks can be constructed up using geocellular crates, which offer flexibility in size, shape and constructability of the tank meaning that they can be tailored to suit specific site characteristics.

It is proposed to provide 2no. attenuation tanks within the site, i.e. 1no. tank per catchment. These will be designed for the 1 in 100 year storm + 20% climate change. They will form the last part of the SuDS management train. A Hydrobrake will be fitted downstream of each tank in order to restrict the flow to Qbar for each sub-catchment.

Figure 7.2 SuDS Strategy excerpt

Please refer to BMCE drawing ARD-BMD-00-XX-DR-C-1010 & C-1015 for a full list of SuDS measures.

SuDS Management Train

The SuDS measures proposed are linked in series, and this is commonly known as a SuDS Management Train, (SMT). The SMT ensures that rainwater falling on a site is captured, conveyed, stored, intercepted and removed of pollutant correctly and efficiently before it is discharged back into the surrounding water course of network. A robust SMT will ensure that the most effective measures are utilised in the correct sequence throughout the site. Table below *(CIRIA, SuDS Manual 2015)* illustrates the effectiveness of each SuDS measure along the SMT.

TABLE 26.7 Indicative suitability of SuDS components within the Management Train

SuDS component	Interception[1]	Close to source/ primary treatment	Secondary treatment	Tertiary treatment
Rainwater harvesting	Y			
Filter strip	Y	Y		
Swale	Y	Y	Y	
Filter drain	Y		Y	
Permeable pavement	Y	Y		
Bioretention	Y	Y	Y	
Green roof	Y	Y		
Detention basin	Y	Y	Y	
Pond	[3]	Y[2]	Y	Y
Wetland	[3]	Y[2]	Y	Y
Infiltration system (soakaways/ trenches/ blankets/basins)	Y	Y	Y	Y
Attenuation storage tanks	Y[4]			
Catchpits and gullies		Y		
Proprietary treatment systems		Y[5]	Y[5]	Y[5]

Table 7.1 C573 SuDS Manual Table 26.

SuDS Pollutant Analysis

To ensure that the SuDS measures proposed are sufficient in removing pollutants from the generated run-off, a SuDS pollutant analysis has been carried out. This is performed in conjunction with the guidelines and steps set out in Section 26.7 of CIRIA SuDS Manual (2015).

The main form of pollutant is from surface water run-off from the entrances to the undercroft car park and basement car park. Table 6.2 highlights the pollution hazards for different land uses. The pollution hazards on site are generally 'very low'. The 2no. entrances to the car parking areas are classed as 'Low'. (Note: The undercroft car park and basement car park will discharge to the foul network). The Catchment 1 entrance will be treated using permeable paving on the eastern side of block C.

TABLE 26.2 Pollution hazard indices for different land use classifications

Land use	Pollution hazard level	Total suspended solids (TSS)	Metals	Hydro-carbons
Residential roofs	Very low	0.2	0.2	0.05
Other roofs (typically commercial/ industrial roofs)	Low	0.3	0.2 (up to 0.8 where there is potential for metals to leach from the roof)	0.05
Individual property driveways, residential car parks, low traffic roads (eg cul de sacs, homezones and general access roads) and non-residential car parking with infrequent change (eg schools, offices) ie < 300 traffic movements/day	Low	0.5	0.4	0.4

Table 7.2 C573 SuDS Manual Table 26.2 Extract

Giving the very low to low pollution index the 'Simple Index Approach,' is applied and can be summarised below

Total SuDS Mitigation Index ≥ Pollution Hazard Index

By inspection the extensive use of SuDS measures throughout the site insures that criterion is met, for example, considering the entrances to the undercroft car parking referred to above. Using Table 26.2 and Table 26.3, from the SuDS manual we can compare the mitigation index for permeable paving with the hazard index for the residential car park entrances:

	Total SuDS Mitigation Index		Pollution Hazard Index	Status
Total Suspended Solids	0.7	>	0.5	O.K.
Metals	0.6	>	0.4	O.K.
Hydrocarbons	0.7	>	0.4	O.K.

Table 7.3 Pollution Hazard Assessment

From Table 7.3 above the SuDS strategy for the site is effective in removing pollutants from the surface water and therefore protecting the watercourse.

Attenuation Storage

The GDSDS requires that flood waters be managed within the site for a 1 in 100 year flood. As described in previous sections, the site has been divided into 2no. sub-catchments. The overall Qbar of each of these sub-catchments will be less than the total site Qbar (5.00 l/s).

The surface water from each sub-catchment will flow into an attenuation storage tank which has been designed for that catchment.

The surface water system within each catchment has been hydraulically modelled in MICRODRAINAGE. Each sub-catchment system has been designed to ensure that their combined discharge rate does not exceed the previous discharge rate from the site.

The attenuation tanks will be placed outside of the building envelope.

Please see Appendix 7.2 for full breakdown of MICRODRAINAGE calculations.

Foul Water Drainage

Existing Foul Sewer Infrastructure
There is an existing foul sewer network on the site. This network discharges to a public foul sewer at the junction of Airton & Greenhills Road manhole.

The foul discharge from the site is principally from staff toilets associated with the factory building. The site is currently vacant with no discharge rate into the foul network.

Proposed Foul Drainage System
A new system will serve the development. It is proposed to provide 2no. Connections from the site drainage system into the sewer network.

A new 225mm diameter foul drainage will connect into Airton Road, to the existing 225mm diameter sewer. This connection will serve Catchment 1 (Block A, B & C). This consists of 275 apartments, a 329m² crèche, 465m² of communal space and 187m² of retail.

A new 225mm diameter foul drainage will connect into the existing sewer network on Greenhills Road, to the existing 225mm diameter sewer. This connection will serve Catchment 2 (block D, E & F), a total of 227 apartments, 239m² of communal space and 295m² of retail.

The flow table below are calculated using Irish Water flow rates of 150 l/hd/person per day for residential use and the I.W. recommended occupancy rate of 2.7 per unit.

		Units / m²	Daily Flow (l/day)	Average Flow (l/s)	Peak Flow (l/s)
Catchment 1	Residential	275 units	122,513	1.418	8.508
	Crèche	329 m²	3,300	0.038	0.229
	Communal	465 m²	6,380	0.074	0.148
	Retail	187 m²	1,624	0.190	0.038
Catchment 2	Residential	227 units	101,129	1.170	7.023
	Retail	295 m²	2,553	0.030	0.059
	Communal	239 m²	3,259	0.038	0.075
Overall Site	Residential	502 units	223,642	2.588	15.531
	Retail	482 m²	4,177	0.220	0.097
	Communal	704 m²	9,639	0.112	0.223
	Crèche	329 m²	3,300	0.038	0.229

Table 7.4 Foul Network Summary

Water Supply

Existing Water Supply Infrastructure

There was a water supply to the site to serve the existing factory & staff facilities. The site is currently vacant with no abstraction from the public watermain network.

Proposed Water supply System
A new 150mm diameter HDPE water main pipe will be installed on site. It is proposed to provide 2no. connections from the site water system into the water main system nearby.

		Units / m²	Daily Flow (l/day)	Average Flow (l/s)	Peak Flow (l/s)
Catchment 1	Residential	275 units	111,375	1.611	8.057
	Crèche	329 m²	3,000	0.043	0.217
	Communal	465 m²	5,800	0.084	0.420
	Retail	187 m²	1,476	0.021	0.107
Catchment 2	Residential	227 units	91,935	1.330	6.650
	Retail	295 m²	2,321	0.034	0.168
	Communal	239 m²	2,963	0.043	0.214
Overall Site	Residential	502 units	203,310	2.941	14.707
	Retail	482 m²	3,797	0.055	0.275

	Communal	704 m²	8,763	0.127	0.634
	Crèche	329 m²	3,000	0.043	0.217

Table 7.5 Watermain Summary

7.5 POTENTIAL IMPACTS

The following provides an assessment of the potential impact on the water environment of the proposed development without mitigation measures being incorporated into the detailed design and construction phase. The mitigation measures and predicted impact of the proposed development are set out below.

Surface Water

Construction Phase
The following are the potential impacts of the proposed scheme during the construction stage:

- Mobilisation of sediments and harmful substances during the construction phase, due to exposed soil and earth movement/excavation
- Accidental spills of harmful substances such as petrol/diesel or oil during the delivery and storage of harmful substances or by leakages from construction machinery
- Potential for building materials or silts to be washed into the surface water system, causing blockages and pollution.

Operational Phase
There are currently no SUDS measures in place on site. There will be an impact on the surface water in the area due to the new development. However, the surface water system detailed in sections above will ensure the impact from the operational phase on surface water will be minimal and constitute a significant improvement from existing conditions.

There will be a decrease in the rate of surface water run-off from the new development due to the SUDS measures proposed. Surface water run-off will also improve in quality due to these measures.

There is very little risk of accidental spillages resulting in water quality issues during the operational stage.

Foul Water Drainage

Construction Phase
The following are the potential impacts of the proposed scheme during the construction stage:

- Mobilisation of sediments and harmful substances during the construction phase, due to exposed soil and earth movement, which may be flushed into the culverted stream during rainfall events.
- Accidental spills of harmful substances such as petrol or oil during the delivery and storage of harmful substances or by leakages from construction machinery.

Operational Phase
The development will result in an increase in the wastewater discharged from the site to the public sewer system. The foul outflow from the site will be directed to the existing system.

There exists a minor risk associated with the possibility of leakage from damaged foul sewers and drains within the development site. Any foul water leakage could result in minor contamination of groundwater in the area. The current foul water drainage system that is on site will need to be replaced. Placing a new system on site reduces the overall risk of leakage from damaged sewers.

A Pre-Connection Enquiry form was submitted to Irish Water. They have assessed the receiving sewerage system and deemed the additional foul flow into their system to be acceptable. A Confirmation of Feasibility Letter has been issued by them.

The basement car park discharges to the foul system via a petrol interceptor to prevent pollution from accidental oil spills.

The current surrounding foul water system has the capacity for the proposed development. The potential impact from the operational phase of the development is therefore likely to be minimal.

Water Supply

Construction Phase
During the connection of new mains to existing mains on site there is a small risk that contamination of the existing supply may occur. The potential impact on the local public water supply network would be short term and imperceptible.

Operational Phase
The new development will have an increase in the water supply demand.

7.6 POTENTIAL CUMULATIVE IMPACTS

Given the scale of the proposed residential development, and the capacity of the surrounding environment to accommodate a development of this nature, it is not likely to give rise to any significant effects cumulatively or, in combination with, other developments in the area.

7.7 MITIGATION MEASURES

Remedial and mitigation measures describe any corrective measures that are either practicable or reasonable, having regard to the potential impacts discussed above. This includes avoidance, reduction and remedy measures as per the guidance set out in Section 4.7 of the Development Management Guidelines 2007 to reduce or eliminate any significant adverse impacts identified.

Surface Water

Construction Phase
The following remedial or reductive measures to mitigate the impact of the construction phase on the existing environment are proposed with reference to water:

- A method statement for all works to be carried out will be prepared by the contractor and agreed with South Dublin County Council prior to commencement of works to outline what measures are to be taken to ensure there is no loss of service during the works.
- Dewatering measures should only be employed where necessary.
- If concrete mixing is carried out on site, the mixing plant should be sited in a designated area with an impervious surface.
- Existing surface drainage channels within the lands that serve adjacent lands should be retained where possible to prevent causing increased flooding impacts.
- Construction methods used should be tailored to reduce, as much as possible, dust and noise pollution.
- Comprehensive traffic management procedures, including the provision of access to all roads, and access/egress points should be prepared and agreed with the Local Authority. These traffic management measures should be implemented at times when traffic disruption may be experienced.
- Road sweeping and/or wheel wash facilities should be provided, as required.

- All oils/diesel stored on site for construction equipment are to be located in appropriately bunded areas.
- Filters and silt traps will be used to prevent rain washing silts and other materials into the surface water network and creating blockages.
- Adjacent watercourses/groundwater need to be protected from sedimentation and erosion due to direct surface water runoff generated onsite during the construction phase. To prevent this from occurring surface water discharge from the site will be managed and controlled for the duration of the construction works until the permanently attenuated surface water drainage system of the proposed site is complete. A temporary positive drainage system shall be installed prior to the commencement of the construction works to collect surface water runoff from the site during construction. A series of geotextile lined cascading, high level outfall, settling basins will be installed upstream of the agreed discharge point. This temporary surface water management facility will throttle runoff and allow suspended solids to be settled out and removed before being discharged in a control manner to the agreed outfall. Inlet to the cascading settling basins will be riprapped to prevent scour and erosion in the vicinity of the inlet.

Operational Phase
The following mitigation measures are proposed for the operational phase of the proposed development with reference to water:

- Water Quality: The SuDS measures in the new development including the green roofs for the apartments, the landscaping on the podiums and the car park permeable paving will improve the quality of surface water run from the site.

Foul Water Drainage

Effluent generated on the site from the contractor's sanitary facilities will be discharged to a holding tank and removed off site by a certified waste removal contractor in accordance with the requirements of the Waste Management Act of 1996 and 2001. Any other arrangements would be subject to agreement with SDCC Drainage Division.

The following remedial or reductive measures to mitigate the impact of the construction phase on the existing environment are proposed: -

Construction Phase

- All sewers will be inspected and where necessary sealed to ensure that uncontrolled ground water inflow does not occur.
- Any leakage from the foul sewer will be cordoned off and the contaminated effluent and soil collected and disposed by licensed contractors.

Operational Phase

- Dual & low flush toilets and water economy outlets will be used to reduce flows from the development.

Water Supply

Construction Phase

- Contact the local authority to adhere to the measures required for introducing a new watermain connection.
- Testing of the system meter & telemetry system is required.

Operational Phase

- The site water main system will be metered as directed by the Council to facilitate detection of leakage and the prevention of water loss.
- Dual & low flush toilets and water economy outlets will all be considered to reduce the water demand.

7.8 PREDICTED IMPACTS

Surface Water

Construction Phase
Provided that the proposed remedial or reductive measures are implemented, the impact of the proposed development during the construction stage will be of a temporary nature and will be minimised.

Operational Phase
There will be a decrease in surface water run-off from the new development due to the SUDS measures proposed. Surface water run-off will also improve in quality due to these measures.

Foul Water Drainage

Construction Phase
Provided that the proposed remedial or reductive measures are implemented, the impact of the proposed development during the construction stage will be of a temporary nature and will be minimised. There will be a temporary increase in traffic due to the delivery of materials and other construction related traffic.

The contractor's operations will result in the generation of effluent and sanitary waste from facilities provided for the workforce on site.

Operational Phase
The increase in water consumption and resulting foul water flow is a function of the usage of the development.

Water Supply

Construction Phase
Provided that the proposed remedial or reductive measures are implemented, there will be no appreciable impact of the proposed development during the construction stage on the water supply in the area.

Operational Phase
The increase in water consumption is a function of the usage of the development.

The installation of water saving devices will further reduce the impact of the re-development on the existing water supply network.

7.9 'DO NOTHING' SCENARIO

Surface Water

If the proposed development were not constructed there would be no effect on the existing surface water network and storm water from the lands will continue to be discharged to the sewerage system without attenuation or SUDs measures in place.

Foul Water Drainage

If the proposed development were not constructed there would be no effect on the existing foul water network and foul water from the site would continue to be discharged to the existing system.

Water Supply

If the proposed development were not to go ahead there would be no increase in the demand on the existing water supply network.

7.10 WORST CASE SCENARIO

Surface Water

A '*worst-case*' scenario is that flooding occurs on-site and in the surrounding area due to this development. The design of the new drainage system ensures that the pipe sizes, gradients etc. will be adequate for the design stormwater flows. The depth, size, gradient of the receiving culverted watercourse means that blockage downstream of the site is not deemed to be a risk.

Foul Water Drainage

A '*worst-case*' scenario resulting from the construction of the development would result in the contamination of groundwater and the local streams by foul effluent from the development. However, the mitigation measures outlined will ensure that this should not occur.

Water Supply

The '*worst case*' scenario would be the pollution of the water supply by an accidental spillage or contamination during the connection process. However, the mitigation measures proposed should ensure that this will not occur. Prior to connection to the public watermain, all watermains in the development will be tested and cleaned to the requirements of Irish Water.

7.11 MONITORING & REINSTATEMENT

All surface water drainage works will be approved by South Dublin County Council, Drainage Division, and will be carried out in accordance with Technical Guidance Document H Building Regulations, Drainage and Wastewater Disposal. Foul and water works will be carried out in accordance with Irish Water Codes of Practice.

Surface Water

Construction Phase
Monitoring during the Construction Phase of the development should consist of the following:

- Normal quality control inspection of the works
- Monitoring of possible discharges to the existing culverted watercourse at its outfall may also be required by GCC to ensure that no unauthorized discharges are occurring.
- Pressure testing and CCTV inspections of the surface water drains following completion of stages of the construction is recommended to ensure that the required construction standards are being maintained.
- Upon completion of the development, monitoring of the discharges from the development will be undertaken as required.

Operational Phase
Monitoring during the operational phase of the development is recommended as follows:

- All filters, silt traps, hydro-brakes and overflows should be inspected regularly and in particular after heavy rainfall events to ensure that they are not blocked.
- Gullies in the public road should be inspected and cleaned as required
- Pollutants which accumulate within the oil petrol interceptor on site should be regularly monitored and removed as necessary.

Foul Water

Construction Phase
Monitoring during the Construction Phase of the development should consist of the following:

- Normal quality control inspection of the works.
- Monitoring of possible discharges to the existing culverted watercourse is also required by GCC to ensure that no unauthorized discharges are occurring.
- Pressure testing and CCTV inspections of the foul sewers following completion of stages of the construction is recommended to ensure that the required construction standards are being maintained.
- Upon completion of the development, monitoring of the discharges from the development will be undertaken as required.

Operational Phase
No monitoring of foul effluent from the development is considered to be necessary.

Water Supply

Metering will allow the water supply to the development to be monitored, this is to be done to the requirements of Irish Water.

7.12 DIFFICULTIES IN COMPILING INFORMATION

Surface Water
None.

Foul Water Drainage
None.

Water Supply
None.

7.13 REFERENCES

- *Guidelines on the information to be contained in Environmental Impact Statements (EPA 2002) and Advice Notes on Current Practice in the preparations of Environmental Impact Statements (EPA 2003)*
- *BS EN 752:2008 "Drain and Sewer Systems outside Buildings"*
- *Part H of the Building Regulations*
- *Ciria C753 "The SUDS Manual"*
- *Sewers for adoption: 6th Edition*
- *Guidelines on the information to be contained in Environmental Impact Statements (EPA 2002) and Advice Notes on Current Practice in the preparations of Environmental Impact Statements (EPA 2003)*

8 NOISE & VIBRATION

8.1 INTRODUCTION

This section of the EIAR has been prepared by Traynor Environmental Ltd to identify and assess the potential noise impacts associated with the proposed development of lands for mixed use development at The Former Gallaher Site, Airton road, Tallaght, County Dublin during both the construction/demolition and operational phases of the development.

This chapter includes:

- A description of the receiving ambient noise climate in the vicinity of the subject site.
- An assessment of the potential noise and vibration impact associated with the proposed development during
    - The short-term construction/demolition phase and
    - The long-term operational phase on its surrounding environment.
- 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.

Proposed Development Site Location and Brief Description
This is as described in chapters 1 (introduction) and 3 (Description of Development) of this EIAR and as set out in the statutory notices.

Statement of Competence
In accordance with Article 5(3)(a) of the EU Directive, by appointing Traynor Environmental, the applicant has ensured that this chapter has been prepared by "Competent experts".

In accordance with Environmental Protection Agency (EPA) guidance "All competent persons must possess a combination of technical knowledge, experience and skills, and must be able to demonstrate both practical and theoretical competence and should participate in continual professional development. Competence may be demonstrated through reference to an appropriate qualification and/or professional membership of a recognised acoustic organisation (e.g. the Institute of Acoustics) and/or appropriate experience".

The monitoring and analysis of the data was conducted by Nevin Traynor of Traynor Environmental deemed to be a "competent person" as per criteria outlined by the EPA. The monitoring programme, data and report was carried out by Nevin Traynor who is certified as been competent in Environmental Noise Measurement by the Institute of Acoustics (IOA) with over 15 years' experience in Environmental and Acoustic Consultancy.

Figure 8.1 Site Layout (Source: Landscape Masterplan, Mitchell Associates)

8.2 METHODOLOGY

This assessment meets the requirements for an EIAR, as outlined in the relevant National and EU legislation, and has been prepared in accordance with guidance documents.

- BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites - Part 1 – Noise.
- BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites - Part 2 -Vibration.
- BS 7385-2:1993 *Guide for measurement of vibrations and evaluation of their effects on buildings*.
- *BS 4142: 2014: Methods for Rating and Assessing Industrial and Commercial Sound.*
- BS 8233:2014 Guidance on Sound Insulation and Noise Reduction for Buildings.

- BS 6841 (1987): Measurement and evaluation of human exposure to whole-body mechanical vibration and repeated shock.
- *ISO 1996: 2017: Acoustics - Description, Measurement and Assessment of Environmental Noise.*
- ProPG: Planning & Noise.
- EPA Advice Notes for Preparing Environmental Impact Statements, (Draft, September 2015).

The study has been undertaken using the following methodology:

- Baseline Noise monitoring and an Environmental Noise Survey has been undertaken across the development area to determine the range of noise levels at varying locations across the site.
    - The equipment used was a Larson Davis Sound Expert LxT and a Larson Davis Expert 831.
    - The Baseline monitoring periods were from June 07th up to and including June 9th, 2019 at Location A & B, from the June 11th up to and including the June 13th, 2019 at locations C, from the June 15th up to and including the June 17th, 2019 at locations D and from the June 12th up to and including the June 14th, 2019 at locations E (Table 8.8).
    - The Environmental Noise Survey monitoring period was carried out at five noise sensitive locations around the proposed development on September 18th, 2019 between 09:00hrs to 17:45hrs.

- 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/demolition and operational phases of the proposed development, this is summarised in the following sections.

- Predictive calculations have been performed to estimate the likely noise emissions during the construction/demolition phase of the project at the nearest sensitive locations (NSL) to the site.

- Predictive calculations have been performed to assess the potential impacts associated with the operation of the development at the most sensitive locations surrounding the development site; and,

- A schedule of mitigation measures has been proposed, where relevant, to control the noise and vibration emissions associated with both the construction/demolition and operational phases of the proposed development.

Construction/Demolition Phase – Noise Assessment Criteria

There is no published statutory Irish guidance relating to the maximum permissible noise level that may be generated during the construction/demolition phase of a project. South Dublin County Council (SDCC) typically controls 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 -1:2009 +A1 2014 Code of practice for noise and vibration control on construction and open sites- Noise*. Part 1 of this document Noise provides guidance on selecting appropriate noise criteria relating to construction works.

BS 5228-1:2009+A 1:2014 gives several examples of acceptable limits of construction and demolition noise, the most simplistic being based on upon the exceedance of fixed noise limits. For example, paragraph E.2 states:
'noise from construction and demolition sites should not exceed the level at which conversation in the nearest building would be difficult with windows shut.'

Paragraph E.2 goes on to state:
'noise levels, between 07:00 and 19:00 hours; outside the nearest window of the occupied room closest to the site boundary should not exceed:
70 decibels (dBA) in rural, suburban areas away from the main road traffic and industrial noise.
75 decibels (dBA) in urban areas near main roads in heavy industrial areas.'

Note that a typical planning condition in relation to construction noise issued by Local Authorities refer also to the compliance with BS 5228 part 1 as a means of controlling impacts to the surrounding environment. BS 5228 has therefore been used to inform the assessment approach for construction noise in line with Local Authorities requirements.

For residential properties it is considered appropriate to adopt the 75dB(A) during daytime. The construction noise limits, which are presented in Table 8.1 represent a reasonable compromise between the practical limitations in a construction project, and the need to ensure an acceptable noise level for the nearby residents and their sensitive receptors including amenity space. Table 8.1 specifies the recommended Project Noise Limit Criteria in accordance NRA Maximum Permissible Construction Phase Noise Levels at the Façade of Dwellings during road developments.

Construction Phase Noise Limit Criteria		
Days & Times	**L_{Aeq}, (1hr) dB**	**$L_{pA(max)}$ slow dB**
Monday to Friday - 07:00 to 19:00	70	80
Monday to Friday - 19:00 to 22:00	60	65
Saturday - 08:00 to 16:30	65	75
Sundays and Bank Holidays - 08:00 to 16:30	60	65

Table 8.1 NRA Maximum Permissible Construction Phase Noise Levels at the Façade of Dwellings during Road Developments.

Note 1: Construction activity at these times, other than that required in respect of emergency works, will normally require the explicit permission of the relevant local authority. For the appropriate assessment period (i.e. daytime in this instance) the ambient noise level is determined. If the construction noise exceeds, then a significant effect is deemed to occur.

The closest neighbouring noise sensitive property to the proposed development is a Primary Care Centre located approximately 25m north of the proposed site.

Construction/Demolition Phase – Vibration Assessment Criteria

Guidance relevant to acceptable vibration in order to avoid damage to buildings is contained within *BS 7385-2 (1993*). The guidance values contained within *BS 7385* are reproduced also in *British Standard BS 5228-2 (2009).*

These standards differentiate between transient and continuous vibration. Surface construction activities are considered to be transient in nature as they occur for a limited period of time at a given location. The standards note that the risk of cosmetic damage to residential buildings starts at a Peak Particle Velocity (PPV) of 15mm/s at 4Hz. The standard also notes that below 12.5mm/s PPV the risk of damage tends to zero. Both standards note that important buildings that are difficult to repair might require special consideration on a case by case basis but building of historical importance should not (unless it is structurally unsound) be assumed to be more sensitive. If a building is in a very unstable state, then it will tend to be more vulnerable to the possibility of damage arising from vibration or any other ground borne disturbance.

Table 8.2 below summarises the proposed vibration criteria below which there is no risk of damage to buildings. These limits apply to vibration frequencies below 15Hz where the most conservative limits are required. If there are any protected buildings near the works, there is a greater potential for these to be more vulnerable than other adjacent modern structures. Therefore, on a precautionary basis, the guidance values for structurally sound buildings are reduced by 50% in line with the guidance documents referred to above.

Category of Building	Threshold of potential significant effect (Peak Particle Velocity - PPV - at building foundation) for Transient Vibration
Structurally sound and non-protected buildings	12 mm/s
Protected and / or potentially vulnerable buildings	6 mm/s

Table 8.2 Transient Vibration Impact Criteria for Buildings (Conservative Criteria below which there is No Risk of Cosmetic Damage). Source: "Guidelines for the Treatment of Noise & Vibration in National Road Schemes", NRA, 2004

Building Response

As previously mentioned in table 8.2 the standard notes that below 12 mm/s PPV the risk of damage tends to zero. It is therefore common, on a cautious basis to use this lower value. Taking this into consideration the vibration criteria in Table 8.3 is 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 8.3 Recommended Vibration Criteria During Construction/Demolition Phase

Expected vibration levels from the construction works will be discussed further in Section 8.5.

Human Perception

It is acknowledged that humans are sensitive to vibration stimuli and that perception of vibration at high magnitudes may lead to concern. Vibration typically becomes perceptible at around 0.15 to 0.3 mm/s and may become disturbing or annoying at higher magnitudes. However, higher levels of vibration are typically tolerated for single events or events of short-term duration, particularly during construction projects and when the origin of vibration is known. For example, piling can typically be tolerated at vibration levels up to 6 mm/s respectively if adequate public relations are in place. These values refer to the day and evening time periods only.

Operational Phase -Noise Assessment Criteria

The operational phase of the development has been assessed with regard to the four Local Authorities in the Dublin Agglomeration - Dublin City Council, Dún Laoghaire - Rathdown County Council and South Dublin County Council in their role as designated Action Planning Authorities under Article 7 of the Environmental Noise Regulations 2006, Statutory Instrument Number 140 of 2006 (the Regulations). The Action Plan is aimed at managing Environmental Noise and excludes noise from domestic activities, noise created by neighbours, noise at workplaces or construction noise as these can be dealt with under existing legislation such as the Environmental Protection Agency Act 1992 and Health & Safety legislation.

Mechanical Plant

Due consideration must be given to the nature of the primary noise sources when setting criteria. Criteria for noise from these sources, with the exception of additional vehicular traffic on public roads, will be set in terms of the $L_{Aeq,T}$ parameter (the equivalent continuous sound level). In relation to day-to-day Operational Phase noise impacts on off-site residential locations South Dublin County Council would typically apply the following condition to a development of this nature:

Noise levels from the proposed development shall not be so loud, so continuous, so repeated, of such duration or pitch or occurring at such times as to give reasonable cause for annoyance to a person in any premises in the neighbourhood or to a person lawfully using any public place. In particular, the rated noise levels from the proposed development shall not constitute reasonable grounds for complaint as provided for in B.S. 4142. Method for rating industrial noise affecting mixed residential and industrial areas.

Reason: In order to ensure a satisfactory standard of development, in the interests of residential amenity.

This wording is most relevant to the noise emissions from mechanical plant serving the development and careful consideration will be given to this issue as part of the detailed assessment.

Guidance from SDCC on noise emissions from mechanical plant items typically makes reference to the *British Standard BS 4142: 2014: Methods for Rating and Assessing Industrial and Commercial Sound.* This guidance is the industry standard method for analysing building services plant noise emissions to residential receptors and is the document typically used by SDCC in their standard planning conditions and also in complaint investigations.

BS 4142 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.

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 in Table 8.4 below:

Noise	Description
ambient noise level, LAeq,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, LAeq,T	is the noise level produced by all sources excluding the sources of concern, i.e. the ambient sound remaining at the assessment location when the specific sound source is suppressed to such a degree that it does not contribute to the ambient sound, in terms of the equivalent continuous A-weighted sound pressure level over the reference time interval [T]
specific noise level, LAeq, 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, LAr,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, LA90,T	is the sound pressure level of the residual noise that is exceeded for 90% of the time period T

Table 8.4 Tonal Noise Characteristics

If the rated plant noise level is +10dB 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 +5dB 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.

Traffic Noise

Given that traffic to and from the development will make use of existing roads already carrying traffic volumes, it is appropriate to consider the increase in traffic noise level that arises as a result of vehicular movements associated with the development.

In order to assist with the interpretation of the noise associated with vehicular traffic on public roads, Table 8.5 offers guidance as to the likely impact associated with any particular change in traffic noise level (Source DMRB, 2011). It shows that small changes in noise levels are not normally noticeable, whereas an increase of 10dB would be described as a doubling of loudness. In summary the assessment looks at the impact with and without development at the nearest noise sensitive locations.

Change in Sound Level (dB)	Subjection Reaction	Magnitude of Impact	EPA Glossary of Effects[1]
0	None	No Change	Neutral
0.1 - 2.9	Imperceptible	Negligible	Imperceptible
3-4.9	Perceptible	Minor	Slight
5 - 9.9	Up to a doubling of loudness	Moderate	Moderate
10+	Over a doubling of loudness	Major	Significant

Table 8.5 Significance in Change of Noise Level Source: [1]EPA Guidelines on the Information to be contained in Environmental Impact Assessment Reports, (Draft August 2017)

Mechanical Plant and Employment Land Criteria

During the operational phase, potential noise sources relate to building and mechanical services used to serve the proposed development.

In order to set appropriate operational noise criteria for these potential sources, guidance has been taken from BS 8233:2014 Guidance on Sound Insulation and Noise Reduction for Buildings. The recommended internal noise levels for dwellings are set out in Table 8.6.
In order to set an external noise level based on the internal criteria noted above, this is done by factoring in the degree of noise reduction afforded by a partially open window, which BS 8233 suggests as 15dB. Using this value, external noise levels of 50 and 45dB $L_{Aeq,T}$ are considered appropriate for day and night-time periods respectively. The time period for day-time noise levels has been set over a 1-hour period to provide a robust criterion. Given the higher sensitivity of people to noise at night, the time period for night-time levels is set as 15mins. In this instance, the following criteria relate to the nearest noise sensitive properties external to the site.

- Daytime (07:00 to 23:00hrs) 50dB $L_{Aeq,1hr}$
- Night-time (23:00 to 07:00hrs) 45 dB $L_{Aeq,15min}$

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.

Inward Noise Impact

The Professional Guidance on Planning & Noise (ProPG) report was published in May 2017. This guidance 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; and
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 8.2 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 onsite.

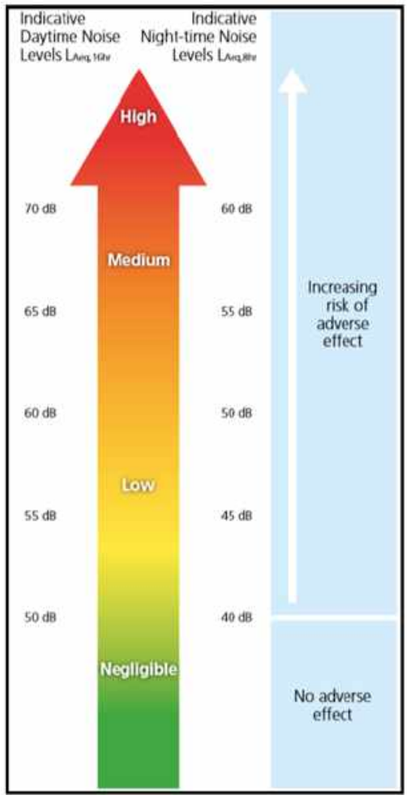


Figure 8.2 ProPG Stage 1- Initial Noise Risk Assessment

A site should not be considered a negligible risk if more than 10 L_{AFmax} events exceed 60dB during the night period and the site should be considered a high risk if the L_{AFmax} events exceed 80dB 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 8.5 below and are based on annual average data, that is to say they omit occasional events where higher intermittent noisy events may occur.

Activity	Location	(07:00 to 23:00)	(23:00 to 07:00)
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 8.6 ProPG Internal Noise Levels

**Note The document comments that the internal LAFmax, 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 5dB can still provide reasonable internal conditions.

The ProPG guidance provides the following advice with regards to external noise levels for amenity areas in the development:

'The acoustic environment of external amenity areas that are an intrinsic part of the overall design should always be assessed and noise levels should ideally not be above the range 50-55dB LAeq,16hr.'

Operational Phase – Vibration Assessment Criteria
Taking into account the proposed development under consideration here, there are no vibration sources associated with the operational phase. Operational criteria relating to this issue are therefore not included.

8.3 RECEIVING ENVIRONMENT

The proposed development is located at the Former Gallaher Site, Airton Road, Tallaght, Dublin 24. The proposal is for a mixed-use development on a site of c. 2.79ha. The proposal consists of:

- Demolition of existing factory/ warehouse buildings on site.
- Construction of 502 residential units comprising of 197 no. 1-Bed; 257 no. 2-Bed; and 48 no. 3-Bed apartments all with associated private balconies/terraces to the north/south/east/west elevations.
- Construction of 3 no. Retail Units; a creche; and communal facilities.
- The development will take place over 6 no. Blocks (A-F) ranging in height up to 8 storeys.
- The development will have 202 no. car parking spaces located at undercroft level of blocks A, B and C and at basement level of blocks E and F. 584 no. secure bike parking spaces are also provided. The site is accessed through 2 no. vehicular access to the north and east of the scheme. There will be a number of pedestrian entrances along Airton Road and Greenhills Road which also provide access for emergency vehicles.
- In addition to all of the new facilities, all other site services and works to enable the development of the site will also be provided including bins, ESB substations, boundary treatments and landscaping.
- Additional pedestrian crossing points and road improvements will also be provided along Greenhills Road and Airton Road.

Noise Monitoring Equipment
The equipment used during the baseline noise and environmental noise survey was installed and removed by Traynor Environmental. The noise measurements were carried out using the following equipment mentioned in Table 8.7 below. The instruments were checked and calibrated before and after the survey with no significant drift noted.

Instrumentation Details				
Manufacturer	**Instrument**	**Calibrated by**	**Calibration Certificate Ref**	**Last Laboratory Calibration**
Larson Davis Sound Expert LxT	(Serial No.5595)	Environmental Measurements, Unit 12, Tallaght Business Park, Dublin 24	2018004505	30th April 2018
Larson Davis Sound Expert 831	(Serial No.3913)	Environmental Measurements, Unit 12, Tallaght Business Park, Dublin 24	31417	8th March 2018

Table 8.7 Instrumentation Details Noise Monitoring Locations

Measurement Parameters
The noise survey results are presented in terms of the following parameters:
L_{Aeq} This is the equivalent continuous sound level. It is an average and is used to describe a fluctuating noise in terms of a single noise level over the sample period. The closer the Laeq value is to either the L_{A10} or L_{A90}

value indicates the relative impact of the intermittent sources and their contribution. The relative spread between the values determines the impact of intermittent sources such as traffic on the background.

L_{A90} This is the sound that is exceeded for 90% of the sample period. It is typically used as a descriptor for traffic noise.

L_{A10} This is the sound that is exceeded for 10% of the sample period. It is typically used as a descriptor for traffic noise.

L_{AFMIN} is the instantaneous minimum sound level measured during the sample period using the 'F' time weighting.

L_{AFmax} is the instantaneous maximum sound level measured during the sample period using the 'F' time weighting.

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 $2x10^{-5}$ Pa.

Baseline Noise Survey

The subject site is located on the Former Gallaher Site, Airton Road, Tallaght, Dublin 24 approximately 1.3km south west of the M50 motorway. The site is bounded to the north by a retail park, Kilnamanagh -Tymon Primary Care Centre and Airton road, east by the R819, to the south/south west by the Technological University Dublin Tallaght Campus and to the west by the Airton Training Centre. The Airton road area is characterised largely by commercial/retail development.

A baseline noise survey has been conducted at the site in order to quantify the existing noise environment. The survey was conducted in general accordance with *ISO 1996: 2017: Acoustics - Description, Measurement and Assessment of Environmental Noise*. Specific details are set out below.

Three measurement locations were selected as shown in Figure 8.3 below and described below.

Location A - located on the south/west boundary.
Location B - located on the west boundary.
Location C - located on the north boundary.
Location D - located on the east boundary.
Location E - located on the east of the proposed site.

Figure 8.3 Baseline nose monitoring locations

Survey Periods

Baseline noise survey measurements were conducted at Locations A – C over the following survey periods:

Location	Period	
	Start Time/Date	End Time/Date
A	23:00hrs on 07/06/19	22:30hrs on 09/06/19
B	23:00hrs on 07/06/19	22:30hrs on 09/06/19
C	23:00hrs on 11/06/19	22:30hrs on 13/06/19
D	23:00hrs on 15/06/19	22:30hrs on 17/06/19
E	23:00hrs on 12/06/19	22:30hrs on 14/06/19

Table 8.8 Baseline survey dates and times

Survey Results and Discussion

Location A

Date	L_{Aeq}	L_{AFmax}	$L_{AF10.00}$	$L_{AF90.00}$
07/06/2019	50.8	63.5	52.8	46.1
08/06/2019	51.3	64.9	53.6	47.0
Average	**51.05**	**64.20**	**53.20**	**46.55**

Table 8.9 Location A: Average Nighttime Noise

Date	L_{Aeq}	L_{AFmax}	$L_{AF10.00}$	$L_{AF90.00}$
08/06/2019	54.4	64.2	62.7	50.9
09/06/2019	51.9	72.9	61.8	49.0
Average	**53.15**	**68.55**	**62.25**	**49.95**

Table 8.10 Location A: Average Day time Noise

The noise environment at the measurement location A was dominated by intensive short duration noise events which are characteristic of road traffic noise from the R819 road. Daytime noise levels measured at 53.15 dB(A) L_{Aeq} and background noise levels measured 49.95 dB(A) L_{A90}. Nighttime noise levels were measured at 51.05 dB(A) L_{Aeq} and the measured background noise level was 46.55 dB(A) L_{A90}.

Location B

Date	L_{Aeq}	L_{AFmax}	$L_{AF10.00}$	$L_{AF90.00}$
07/06/2019	46.8	70.6	47.5	43.2
08/06/2019	46.0	64.8	47.2	42.8
Average	**46.40**	**67.40**	**47.35**	**43.00**

Table 8.11 Location B: Average Nighttime Noise

Date	L_{Aeq}	L_{AFmax}	$L_{AF10.00}$	$L_{AF90.00}$
08/06/2019	52.0	76.5	54.2	46.5
09/06/2019	49.1	67.4	52.1	41.5
Average	**50.55**	**71.95**	**53.15**	**44.00**

Table 8.12 Location B: Average Day time Noise

The noise environment at the measurement location B indicates that the measured noise was dominated by intensive short duration noise events which are characteristic of road traffic noise. Daytime noise measured at 50.55 dB(A) L_{Aeq} and background noise levels measured 44.00 dB(A) L_{A90}. Night-time measured at 46.40 dB(A) L_{Aeq} and the measured background noise level was 43.00 dB(A) L_{A90}.

Location C

Date	L_{Aeq}	L_{AFmax}	$L_{AF10.00}$	$L_{AF90.00}$
11/06/2019	47.5	67.3	47.6	41.3
12/06/2019	48.8	68.8	48.7	42.4
Average	**48.15**	**68.05**	**48.15**	**41.85**

Table 8.13 Location C: Average Nighttime Noise

Date	L_{Aeq}	L_{AFmax}	$L_{AF10.00}$	$L_{AF90.00}$
12/06/2019	59.4	75.2	62.7	50.9
13/06/2019	58.3	72.9	61.8	49.0
Average	**58.85**	**74.05**	**62.25**	**49.95**

Table 8.14 Location C: Average Day time Noise

The noise environment at the measurement location C indicate that the measured noise was dominated by intensive short duration noise events which are characteristic of road traffic noise. Daytime noise measured at 58.85 dB(A) L_{Aeq} and background noise levels measured 49.95 dB(A) L_{A90}. Night-time measured at 48.15 dB(A) L_{Aeq} and the measured background noise level was 41.85 dB(A) L_{A90}.

Location D

Date	L_{Aeq}	L_{AFmax}	$L_{AF10.00}$	$L_{AF90.00}$
15/06/2019	57.1	76.5	59.3	41.7
16/06/2019	56.9	77.1	58.9	43.0
Average	**57.00**	**76.10**	**59.10**	**42.35**

Table 8.15 Location D: Average Nighttime Noise

Date	L_{Aeq}	L_{AFmax}	$L_{AF10.00}$	$L_{AF90.00}$
16/06/2019	59.4	74.7	63.5	48.9
17/06/2019	61.1	78.1	64.6	52.7
Average	**60.25**	**76.4**	**64.05**	**50.80**

Table 8.16 Location D: Average Day time Noise

The noise environment at the measurement location D indicate that the measured noise was dominated by road traffic from the Greenhills Road (R819). Aircrafts from Casement Aerodrome were also a noise source on the 17th June 2019. It was noted that they had a minor impact on the ambient noise environment.
Daytime noise measured at 60.25 dB(A) L_{Aeq} and background noise levels measured 50.80 dB(A) L_{A90}. Night-time measured at 57.00 dB(A) L_{Aeq} and the measured background noise level was 42.35 dB(A) L_{A90}.

Location E

Date	L_{Aeq}	L_{AFmax}	$L_{AF10.00}$	$L_{AF90.00}$
12/06/2019	50.3	66.4	54.2	38.2
13/06/2019	50.2	65.0	54.1	39.6
Average	**50.25**	**65.70**	**54.15**	**38.90**

Table 8.17 Location E: Average Nighttime Noise

Date	L_{Aeq}	L_{AFmax}	$L_{AF10.00}$	$L_{AF90.00}$
13/06/2019	58.0	73.6	59.9	50.6
14/06/2019	56.1	68.0	58.7	48.6
Average	**57.05**	**70.80**	**59.30**	**49.60**

Table 8.18 Location E: Average Day time Noise

The noise environment at the measurement location E indicate that the measured noise was dominated by road traffic from the Greenhills Road (R819). Daytime noise measured at 57.05 dB(A) L_{Aeq} and background noise levels measured 49.60 dB(A) L_{A90}. Night-time measured at 50.25 dB(A) L_{Aeq} and the measured background noise level was 38.90 dB(A) L_{A90}.

Discussion and conclusions

Location A, B, C, D & E all indicate that the dominate intensive short duration noise events are characteristic of road traffic noise from the Greenhill Road (R819) and Airton Road. Aircrafts from Casement Aerodrome they had a minor impact on the ambient noise environment. The baseline noise environment will not require additional constraints to be imposed on the majority of the proposed project outside of the normal criteria applicable to a development of the scale and nature of that proposed.

Environmental Noise Survey

An environmental noise survey has been conducted at the site in order to quantify the existing noise environment. The survey was conducted in general accordance with ISO 1996: 2017: *Acoustics - Description, Measurement and Assessment of Environmental Noise*. Specific details are set out below. Five measurement locations were selected as shown in Figure 8.4 and described in Table 8.19 below.

Noise Measurement Location	Description
Location NM1	Located at Bankcroft Avenue, residential area, southeast of the proposed site.
Location NM2	Location at Technical University Dublin football pitch, southwest of the proposed site.
Location NM3	Location at the Broomhill road and Broomhill Close intersection, Industrial Estate, northwest of the proposed site.
Location NM4	Location at the north end of the Greenhills road, north of proposed site.
Location NM5	Location to the north east of the proposed site, Tymon North Green road.

Table 8.19 Description of Noise Measurement Location

Figure 8.4 Noise Monitoring Locations (Image Source: Google Maps)

**NM: Noise measurement, NSL: Noise Sensitive Location*

Survey Periods

The noise survey was carried out at five locations over the following period:

09:00hrs to 17:45hrs on 18th September 2019

For the purpose of this assessment, daytime is taken to be between 07:00 and 23:00, whilst nighttime is between 23:00 and 07:00. The weather during the daytime survey period was dry and with windspeeds range between 1 and 3m/s daytime temperature range between 10 - 18˚C. The weather during the nighttime was dry and calm with a minimum temperature of 8˚C 2.5m/s. (Weather information from met Éireann synoptic Casement weather station).

Survey Results and Discussion

The noise survey results for the five monitoring locations are summarised in Tables 8.20 – 8.24 below.

Location NM1

Time		Measured Noise Levels (dB re. $2x10^{-5}$Pa)				
		LA_{max}	LA_{min}	$LA_{10.00}$	$LA_{90.00}$	L_{Aeq}
Day	9:00	78.4	43.2	54.5	46.6	52.7
	12:45	79.6	44.3	55.2	47.5	53.5
	15:45	78.2	44.1	55.4	48.2	53.8

Table 8.20 Measured Noise Levels at NM1

The dominant noise source at this location was traffic on the R819 and various activities within the Bancroft housing estate. These include cars on the R819 and roads on the Bancroft estate and car parking at the estate. Background noise from the R819 was a significant noise source at this location. Other minor noise sources included sports activities from the Westpark Fitness Pitch to the south. The L_{Aeq} ranged from 52.7 to 53.8 dB. The L_{A90} ranged from 46.6 to 48.2 dB.

Location NM2

Time		Measured Noise Levels (dB re. $2x10^{-5}$Pa)				
		LA_{max}	LA_{min}	$LA_{10.00}$	$LA_{90.00}$	L_{Aeq}
Day	11:15	68.4	45.7	56.8	46.8	53.2
	13:15	66.8	45.5	55.9	50.1	53.8
	16:00	72.5	36.1	53.3	44.0	51.1

Table 8.21 Measured Noise Levels at NM2

NM2 was located Location at Technical University Dublin pitch, southwest of the proposed development. The ambient noise environment was primarily made up of background traffic noise from the R819. Other noise sources included whistle blowing and football activities. The ambient noise fluctuated when during whistle blowing and football activities. The L_{Aeq} ranged from 51.1 to 53.8 dB. The L_{A90} ranged from 44.0 to 50.1 dB.

Location NM3

Time		Measured Noise Levels (dB re. $2x10^{-5}$Pa)				
		LA_{max}	LA_{min}	$LA_{10.00}$	$LA_{90.00}$	L_{Aeq}
Day	11:45	72.6	49.9	63.5	52.8	60.3
	14:00	71.8	49.8	63.2	51.4	59.8
	16:30	70.6	48.4	62.3	50.4	58.2

Table 8.22 Measured Noise Levels at NM3

The existing noise environment at NM3 is in an industrial estate and is made up of the various activities along the Broomhill road and Broomhill Close intersection. These include cars and lorries on the roads at Broomhill. Background noise from the Airton Road was a significant noise source at this location. People walking and talking was also a contributing noise source. The L_{Aeq} ranged from 58.2 to 60.3 dB. The L_{A90} ranged from 50.4 to 52.8 dB. The variation in L_{Aeq} can be attributed to the cars and lorries on the roads near the measurement location.

Location NM4

Time		Measured Noise Levels (dB re. $2x10^{-5}$Pa)				
		LA_{max}	LA_{min}	$LA_{10.00}$	$LA_{90.00}$	L_{Aeq}
Day	12:00	81.4	47.6	64.3	52.0	60.8
	15:00	82.5	46.3	64.4	52.1	61.2
	16:45	72.3	46.2	64.8	51.5	60.6

Table 8.23 Measured Noise Levels at NM4

NM4 was located along the north east of the proposed site, beside the R819. The ambient noise environment was primarily made up of background traffic noise from the R819. Other noise sources included parking area in front of retail sites. The ambient noise fluctuated from volume of road traffic on the R819. The L_{Aeq} ranged from 60.8 to 61.2 dB. The L_{A90} ranged from 51.5 to 52.1 dB.

Location NM5

Time		Measured Noise Levels (dB re. $2x10^{-5}$Pa)				
		LA_{max}	LA_{min}	$LA_{10.00}$	$LA_{90.00}$	L_{Aeq}
Day	12:30	74.5	43.5	55.5	46.6	52.6
	15:15	78.2	45.6	55.8	48.7	54.2
	17:15	77.8	44.6	55.8	47.2	53.2

Table 8.24 Measured Noise Levels at NM5

The existing noise environment at NM5 is made up of the various activities within the Housing Estate. These include cars on the estate roads, dogs barking, lawnmowers, children playing. Background noise from the R819 was faintly audible but was not a significant noise source at this location. The L_{Aeq} ranged from 52.6 to 54.2 dB. The L_{A90} ranged from 46.6 to 48.7 dB.

Conclusion

The results of the environmental noise survey study suggest the noise environment will not require additional constraints to be imposed on the majority of the proposed Project outside of the normal criteria applicable to a development of the scale and nature of that proposed.

8.4 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

The proposed development consists of circa 502 no. residential units, a creche, a retail area, communal facilities and all associated ancillary site development works. A detailed description of the development is provided in Chapter 3 (Description of Development).

When considering a development of this nature, the potential noise and vibration impact on the surroundings is considered for each of two distinct stages:

- Construction/Demolition Phase.
- Operational Phase

The construction/demolition phase will involve demolition of existing buildings, excavation over the development site, landscaping, construction of internal roads, excavation of foundations, building and transport of materials to site using the local road network. Buildings shall be demolished by approved methods and in a manner that reduces the impact on ambient noise levels. This phase will generate the highest potential noise impact due to the works involved, however the time frame is short term in nature.

The primary sources of outward noise in the operational context are deemed to be long term in duration and will comprise traffic movements to site using the existing road network. (These issues are discussed in detail in the following sections).

8.5 POTENTIAL IMPACTS

The potential noise and vibration impacts associated with the construction/demolition and operational phases of the proposed development are discussed in the following sections.

Construction/Demolition Phase

Noise

A review of the baseline noise survey and the threshold values detailed in Table 8.1 indicates that the daytime noise guidance limit for construction/demolition noise is **65dB L_{Aeq}**. It is assumed that construction/demolition works will take place during normal working hours only. During the construction/demolition phase of the proposed development, a variety of items of plant will be in use, such as excavators, dumper trucks, compressors and generators.

Due to the nature of daytime activities undertaken on a construction site of this nature, there is potential for generation of significant levels of noise. The flow of vehicular traffic to and from a construction site is also a potential source of relatively high noise levels.

Taking into account the outline construction/demolition programme, it is possible to predict typical noise levels using guidance set out in BS 5228-1:2009+A1:2014. Table 8.21 outlines typical plant items and associated noise levels that are anticipated for various phases of the construction programme.

Activity	Item of Plant (BS5228 Ref)	Noise level at 10m Distance (dB $L_{Aeq\ (1hour)}$)
Site Preparation (Phase 1)	Wheeled Loader Lorry (D3 1)	75
	Track Excavator (C2 22)	72
	Dozer (C2.13)	78
	Dump Truck (C4.2)	78
	Cumulative Site Preparation	82
Demolition (Phase 2)	Pulveriser on Tracked Excavator (C1.5)	72
	Tracked Crusher (C1.14)	82
	Pulveriser on Tracked Excavator (C1.4)	76
	Dump Truck (C2.30)	79
	Diesel Generator (C4.76)	61
	Cumulative Site Clearance	85
General Construction (Phase 3)	Dump Truck (C2.30)	79
	Tracked excavator (02.21)	71
	Compressor (D7.08)	70
	Telescopic Handler (C4.54)	79
	Handheld Circular Saw (C4.72)	79
	Diesel Generator (C4.76)	61
	Internal Fit out	70
	Cumulative General Construction	84

Road Works/Landscaping (Phase 4)	Asphalt Paver & Tipping Lorry (C5.30)	75
	Electric Water Pump (C5.40)	68
	Vibratory Roller (C5.20)	75
	Cumulative General Landscaping and Road Work	78

Table 8.25 Predicted Noise Levels from Key Pieces of Equipment

The calculations also assume that the equipment will operate for 66% of the 12-hour working day (i.e. 8 hours) and that a standard site hoarding, typically 2.4m height will be erected around the perimeter of the construction site for the duration of works. It is assumed that construction works will take place during normal working hours only. The closest noise sensitive locations (NSL) have been identified as shown in Figure 8.4 and described below in table 8.26.

Noise Sensitive Locations	Description
Location NSL1	This represents the Kilnamanagh – Tymon Primary Care Centre located off the R819 to the north east of the proposed site approximately 25m from the nearest significant site work,
Location NSL2	This represents an Astro Park located along the east boundary of the proposed site approximately 40m from the nearest significant site works;
Location NSL3	This represents the West Park Fitness centre located off the R819 to the south east of the proposed site approximately 50m from the nearest significant site work,
Location NSL4	This represents Technological University Dublin, Tallaght Campus located off the R819 to the south west of the proposed site approximately 300 from the nearest significant site work.
Location NSL5	This represents a Storage Building located to the west of the proposed site approximately 30m from the nearest significant site works.

Table 8.26 Description of Noise Measurement Location

Figure 8.5 Site Context & Noise Assessment Locations (Image Source: Google Maps)

Predicted Noise Level at Various Locations

In order to assess the level of Environmental noise associated with the proposed development a number of noise sensitive locations were considered. Figure 8.4 details the locations from the nearest façade of the neighbouring building to the proposed development.

Table 8.27 below presents the predicted daytime noise levels from an indicative construction period at these noise sensitive locations (NSL).

Construction Phase	Item of Plant (BS5228-1 Ref)	L_{Aeq} at distance (m)				
		NSL1	NSL2	NSL3	NSL4	NSL5
		25m	40m	50m	300m	30m
		dB	dB	dB	dB	dB
Site Preparation (Phase 1)	Wheeled Loader Lorry (D3 1)	63	60	59	50	62
	Track Excavator (C2 22)	60	57	56	47	59
	Dozer (C2.13)	66	63	62	53	65
	Dump Truck (C4.2)	66	63	62	53	65
	Cumulative Site Preparation	**70**	**67**	**66**	**57**	**69**
Demolition (Phase 2)	Pulveriser on Tracked Excavator (C1.5)	60	57	56	47	59
	Tracked Crusher (C1.14)	70	67	66	57	69
	Pulveriser on Tracked Excavator (C1.4)	64	61	60	51	63
	Dump Truck (C2.30)	67	64	63	54	66
	Diesel Generator (C4.76)	49	46	45	36	48

	Cumulative Site Clearance	**73**	**70**	**69**	**60**	**72**
General Construction (Phase 3)	Dump Truck (C2.30)	67	64	63	54	66
	Tracked excavator (02.21)	59	55	54	46	56
	Compressor (D7.08)	58	54	53	45	55
	Telescopic Handler (C4.54)	67	64	63	54	66
	Handheld Circular Saw (C4.72)	67	64	63	54	66
	Diesel Generator (C4.76)	49	46	45	36	48
	Internal Fit out	58	54	53	45	55
	Cumulative General Construction	**72**	**69**	**68**	**59**	**70**
Road Works/ Landscaping (Phase 4)	Asphalt Paver & Tipping Lorry (C5.30)	63	60	59	50	62
	Electric Water Pump (C5.40)	56	53	52	43	55
	Vibratory Roller (C5.20)	63	60	59	50	62
	Cumulative General Landscaping and Road Work	**66**	**63**	**62**	**53**	**65**

Table 8.27 Indicative Construction Noise Levels at Nearest Noise Sensitive Locations

Taking into account these assumptions and allowing for the attenuation of sound over distance, the predicted construction noise level at the nearest sensitive properties is above the relevant construction noise criteria, i.e. the level at which a potential significant impact could be expected to occur, at noise sensitive locations within 50m of site work. Also, considering the proximity of NSL1 (approx. 25m at nearest point), NSL2 (approx. 40m at nearest point), NSL3 (approx. 50m at nearest point) and NSL5 (approx. 30m at nearest point) a potential significant impact is associated with this aspect of the site preparation, demolition and general construction in the absence of mitigation. Also, NSL1 and NSL5 (approx. 25m-30m at the nearest point) has potential significant impact associated with this aspect of road works/landscaping, in the absence of mitigation.

Review of the predicted noise levels at these locations are above the criteria at which a significant impact is deemed to occur (65dB $L_{Aeq,T}$) and therefore, in the absence of noise mitigation, a **negative**, **significant** and **short-term** impact is likely.

At greater distances (property represented by NSL4) predicted construction noise levels are lower, therefore any impact is expected to be **negative, moderate and short-term.**

Construction Traffic

The noise levels associated with mobile plant items such as concrete mixer trucks, loaders etc. operational on site have been included as part of the construction noise assessment and calculated noise levels in Table 8.23. Consideration should also be given to the addition of construction traffic along the site access routes. Access to the development site for construction traffic will be via the Airton Road to the north of the proposed development.

It is possible to calculate the noise levels associated with the passing vehicle using the following formula.

$$L_{Aeq,T} = L_{AX} + 10\log_{10}(N) - 10\log_{10}(T) + 10\log_{10}(r_1/r_2)\text{dB}$$

Where: $L_{Aeq,T}$ = is the equivalent continuous sound level over the time period Tin seconds.
L_{AX} = is the "A-weighted" Sound Exposure Level of the event considered(dB).
N = is the number of events over the course of time period T.
r_1 = is the distance at which LAX is expressed.
r_2 = is the distance to the assessment location

A calculation distance of 5m from the road has been used to assess noise levels at the closest buildings along the construction routes. The mean value of Sound Exposure Level for truck moving at low to moderate speeds (i.e. 15 to 45km/hr) is of the order of 82dB L_{ax} at a distance of 5 metres from the vehicle. This figure is based on a series of measurements conducted under controlled conditions. Construction vehicle are predicted in the table below for peak hours associated with each key phase. Table 8.28 below summarises the calculated noise level associated with passing haul vehicles during each phase, assuming the peak hour flows per day.

Construction Phase	No. of Trucks/peak hour	Calculated Noise at edge of road (5m),dB $L_{Aeq,\ 1hr}$
Phase 1	3	55
Phase 2	10	61
Phase 3	2	51
Phase 4	3	53

Table 8.28 Calculated Construction Traffic Noise Levels at Edge of Road

The calculated noise levels associated with the various phases are in the range of 51 to 61dB $L_{Aeq,1hr}$. The calculated noise levels are below the construction noise criterion of 65dB. In addition, it should be noted that, in order to assess a worst- case scenario, a large proportion of the daily vehicle numbers have been assumed to arrive/depart over an hour-long period.

Vibration

The main potential source of vibration during the construction programme is associated ground-breaking activities.

Considering the low vibration levels at very close distances to the ground-breaking activities, vibration levels at the nearby buildings are not expected to pose any significance in terms of cosmetic or structural damage to any of the residential or sensitive buildings in proximity to the development works. In addition, the range of vibration levels is typically below a level which would cause any disturbance to occupants of nearby buildings.

It is anticipated that excavations will be made using standard excavation machinery, which typically do not generate appreciable levels of vibration close to the source. Taking this into account and considering the distance that these properties are from the works and the attenuation of vibration levels over distance, the resultant vibration levels are expected to be well below a level that would cause disturbance to building occupants or even be perceptible.

The associated impact with these activities is considered to be **neutral** and **imperceptible.**

Operational Phase

Noise

There are six primary potential sources of noise associated with the development once operational these are:

- Additional vehicular traffic on public roads.
- Inward Noise Impact.
- Mechanical plant noise.
- Residential.
- Retail units.
- Creche.

Each of these primary noise sources is addressed in turn in the following sections.

Note there is no significant source of vibration associated with the operational phase of the proposed development.

Additional Traffic on Adjacent Roads

During the operational phase of the proposed development, there will be an increase in vehicular traffic associated with the site on some surrounding roads.

A traffic impact assessment relating to the proposed development has been prepared by Barrett Mahony Consulting Engineers Civil & Structural, as part of this EIAR. Using this information and Project Appraisal Guidelines from Transport Infrastructure Ireland related noise impacts of the road links has been assessed.

Table 8.29 below displays the predicted change in noise level at different road links around the site for the year of opening and the design year using the Annual Average Daily Traffic (AADT).

Road Links	2022 Opening Year Base		
	AADT Without Development	AADT With Development	Change in Noise Level
Belgard Road/Airton Road	30,696	31,180	0.3
Greenhills Road/Airton Road	14,719	15,374	0.4
Road Links	2027 Year Base		
	AADT Without Development	AADT With Development	Change in Noise Level
Belgard Road/Airton Road	32,814	33,331	0.3
Greenhills Road/Airton Road	15,735	16,435	0.4
Road Links	2037 Year Base		
	AADT Without Development	AADT With Development	Change in Noise Level
Belgard Road/Airton Road	34,717	35,264	0.3
Greenhills Road/Airton Road	16,647	17,387	0.5

Table 8.29 Predicted Change in Noise Level associated with Vehicular Traffic – Existing Road Network

With reference to Table 8.5, the predicted change in noise level associated with additional traffic accessing the proposed development, for the existing road network, has a negligible effect. The impact is therefore **imperceptible** and **long term.**

Inward Noise Impact
An assessment of the inward noise impact from road traffic sources has been carried out and is included in section 8.8 below. In summary the noise levels across the site ranges from low to medium noise risk in accordance with the guidance in ProPG.

Mechanical Plant
It is expected that the principal items of building and mechanical services plant will be associated with the proposed retail units. These items will be selected at a later stage, however, they will be designed and located so that there is no negative impact on sensitive receivers within the development itself. The services plant will be designed/attenuated to meet the relevant plant noise criteria for day and night-time periods at nearby sensitive receivers as set out in Section (Human Perception)

Residential
The noise impact of the residential aspect of the development on the receiving environment will be slight. It will be limited to internal vehicle movements entering and exiting the undercroft carpark, and residents using the public open space which will be screened by the retail units, creche and commercial facilities.

Retail Unit
The retail unit of the development will also have a potential noise impact on the residential aspect of the development; however this aspect of the development will not occur during the night-time period. The main noise associated with a retail premises is from deliveries by lorries or van and from external speakers. External speakers shall not be used at any of the retail units. All deliveries will be only permitted between 07:00hrs – 19:00hrs, in order to ensure that this activity does not impact the more sensitive night-time period. Retail units shall be posted appropriate signage to this effect.

Creche
The Creche which is located in the centre of the site will serve the residents of the development. The opening hours of the creche is expected to be from 7am – 7pm Monday to Friday. No early morning noise associated with the creche is expected before 7am. The noise of children playing in any environment is regarded as a natural aspect of life in any area of a development.

Taking into account that sensitive receivers within the development are much closer than off-site sensitive receivers, once the relevant noise criteria is achieved within the development it is expected that there will be no negative impact at sensitive receivers off site.

8.6 POTENTIAL CUMULATIVE IMPACTS

Construction/Demolition Phase
During the construction/demolition phase of the proposed development, construction noise on site will be localised and will therefore likely be the primary noise source at the nearest noise sensitive receivers. In the event that construction activities associated with the majority of developments noted above occur simultaneous to the proposed development, they are at sufficient distances such that the cumulative noise levels will remain dominated by the localised works referred to in Table 8.23.

In the event that works on site and works associated with proposed or permitted developments were ongoing simultaneously, there is potential for cumulative noise impacts at NSL1, NSL2, NSL3 and NSL5. Under this scenario, construction/demolition activities will be audible at a number of facades of the residential areas due to their location with respect to both areas of works.

The contractor will be required to control noise and vibration impacts associated with this development in line with the guidance levels included in Table 8.1 and Table 8.2 and follow the best practice control measures within BS 8228-2.The impact from any construction works associated with the other developments listed above is considered to be imperceptible as these works are expected to take place at large distances to the most exposed noise sensitive receivers to the proposed development under assessment.

Operational Phase
The operational phase of the development listed above have the potential to generate additional traffic on the roads in the vicinity of the local area. These additional vehicle movements have been taken into account in the traffic assessment in the operational phase of the potential impact section. The cumulative impact of this source is determined to be imperceptible and long term.

8.7 PREDICTED IMPACTS

Construction/Demolition Phase
During the construction/demolition phase of the project there is the potential for significant and moderate impacts on nearby noise sensitive properties due to noise emissions from site activities.
The demolition phase of the re-development of The Former Gallaher Site shall be conducted utilising standard demolition techniques in accordance with industry standards.

This stage of demolition will generate medium levels of noise generated principally as a result of manual works involving handheld power tools. As these works will occur generally within the structures of the buildings, there will not be a significant noise impact from these activities.

The application of binding noise limits, hours of operation, along with implementation of appropriate noise and vibration control measures, will ensure that noise and vibration impact will have a **negative, moderate** and **short-term** impact on the surrounding environment.

Operational Phase

Additional Vehicular Traffic

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.

Mechanical Plant, Retail units & Creche

Noise levels associated with operational plant are expected to be well within the adopted day and night-time noise limits at the nearest noise sensitive properties taking into account the site layout, the nature and type of units proposed and distances to nearest residences. Assuming the operational noise levels do not exceed the adopted design goals, the resultant residual noise impact from this source will be of neutral, Imperceptible, long term impact.

Local Aircraft Noise

The proposed development is approx. >5.0 km east from the Casement Aerodrome runway. The proposed development is not located within the Casement Aerodrome inner horizontal surface but is located within the approach & take off climb surfaces. The proposed development is potentially within the flight path of emergency helicopter associated with Tallaght University Hospital and garda helicopters. During the baseline and environmental noise surveys aircraft movements associated with Casement Aerodrome were observed and it was noted that they had a minor impact on the ambient noise environment. Road traffic on the Greenhills Road (R819) and Airton Road was the dominated noise at the site.

8.8 MITIGATION MEASURES

Construction/Demolition Phase - Noise

With regard to construction/demolition 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*. Whilst construction noise and vibration impacts are expected to vary during the construction/demolition phase depending on the distance between the activities and noise sensitive buildings, the contractor will ensure that all best practice noise and vibration control methods will be used, as necessary in order to ensure impacts at off-site noise sensitive locations are minimised.

The best practice measures set out in BS 5228 (2009) Parts 1 and 2 includes guidance on several aspects of construction site mitigation measures, including, but not limited to:

- Selection of quiet plant.
- Noise control at source.
- Screening.
- Liaison with the public, and.
- Monitoring

A detailed comment is offered on these items in the following paragraphs. Noise control measures that will be considered include the selection of quiet plant, enclosures and screens around noise sources, limiting the hours of work and noise and vibration monitoring, where required.

Selection of Quiet Plant

This practice is recommended in relation to static plant such as compressors and generators. It is recommended that these units be supplied with manufacturers' proprietary acoustic enclosures. The potential for any item of plant to generate noise will be assessed prior to the item being brought onto the site. The least noisy item should be selected wherever possible. Should a particular item of plant already on the site be found to generate high noise levels, the first action should be to identify whether or not said item can be replaced with a quieter alternative.

Noise Control at Source

If replacing a noisy item of plant is not a viable or practical option, consideration will be given to noise control "at source". This refers to the modification of an item of plant or the application of improved sound reduction methods in consultation with the supplier. For example, resonance effects in panel work or cover plates can be reduced through stiffening or application of damping compounds; rattling and grinding noises can often be controlled by fixing resilient materials in between the surfaces in contact.

Referring to the potential noise generating sources for the works under consideration, the following best practice mitigation measures should be considered:

- Site compounds will be located in excess of 30m from noise sensitive receptors within the site constraints. The use lifting bulky items, dropping and loading of materials within these areas should be restricted to normal working hours.
- For mobile plant items such as dump trucks, excavators and loaders, the installation of an acoustic exhaust and/or maintaining enclosure panels closed during operation can reduce noise levels by up to 10dB. Mobile plant should be switched off when not in use and not left idling.
- For steady continuous noise, such as that generated by diesel engines, it may be possible to reduce the noise emitted by fitting a more effective exhaust silencer system or utilising an acoustic canopy to replace the normal engine cover. For concrete mixers, control measures should be employed during cleaning to ensure no impulsive hammering is undertaken at the mixer drum.
- For all materials handling ensure that materials are not dropped from excessive heights, lining drops chutes and dump trucks with resilient materials.
- For compressors, generators and pumps, these can be surrounded by acoustic lagging or enclosed with in acoustic enclosures providing air ventilation.
- Demountable enclosures can also be used to screen operatives using hand tools and will be moved around site as necessary.
- All items of plant should be subject to regular maintenance. Such maintenance can prevent unnecessary increases in plant noise and can serve to prolong the effectiveness of noise control measures.

Screening

Screening is an effective method of reducing the noise level at a receiver location and can be used successfully as an additional measure to all other forms of noise control. Construction site hoarding will be constructed around the site boundaries as standard. The hoarding will be constructed of a material with a mass per unit of surface area greater than 7 kg/m^2 to provide adequate sound insulation.

In addition, careful planning of the site layout will also be considered. The placement of site buildings such as offices and stores will be used, where feasible, to provide noise screening when placed between the source and the receiver.

Liaison with the Public

A designated environmental liaison officer will be appointed to site during construction works. Any noise complaints should be logged and followed up in a prompt fashion by the liaison officer. In addition, where a particularly noisy construction activity is planned or other works with the potential to generate high levels of noise, or where noisy works are expected to operate outside of normal working hours etc., the liaison officer will inform the nearest noise sensitive locations of the time and expected duration of the noisy works.

Monitoring

Where required, construction noise monitoring will be undertaken at periodic sample periods at the nearest noise sensitive locations to the development works to check compliance with the construction noise criterion.

Noise monitoring should be conducted in accordance with the International Standard ISO 1996: 2017: *Acoustics - Description, measurement and assessment of environmental noise.*

Project Programme

The phasing programme will be arranged so as to control the amount of disturbance in noise and vibration sensitive areas at times that are considered of greatest sensitivity. During excavation or when other high noise generating works are in progress on a site at the same time as other works of construction that themselves may generate significant noise and vibration, the working programme will be phased so as to prevent unacceptable disturbance at any time.

Construction/Demolition Phase - Vibration

The vibration from construction activities will be limited to the values set out in Section 8.2 (Methodology). Magnitudes of vibration slightly greater than those in the table are normally unlikely to cause cosmetic damage, but construction work creating such magnitudes should proceed with caution. Limit values have been provided for soundly constructed residential and commercial properties.

Operational Phase

Additional Traffic on Adjacent Roads

During the operational phase of the development, noise mitigation measures with respect to the outward impact of traffic from the development are not deemed necessary.

Mechanical Services Plant

Taking into account that sensitive receivers within the development are much closer than off-site sensitive receivers, once the relevant noise criteria is achieved within the development it is expected that there will be no negative impact at sensitive receivers off site, and therefore no further mitigation required.

Inward Noise Impact

External noise can enter rooms within developments through windows, ventilators, walls, roof and doors. In most cases windows provide the main pathway. Mitigation measures has focussed on these building elements to ensure that the insulation is adequate.

The internal noise levels of the proposed development can be controlled with suitable sound insulating facades, including glazing and acoustically attenuated ventilation. However, it is usually more desirable to control noise levels by other means so that windows can be opened for natural ventilation. There shall be no standard passive air vents on any external walls to reduce the breakthrough of external noise. The apartments shall include acoustically attenuated ventilation.
In order to determine internal noise levels within the proposed site a review of the baseline noise survey, operational phase noise and building elements have been undertaken as set out below.

All residential units with facades facing towards the Greenhill Road (R819) and the Airton Road shall have acoustically rated high performing double/ triple pane window sets (inclusive of glazing, frames, seals and openable elements) to prevent the breakthrough of external noise.

The facades highlighted in Figure 8.5 below will provided the minimum sound insulation performance for bedrooms and living areas.

Glazing Specification	Octave Band Centre Frequency (Hz)						R_w
	125	250	500	1k	2k	4k	
Bedroom	21	31	39	41	41	52	40
Living Areas	22	20	26	34	46	39	32

Table 8.30 Sound Insulation Performance Requirements for Glazing, SRI (dB)

The overall Rw 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 8.30 or greater.

On review of the baseline noise survey and operational phase noise, levels across the development site over day and night-time periods require two types of glazing. This glazing will achieve the recommended internal noise levels for day and night-time periods within living rooms and bedrooms.

It is important to note that the acoustic performance specifications detailed herein are minimum requirements which apply to the overall glazing system.

All window sets should be tested for sound insulation in accordance with BS EN ISO 140 and BS EN ISO 717
Under the provisions of the Department of the Building Regulations Approved Document E "Sound" 2014, all residential developments require to achieve acoustic privacy between adjoining residential living areas. The table below provides details sound insulation performance requirements.

Separating Construction	Airborne sound insulation $D_{nT,w}$dB	Impact Sound insulation $L'_{nT,w}$dB
Wall	53 (min)	-
Floors (Including stairs with a separating function)	53 (min)	58(max)

Table 8.31 Sound Performance levels

8.9 'DO-NOTHING' SCENARIO

Should the project not proceed there would be no increase in noise emanating from the site.

8.10 'WORST-CASE' SCENARIO

The 'worst case' scenario is that the development is not constructed as per the drawings and details provided in the planning application. While one would expect the development is required to be constructed in accordance with the planning documents which includes various mitigation measures outlined above.

Daytime Noise levels from the baseline noise survey range from 50.55 – 60.25dB L_{Aeq} and the nighttime levels ranged from 46.40 – 57.00dB L_{Aeq} across the proposed development site. These figures are in the low – medium risk area based on the ProPG guidelines. When the development becomes fully operational, due to people walking/running, dogs barking, children playing, mechanical plant, retail units, creche and addition vehicular traffic on surrounding roads noise will increase slightly

The 'worst case' scenario would be that the attributes, mitigation measures were not carried out, the ProPG Internal Noise Levels guidelines, BS 8233:2014 Guidance on Sound Insulation and Noise Reduction for Buildings are not met.

8.11 MONITORING AND REINSTATEMENT

Construction/Demolition Phase

It is recommended that monthly noise and vibration monitoring surveys be carried along the boundary of the proposed site in order to monitor the effectiveness of noise and vibration management for the duration of the construction/demolition phase. Noise and vibration levels at Residential Sensitive Locations should not exceed the construction/demolition phase noise and vibration limit criteria in Table 8.1 and Table 8.2. Any breaches of these

limits will require a review of operations and mitigation measures if the exceedance is due to the construction works on site.

In order to effectively manage noise and vibration at Kilnamanagh - Tymon Primary Care Centre, installation of continuous data logging live noise and vibration monitoring system is required. This software will require remote login, data download and text/email alert functionality. It will measure key noise and vibration parameters (e.g. L_{Aeq}, L_{AFMAX}, L_{A90}, L_{A10}, PPV(mm/sec) and Frequencies as Hz.

Operational Phase
When the residential development is operational it will not result in an increase in noise and vibration levels at any of the sensitive locations beyond the site boundary therefore no monitoring is deemed necessary going forward.

8.12 DIFFICULTIES IN COMPILING INFORMATION

No difficulties were encountered during the preparation of the EIAR chapter.

8.13 REFERENCE

- BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites - Part 1 - Noise.
- BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites - Part 2 -Vibration.
- BS 6841 (1987): Measurement and evaluation of human exposure to whole-body mechanical vibration and repeated shock
- BS 4142: 2014: Methods for Rating and Assessing Industrial and Commercial Sound.
- Design Manual for Roads and Bridges, 2011
- EPA Advice Notes for Preparing Environmental Impact Statements, (Draft, September 2015).
- 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 Statements, (EPA, 2002).
- EPA Guidelines on the Information to be contained in Environmental Impact Assessment Reports, (Draft August 2017)
- ISO 1996: 2017: Acoustics - Description, measurement and assessment of environmental noise.
- The Transport Infrastructure Ireland (TII, formerly NRA) Good Practice Guidance for the Treatment of Noise during the Planning of National Road Schemes (TII, 2014), the Guidelines for the Treatment of Noise and Vibration in National Road Schemes (TII, 2004) was also considered in the preparation of the assessment. This document sets out noise and vibration limits for the construction/demolition phase which are generally applied by planning authorities to all construction projects.
- The Professional Guidance on Planning & Noise (ProPG), May 2017

9 CLIMATE & AIR QUALITY

9.1 INTRODUCTION

This section identified and assessed the potential air quality and climatic impacts associated with the proposed development both the construction/demolition and operational phases of the development.

It includes a comprehensive description of

- the existing air quality and climate at and in the vicinity of the subject site,
- how the construction/demolition and operational phases of the development may impact existing air quality and finally;
- the mitigation measures that shall be implemented to control and minimise the impact that the development may have on local ambient air quality and reduce the impact on the local microclimate.

Proposed Development Site Location and Brief Description
This is as described in chapters 1 (introduction) and 3 (Description of Development) of this EIAR and as set out in the statutory notices.

Statement of Competence
In accordance with Article 5(3)(a) of the EU Directive, by appointing Traynor Environmental, the applicant has ensured that this chapter has been prepared by "Competent experts".

9.2 METHODOLOGY

The general assessment methodology of the potential impact of the proposed development on air quality and climate has been devised in accordance with:

- 2017 EPA Guidelines on information to be contained in Environmental Impact Assessment Reports.
- Guidelines on Information to be Contained in an Environmental Impact Statement (EPA 2002).
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (DoHPLG, August 2018).
- Advice Notes on Current Practice (in preparation of Environmental Impact Statements) (EPA 2003).
- Environmental Protection Agency, 2015. Revised Guidelines on the Information to be Contained in Environmental Impact Statements.
- Environmental Protection Agency, 2015. Draft Advice Notes for Preparation of Environmental Impact Statements.
- Environmental Impact Assessment (EIA), Guidance for Consent Authorities Regarding Sub-Threshold Development (DoEHLG 2003).
- Development Management Guidelines (DoEHLG, 2007).
- European Union (Planning & Development) (Environmental Impact Assessment Regulations 2018).
- Design Manual for Roads and Bridges (DMRB).

Baseline Environment
The existing ambient air quality in the vicinity of the site has been characterised with information obtained from a number of sources including EPA Annual Air Quality in Ireland Reports and Local air monitoring stations data.
The ambient air quality data collected and reviewed for the purpose of this study focused on the principal substances (dust, vehicle exhaust emissions and boiler emissions) which may be released from the site during the construction/demolition and operation phases and which may exert an influence on local air quality.

Air Quality Standards and other Relevant Guidance
Air quality standards and guidelines are available from a number of sources. The guidelines and standards referenced in this report include those from Ireland and the European Union.

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 (Ref Table 9.1).

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 National Air Quality Standards Regulations 2011 (S.I No. 180 of 2011), which incorporate European Commission Directive 2008/50/EC which has set limit values for the pollutants SO_2, NO_2, PM_{10}, benzene and CO Council Directive 2008/50/EC combines the previous Air Quality Framework Directive (96/62/EC) and its subsequent daughter directives (including 1999/30/EC and 2000/69/EC). Provisions are also made for the inclusion of new ambient limit values relating to $PM_{2.5}$. The European 2008/50/EC Clean Air for Europe (CAFÉ) Directive is the current air quality directive for Europe which supersedes the European Directives 1999/30/EC and 2000/69/EC.

In order to assess a wider range of air pollutants in the development area it is necessary to review current air quality monitoring data from published sources such as the most recent EPA's 2018 Annual report entitled Air Quality in Ireland. This EPA report provides detailed monitoring data collected from a number of monitoring locations throughout Ireland on an annual basis to assess national compliance with National Air Quality Regulations. The location of the site in The Former Gallaher Site, Airton Road, Tallaght, Dublin 24 is characterised as a Zone A area as defined by the EPA.

EU legislation on air quality requires that Member States divide their territory into zones for the assessment and management of air quality. The zones currently in place in Ireland in are as follows:

- Zone A is the Dublin conurbation,
- Zone B is the Cork conurbation
- Zone C comprising 23 large towns in Ireland with a population >15,000.
- Zone D is the remaining area of Ireland.

The zones changed on 1 January 2013 to reflect the results of the 2011 census.

The air quality in each zone is assessed and classified with respect to upper and lower assessment thresholds based on measurements over the previous five years. Upper and lower assessment thresholds are prescribed in the legislation for each pollutant. The number of monitoring locations required is dependent on population size and whether ambient air quality concentrations exceed the upper assessment threshold, are between the upper and lower assessment thresholds, or are below the lower assessment threshold.

Design Manual for Roads and Bridges (DMRB) Guidelines.
The DMRB Model is based on the UK Highway Agency's DMRB and adapts it for use on national roads in Ireland through a series of implementation documents. Due to the lack of such a model in Ireland the UK DMRB was used to predict vehicle emissions from the new development.

DMRB Volume II, section 3, Part 1 Air Quality provides a screening model which is used to predict vehicle emissions for NO_2, NO_x, PM_{10}, carbon monoxide, benzene and 1,3-butadiene at sensitive receptors which have potential to be affected by the proposed development.

The DMRB model requires a number of inputs such as traffic flow (AADT), speed and vehicle mix and annual background pollutant concentrations. Background pollutant concentrations according to air zone were attained by averaging six years of data, from yearly EPA air quality reports for 2013-2018. Predicted concentrations for the construction/demolition and operation phases of the project were compared with the Irish ambient air quality standard – S.I. No.180 of 2011 – Air Quality Standards Regulations 2011. These regulations set limit values and averaging periods, which are used to assess the impact of emissions on human health, vegetation and ecosystem. Key pollutant concentrations were predicted for nearby sensitive receptors for the following scenarios:

- The baseline scenario (2019), for model verification.
- Do-Nothing scenario (DN), which assumes the retention of present site usage with no development in place (2022).
- Opening Year Do-Something scenario (DS), which assumes the proposed development in place (2022).
- Design Year Do-Nothing scenario (DN), which assumes the retention of present site usage with no development in place (2037); and
- Design Year Do-Something scenario (DS), which assumes the proposed development in place (2037).

The assessment methodology involved using the DMRB Screening Model (Version 1.03c, July 2007), the NO_x to NO_2 Conversion Spreadsheet (Version 5.1, June 2016), and following guidance issued by the TII, and the EPA. The TII guidance 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 TII guidance, 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 heavy goods vehicles, annual average traffic speeds and background concentrations. The 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 this 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 ambient concentrations are then compared with the relevant ambient air quality standards to assess the compliance of the proposed development with these ambient air quality standards. The TII Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes detail a methodology for determining air quality impact significance criteria for road schemes and this 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. The significance criteria are based on PM_{10} and NO_2 as these pollutants are most likely to exceed the annual mean limit values (40 µg/m^3). 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.

Transport Infrastructure Ireland (TII) Guidelines
Construction/Demolition Phase

As stated in the TII Guidance it is *"very difficult to accurately dust emissions arising from construction activities". "A semi quantitative approach is recommended to determine the likelihood of a significant impact, which should be combined with an assessment of the proposed mitigation measures".*

The semi-quantitative assessment outlined is used to assess the impact of the dust during the construction/demolition phase. TII guidance states that dust emissions from construction sites can lead to elevated PM_{10} concentrations and can cause soiling of properties. The impact of dust emissions during the construction/demolition phase is assessed by estimating the area over which there is a risk of significant impacts, in line with the TII guidance. Emissions from construction vehicles are assessed where construction traffic results in a significant (>10%) increase in AADT flows near sensitive receptors in accordance with the TII guidance.

Significance criteria outlined in Tables 9.10 and 9.11 are used to assess the impact of the construction traffic on worst-case sensitive for receptors.

Operational Phase

The TIFs Guidelines for the Treatment of Air Quality during the Planning and Construction of National Road Schemes specifies that the changes in pollutant concentrations alongside roads with a significant change in traffic should be assessed. It states that receptors should be considered at all road links where a greater than 5% change in flows or speeds is predicted for the "Do-Something" option.

Significance criteria have been adopted from the TII guidelines and these are presented in Appendix 9.2. The TII guidelines requires the consideration of NO_x and nitrogen deposition impacts at ecological sites that are located within 200m of the proposed development.

POLLUTANT	REGULATION	LIMIT CRITERIA	TOLERANCE	LIMIT VALUE
NITROGEN DIOXIDE	2008/50/EC	Hourly limit for the protection of human health – not to be exceeded more than 18 times/year	40% until 2003 reducing linearly to 0% by 2010	200 µg/m^3
		Annual limit for the protection of human health	40% until 2003 reducing linearly to 0% by 2010	40 µg/m^3
		Annual limit for the protection of vegetation	None	400 µg/m^3 NO & NO^2
LEAD	2008/50/EC	Annual limit for the protection of human health	100%	0.5 µg/m^3
SULPHUR DIOXIDE	2008/50/EC	Hourly limit for protection of human health – not to be exceeded more than 24 times/year	150 µg/m^3	350 µg/m^3
			NONE	125 µg/m^3

		Daily limit for protection of human health – not to be exceeded more than 3 times/year Annual and Winter limit for the protection of ecosystems	NONE	20 µg/m^3
PARTICULATE MATTER PM_{10}	2008/50/EC	24-hour limit for protection of human health – not to be exceeded more than 35 times/year Annual limit for the protection of human health	50% 20%	50 µg/m^3 40 µg/m^3
PARTICULATE MATTER $PM_{2.5}$ STAGE 1	2008/50/EC	Annual limit for the protection of human health	20% from June 2008. Decreasing linearly to 0% by 2015	25 µg/m^3
PARTICULATE MATTER $PM_{2.5}$ STAGE 2	2008/50/EC	Annual limit for the protection of human health	NONE	20 µg/m^3
BENZENE	2008/50/EC	Annual limit for the protection of human health	20% until 2006. Decreasing linearly to 0% by 2010	5 µg/m^3
CARBON MONOXIDE	2008/50/EC	8-hour limit (on a rolling basis) for protection of human health	60%	10 mg/m^3
DUST DEPOSITION	German TA Luft Air Quality Standard Note 1	30 Day Average	NONE	350 mg/m^2/day

Table 9.1 Air Quality Standards Regulations 2011 (based on EU Council Directive 2008/50/EC)

Note 1: Dust levels in urban atmospheres can be influenced by industrial activities and transport sources. There are currently no national or European Union air quality standards with which these levels of dust deposition can be compared. However, a figure of 350 mg/m2-day (as measured using Bergerhoff type dust deposit gauges as per German Standard Method for determination of dust deposition rate, VDI 2129) is commonly applied to ensure that no nuisance effects will result from industrial or construction/demolition activities.

Construction/Demolition Impact Assessment Criteria

Transport Infrastructure Ireland's 'Guidelines for the Treatment of Air Quality during the Planning and Construction of National Road Schemes' (Revision 1, 2011) states that

> "*it is very difficult to accurately quantify dust emissions arising from construction activities*" and that "*it is thus not possible to easily predict changes to dust soiling rates or PM_{10} concentrations.*"

The guidance advises the use of a semi-quantitative approach to determine the likelihood of a significant impact which should be combined with an assessment of the proposed mitigation measures.

The impact of construction related dust emissions is assessed by estimating the area over which there is a risk of significant impacts as per the NRA guidance. The construction assessment criteria, reproduced from the NRA guidance, are set out in Appendix 9.3 below.

Operational Impact Assessment Criteria

Once operational the proposed development may impact on air quality as a result of the requirements of new buildings to be heated and with the increased traffic movements associated with the development.

Air quality significance criteria are assessed on the basis of compliance with the national air quality limit values. The Air Quality Standards Regulations 2011 replace the Air Quality Standards Regulations 2002 (S.I. No. 271 of 2002), the Ozone in Ambient Air Regulations 2004 (S.I. No. 53 of 2004) and S.I. No. 33 of 1999.

Climate Assessment Methodology

Climate has implications for many aspects of the environment from soils to biodiversity and land use practices. The proposed development may impact on both the macro-climate and micro-climate. The macro-climate is the climate of a large geographic area such as Ireland. The micro-climate refers to the climate in the immediate area. With respect to microclimate, green areas are considered to be sensitive to development. Development of any green area is generally associated with a reduction in the abundance of vegetation including trees and a reduction in the amount of open, undeveloped space. The removal of vegetation or the development of man-made structures in these areas can intensify the temperature gradient.

To assess the impacts of converting vegetative surfaces to hard-standing with residential buildings and its significance, the number of vegetative surfaces associated with the proposed development that will be converted to residential buildings and hard-standing has been considered.

The impact of the proposed scheme upon the macro-climate is assessed through the consideration of the change in CO_2 emissions that will occur due to the changes in traffic flow that occur in response to the proposed scheme. Ireland ratified the United Nations Framework Convention on Climate Change (UNFCCC) in April 1994 and the Kyoto Protocol in 1997 (FCCC 1997, 1999). For the purposes of the EU burden sharing agreement under Article 4 of the Kyoto Protocol, Ireland agreed to limit the net anthropogenic growth of the six GHGs under the Kyoto Protocol to 13% above the 1990 level over the period 2008 to 2012 (ERM 1998). 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 (COP24) to the agreement was convened in Katowice, Poland December 2018. COP24 was viewed as an important step towards the new 2015 agreement on climate change which was signed in Paris in late 2015. 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, on the 23/24th of 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.

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 (SO_2), Nitrogen Oxides (NO_X), Volatile Organic Compounds (VOCs) and Ammonia (NH_3). To achieve the initial targets Ireland was obliged, by 2010, to meet national emission ceilings of 42 kt for SO_2 (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 $PM_{2.5}$. In relation to Ireland, 2020 emission targets are 25 kt for SO_2 (65% below 2005 levels), 65 kt for NO_X (49% reduction), 43 kt for VOCs (25% reduction), 108 kt for NH_3 (1% reduction) and 10 kt for $PM_{2.5}$ (18% reduction). COM (2013) 917 Final is the "Proposal for a Council Decision for the acceptance of the Amendment to the 1999 Protocol to the 1979 Convention on Long-Range Transboundary Air Pollution to Abate Acidification, Eutrophication and Ground level Ozone".

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 most recent data available from the EU in 2010 indicated that Ireland complied with the emissions ceilings for SO_2, VOCs and NH_3 but failed to comply with the ceiling for NO_X (EEA 2011). COM (2013) 920 Final is the "Proposal for a Directive on the reduction of national emissions of certain atmospheric pollutants and amending Directive 2003/35/EC". The proposal will apply the 2010 NECD limits until 2020 and establish new national emission reduction commitments which will be applicable from 2020 and 2030 for SO_2, NO_X, NMVOC, NH_3, $PM_{2.5}$ and CH_4. In relation to Ireland, 2020-29 emission targets are for SO2 (65% below 2005 levels), for NO_X (49% reduction), for VOCs (25% reduction), for NH_3 (1% reduction) and for $PM_{2.5}$ (18% reduction). In relation to 2030, Ireland's emission targets are for SO_2 (83% below 2005 levels), for NO_X (75% reduction), for VOCs (32% reduction), for NH_3 (7% reduction), for $PM_{2.5}$ (35% reduction) and for CH_4 (7% reduction).

Guidance issued by the European Commission in 2013 entitled Guidance on Integrating Climate Change and Biodiversity into Strategic Environmental Assessment has been applied to this assessment in order to determine the potential impacts the proposed developments may have a climate change and biodiversity.

9.3 RECEIVING ENVIRONMENT

Description of the Baseline Environment/Context

The proposed development is located in The Former Gallaher Site, Airton Road, Tallaght, Dublin 24.
The proposal is for a mixed-use development on a site of c. 2.79ha. The proposal consists of:

- Demolition of existing factory/ warehouse buildings on site.
- Construction of 502 residential units comprising of 197 no. 1-Bed; 257 no. 2-Bed; and 48 no. 3-Bed apartments all with associated private balconies/terraces to the north/south/east/west elevations.
- Construction of 3 no. Retail Units; a creche; and communal facilities.
- The development will take place over 6 no. Blocks (A-F) ranging in height up to 8 storeys.
- The development will have 202 no. car parking spaces located at undercroft level of blocks A, B and C and at basement level of blocks E and F. 584 no. secure bike parking spaces are also provided. The site is accessed through 2 no. vehicular access to the north and east of the scheme. There will be a number of pedestrian entrances along Airton Road and Greenhills Road which also provide access for emergency vehicles.
- In addition to all of the new facilities, all other site services and works to enable the development of the site will also be provided including bins, ESB substations, boundary treatments and landscaping.
- Additional pedestrian crossing points and road improvements will also be provided along Greenhills Road and Airton Road.

The subject site is located on The Former Gallaher Site, Airton Road, Tallaght, Dublin 24 approximately 1.3km south west of the M50 motorway. The site is bounded to the north by a retail park, health centre and Airton road, east by the R819, to the south/south west by the Technological University Dublin Tallaght Campus and to the west by the Airton training Centre. The Airton road area is characterised largely by commercial/retail development.

The site is not located within a Conservation Area or an Architectural Conservation Area.

A pedestrian footpath, wire fence and grass verge separate the site from Airton road. The Dublin Bus services in the area provide direct linkage to the city, the Route 27 (high-frequency) along Greenhills Road towards the city centre, the 76 Route along Belgard Road towards Chapelizod, and the 54a linking Tallaght to the city centre. The topography of the site is generally flat. The development area is located within a zone which includes a number of sources of transportation related air emissions principally R819 Greenhills road and Airton road.

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 PM_{10}, 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 ($PM_{2.5}$ - PM_{10}) will actually increase at higher wind speeds. Thus, measured levels of PM_{10} will be a non-linear function of wind speed.

Description of Existing Climate

The nearest representative synoptic meteorological station to the subject site is at Casement which is located approximately 4km west of the Airton road site and as such, long-term measurements of wind speed/direction and air temperature for this location are representative of prevailing conditions experienced at the subject site. Recent meteorological data sets for Casement were obtained from Met Éireann for the purposes of this assessment study.

Rainfall

Precipitation data from the Casement meteorological station for the period 2011-2018 indicates a mean annual total of about 777.2 mm. This is within the expected range for most of the eastern half of the Ireland which has between 750mm and 1000 mm of rainfall in the year.

Temperature

The annual mean temperature at Casement (2011-2018) is 9.8ºC. Given the relative close proximity of this meteorological station to the proposed development site, similar conditions would be observed. Table 9.2 sets out meteorological data for Casement from 2011-2018

Year	Period	Rainfall (mm)	Mean Temperature (0C)
2011	**Annual Mean**	726.8	10.1
2012	**Annual Mean**	688.5	9.4
2013	**Annual Mean**	925.7	9.6
2014	**Annual Mean**	946.9	10.1
2015	**Annual Mean**	836.5	9.4
2016	**Annual Mean**	731.7	9.7
2017	**Annual Mean**	703.5	10.0
2018	**Annual Mean**	657.7	9.9
Mean		**777.2**	**9.8**

Table 9.2 Meteorological Data for Casement 2011-2018

Wind

Wind is of key importance for both the generation and dispersal of air pollutants. Casement met data has been examined to identify the prevailing wind direction and average wind speeds over a five-year period (see Figure

9.1). For data collated during five representative years (2012 - 2016), the predominant wind direction is westerly to south-westerly with predominately moderate wind speeds.

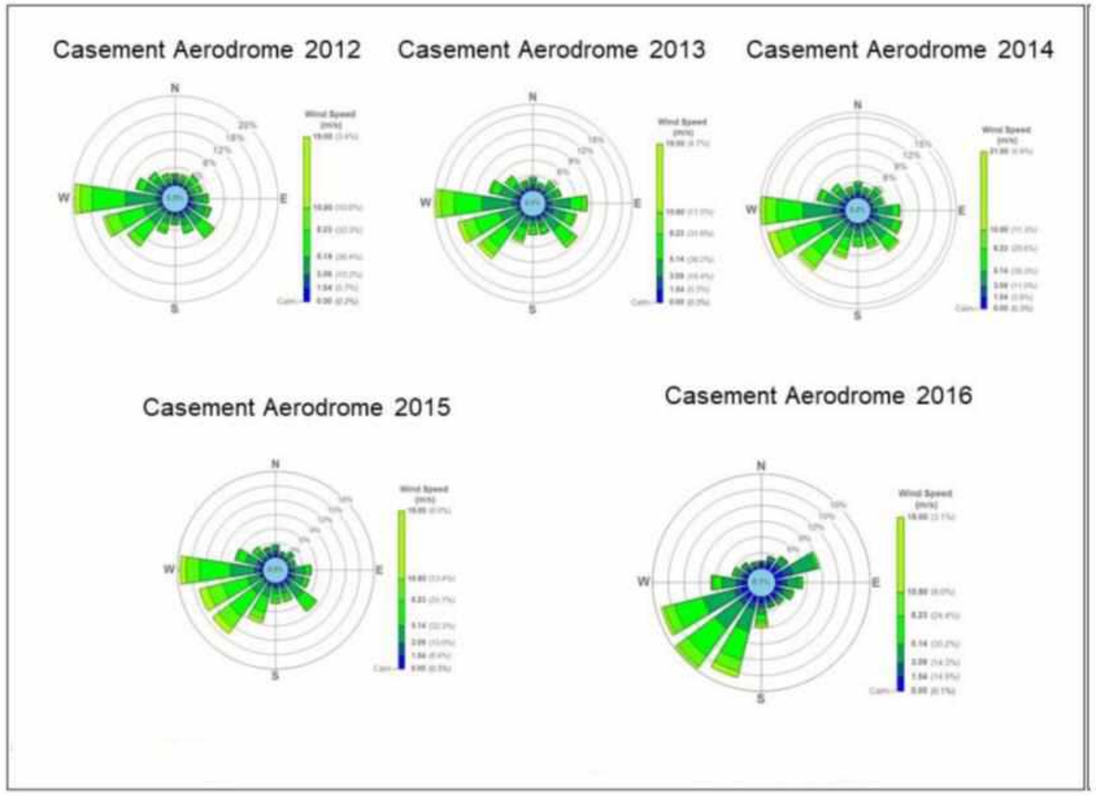


Figure 9.1 Casement Windrose 2012-2016

Description of Existing Air Quality

The existing ambient air quality at and in the vicinity of the site is typical of a city urban location and as such, domestic and commercial heating sources and road traffic are identified as the dominant contributors of hydrocarbon, combustion gases and particulate emissions to ambient air quality.

Trends in Air Quality

Trends in Annual air quality monitoring programs have been undertaken in recent years by the EPA and Local Authorities. The most recent annual report on air quality "Air Quality in Ireland 2018– Key Indicators of Ambient Air Quality" details the range and scope of monitoring undertaken throughout Ireland with Dublin 24 categorised as Zone A.

The most recent 2018 EPA publication includes a number of Zone A monitoring locations which would be broadly comparable to the expected air quality at the subject site. The various Zone A air quality monitoring stations within Ireland provide a comprehensive range of air quality monitoring data sets which have been selected as part of this assessment to describe the existing ambient air quality at the subject site.

Baseline Air Quality – Review of Available Background Data

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 – Indicators of Air Quality*" (EPA, 2020). 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, 2020).

In terms of air monitoring and assessment, the proposed development site is within Zone A. The long-term 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.) The most recent EPA publication includes a number of monitoring locations in Dublin City which would be broadly comparable to the expected air quality at the subject site. The various air quality monitoring stations within the Dublin area provides a comprehensive range of air quality monitoring data sets which have been selected as part of this assessment to describe the existing ambient air quality at the subject site.

Nitrogen Dioxide (NO_2)

With regard to NO_2, continuous monitoring data from the EPA at the Zone A locations of Ringsend, Swords, Blanchardstown, Ballyfermot, Dun Laoghaire, Rathmines, Colaraine St and Winetavern St show that levels of NO_2 are below the annual limit values. The average results at all location has been used in the DMRB screening model. Long-term data for the period 2013 – 2018 show annual mean concentrations range from 13.0 – 36.6 µg/m^3; suggesting an average over the six year period of no more than 21.63µg/m^3. Based on these results from 2013 - 2018 a current maximum daily 1-hr mean of 156.30µg/m^3 has been used in the DMRB screening model.

Air Quality Zone A	**Nitrogen Dioxide (NO_2)**						
Station	**Averaging Period**	**Year**					
		2013	**2014**	**2015**	**2016**	**2017**	**2018**
Ringsend	Annual Mean NO_2 (µg/m^3)	-	-	-	-	21.9	27
	Max 1-hr NO_2 (µg/m^3)	-	-	-	-	137.7	121
Swords	Annual Mean NO_2 (µg/m^3)	15.0	14.0	13.0	15.7	14.2	16
	Max 1-hr NO_2 (µg/m^3)	221.0	325.0	170.0	205.9	107.3	112
Blanchardstown	Annual Mean NO_2 (µg/m^3)	29.0	31.0	25.0	30.2	26.2	25
	Max 1-hr NO_2 (µg/m^3)	154.0	215.0	178.0	160.2	331.2	149
Ballyfermot	Annual Mean NO_2 (µg/m^3)	16.0	16.0	16.0	17.3	16.5	17
	Max 1-hr NO_2 (µg/m^3)	107.0	128.0	142.0	127.3	148.2	217
Dun Laoghaire	Annual Mean NO_2 (µg/m^3)	16.0	15.0	16.0	18.6	17.4	19
	Max 1-hr NO_2 (µg/m^3)	123.0	105.0	103.0	141.7	153.3	135
Rathmines	Annual Mean NO_2 (µg/m^3)	19.0	17.0	18.0	20.0	17.1	20
	Max 1-hr NO_2 (µg/m^3)	107.0	112.0	106.0	102.0	115.9	138
Colaraine St.	Annual Mean NO_2 (µg/m^3)	26.0	25.0	25.0	27.6	25.6	-
	Max 1-hr NO_2 (µg/m^3)	118.0	130.0	157.0	146.5	189.4	-
Winetavern St.	Annual Mean NO_2 (µg/m^3)	31.0	31.0	31.0	36.6	27.2	29
	Max 1-hr NO_2 (µg/m^3)	158.0	188.0	182.0	193.9	196.4	165

Table 9.3 Trends in Zone A Air Quality - Nitrogen Dioxide (NO2)

Particulate Matter (PM_{10})

Results of Continuous PM_{10} monitoring carried out at the locations of Ringsend, Tallaght, Blanchardstown, Ballyfermot, Dun Laoghaire, Rathmines, Winetavern St and Phoenix Park, with six years of annual mean concentrations are shown in Table 9.4. Long-term data for the period 2013 – 2018 show concentrations of the annual mean ranges from 9.1 – 20 µg/m^3; suggesting an average concentration over the six year period of no more than 14.05 µg/m^3. The daily limit for the protection of human health is no more than 35 days>50µg/m^3. Based on

the EPA data (Table 9.4) a conservative estimate of the current background PM_{10} concentration in the region of the proposed development is 14.05 µg/m³.

Air Quality Zone A		PM 10					
Station	Averaging Period	Year (PM_{10})					
		2013	2014	2015	2016	2017	2018
Ringsend	Annual Mean PM_{10} (µg/m³)	-	-	-	-	13.4	20
	Daily Max > 50 µg/m³	-	-	-	-	2	3
Tallaght	Annual Mean PM_{10} (µg/m³)	-	15.0	14.0	14.2	11.8	15
	Daily Max > 50 µg/m³	-	2	4	0	2	1
Blanchardstown	Annual Mean PM_{10} (µg/m³)	20	18.0	17.0	17.9	15.0	17
	Daily Max > 50 µg/m³	11	5	9	2	3	2
Ballyfermot	Annual Mean PM_{10} (µg/m³)	12	11	12.0	10.7	12	16
	Daily Max > 50 µg/m³	2	2	3	0	1	0
Dun Laoghaire	Annual Mean PM_{10} (µg/m³)	17	14	13.0	12.9	11.9	13
	Daily Max > 50 µg/m³	5	2	3	0	2	0
Rathmines	Annual Mean PM_{10} (µg/m³)	17	14	15.0	14.8	13.4	15
	Daily Max > 50 µg/m³	8	3	5	3	5	2
Winetavern St.	Annual Mean PM_{10} (µg/m³)	14	14	14.0	14.0	12.9	14
	Daily Max > 50 µg/m³	3	1	4	2	3	1
Phoenix Park	Annual Mean PM_{10} (µg/m³)	14	12	12.0	10.5	9.1	11
	Daily Max > 50 µg/m³	3	0	2	0	1	0

Table 9.4 Trends in Zone A Air Quality - PM10

Nitrogen Oxide (NO_x)

With regard to NO_x, continuous monitoring data from the EPA at the Zone A locations of Ringsend, Swords, Blanchardstown, Ballyfermot, Dun Laoghaire, Rathmines, Colaraine St and Winetavern St. The average long-term concentrations range from 22 – 59 µg/m³ for the period 2013 – 2018. Based on these results a conservative estimate of the current background NO_X concentration in the region of the proposed development is 38.20 µg/m³.

Air Quality Zone A		Nitrogen oxide (NO_x)					
Station	Averaging Period	Year (NO_x)					
		2013	2014	2015	2016	2017	2018
Ringsend	Annual Mean NO_x (µg/m³)	-	-	-	-	54.3	50
	Hourly Max[1]	-	-	-	-	986.1	909
Swords	Annual Mean NO_x (µg/m³)	25	24	22	24.5	22.2	23
	Hourly Max[1]	1018	7022	833	1173.4	653.8	735
Blanchardstown	Annual Mean NO_x (µg/m³)	62	67	55	76.4	57.8	62
	Hourly Max[1]	1006	1440	962	953.2	1441.5	1032
Ballyfermot	Annual Mean NO_x (µg/m³)	21	25	23	25.6	20.7	25
	Hourly Max[1]	523	839	553	705.2	789.4	704
Dun Laoghaire	Annual Mean NO_x (µg/m³)	27	22	27	29.1	27.4	30
	Hourly Max[1]	424	416	915	570.9	796.4	614
Rathmines	Annual Mean NO_x (µg/m³)	28	27	28	31.1	26.8	33
	Hourly Max[1]	668	750	593	558.1	946.2	681
Colaraine St.	Annual Mean NO_x (µg/m³)	46	41	44	49.5	46.2	-
	Hourly Max[1]	1000	720	962	1008.2	1530.9	-
Winetavern St.	Annual Mean NO_x (µg/m³)	50	59	49	63.4	45.6	47
	Hourly Max[1]	1209	1236	982	1222.1	1427.7	1144

Table 9.5 Trends in Zone A Air Quality - Nitrogen oxide (NOx)

Note 1 NOx is expressed as µg/m3.
Note 2 NOx annual mean limit value for the protection of Vegetation: 30 µg/m3 (Limit only applies to rural stations in Zone D)

Particulate Matter ($PM_{2.5}$)

Continuous $PM_{2.5}$ monitoring was carried out by the EPA at the Zone A locations of Marino, Finglas, Rathmines and Coleraine showed annual mean levels of 6 - 11 µg/m³ over the period 2013 - 2018. Based on this EPA data shown in table 9.6, an average background $PM_{2.5}$ concentration in the region of the proposed development is 8.40 µg/m³. There were no exceedances of limit of 25 µg/m³ in annual mean.

Air Quality Zone A		PM 2.5					
Station	Averaging Period	Year ($PM_{2.5}$)					
		2013	2014	2015	2016	2017	2018
Marino	Annual Mean PM_{10} (µg/m³)	9	8	8	7	6.9	6
	Daily Max	55	50	84	111.3	71.3	30
Finglas	Annual Mean PM_{10} (µg/m³)	-	7	8	8.5	6.6	8
	Daily Max	-	35	75	111.3	51.9	97
Rathmines	Annual Mean PM_{10} (µg/m³)	11	9	10	10	8.5	9
	Daily Max	76	49	85	53.3	95.7	70
Coleraine	Annual Mean PM_{10} (µg/m³)	11	9	9	9	8	-
	Daily Max	62	43	82	46.4	81.5	-

Table 9.6 Trends in Zone A Air Quality - (PM 2.5)

Note 1 *PM2.5 annual mean limit value for the protection of human health: 25 µg/m3*

Benzene

In terms of benzene, the annual mean concentration in the Zone A monitoring location of Rathmines from 2013 - 2018 was 0.83 µg/m³. This is well below the limit value of 5 µg/m³. Between 2013 - 2018 annual mean concentrations at Zone A sites 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 0.83 µg/m³

Air Quality Zone A		Benzene					
Station	Averaging Period	Year					
		2013	2014	2015	2016	2017	2018
Rathmines	Annual Mean Benzene(µg/m³)	0.94	0.94	0.92	1.01	0.92	0.30
	Daily Max	5.77	4.70	7.89	1.94	4.60	4.40

Table 9.7 Trends in Zone A Air Quality - Benzene 2013 - 2018

Carbon Monoxide (CO)

With regard to CO, annual averages at the Zone A locations of Coleraine Street, Winetavin Street and Balbriggan over the 2013 – 2018 period are low, ranging from 0 to 0.6 µg/m³ based on this EPA data, a conservative estimate of the current background CO concentration in the region of the proposed development is 0.36 mg/m³. The maximum daily 8-hr mean of 2.28mg/m³ has been used in the DMRB screening model.

Air Quality Zone C		Carbon Monoxide(CO)					
Station	Averaging Period	Year (CO)					
		2013	2014	2015	2016	2017	2018
Coleraine Street	Annual Mean PM_{10} (mg/m³)	0.4	0.4	0.4	0.5	0.43	-
	Max[1]	2.7	2.5	3	2.3	2.9	-
Winetavern Street	Annual Mean PM_{10} (mg/m³)	0	0	0	0.1	0.14	0.2
	Max[1]	2.4	2.4	2	1.9	2.3	1.8
Balbriggan	Annual Mean PM_{10} (mg/m³)	0.6	0.5	-	-	-	-

	Max[1]	1.6	1.9	-	-	-	-

Table 9.8 Trends in Zone A Air Quality - Carbon Monoxide (CO)

Note 1 maximum daily 8-hr mean limit value for protection of human health of 10 mg/m^3
Table 9.8:

Background concentrations for 2022 and 2037 have been calculated. These have used the predicted current 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 and the UK Department for Environment, Food and Rural Affairs LAQM.TG.

9.4 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

The proposed development as described in chapter 3 of this EIAR and set out in the statutory planning notices. 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:

A. - Construction/Demolition phase;
B. - Operational phase.

During the construction/demolition stage the main source of air quality impacts will be as a result of fugitive dust emissions from site activities. Emissions from construction vehicles and machinery have the potential to impact climate. The primary sources of air and climatic emissions in the operational context are deemed long term and will involve the change in traffic flows or congestion in the local areas which are associated with the development.

The following describes the primary sources of potential air quality and climate impacts which have been assessed as part of this EIAR.

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).

9.5 POTENTIAL IMPACTS

Construction/Demolition Impacts
Air Quality
The greatest potential impact on air quality during the construction and demolition phase of the proposed development is from construction/demolition dust emissions and the potential for nuisance dust and PM_{10}/PM_{25} emissions. The proposed development can be considered moderate in scale and therefore there is the potential for significant dust soiling 50m from the source (Table 9.9). While construction/demolition dust tends to be deposited within 200m of a construction site, the majority of the deposition occurs within the first 50m. In order to minimise dust emissions during construction/demolition, 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 9.3) are adhered to, the air quality impacts during the construction/demolition phase will not be significant. Regard has also been taken for the import of infill materials from off-site locations and potential dust impacts as a result of this will also be mitigated. The mitigation measures are summarised in Section 9.7

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 9.9 Assessment Criteria for the Impact of Dust from Construction, with Standard Mitigation in Place

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 CO_2 and NO_2 emissions. However, the impact on the climate is considered to be imperceptible in the long and short term.

Human Health
Best practice mitigation measures are proposed for the construction/demolition 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/demolition 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/demolition of the proposed development is likely to be short-term and imperceptible with respect to human health.

Operational Phase
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 NO_2, CO, benzene and PM_{10}.

Annual Average Daily Traffic Flow (AADT) information was obtained from Barrett Mahony Consulting Engineers Civil & Structural on this project 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. Cumulative effects have been assessed, as recommended in the EU Directive on EIA (Council Directive 2014/52/EU). Firstly, background concentrations have been included in the modelling study. These background concentrations are year-specific and account for non-localised sources of the pollutants of concern. Appropriate background levels were selected based on the available monitoring data provided by the EPA.

The impact of the proposed development has been assessed by modelling emissions from the traffic generated as a result of the development. The impact of CO, benzene, NO_2, NO_x and PM_{10} for the years 2022 and 2037 was predicted at the nearest sensitive receptors to 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 worst-case traffic data which satisfied the assessment criteria detailed in Section 9.2 is shown in Table 9.10 which has a 10% HGV flow. Seven receptors have been identified in the vicinity of the proposed development. Sensitive receptors have been chosen as they have the potential to be adversely impacted by the development, these receptors are shown in Table 9.10, 9.11 and Figure 9.2.

Link Number	Road Name	Speed (kph)	Base Year	Do-Nothing		Do-Something	
			2019	2022	2037	2022	2037
1	Belgard Road/Airton Rd.	50	29516	30696	34,717	31,180	35,264
2	Greenhills/Airton Rd.	50	14153	14719	16,647	15,374	17,387

Table 9.10 ADDT - Traffic Data used in Air Modelling Assessment

Name	Receptor Type	Coordinates	
		Eastings	Northings
R1	Primary Care Centre	309590	22833
R2	Astro Park	309618	228196
R3	Shopping Centre	309613	228395
R4	Airton Training Centre	309347	228288
R5	Industrial Unit	308740	228122
R6	Industrial Unit	308835	228150
R7	Industrial Unit	308903	228243

Table 9.11 Description of Sensitive Receptors

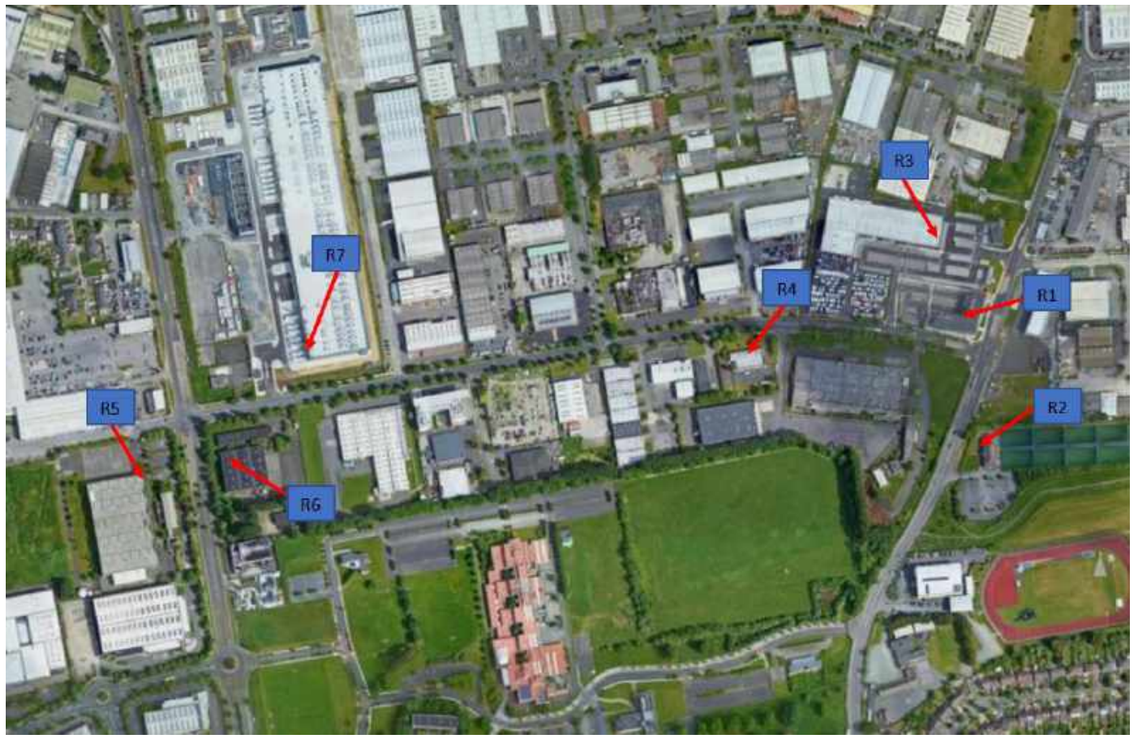


Figure 9.2 Approximate Sensitive Receptor Locations used in Modelling Assessment

Modelling Assessment

Transport Infrastructure Ireland Guidelines for the Treatment of Air Quality during the Planning and Construction of National Road Schemes 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.

NO_2

The results of the DMRB modelled impact of the proposed development for NO_2 in 2022 and 2037 are shown in Table 9.12 – 9.19. The annual average concentration is within the limit value at all worst-case receptors. Levels of NO_2 range between 54.25% - 60.25% in 2022 and 54.28% - 60.53% in 2037 of the annual limit value using the annual mean concentrations for the EPA. The hourly limit value for NO_2 is 200 µg/m^3 and is expressed as a 99.8th percentile (i.e. it must not be exceeded more than 18 times per year). The daily maximum 1-hour NO_2 concentration is not predicted to be exceeded in 2022 or 2037. There are some increases in traffic flows between 2022 and 2037, therefore any reduction in concentrations is due to reduced background concentrations and greater efficiencies predicted in engines.

The impact of the proposed development on annual mean NO_2 levels can be assessed relative to "Do Nothing (DN)" levels in 2022 and 2037. Relative to baseline levels, some imperceptible increases in pollutant levels are predicted as a result of the proposed development. With regard to impacts at individual receptors, the greatest impact on NO_2 concentrations will be an increase of 0.08% of the annual limit value at Receptors 6. Thus, using the assessment criteria outlined in Appendix 9.2 Tables A1 – A2, the impact of the proposed development in terms of NO_2 is negligible. Therefore, the overall impact of NO_2 concentrations as a result of the proposed development is long-term and imperceptible at all of the receptors assessed.

PM_{10}

The results of the modelled impact of the proposed development for PM_{10} in 2022 and 2037 are shown in Table 9.14. Predicted annual average concentrations at all receptors in the region of the development range between 35.18% - 37.18 % in 2026 of the limit value. Future trends with the proposed development in place indicate similarly low levels of PM_{10}. PM_{10} concentrations in 2037 range between 35.18% - 37.26% of the limit value.

The impact of the proposed development can be assessed relative to "Do Nothing" levels in 2022 and 2037. Relative to baseline levels, no imperceptible increases in PM_{10} levels at the worst-case receptors are predicted as a result of the proposed development. Thus, the magnitude of the changes in air quality are negligible at all receptors based on the criteria outlined in Appendix 9.2, Tables A1 – A3. Therefore, the overall impact of PM_{10} concentrations as a result of the proposed development is long-term and imperceptible.

NO_x

The results of the modelled impact of the proposed development for NO_x in 2022 and 2037 are shown in Table 9.16 There is no limit valve assigned to Zone A.

The impact of the proposed development on annual mean NO_x levels can be assessed relative to "Do Nothing (DN)" levels in 2022 and 2037. Relative to baseline levels, some imperceptible increases in pollutant levels are predicted as a result of the proposed development. Thus, using the assessment criteria for NO_2 and PM_{10} outlined in Appendix 9.2 and applying these criteria to NO_x, the impact of the proposed development in terms of NO_x is negligible, long-term and imperceptible.

$PM_{2.5}$

The Air Quality Standards Regulations 2011 specify a $PM_{2.5}$ target value of 25 µg/m^3 over a calendar year to be met by 1 January 2015. Long term $PM_{2.5}$ monitoring was carried out in four Zone A locations. Based on this EPA data shown in table 9.6, an average background $PM_{2.5}$ concentration in the region of the proposed development is 8.40 µg/m^3. Therefore, long term averages were below the target value 25 µg/m^3.

CO and Benzene

The results of the modelled impact of CO and benzene in the development for 2022 and 2037 are shown in Table 9.17 and Table 9.18 respectively. Predicted pollutant concentrations with the proposed development in place are below the ambient standards at all locations. Levels of CO range between 22.8% - 23.0% of the limit value in 2022 and 2037. Levels of benzene ranging between 16.6% - 18.2% in 2022 and 16.6% - 18.4% in 2037 of the total limit

value. Future trends indicate similarly low levels of CO and benzene. Levels of both pollutants are below their respective limit values, with CO reaching 23.0% of the limit and benzene reaching 18.4% in 2026 and 2036.

The impact of the proposed development can be assessed relative to "Do Nothing" levels in 2022 and 2037. CO and benzene concentration from the DMRB Model in both 2022 or 2037 are predicted to increase marginally. Thus, using the assessment criteria for NO_2 and PM_{10} outlined in Appendix 9.2 and applying these criteria to CO and benzene, the impact of the proposed development in terms of CO and benzene is negligible, long-term and imperceptible.

Receptor	Impact Opening Year (2022)					Impact Design Year (2037)				
	DN	DS	DS-DN	Magnitude	Description	DN	DS	DS-DN	Magnitude	Description
1	24.08	24.10	0.02	Imperceptible	Negligible Increase	24.20	24.21	0.01	Imperceptible	Negligible Increase
2	21.70	21.70	0.00	Imperceptible	Negligible Increase	21.71	21.71	0.00	Imperceptible	Negligible Increase
3	21.91	21.91	0.00	Imperceptible	Negligible Increase	21.92	21.92	0.00	Imperceptible	Negligible Increase
4	21.70	21.70	0.00	Imperceptible	Negligible Increase	21.71	21.71	0.00	Imperceptible	Negligible Increase
5	22.11	22.12	0.01	Imperceptible	Negligible Increase	22.14	22.14	0.00	Imperceptible	Negligible Increase
6	22.69	22.72	0.03	Imperceptible	Negligible Increase	22.76	22.78	0.02	Imperceptible	Negligible Increase
7	21.82	21.82	0.00	Imperceptible	Negligible Increase	21.83	21.83	0.00	Imperceptible	Negligible Increase

Table 9.12 Annual Mean NO2 Concentrations (µg/m3)

Receptor	Daily Maximum 1-hour for NO_2 concentrations (µg/m^3)					
	Impact Opening Year (2022)			Impact Design Year (2037)		
	DN	DS	DS-DN	DN	DS	DS-DN
1	159.78	159.80	0.02	159.93	159.94	0.01
2	156.46	156.46	0.00	156.47	156.47	0.00
3	156.83	156.83	0.00	156.85	156.86	0.01
4	156.46	156.46	0.00	156.47	156.47	0.00
5	157.14	157.17	0.03	157.19	157.20	0.01
6	157.99	158.02	0.03	158.08	158.11	0.03
7	156.67	156.68	0.01	156.69	156.70	0.01

Table 9.13 Daily maximum 1-hour for NO2 concentrations (µg/m3)

Receptor	Impact Opening Year (2022)					Impact Design Year (2037)				
	DN	DS	DS-DN	Magnitude	Description	DN	DS	DS-DN	Magnitude	Description
1	14.87	14.87	0.00	Imperceptible	Negligible	14.91	14.91	0.00	Imperceptible	Negligible
2	14.07	14.07	0.00	Imperceptible	Negligible Increase	14.07	14.07	0.00	Imperceptible	Negligible Increase
3	14.14	14.14	0.00	Imperceptible	Negligible	14.14	14.14	0.00	Imperceptible	Negligible
4	14.07	14.07	0.00	Imperceptible	Negligible Increase	14.07	14.07	0.00	Imperceptible	Negligible Increase
5	14.20	14.21	0.01	Imperceptible	Negligible Increase	14.21	14.21	0.00	Imperceptible	Negligible Increase
6	14.39	14.40	0.01	Imperceptible	Negligible	14.42	14.42	0.00	Imperceptible	Negligible
7	14.11	14.11	0.00	Imperceptible	Negligible Increase	14.11	14.11	0.00	Imperceptible	Negligible Increase

Table 9.14 Annual Mean PM10 Concentrations (µg/m3)

Receptor	Impact Opening Year (2022)		Impact Design Year (2037)	
	DN	DS	DN	DS
1	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00

Table 9.15 Number of days with PM10 concentration > 50 µg/m3

Receptor	Impact Opening Year (2026)					Impact Design Year (2036)				
	DN	DS	DS-DN	Magnitude	Description	DN	DS	DS-DN	Magnitude	Description
1	47.42	47.48	0.06	Imperceptible	Negligible Increase	47.88	47.94	0.06	Imperceptible	Negligible Increase
2	38.46	38.46	0.00	Imperceptible	Negligible Increase	38.47	38.47	0.00	Imperceptible	Negligible Increase
3	39.20	39.21	0.01	Imperceptible	Negligible Increase	39.25	39.26	0.01	Imperceptible	Negligible Increase
4	38.46	38.46	0.00	Imperceptible	Negligible Increase	38.47	38.47	0.00	Imperceptible	Negligible Increase
5	39.91	39.96	0.05	Imperceptible	Negligible Increase	40.02	40.05	0.03	Imperceptible	Negligible Increase
6	42.07	42.17	0.10	Imperceptible	Negligible Increase	42.32	42.38	0.06	Imperceptible	Negligible Increase
7	38.87	38.89	0.02	Imperceptible	Negligible Increase	38.91	38.93	0.02	Imperceptible	Negligible Increase

Table 9.16 Annual Mean NOx Concentrations (µg/m3)

Receptor	Impact Opening Year (2026)					Impact Design Year (2036)				
	DN	DS	DS-DN	Magnitude	Description	DN	DS	DS-DN	Magnitude	Description
1	0.91	0.91	0.00	Imperceptible	Negligible	0.92	0.92	0.00	Imperceptible	Negligible
2	0.35	0.35	0.00	Imperceptible	Negligible	0.83	0.83	0.00	Imperceptible	Negligible
3	0.84	0.84	0.00	Imperceptible	Negligible	0.84	0.84	0.00	Imperceptible	Negligible
4	0.83	0.83	0.00	Imperceptible	Negligible	0.83	0.83	0.00	Imperceptible	Negligible
5	0.84	0.84	0.00	Imperceptible	Negligible	0.84	0.84	0.00	Imperceptible	Negligible
6	0.85	0.85	0.00	Imperceptible	Negligible	0.85	0.85	0.00	Imperceptible	Negligible
7	0.83	0.83	0.00	Imperceptible	Negligible	0.83	0.83	0.00	Imperceptible	Negligible

Table 9.17 Annual Mean Benzene Concentrations (µg/m3)

Receptor	Impact Opening Year (2026)					Impact Design Year (2036)				
	DN	DS	DS-DN	Magnitude	Description	DN	DS	DS-DN	Magnitude	Description
1	2.33	2.33	0.00	Imperceptible	Negligible	2.33	2.33	0.00	Imperceptible	Negligible
2	2.28	2.28	0.00	Imperceptible	Negligible Increase	2.28	2.28	0.00	Imperceptible	Negligible
3	2.28	2.28	0.00	Imperceptible	Negligible	2.29	2.29	0.00	Imperceptible	Negligible

4	2.28	2.28	0.00	Imperceptible	Negligible	2.28	2.28	0.00	Imperceptible	Negligible
5	2.29	2.29	0.00	Imperceptible	Negligible Increase	2.29	2.29	0.00	Imperceptible	Negligible Increase
6	2.30	2.30	0.00	Imperceptible	Negligible	2.30	2.30	0.00	Imperceptible	Negligible
7	2.28	2.28	0.00	Imperceptible	Negligible	2.28	2.28	0.00	Imperceptible	Negligible

Table 9.18 Maximum 8-hour CO Concentrations (mg/m3)

Year	Scenario	CO	NOx	PM_{10}	C
		(kg/annum)	(kg/annum)	(tonnes/annum)	(tonnes/annum)
2026	Do Nothing	7968	4158	109	556
	Do Something	8164	4260	112	569
2036	Do Nothing	9012	4702	123	629
	Do Something	9233	4818	127	645
Increment in 2026		196kg	102Kg	3 Tonnes	13 tonnes
Increment in 2036		221kg	116kg	4 Tonnes	16 tonnes

Table 9.19 Regional Air Quality & Climate Assessment

Summary of Modelling Assessment
Levels of traffic-derived air pollutants for 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 Appendix 9.2, Table A1 – A3, the impact of the development in terms of PM_{10}, CO, NO_2, NO_x and benzene is negligible, long-term and imperceptible.

Regional Air Quality and Climate Impact
The regional impact of the proposed development on emissions of CO, NO_X, PM_{10} and C has been assessed using the procedures of Transport Infrastructure Ireland. The results (see Table 9.19) show that the likely impact of the proposed development has on the area. The likely overall magnitude of the changes on air quality and climate in the operational stage is imperceptible.

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, will not result in a significant impact on human health.

9.6 POTENTIAL CUMULATIVE IMPACTS

In accordance with The Planning and Development Regulations 2001 as amended, this section has considered the cumulative impact of the proposed development in conjunction with future and current development in the vicinity of the subject site. This section relates to the cumulative impact on the subject site itself and on surrounding sites.

The European Commission's report of May 1999 'Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions' defines cumulative impact as follows:

"Impacts that result from incremental changes caused by other past, present or reasonably foreseeable actions together with the project".

The cumulative air quality impact of the existing residential development, under construction developments and existing local transport infrastructure together with the proposed development is assessed with regard to having established the baseline air quality and then predicting the impact that the proposed development will have on the baseline air quality. Together the combined impact can be assessed to determine if there is sufficient "atmospheric capacity" to facilitate the proposed development.

It is predicted that the cumulative impact of the construction/demolition and operational phases of the proposed development and proposed or permitted neighbouring developments will not have an adverse long term impact on the receiving environment.

It is considered that there will be the potential for a short term slight negative cumulative impact associated with the construction/demolition phase of the subject development on ambient air quality and climate primarily as a result of the use of diesel to fuel construction plant and equipment. However, through the implementation of the mitigation measures and the integration into the design of the operational development of sustainable aspects and energy reduction features will ensure the receiving environment including off site residential receptors and existing habitats will not be adversely impacted.

9.7 MITIGATION MEASURES

Construction/Demolition phase
Air Quality
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 9.3.

- 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/demolition 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/demolition phase of the development. Construction vehicles, generators etc., may give rise to some CO_2 and N_2O emissions. However, due to short-term and temporary nature of these works, the impact on climate will not be significant.

Nevertheless, some site-specific mitigation measures can be implemented during the construction/demolition 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.

Mitigation Measures (Construction/Demolition)

- Avoid unnecessary vehicle movements and manoeuvring, and limit speeds on site so as to minimise the generation of airborne dust.
- Buildings shall be demolished by approved methods and in a manner that reduces the impact on air quality.

- Manual Stripping of buildings of internal fixings, metals, glass and asbestos.
- A 3m high solid wooden hoarding with a 3m high dust net shall be erected around the entire construction site perimeter giving a total dust barrier height of 6m.
- Use of rubble chutes and receptor skips during construction/demolition activities.
- All buildings in which asbestos has been identified shall be sealed during the asbestos removal process. Asbestos shall only be removed by an appropriately permitted company. All asbestos waste shall be double bagged, stored in a dedicated sealed waste container/skip prior to removal off-site for disposal at an appropriately permitted/licenced facility. Records of all asbestos waste removed from site shall be maintained by the site manager and certificates of destruction shall be provided by the asbestos removal contractor. Asbestos surveys shall be conducted by an appropriately HSE approved contractor.
- All buildings shall be thoroughly wetted down prior to commencement of building demolition to suppress high level dust emissions.
- All demolition plant shall be fitted with high pressure water sprays to direct water onto demolition point.
- Mobile crushing units (if utilised on-site) shall be fitted with spray bars to suppress dust generated by the crushing activity.
- Temporary dust screens shall be fitted around all mobile crushing plant (if used on-site).
- Demolition stockpiles shall be kept to an absolute minimum and all C&D waste shall be promptly removed from site.
- Demolition stockpiles shall be covered by tarpaulin during dry and windy weather.
- During dry periods, dust emissions from heavily trafficked locations (on and off site) will be controlled by spraying surfaces with water and wetting agents.
- Hard surface roads will be swept to remove mud and aggregate materials from their surface while any unsurfaced roads will be restricted to essential site traffic only.
- A road sweeper vehicle shall be on-site at all times to clean soiled public roads in the vicinity of the site.
- A mobile wheel wash unit shall be installed at the site exit to wash down the wheels of all trucks exiting the site.
- An independent environmental consultant shall be appointed by the contractor to prepare a dust control and monitoring method statement prior to the commencement of site activities and to witness all demolition activities to ensure that the specified dust mitigation measures are implemented.
- A weekly inspection of each dust gauge will ensure that the site manager identifies at the earliest instance if dust suppression techniques shall be implemented at the project site areas.
- Re-suspension in the air of spillages material from trucks entering or leaving the site will be prevented by limiting the speed of vehicles within the site to 10kmh and by use of a mechanical road sweeper.
- The overloading of tipper trucks exiting the site shall not be permitted.
- Aggregates will be transported to and from the site in covered trucks.
- Where the likelihood of windblown fugitive dust emissions is high and during dry weather conditions, dusty site surfaces will be sprayed by a mobile tanker bowser.
- Wetting agents shall be utilised to provide a more effective surface wetting procedure.
- Exhaust emissions from vehicles operating within the construction site, including trucks, excavators, diesel generators or other plant equipment, will be controlled by the contractor by ensuring that emissions from vehicles are minimised by routine servicing of vehicles and plant, rather than just following breakdowns; the positioning of exhausts at a height to ensure adequate local dispersal of emissions, the avoidance of engines running unnecessarily and the use of low emission fuels.
- All plant not in operation shall be turned off and idling engines shall not be permitted for excessive periods.
- Material handling systems and site stockpiling of materials will be designed and laid out to minimise exposure to wind. Water misting or sprays will be used as required if particularly dusty activities are necessary during dry or windy periods.
- Material stockpiles containing fine or dusty elements including top soils shall be covered with tarpaulins.
- Where drilling or pavement cutting, grinding or similar types of stone finishing operations are taking place, measures to control dust emissions will be used to prevent unnecessary dust emissions by the erection of wind breaks or barriers. All concrete cutting equipment shall be fitted with a water dampening system.
- A programme of air quality monitoring shall be implemented at the site boundaries for the duration of construction/demolition phase activities to ensure that the air quality standards relating to dust deposition and PM_{10} are not exceeded. Where levels exceed specified air quality limit values, dust generating activities shall immediately cease and alternative working methods shall be implemented.

- A complaints log shall be maintained by the construction site manager and in the event of a complaint relating to dust nuisance, an investigation shall be initiated.

Table 9.20 presents a summary of dust control techniques which will be implemented at the site during demolition activities.

Table 9.20: SUMMARY OF DUST CONTROL TECHNIQUES

Sources of Particular Matter	Control Technique
Loading and unloading processes	**Containment / Suppression**
	Reducing drop heights
	Use of variable height conveyors
	Use of chutes
Double handling transfer points	**Site and process design**
	Reduction of vehicle movements
Aggregate stockpiles	**Appropriate siting**
	Away from closest receptors/site boundaries
	Use of enclosures and bunding
	Reduced drop heights
	Water suppression
	Sprays
	Bowsers
	Covering
	Covered stock bins
	Dust covers
Mobile Crushing of site generated C&D Waste (if applicable)	**Appropriate siting**
	Away from closest receptors/site boundaries
	Use of enclosures and bunding
	Reduced drop heights
	Water suppression
	Sprays
	Bowsers
Conveyors / transfer points	**Containment**
	Wind boards
	Housings
	Suppression

	Water sprays
	Housekeeping
	Clean up of spilled materials
	Appropriate siting
	Away from closest receptors/site boundaries
Concrete Cutting Plant	**Suppression**
	Water sprays fitted to equipment/plant
Roadways including site yard area	**Suppression**
	Water sprays and bowsers
	Wheel wash at site compounds
Vehicles	**Washing / Covering**
	Wheel wash to be installed at site exit
	Vehicles exiting the site with C&D loads shall be covered with tarpaulin

Table 9.20 Summary of dust control techniques

Operational Phase
No additional mitigation measures are required as the operational phase of the proposed development as it is predicted to have an imperceptible impact on ambient air quality and climate.
The operational phase mitigation by design measures to minimise the impact of the development on air quality and climate are as follows:

Mitigation Measures (Operational)

- Thermally efficient glazing systems on all units
- Mechanical Ventilation and Heat Recovery (MVHR) systems or equivalent installed in all apartments
- Thermal insulation of walls and roof voids of all units
- Natural Gas heating in all units
- Inclusion of electric car charging points to encourage electric vehicle ownership

Predicted Impacts
Various elements associated with the construction/demolition phase of the proposed development have the potential to impact local ambient air quality, however the potential construction/demolition phase impacts shall be mitigated as detailed in Section 9.7 above to ensure there is a minimal impact on ambient air quality for the duration of all construction/demolition phase works. It is predicted that the operational phase of the development will not generate air emissions that would have an adverse impact on local ambient air quality or local human health.

9.8 '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).

9.9 WORST CASE SCENARIO

The main potential for adverse impact on local air quality will occur during the construction/demolition phase. The worst-case scenario therefore corresponds to the situation where the mitigation measures for construction and demolition activities fail or are not implemented. Should dust mitigation measures not be implemented during the construction/demolition phase, significant dust nuisance is likely in areas close to the construction site. Given the distance to sensitive receptors dust nuisance is not considered to be a significant issue providing mitigation measures are carried out.

9.10 MONITORING & REINSTATEMENT

Monitoring
Monitoring of construction and demolition dust deposition at nearby sensitive receptors (residential dwellings) during the construction/demolition phase of the proposed development is recommended to ensure mitigation measures are working satisfactorily. This can be carried out using the Bergerhoff method in accordance with the requirements of the German Standard VDI 2119. The Bergerhoff Gauge consists of a collecting vessel and a stand with a protecting gauge. The collecting vessel is secured to the stand with the opening of the collecting vessel located approximately 2m above ground level. The TA Luft limit value is 350 mg/(m2*day) during the monitoring period between 28– 32 days.

There is no monitoring recommended for the operational phase of the development as impacts to air quality and climate are predicted to be imperceptible.

9.11 DIFFICULTIES IN COMPILING INFORMATION

There were no difficulties encountered in compiling this section of the EIAR.

9.12 RESIDUAL IMPACTS

Construction/Demolition Phase
Air Quality
When the dust minimisation measures detailed in the mitigation section of this Chapter (Section 9.7) are implemented, fugitive emissions of dust from the site will be insignificant and pose no nuisance at nearby receptors.

Climate
Impacts to climate during the construction/demolition phase are considered imperceptible and therefore residual impacts are not predicted.

Operational Phase
The results of the air dispersion modelling study indicate that the impacts of the proposed development on air quality and climate is predicted to be imperceptible with respect to the operational phase for the long and short term.

9.13 REFERENCES

- German VDI (2002) Technical Guidelines on Air Quality Control – TA Luft
- Framework Convention on Climate Change (1997) Kyoto Protocol To The United Nations Framework Convention On Climate Change
- Framework Convention on Climate Change (1999) Ireland - Report on the in-depth review of the second national communication of Ireland
- Environmental Resources Management (1998) Limitation and Reduction of CO_2 and Other Greenhouse Gas Emissions in Ireland
- EU (2014) EU 2030 Climate and Energy Framework
- Department of the Environment, Heritage and Local Government (DEHLG) (2003) Strategy to Reduce Emissions of Trans-boundary Pollution by 2010 to Comply with National Emission Ceilings - Discussion Document
- DEHLG (2004) National Programme for Ireland under Article 6 of Directive 2001/81/EC for the Progressive Reduction of National Emissions of Transboundary Pollutants by 2010

- DEHLG (2007a) Update and Revision of the National Programme for Ireland under Article 6 of Directive 2001/81/EC for the Progressive Reduction of National Emissions of Transboundary Pollutants by 2010
- Environmental Protection Agency (EPA) (2002) Guidelines On Information To Be Contained in Environmental Impact Statements
- EPA (2003) Advice Notes On Current Practice (In The Preparation Of Environmental Impact Statements)
- EPA (2017) Guidelines on the Information to be Contained in Environmental Impact Assessment Reports - Draft
- EPA (2015) Advice Notes for Preparing Environmental Impact Statements – Draft
- UK DEFRA (2016a) Part IV of the Environment Act 1995: Local Air Quality Management, LAQM. PG
- UK DEFRA (2016b) Part IV of the Environment Act 1995: Local Air Quality Management, LAQM.TG
- UK Department of the Environment, Transport and Roads (1998) Preparation of Environmental Statements for Planning Projects That Require Environmental Assessment - A Good Practice Guide, Appendix 8 - Air & Climate
- EPA (2016) Air Quality Monitoring Report 2015 (& previous annual reports 1997-2014)
- EPA (2017) EPA Website: http://www.epa.ie/whatwedo/monitoring/air/
- UK DEFRA (2016) NO_x to NO_2 Conversion Spreadsheet (Version 5.1)
- Transport Infrastructure Ireland (2011) Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes
- Transport Infrastructure Ireland (2009) Guidelines for Assessment of Ecological Impacts of National Roads Schemes (Rev. 2, Transport Infrastructure Ireland, 2009)
- Department of the Environment, Heritage and Local Government (2010) Appropriate Assessment of Plans and Projects in Ireland – Guidance for Planning Authorities
- World Health Organisation (2006) Air Quality Guidelines - Global Update 2005 (and previous Air Quality Guideline Reports 1999 & 2000)
- Highways England (2013) Interim Advice Note 170/12 v3 Updated air quality advice on the assessment of future NO_x and NO_2 projections for users of DMRB Volume 11, Section 3, Part 1 'Air Quality
- Institute of Air Quality Management (IAQM) (2014) Guidance on the Assessment of Dust from Demolition and Construction Version 1.1
- EU (2017) Ireland's Final Greenhouse Gas Emissions in 2015
- BRE (2003) Controlling Particles, Vapours & Noise Pollution From Construction Sites
- The Scottish Office (1996) Planning Advice Note PAN50 Annex B: Controlling The Environmental Effects Of Surface Mineral Workings Annex B: The Control of Dust at Surface Mineral Workings
- UK Office of Deputy Prime Minister (2002) Controlling the Environmental Effects of Recycled and Secondary Aggregates Production Good Practice Guidance
- USEPA (1997) Fugitive Dust Technical Information Document for the Best Available Control Measures
- USEPA (1986) Compilation of Air Pollutant Emission Factors, AP-42, Fifth Edition (periodically updated)

10 LANDSCAPE & VISUAL

10.1 INTRODUCTION

This chapter deals with landscape and visual impact assessment (LVIA) of the proposed mixed-use development at former Gallaher's site, Airton Road. It examines the potential impacts of the proposed development on the landscape setting as well as on visual receptors in the landscape such as residents, visitors, people pursuing recreational activities etc. The assessment indicates the level of anticipated impact and outlines measures by which impacts can be mitigated.

Photomontages have been prepared for the proposed scheme by 3D Design Bureau (refer to the proposed views for photomontages outlined in section 10.8 below. A3 of the photomontages also included with the SHD application pack).

Definition of Landscape
The European Landscape Convention 2000 (ELC), also known as the Florence convention, defines landscape as 'an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors'. The ELC applies to natural, rural, urban and peri-urban areas and concerns landscapes that might be considered outstanding as well as every day or degraded. This is an inclusive definition that extends beyond the idea of landscape as only a matter of aesthetics and visual
amenity.

The National Landscape Strategy for Ireland 2015-2025, which was developed as a result of the ELC, recognises that the Irish landscape has evolved over time and will continue to do so. This strategy notes that landscape is *more than our stunning countryside and dramatic coastline; it also encompasses out towns, cities and villages, the ordinary and the everyday.*

The Planning and Development Act 2000, as amended, provides that 'landscape' has the same meaning as in the ELC. The PDA, as amended, requires Development Plans and Regional Guidelines to include objectives relating to *landscape, in accordance with relevant policies or objectives for the time being of the Government or any Minister of the Government relating to providing a framework for identification, assessment, protection, management and planning of landscapes and developed having regard to the European Landscape Convention done at Florence on 20 October 2000.* In addition, an environmental impact assessment.

10.2 METHODOLOGY

This assessment has been prepared based on the following guidelines and documents:

- *Guidelines on the Information to be contained in and Environmental Impact Statement*, by the Environmental Protection Agency, 2002
- *Revised Guidelines on the information to be contained in Environmental Impact Statements*- Draft, by the Environmental Protection Agency, 2015
- *Advice Notes on Current Practice in the preparation of Environmental Impact Statements,* by the Environmental Protection Agency, 2015.
- *Guidelines on Environmental Impact Assessment*, Draft, by the Environmental Protection Agency, 2017
- *Guidelines for Landscape and Visual Assessment*, 3rd Ed., Landscape Institute and Institute of Environmental Management and Assessment, 2013.
- *National Landscape Strategy for Ireland,* Department of Arts, Heritage and the Gaeltacht, 2015-25
- *South Dublin County Development Plan* 2016-2022
- *Tallaght Town Centre LAP Renewed in 2011*
- *Proposed Draft Tallaght Town Centre Local Area Plan 2019*

The Landscape and Visual Assessment involved:

- Visiting the area;
- Undertaking a desk study of the subject site and its immediate environs in relation to its local and urban significance using the information gathered from site visits, studying aerial photography and Ordnance Survey mapping;
- Establishing and describing the receiving environment in terms of the existing landscape and its visual amenity;
- Assessing the nature, scale and quality of the proposed development through examination of the design team's drawings, illustrations and descriptions of the proposed scheme;

The Draft EPA Guidelines 2017 recommend using descriptive terminology to determine the types, quality and significance of effects. This guidance is also included in the Guidelines for Landscape and Visual Assessment 2013 recommends using categories of significance to describe effects.

Once the receiving environment has been established, the proposed development is then applied to allow the identification of potential positive, negative and neutral impacts, prediction of their magnitude and the assessment of their significance on the environment. The definition of these effects is defined are given in Table 10.1. The magnitude of these effects is categorised as 'slight', 'moderate', 'substantial' or 'no change' and the criteria for each category is given in Table 10.2. Mitigation measures can then be identified, usually forming the main elements of the landscape masterplan, to reduce as far as possible any potential negative environmental effects. The effects of the proposal are considered during both the construction and operational phase of the proposed development.

Effect Description	Definition
Positive Effect	A change, which improves the quality of the existing landscape character.
Neutral Effect	A change, which does not affect the quality of the landscape character.
Negative Effect	A change, which reduces the quality of the existing landscape character.

Table 10.1 Effect Types

Substantial Effect	Total loss or major alteration of key elements / features / characteristics of the baseline landscape character and / or introduction of features considered to be totally uncharacteristic when set within the receiving landscape and its level of sensitivity.
Moderate Effect	Partial loss or alteration of key elements / features / characteristics of the baseline landscape character and / or introduction of features that may be prominent but not necessarily considered to be substantially uncharacteristic when set within the receiving landscape and its level of sensitivity.
Slight Effect	Minor loss or alteration to one or more key elements / features / characteristics of the baseline landscape character and / or introduction of features that may not be uncharacteristic when set within the receiving landscape and its level of sensitivity.
No Perceived Change	Very minor loss or alteration to one or more key elements / features / characteristics / of the baseline landscapes approximating the no change situation.

Table 10.2 Effect Categories

10.3 RECEIVING ENVIRONMENT

Context & Character

The subject site is c.2.79Ha in area and is located at former Gallaher's cigarette factory site, Airton Road, Tallaght. It is a brownfield site that is currently occupied by low rise vacant industrial units. These are proposed to be demolished as part of the development. The site is located in a regeneration zone. The topography of the site is generally flat.

Figure 10.1 Site location and context

Figure 10.2 View from Greenhills road (Source: Google 2019)

Figure 10.3 View from Airton Road and Greenhills road junction into the site(Source: Google 2019)

The site is bound by Greenhills Road along the eastern edge of the site and Airton road along the north of the site. The character of the site would be considered that of a traditional low-rise industrial development with no inherent aesthetic qualities. Similar commercial and industrial low-density development (1-2 storeys) continues towards the north and immediate west of the site. Building heights reflect their industrial purpose and seldom go above 2 storeys. The HSE Kilnamanagh Tymon Primary Care centre is a modern 5 storey building located opposite, to the north of the site. The southern edge of the site is bound by Technological University Tallaght Campus playing pitches. The lands to the east of the site can be characterised as broad, open plains that looks onto Dublin Mountains. They include major active open spaces, Astro Park Tallaght and Tallaght Athletics Club pitches and are the major receptors of the proposed development.

Visibility

Due to the landscape context of the site, there are generous views into the site from the south and east of the site. The site is located in a middle ground land with lowlands existing towards the east of the site and upland to the south of the site. The site has excellent views to Dublin mountains most notably Kilmashogue mountain, Mount Pelier etc.

Views along Greenhills road from the south are restricted to an extent by the mature trees lining the Technological University Dublin Tallaght Campus. The proposed development will fit into the context set by existing buildings to the north of the site that includes the HSE Kilnamanagh Tymon, Primary Care centre. Views along Airton are partially blocked by the broad leaf trees that are planted along the sidewalks. The contour falls gradually along Airton road from West to East.

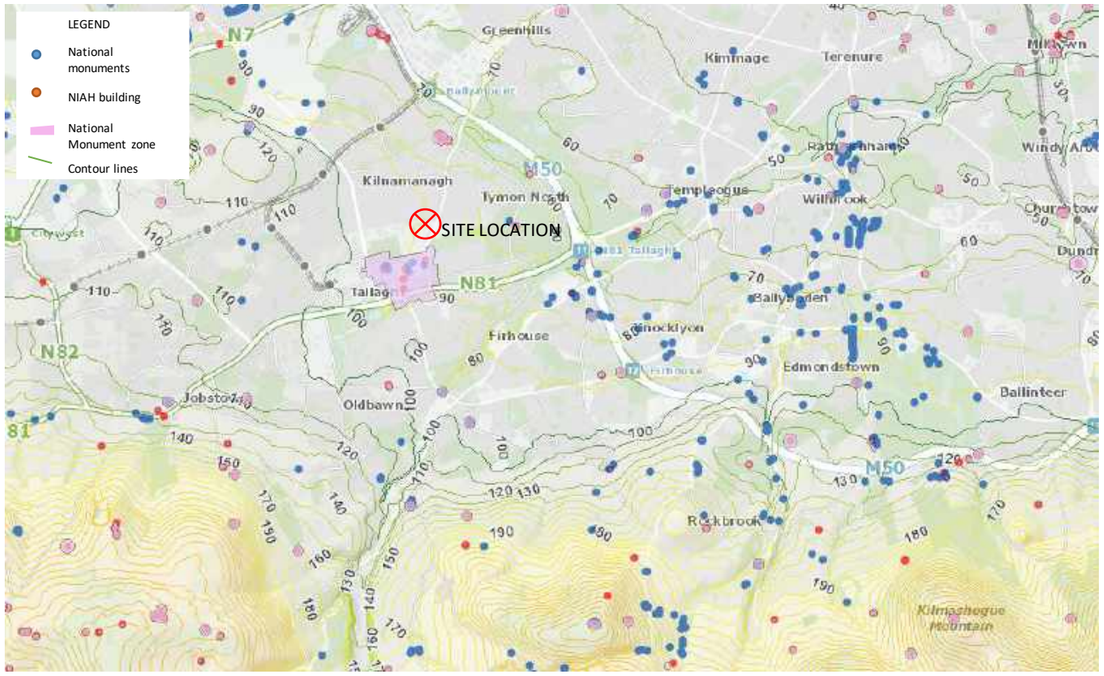


Figure 10.4 Protected structures in the vicinity of the Site (Source: www.map.geohive.ie)

Trees and Hedgerows

Within the site and there is therefore a generous amount of tree cover around the southe rn boundary of the site with TU Dublin campus. Airton Road is also lined with semi mature trees along the road. There is a short rubble wall lining the site along the eastern boundary with Greenhills road. The hedgerow along this wall is now in an overgrown state.

The site consists of a low density of trees species that generally consist of naturally -seeded Fraxinus excelsior(Ash), Populus spp. (Poplar) and Betula pendula (Birch)) and planted middle-aged to mature Sorbus aria (Whitebeam), Prunus spp. (Cherry and Plum) and other minor species. The trees vary in age and range from young (<15 years) to mature (>50years). Trees are generally in fair to poor condition with little or no arboricultural or sylvicultural management practices carried out in the past. hedgerow along the eastern boundary of the site is in good condition and comprises of native hedgerow indigenous species of Crataegus monogyna (Whitethorn), Prunus spinosa (Blackthorn), Corylus avellana(Hazel), Rosa spp. (Rosa) and Fraxinus excelsior (Ash). The hedgerows will require ongoing trimming to curtail height and lateral spread.

***Figure 10.5** Existing tree survey Map (Source Tree Management Services)*

The Tree Survey report and accompanying drawings, submitted with this application, outlines the trees and vegetation existing on the subject site in further detail.

Planning policy Context

The South Dublin County Development Plan 2016-22 promotes varied building height developments within regeneration zones subject to the amenity of the area in order to support compact urban form, and legibility. The site is zoned for REGEN the objective for which is to 'facilitate enterprise and/or residential led regeneration.'

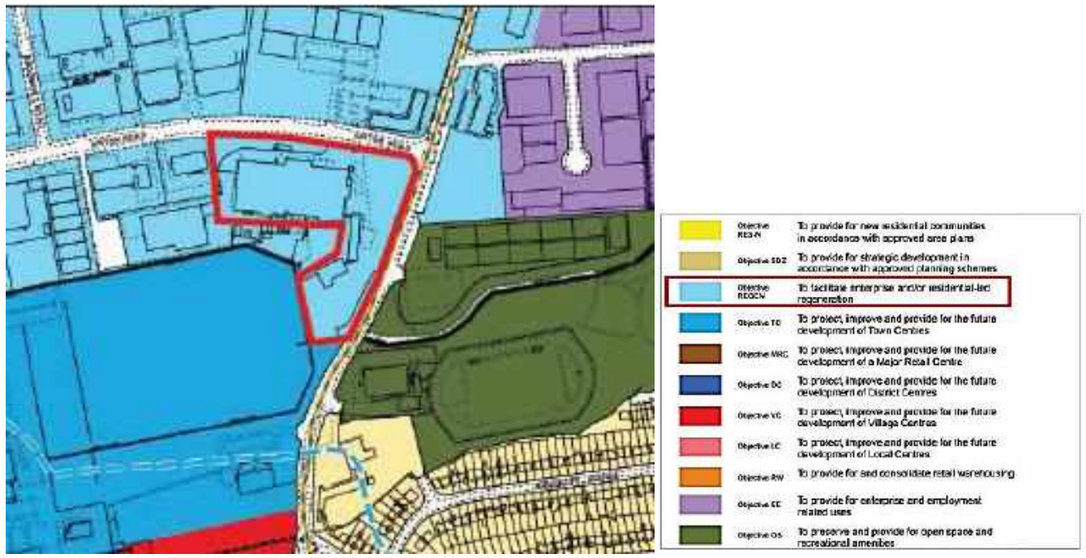


Figure 10.5 Zoning map SDCC Development plan 2016--22

It is the policy of the Council to preserve Views and Prospects and the amenities of places and features of natural beauty or interest including those located within and outside the County (HCL Policy 8). The council seeks to preserve and improve views of special amenity, historic or cultural value or interest including rural, river valley, mountain, hill, coastal, upland and urban views and prospects that are visible from prominent public places. It is implied within the development plan that the impact of development on protected views and prospects will be considered within the assessment of planning applications.

A Landscape Character Assessment LCA of the county was published by SDCC in 2015.The assessment has identified distinct character areas based on patterns of geology, landform, landuse, cultural, historical and ecological features. They are: 1. Liffey Valley LCA, 2. Newcastle Lowlands LCA, 3. Dodder and Glenasmole Valley LCA, and 4. Suburban Lowlands. Key recommendations from the LCA emphasize on *containing urban sprawl by providing for higher density and high quality residential development that accommodates different demographic needs, and reflects and enhances local landscape character*.

Figure below shows the Landscape character types identified for the county. The subject site is identified within the Urban Character area. The LCA acknowledges that it has not assessed the urban areas of SDCC as they would require a finer scale of assessment that is normally undertaken within a townscape character assessment. The preliminary assessment for urban areas recommends the following:
- *to enhance connectivity between open spaces as means of enhancing biodiversity and*
- *to audit new development that will impact views into rural hinterlands of the country.*

Figure 10.6 Landscape Character Areas of SDCC Development plan 2016-22

It is an objective within the SDCC Development Plan 2015-22 (HCL7 Objective 1) *To protect and enhance the landscape character of the County by ensuring that development retains, protects and, where necessary, enhances the appearance and character of the landscape, taking full cognisance of the Landscape Character Assessment of South Dublin County (2015).*

HCL7 Objective 2 requires *to ensure that development is assessed against Landscape Character, Landscape Values and Landscape Sensitivity as identified in the Landscape Character Assessment for South Dublin County (2015) in accordance with Government guidance on Landscape Character Assessment and the National Landscape Strategy.*

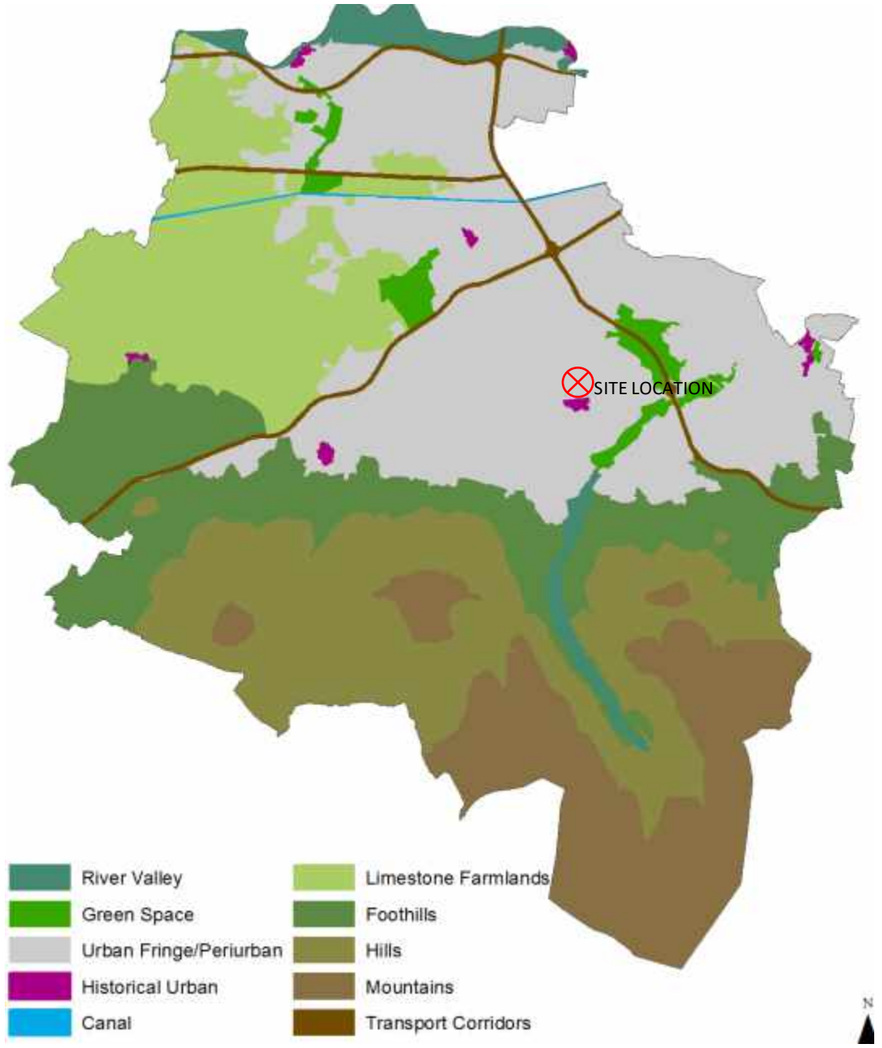


Figure 10.7 Landscape Character types of South Dublin County (Landscape Character Assessment SDCC 2015)

10.4 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

The proposal is for a mixed-use development on a site of c. 2.79ha. The proposal is set out in full in Chapter 3 and in the Statutory notices. In brief it consists of the

- Demolition of existing factory/ warehouse buildings on site;
- Construction of 502 residential units comprising of 197 no. 1-Bed; 257 no. 2-Bed; and 48 no. 3-Bed Apartments all with associated private balconies/terraces to the north/south/east/west elevations;
- Construction of 3 no. Retail Units; a creche; and communal facilities;
- The development will take place over 6 no. Blocks (A-F) ranging in height up to 8 storeys;
- The development will have 202 no. car parking spaces located at undercroft level of blocks A, B and C and at basement level of blocks E and F. 584 no. secure bike parking spaces. The site is accessed through 2 no. vehicular access to the north and east of the scheme. There will be a number of pedestrian entrances along Airton Road and Greenhills Road which also provide access for emergency vehicles.

Landscape Component
The landscape strategy by Mitchell Associates for the site aims to create a high quality attractive environment with adequate amenity facilities for the surrounding residences and users of the park spaces. It is an objective of the landscape design to retain the existing trees and hedgerows where possible to Arborists recommendations. The landscape plan undertakes full coordination with site services, SuDS, DMURS etc.

The landscape proposals for the scheme includes open footpath network , centrally located public open space that includes kick about spaces, seating/picnic areas, playground facilities that will cater for individual/group play, Semi private landscape associated with apartments, a communal amenity linear open space is proposed within the Riparian strip towards the south of the site, communal open spaces are also proposed at podium levels within blocks A/B/C and Blocks E/F.

A public plaza is proposed at the junction of Airton Road and Greenhills Road adjacent to the retail units creating a social, active and vibrant corner on the streetscape with tree planters, social seating and visitor cycle parking.

A number of pedestrian entrances are proposed along both Airton Road and Greenhills Road that will increase pedestrian permeability through the development. They will also provide access for emergency and service vehicles. A pedestrian connection is also provided across Greenhills Road to the adjacent Bancroft Park.

10.5 POTENTIAL IMPACTS

Construction Phase

As the site is of a significant size(2.79Ha) and is currently derelict, any major redevelopment of the site will result in significant visual impact and material change to the landscape character of the site. The construction phase of the development would be visually unappealing during the initial stages and as the development progresses the visual impact will improve. These visual impacts during the construction phase are temporary in nature and site activity in and around the site.

Major impacts during the construction phase will be:

- Changes to the landscape due to construction works, land excavations, temporary structures, machinery and scaffolding on the site.
- Removal of some vegetation and hedgerows with respect to site preparation works and operations.
- Dust and noise impacts to the surrounding due to construction traffic and works
- Temporary fencing/ hoarding and buildings (including office accommodation)
- Large machinery and work vehicles going to and from the site.
- Construction workers coming and going from the site

Mitigation measures to the construction phase will be dealt within the construction management plan.

Operational Phase

On completion the mixed-use development will significantly alter the landscape from a vacant industrial site to a large mixed-use estate. The character of the area will change from low density industrial estate to high density residential apartment blocks.

The scheme will be visible along the adjoining public roads and from certain vantage points in the wider landscape along Bancroft Park and Technological University Tallaght campus.

The development along with the proposed landscaping works will create a new vertical emphasis for the site integrating with developments within adjoining sites. New levels of planting and landscaping proposed will supersede the poor provision that currently existing on this site, although some boundary planting will also be lost due to proposed new entrance into the site along Greenhills road.

The layout has been carefully considered with open spaces located in between blocks at ground floor and raised landscape courtyards provided at first floor levels with independent access from ground floor.

The proposed apartment development is of high-quality and accords with the requirements of South Dublin County Council Development Plan 2016-22 and associated national policy.

10.6 POTENTIAL CUMULATIVE IMPACTS

The site is zoned for REGEN to 'facilitate enterprise and/or residential led regeneration.' Residential use is permitted, and the proposed development is in accordance with the quantitative and qualitative standards currently applied to residential development within local and national planning policy.

The design of the scheme will provide a distinctive and sustainable new residential development with the aim of providing compact and sustainable living options.

Due to the topography of the site and surrounding landscape the proposed development, at certain vantage points, will result in a cumulative impact visually with other adjoining developed areas. These are considered in Section 10.8 below.

However, as is shown, the extent of impact on the wider landscape will not be widespread given that the views of the site in most locations are constrained by topography, vegetation and the existing built environment. Where visible the additional impact will not be excessive within the existing industrial context and given the sensitive design proposed.

10.7 MITIGATION MEASURES

Design Phase

As described in Chapter 2 of this EIAR, the current layout has evolved to provide functional quality open space that will benefit the residents of the scheme and the neighbouring areas. Chapter 2 discusses in detail the alternative layouts that was considered for this site. The proposed layout takes advantage of the existing resources of the site. The height and massing of the blocks within the current proposal allows maximum amenity for the residents and overlooking to the proposed and existing open areas. A key consideration in this design process was the impact of the proposed development on the surrounding landscape and how it would integrate into the area.

Construction Phase

To reduce the potential negative impacts during the construction phase, good site management and housekeeping practices will be adhered to. The visual impact of the site compounds and scaffolding visible during the construction phase are of a temporary nature only and therefore require no remedial action.

To ensure the successful retention of trees as per Arborists recommendation to be retained by the contractor or developer to monitor and advise any works within the Root Protection Zones of retained trees.

Operational Phase

Mitigation measures have been incorporated into the design of the development to minimise visual intrusion and adverse landscape impact whilst creating an interesting visual setting. The proposed development provides strong urban edge to the site along Greenhills road, complementing the existing built character of the area. Trees and other planting are proposed at ground level along pedestrian pathways and within main open spaces. This extensive landscaping benefits the future users of the scheme as functional open spaces as well as to soften the visual impact of the proposed development from pedestrian level.

10.8 PREDICTED IMPACTS

Landscape

The proposed development will constitute a significant alteration to the existing landscape character of the site and its immediate context.

However, this level of change has been pre-empted in the underlying planning context for the site with the site zoned for significant regeneration which includes mixed use and residential development.

At the same the particular design and layout employed strikes an appropriate balance between establishing a new urban edge and streetscape, particularly in the immediate vicinity along the public road whilst at the same time not negatively impacting the landscape character of the wider area.

This is achieved through the careful design of the taller elements away from the highest point of the site, along with provision of quality open spaces and landscaping that will create better urban design and living spaces for the future residents.

In light of the underlying planning objectives for the zoned lands, and the specific design employed, the predicted change on landscape character is expected to be Moderate-Neutral.

Visual

A series of 8 photomontages have been prepared to assess the visual amenity impact of the proposed development (including proposed landscaping) from a variety of locations in the wider landscape.

Figure 10.8 Visual envelope and viewpoints for photo montage

Location of viewpoints

1. View looking east from Airton road near Trulife building
2. View from Airton road further east near BW hardware
3. View from Greenhills road looking south near Costa Coffee outlet
4. View from Bancroft park looking west at the proposed development
5. View from entrance to TU Dublin Tallaght Campus from Greenhills road
6. View from old Greenhills road junction.
7. View from Airton/Greenhills road junction
8. View along Airton road across the entrance to site

1. View looking east from Airton road near Trulife building

EXISTING

PROPOSED

Existing: The view looks east across industrial units along Airton Road next to Trulife building. The road is lined with mature trees on both sides and has grass verges separating pedestrian footpaths on both sides. The landscape slopes gently to the east. There are no views of the site due to a combination of factors that includes vegetation, terrain and existing built structures.

Construction Phase: The construction works will not be visible from this location.

Operational Phase: The development will not be visible.

Predicted Effect: No Perceived Change.

2. View from Airton road further east near BW hardware

EXISTING

PROPOSED

Existing: This closer view looks east across adjoining industrial site along south side of Airton road. The proposed development is not visible at road level due to the topography and existing foliage in the area.

Construction Phase: The construction works will not be visible from this location.

Operational Phase: The development will not be visible.

Predicted Effect: No Perceived Change.

3. View from Greenhills road looking south near Costa Coffee outlet

EXISTING

PROPOSED

Existing: This view is located along Greenhills road next to Costa Coffee looking South. Views to the site are partially blocked by the existing HSE Kilnamanagh Tymon Primary Care centre building and existing foliage within the site. There are no views to the site further north to this point.

Construction Phase: Construction works will be visible on the subject site from this location, the effects of which will be Negative but temporary.

Operational Phase: The proposed development will create a strong urban edge along Greenhills road continuing that set by the existing HSE building. The proposed built form and setbacks create an attractive urban frontage along the road. The proposed materials and finishes complement the emerging urban character of the area. At the same time the landscaping strategy with boundary planting along the roadside and a public open space near the junction of Airton Greenhills road gives character and legibility to the site.

Predicted Effect: Moderate-Positive.

4. View from Bancroft park looking west at the proposed development

EXISTING

Existing: The view looks west towards Greenhills Road from Bancroft Park. The site is not currently visible due to existing planting and the low scale of existing buildings on site. HSE Kilnamanagh Tymon Primary care centre is visible to the right and Tallaght athletics centre is visible to the left. However, in general there is a distinct lack of urban presence overlooking the park and little sense that a significant urban regeneration area is located beyond.

Construction Phase: The construction works on the subject site will be highly visible from this location and will be Negative but temporary.

PROPOSED

Operational Phase: The proposed development will have significant impact on this view. It will establish a significant new built edge and backdrop to the public par. It will reinforce and extend the urban edge established by the existing HSE building .

Whilst the level of change is significant and dramatic it is considered suitable for this urban location and has been anticipated given the urban context and zoning of the lands for residential led regeneration in combination with national and local planning policies.

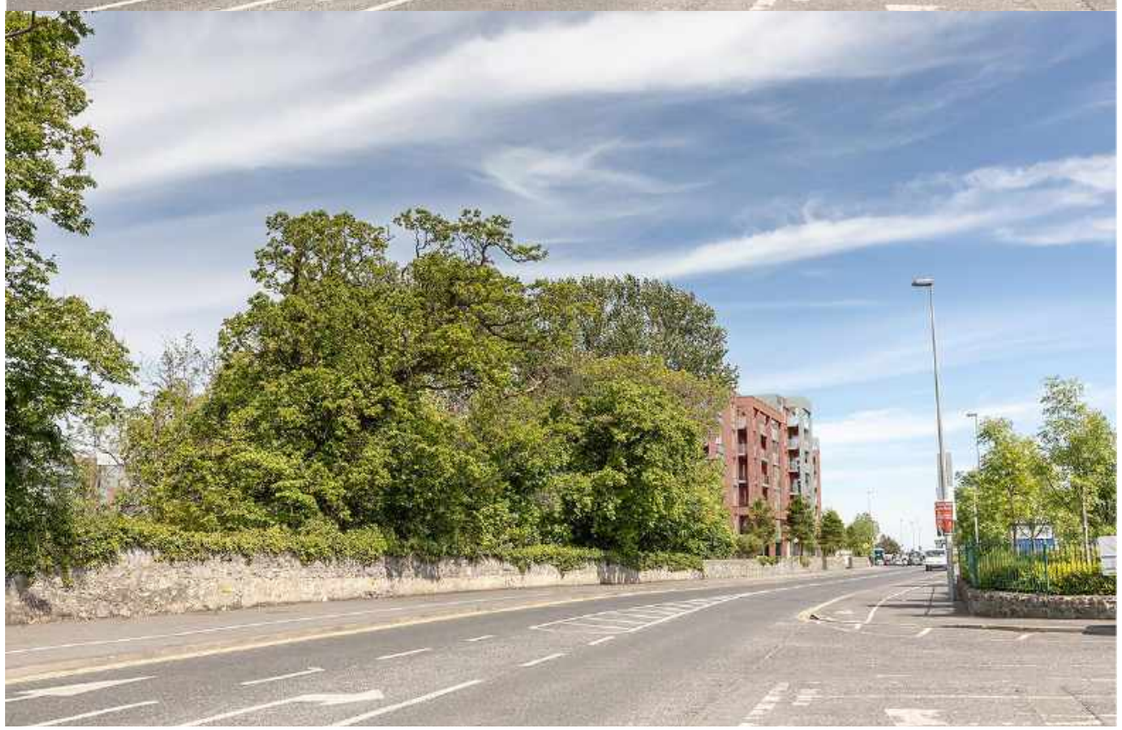
Predicted Effect: Substantial Positive.

5. View from entrance to TU Dublin Tallaght Campus from Greenhills road

EXISTING

Existing: The view looks north from the entrance to TU Dublin Tallaght campus along Greenhills road with the HSE primary care centre partially visible in the background. Views into the site are blocked by existing mature vegetation along the southern boundary of the site. There are no long distance views of the wider urban landscape beyond.

Construction Phase: The construction works on the subject site will be highly visible from this location and will be Negative but temporary.



PROPOSED

Operational Phase: The proposed development will be partially visible from this viewpoint but the scale and massing of the development is reduced by the retention of the mature trees at the south of the site.

Predicted Effect: Moderate-Positive.

6. View from old Greenhills road junction

EXISTING

Existing: The view looks north from old Greenhills road junction showing hard landscaped streetscape in the foreground. The existing buildings on site are not visible at this viewpoint due to the mature trees in the southern portion of the site.

Construction Phase: Only limited visibility of the construction works at the subject site. The effect will be Slight Negative but temporary.

PROPOSED

Operational Phase: The development will be partially visible from this viewpoint, but the scale and massing of the development will be reduced by the retention of the mature trees at the south of the site.

Predicted Effect: Slight-Positive

7. View from Airton/Greenhills road junction

EXISTING

Existing: This view looks across Greenhills road from the Airton/Greenhills road junction. The existing streetscape is considered poor given the low building scale and significant set back. The existing derelict industrial buildings on the site do not a positive visual focus or interest to viewers and passers-by. The site is enclosed in mesh fencing that creates an uninviting and impermeable site.

Construction Phase: The site will be hoarded or fenced off from the public during the construction phase. Effects of the change will be negative but temporary in nature.

PROPOSED

Operational Phase: The proposed development will radically alter the streetscape and urban edge along Greenhills Road and Airton Road. The block layouts, elevational design and variety of materials and colours, will help break up the massing of the scheme, providing a varied and visually interesting scheme.

The set backs from the public road allow new/existing street landscaping to further reduce and soften the massing of the development. The form and scale of the development is considered in line with the regeneration zoning for the lands.

Predicted Effect: Substantial-Positive

8. View along Airton road across the entrance to site

EXISTING

Existing: The view looks across the entrance to the site along Airton road. Existing view into the site indicate the low scale and monotonous massing of the existing industrial buildings. The existing mature planting along Airton Road ameliorates somewhat the negative aspects of the site in the background.

Construction Phase: The site will be hoarded or fenced off from the public during the construction phase. Effects of the change will be negative but temporary in nature.

PROPOSED

Operational Phase: The proposed development will radically transform the Airton Road creating an strong urban edge and visual presence along the street. The existing and enhanced landscaping along Airton road will integrate well with the building designs, and ground floor uses to create an attractive urban streetscape. Though there is significant transformation to this view, this level of change is envisioned with the zoning for the site and is considered to be a positive improvement to the urban setting.

Predicted Effect: Substantial-Positive

10.9 CONCLUSIONS

View	View Location	Predicted Effect (Operational Phase)
1.	View looking east from Airton road near Trulife building	No Perceived Change
2.	View from Airton road further east near BW hardware	No Perceived Change
3.	View from Greenhills road looking south near Costa Coffee outlet	Moderate-Positive
4.	View from Bancroft park looking west at the proposed development	Substantial -Positive
5.	View from entrance to TU Dublin Tallaght Campus from Greenhills road	Moderate-Positive
6.	View from old Greenhills road junction.	Slight-Positive
7.	View from Airton/ Greenhills road junction.	Substantial-Positive
8.	View along Airton road across site entrance.	Substantial-Positive

Table 10.3 Summary of Visual Assessment

At a local level the proposed development will constitute a significant intervention in the local setting replacing a disused industrial site. The impact on local views will be mitigated by existing vegetation and proposed new landscaping treatment. Immediate to the site the visual change will be dramatic but ameliorated by the quality of the building design and landscaping.

Within the wider landscape, views of the proposed development site are generally constrained by a combination of variation in topography, vegetation and existing buildings. Where views of the proposed development are significant the design qualities associated with the proposed development in terms of positioning, setbacks and varying heights of buildings as well as landscape treatments, will serve to reduce the impact.

In the long term the maturation of boundary planting will further screen the scheme at the small number of locations where the development will be visible in the wider landscape. Overall the impact in considered acceptable in light of the site's zoning, and designation for residential development.

Do Nothing Scenario
Without the proposed development, the site and the existing buildings will remain vacant and likely stay as disused.

Worst Case Scenario
The worst case scenario from a visual impact would arise if construction of the proposed scheme had to cease, leaving an incomplete development or if the proposed landscaping was not fully/properly progressed.

10.9 MONITORING

The post development monitoring of the landscape and visual effects on the environment will take the form of management of the proposed landscaping treatment for the development and which will be detailed more specifically in the bills of quantities and specification for the landscape contractor at the implementation stage of the landscape proposal.

10.10 REFERENCES

-*Guidelines on the Information to be contained in and Environmental Impact Statement*, by the Environmental Protection Agency, 2002
-*Revised Guidelines on the information to be contained in Environmental Impact Statements*- Draft, by the Environmental Protection Agency, 2015
-*Advice Notes on Current Practice in the preparation of Environmental Impact Statements,* by the Environmental Protection Agency, 2015.
- *Guidelines on Environmental Impact Assessment*, Draft, by the Environmental Protection Agency, 2017
-*Guidelines for Landscape and Visual Assessment*, 3rd Ed., Landscape Institute and Institute of Environmental Management and Assessment, 2013.
- *National Landscape Strategy for Ireland,* Department of Arts, Heritage and the Gaeltacht, 2015-25
-*South Dublin County Development Plan* 2016-22

11 TRAFFIC AND TRANSPORT

11.1 INTRODUCTION

Author: John Considine, (B Eng MIEI MIStruct E C Eng FConsEI IEI Mem No. 022256)

Material assets are defined in the EPA "Guidelines on Information to be contained in Environmental Impacts Statements (EPA, 2002) as: "*Resources that are valued and that are intrinsic to specific places are called 'material assets'. They may be of either human or natural origin and the value may arise for either economic or cultural reasons. Examples of natural resources of economic value include assimilative capacity of air and water, non-renewable resources (e.g. minerals, soils, quarries and mines), renewable resources (hydraulic head, wind exposure).*"

This chapter of the EIAR provides a description of the existing land, soil and geology within and immediately surrounding the site of the proposed development. It will provide an assessment of the potential impacts of the proposed residential development on the land and soils during the demolition, construction and operational phases of the proposed development. It will also identify the characteristics, predicted impact and mitigation measures from the different phases.

The material assets considered in this chapter of the EIAR include the surrounding transport network and utilities such as;

Transport Network:

- Road network and associated junction nodes
- Pedestrian
- Cyclist
- Public transport

1. Bus
2. Rail
3. Luas

The information outlined within this chapter has been in part extracted from the proposed developments Traffic Assessment, the Parking and Mobility Study, drainage drawings, Infrastructure report, chapter 5.0 Land & soils, chapter 6.0 Water.

Existing:
The 2.79-hectare site is currently occupied by the disused factory/warehouse & associated hardstanding (Gallaher's cigarette production facility).

Proposed:
The proposed development will consist of 502no. residential apartment units in 6no. multi-storey blocks (A-F). Ground level car parking will be provided as an undercroft to blocks A-C and basement car parking will be provided below blocks E and F. The total number of car parking spaces provided is 202. 3no. retail units are with a combined total area of 481m² will be provided (187m², 161m² and 134m²). A 329m² crèche will be provided under the south eastern of Block C, within the site adjacent to the open space. The site will also include communal facilities, (gym, offices) of 704m². This is not a 'Build-to-Rent' (BTR) scheme.

As part of the development, 2no. new entrances will be created to allow access into the site for the residents. Additional infrastructure works will be undertaken to ensure that there is sufficient pedestrian and cyclist facilities to allow ingress and egress to, from and along the site.

It is envisaged that all structural loads will be carried via concrete foundations to either bedrock or the over-lying layers of stiff black boulder clay.

11.2 METHODOLOGY

The assessment of the potential impact of the proposed development on the material assets in the area was carried out according to the methodology specified by the EPA and the specific criteria set out in the Guidelines on Information to be Contained in an Environmental Impact Statement (EPA 2002 and 2017 (Draft)), EIA Directive 2014/EU/52, Advice Notes on Current Practice (in preparation of Environmental Impact Statements) (EPA 2003), Environmental Impact Assessment (EIA), Guidance for Consent Authorities Regarding Sub-Threshold Development (DoEHLG 2003), Development Management Guidelines (DoEHLG, 2007) and Guidelines for Planning Authorities and An Bord Pleanála on Carrying out Environmental Impact Assessments August 2018.

The following sources of information were used in the completion of this assessment:

- Smarter Travel A Sustainable Future (2009-2020).
- National Cycle Policy Framework (2009).
- Regional Planning Guidelines for the Greater Dublin Area.
- Guidelines for Traffic Impact Assessments': The Institution of Highways and Transportation;
- Transport for Ireland – Irish Rail

The methodology included a number of key inter-related stages;

- Background Review: This important exercise incorporated three parallel tasks which included;

1. An examination of the local regulatory and development management documentation.
2. An analysis of previous 'transport' related, strategic and site specific studies of development and transport infrastructure proposals across the Tallaght Local Area Plan.
3. A review of planning applications to establish the legal status of various third party development schemes that were either considered within the strategic 'transport' studies or which have emerged and received full planning permission.

- Traffic Counts: Classified junction traffic counts in addition to automatic traffic counts were undertaken and analysed with the objective of establishing local traffic characteristics in the immediate area of the proposed residential development.
- Trip Generation: A trip generation exercise has been carried out to establish the potential level of vehicle trips generated by the proposed residential development.
- Trip Distribution: Based upon both the existing and future (for the adopted assessment horizon years) network characteristics, a distribution exercise has been undertaken to assign site generated vehicle trips across the local road network.

11.3 RECEIVING ENVIRONMENT

The site is bounded to the north by Airton Road and to the east by Greenhills road. The north west of the site is bounded by an entrance road to an industrial unit, the south west is bounded by the car park used for the industrial unit. The Tymon stream/River Poddle runs along the south of the site and Tallaght University sports grounds are on the other side of the river. There will be two permanent road access points to the site, one along Airton road

and another on Greenhills road. The development will have no through route, and each of these entrances will serve their respective apartment blocks, (blocks A-C on Airton and blocks D-F on Greenhills).

Figure 11.1 Site Location

Walking Mobility

There is no permissible existing pedestrian movement through the site. The site is surrounded by an impermeable fencing, which is a function of the land usage as an industrial warehouse (now dis-used).

Figure 11.2 below indicates the existing lack of pedestrian permeability and the new proposed landscaped permeable pathways through the site.

Figure 11.2 – Site Permeability

There are no welcoming pedestrian routes or areas in proximity to the site. Land usage in the area has been predominantly industrial and therefore there are no permeable paths or congregation zones for pedestrians in the area.

The footpath along Greenhills Road has no barriers between the pedestrians and the traffic on the road, and the footpath surface is shared with cyclists. This road has a high frequency of traffic usage and is used by HGV's and Dublin bus routes, particularly at peak times.

Figure 11.3 – Greenhills Road Pedestrian Footpaths (looking northwards)

The Airton Road and Greenhills Road junction is a busy junction with heavy traffic usage. Pedestrians and cyclists who wish to progress from a southern direction and travel west must traverse around the entire site perimeter along this busy junction which has limited pedestrian defences.

Figure 11.4 Greenhills/Airton Junction

Cycling Mobility

South Dublin County Council has an overall target of increasing journeys by bicycle in the city by 25% by the year 2020. Permeability and direct safe routes are therefore critical in achieving this goal. As previously stated, the majority of infrastructure for cyclists exist along major strategic roads where cyclists must share their space with buses and large volumes of traffic.

The existing cycle route adjacent to the site is a shared pedestrian space with no protection from the heavy vehicular traffic which uses the road space, as seen in Figure 11.3 above. When cyclists reach the junction of Greenhills Road, they must then join the traffic on the road surface. Cyclists progressing up this road who wish to turn left at this junction have no other choice but to join the road traffic turning left, Figure 11.5. This can increase the likelihood of an accident occurring on the road and prevent people from cycling along the road.

Figure 11.5 – Shared Cycle Lane on Greenhills Road Northbound

Public Transport Mobility

The role of public transport in accommodating the movement requirements of the area now and into the future is crucial. Buses have the greatest potential to increase public transport capacity and decrease the number of private vehicles on the road. The focus of the Mobility Management Plan is to improve connectivity to existing public transport services and promote the usage sustainable transport services.

The site area is currently connected by public transport services such as Dublin Bus adjacent to the site and the Luas Red Line 1.3km away. These services are predominantly radial in nature however, providing good links between the city centre and the west but not to other areas of the city. The full array of public transport and times can be seen below.

Bus Services

The Dublin Bus services in the area provide direct linkage to the city from the subject site. The frequency of each bus can be seen in Table 3-1, with an approximate 10-minute waiting time between the most frequent bus at peak frequency. There is an inbound Route 27 stop situated within a 2-minute walk of the site and accessing the stop is easy with a pedestrian junction allowing progression across Airton Road.

Route	Origin	Destination	Frequency (08:00 – 09:00)
Route 27	Jobstown	Clare Hall	6 per hour
Route 76	Tallaght (the Square)	Chapelizod	3 per hour
Route 54a	Kiltipper Way	Pearse Street	3 per hour

Table 11.1 Dublin Bus Route Frequencies

Luas Service

The Luas Red Line service is a form of public transport which travels from the city centre to Citywest and is both a reliable and sustainable transport option. The frequency of service is a carriage every 5/6 minutes, which is twice the regularity of the bus service in the area. The nearest Luas stop to the site is approx. 15 minutes' walk away. This walk is due to the lack of permeability in adjacent sites, due to their industrial uses. This walking distance will be reduced when the other sites within the proximity of the site area are further developed into residential units with an increased level of permeability.

Travel Distance

These travel distances were taken at 08:00am starting from the junction of Airton Road and Greenhills Road and travelling to The Spire on O'Connell street used to represent the City Centre. The modes of transport which have been listed above where calculated using google maps. Modes of transport include walking distances (i.e. walking to and from the Luas stop). These times have been added to the overall travel duration. For example, no. 4 below has a total travel duration of 55 min. This is comprised of a 15 min walk, 35 min Luas journey and a 5 min walk.

No.	MODE	START	LOCATION	DURATION
1	Walking	Airton Road / Greenhills Road	The Spire	2h 5 min
2	Cycling	Airton Road / Greenhills Road	The Spire	33 min
3	Bus Service	Airton Road / Greenhills Road	The Spire	55 min
4	Luas Service	Airton Road / Greenhills Road	The Spire	55 min
5	Car	Airton Road / Greenhills Road	The Spire	45 min

Table 11.2 Public Transport Services

11.4 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

Walking Mobility

As part of the development, 2no. new pedestrian crossings and a new landscaped route through the site and along Greenhills Road (which will be set-back from the road) are proposed.

There will be a new pedestrian crossing to the south of the site, along Greenhills Road, which will provide a link across the busy road to the new green route in the Tymon Park. This new green route forms part of the green strategy for the area which is set out in the Tallaght LAP document. By allowing pedestrians to gain safe and easy access to the Tymon Park, it promotes the permeability of the site.

The second pedestrian crossing will be on Airton Road, along the northern part of the site. As part of the proposed development an existing uncontrolled pedestrian crossing was required to be removed to allow vehicular access to the undercroft parking within the site. This uncontrolled pedestrian crossing will be reinstated.

All pedestrian crossings will be designed in accordance with Design Manual for Urban Roads and Streets (DMURS), the National Roads Authority (NRA) and the National Transport Authority (NTA) guidelines and documents.

To increase permeability and reduce the number of pedestrians who must traverse around the full perimeter of the site in order to travel west along Airton Road, 2no. new site entrances have been proposed along the Greenhills Road elevation. There is provision within the site masterplan to link both routes with future developments along Airton Road.

- The first point of entry is at the southernmost point of the site. This new site entrance will allow pedestrians who wish to travel through the site to move away from the busy road and progress up to the landscaped podium and further on into the site.
- The second point of entry is further north along the Greenhills Road elevation. This new site entrance will allow access to pedestrians and cyclists who wish to travel west to move away from the busy road. This ground level access point will welcome users through the landscaped route within the site.

The current hard-fenced site perimeter at the Airton Road / Greenhills road junction will now be replaced by a designated courtyard for pedestrians. The buildings within the development in this area have been designated for retail units ideally suited for a small coffee shop or similar commercial unit.

The proposed bus connects route runs along the Greenhills Road elevation. The site has been designed to function with or without the bus connects plans going ahead. If the bus connects route does progress, it will only increase the walking mobility adjacent to the site as part of the bus connects proposal involves protected pedestrian routes. A bus connects description of their proposal can be seen in Appendix 11.2, which illustrates the new pedestrian pathway.

The existing Airton Road pedestrian footpath has a set-back from the road and is already tree-lined.

For further information please see the landscaping and architectural drawings which have been submitted as part of this application.

Cycling Mobility

The "Cycle Network Plan for the Greater Dublin" area has produced an overall plan for providing safe cycle routes in and out of the city which can be seen Appendix 11.1. The document highlights the new proposed Route 8-B which will run along Greenhills Road adjacent to the site.

Route 8 will be a primary network and per The Cycle Network Plan, the route "*…is a much better alternative to the existing route via the very busy and intimidating Walkinstown Roundabout and the narrow section of Greenhills Road along the edge of Ballymount Industrial area".*

The new green route proposed as part of the Tallaght LAP in the Tymon Park has great potential for cyclists to utilise when travelling into the city centre. The new pedestrian crossing, mentioned above, will be a "Toucan" crossing. This will allow the safe usage of the crossing by cyclists and similarly promote the usage of the new green route.

As discussed, there will be increased permeability through the site. The new site entrance, along Greenhills road, will allow cyclists who wish to head west to navigate through the safe and welcoming landscaped pathway within the site. Cyclists will now not need to join the heavy traffic which regularly uses the Greenhills Road and this will then increase and promote the use of bicycles within the surrounding site area.

To accommodate this proposed usage of bicycles to travel in and out of the city centre, 584no. bicycle parking locations have been provided at a variety of easily accessible locations throughout the site.

Public Transport Mobility

Bus Services
Future bus plans involve the "Bus Connects" initiative, which is an attempt to overhaul the current bus system in the Dublin region by developing new bus corridors, new bus routes, increasing services and new buses. The site will be serviced by the new Route 9.

Preparing the site for this new bus service is an important part of designing the proposed development for the future. The site has been fully designed with the bus connects proposal in place and therefore access to this route has been a priority within the design. The access point along Greenhills Road will allow pedestrians to avail of this route.

11.5 POTENTIAL IMPACTS

This section contains an assessment of the potential effects of the proposed development on the traffic and transport near the site. This is provided with reference to both the Characteristics of the Receiving Environment and Characteristics of the Proposed Development sections. The assessment takes both the construction and operational phases of development into account.

All construction activities will be governed by a Construction Traffic Management Plan (CTMP) which will form a key component of the development proposals overall Construction Management Plan. Furthermore, the application's accompanying Construction and Demolition Waste Management Plan also considers the impacts potentially generated during the construction stage. The details, scope and management initiatives detailed within the final CTMP will be agreed with the local authority's Roads Department prior to the commencement of construction activities on-site. The principal objective of the CTMP is to ensure that the impacts of all building activities generated during the construction of the proposed development upon both the public (off-site) and internal (on-site) workers environments, are fully considered and proactively managed / programmed respecting key stakeholders requirements thereby ensuring that both the public' and construction workers' safety is maintained at all times, disruptions are minimised and undertaken within a controlled hazard free environment. It is noted that the impact of the construction works will be temporary in nature.

Road Network

Construction Phase
The works associated with the new development will result in additional traffic on the road network with the removal of excavated material, small amounts of demolition waste, and the delivery of new materials, concrete trucks etc.

The period (time of day and day of week) during which construction activities will be permitted on-site, and during which construction traffic will be travelling across the local road network will be set out in the construction management plan.

Construction staff traffic movements will generally occur before 08:00 and therefore avoid the morning road network peak. It is anticipated that all general construction traffic (deliveries) will occur outside of the peak commuting hours, 08:00 – 09:00.

Operational Phase
There will be an increase of traffic during the operational phase of the site. However, based on the minimal on-site parking provided this increase will be minimal. The large emphasis and access provided to other transport options will also mean that the increase to the road network will be minimal.

The commercial aspect of the proposed development will also not generate a large increase of vehicles on the road network as per the Traffic and Transport Assessment report.

Pedestrian

Construction Phase
The site is currently impermeable to pedestrians. The addition of hoarding around the site perimeter should not change the current permeability of the site for pedestrians.

It is expected that people will travel to site in a variety of modes, given its accessible nature.

Operational Phase
The proposed permeability of the site will allow pedestrians to pass through the site and access the surrounding proposed green routes.

The addition of 2no. new pedestrian crossings as part of the proposed development will also only aid pedestrians in the vicinity of the site.

Cyclist

Construction Phase
The site is currently impermeable to cyclists. The addition of hoarding around the site perimeter should not change the current permeability of the site for cyclists.

Due to the location of the site the number of additional cyclists in the form of site staff will be almost non-existent as the majority will use private vehicles or public transport.

Operational Phase
The proposed permeability of the site will allow cyclists to pass through the site and access the surrounding proposed green routes.

The addition of a toucan crossing along Greenhills road as part of the development will form a link from the site to the green route in the Tymon Park and promote the usage of cycling as a means of transport.

Public Transport

Construction Phase
There will be an increase of public transport usage during the construction phase. The proximity and frequency of the Luas and Dublin Bus services to the site means that this will be the primary method of reaching the site used by site staff. This should not negatively affect the public transport services within the area. The site staff will arrive before 08:00, before peak commuting hours, which should not negatively impact the public transport.

The frequency of each service, described above alludes to the fact that there should be no negative effect felt by the public transport system based on site staff.

Using public transport will mean that there is no negative impact on the surrounding road network.

Operational Phase
There will be an increase of public transport usage during the operational phase. The proximity and frequency of the Luas and Dublin Bus services to the site means that this will be the primary method of transport used by residents. This should not negatively affect the public transport services within the area.

The frequency of each service described above alludes to the fact that there should be no negative effect felt by the public transport system based on site staff.

Using public transport will mean that there is no negative impact on the surrounding road network.

11.6 POTENTIAL CUMULATIVE IMPACTS

There may be a small increase in road traffic from private vehicles, however given the developments proposal of a low ratio of private car spaces to apartments, the addition will be negligible.

Please refer to the Traffic and Transport Assessment which was submitted as part of this application.

Pedestrian
There should be no cumulative effect on pedestrians in the area.

Cyclist
There should be no cumulative effect on cyclists in the area.

Public Transport
The development will add to the public transport usage; however, the public transport should have capacity for additional patronage. The increased usage of public transport will not have an effect on the road traffic and transport in the area.

Should the development secure planning approval, then the new bus connects route (which runs adjacent to the site) should have the ability to design the bus route with the development capacity in mind.

11.7 MITIGATION MEASURES

Remedial and mitigation measures describe any corrective measures that are either practicable or reasonable, having regard to the potential impacts discussed above. This includes avoidance, reduction and remedy measures as per the guidance set out in Section 4.7 of the Development Management Guidelines 2007 to reduce or eliminate any significant adverse impacts identified.

The Construction Management Plan will incorporate a range of integrated control measures and associated management activities with the objective of mitigating the impact of the proposed developments on-site construction activities.

Road Network

Construction Phase
The following remedial or reductive measures to mitigate the impact of the construction phase on the existing environment are proposed with reference to the road network:

- Any recommendations regarding construction traffic management made by the Local authority will be adhered to.
- All road works will be adequately signposted and enclosed to ensure the safety of all road users and construction personnel.
- Efforts are to be made to promote the usage of public transport by site staff to prevent additional private cars on the road network.
- Provision of enough on-site parking and compounding to ensure no overflow of construction generated traffic onto the local network.
- A dedicated 'construction site' access / egress system will be implemented during the construction phases.
- Site offices and compound will be located within the site boundary. The site will be able to accommodate employee and visitor parking throughout the construction period through the construction of temporary hard standing areas. This will prevent visitors or employees parking on the surrounding streets.
- A series of 'way-finding' signage will be provided to route staff / deliveries into the site and to designated compound / construction areas.
- Truck wheel washes will be installed at construction entrances if deemed necessary.

Operational Phase
The following mitigation measures are proposed for the operational phase of the proposed development with reference to the road network:

- The development will have a dedicated management company and therefore access to dedicated on-site parking will be controlled by the management team on-site as per the Mobility Management Plan report.

Pedestrian

Construction Phase
The following remedial or reductive measures to mitigate the impact of the construction phase on the existing environment are proposed with reference to the pedestrian network:

- Hoarding to be set up around the perimeter to prevent pedestrian access.
- Signage to be implemented to clearly indicate navigation routes around the site.

Operational Phase
The following mitigation measures are proposed for the operational phase of the proposed development with reference to the pedestrian network:

- Provide signage to indicate the green routes in the vicinity.
- Provide adequate lighting along pedestrian routes to promote usage in the evenings.
- Signage of local green routes should be on site to indicate trip time and route to various surrounding locations.

Cyclist

Construction Phase
The following remedial or reductive measures to mitigate the impact of the construction phase on the existing environment are proposed with reference to the cyclist network:

- Provide bike parking locations on site to promote the usage of cycling by site staff.

Operational Phase
The following mitigation measures are proposed for the operational phase of the proposed development with reference to the cyclist network:

- Provide adequate bike parking locations on the site for each resident.
- Provide adequate lighting along cycle routes to promote usage in the evenings
- Signage of local green routes should be on site to indicate trip time and route to various surrounding locations.

Public Transport

Construction Phase
The following remedial or reductive measures to mitigate the impact of the construction phase on the existing environment are proposed with reference to the public transport network:

- Promote usage of public transport by site staff by clearly displaying local bus, Luas and rail services with a map and timetable indicating routes and travel times.

Operational Phase
The following mitigation measures are proposed for the operational phase of the proposed development with reference to the public transport network:

- Provide access to the bus stops travelling into town via a new pedestrian crossing system.

11.8 PREDICTED IMPACTS

Road Network

Construction Phase
Provided that the proposed remedial or reductive measures are implemented, the impact of the proposed development during the construction stage will be of a temporary nature and will be minimised.

Operational Phase
There will be an increase in road network usage by private vehicles, although this addition will be minimal.

Pedestrian

Construction Phase
Provided that the proposed remedial or reductive measures are implemented, the impact of the proposed development during the construction stage will be of a temporary nature and will be minimised.

Operational Phase
There will be an increase in pedestrians in the surrounding area, however these pedestrians will predominantly use the proposed green routes.

Cyclist

Construction Phase
Provided that the proposed remedial or reductive measures are implemented, the impact of the proposed development during the construction stage will be of a temporary nature and will be minimised.

Operational Phase
There will be an increase in cyclists in the surrounding area, however these pedestrians will predominantly use the proposed green routes.

Public Transport

Construction Phase
Provided that the proposed remedial or reductive measures are implemented, the impact of the proposed development during the construction stage will be of a temporary nature and will be minimised. There will be an

increase in public transport usage by site staff. This should not negatively affect the public transport systems in the area and will have no effect on the road network.

Operational Phase
There will be an increase in public transport usage by residents of the development. This should not negatively affect the public transport systems in the area and will have no effect on the road network.

11.9 'DO NOTHING' SCENARIO

Road Network
If the proposed development were not constructed there would be no effect on the road network.

Pedestrian
If the proposed development were not constructed there would be no effect on the pedestrian usage of the site area.

Cyclist
If the proposed development were not constructed there would be no effect on the cyclist usage of the site area.

Public Transport
If the proposed development were not constructed there would be no effect on the public transport area.

11.10 MONITORING & REINSTATEMENT

Construction Phase
During the construction stage the following monitoring exercises are likely to be required. The specific compliance exercises to be undertaken in regard to the range of measures detailed in the final Construction Management Plan will be agreed with the planning authority.

- Compliance with construction vehicles routing practices.
- Compliance with construction vehicles parking practices.
- Internal and external road conditions
- Timing of construction activities.

Operational Phase
The mobility management plan for the residential elements of the development will be monitored and updated every two years over a period of ten years from the initial occupancy of the units. This will allow progress to be made towards achieving a working system. The information obtained from the monitoring surveys will be used to identify ways in which the MMP initiatives should be taken forward in order to maintain and further encourage sustainable travel characteristics.

11.11 DIFFICULTIES IN COMPILING INFORMATION

None.

11.12 REFERENCES

- NRA Traffic & Transportation Assessment Guidelines; National Roads Authority (May 2014)
- TII Project Appraisal Guidelines for National Roads Unit 5.3 – Travel Demand Projections (PE-PAG-02017); TII (October 2016)
- 'Traffic Management Guidelines' Dublin Transportation Office & Department of the Environment and Local Government (May 2003)
- 'Guidelines for Traffic Impact Assessments' the Institution of Highways and Transportation (1994)
- Tallaght Local Area Plan
- Greater Dublin Area Cycle Network Plan; National Transport Authority (2013); www.nta.ie
- Dublin Bus Website; www.dublinbus.ie
- Irish Rail Website; www.irishrail.ie
- Luas Website; www.luas.ie/

12 MATERIAL ASSETS

12.1 INTRODUCTION

This section evaluates the impacts of the proposed development on the existing services and material assets of the subject site and its surrounding. Material assets discussed here are in relation to the built services and infrastructure belonging to the subject site. Traffic and transportation are assessed separately in this EIAR.

12.2 METHODOLOGY

A desktop study was conducted in relation to the material assets associated with the proposed development and their capacities. Projections of the resources where made for the construction and operational phase of the development. The Guidelines on information to be contained in an Environment Impact Statement (EPA 2002), the advice notes on current practice and Draft EPA guidelines published in 2017 requires assessment of 'economic assets of human origin' to be included in the impact study as a desktop study of material assets associated with the development.

The impacts are assessed in terms of their scale, duration and significance to the site context. During the construction phase assessments are undertaken on the impact of the proposal likelihood in incurring loss or disturbance to material assets due to construction activities. It is unlikely that there will be any major impacts during the operation phase of the development. Economic assets of natural origin that includes biodiversity, soil and water are addressed specifically in the following chapters 5, 6 and 7.

12.3 RECEIVING ENVIRONMENT

The overall area of the site is c.2.79Ha. The subject site is located c. 9km south west of Dublin City Centre, c. 750m north of Tallaght Main Street, and c. 1.6km north east of The Square Tallaght Shopping Centre on Former Gallaher's Site, Junction of Airton Road and Greenhills Road, Tallaght, Dublin 24, on a site area of c. 2.5 ha. The topography of the site is generally flat.

BUILT ENVIRONMENT/LAND

The site comprises of factory buildings which will be demolished as part of this application. The site fronts onto Airton Road to the north and Greenhills Road to the east. The site is bounded to the south by the Technological University Dublin- Tallaght Campus and to the west by a Garda car compound. The surrounding area comprises of a broad range of uses including commercial/ retail, residential, educational and sports and recreation.

ACCESS AND OWNERSHIP

The development site is in the private ownership of the applicant. Public access into the development site is currently only available from Airton road. There is no public access into or across the development lands currently. Any/no other parties have a Right of Way through the lands for which the development is applicable.

Some of the public road under the control of South Dublin County Council is also included within the red application line to facilitate road improvements and pedestrian crossings. A letter of consent from the local authority to include these lands in the application is included.

TRANSPORT INFRASTRUCTURE

The site is close to a number of bus stops which are serviced by a number of high frequency routes including nos. 27, 54a, 65, 75, 75a, 76, 76a, 77a, and 175. These services link the area to Dublin City Centre, Liffey Valley, Blanchardstown, Dundrum, Stillorgan, Dún Laoghaire, Citywest and UCD. The subject site is located c. 1.6km south east of the Belgard Luas Stop which is serviced by the Redline Luas. As part of the Bus Connects scheme there is a proposed priority bus corridor for Greenhills Road. When this bus corridor is constructed it will significantly reduce journey times to the City Centre. This proposal will also provide excellent cycle infrastructure for the area. Currently the site is a c. 28 minute cycle to St Stephen's Green. The proposed site layout is stepped back from the eastern boundary along Greenhills Road to accommodate the Bus Connects plan.

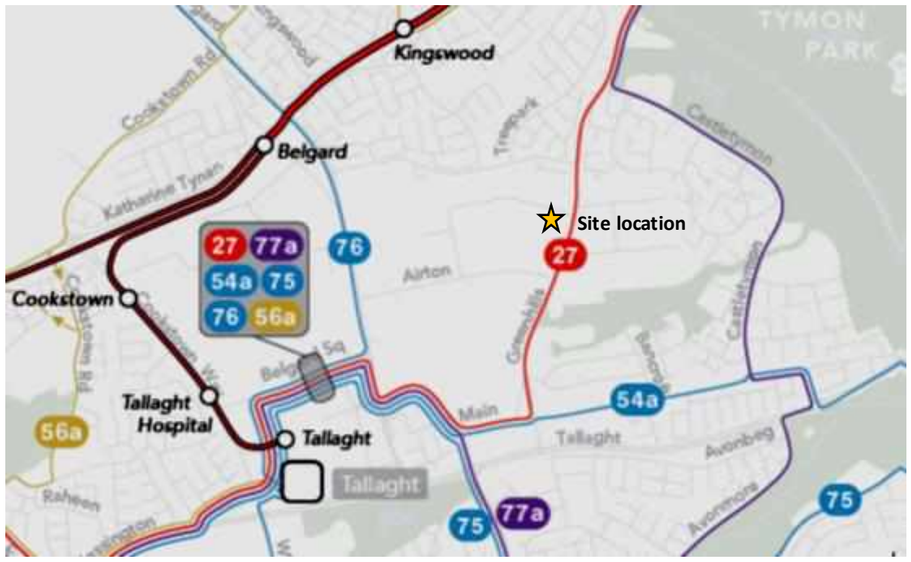


Figure 12.1 Map showing both the 27, 54a and 76 routes within the vicinity of the subject site (Source: TRAFFIC & TRANSPORT STATEMENT, BMCE)

The existing cycle facilities consist of cycle lanes shared with bus lanes along Belgard and Greenhills road. In addition, cycle lanes are available along LUAS Red line along Katherine Tynan road running towards the Naas Road. Existing cycle facilities are located in figure below. Greater Dublin Area Cycle Plan proposes to upgrade the cycle paths along both Belgard Road and Greenhills road to primary route with the route along the LUAS Red line acting as a secondary route. These will then connect the site to South Great Georges Street in the city centre and terminates in Citywest/Fortunestown via Belgard and Ballymount. The Greenhills route proceeds to connect the site to Tymon Park. To promote more sustainable travel modes the proposal includes 580cycle parking spaces.

Figure 12.2 Existing cycle facilities for the site(Source: Traffic and Transportation Assessment, BMCE)

The proposed development has provisions for the construction of pedestrian footpath improvements and crossovers along Airton road and Greenhills road.

WATER SUPPLY

A pre connection enquiry with Irish Water confirmed that a connection to the existing network can be facilitated. The site was connected to the public watermain network that served the factory and staff facilities that existed on the site. It is proposed to provide a new 150mm diameter HDPE water main pipe will be installed on site. It is proposed to provide 2no. Connections from the site water system into the water main system nearby.

FOUL DRAINAGE

The foul discharge currently existing for the site is principally from staff toilets that existed with the factory building on site. The site is currently vacant with no discharge rate into the foul network. A new 225mm diameter foul drainage will connect into Airton Road, to the existing 225mm diameter sewer. This connection will serve Catchment 1 (Block A, B & C). A new 225mm diameter foul drainage will connect into the existing sewer network on Greenhills Road, to the existing 225mm diameter sewer. This connection will serve Catchment 2 (block D, E & F). The full details of the foul drainage system can be found in Infrastructure Report prepared by BMCE.

SURFACE WATER DRAINAGE

There is an existing surface water network and river system existing for this site. This surface water network is divided into two different catchments. The northern network catchment discharges rainwater from the industrial unit roof, office roof and hardstanding (1.30 ha). This catchment discharges to a surface water manhole in the north east of the site and then to the surface water sewer along Airton Road. The southern network discharges the remaining hardstanding and roof area (0.35 ha) in a southerly direction on the site. There is no surface water system in this area, so it assumed that this network discharges to the Tymon/Poddle river which runs along the southern boundary of the site.

Figure 12.3 SuDS Layout(Source BMCE)

The proposed development will be designed in accordance with the principles of Sustainable Drainage Systems (SuDS) as embodied in the recommendations of the Greater Dublin Strategic Drainage Study (GDSDS) and will significantly reduce run-off rates and improve storm water quality discharging to the public storm water system. The GDSDS addresses the issue of sustainability by requiring designs to comply with a set of drainage criteria which aim to minimize the impact of urbanization by replicating the run-off characteristics of the greenfield site.

The site will be a high-density urban environment and therefore the available applicable SuDS measures are limited within the site. Below are the applicable SuDS measures which have been chosen for the site. The proposed site

has been divided into two sub-catchment areas. Catchment 1 comprises of blocks A-C and is in the north west of the site. Catchment 2 comprises of Blocks D, E & F as well as the central public amenity area.

The GDSDS requires that flood waters be managed within the site for a 1 in 100 year flood. The overall Qbar of each of these sub-catchments will be less than the total site Qbar (5.00 l/s). The surface water from each sub-catchment will flow into an attenuation storage tank which has been designed for that catchment.

The surface water system within each catchment has been hydraulically modelled in MICRODRAINAGE. Each sub-catchment system has been designed to ensure that their combined discharge rate does not exceed the previous discharge rate from the site.

The attenuation tanks have been provisionally designed with 30% void ratio. The tanks will be placed outside of the building envelope.

TELECOMMUNICATIONS

There is an existing network of Telecommunication services within the vicinity of the area. The development is unlikely to have any impact on that infrastructure. The development shall be supplied from the existing telecoms network that is adjacent the site.

Eir & Virgin Media Networks have the capacity to supply fibre and standard copper wire telecom services to the development. The telecom supplies shall be connected to an on-site comms room which in turn will be used to service the individual apartments.

NATURAL GAS

The area is serviced by existing gas infrastructure. Should the proposed development connect to the gas network in the future the developer will have due regard to the provisions set within 'Safety advice for working in the vicinity of Natural Gas Pipes.'

The development shall be supplied from the existing gas network that is adjacent the site. The estimated total gas load for the development shall be in the region of 4MW. Bord Gais have confirmed that the gas supply is available to serve the development

ELECTRICITY SUPPLY

The development shall be supplied from the existing ESB electrical network that is adjacent the site.
The estimated total electrical load for the development shall be in the region of 1.5MW. ESB have confirmed that the electricity supply is available to serve the development.

The scheme also includes provisions for 2 no. ESB sub-stations/ switch rooms.

WASTE MANAGEMENT

South Dublin County Council is the local authority responsible for setting and administering waste management activities in the area. Currently the site is vacant with no waste generated. Once operational, the Proposed Development is anticipated to produce approximately 90,222L of waste from all land uses per week. Of this total, 81,136L will be generated by the residential elements and 9,086L will be generated by the commercial/communal/creche elements.

Residential waste storage allows for a weekly (seven day) storage capacity for MDR, food, glass and residual (i.e. nonrecyclable). Residential bins will be provided within dedicated storage rooms within the core of each residential block. On the day of collection, bins from the waste storage areas will be brought to the collection point where all bins will be emptied by the approved waste collector. Once emptied the bins will be returned back to the appropriate waste storage areas. All waste receptacles presented for collection will be clearly identified as required by waste legislation and the requirements of the SDCC Waste Byelaws. Also, waste will be presented for collection in a manner that will not endanger health, create a risk to traffic, harm the environment or create a nuisance through odours or litter. Waste management is further discussed within the Operational Waste Management Plan prepared by Traynor Environmental.

EXTERNAL LIGHTING

Existing public lighting is provided along the public road past the site. Additional public lighting is proposed as per the lighting plan and report submitted with the application. Further details on lighting is detailed in Luminaire data prepared by Alumina Lighting.

12.4 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

The scheme proposed by applicant Greenleaf homes Limited is for a strategic housing development at the Former Gallaher site, Airton Road, Tallaght, Dublin 24. A full description is set out in the site notices and in chapter 3 of the EIAR.

12.5 POTENTIAL IMPACTS

The potential impacts of the proposed development are assessed below with respect to the impacts of the development during the construction and operational phase. The analysis takes into consideration the Characteristics of the receiving baseline environment and Characteristics of the proposed development.

BUILT ENVIRONMENT/LAND

Construction Phase

Construction activities may cause some local impacts including increase in noise, traffic, dust etc. to the surrounding built environment. However, the site is not directly adjacent the main residential estates in the area. The site context is predominantly industrial with established residential estates located further along Greenhills road. Technological University Tallaght campus is located to the south and Bancroft Park is located to the east of the site. The construction impacts will be localized and can be mitigated appropriately as per the measures outlined in chapters 8, 9, 11 and 16 of this EIAR.

In constructing the development, the existing vacant building will be demolished and removed as part of the proposed development. A site specific Construction & Demolition Waste Management Plan (C&D WMP) has been prepared by Barrett Mahony Consulting Engineers for the construction and demolition phase of the development in advance of the commencement of the construction works. Associated land works necessary for the work are outlined and mitigated for in Chapter 6 of this EIAR.

Operational Phase

This vacant industrial brownfield site will be redeveloped into a new mixed use residential apartment scheme of 502 units, comprising of 197 no. 1-Bed; 257 no. 2-Bed; and 48 no. 3-Bed Apartments

The change from industrial to residential use is in accordance with the zoning objectives pertaining to the site as per the South Dublin County Development Plan.

It is unlikely that the development in the operational phase will adversely affect the built environment in the local area. The development strikes an appropriate balance between respecting existing amenities/properties and providing a quantum and design quality that accords with local and national residential planning policy.

ACCESS AND OWNERSHIP

Construction Phase
The applicant has consent to develop this site, as demonstrated by the letter of consent from the existing owner of the site. A letter of consent is also provided by South Dublin County Council for proposed works to the road. A road opening licence will be utilised to carry out the road works and connections to public water services.

Construction access to the site will be via Airton Road at or close to the existing access. This access will be managed in accordance with the Construction & Environmental Management Plan (CEMP) as submitted in outline with this application and will ensure minimal impact on access for the public along the public road and footpaths.

Operational Phase
The completed development will be accessed from both Airton and Greenhills road, connecting to the existing public road and footpath network in the area and to the cycle network in the wider area. The proposed layout is permeable to cyclist and pedestrians. The use of cars are restricted to the under croft parking for blocks A,B,C and within the basement proposed for E,F.

As phases of the development are completed individual units will be sold to private purchasers who will form the future residential community. Some of the units may be purchased and rented to third parties. The local authority will assume a proportion of units for provision of social housing.

TRANSPORT INFRASTRUCTURE

Construction Phase
The construction activities on the site will contribute to increased construction traffic impact along Airton Road. However, these impacts will be short-term, and a series of mitigations are outlined in Chapter 11 of the EIAR and the CEMP submitted with the application. The associated road works and connections to the water services network will also involve temporary impacts to traffic movements along the public road in the local area but which will be properly controlled and managed by Irish Water and South Dublin County Council.

The construction phase may also positively impact on public transport in the area with increased usage of same by some of the construction workers coming to the site each day.

Operational Phase
The operation of the development will result in additional levels of traffic coming into and out of the development via Airton Road and Greenhills Road. The proposed design includes for improvements to the public road to facilitate this additional traffic. The traffic impact on the road network has also been assessed in Chapter 11 of the EIAR and was found to be acceptable.

The future development will also create greater demand for, and usage of public transport and the footpath and cycle path network helping to sustain this infrastructure and promote further improvements by the local authority and other transport agent.

WATER SUPPLY, FOUL AND SURFACE WATER

Construction Phase
The proposed development will require connection to the public water services network. This will result in a temporary suspension of the network to facilitate the connection, but which will be controlled and managed by Irish Water and South Dublin County Council. The associated road works to facilitate the connections will also be controlled by these agencies in accordance with standard protocols.

Temporary water services on site to facilitate the construction of the development (i.e. water supply and toilets) will be provided separately by the contractor and will not impact the public network. These services will also be properly managed in accordance with the CEMP.

Operational Phase
The demand on water services from the proposed residential development has been detailed and agreed with Irish Water and South Dublin County Council in advance of the lodgement of the application. Connection to the public network is agreed in principle subject to the additional works required as included in this application. As a result, there is no anticipated negative impact on the established infrastructure network.

The full implications and requirements for the water supply, foul and surface water infrastructure is outlined in Chapter 7 of the EIAR and within the Infrastructure report prepared by BMCE.

NATURAL GAS

Construction Phase
The proposed development may connect to the gas network in the wider area. Bord Gais have confirmed that the gas supply is available to serve the development. If the development is connected to the network, then this will be carried out by Gas Networks Ireland under its powers as a statutory undertaker.

Operation Phase
The completed development will not result in any negative impact to the gas network in the area.

ELECTRICAL SUPPLY

Construction Phase
Connection to existing power supply for the area will lead to the temporary suspension when power is provided to the site. However, this will be controlled ESB Networks as the statutory undertaker and in accordance with standard protocols.

Operational phase
The Operation Phase of the development will see an increase in demand and usage of electricity supply, but this can be facilitated by the local network.

WASTE MANAGEMENT

Construction Phase
The proposed development will generate a range of hazardous and non-hazardous waste material during the construction phase. If not managed correctly the potential impacts of this waste generation include negative environmental impacts, pollution, litter, the presence of vermin within the development. Any waste generated during the construction phase will be collected, separated at source and stored in dedicated receptacles within the temporary compounds. The following sourced segregated materials containers will be made available on site at a suitable location: Timber; Ferrous metals; Aluminium; Dry mixed recyclables; and Packaging waste.

Wherever possible materials will be re-used onsite for other suitable purposes such as:
- Re-use of shuttering etc. where suitable and where it is safe to do so; and

- Re-use of excavated stone etc. as suitable fill elsewhere where suitable.
- Excavated material from the site will be generally disposed of off - site as there will be limited opportunities for re use. Excavated topsoil, 2,500m will be retained in a stockpile for reuse in the landscaping

Where waste disposal is unavoidable, the waste collected will be disposed responsibly minimising any adverse impacts to the environment. All waste materials will be stored in suitable locations and enclosed containers where suitable to avoid pollution and generation of wind-blown debris. All waste will be collected by a suitably competent and permitted waste collection contractor; and, no material be burned on site under any circumstances.

The potential effect of construction waste generated from the proposed development is considered to be short-term, and not significant. The waste generated by the proposed development is discussed in detail within Chapter 13 of this EIAR.

Operational Phase
Domestic waste generated on a daily basis will be stored in dedicated waste storage areas for the apartments and individually within the own door properties.

Municipal waste collections will service the development on a regular basis to remove waste and in accordance with regional and national waste legislation. An Operational Waste and Recycling Management Plan (OWRMP) has been submitted with the application.

12.6 POTENTIAL CUMULATIVE IMPACTS

The potential cumulative impacts from the development on the material assets of the subject site and its surroundings has been taken into consideration in the above assessment and those of related chapters of the EIAR and, subject to the range of mitigation measures proposed, are not considered significant.

12.7 MITIGATION MEASURES

Construction Phase

A range of construction related mitigation measures are outlined within other chapters of the EIAR with respect to various aspects of the built environment – chapters 6, 7, 11 and 13.

As noted above, connections to the existing electricity, water services, gas and telecommunications networks will be coordinated with the relevant utility provider and carried out by approved contractors.

Operational Phase

Mitigation measures for the various aspects of the built environment are outlined within other chapters of the EIAR – chapters 6, 7, 11 and 12. No additional mitigation measures to those outlined in other chapters are considered necessary during the operational phase of the development as it is considered to have a neutral to positive effect on material assets including services and infrastructure.

12.8 PREDICTED IMPACTS

Construction Phase

On the basis that the specified mitigation measures are incorporated during the construction of the proposed development, the predicted impact will be neutral.

Operational Phase

Whilst the demand on water services, power, telecommunications and transport infrastructure will all increase due to the development, on the basis that the specified mitigation measures are incorporated then the operation of the proposed development is predicted to have a neutral-long term impact on material assets.

12.9 'DO NOTHING' SCENARIO

A 'Do nothing' scenario will result in the subject site remaining undeveloped and in vacant state.

12.10 WORST CASE SCENARIO

Worst case scenarios for individual material assets are outlined in individual chapters of the EIAR. In relation to power and telecommunications a worst case scenario would be where the works involved during construction resulted in an extended outage for existing properties in the area due to unforeseen delays on site.

12.11 MONITORING & REINSTATEMENT

No monitoring is required in addition to those specifically noted in other chapters of the EIAR.

12.12 DIFFICULTIES IN COMPILING INFORMATION

There were no significant difficulties in compiling the information.

12.13 REFERENCES

Not applicable

13 WASTE MANAGEMENT

13.1 INTRODUCTION

This section addresses the subject of waste management for the proposed mixed-use development at Airton Road, Tallaght, Co. Dublin. Waste management is addressed for the demolition, construction and operational phases of the project. The proposed development will consist of 502 no. apartments and associated communal facilities.

A site specific Construction & Demolition Waste Management Plan (C&D WMP) has been prepared by Barrett Mahony Consulting Engineers for the construction and demolition phase of the development in advance of the commencement of the construction works. A separate Operational Waste & Recycling Management Plan (OWRMP) has also been prepared by Traynor Environmental Ltd for the operational phase of the development.

The C&D WMP has been 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.

These documents will ensure the sustainable management of wastes arising at the development in accordance with legislative requirements and best practice standards.

Proposed Development Site Location and Brief Description
This is as described in chapters 1 (introduction) and 3 (Description of Development) of this EIAR and as set out in the statutory notices.

Statement of Competence
In accordance with Article 5(3)(a) of the EU Directive, by appointing Traynor Environmental, the applicant has ensured that this chapter has been prepared by "Competent experts".

Figure 13.1 Site Layout(Source: Landscape Masterplan, Mitchell Associates)

13.2 METHODOLOGY

The assessment of the impacts of the proposed development arising from the consumption of resources and the generation of waste materials, was carried out taking into account the methodology specified in relevant guidance documents, along with an extensive document review to assist in identifying current and future requirements for waste management including national and regional waste policy, waste strategies, management plans, legislative requirements and relevant reports.

The primary legislative instruments that govern waste management in Ireland and applicable to the project are:

- Waste Management Act 1996 (No. 10 of 1996) as amended. Sub-ordinate legislation includes:
  - European Communities (Waste Directive) Regulations 2011 (SI 126 of 2011) as amended
  - Waste Management (Collection Permit) Regulations (S.I No. 820 of 2007) as amended
  - Waste Management (Facility Permit and Registration) Regulations 2007, (S.I No. 821 of 2007) as amended
  - Waste Management (Licensing) Regulations 2004 (S.I. No. 395 of 2004) as amended
  - Waste Management (Packaging) Regulations 2014 (S.I. 282 of 2014) as amended
  - Waste Management (Planning) Regulations 1997 (S.I. No. 137 of 1997)
  - Waste Management (Landfill Levy) Regulations 2015 (S.I. No. 189 of 2015)
  - European Union (Waste Electrical and Electronic Equipment) Regulations 2014 (S.I. No. 149 of 2014)

  - European Union (Batteries and Accumulators) Regulations 2014(S.I. No. 283 of 2014) as amended
  - Waste Management (Food Waste) Regulations 2009 (S.I. 508 of 2009), as amended
  - European Union (Household Food Waste and Bio-waste) Regulation 2015 (S.I. No. 191 of2015)
  - Waste Management (Hazardous Waste) Regulations, 1998 (S.I. No. 163 of 1998) as amended
  - Waste Management (Shipments of Waste) Regulations, 2007 (S.I. No. 419 of 2007) as amended
  - Waste Management (Movement of Hazardous Waste) Regulations, 1998 (S.I. No. 147 of 1998)
  - European Communities (Transfrontier Shipment of Waste) Regulations 1994 (SI 121 of 1994)
  - European Union (Properties of Waste which Render it Hazardous) Regulations 2015 (S.I. No. 233 of 2015)
- Environmental Protection Act 1992 (No. 7 of 1992) as amended.
- Litter Pollution Act 1997 (No. 12 of 1997) as amended.
- Planning and Development Act 2000 (No. 30 of 2000) as amended.

This Chapter is based on the proposed development and considers the following aspects:

- Legislative context.
- Demolition phase.
- Construction phase (including site preparation, excavation and levelling); and,
- Operational phase.

A desk study was carried out which included the following:

- Review of applicable policy and legislation which creates the legal framework for resource and waste management in Ireland;
- Description of the typical waste materials that will be generated during the demolition, construction and operational phases; and
- Identification of mitigation measures to prevent waste generation and promote management of waste in accordance with the waste hierarchy.

Estimates of waste generation during the demolition, construction and operational phases of the proposed development have been calculated. The waste types and estimated quantities are based on published data by the EPA in *National Waste Reports*, data recorded from similar previous developments, Irish and US EPA waste generation research, other available research sources and waste collection data from the current facilities on site.

Mitigation measures are proposed to minimise the effect of the proposed development on the environment during the construction and operational phases, to promote efficient waste segregation and to reduce the quantity of waste requiring disposal.

Legislation and Guidance

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).

In addition, the Irish government issues policy documents which outline measures aimed to improve waste management practices in Ireland and help the country to achieve EU targets in respect of recycling and disposal of waste. The most recent policy document *A Resource Opportunity – Waste Management Policy in Ireland* was published in 2012 and stresses the environmental and economic benefits of better waste management, particularly in relation to waste prevention.

The strategy for the management of waste from the construction and demolition phase is in line with the requirements of the *Best Practice Guidelines for the Preparation of Waste Management Plans for Construction and Demolition Projects* published in 2006. The guidance document *Construction and Demolition Waste Management: A handbook for Contractors and Site Managers* was also consulted in the preparation of this assessment.
There are currently no Irish guidelines on the assessment of operational waste generation and guidance is taken from industry guidelines, plans and reports, British Standards and other relevant studies and reports including BS 5906:2005 Waste Management in Buildings – Code of Practice, the Eastern-Midland Region Waste Management Plan 2015 – 2021, the EPA National Waste Database Reports 1998 – 2012 and the EPA National Waste Statistics Web Resource.

13.3 RECEIVING ENVIRONMENT

The subject site is located at Airton Road, Tallaght, Co. Dublin. In terms of waste management, the receiving environment is largely defined by South Dublin County Council as the local authority responsible for setting and administering waste management activities 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 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 National Waste Statistics update published by the EPA in December 2017 identifies that Ireland's current progress against this C&D waste target is at 68% and our progress against 'Preparing for reuse and recycling of 50% by weight of household derived paper, metal, plastic & glass (includes metal and plastic estimates from household WEEE)' is at 45%. Both of these targets are required to be met by 12 December 2020 in accordance with the requirements of the Waste Framework Directive. The South Dublin County Council Development Plan 2016 – 2022 also sets policies and objectives for the area which reflect those set out in the regional waste management plan.

South Dublin County Council no longer operates any municipal waste landfill in the area. There are numerous 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.

Demolition Phase

There will be waste generated from demolition works at the site. It is anticipated that this material will be more difficult to segregate than waste generated from the construction phase, as many of the building materials will be bonded together or integrated, i.e. steel reinforcement in concrete and metal or timber stud partition walls. Demolition wastes will typically include concrete, steel cladding, steel beams, gypsum, metals, plastic, wood, glass and waste electronic and electrical equipment (WEEE).

An Asbestos Survey has been carried out by Phoenix Environmental Safety Ltd to identify and characterise ACM's. A report was issued which contains a register showing the location and type of asbestos and the risks and recommendations in relation to the material found. ACM's will only be removed by competent persons and transferred offsite by a suitably permitted waste contractor and will be brought to a suitably authorised facility.

The handling of asbestos where required and material should be dealt with in accordance with the Safety, Health and Welfare at Work (Exposure to Asbestos) Regulations 2006, as amended. The estimated quantum of demolition waste and indicative reuse/recovery/recycling/disposal targets as detailed in the C&D WMP are presented in Table 13.1.

The proposed development site is a brownfield site, the demolition of the existing buildings on site is required as part of the proposed developments. The total tonnage of waste generated by the five buildings to be demolished is as follows:

1. Industrial: (7350m^2/100m^2) x 12.6 tonnes = 926 tonnes
2. Commercial: [(573m^2 x 2) / 100m^2] x 23.8 tonnes = 273 tonnes
3. Commercial: [(164m^2 x 2) / 100m^2] x 23.8 tonnes = 78 tonnes
4. Industrial: (392m^2 / 100m^2) x 12.6 tonnes = 50 tonnes

Total = 1327 tonnes.

Construction Phase

During the construction phase, waste will be produced from surplus materials such as broken or off-cuts of timber, plasterboard, concrete, tiles, bricks, etc. Waste from packaging (cardboard, plastic, timber) and oversupply of materials may also be generated. The construction contractor will be required to ensure that oversupply of materials is kept to a minimum and opportunities for reuse of suitable materials is maximised.

In addition, there will be excavations associated with foundations and trenches for site services. The project engineers, Barret Mahony Consulting Engineers, have estimated that the total volume of material to be excavated will be c. 19,250m^3. Excavated material from the site will be generally disposed off site as there will be limited opportunities for re-use. Excavated topsoil, 2500m^3, will be retained in a stock pile for re-use in the landscaping. The total quantity of material to be disposed off site is assumed therefore to be 19,250m^3 less 2,500m^3, which equals 16,750m^3 approx. Using 4-axle trucks with an 18.0 tonne capacity (36m^3), this equates to approximately 465 truck movements spread over a likely period of four months equating to 15 to 20 no. truck movements per day a likely maximum during the site strip. Excavated material will be disposed off-site to a licensed facility. Please refer to the Construction & Demolition Waste Management Plan report for further information.
In order to establish the appropriate reuse, recovery and/or disposal route for the material to be removed off-site, it will first need to be classified. Waste material will initially need to be classified as hazardous or non-hazardous in accordance with the EPA publication *Waste Classification – List of Waste & Determining if Waste is Hazardous or Non-Hazardous*. Environmental soil analysis will be carried out prior to construction on a number of the soil samples in accordance with the requirements for acceptance of waste at landfills (Council Decision 2003/33/EC Waste Acceptance Criteria). This legislation sets limit values on landfills for acceptance of waste material based on properties of the waste including potential pollutant concentrations and leachability.

In the unlikely event that surplus soils/stones are generated it may be suitable for acceptance at either inert or non-hazardous soil recovery facilities/landfills in Ireland, In the event of hazardous material being encountered, it will be transported for treatment/recovery or exported abroad for disposal in suitable facilities.

Waste will be generated from construction workers e.g. organic/food waste, dry mixed recyclables (waste paper, newspaper, plastic bottles, packaging, aluminium cans, tins and Tetra Pak cartons), mixed non-recyclables and potentially sewage sludge from temporary welfare facilities provided onsite during the construction phase. Waste printer/toner cartridges, waste electrical and electronic equipment (WEEE) and waste batteries may also be generated infrequently from site offices.

Further detail on the waste materials likely to be generated during the demolition, excavation and construction works are presented in the project-specific C&D WMP. The demolition waste breakdown on a typical construction site, based on the BRE document is typically as follows in Table 13.1.

	Waste Types	&	Airton Road Site (Tonnes)
1	Concrete, Bricks, Tiles, Ceramic *	64	849
2	Timber	13	172
3	Slate	8	106
4	Asphalt, Tar and Tar products	6	80
5	Plasterboard	4	53
6	Glass	3	40
7	Metals *	2	27
	Total Waste	**100%**	**1327 Tonnes**

*Table 13.1 Typical Breakdown of Demolition Waste based on the BRE Waste Benchmark Data. *Note: If the warehouse is steel framed instead of concrete then item 7 quantity will rise & item 1 will fall.*

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 construction waste that will be generated. The exact materials and quantities may be subject to some degree of change and variation during the construction process. The site specific C&D WMP will be updated and submitted prior to commencement of the construction phase which may refine the above waste estimates.

Operational Phase

An Operational Waste & Recycling Management Plan (OWRMP) has been prepared for the development. The plan will seek to ensure the development contributes to the targets outlined in the Eastern Midlands Regional (EMR) Waste Management Plan 2015 – 2021. Mitigation measures proposed to manage impacts arising from wastes generated during the operation of the proposed development are summarised below.

All waste materials will be segregated into appropriate categories and will be stored in appropriate bins or other suitable receptacles in a designated, easily accessible areas of the site in accordance with the *South Dublin County Development Plan 2016 – 2022.*

Waste Volume (L/week)						
Waste type	**Block A**	**Block B**	**Block C**	**Block D**	**Block E-F**	**Totals**
Organic Waste	440	470	465	535	600	**2,510**
Mixed Dry Recyclables	6920	6870	6785	8465	10025	**39,065**
Mixed Municipal Waste	6920	6870	6785	8465	10025	**39,065**
Glass	85	95	92	105	119	**496**
Total	**14,365**	**14,305**	**14,127**	**17,570**	**20,769**	**81,136**

Table 13.2 Residential Waste Prediction (m3/per week)

Non-Residential Floor Areas	Location	Area (sq.)	Area (NIA)	MDR	Food Waste	Residual Waste	Glass	Total
Communal Facilities	Block C	465	357.28	893.2	10	893.2	5	1801.4
Communal Facilities	Block D	93	70.84	177.1	5	177.1	5	364.2
Communal Facilities	Block E-F	146	111.65	279.1	8	279.1	5	571.2
Creche (44 Children)	Block C	329	254.1	1,270.5	50	1,270.5	10	2601
Retail Unit	Block C	187	143.99	719.95	10	719.95	5	1454.9
Retail Unit	Block D	161	123.97	619.85	10	619.85	5	1254.7
Retail Unit	Block D	134	102.41	512.05	10	512.05	5	1039.1
Total		**1,515**	**1,164.24**	**4,471.75**	**103**	**4,471.75**	**40**	**9,086.5**

Table 13.3 Commercial/Creche/Communal Waste Predictions (L/per week)

All waste leaving the site will be recycled or recovered, with the exception of those waste streams where appropriate recycling/recovery facilities are currently not available. All waste leaving the site will be transported by suitable permitted contractors and taken to suitably permitted or licenced facilities. All waste leaving the site will be recorded and copies of relevant documentation maintained.

Hazardous Waste
Hazardous waste may be generated from WEEE, batteries, fluorescent tubes, and cleaning products. Any waste classed as hazardous will be required to be taken to a specialise waste company e.g. Rilta.

13.4 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

Planning permission is being sought for a mixed-use development located at Airton Road, Tallaght. The proposal consists of:

- Demolition of existing factory/ warehouse buildings on site.
- Construction of 502 residential units comprising of 197 no. 1-Bed; 257 no. 2-Bed; and 48 no. 3-Bed apartments all with associated private balconies/terraces to the north/south/east/west elevations.
- Construction of 3 no. Retail Units; a creche; and communal facilities.
- The development will take place over 6 no. Blocks (A-F) ranging in height up to 8 storeys;
- The development will have 202 no. car parking spaces located at under croft level of blocks A, B and C and at basement level of blocks E and F. 584 no. secure bike parking spaces are also provided. The site is accessed through 2 no. vehicular access to the north and east of the scheme. There will be a number of pedestrian entrances along Airton Road and Greenhills Road which also provide access for emergency vehicles.
- In addition to all of the new facilities, all other site services and works to enable the development of the site will also be provided including bins, ESB substations, boundary treatments and landscaping.
- Additional pedestrian crossing points and road improvements will also be provided along Greenhills Road and Airton Road.

The project will involve the development of the proposed Airton site over a construction period 3-5 years. When considering a development of this nature, the potential waste management impact on the surroundings must be considered for each of two distinct stages:

- Demolition and Construction Phase;
- Operational Phase.

As stated, the construction and demolition phase will involve extensive excavation over the development site and the erection of a new development and associated communal facilities over a phased construction period. These issues are discussed in detail in the following sections. Waste activities relating to the demolition, construction and operation of the development in terms of waste management are discussed.

13.5 POTENTIAL IMPACTS OF THE PROPOSED DEVELOPMENT

This section details the potential waste impacts associated with the proposed development.

Demolition and Construction Phase
The proposed development will generate a range of non-hazardous and hazardous waste materials during demolition 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 need to 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. 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 arising 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.

There is a quantity of top soil and sub soil which will need to be excavated to facilitate the proposed development. The project engineers Barrett Mahony Consulting Engineering have advised that it is likely that all of the excavated material from the site will be generally disposed off site as there will be limited opportunities for re-use. Correct classification and segregation of the excavated material is required to ensure that any potentially contaminated

materials are identified and handled in a way that will not impact negatively on workers as well as on water and soil environments, both on and off-site.

The opportunities for waste materials to be reused off-site will provide positive impacts in the resourcing of materials for other developments and reduce the requirement for raw material extraction.
The potential effect of construction waste generated from the proposed development is considered to be ***short-term,*** and ***not significant.***

Operational Phase
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. This would lead to an increased volume of waste been disposed of site.
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).

The waste materials generated on a daily basis will be stored in dedicated waste storage areas.

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 collection vehicles 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. Time and resources should be dedicated to ensuring efficient waste management practices. An Operational Waste & Recycling Management Plan has been included as an appendix.

The potential impact of operational waste generation from the development is considered to be ***long-term*** and ***not significant***.

13.6 POTENTIAL CUMULATIVE IMPACTS
The cumulative impact of the additional wastes generated by the proposed development has been considered. The existing waste management infrastructure and procedures for management of waste are sufficient and as such there will be no significant cumulative impact in terms of waste from the proposed development.

13.7 MITIGATION MEASURES
This section outlines the measures that will be employed in order to reduce the amount of waste produced, manage the wastes generated responsibly and handle the waste in such a manner as to minimise the effects on the environment.

Demolition and Construction Phase
A project specific C&D WMP has been prepared in line with the requirements of the guidance document issued by the DoEHLG. 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 construction phase of the proposed development.

Barrett Mahony Consulting Engineers have estimated that c.19,250m3 of top soil and sub soil will be generated from the excavations required to facilitate construction. It is anticipated that all of this material will require removal for offsite. Contractor(s) will endeavour to ensure material taken offsite is reused or recovered off-site or disposed of at authorised facility.

In addition, the following mitigation measures will be implemented:
- Building materials will be chosen with an aim to 'design out waste';
- 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:
  - Concrete rubble (including ceramics, tiles and bricks);
  - Plasterboard;
  - Metals;
  - Glass; and
  - Timber.
- Left over materials (e.g. timber off-cuts, broken concrete blocks/bricks) and any suitable construction materials shall be re-used on-site, where possible;
- All waste materials will be stored in skips or other suitable receptacles in designated areas of the site;
- 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);
- A waste manager will be appointed by the main contractor(s) to ensure effective management of waste during the excavation and construction works;
- All construction staff will be provided with training regarding the waste management procedures;
- All waste leaving site will be reused, recycled or recovered where possible to avoid material designated for disposal;
- All waste leaving the site will be transported by suitable permitted contractors and taken to suitably registered, permitted or licenced facilities; and
- All waste leaving the site will be recorded and copies of relevant documentation maintained.

These mitigation measures will ensure that the waste arising from the construction phase of the development is dealt with in compliance with the provisions of the *Waste Management Act 1996*, as amended, associated Regulations, the *Litter Pollution Act 1997* and the *EMR Waste Management Plan (2015 - 2021)*. It will also ensure optimum levels of waste reduction, reuse, recycling and recovery are achieved and will encourage sustainable consumption of resources.

Operational Phase
All waste materials will be segregated into appropriate categories and will be stored in appropriate bins or other suitable receptacles in a designated, easily accessible areas of the site in accordance with the *South Dublin County Council Development Plan 2016 – 2022*.
In addition, the following mitigation measures will be implemented:
- On-site segregation of all waste materials into appropriate categories including (but not limited to):
  - Organic/catering waste (including garden waste from landscaping activities).
  - Dry Mixed Recyclables;
  - Mixed Non-Recyclable Waste;
  - Glass;
  -Waste electrical and electronic equipment (WEEE) including computers, printers and other ICT equipment;
  - Batteries (non-hazardous and hazardous)
  - Fluorescent bulb tubes and other mercury containing waste (if arising).
  - Cleaning chemicals (pesticides, paints, adhesives, resins, detergents, etc.); and

- 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;
- 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;
- All waste leaving the site will be transported by suitable permitted contractors and taken to suitably registered, permitted or licensed facilities; and

These mitigation measures will ensure the waste arising from the development is dealt with in compliance with the provisions of the *Waste Management Act 1996*, as amended, and all associated Regulations. It will also ensure optimum levels of waste reduction, reuse, recycling and recovery are achieved.

13.8 PREDICTED IMPACTS

The implementation of the mitigation measures outlined in Section 13.7 will ensure that a high rate of reuse, recovery and recycling is achieved at the development during the construction phases as well as during the operational phase. It will also ensure that European, National and Regional legislative waste requirements with regard to waste are met and that associated targets for the management of waste are achieved.

Demolition and Construction Phase

A carefully planned approach to waste management as set out in Section 13.7 and adherence to the C&D WMP during the construction phase will ensure that the impact on the environment will be *short-term, neutral* and *imperceptible.*

Operational Phase

During the operational phase, a structured approach to waste management as set out in Section 13.7 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 impact of the operational phase on the environment will be *long-term, neutral* and *imperceptible*.

13.9 'DO NOTHING' SCENARIO

If the proposed development did not go ahead there would be no waste generated at this site and operational waste generated from this site would stay at its current level.

13.10 WORST CASE SCENARIO

The 'worst-case' scenario, is that, should a C&D WMP not be implemented, the target recycling rates outlined in the Waste Management Plan for the South Dublin Region and all relevant waste guidance targets will not be achieved. In addition, if waste is not managed and stored correctly on site, this may lead to litter or pollution issues on the site or adjacent sites. However, this is thought to be unlikely having taken into consideration the mitigation measures outlined above.

13.11 MONITORING & REINSTATEMENT

Demolition and Construction Phase

The objective of setting targets for waste management is only achieved if the actual waste generation volumes are calculated and compared. This is particularly important during the construction phases where there is a potential for waste management to become secondary to progress and meeting construction schedule targets. The C&D WMP will specify the need for a waste manager to be appointed who will have responsibility to monitor the actual waste volumes being generated and to ensure that contractors and sub-contractors are segregating waste as required. Where targets are not being met, the waste manager should identify the reasons for targets not being achieved and work to resolve any issues. Recording of waste generation during the project will enable better management of waste contractor requirements and identify trends. The data should be maintained to advise on future projects.

Operational Phase

During the operational phase, waste generation volumes should be monitored against the predicted waste volumes outlined in the OWRMP. There may be opportunities to reduce the number of bins required in the communal Waste Storage Areas (WSAs) where estimates have been too conservative. Reductions in bin requirements will improve efficiency and reduce waste contractor costs. Waste legislation should also be consulted on a regular basis in case of any changes which may impact on waste management procedures.

13.12 DIFFICULTIES IN COMPILING INFORMATION

There were no difficulties encountered during the production of this chapter of the EIAR.

14 ARCHAEOLOGY AND CULTURAL HERITAGE

14.1 INTRODUCTION

The following chapter details an archaeological and cultural heritage assessment undertaken in advance of a proposed residential development at Airton Road, Tallaght, Dublin 24 (ITM 709507/728258; Figure 14.1). This assessment has been carried out to ascertain the potential impact, if any, of the proposed development on the archaeological, cultural heritage and historical resource that may exist within the area. The assessment was undertaken by Faith Bailey and Ross Waters of Irish Archaeological Consultancy Ltd (IAC), on behalf of McGill Planning Limited.

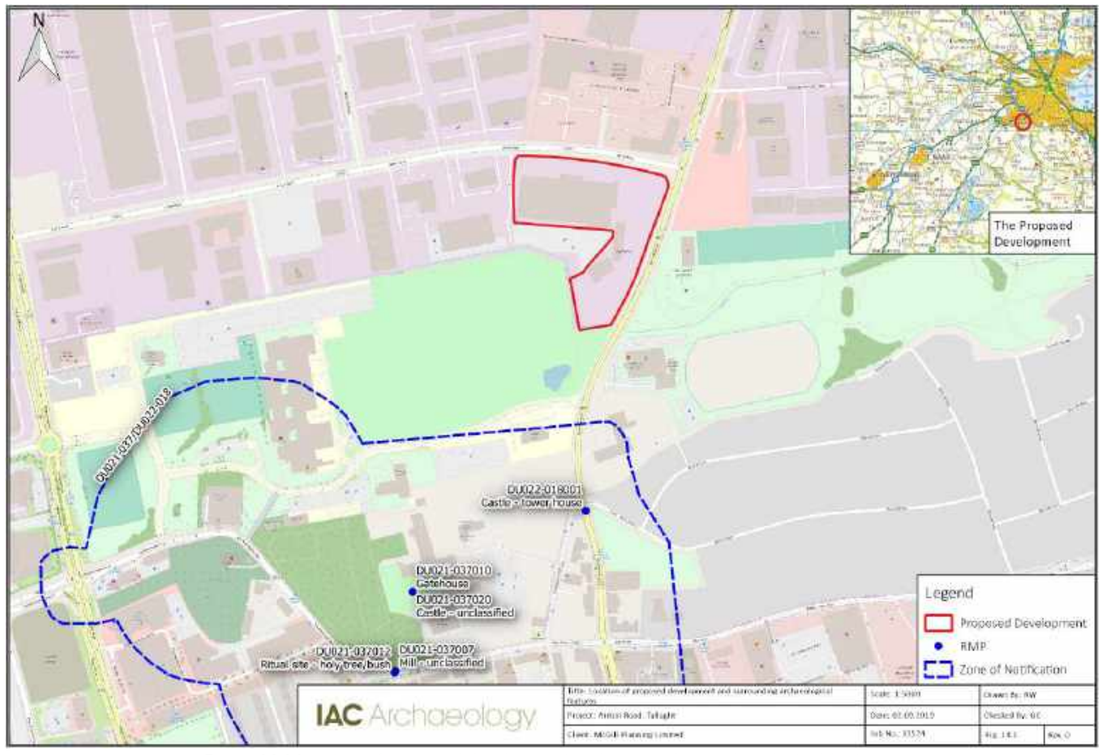


Figure 14.1 Location of proposed development and surrounding archaeological features.

This study determines, as far as reasonably possible from existing records, the nature of the archaeological and cultural heritage resource in and within the vicinity of the application area using appropriate methods of study. Desk-based assessment is defined as a programme of study of the historic environment within a specified area or site that addresses agreed research and/or conservation objectives. It consists of an analysis of existing written, graphic, photographic, and electronic information in order to identify the likely heritage assets, their interests and significance and the character of the study area, including appropriate consideration of the settings of heritage assets (CIfA 2014). This leads to the following:

- Determining the presence of known archaeological sites that may be affected by the proposed development;
- Assessment of the likelihood of finding previously unrecorded archaeological remains during the construction programme;
- Determining the impact upon the setting of known cultural heritage sites in the surrounding area;
- Suggested mitigation measures based upon the results of the above research.

14.2 METHODOLOGY

Research has been undertaken in two phases. The first phase comprised a paper survey of all available archaeological, historical, and cartographic sources. The second phase involved a field inspection of the proposed development area.

Paper Study

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

- Record of Monuments and Places for County Dublin;
- Sites and Monuments Record for County Wicklow;
- National Monuments in State Care Database;
- Preservation Orders List;
- Topographical files of the National Museum of Ireland;
- Cartographic and written sources relating to the study area;
- The South Dublin County Council Development Plan (2016 -2022);
- Tallaght Town Centre Local Area Plan (Adopted 2006, extended 2011);
- Place names analysis;
- Aerial photographs; and
- Excavations Bulletin (1970–2018).

The Record of Monuments and Places (RMP) is a list of archaeological sites known to the National Monuments Section, which are afforded legal protection under Section 12 of the 1994 National Monuments Act and are published as a record.

Sites and Monuments Record (SMR) holds documentary evidence and field inspections of all known archaeological sites and monuments. Some information is also held about archaeological sites and monuments whose precise location is not known e.g. only a site type and townland are recorded. These are known to the National Monuments Section as 'un-located sites' and cannot be afforded legal protection due to lack of locational information. As a result, these are omitted from the Record of Monuments and Places. SMR sites are also listed on a website maintained by the Department of Culture, Heritage and the Gaeltacht (DoCHG) – www.archaeology.ie.

The National Monuments in State Care Database is a list of all the National Monuments in State guardianship or ownership. Each is assigned a National Monument number whether in guardianship or ownership and has a brief description of the remains of each Monument.

The Minister for the DoCHG may acquire national monuments by agreement or by compulsory order. The state or local authority may assume guardianship of any national monument (other than dwellings). The owners of national monuments (other than dwellings) may also appoint the Minister or the local authority as guardian of that monument if the state or local authority agrees. Once the site is in ownership or guardianship of the state, it may not be interfered with without the written consent of the Minister.

Preservation Orders List contains information on Preservation Orders and/or Temporary Preservation Orders, which have been assigned to a site or sites. Sites deemed to be in danger of injury or destruction can be allocated

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

The topographical files of the National Museum of Ireland are the national archive of all known finds recorded by the National Museum. This archive relates primarily to artefacts but also includes references to monuments and unique records of previous excavations. The find spots of artefacts are important sources of information on the discovery of sites of archaeological significance.

Cartographic sources are important in tracing land use development within the development area as well as providing important topographical information on areas of archaeological potential and the development of buildings. Cartographic analysis of all relevant maps has been made to identify any topographical anomalies or structures that no longer remain within the landscape.

- William Petty, Down Survey Map, *Barony of Newcastle,* c. 1655
- John Rocque, *Map of the County of Dublin*, 1760
- John Taylor, *Map of the Environs of Dublin*, 1816
- William Duncan, *Map of the County of Dublin*, 1821
- Ordnance Survey maps of County Dublin 1843, 1909 and 1935

Documentary sources were consulted to gain background information on the archaeological and cultural heritage landscape of the proposed development area.
Development plans contain a catalogue of all the Protected Structures and archaeological sites within the county. The South Dublin County Council Development Plan (2016 -2022) and Tallaght Town Centre Local Area Plan (Adopted 2006, extended 2011) were consulted to obtain information on cultural heritage sites in and within the immediate vicinity of the proposed development area.

Place Names are an important part in understanding both the archaeology and history of an area. Place names can be used for generations and in some cases have been found to have their root deep in the historical past.

Aerial photographic coverage is an important source of information regarding the precise location of sites and their extent. It also provides initial information on the terrain and its likely potential for archaeology. A number of sources were consulted including aerial photographs held by the Ordnance Survey and Google Earth.

Excavations Bulletin is a summary publication that has been produced every year since 1970. This summarises every archaeological excavation that has taken place in Ireland during that year up until 2010 and since 1987 has been edited by Isabel Bennett. This information is vital when examining the archaeological content of any area, which may not have been recorded under the SMR and RMP files. This information is also available online (www.excavations.ie) from 1970–2018.

Field Inspection

Field inspection is necessary to determine the extent and nature of archaeological remains, and can also lead to the identification of previously unrecorded or suspected sites and portable finds through topographical observation and local information.

The archaeological field inspection entailed:

- Walking the proposed development area and its immediate environs.
- Noting and recording the terrain type and land usage.
- Noting and recording the presence of features of archaeological or cultural heritage significance.
- Verifying the extent and condition of recorded sites.
- Visually investigating any suspect landscape anomalies to determine the possibility of their being anthropogenic in origin.

Definitions

In order to assess, distil and present the findings of this study, the following definitions apply:

'Cultural Heritage' where used generically, is an over-arching term applied to describe any combination of archaeological and cultural heritage features, where;

- the term 'archaeological heritage' is applied to objects, monuments, buildings or landscapes of an (assumed) age typically older than AD 1700 (and recorded as archaeological sites within the Record of Monuments and Places)
- the term 'cultural heritage', where used specifically, is applied to other (often less tangible) aspects of the landscape such as historical events, folklore memories and cultural associations. This designation can also accompany an archaeological or architectural designation.

Consultation

Following the initial research, a number of statutory and voluntary bodies were consulted to gain further insight into the cultural background of the background environment, receiving environment and study area, as follows:

- Department of Culture, Heritage and the Gaeltacht – the Heritage Service, National Monuments and Historic Properties Section: Record of Monuments and Places; Sites and Monuments Record; Monuments in State Care Database; Preservation Orders; and the database of Irish excavation reports;
- National Museum of Ireland, Irish Antiquities Division: topographical files of Ireland; South Dublin County Council: Planning Section.

Impact Assessment Methodology

The nature of a potential effect can vary. The terminology used to describe the nature of effects in this assessment is defined as follows:

- Negative effect: A change that will detract from or permanently remove an archaeological/cultural heritage site from the landscape.
- Neutral effect: A change that does not affect the archaeological/cultural heritage.
- Positive effect: A change that improves or enhances the setting of an archaeological/cultural heritage site.
- Direct effect: Refers to an effect on an archaeological/cultural heritage site which is physically located within the footprint of the proposed development and which entails the removal of part of or all of the feature in question.
- Indirect effect: Refers to an effect on an archaeological/cultural heritage site or its setting, which is located in close proximity to the proposed development.
- No predicted effect: Refers to circumstances in which the proposed development does not adversely or positively affect an archaeological/cultural heritage site.

It should be noted that whilst effect levels and definitions are applied consistently to the cultural heritage resource, direct effects on sites that are subject to statutory protection are considered to be more significant than those on sites/structures not subject to statutory protection.

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
An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.

Moderate
An effect that alters the character of the environment in a manner that is consistent with existing or emerging trends.

Significant
An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.

Very Significant
An effect which, by its character, magnitude, duration or intensity alters the majority of a sensitive aspect of the environment.

Profound
An effect that obliterates sensitive characteristics.

Significance of Effects as defined by the EPA 2017 Guidelines (pg. 23).

Guidance and Legislation

The following legislation, standards and guidelines were consulted as part of the assessment.

- National Monuments Acts, 1930-2014;
- The Planning and Development (Strategic Infrastructure) Act, 2006;
- Planning and Development Act, 2000, As Amended;
- Planning and Development Regulations, 2001, As Amended
- Heritage Act, 1995;
- Advice Notes for preparing Environmental Impact Statements (Draft Sept. 2015). Dublin, Government Publications Office;
- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (DRAFT) (EPA 2017). Dublin: Government Publications Office;
- 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);
- Frameworks and Principles for the Protection of the Archaeological Heritage, 1999, (formerly) Department of Arts, Heritage, Gaeltacht and Islands;

Appendix 14.3 contains further details of legislation and planning policies.

14.3 RECEIVING ENVIRONMENT

The proposed development area is located at Airton Road, Tallaght, Dublin 24 within the townland and parish of Tallaght and the Barony of Uppercross. The name Tallaght or *Taimleacht* means a burial place. Tradition claims that the area was the burial place of the People of Parthalon who all died of plague after Parthalon the Greek led them to settle in Ireland after Noah's Flood (Lewis 1837). However, it more likely relates to the large graveyard (RMP DU021-037004) associated with the ecclesiastical enclosure and church (RMP DU021-037002/3), c. 520m to the southwest of the proposed development.

The proposed development area consists of an industrial building and is bordered to the north by the Airton Road, to the east by the Greenhills Road, and to the southwest by the grounds of the Institute of Technology Tallaght. There are five recorded monuments located within 500m of the proposed development site; all are within the zone of notification for the historic town of Tallaght (RMP DU021-037/DU022-018), c. 120m to the south (Figure 14.1).

Archaeological and Historical Background

Prehistoric Period

Mesolithic Period (8000-4000 BC)
Although very recent discoveries may push back the date of human activity by a number of millennia (Dowd and Carden 2016), the Mesolithic period is the earliest time for which there is clear evidence for prehistoric activity in Ireland. During this period people hunted, foraged and gathered food and appear to have had led a primarily, but not exclusively, mobile lifestyle. The presence of Mesolithic communities is most commonly evidenced by scatters of worked flint material, a by-product from the production of flint implements.

The current archaeological evidence suggests that the environs around Dublin were first inhabited towards the later part of this period. At this time people made crude flint tools known as Larnian (or Bann) Flakes. Small numbers of these flakes have been found along coastal areas of County Dublin such as Dun Laoghaire, Dalkey Island, and Loughlinstown and may indicate small-scale transient settlement along the riverbanks and seashores (Corlett 1999). There are no known Mesolithic sites located within the immediate vicinity of the proposed development area.

Neolithic Period (4000–2500 BC)
During the Neolithic period, communities generally became less mobile and their economy became based on the rearing of stock and cereal cultivation. The transition to the Neolithic was marked by major social change. Communities had expanded and moved further inland to more permanent settlements. This afforded the development of agriculture which demanded an altering of the physical landscape. Forests were rapidly cleared and field boundaries constructed. Pottery was also being produced, possibly for the first time. While recent years have seen a large increase in the number of identified Neolithic settlement and habitation sites, the period is most commonly characterised by its impressive megalithic tombs. A late Neolithic/early Bronze Age lithic assemblage was also identified during an investigation c. 190m to the southwest of the proposed development area (Licence 11E0054). The small assemblage contained household and knapping waste which was likely associated with a nearby house.

The Bronze Age was marked by the widespread use of metal for the first time in Ireland. As with the transition from Mesolithic to Neolithic, the transition into the early Bronze Age was accompanied by changes in society. The construction of megalithic tombs went into decline and the burial of the individual became typical. Cremated or inhumed bodies were often placed in a cist, which is a stone-lined grave, usually built of slabs set upright to form a box-like construction and capped by a large slab or several smaller lintels (Buckley & Sweetman 1991). Barrows and pit burials are also funerary monuments associated with this period. The nearest example, DU021-015003, is located c. 2.2km to the north. As during the Neolithic period, the high ground of the Dublin Mountains to the south

of Tallaght may have been perceived as being sacred and a large number of burial monuments dating to this period are recorded within this landscape.

Another site type thought to reveal of glimpse of domestic life at this time is the burnt mound and *fulacht fiadh*. A common site within the archaeological record, they are normally interpreted as temporary cooking sites but may have been used for other industrial or even recreational functions (Brindley & Lanting 1990). There is one recorded *fulacht fiadh* (DU022-111), located c. 2.5km to the southeast of the proposed development area, within the townland of Scholarstown.

Iron Age (800 BC–AD 500)

Until recently, the dearth of evidence representing the Irish Iron Age led to the it being among the most enigmatic and least understood period in Irish prehistory. However, large scale commercial excavations carried out over the past two decades have produced large quantities of new data relating to Iron Age settlement and industry across the country. This raw excavation data is still being analysed and a picture of life during the Iron Age is being assembled (Becker 2012, 1).

There is no firmly dated evidence for Iron Age activity within the immediate vicinity of the proposed development. However, some monuments, such as barrows or hillforts, located on higher ground, have the potential to have been constructed or in use during the Iron Age. The stepped barrow, c. 2.2km to the north, is an example of this (DU021-015003).

Early Medieval Period (AD 500–1100)

The early medieval period is depicted in the surviving sources as largely rural, characterised by the basic territorial unit known as *túath*. Byrne (1973) estimates that there were at least 150 kings in Ireland at any given time during this period, each ruling over their own *túath*. One of the most common indicators of settlement during this period is the ringfort. Ringforts were often constructed to protect rural farmsteads and are usually defined as a broadly circular enclosure. One of the most recent studies of the ringfort (Stout 1997) has suggested that there is a total of 47,000 potential ringforts or enclosure sites throughout Ireland. These enclosed farmsteads were intimately connected to the division of land and the status of the occupant.

The space within the ringfort that was enclosed by the ditch or wall is known as the *lios* in early literature, while larger fortifications were known as *dúns*. Ringforts are most commonly located at sites with commanding views of the surrounding environs, which provided an element of security. While raths, for the most part, avoid the extreme lowlands and uplands, they also show a preference for the most productive soils (Stout 1997). Ringforts and potential ringforts are often recorded as enclosures. An enclosure (DU021-037013) is recorded c. 615m south-southwest of the proposed development area.

This period was also characterised by the introduction of Christianity to Ireland. The early medieval ecclesiastical enclosure of St Maelruan's is recorded c. 540m to the southwest of the proposed development area (DU021-037002). The saint established the monastery in 769 AD and died in 792 AD (askaboutireland.ie). The grave of St Maelruan is supposedly marked by a small Latin cross (DU021-037006) in the nearby graveyard (DU021-037004). The inner and outer enclosure ditches of the monastery have been identified during several archaeological investigations in the wider area (Licence 90E0016, Bennett 1991:053; Licence 91E0027, Bennett 1991:053; Licence 94E0086, Bennett 1994:101; Licence 94E0135, Bennett 1994:102; Licence 95E0155, Bennett 1995:111; Licence 96E0054, Bennett 1996:142; Licence 96E0188, Bennett 1997:187; Mullins 2003, Licence 03E0945). The monastery quickly became a centre of learning and was known, along with the monastery at Finglas, as the 'two eyes of Ireland'. It was associated with the *Céli Dé* spiritual reform movement. Vikings attacked the monastery in 811 but the institution quickly recovered (askaboutireland.ie; southdublinhistory.ie). In 1829 the current church of St Maelruan's was built on the ruins of the older monastery (DU021-037003). Many holy sites are often found in association with early ecclesiastical sites. There is a holy tree (DU021-037012) on the grounds of St Mary's Priory, a mature walnut tree, associated with St Maelruan.

Medieval Period (AD 1100–1600)

The beginning of the medieval period was characterised by political unrest that originated from the death of Brian Borumha in 1014. In 1171 AD, Dublin was besieged and taken by Diarmait MacMurchada and his Leinster forces supported by a force of Anglo-Norman knights led by Strongbow (Richard Fitz-Gilbert de Clare) and Raymond le Gros. Diarmait MacMurchada, deposed King of Leinster, sought the support of mercenaries from England, Wales and Flanders to assist him in his challenge for kingship. Norman involvement in Ireland began in 1169 AD, when Richard de Clare and his followers landed in Wexford to support MacMurchada. Two years later de Clare (Strongbow) inherited the Kingdom of Leinster and by the end of the 12th century the Normans had succeeded in conquering much of the country (Stout & Stout 1997). The initial stage of the invasion of the country was marked by the construction of motte and bailey castles, which were later replaced with stone fortifications.

After the Anglo-Norman invasion, Tallaght was confirmed to the See of Dublin in 1179. The monastic settlement disappeared during this period. During the 13th century the O'Byrnes, O'Tooles and many of the archbishop's tenants rebelled against the archbishop, as such agriculture was failing in the area during this century. A royal grant to enclose the town was issued to the town's bailiffs 1310 to protect Tallaght. However, no evidence of the walls has been found. Between 1324 and 1349 Tallaght Castle, c. 405m south-southwest of the site (DU021-037020), was constructed by Alexander de Bicknor, the Archbishop of Dublin, although it was reportedly in need of repair a century later. The castle was raided by the O'Toole of Imaile in 1331, who defeated the forces sent by Dublin under Sir Philip Britt to defend the archbishop's castle. In 1378 Matthew de Bermingham was stationed at the castle to defend it against the O'Byrnes. The O'Toole family later devastated the castle and its surrounding holdings in 1540 (askaboutireland.ie; Lewis 1837; southdublinhistory.ie).

During the later medieval period, a new type of residence known as a tower house emerged in Ireland. It was essentially a vertical stack of rooms that was set within a larger walled enclosure often accompanied by a gatehouse. In the Dublin area, especially along the 'frontier zone' there are a substantial number of tower houses and fortified buildings. This may be in part due to the presence of The Pale, which was defined as a hinterland around the centre of Anglo-Norman rule based in Dublin. During the 15th century the 'Subsidised Castles Act' provided grants of ten pounds to encourage the construction of castles to defend the Pale against the native Irish. The Pale was also strengthened in other ways. In 1494 an act of Parliament required landowners to construct a line of defences along the border of the Pale, but it is likely that not all did so. A tower house (DU022-018001) is recorded c. 235m south of the site; however, archaeological investigations in the area failed to located any remains of the structure (Licence 03E0131, Coughlan 2003).

Post-Medieval Period (AD 1600–1900)

The 18th century witnessed a more pacified Ireland and during this time industry was developed in the landscape. In the area of Tallaght, the water power of the River Dodder was utilised and fed numerous millraces to operate a multitude of mills. The first edition OS map of 1843 shows several of the mills found to the southwest of Tallaght town during this time. One of the largest, the Haerlem mill complex, c. 1.2km to the south, consisted of two flour mills and a woollen cloth mill. The Dublin to Blessington Steam Tramway opened in 1888 and passed through the town, however a bus service established in 1929 spelled the end for the tram which closed in 1932 (askaboutireland.ie, southdublinhistory.ie).

With the onset of the 18th century, the political climate settled, and this saw a dramatic rise in the establishment of large residential houses around the country. This was largely due to the fact that after the turbulence of the preceding centuries, the success of the Protestant cause and effective removal of any political opposition, the country was at peace. The large country house was only a small part of the overall estate of a large landowner and provided a base to manage often large areas of land that could be dispersed nationally. During the latter part of the 18th century, the establishment of a parkland context (or demesnes) for large houses was the fashion. Although the creation of a parkland landscape involved working with nature, rather than against it, considerable

construction effort went into their creation. Major topographical features like rivers and mountains were desirable features for inclusion into, and as a setting, for the large house and parkland.

Multiple demesne landscapes and large houses were established throughout County Dublin during this period, due to the proximity of the city. Archbishop Hoadley ordered the demolition and replacement of the ruined Tallaght Castle with the Archbishop's Palace in 1729, a large mansion-house with gardens laid out in the Dutch style. The last archbishop to reside in the palace was Dr Fowler who died in 1803 (Lewis 1837). However, by 1821 an Act of Parliament was passed to demolish the palace as it was no longer considered safe. Major Palmer carried out the demolition and then built Tallaght House in 1822. The Dominican Order bought the house in 1856 and founded St Mary's Priory on the site of the old palace in 1864 reusing architectural elements, such as a tower/gatehouse (DU021-037010) originally from Tallaght Castle. The old palace gardens were also incorporated into the Priory's grounds (askaboutireland.ie; southdublinhistory.ie). The closest demesne to the proposed development area is associated with Tallaght House (NIAH Garden DU-50-O-094277), to the immediate south on the first edition OS map. The NIAH Garden Survey records it as 'main features substantially present - some loss of integrity'.

Summary of Previous Archaeological Fieldwork

A review of the Excavations Bulletin (1970–2018) has revealed that there have been 17 previous archaeological investigations, four of which did not identify anything of archaeological significance within the study area of the proposed development site.

A range of archaeological investigations have been undertaken across the Institute of Technology Tallaght to the southwest of the site. A geophysical survey, c. 35m to the southwest of the proposed development area, recorded several linear responses possibly representing archaeological ditches or former field divisions and two potential isolated archaeological features (Enright 2007, Licence 07R0114). Evidence of medieval and post-medieval occupation; consisting of 12-14th century ditches, a pit and 18th century stone drains, was recorded during test trenching following on from the geophysical survey (Licence 10E0026, Bennett 2010:298). One of these ditches may have originally enclosed Tallaght Castle (RMP DU021-037010).

Monitoring, c. 275m to the southwest for the proposed CASH Building, followed on from the testing and this recovered 12th-14th century medieval pottery (Licence 10E0247, Bennett 2010:299). Monitoring of infrastructural works and upgrading of services within the campus revealed a series of medieval agricultural drains and ditches, which were all excavated and recorded (Licence 11E0045, Bennett 2011:235; Licence 11E0317, Bennett 2011:237). Two ditches, five linear features, three spreads, a curvilinear ditch and a gully of medieval date along with a post-medieval field boundary ditch, furrow scars, drains and postholes were all excavated c. 190m to the southwest in association with the development of the campus in 2011 (Ruttle 2012, Licence 11E0054, Bennett 2011:236). It is possible that these features were part of the estate of Tallaght Castle in the 13th and 14th centuries. A small lithic assemblage representing household and knapping waste, likely associated with a nearby house, was also recovered. This was dated to the late Neolithic/early Bronze Age.

Two trenches were excavated c. 480m to the southwest in 1991 in advance of the construction of the entrance to the Institute of Technology Tallaght (Hayden 1991, Licence E000536). Two ditches were identified within the trenches and were interpreted as being a portion of the ecclesiastical enclosure of St Maelruan's (RMP DU021-037002). A sherd of medieval pottery was recovered during monitoring, c. 480m to the southwest of the proposed development (Mullins 2003, Licence 03E0945).

An investigation in association with the realignment of the Greenhills Road that had the potential to impact upon a tower house (DU022-018001), the site of a corn mill, the site of a gate lodge and pond and a culvert, was carried out c. 490m to the south of the proposed development area. The site of the tower house was not investigated, and only evidence of the post-medieval pond and culvert were uncovered to the immediate south of the site on the Tymon/Poddle River (Licence 00E0464, Bennett 2000:0348). A second programme of archaeological testing was undertaken to investigate the site of the tower house, Bancroft's Castle (DU022-018001) c. 320m to the south, which was demolished in the 1970s. No remains of the tower house nor anything of archaeological significance were uncovered (Licence 03E0131, Coughlan 2003).

Testing for a residential development 485m south of the proposed development identified two features of archaeological significance (Licence 04E0569, Bennett 2004:0656). These comprised an undated, 3m-wide, north-south linear feature containing animal bone and charcoal and an undated, 8m-wide, north-south linear feature. Additional testing revealed a medieval drain truncated by a modern feature (Licence 04E0569 ext., Bennett 2005:540). The drain contained animal bone, seven sherds of cooking ware pot and nine sherds of glazed ware, all dating to the 12th-14th century. A medieval, sub rectangular, stone-lined pit was also the upper layer of which contained 12th-14th century pottery. An 18th/19th-century well was located on the site. No further archaeological deposits or features were encountered in the final phase of monitoring for the residential development (Licence 04E0569 ext., Bennett 2007:550).

The four licences tabulated in Table 14.1 did not identify anything of archaeological significance within the study area of the proposed development.

Licence No.	Reference	Distance from Site
03E0927	Lynch 2003	c. 25m southeast
04R0136	Leigh 2004	c. 315m southwest
05E0316	Bennett 2005:538	c. 315m southwest
05E0316 ext.	Bennett 2005:539	c. 315m southwest

Table 14.1Archaeological Licences that did not encounter any Archaeological Features or Deposits.

Cartographic Analysis

William Petty's Down Survey Map, Barony of Newcastle, c. 1655

The Down Survey maps were compiled at a scale of 40 perches to one inch (the modern equivalent of 1:50,000) and represent the first systematic mapping of a large area on such a scale attempted anywhere. On Petty's map, the town of Tallaght is depicted as containing Tallaght Church, St Maelruan's (DU021-037003), with six houses to its east. Two roads meet in the town, one travels north-south through the centre of the houses, Greenhills Road, and the other joins it from the west, Main Street. The exact location of the proposed development area is not possible to identify, though it is likely to the north of the houses and immediate west of the north-south road.

John Rocque's *Map of the County of Dublin*, 1760 (Figure 14.2)

On Rocque's map the town of 'Tallow' (Tallaght), its road system, and the Archiepiscopal Palace (DU021-037010) are depicted, as are the structures of St Maelruan's (DU021-037003). The proposed development area occupies three open fields bordering Greenhills Road. A structure is depicted, fronting onto the road, within the site.

John Taylor's *Map of the Environs of Dublin*, 1816 (Figure 14.2)

The Archbishop of Dublin's Palace (DU021-037010) is depicted in greater detail than on Rocque's map and a castle (DU022-018001) is marked to the south of the proposed development area. The structure within the site is no longer depicted and the demesne of the Archbishop's Palace extends into the site. A number of mills are annotated to the south and southeast of the Tallaght, including the Harlem Mills and paper mills at Bowlbrook.

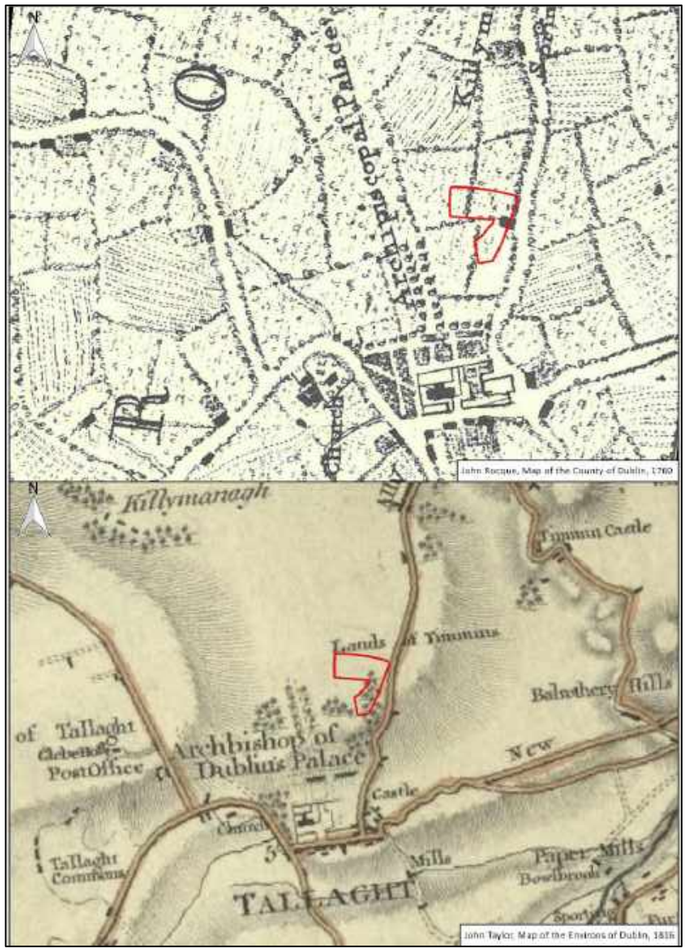


Figure 14.2 Extract from Rocque's map (1760) and Taylor's map (1816) showing the proposed development.

William Duncan's Map of the County of Dublin, 1821
By the time of this map the Tymon/Poddle River to the immediate south of the site is depicted, the demesne of the palace (DU021-037010) no longer extends into the site, and the castle (DU022-018001) is no longer annotated to the south of the proposed development area. There are no other significant changes of note.

First Edition Ordnance Survey Map, 1843, Scale 1:10560 (Figure 14.3)
This is the first accurate historic mapping coverage of the area containing the proposed development. The site is depicted within four open fields to the immediate north of the Tymon/Poddle River and demesne of Tallaght House, the gate house of which is depicted c. 80m south. The house has been built within the grounds of the former Archbishop's Palace (DU021-037010), with the palace annotated as an 'Old Castle'. A national school is depicted c. 255m to the south of the site, opposite Tallaght House and there is a group of three farmyard structures located c. 80m to the north.

The church (DU021-037003) first seen on the Down Survey, is depicted with an associated graveyard (DU021-037004), while the houses on the south side of Main Street are depicted with burgage plots at the rear. Boldbrook is now annotated as Bolbrook Paper Mill and at the Haerlem Mill Complex a woolen cloth mill and two flour mills are depicted.

Ordnance Survey Map, 1909, Scale 1:2500 (Figure 14.3)
The proposed development area is situated within three open fields on this map and a structure occupies the southernmost and smallest field. The farmyard structures to the north are annotated as Airton House. St Mary's Priory (Dominican) and R.C. Church have been built at the site of the old Archbishop's Palace, incorporating some of its elements to the southwest. The gatehouse of the palace is annotated as a tower (DU021-037010) and the site of the castle is marked (DU021-037020). A lodge of the priory is marked on the Main Street. A structure annotated as Bancroft's Castle (RMP DU022-018001) is marked in ruins c. 385m to the south.

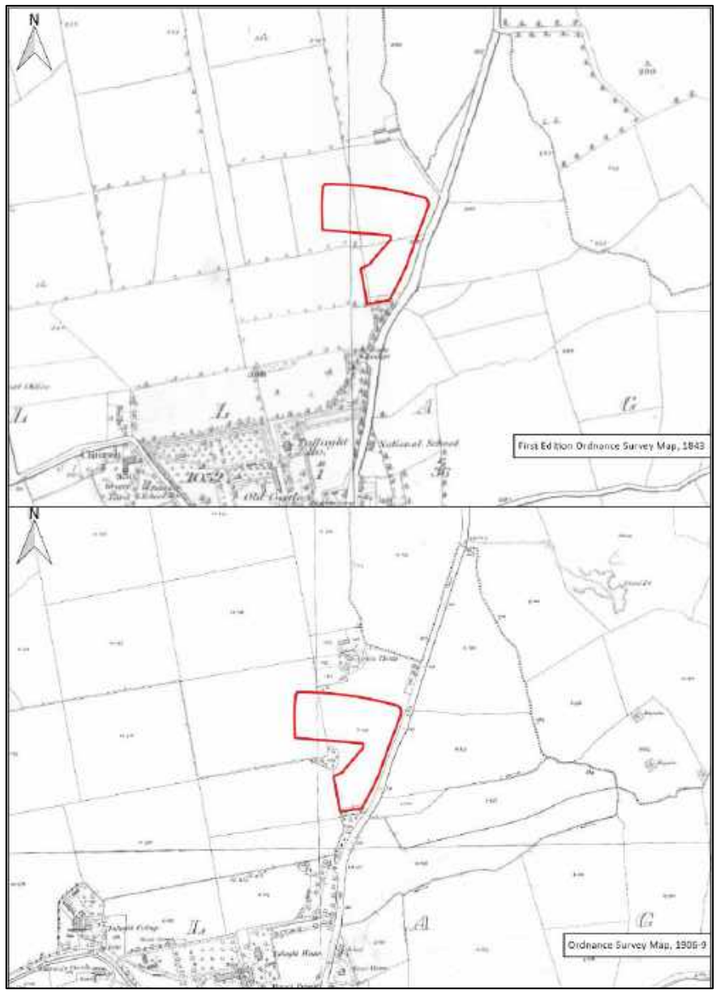


Figure 14.3 Extract from the 1843 and 1906-9 OS maps showing the proposed development.

Third Edition Ordnance Survey Map, 1935, Scale 1:10,560
The small structure at the southern end of the proposed development is still present on this map. Airton House has expanded to the north of the proposed development area and the school to the south has become a library. The remains of a cross (DU021-037006) are annotated in the graveyard (DU021-037004) at the west end of the town. The Bolbrook Paper Mills are no longer depicted; however, the Haarlem Mill Complex appears to have

slightly expanded to the south. Further signs of industry in Tallaght include the presence of Urney Chocolate Factory, c. 680m to the west.

County Development Plan

The South Dublin County Development Plan (2016–2022) and Tallaght Town Centre Local Area Plan (Adopted 2006, extended 2011) recognise the statutory protection afforded to all RMP sites under the National Monuments Legislation (1930–2014). The plans list a number of aims and objectives in relation to archaeological heritage (Appendix 14.3). It is the objective of the council to protect and preserve (in-situ, or at a minimum, preservation by record) all known sites and features of historical and archaeological interest and all sites and features of historical interest discovered subsequent to the publication of the Record of Monuments and Places.

There are five recorded monuments within the study area of the proposed development, all within the zone of notification for the historic town of Tallaght (DU021-037/DU022-018), c. 120m to the south (Table 14.2, Figure 14.1, Appendix 14.1).

SMR/RMP No.	Townland	Classification	Distance from Site
DU021-037	Tallaght	Historic town of Tallaght	c. 120m south
DU022-018001	Tallaght	Castle - tower house	c. 235m south
DU021-037020	Tallaght	Castle - unclassified	c. 405m south-southwest
DU021-037010	Tallaght	Gatehouse	c. 405m south-southwest
DU021-037007	Tallaght	Mill - unclassified	c. 500m south-southwest
DU021-037012	Tallaght	Ritual site - holy tree/bush	c. 500m south-southwest

Table 14.2 Recorded Archaeological Sites within the Study Area.

Cultural Heritage

The term 'cultural heritage' can be used as an over-arching term that can be applied to both archaeology and architecture. However, it also refers to more ephemeral aspects of the environment, which are often recorded in folk law or tradition or possibly date to a more recent period. Within the study area of the proposed development there are two purely cultural heritage features. These are the Institute of Technology Tallaght to the immediate southwest and Bancroft Park to the immediate east-southeast. The institute has been a centre of higher education and knowledge creation within South Dublin County since 1992. Bancroft Park is a public park and it is host to a number of leisurely activities for the residents of Tallaght such as St Maelruans Football Club and Tallaght Athletics Club.

There are a number of built heritage features within the study area that also constitute as cultural heritage. The sole demesne within the study area of the proposed development is that associated with Tallaght House (NIAH Garden DU-50-O-094277), depicted to the immediate south on the first edition OS map. The NIAH Garden Survey records it as 'main features substantially present - some loss of integrity'. There are three Protected Structures within the demesne and another to its east, all of which are also listed on the NIAH Building Survey (Table 14.3, Figure 14.4). The nearest consists of St. Basil's Training Centre (RPS 268; NIAH 11215003) c. 265m to the south, built c. 1940. The archaeological sites within the study area listed in Table 14.2 should also be considered as cultural heritage.

RPS No.	NIAH No.	Townland	Classification	Distance from Site
268	11215003	Tallaght	St. Basil's Training Centre	c. 265m south
270	11215001	Tallaght	St. Mary's Dominican Priory	c. 310m south-southwest
269	11215001	Tallaght	The Priory (Gatehouse DU021-037010)	c. 350m south-southeast
273	11215002	Tallaght	St. Mary's Dominican Church	c. 385m south-southwest

Table 14.3 Built Heritage Sites within the Study Area.

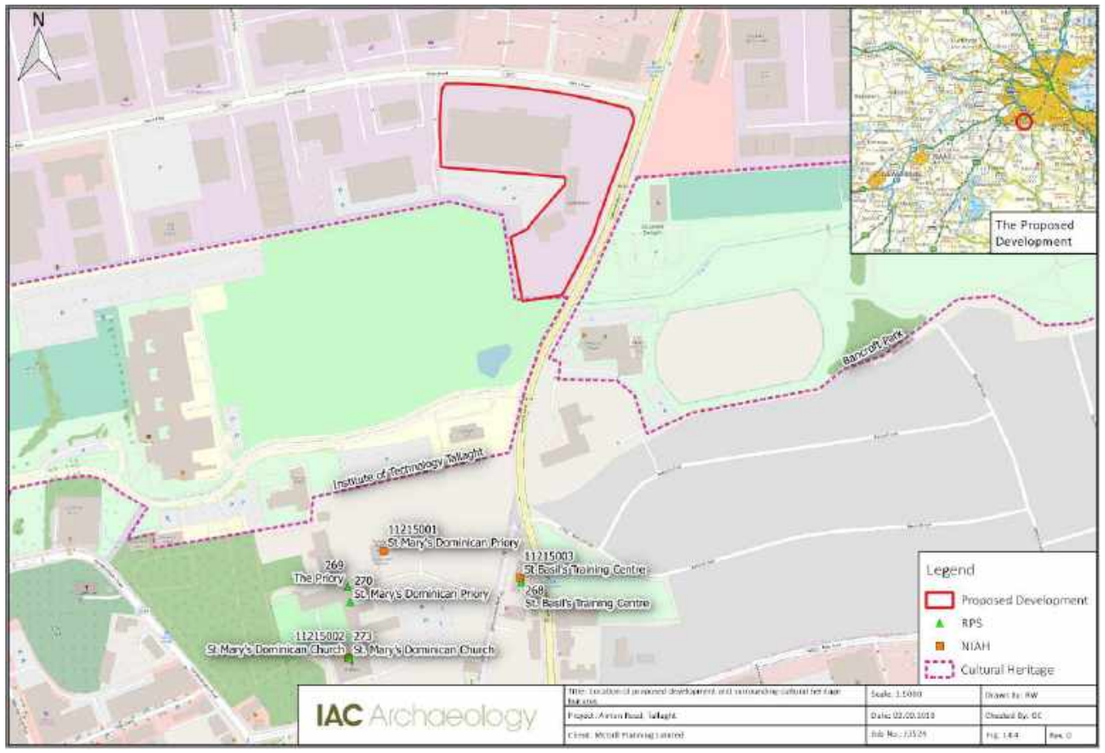


Figure 14.4Location of proposed development and surrounding cultural heritage features

Place Name Analysis

Townland and topographic names are an invaluable source of information on topography, land ownership and land use within the landscape. They also provide information on history, archaeological monuments and folklore of an area. A place name may refer to a long-forgotten site and may indicate the possibility that the remains of certain sites may still survive below the ground surface. The Ordnance Survey surveyors wrote down townland names in the 1830's and 1840's, when the entire country was mapped for the first time. Some of the townland names in the study area are of Irish origin and through time have been anglicised. The main reference used for the place name analysis is *Irish Local Names Explained* by P.W Joyce (1870). A description and possible explanation of each townland name in the environs of the proposed route are provided in Table 14.4.

The proposed development area is located within the townland of Tallaght. The surrounding townlands in the study area consists of Tymon North to the north and Kilnamanagh to the north-northwest. These townlands are located within the parish of Tallaght and the Barony of Uppercross, County Dublin.

Name	Derivation	Possible Meaning
Tallaght	Taimleacht	Tradition claims that the area was the burial place of the People of Parthalon it more likely relates to the large graveyard (RMP DU021-037004) associated with the ecclesiastical enclosure and church (RMP DU021-037002/3) to the southwest of the proposed development
Tymon North	Tigh Motháin	Munn's house
Kilnamanagh	Cill na Manach	Church of the monks
Uppercross	-	-

Table 14.4 Townlands, Parishes, and Baronies within the Study Area.

Townlands

The townland is an Irish land unit of considerable longevity as many of the units are likely to represent much earlier land divisions. However, the term townland was not used to denote a unit of land until the Civil Survey of 1654. It bears no relation to the modern word 'town' but like the Irish word *baile* refers to a place. It is possible that the word is derived from the Old English *tun land* and meant 'the land forming an estate or manor' (Culleton 1999, 174).

Gaelic land ownership required a clear definition of the territories held by each sept and a need for strong, permanent fences around their territories. It is possible that boundaries following ridge tops, streams or bog are more likely to be older in date than those composed of straight lines (*ibid.* 179).

The vast majority of townlands are referred to in the 17th century, when land documentation records begin. Many of the townlands are mapped within the Down Survey of the 1650s, so called as all measurements were carefully 'laid downe' on paper at a scale of forty perches to one inch. Therefore, most are in the context of pre-17th century landscape organisation (McErlean 1983, 315).

In the 19th century, some demesnes, deer parks or large farms were given townland status during the Ordnance Survey and some imprecise townland boundaries in areas such as bogs or lakes, were given more precise definition (*ibid.*). Larger tracks of land were divided into a number of townlands, and named Upper, Middle or Lower, as well as Beg and More (small and large) and north, east, south and west (Culleton 1999, 179). By the time the first Ordnance Survey had been completed a total of 62,000 townlands were recorded in Ireland.

Although not usually recorded as archaeological monuments in their own right, townland boundaries are important as cultural heritage features as they have indicated the extents of the smallest land division unit in the country—the townland—which have been mapped since the 19th century. It remains unclear how old these land units actually are, though it has been convincingly argued that they date to at least the medieval period and may be significantly older than this (McErlean 1983; MacCotter 2008). There are no townland boundaries within or bordering the proposed development.

Aerial Photographic Analysis

Inspection of the aerial photographic coverage of the proposed development area held by the Ordnance Survey (1995, 2000, 2005), Google Earth (2008-2019), and Bing Maps (2018) revealed that the site has remained unchanged since 1995 and failed to identify any previously unknown archaeological features.

Field Inspection

The field inspection sought to assess the site, its previous and current land use, the topography and any additional information relevant to the report. During the course of the field investigation the proposed residential development site and its surrounding environs were inspected.

The site is currently occupied by three modern but derelict structures, a car park to the south, and two areas of overgrown grass to the north and east alongside the Airton Road and Greenhills Road (Plates 14.1-14.4). The site is level, tarmacked and bound my metal fences. The grass area in the east of the site gently slopes down to the east and north while the grass area along the northern boundary rises up to the road and a portion of it has been built over a bunker. A small watercourse with mature vegetation borders the site to the south and lower half of the western boundary. No archaeological features were noted during the field inspection.

Plate 14.1 Proposed development, facing south.

Plate 14.2 Carpark in south of site, facing north

Plate 14.3 Overgrown area of grass in east of site, facing north-northeast.

Plate 14.4 Overgrown area of grass in north of site, facing east-southeast.

Conclusions

The proposed development area is located in the townland and parish of Tallaght within the Barony of Uppercross. The site is situated c. 120m to the north of the zone of notification for the historic town of Tallaght (RMP DU021-037/DU022-018). There are four additional recorded monuments within the study area, the nearest of which comprises a tower house (DU022-018001), c. 235m to the south. An analysis of the cartographic sources revealed that the proposed development area has been situated within open fields bordered to the east by the Old Greenhills Road to the north of Tallaght since the 17th century. A review of the aerial photographic coverage noted that the site has been occupied by a warehouse and associated car parking and landscaping since 1995. The field inspection also did not identify any features of archaeological potential.

There have been 17 archaeological investigations within the study area surrounding proposed development, four of which did not encounter anything of note. The majority of these investigations are associated with the development of the Institute of Technology Tallaght and identified medieval and post-medieval activity to the immediate north of Tallaght Castle/Archbishop's Palace (DU021-037020).

There are two purely cultural heritage features within the study area of the proposed development, the Institute of Technology Tallaght and Bancroft Park to the immediate southwest and southeast respectively. Additionally, the recorded monuments within the study area are also cultural heritage sites as are the built heritage features. The built heritage sites comprise the demesne of Tallaght House (NIAH Garden DU-50-O-094277) and four Protected Structures, all of which are also listed on the NIAH Building Survey. The nearest structure consists of St. Basil's Training Centre (RPS 268; NIAH 11215003), c. 265m to the south.

14.4 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

Planning permission is being sought for a mixed-use development located at Airton road, Tallaght. The proposed development is described in detail within chapter 3 of this EIAR and the statutory planning notices. Additional details regarding the design strategy and materials proposed can be found within the Architectural Design Statement produced by Ferreira Architects that is submitted with this application.

Figure 14.5Site Plan of proposed development. (Source: Landscape Masterplan, Mitchell Associates)

14.5 POTENTIAL IMPACTS

Impacts can be identified from detailed information about a project, the nature of the area affected, and the range of archaeological and cultural heritage resources potentially affected. Heritage sites can be affected adversely in a number of ways: disturbance by excavation, topsoil stripping; disturbance by vehicles working in unsuitable conditions; and burial of sites, limiting access for future archaeological investigation. Upstanding archaeology can be affected adversely by direct damage or destruction arising from development, from inadvertent damage arising from vibration, undermining etc. and also by indirect impacts to a building's visual setting, view or curtilage.

Construction Phase

Archaeology

- The proposed development area has been subject to some modern development, although it is unclear how that may have affected the potential archaeological resource. Considering the wealth of archaeological material discovered to the immediate southwest within the grounds of the Institute of Technology Tallaght, it is possible that ground disturbances associated with development may have a negative direct impact on archaeological remains that may survive beneath the existing ground level with no surface expression. Dependant on the nature, extant and significance of any such remains, impacts may range from moderate to profoundly negative.

Cultural Heritage

- No potential impacts to cultural heritage assets have been identified.

Operational Phase

Archaeology

- No potential impacts upon the archaeological heritage resource have been identified during the operation of the proposed development.

Cultural Heritage

- No potential impacts upon the cultural heritage resource have been identified during the operation of the proposed development.

14.6 POTENTIAL CUMULATIVE IMPACTS

As it is proposed to monitor construction activity and preserve any identified archaeological features by record, no cumulative impacts are predicted upon the archaeological or cultural heritage resource.

14.7 MITIGATION MEASURES

Construction Phase

Archaeology

- All ground disturbances within the proposed development area will be monitored by a suitably qualified archaeologist. If any features of archaeological potential are discovered during the course of the works further archaeological mitigation may be required, such as preservation *in-situ* or by record. Any further mitigation will require approval from the National Monuments Service of the DoCHG.

Cultural Heritage

- No mitigation is required.

Operational Phase

- No mitigation is required.

14.8 PREDICTED IMPACTS

Construction Phase

- Should all mitigation measures, recommended above, be carried out fully and successfully there will be no predicted residual impact to the archaeological and cultural heritage resource by the proposed development.

Operational Phase

- There are no predicted residual impacts for the operational phase of the proposed development upon the archaeological and cultural heritage resource.

14.9 'DO NOTHING' SCENARIO

If the proposed development were not to proceed there would be no negative impact on the archaeological or cultural heritage resource.

14.10 WORST CASE SCENARIO

Under a worst-case scenario, the proposed development would disturb previously unrecorded and unidentified deposits and artefacts without proper excavation and recording being undertaken.

14.11 MONITORING & REINSTATEMENT

The mitigation measures recommended above would also function as a monitoring system during construction to allow the further assessment of the scale of the predicted impacts and the effectiveness of the recommended mitigation measures.

14.12 DIFFICULTIES IN COMPILING INFORMATION

No difficulties were encountered in compiling information.

14.13 REFERENCES

Becker, K. 2012 'Redefining the Irish Iron Age' In: Potterton, M. and Corlett C. (eds) *Life and death in Iron Age Ireland*. Wordwell books, Bray, 1-14.

Bennett, I. (ed.) 1987-2010 *Excavations: Summary Accounts of Archaeological Excavations in Ireland*. Bray. Wordwell.

Brindley, A. L., and Lanting, J. N. 1990. "The dating of fulachta fiadh." *Burnt Offerings. International contributions to burnt mound archaeology*, 55-56.

Buckley, V. and Sweetman, P.D. 1991. *Archaeological Survey of County Louth*. Dublin.

Byrne, F. J. 1973. *Irish kings and high-kings*. London: Batsford.

Chartered Institute for Archaeologists 2014a *Standards & Guidance for Field Evaluation*.

Chartered Institute for Archaeologists 2014b *Standards & Guidance for Archaeological Excavation*.

Chartered Institute for Archaeologists 2014c *Standards & Guidance for an Archaeological Watching Brief (Monitoring)*.

Corlett, C. 1999. *Antiquities of Old Rathdown: The Archaeology of South County Dublin and North County Wicklow*. Bray. Wordwell.

Coughlan, T. 2003. *Archaeological Assessment at the Greenhills Road Re-alignment, Tallaght, Dublin 24*. Licence 03E0131.

Culleton E. (ed.) 1999 *Treasures of The Landscape; Townland Names by An Tathair Seamas S. De Vaal* Dublin: Trinity College.

Department of Arts, Heritage, Gaeltacht and the Islands. 1999a *Framework and Principles for the Protection of the Archaeological Heritage*. Dublin. Government Publications Office.

Department of Arts, Heritage, Gaeltacht and the Islands. 1999b *Policy and Guidelines on Archaeological Excavation*. Dublin. Government Publications Office.

Dowd, M. and Carden, R. 2016 First evidence of a Late Upper Palaeolithic human presence in Ireland. *Quaternary Science Reviews* 139, 158–63.

Enright, D. 2007. *Geophysical Survey Report Tallaght IT South Co. Dublin*. Licence 07R0114.

Environmental Protection Agency. 2015 *Draft Advice Notes on Current Practice (in the preparation of Environmental Impact Statements)*. Dublin. Government Publications Office.

Environmental Protection Agency. 2017 *Draft Guidelines on the Information to be Contained in Environmental Impact Statements*. Dublin. Government Publications Office.

Hayden, A. 1991 *Examination of Two Service Trenches for Archaeological Purposes at the New Regional Technical College Site, Tallaght, Co. Dublin*.

Joyce, P. W. 1870. *Irish Local Names Explained*. Sydney: Wentworth Press.

Leigh, J. 2004. *Geophysical Survey I.T. Tallaght Incubation Building, County Dublin.* Licence Ref. 04R0136.

Lewis, S. 1837 (online edition) *Topographical Dictionary of Ireland*.

Lynch, R. 2003. *Archaeological Monitoring of Bancroft Park, Tallaght, Dublin 24*. Licence 03E0927.

MacCotter, P. 2008 *Medieval Ireland*. Dublin: Four Courts Press.

McErlean, T. 1983 "The Irish townland system of landscape organisation". In Reeves-Smyth, Terence; Hamond, Fred (eds) *Landscape Archaeology in Ireland BAR British Series* 116. pp. 315–39.

Mullins, C. 2003 *A Report on the Archaeological Monitoring of a Site at St. Catherine's, Old Blessington Road, Dublin 24*.

National Monuments Service, Department of Culture, Heritage and the Gaeltacht. *Sites and Monuments Record*, County Dublin.

National Museum of Ireland. *Topographical Files*, County Dublin.

Ruttle, E. 2012 *Third Level Bundle Two PPP Project, Institute of Technology Tallaght Site, Tallaght, Dublin 24 Final Excavation Report Contract Stage iv*.

South Dublin County Council Development 2016-2022.

Stout, M. 1997 *The Irish Ringfort*. Dublin. Four Courts.

Stout, G. and Stout, M. 1997 Early Landscapes: from Prehistory to Plantation. In F.H.A. Aalen et al. (eds), *Atlas of the Irish Rural Landscape*. Cork. Cork University Press.

Swan, D. L. 1995 *Report on Archaeological Testing at St. Maelruan's, Tallaght, Dublin 24*.

Cartographic Sources

William Petty, Down Survey Map, *Barony of Newcastle,* c. 1655

John Rocque, *Map of the County of Dublin*, 1760

John Taylor, *Map of the Environs of Dublin*, 1816

William Duncan, *Map of the County of Dublin*, 1821

Ordnance Survey maps of County Dublin 1843, 1909, and 1935

Electronic Sources

www.excavations.ie – Summary of archaeological excavation from 1970–2018.

www.archaeology.ie – DoCHG website listing all SMR sites.

www.osiemaps.ie – Ordnance Survey aerial photographs dating to 1995, 2000, & 2005 and 6-inch/25-inch OS maps.

www.heritagemaps.ie – The Heritage Council web-based spatial data viewer which focuses on the built, cultural and natural heritage.

www.googleearth.com – Satellite imagery of the proposed development area.

www.bingmaps.com – Satellite imagery of the proposed development area.

www.booksulster.com/library/plnm/placenamesC.php - Contains the text from *Irish Local Names Explained* by P.W Joyce (1870).

www.logainm.ie –Placenames Database of Ireland launched by *Fiontar agus Scoil na Gaelige* and the DoCHG.

www.askaboutireland.ie – The History of Tallaght

www.southdublinhistory.ie – Tallaght – History and Chronology.

15INTERACTIONS

15.1 INTRODUCTION

As a requirement of the Planning and Development Regulations 2001, as amended, and the draft EPA guidelines (2017), not only are the individual significant impacts required to be considered when assessing the impact of a development on the environment, but so must the interrelationships between these factors be identified and assessed.

Under the Regulations interactions between the various environmental factors, are to be assessed as well as the vulnerability of the proposed development to the risk of natural disaster.

15.2 ASSESSMENT

Where an interaction is both likely and significant, it is given a reference number in the matrix and detail of the interaction is recorded below. The interactions are listed in numerical sequence, purely for referencing purposes.

	Population	*Biodiversity*	*Soils/ Geology*	*Water*	*Noise*	*Air Climate*	*Landscape*	*Cultural Heritage*
Population								
Biodiversity								
Soils	**1**	**7**						
Water	**2**	**8**	**11**					
Noise	**3**	**9**						
Air Climate	**4**		**12**					
Landscape	**5**	**10**	**13**					
Material Assets	**6**							
Cultural Heritage							**14**	

Table 15.1 Interaction matrix

1. Population & Human Health / Soils

There is potential for dust generation during construction and demolition works which under dry and windy conditions could lead to localised dust impacts for the small number of properties proximate to the development site. However, the implementation of dust management and dust control measures will ensure that the proposed development will not give rise to the generation of any significant quantities of dust. Therefore, there will be minimal impacts on local community.

2. Population & Human Health / Water

Failure or mismanagement of the potable water supply could lead to its contamination during the construction phase. A range of mitigation measures will be put in place during the construction phase of the development to ensure this does not occur.

3. Population & Human Health / Noise

Increased noise levels during the construction phase will be temporary and are not expected to have a long-term significant adverse effect upon the local population. Construction noise will be audible at a low level in the ambient noise. However, the impact is predicted to be minor. The impact due to the increased traffic associated with the operational development is expected to be minor.

4. Population & Human Health / Air

The completed development will generate additional emissions to the atmosphere due to increase in traffic associated with the development. However, air quality in the vicinity of the site is expected to remain within air quality standards.

During construction, there may be potential for slight dust nuisance in the immediate vicinity of the site. However, dust control measures, such as wheel washes, covering of fine material etc. will minimise the impacts on air quality.

5. Population & Human Health / Landscape

Existing residents and visitors to the Airton/Greenhills area and the existing Bancroft Park will interact with the landscape, such that they will be aware of a significant change at this site from fenced off, vacant brownfield site to a new residential development with multi-storey blocks, open spaces, etc. Such a transformation, whilst significant, is designated for under the Development Plan and the Local Area Plan. It is expected that the design of the proposed scheme will over time integrate with the adjoining sites within the \industrial estate along Airton road to the west of the site.

6. Population & Human Health / Materials Assets

It is expected that the proposed development will benefit the materials assets with the additional population helping to sustain and generate improvements to the physical infrastructure of the area.

7. Biodiversity / Soils

Potential construction stage effects arising from the general loss and fragmentation of some habitats and reduction of associated opportunities for biodiversity are considered neutral to slight negative during the construction phase, while potential operational stage effects are considered imperceptible neutral as new planting/landscaping matures.

8. Biodiversity / Water

As concluded in the Natura Impact Statement submitted with the application there are no elements of the proposed development that are likely to give rise to significant effects on the local Natura 2000 sites.

The implementation of construction and operational phase soils and water management proposals, together with the site drainage design will adequately reduce such potential impacts arising from the development site on these aquatic habitats in the wider area. Potential construction and operational phase effects on biodiversity associated with aquatic habitats in the wider area are considered imperceptible neutral with the implementation of soils and water management proposals.

9. Biodiversity / Noise

Increased noise levels during the construction phase will only be temporary and are not expected to have a long-term significant adverse effect upon remaining fauna within the wider landscape.

Operational noise will be audible at a low level in the ambient noise and the impact is predicted to be minor.

10. Biodiversity / Landscape

New boundary planting is planned, and two public open spaces are proposed as part of the proposed landscape improvements. The riparian zone is to become an improved amenity space for the residents with walking and cycling tracks. There will be additional planting of native trees and other flora, which will aid the growth of biodiversity of the site.

Otherwise the successful implementation of the mitigation measures as outlined in this EIAR and accompanying documents, together with the landscape masterplan will minimise the potential impact of the proposed development on local biodiversity such that its residual impact on other habitats, flora and fauna will be imperceptible neutral overall.

11. Soils / Water

When soil is exposed after vegetative clearance there will also be increased run-off and evaporation. Mitigation measures will be implemented during construction to prevent this run-off water from discharging directly to watercourses.

12. Soils / Air

Exposed soil during the construction phase of the proposed scheme may give rise to increased dust emissions. However, the implementation of dust management and dust control measures will ensure that the proposed development will not give rise to the generation of any significant quantities of dust.

13. Soils/Landscape

Residual soils arising as a result of excavation at the development site will be used in landscaping works in the proposed public open space as much as possible rather than transporting off-site.

14. Landscape/Cultural Heritage

Careful consideration has been given to minimizing the visual impact of the proposed scheme on architectural heritage in the wider area.

16SCHEDULE OF MITIGATION MEASURES

16.1 INTRODUCTION

Given the complexity of the proposed development and this EIAR, this chapter seeks to provide a complete summary of mitigation measures proposed in Chapters 4 to 16. The appointed contractor will be required to adhere to the mitigation contained in the EIAR. Monitoring of the effectiveness of mitigation measures put forward in the EIAR document by the competent authorities is also integral to the process.

16.2 CONSTRUCTION STAGE

Population & Human Health	Construction and Environmental Management Plan(CEMP) will be prepared by the contractor and implemented during the construction phase to reduce the detrimental effects of the construction phase on the environment and local population. CEMP will be agreed in writing with the planning authority in writing prior to the commencement of the development.
Biodiversity	In order to mitigate against the impacts listed above, then the following mitigation measures should be adhered to during all phases of the development. • All works associated with the development should be confined to the proposed development site. All site development works should adhere to best practice. • The techniques of SUDs (Sustainable urban Drainage Systems) should be applied to all hydrological engineering aspects of this proposed development. • In accordance with the policies and objectives of the County Development Plan, the existing green infrastructure of the site, i.e., the existing treelines and hedge rows, should be incorporated into the development in so far as possible. • Habitat fragmentation should be avoided where possible, especially in the treelines within the site. These areas should be cordoned off during all site preparation and construction activities on the site. There must be no dumping or storage of construction waste or machinery in these areas during construction. • Any natural verges along treelines or hedgerows should be retained and managed appropriately for the benefit of wildlife. They should not be sprayed with herbicide and a low intensity mowing or strimming regime should be incorporated. This will benefit local pollinators. • Tree removal should only take place outside of the bird nesting season and for the protection of bats, in late autumn. • Tree removal must only occur under guidance of a consultant arborist and with regard to the tree constraints plan that has be en prepared for the site. • It is vital that there is no deterioration in water quality in any watercourse in the vicinity of the development. This will protect both habitats and species that are sensitive to pollution. Therefore, strict controls of erosion, sediment generation and other pollutants associated with the construction process shou ld be implemented, including the provision of attenuation measures, silt traps or geotextile curtains to reduce and intercept sediment release into any local watercourses. • Fuels, oils, greases and hydraulic fluids must be stored in bunded compounds. Refuelling of machinery, e tc., should be carried out in bunded areas. Any bulk fuel storage tank should be properly bunded with a bund capacity of at least 110% of that of the fuel tank. • Stockpile areas for sands and gravel should be kept to a minimum size, well away from the dra ins and watercourses. • All waste associated with the development should be disposed of in an environmentally friendly manner. Registered contractor s should only be used. • The recommendations in the accompanying bat report should be followed, including: ✓ The wooden panels at the rear of the building should be removed by hand prior to any demolition of the building. This should be supervised by an ecologist. ✓ Two 2F and Two 1FF Schwegler bat boxes with built in timber panels should be distributed throughout th e site. These should be paced on trees or posts, at least 3m high with a clear drop below (as bats need to drop to start their flight). They should be placed in a dark area of the site.

	✓ To mitigate against the loss of food sources for local bat populations, native species should be used when landscaping with trees and shrubs. ✓ If bats are discovered at any stage of the development, building work should cease and a bat expert should be consulted immed iately. ✓ If the building is not demolished within 12 months, it should be resurveyed for bats prior to demolition.
Land, Soils & Geology	In order to minimise the impact of construction on the sites soils and geology the following mitigation measures should be im plemented: - In order to prevent the accidental release of hazardous materials (fuels, paints, cleaning agents, etc.) during construction site activity all hazardous materials should b e stored within secondary containment designed to retain at least 110% of the storage contents. Temporary bunds for oil/di esel storage tanks should be used on the site during the construction phase of the project. Safe materials handling of all potentially hazardous materials should be emphasised to all construction personnel employed during this phase of the project. - Sediment runoff will be minimised by standard engineering measures including sediment skirts around soil stockpiles, sediment retention barri ers in surface water drains and the use of adequate construction roads. - Construction access to the site will be from the Naas Road. The provision of wheel wash areas at the construction entrances to the development will minimise the amount of soil deposited on the surrounding road network. - Measures will be implemented throughout the construction stage to minimise the risk of contamination of the soil from accidental oil and petrol leakage from site plant. Bunding of storage areas and refuelling areas will be incorporated into the site compound. The bund walls will be designed to the appropriate level to ensure no over-spilling occurs in the event of an accidental spillage. All lock up/storage areas will have a metal or concrete leak proof floor. Any accidental chemical spillages should be cleaned up and disposed of in an approved landfill site in accordance with the chemical manufacturer's recommendations.
Hydrology	Remedial and mitigation measures describe any corrective measures that are either practicable or reasonable, having regard to the potential impacts discussed above. This includes avoidance, reduction and remedy measures as per the guidance set out in Section 4.7 of the Development Management Guidelines 2007 to reduce or eliminate any significa nt adverse impacts identified. **Surface Water** The following remedial or reductive measures to mitigate the impact of the construction phase on the existing environment are proposed with reference to water: • A method statement for all works to be carried out will be prepared by the contractor and agreed with South Dublin County Cou ncil prior to commencement of works to outline what measures are to be taken to ensure there is no loss of service during the works. • Dewatering measures should only be employed where necessary. • If concrete mixing is carried out on site, the mixing plant should be sited in a designated area with an impervious surface. • Existing surface drainage channels within the lands that serve adjacent lands should be retained where possible to prevent ca using increased flooding impacts. • Construction methods used should be tailored to reduce, as much as possible, dust and noise pollution. • Comprehensive traffic management procedures, including the provision of access to all roads, and access/egress points should be prepared and agreed with the Local Authority. These traffic management measures should be implemented at times when traffic disruption may be experienced. • Road sweeping and/or wheel wash facilities should be provided, as required. • All oils/diesel stored on site for construction equipment are to be located in appropriately bunded areas. • Filters and silt traps will be used to prevent rain washing silts and other materials into the surface water network and creating blockages. • Adjacent watercourses/groundwater need to be protected from sedimentation and erosion due to direct surface water runof f generated onsite during the construction phase. To prevent this from occurring surface water discharge from the site will be managed and controlled for the duration of the cons truction works until the permanently attenuated surface water drainage system of the proposed site is complete. A temporary positive drainage system shall be installed prior to the commencement of the construction works to collect surface water runoff from the site during construction. A series of geotextile lined cascading, high level outfall, settling basins will be installed upstream of the agreed discharge point. This temporary surface water management facility will throttle runoff and allow suspended solids to be settled out and removed before being discharged in a control manner to the agreed outfall. Inlet to the cascading settling basins will be riprapped to prevent scour and erosion in the vicinity of the inlet. **Foul Water Drainage** Effluent generated on the site from the contractor's sanitary facilities will be discharged to a holding tank and removed off site by a certified waste removal contractor in accordance with the requirements of the Waste Management Act of 1996 and 2001. Any other arrangements would be subject to agreement with SDCC Dr ainage Division. The following remedial or reductive measures to mitigate the impact of the construction phase on the existing environment are proposed: - • All sewers will be inspected and where necessary sealed to ensure that uncontrolled ground water inflow does not occur. • Any leakage from the foul sewer will be cordoned off and the contaminated effluent and soil collected and disposed by licensed contractors.

	Water Supply • Contact the local authority to adhere to the measures required for introducing a new watermain connection. • Testing of the system meter & telemetry system is required.
Noise & Vibration	With regard to construction/demolition activities, best practice control measures for noise and vibration from construction sites are found within BS 5228 (2009 +A 1 2014) *Code of Practice for Noise and Vibration Control on Construction and Open Sites Parts 1 and 2*. Whilst construction noise and vibration impacts are expected to vary during the construction/demolition phase depending on the distance between the activities and noise sensitive buildings, the contractor will ensure that all best practice noise and vibration control methods will be used, as necessary in order to ensure impacts at off-site noise sensitive locations are minimised. The best practice measures set out in BS 5228 (2009) Parts 1 and 2 includes guidance on several aspects of construction site mitigation measures, including, but not limited to: • Selection of quiet plant. • Noise control at source. • Screening. • Liaison with the public, and; • Monitoring A detailed comment is offered on these items in the following paragraphs. Noise control measures that will be considered include the selection of quiet plant, enclosures and screens around noise sources, limiting the hours of work and noise and vibration monitoring, where required. <u>Selection of Quiet Plant</u> This practice is recommended in relation to static plant such as compressors and generators. It is recommended that these units be supplied with manufacturers' proprietary acoustic enclosures. The potential for any item of plant to generate noise will be assessed prior to the item being brought onto the site. The least noisy item should be selected wherever possible. Should a particular item of plant already on the site be found to generate high noise levels, the first action should be to identify whether or not said item can be replaced with a quieter alternative. <u>Noise Control at Source</u> If replacing a noisy item of plant is not a viable or practical option, consideration will be given to noise control "at source". This refers to the modification of an item of plant or the application of improved sound reduction methods in consultation with the supplier. For example, resonance effects in panel work or cover plates can be reduced through stiffening or application of damping compounds; rattling and grinding noises can often be controlled by fixing resilient materials in between the surfaces in contact. Referring to the potential noise generating sources for the works under consideration, the following best practice mitigation measures should be considered: • Site compounds will be located in excess of 30m from noise sensitive receptors within the site constraints. The use lifting bulky items, dropping and loading of materials within these areas should be restricted to normal working hours. • For mobile plant items such as dump trucks, excavators and loaders, the installation of an acoustic exhaust and/or maintaining enclosure panels closed during operation can reduce noise levels by up to 10dB. Mobile plant should be switched off when not in use and not left idling. • For steady continuous noise, such as that generated by diesel engines, it may be possible to reduce the noise emitted by fitting a more effective exhaust silencer system or utilising an acoustic canopy to replace the normal engine cover. For concrete mixers, control measures should be employed during cleaning to ensure no impulsive hammering is undertaken at the mixer drum. • For all materials handling ensure that materials are not dropped from excessive heights, lining drops chutes and dump trucks with resilient materials. • For compressors, generators and pumps, these can be surrounded by acoustic lagging or enclosed with in acoustic enclosures providing air ventilation. • Demountable enclosures can also be used to screen operatives using hand tools and will be moved around site as necessary. • All items of plant should be subject to regular maintenance. Such maintenance can prevent unnecessary increases in plant noise and can serve to prolong the effectiveness of noise control measures. <u>Screening</u> Screening is an effective method of reducing the noise level at a receiver location and can be used successfully as an additional measure to all other forms of noise control. Construction site hoarding will be constructed around the site boundaries as standard. The hoarding will be constructed of a material with a mass per unit of surface area greater than 7 kg/m^2 to provide adequate sound insulation. In addition, careful planning of the site layout will also be considered. The placement of site buildings such as offices and stores will be used, where feasible, to provide noise screening when placed between the source and the receiver. <u>Liaison with the Public</u>

	A designated environmental liaison officer will be appointed to site during construction works. Any noise complaints should be logged and followed up in a prompt fashion by the liaison officer. In addition, where a particularly noisy construction activity is planned or other works with the potential to generate high levels of noise, or where noisy works are expected to operate outside of normal working hours etc., the liaison officer will inform the nearest noise sensitive locations of the time and expected duration of the noisy works. Monitoring Where required, construction noise monitoring will be undertaken at periodic sample periods at the nearest noise sensitive locations to the development works to check compliance with the construction noise criterion. Noise monitoring should be conducted in accordance with the International Standard ISO 1996: 2017: *Acoustics - Description, measurement and assessment of environmental noise.* Project Programme The phasing programme will be arranged so as to control the amount of disturbance in noise and vibration sensitive areas at times that are considered of greatest sensitivity. During excavation or when other high noise generating works are in progress on a site at the same time as other works of construction that themselves may generate significant noise and vibration, the working programme will be phased so as to prevent unacceptable disturbance at any time. **Vibration** The vibration from construction activities will be limited to the values set out in Section 8.2 (Methodology). Magnitudes of vibration slightly greater than those in the table are normally unlikely to cause cosmetic damage, but construction work creating such magnitudes should proceed with caution. Limit values have been provided for soundly constructed residential and commercial properties.
Air Quality & Climate	- Avoid unnecessary vehicle movements and manoeuvring, and limit speeds on site so as to minimise the generation of airborne dust. - Use of rubble chutes and receptor skips during construction activities. - During dry periods, dust emissions from heavily trafficked locations (on and off site) will be controlled by spraying surfaces with water and wetting agents. - Hard surface roads will be swept to remove mud and aggregate materials from their surface while any unsurfaced roads will be restricted to essential site traffic only. - Re-suspension in the air of spillages material from trucks entering or leaving the site will be prevented by limiting the speed of vehicles within the site to 10kmh and by use of a mechanical road sweeper. - The overloading of tipper trucks exiting the site shall not be permitted. - Aggregates will be transported to and from the site in covered trucks. - Where the likelihood of windblown fugitive dust emissions is high and during dry weather conditions, dusty site surfaces will be sprayed by a mobile tanker bowser. - Wetting agents shall be utilised to provide a more effective surface wetting procedure. - Exhaust emissions from vehicles operating within the construction site, including trucks, excavators, diesel generators or other plant equipment, will be controlled by the contractor by ensuring that emissions from vehicles are minimised by routine servicing of vehicles and plant, rather than just following breakdowns; the positioning of exhausts at a height to ensure adequate local dispersal of emissions, the avoidance of engines running unnecessarily and the use of low emission fuels. - All plant not in operation shall be turned off and idling engines shall not be permitted for excessive periods. - Material handling systems and site stockpiling of materials will be designed and laid out to minimise exposure to wind. Water misting or sprays will be used as required if particularly dusty activities are necessary during dry or windy periods. - Material stockpiles containing fine or dusty elements including topsoils shall be covered with tarpaulins. - Where drilling or pavement cutting, grinding or similar types of stone finishing operations are taking place, measures to control dust emissions will be used to prevent unnecessary dust emissions by the erection of wind breaks or barriers. All concrete cutting equipment shall be fitted with a water dampening system. - A programme of air quality monitoring shall be implemented at the site boundaries for the duration of construction phase activities to ensure that the air quality standards relating to dust deposition and PM10 are not exceeded. Where levels exceed specified air quality limit values, dust generating activities shall immediately cease and alternative working methods shall be implemented. - A complaints log shall be maintained by the construction site manager and in the event of a complaint relating to dust nuisance, an investigation shall be initiated.
Landscape & Visual	To reduce the potential negative impacts during the construction phase, good site management and housekeeping practices will be adhered to. The visual impact of the site compounds and scaffolding visible during the construction phase are of a temporary nature only and therefore require no remedial action. To ensure the successful retention of trees as per Arborists recommendation to be retained by the contractor or developer to monitor and advise any works within the Root Protection Zones of retained trees.

Traffic &Transportation	

	Remedial and mitigation measures describe any corrective measures that are either practicable or reasonable, having regard to the potential impacts discussed above. This includes avoidance, reduction and remedy measures as per the guidance set out in Section 4.7 of the Development Management Guidelines 2007 to reduce or eliminate any significant adverse impacts identified. The Construction Management Plan will incorporate a range of integrated control measures and associated management activities with the objective of mitigating the impact of the proposed developments on-site construction activities. **Road Network** The following remedial or reductive measures to mitigate the impact of the construction phase on the existing environment are proposed with reference to the road network: - Any recommendations regarding construction traffic management made by the Local authority will be adhered to. - All road works will be adequately signposted and enclosed to ensure the safety of all road users and construction personnel. - Efforts are to be made to promote the usage of public transport by site staff to prevent additional private cars on the road network. - Provision of enough on-site parking and compounding to ensure no overflow of construction generated traffic onto the local network. - A dedicated 'construction site' access / egress system will be implemented during the construction phases. - Site offices and compound will be located within the site boundary. The site will be able to accommodate employee and visitor parking throughout the construction period through the construction of temporary hard standing areas. This will prevent visitors or employees parking on the surrounding streets. - A series of 'way-finding' signage will be provided to route staff / deliveries into the site and to designated compound / construction areas. - Truck wheel washes will be installed at construction entrances if deemed necessary. **Pedestrian** The following remedial or reductive measures to mitigate the impact of the construction phase on the existing environment are proposed with reference to the pedestrian network: - Hoarding to be set up around the perimeter to prevent pedestrian access. - Signage to be implemented to clearly indicate navigation routes around the site. **Cyclist** The following remedial or reductive measures to mitigate the impact of the construction phase on the existing environment are proposed with reference to the cyclist network: - Provide bike parking locations on site to promote the usage of cycling by site staff. **Public Transport** The following remedial or reductive measures to mitigate the impact of the construction phase on the existing environment are proposed with reference to the public transport network: - Promote usage of public transport by site staff by clearly displaying local bus, Luas and rail services with a map and timetable indicating routes and travel times.
Material Assets	A range of construction related mitigation measures are outlined within other chapters of the EIAR with respect to various aspects of the built environment – chapters 6, 7, 11 and 13. As noted above, connections to the existing electricity, water services, gas and telecommunications networks will be coordinated with the relevant utility provider and carried out by approved contractors.
Waste Management	This section outlines the measures that will be employed in order to reduce the amount of waste produced, manage the wastes generated responsibly and handle the waste in such a manner as to minimise the effects on the environment. A project specific C&D WMP has been prepared in line with the requirements of the guidance document issued by the DoEHLG. 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 construction phase of the proposed development. Barrett Mahony Consulting Engineers have estimated that c.19,250m3 of topsoil and sub soil will be generated from the excavations required to facilitate construction. It is anticipated that all of this material will require removal for offsite. Contractor(s) will endeavour to ensure material taken offsite is reused or recovered off-site or disposed of at authorised facility. In addition, the following mitigation measures will be implemented: • Building materials will be chosen with an aim to 'design out waste'. • 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: - Concrete rubble (including ceramics, tiles and bricks). - Plasterboard. - Metals. - Glass; and

	- Timber. • Left over materials (e.g. timber off-cuts, broken concrete blocks/bricks) and any suitable construction materials shall be re-used on-site, where possible. • All waste materials will be stored in skips or other suitable receptacles in designated areas of the site. • 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). • A waste manager will be appointed by the main contractor(s) to ensure effective management of waste during the excavation and construction works. • All construction staff will be provided with training regarding the waste management procedures. • All waste leaving site will be reused, recycled or recovered where possible to avoid material designated for disposal. • All waste leaving the site will be transported by suitable permitted contractors and taken to suitably registered, permitted or licenced facilities; and • All waste leaving the site will be recorded and copies of relevant documentation maintained. These mitigation measures will ensure that the waste arising from the construction phase of the development is dealt with in compliance with the provisions of the *Waste Management Act 1996*, as amended, associated Regulations, the *Litter Pollution Act 1997* and the *EMR Waste Management Plan (2015 - 2021)*. It will also ensure optimum levels of waste reduction, reuse, recycling and recovery are achieved and will encourage sustainable consumption of resources.
Cultural Heritage	**Archaeology** All ground disturbances within the proposed development area will be monitored by a suitably qualified archaeologist. If any features of archaeological potential are discovered during the course of the works further archaeological mitigation may be required, such as preservation *in-situ* or by record. Any further mitigation will require approval from the National Monuments Service of the DoCHG. **Cultural Heritage** No mitigation is required.

16.3 OPERATION STAGE

Population & Human Health	No addition mitigations measures are considered necessary.
Biodiversity	- Only native trees and shrubs should be used in the landscaping. - A proportion of the grass areas should be maintained through methods that mimic traditional grassland management (low level grazing and mowing regimes). This will benefit local pollinators. Locally sourced wildflower seed would also be beneficial. - When planting flowers, shrubs and trees native species should be used, ideally from a local source. - Allow some areas to go 'wild' where bramble and scrub, etc. can develop. - Garden plants that have the potential to become invasive must be avoided. - Water features, e.g., attenuation ponds, could be incorporated into the development as additional wildlife features.
Land, Soils & Geology	No significant long-term impact on the soil resulting from the proposed operational phase of the development is predicted. Once the development is completed, risks to the land and soils will be from pollutants deriving from the use of the dwellings and/or from contaminated surface water run-off. The only mitigating measures envisaged during the operational phase are to ensure regular maintenance of SuDS features. Ensuring appropriately designed, constructed and maintained site services will protect the soils and geology from future contamination arising from operation of the developments. In order to minimise the impact of operation on the sites soils and geology the following mitigation measures should be implemented: • The surface water run-off from the development should be collected by an appropriately designed system. This system should ensure that contaminants are removed prior to discharge e.g. via a light liquids separator or by an appropriate treatment train of Sustainable Urban Drainage Systems as outlined in the Greater Dublin Strategic Drainage Study (GDSDS). Any separators and drainage systems should be maintained and operated by the facilities management company (prior to taking in charge by the Local Authority) in accordance with the manufacturers recommendations. • All waste generated by the everyday operation of the development should be securely stored within designated collection areas. These should have positive drainage collection systems to collect potential run off. Operational waste should be removed from site using licensed waste management contractors. • Foul effluent should be collected and discharged from the site via properly constructed sewers to the Public Foul Sewer. • Fuel Storage areas, if required, should be within secured, bunded, designated areas.
Hydrology	**Surface Water** The following mitigation measures are proposed for the operational phase of the proposed development with reference to water: - Water Quality: The SuDS measures in the new development including the green roofs for the apartments, the landscaping on the podiums and the car park permeable paving will improve the quality of surface water run from the site. **Foul Water Drainage** - Dual & low flush toilets and water economy outlets will be used to reduce flows from the development. **Water Supply** - The site water main system will be metered as directed by the Council to facilitate detection of leakage and the prevention of water loss. - Dual & low flush toilets and water economy outlets will all be considered to reduce the water demand.
Noise & Vibration	<u>Additional Traffic on Adjacent Roads</u> During the operational phase of the development, noise mitigation measures with respect to the outward impact of traffic from the development are not deemed necessary. <u>Mechanical Services Plant</u>

Taking into account that sensitive receivers within the development are much closer than off-site sensitive receivers, once the relevant noise criteria is achieved within the development it is expected that there will be no negative impact at sensitive receivers off site, and therefore no further mitigation required.

Inward Noise Impact

External noise can enter rooms within developments through windows, ventilators, walls, roof and doors. In most cases windows provide the main pathway. Mitigation measures has focussed on these building elements to ensure that the insulation is adequate.

The internal noise levels of the proposed development can be controlled with suitable sound insulating facades, including glazing and acoustically attenuated ventilation. However, it is usually more desirable to control noise levels by other means so that windows can be opened for natural ventilation. There shall be no standard passive air vents on any external walls to reduce the breakthrough of external noise. The apartments shall include acoustically attenuated ventilation.
In order to determine internal noise levels within the proposed site a review of the baseline noise survey, operational phase noise and building elements have been undertaken as set out below.

All residential units with facades facing towards the Greenhill Road (R819) and the Airton Road shall have acoustically rated high performing double/ triple pane window sets (inclusive of glazing, frames, seals and openable elements) to prevent the breakthrough of external noise.

The facades highlighted in table below will provided the minimum sound insulation performance for bedrooms and living areas.

Glazing Specification	**Octave Band Centre Frequency (Hz)**						**R_w**
	125	250	500	1k	2k	4k	
Bedroom	21	31	39	41	41	52	40
Living Areas	22	20	26	34	46	39	32

Table 16.1: Sound Insulation Performance Requirements for Glazing, SRI (dB)

The overall Rw 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 8.30 or greater.

On review of the baseline noise survey and operational phase noise, levels across the development site over day and night-time periods require two types of glazing. This glazing will achieve the recommended internal noise levels for day and night-time periods within living rooms and bedrooms.

It is important to note that the acoustic performance specifications detailed herein are minimum requirements which apply to the overall glazing system.

All window sets should be tested for sound insulation in accordance with BS EN ISO 140 and BS EN ISO 717
Under the provisions of the Department of the Building Regulations Approved Document E "Sound" 2014, all residential developments require to achieve acoustic privacy between ad joining residential living areas. The table below provides details sound insulation performance requirements.

Separating Construction	**Airborne sound insulation $D_{nT,w}$dB**	**Impact Sound insulation $L'_{nT,w}$dB**
Wall	53 (min)	-
Floors (Including stairs with a separating function)	53 (min)	58(max)

Table 16.2: Sound Performance levels

Air Quality & Climate	- Thermally efficient glazing systems on all units - Mechanical Ventilation and Heat Recovery (MVHR) systems or equivalent installed in all apartments - Thermal insulation of walls and roof voids of all units - Natural Gas heating in all units - Inclusion of electric car charging points to encourage electric vehicle ownership

Landscape & Visual	Mitigation measures have been incorporated into the design of the development to minimise visual intrusion and adverse landscape impact whilst creating an interesting visual setting. The proposed development provides strong urban edge to the site along Greenhills road, complementing the existing built character of the area. Trees and other planting are proposed at ground level along pedestrian pathways and within main open spaces. This extensive landscaping benefits the future users of the scheme as functional open spaces as well as to soften the visual impact of the proposed development from pedestrian level.
Traffic &Transportation	**Road Network** - The following mitigation measures are proposed for the operational phase of the proposed development with reference to the road network: The development will have a dedicated management company and therefore access to dedicated on-site parking will be controlled by the management team on-site as per the Mobility Management Plan report. **Pedestrian** - The following mitigation measures are proposed for the operational phase of the proposed development with reference to the pe destrian network: Provide signage to indicate the green routes in the vicinity. Provide adequate lighting along pedestrian routes to promote usage in the evenings. Signage of local green routes should be on site to indicate trip time and route to various surrounding locat ions. **Cyclist** - The following mitigation measures are proposed for the operational phase of the proposed development with reference to the cyclist network: Provide adequate bike parking locations on the site for each resident. Provide adequate lighting along cycle routes to promote usage in the evenings Signage of local green routes should be on site to indicate trip time and route to various surrounding locations. **Public Transport** - The following mitigation measures are proposed for the operational phase of the proposed development with reference to the public transport network: Provide access to the bus stops travelling into town via a new pedestrian crossing system.
Material Assets	Mitigation measures for the various aspects of the built environment are outlined within other chapters of the EIAR – chapters 6, 7, 11 and 12. No additional mitigation measures to those outlined in other chapters are considered necessary during the operational phase of the development as it is considered to have a neutral to positive effect on material assets including services and infrastructure.
Waste Management	All waste materials will be segregated into appropriate categories and will be stored in appropriate bins or other suitable receptacles in a designated, easily accessible areas of the site in accordance with the *South Dublin County Council Development Plan 2016 – 2022*. In addition, the following mitigation measures will be implemented: • On-site segregation of all waste materials into appropriate categories including (but not limited to): - Organic/catering waste (including garden waste from landscaping activities). - Dry Mixed Recyclables. - Mixed Non-Recyclable Waste. - Glass. -Waste electrical and electronic equipment (WEEE) including computers, printers and other ICT equipment. - Batteries (non-hazardous and hazardous) - Fluorescent bulb tubes and other mercury containing waste (if arising). - Cleaning chemicals (pesticides, paints, adhesives, resins, detergents, etc.); and • 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. • 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. • All waste leaving the site will be transported by suitable permitted contractors and taken to suitably registered, permitted or licensed facilities; and These mitigation measures will ensure the waste arising from the development is dealt with in compliance with the provisions of the *Waste Management Act 1996*, as amended, and all associated Regulations. It will also ensure optimum levels of waste reduction, reuse, recycling and recovery are achieved.
Cultural Heritage	No mitigation is required.