Chapter 7: Soils, Geology and Waters

7.1 Introduction

This chapter of the EIS assesses the potential impacts, and the likely effects of the proposed development, on the Soil, Geology and Waters (groundwaters and surface waters), on and within the locality of the development site.

This chapter includes assessment of potential impacts related to superficial and solid geology, designated sites, soils, potential contamination, groundwater and associated receptors (groundwater abstractions and private water groundwater supplies) and surface waters and surface water receptors (hydraulically linked designated site).

The objectives of this EIS chapter are as follows;

- Describe the soil, geology and water (groundwater and surface water) baseline;
- Describe the assessment methodology and significance criteria used in completing the impact assessment;
- Describe the potential effects (demolition, construction and operational phases);
- Describe the mitigation measures proposed to address likely significant effects;
- Assess the residual effects remaining following the implementation of mitigation.

This chapter is supported by the following assessments: -

- Appendix 7.1 – Phase 1 Preliminary Risk Assessment (PRA); and
- Appendix 7.2 – Phase 2 Generic Quantitative Risk Assessment GQRA)

Statement of Authority

This chapter has been completed by Mr Frank Macfarlane from O`Sullivan Macfarlane Environmental Consulting. Frank Macfarlane holds a BSc (hons) in Environmental Studies, a MSc in Environmental Management and is a full member of the Institute of Environmental Science.

Consultation

This chapter has been completed in consideration of the following statutory consultee responses, issued during the scoping exercise: -

- DfI Rivers Planning Advisory Unit – Section Reference IN1-18-13805 – Dated 05/12/2018;
- NIEA Natural Environment Division (NED) – Section Reference CB26821-1 – Dated 18/12/2018;
- Shared Environmental Services (SES) – No Reference – Dated 20/12/2019;
- NIEA Land Soil and Air – Section Reference LA06/2018/1137/PAD – Dated 01/04/2019;

- Ards and North Down Borough Council – No Section Reference – Dated 04/04/2019.

7.2 Assessment of Effects

Sensitivity Criteria

The criteria for defining the level of sensitivity is summarised in Table 7.1 below;

Table 7.1: Matrix for determining level of sensitivity

Sensitivity	Examples of Receptors
High	The receptor / resource has little ability to adapt or to change, fundamentally altering its present character, or is of international or national importance.
Moderate	The receptor / resource has moderate capacity to absorb change without significantly altering its present character or is of high importance.
Low	The receptor / resource is tolerant of change without detriment to its character, is of low or local importance.

Magnitude of Effect

The criteria for defining the magnitude of impact is summarised in Table 7.2 below;

Table 7.2: Matrix for determining magnitude of impact

Magnitude of Impact	Criteria for Assessing Impact
Major	Total loss or major / substantial alteration to key elements / features of the baseline (pre-development) conditions such that the post development setting / characteristics will be fundamentally changed.
Moderate	Loss or alteration to one or more key elements / features of the baseline conditions such that post development setting / characteristics of the baseline will be materially changed.
Minor	A minor shift away from the baseline conditions. Change from baseline conditions will be detectable but not material / significant. The underlying characteristics will be similar to pre-development conditions.

Negligible	Very little change from baseline conditions. Change is barely noticed approximating to a "no change" situation.

Significance Criteria

The matrix's for determining impact significance is summarised in Table 7.3;

Table 7.3: Matrix for determining impact significance

Magnitude	Sensitivity		
	High	**Moderate**	**Low**
Major	Major (Adverse / Beneficial)	Major - Moderate (Adverse / Beneficial)	Moderate – Minor (Adverse / Beneficial)
Moderate	Major-Moderate (Adverse / Beneficial)	Moderate – Minor (Adverse / Beneficial)	Minor (Adverse / Beneficial)
Minor	Moderate – Minor (Adverse / Beneficial)	Minor (Adverse / Beneficial)	Minor - Negligible
Negligible	Negligible	Negligible	Negligible

7.3 Baseline Conditions

Sources of Information

The following desktop sources of information were used to describe the baseline conditions at the site;

- Drinking Water Inspectorate (private water supplies database);
- NIEA Waste and Contaminated Land Database;
- NIEA Abstraction Database (groundwater and surface water);
- Ordnance Survey of Northern Ireland (OSNI) historical ordnance survey maps (1830 – 1980`s);
- GSNI Geoindex;

- Central soil map for Northern Ireland (Scale 1: 250,000 – Agri-foods and Biosciences Institute);
- UK Soil Observatory;
- NIEA Natural Environment Map Viewer;
- The Soils of Northern Ireland and Their Environmental Significance, Jordan and Rawlins, Tellus Conference 2007.

In addition to the above-mentioned desktop sources, a field survey / walkover was also undertaken at the site by an environmental engineer from OSM on the 31/08/2018 (discussed in detailed in Appendix 7.1). In response to the Ards and North Down Borough Council Environmental Health Officer consultation a detailed survey of identified areas of potential contamination was carried out; this involved intrusive investigation and is reported on in Appendix 7.2.

Site Description

The development lands are located immediately adjoining the eastern edge of Newtownards, they are bounded by Bowtown Road in the south, Movilla Road in the north, the existing urban area at the Abbots Drive estate to the west and open countryside to the east. Immediately to the north of the site is the housing zoning NS20, which is under development as 'Rivenwood'.

To the south-west on the opposite side of Bowtown Road is the housing development of Greystown Park and Teal Rocks that runs from Bowtown Road to the Portaferry Road on the shore of Strangford Lough, while to the south and south-east lies open countryside forming part of the Area of Outstanding Natural Beauty.

The site is located approximately 600 metres north of the shore of Strangford Lough.

A Site Location Map is presented as Figure A in Appendix 2.

The site is roughly shaped like an inverted Y and is composed of the flanks of a series of drumlins running from south to north, with the open space located on the upper slopes of two drumlins on the western side.

Topographically land levels rise from Bowtown Road where the level is shown on the topographical map as being around 35 metres Ordnance Datum (mOD) to Movilla Road where it is around 51mOD The land comprises a series of 22 agricultural fields, bounded by hedgerows and includes three farm groups and seven dwellings independent of the farm holdings. The farm groups incorporate traditional masonry-built dwellings and agricultural buildings constructed in a range of materials including metal and masonry incorporating tanks and other infrastructure associated with active farming.

The southern arms of the inverted Y are defined by the Ballyreagh Road, which forms the north-western boundary of the western arm and the northern boundary of the eastern arm. This area is relatively flat, here the land is low-lying at the base of the group of three tall drumlins that separate the two arms of the Y. On the south-western arm the level is around 38mOD, while the south-eastern arm south of the Ballyreagh Road varies generally between 33 and 36mOD is with a general fall to the south and east towards Strangford Lough.

Site History

An assessment of the site history was undertaken by reviewing the available historical Ordnance Survey (OS) maps for the site, provided by the Ordnance Survey of Northern Ireland (OSNI).

The OSNI have published a series of historical OS maps for Northern Ireland spanning 1830`s – 1980`s (Historic six-inch series / 1:10,000 Metric Scale Irish Grid 1960`s). A summary of the available OS maps is presented in Table 7.4 and the historical maps are presented within Appendix 7.1 [?].

Table 7.4: Review of Historical OS Maps, Bowtown Road, Newtownards

Map Publication	Summary of Site Setting
1830`s OS Map	In this OS map the site is occupied by agricultural lands and a small number of associated residential / farm dwellings. The lands adjacent to the site are also occupied by agricultural lands. The Movilla Road is present along the northern boundary of the site. A small "Slate Quarry" is present to the north of the site. No significant land use observed.
1850`s OS Map	The land use in the 1850`s OS is similar to the previous OS map, with the site occupied by agricultural lands and a small number of associated residential / farm dwellings. The lands adjacent to the site are also occupied by agricultural lands. The Movilla Road is present along the northern boundary of the site and the Bowtown Road to the south. The slate quarry, previously to the north of the site, is no longer indicated. No significant land use observed.
1900`s OS Map	The land use in the 1900`s OS is similar to the previous OS map, with the site occupied by agricultural lands and a small number of associated residential / farm dwellings. The lands adjacent to the site are also occupied by agricultural lands. The Movilla Road is present along the northern boundary of the site and the Bowtown Road to the south. No significant land use observed.
1920-1939 OS Map	The land use in the 1920`s OS is similar to the previous OS map, with the site occupied by agricultural lands and a small number of associated residential / farm dwellings. The lands adjacent to the site are also occupied by agricultural lands. The Movilla Road is present along the northern boundary of the site and the Bowtown Road to the south. No significant land use observed.

1955- 1975 OS Map	The land use in the 1950`s OS is similar to the previous OS map, with the site occupied by agricultural lands and a small number of associated residential / farm dwellings. The lands adjacent to the site are also occupied by agricultural lands. The Movilla Road is present along the northern boundary of the site and the Bowtown Road to the south. No significant land use observed.

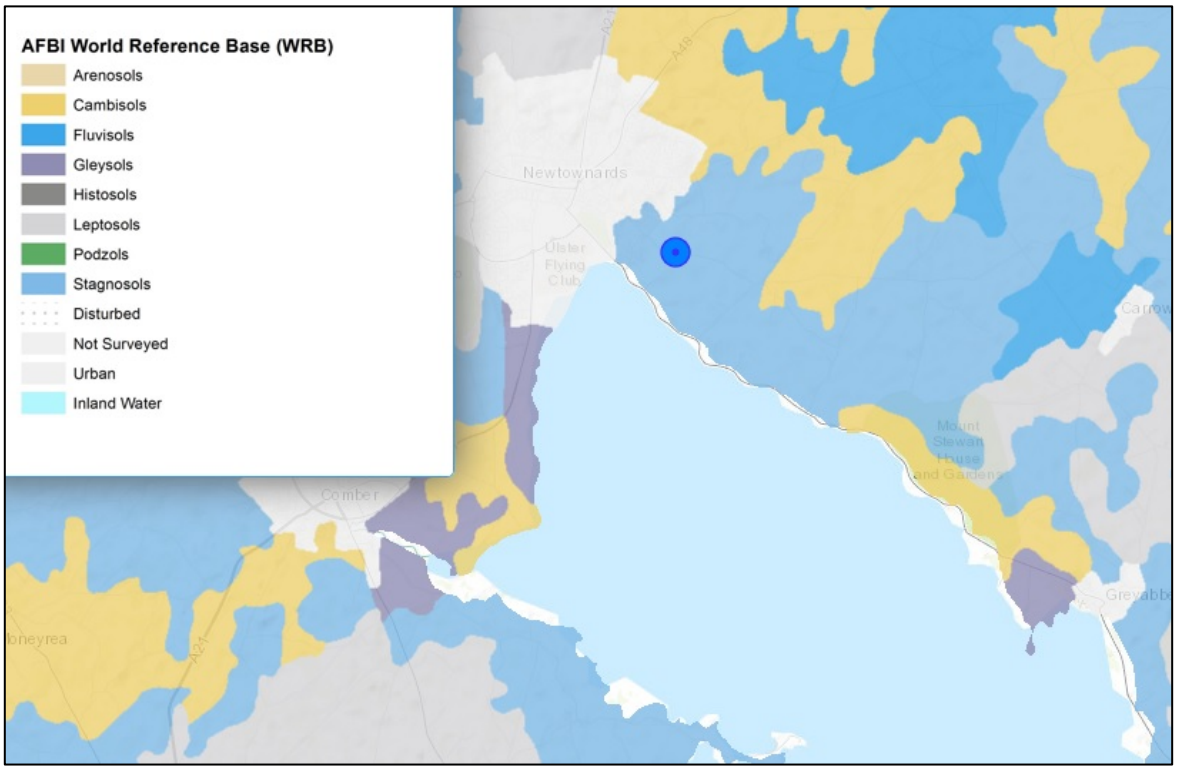
The historical maps have indicated that the development site and adjacent lands have been historically used for agricultural purposes, with the site area primarily occupied by agricultural grassland and a small number of associated residential and farm buildings.

The available OS maps have indicated no obvious on-site land uses of concern. With regards to off-site land uses, a slate quarry indicated close to the north of the site, and this is considered to be the only significant land-uses indicated in the OS maps.

Soils

An extract from the published soil classification map is presented as Figure 7.1 below (Central soil map for Northern Ireland Scale 1: 250,000 – Agri-foods and Biosciences Institute);

Figure 7.1: Site Boundary Map, Lands at Bowtown Road, Newtownards



The mapped soils within the assessment areas consist of Fluvisols.

A Fluvisol in the World Reference Base for Soil Resources (WRB) is a genetically young soil in alluvial deposits. Fluvisols are found on alluvial plains, river fans, valleys and tidal marshes on all continents and in all climate zones. Under natural conditions periodical flooding is fairly

common. The soils have a clear evidence of stratification. Soil horizons are weakly developed, but a distinct topsoil horizon may be present.

A review of the soil composition at the site and surrounding area was undertaken, following a review of the following published information;

- The Soils of Northern Ireland and Their Environmental Significance, Jordan and Rawlins, Tellus Conference 2007;

The soil composition is summarised in Table 7.5 below;

Table 7.5: Review of Historical OS Maps, Bowtown Road, Newtownards

Item	Description
Soil Type	Gleys
Hydrology of Soil Type	Poorly drained gley soils
Agricultural Land Classification	3A - good quality agricultural land
Soil texture	0-20% sand 0-20% clay 0-20% silt
pH	4.9-5.4

Based on Table 7.5, the soils consisting of Fluvisols are considered to be of **Moderate to High** sensitivity.

Agricultural Productivity

The site is mainly occupied by grassed agricultural fields, used for the grazing of sheep and cattle. The land is designated as 3A in terms of agricultural land classification and is described a good quality agricultural lands.

Made-Ground

A review of the site setting, undertaken as part of the completed Phase 1 PRA, indicated that the site was mainly occupied by agricultural fields, with small number of associated residential dwellings and farm buildings. A review of the historical use of the site also indicated that the site was historically used for agriculture with no significant land use within the site boundary. It

is therefore considered that there is no significant presence of made-ground / infill within the site boundary, with most of the site greenfield.

There are potentially some small localised occurrences of made-ground, likely thin, associated with the farm buildings, however these would be considered to be Negligible amounts given the scale of the overall development

Based on Table 7.5, made-ground is considered to be of **low** sensitivity.

Superficial Geology

As shown in Figure 4 of Appendix 7.1, the mapped superficial deposits at the site consist of predominantly boulder clay (glacial till), which is mapped as covering most of the site. Within the boundary of the site small areas of bedrock at or near to the surface are also mapped.

The presence of mapped bedrock at or near to the surface would indicate that superficial deposits across the entire site are likely to be relatively thin, where present.

Based on Table 7.5, the superficial deposits are considered to be of **low** sensitivity.

Bedrock Geology

As shown in Figure 5 of Appendix 7.1, the mapped bedrock geology at the site and the adjacent lands consists of the Gala Group Sandstone.

The published drift geology map (detailed in the previous section) indicated mapped bedrock at or near to the surface in portions of the site and therefore bedrock is considered likely to be at a shallow depth across most of the site. No exposed bedrock was encountered during the site walkover undertaken by OSM.

Based on Table 7.5, the bedrock geology is considered to be of **low** sensitivity.

Hydrogeology

The underlying boulder clay are not considered to represent a potential superficial aquifer, particularly given the likely thin layer of the deposits within the site boundary. Small volumes of shallow groundwater may be encountered within thicker and more permeable lenses within the drift deposits, but volumes would be very modest and would not represent a significant superficial aquifer at this location.

The site is located on the Gala Group bedrock. The Northern Ireland GSNI/NIEA aquifer classification reports this bedrock type as an aquifer with low productivity potential where groundwater moves by fracture flow Bl(f). Where the upper bedrock is more weathered and fractured, enhanced flow can occur. Groundwater flow would be local, discharging to local

watercourses, with little potential for wider regional flow. Whilst groundwater can be abstracted from the bedrock, supply volumes are generally very modest.

The potential flow direction in the bedrock aquifer is unconfirmed, but it is likely to flow in a southerly gradient, in line with the surface land gradient.

The site is in an area mapped under the Northern Ireland regional groundwater vulnerability screening layer as Class 4 (high risk) on a scale from 1 to 5 where 1 is lowest vulnerability and 5 is highest vulnerability.

The high vulnerability rating relates to likely presence of a thin layer of drift deposits and / or the bedrock at or near the surface at the site, therefore offering little or no protection to the bedrock aquifer.

Based on Table 7.5, the shallow / superficial aquifer, if present is considered to be of **low** sensitivity.

Based on Table 7.5, the bedrock aquifer, is considered to be of **moderate** sensitivity.

Hydrology

The closest surface water feature to the site relates to a small watercourse present within the southern boundary of the site, known as the Bowtown Road Stream. The watercourse enters the site from the adjacent residential housing area to the west of the site (culverted), and it flows in a southerly direction along the Ballyreagh Road, crossing the Bowtown Road (location and direction of flow mapped in Figure 6 of Appendix 7.1)

In addition to the Bowtown Road Stream, a second smaller watercourse, open and undesignated, is located in the eastern portion of the site.

Both watercourses are considered to be hydrologically linked to Strangford Lough, which is located ~600m to the south of the site.

Based on Table 7.5, the hydrological setting of the site is considered to be of **moderate - high** sensitivity. This is due to the identified watercourse being hydrologically linked to a number of significant designated sites, detailed In the following section.

Designated Areas

The site is either within, or hydrologically linked, to several designated sites now summarised;

- Strangford and Lecale Area of Outstanding Natural Beauty (AONB) – The site is partly within Strangford and Lecale AONB;

- Strangford Lough Ramsar Site – The site is hydrologically connected to Strangford Lough Ramsar Site which is an area of wetland of international importance;
- Strangford Lough Special Protection Area (SPA) - The site is hydrologically linked to this SPA, which is of international importance, and is Northern Irelands most important coastal site for wintering waterfowl and is important for breeding terns;
- Strangford Lough Special Area of Conservation (SAC) - The site is hydrologically connected to this SAC which is of international importance due to the high diversity of the habitats / species it supports;
- Strangford Lough Part 1 Areas of Special Scientific Interest (ASSI) - The site is hydrologically connected to this ASSI which is of national importance due to the high diversity of habitats / species it supports.

No designated geological sites are located within the assessment area, or within the vicinity of the site.

Groundwater Abstractions and Private Water Supplies

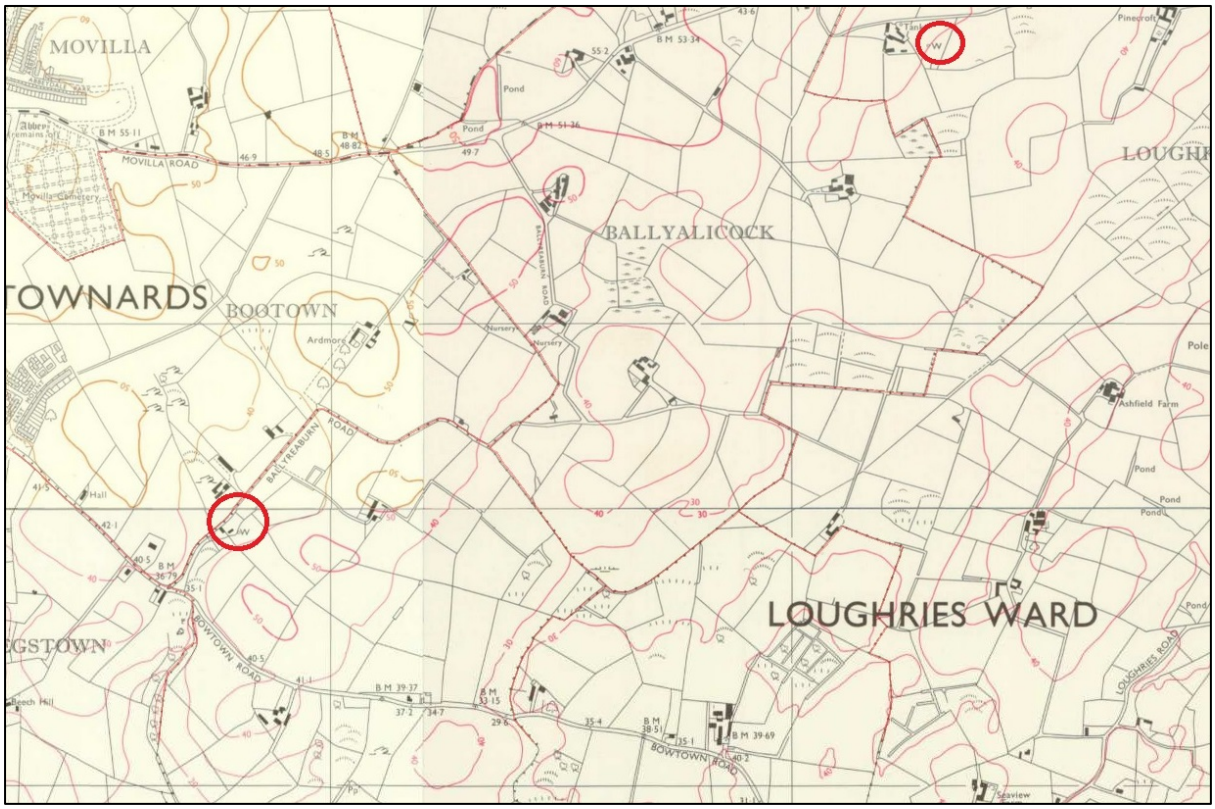
A search of the NIEA Abstraction Database (both groundwater and surface water) and the Drinking Water Inspectorate (DWI) private water supplies database, undertaken as part of the Phase 1 PRA (Appendix 7.1) has indicated no known groundwater abstractions within a 1km radius of the site.

These searches were reviewed again in October 2020 and no further / additional groundwater abstractions were observed, either on the NIEA database or private abstractions with the DWI.

Several the properties in the development area were inspected and discussions with the landowners indicated that the properties were serviced by mains water supply. Given the urban setting, and scale, of the adjacent residential properties it is also considered that these were serviced by mains water supply.

In addition to this, a review of the historical OS maps was undertaken to identify any historical wells either within or close to the development site. 2 No. wells were observed in the 1980`s OS maps, presented below as Figure 7.2;

Figure 7.2: Historical Borehole Map, Lands at Bowtown Road, Newtownards



An inspection of both the mapped wells was undertaken by OSM on the 12/10/2020. Both wells were no longer present and both properties were confirmed to be serviced by mains water.

Overall, it is considered that there are no groundwater abstraction associated with the development area or the adjacent lands.

Mineral Extraction

There are no records of any known historical or current mineral extraction within the assessment area.

Contaminated Land

An outline Conceptual Site Model (CSM) was developed in the Phase 1 PRA (Appendix 7.1) and is now summarised. This was supplemented by further investigation and a GQRA conducted at identified locations within the development site.

Source

The PRA has indicated that the site has historically, and currently, been occupied by agricultural grassland and a small number of associated residential dwellings and farm buildings. The only obvious sources of contamination associated with the historical and current

land use within the site boundary relates to a number of AST`s, used for residential heating oil and the refuelling of farm machinery. The tanks ranged in size from small residential tanks to larger commercial sized tanks and all observed tanks were unbunded. These tanks have the potential to have caused land contamination. It is anticipated that these tanks will be removed as part of the site development works.

The contaminants of concern associated with the AST`s, in relation to soil and / or groundwater, are now summarised.

- Hydrocarbons (aliphatics and aromatics), including BTEX compounds and MTBE;
- Polycyclic Aromatic Hydrocarbons (PAH`s);
- Heavy metals;
- Volatile Organic Compounds (VOC`s);
- MTBE and BTEX compounds.

Volatile vapour could also be present, associated with any potentially impacted / contaminated shallow groundwater (if any present).

It was noted during the site walkover that one farm shed / building was constructed with asbestos roofing. The roof appeared intact and to be in good conditions and there were no obvious fragments / asbestos on the surface surrounding the building. It is recommended that the asbestos is properly removed by a specialist contactor prior to demolition. It is also recommended that an asbestos survey of the site is carried out prior to demolition works and any additional identified asbestos removed. Following the completion of the asbestos survey, and the removal of any identified asbestos by a specialist contractor, the risks posed by asbestos will be low. Therefore, any risk associated with asbestos have not been considered any further.

In terms of off-site sources of contamination information, the historical maps indicated that the adjacent lands were also historically primary agricultural grassland, and most recently residential and agricultural. A small number of nearby sites were indicated in the historical maps and the NIEA WCLD, however given the distances involved to the closest known site (former slate mine at a distance of 175m) it is considered that there are no significant off-site sources.

In summary, the only significant sources of contamination associated with the site relate to the identified AST`s. As previously mentioned, this is subject to the suitable surveying of the site for asbestos and the removal of this material by a specialist contractor.

Pathways

The site development plan includes residential properties, with gardens. Human health pathways are considered to potentially be present in the gardens and soft landscaped areas of the site relating to direct dermal contact, ingestion and inhalation of dust / fibres.

Inhalation of vapours from potentially contaminated shallow groundwater are considered to be a potential human health pathway.

A potential human health pathway which should be considered is human consumption of contaminated groundwater. The setting of the site is such that the shallow groundwater within the upper superficial deposits in this locality is not considered to be a groundwater resource and as such would not be utilised for drinking purposes. Additionally, the bedrock aquifer is not considered to be a significant aquifer with the search of the NIEA database and the DWI response not indicating any groundwater abstractions within a 1km radius of the site. Thus, the pathway of human consumption of contaminated groundwater is not considered to be significant, at this locality.

The potential environmental pathways relate to infiltration into contaminated soils and subsequent leaching of pollutants into the shallow groundwater, (if any present). Shallow groundwater can then move laterally towards surface waters or downward into the underlying bedrock aquifer. Additionally, shallow groundwater can move laterally from off-site sources towards the site.

Receptors

The human health receptors, associated with the identified human health pathways, are the future site users.

In terms of environmental receptors, the shallow groundwater, if present, is not a recognised groundwater resource. At this location, the risks associated with the shallow groundwater are considered to be low. The bedrock is mapped as being Gala Group and given its low productivity it is not considered to be a significant receptor.

With regards to surface water receptors, associated with lateral migration of contamination in the shallow groundwater, the closest known AST to the watercourse was located at a distance of ~460m. Given that the watercourse is located in an area of the site which is agricultural grassland and given the distance involved the identified source (closest AST) the potential risks to the identified watercourse would be considered to be very low.

Summary of Outline CSM

The outline CSM has identified the following significant pollutant linkage associated with the site, both relating to human health:

- **Human Health:** Direct dermal contact, ingestion and inhalation of contaminated soils by future site users;
- **Human Health (future site users)**: Volatile vapour, associated with potentially contaminated shallow groundwater, and ingress site buildings and subsequent inhalation.

A summary of identified significant pollutant pathways is presented in Table 7.6:

Table 7.6: Outline CSM and Risk Rating, Bowtown Road, Newtownards

Source	Pathway	Receptor	Contaminants of Concern	Risk Rating
AST`s within the site boundary	Direct dermal contact with contaminated soils	Future site users	Hydrocarbons BTEX compounds PAH`s MTBE VOC`s Heavy metals	**MODERATE**
Contaminated shallow groundwater because of AST`s	Ingress and accumulation of volatile vapour into site buildings and subsequent inhalation	Future site users	Volatile vapour	**MODERATE**

The outline CSM did not indicate any significant environmental pollutant linkages associated with the site, with regards to land contamination, with both identified pollutant linkages relating to human health.

Further to the Phase 1 PRA assessment and in line with its recommendations, a Phase 2 Generic Quantitative Risk Assessment (GQRA) was undertaken at the site between June-August 2020. The GQRA report is provided as Appendix 7.2. The GQRA assessment comprised a targeted intrusive investigation around the AST's identified in the PRA, including the collection and testing of soil and groundwater samples. The assessment concluded that there was no indication of any contamination impact at 6 of the 7 AST locations. At the remaining AST, it was concluded that viable contaminant linkages with respect to risk to human health existed and that an appropriate remediation strategy was required to mitigate the identified risk. The GQRA report includes a Remediation Strategy to address the identified local impact, concluding that supervised removal of the localised 'hotspot' of contaminated soil and confirmation that retained soils are clean would be appropriate to mitigate the identified risk to human health.

7.4 Impact Prediction – Construction, Demolition and Operational Effects

Demolition Phase

Demolition works required for the development are minimal and simply involve the demolition of three farm groups and an individual residential dwelling. All the properties belong to landowners within the zoned lands. In total five dwellings and 16 agricultural buildings will be demolished.

The dwellings are of traditional construction in a rural area, comprising of rendered brick or block work walls and slated or tiled roofs. None of the buildings are listed. The assessment of effects of the demolition works based / subject to the following being completed pre-demolition;

- Pre-demolition asbestos surveys will be undertaken;
- In line with the recommendations of the contaminated land assessment, implementation of the recommended remedial strategy.

There are no demolition works within proximity to either of the identified watercourses.

Based on the above pre-demolition and remediation works being satisfactorily completed, the potential magnitude of the impact from the demolition works is considered to be **Negligible** and the overall impact significance is considered to be **Negligible .**

Construction and Operational Phase

When assessing potential impacts from the Proposed Scheme, construction and operational phases have been considered together, as the majority of construction impacts (such as earthworks and altered site surface run-off) will be permanent and extend through operation. Where differences are predicted between construction and operation, these have been assessed for each phase in turn.

There are several ways that the development may impact on geology, soil or water features during construction and operation, summarised below;

- Physical disturbance of soils;
- Erosion and transport of soils by surface run-off;
- Changes to groundwater levels, for example, by forming lower permeability barriers or higher permeability preferential pathways;
- Groundwater and surface water interaction;
- Run-off into surface water;
- Movement of sediment within surface watercourses;
- Deposition of sediment onto soils adjacent to watercourses during flood events;

- Direct release of contaminants to soil and surface water;
- Leaching of contaminants from soils into groundwater;
- Migration of contaminants in groundwater;
- Migration of contaminants (in water and/or sediment) in surface water.

A detailed description of the proposed works required during the construction phase is provided in Chapter 2 of the EIS (Description of Development) and a summary is now presented;

- Establishment on site, including erection of protective fencing around retained features and introduction of silt containment, creation of compounds and stores, setting out of works and surveying, marking out and protection of existing services and erection of temporary fencing to protect works;
- Site clearance, demolition;
- Excavation and filling, involving excavation of suitable material from within site and re-use on site to form appropriate levels and development areas for housing, non-residential developments, open space and pedestrian/cycle paths, where applicable;
- In the case of both the distributor and residential roads, this will be bulk excavation and filling on the line of each road;
- Construction of drainage services within the road bases;
- Construction of subsidiary services to each phased housing area;
- Construction of sub-base to carriageways followed by kerbing;
- Installation of telecommunication services, electricity cables, gas mains, water mains and street lighting within the roadways;
- Construction of road base to carriageways followed by laying of bituminous basecourse;
- Trimming of fill to footways followed by construction of sub-base to footways and laying of bituminous base course;
- Deposition of topsoil to verges;
- Landscaping on the residential access roads;
- Construction of housing and non-residential development;
- Creation of open space and pedestrian cycle paths,
- Construction of hard standings, car parking and service areas;
- Landscaping of open space, pedestrian/cycle routes, housing areas and car parking;
- Reinstatement of site compound, additional working areas; and
- Removal of site asset protection measures.

A summary of the determined sensitivity for soil, geology and water receptors is presented in Table 7.7 below;

Table 7.7: Summary of Sensitivity

Receptor Type	Description	Sensitivity
Made-ground	Potentially small isolated areas of made-ground. No indication of any site wide presence.	Low
Soil	Fluvisols	Moderate to High
Geology	Superficial Deposits - Boulder clay	Low
	Bedrock – Gala Group	Low
Groundwater	Superficial Aquifer – No significant superficial aquifer noted. Possible low volumes of shallow groundwater in more permeable lenses of the boulder clay	Low
	Bedrock aquifer - low productivity potential however interaction with nearby surface waters can be expected	Moderate
Surface Water	2 No. surface waters located within he site boundary which are hydrologically linked to a number of regional and internationally designated sites	Moderate - High

Soils

For soils, the magnitude of a potential impact is determined predominantly in terms of the extent of loss of soil or loss of soil function. Typical activities and pathways for soil include:

- A direct change in soil volumes (e.g. excavation and disposal elsewhere);
- A direct change in soil area (e.g. covering soils with hardstanding);
- A direct change in the physical properties of soil (e.g. compaction);
- Changes in soil and water interactions (e.g. erosion or leaching);
- Increased potential for geomorphological instability or activation of existing geomorphologically unstable features; or
- Introduction of contaminants into the soil.

The soil present at the site will likely be stripped back and reused within the development. It is unlikely that any soils will be removed from the site. The soils will be utilsed as surfacing of all soft landscaped areas.

The reduction in extent of these deposits as a result of the construction activities is considered to be of **Minor** magnitude, because of their widespread occurrence in the region and therefore minimal percentage loss. These deposits will also to re-used within the development. As a result, the overall impact significance is considered to be **Negligible** for both construction and operation.

Potential sources of contaminants to the soils will be introduced during the construction process (oil, cements, chemical and wastes) and these could be released to the soil (accidental spills, accidents etc). Depending on the size and nature of the spillage, and the physical properties of the soil (including soil porosity, soil potential for pollutant sorption, and soil saturation), this could lead to contaminant migration and impacts at some distance from the site. The likelihood of leaks and spills occurring is higher in the main storage, refuelling and construction areas than site wide. Refuelling of the fuel bowsers or vehicles within the construction site will only be undertaken within designated refuelling areas. All fuel tanks will be located within secondary containment, which will form an impermeable bund, sufficient to contain at least 110% of the stored volume. The impact of a fuel spill on soil quality and condition may recover through natural processes and the impact is likely to be medium term.

Any potential contamination to soils during construction works is considered to likely be localised and likely to be minor in extent and is therefore considered as a **Negligible** magnitude and **Negligible** significance.

Accidental damage to existing utilities as a source of contamination to the soil and waters is not considered to be significant, given the largely greenfield nature of the development site. This is likely to be minor in extent and is a **Negligible** magnitude and **Negligible** significance.

Geology and Hydrogeology

Superficial deposits (boulder clay) of low sensitivity within the study area are likely to be impacted by the construction of all widenings, roadways, foundations, cuttings, access tracks, SuDS basins, drainage, structures, etc as part of the development. The reduction in extent of these deposits as a result of the construction activities is considered to be of **Minor** magnitude, because of their widespread occurrence in the region and the country, and therefore minimal percentage loss. There is also the potential for these deposits to be re-used within the Proposed Scheme. As a result, the overall impact significance is considered to be **Negligible** for both construction and operation.

Bedrock of **Low** sensitivity may be intercepted by underground works / excavations, particularly given the potential for bedrock to be at or close to the surface in areas of the site. Due to the widespread occurrence of this rock type across Co. Down, these works are expected to represent a **Minor** magnitude of impact on the solid geology, resulting in an impact significance of **Minor** for construction and operation. There is also the potential for excavated rock deposits, if encountered, to be re-used in the Proposed Scheme.

In the absence of any significant superficial aquifer at the site, any shallow groundwater (if present) is considered to have a **low** sensitivity and the construction activities are considered to be of **Minor** magnitude, resulting in an impact significance of **Minor.**

The bedrock aquifer is considered to be of **Moderate** sensitivity. It is considered that groundwater within the bedrock aquifer will not be intercepted as part of the development works, however construction related activities have the potential to introduce surface contaminants that could impact the bedrock aquifer, particularly if areas of the superficial deposit are to be stripped back and the bedrock exposed. Based on the temporary nature of this risk, an impact significance of **Minor** is considered appropriate, with a resulting impact significance of **Minor.**

It is considered that no significant dewatering works will be required as part of the construction works. Piling will also not be required for the site. Dewatering and piling have therefore not been considered as pathways, with regards to risk to groundwater, and surface water (via lateral migration of contaminants).

Surface Waters

Potential impacts to the surface watercourses are likely to arise primarily in the Construction and Pre-Commissioning Phase through potential spills and leaks, discharges and disturbance of soil and sediment leading to impacted surface water run-off.

During the construction phase, fuels and chemicals will be stored and used on site. The storage facilities proposed include embedded mitigation as described in the CEMP (Chapter 17). Waste materials will be temporarily stored on site prior to disposal. Accidental release of pollutants to surface water may occur due to leaks or spills, either by entering watercourses directly, or through leaching from impacted soil to groundwater and subsequent migration in groundwater. The majority of leaks and spills are likely to be relatively small in volume. Long term potential impacts on surface waters are likely to be attenuated through natural processes such as dilution and degradation. Short term impacts may be more significant. Depending on the size and nature of the spillage, this could cause water quality or sediment quality impacts which affect elongated stretches of the watercourse and at some distance downstream from

the site and it is therefore a potential impact of **Moderate** magnitude and **Moderate-High** significance for the surface waters.

Temporary alterations to the surface water flow volumes and rates may occur as a result of trenching, land clearance, access road construction, development of the temporary construction areas and vehicle movements. It is likely that surface water run-off will temporarily increase in the construction areas due to the removal of vegetation, compaction of bare soils and possible exposure of relatively impermeable bedrock and / or boulder clay. Increased sediment entering the surface watercourses could result from land clearance, excavation works and erosional processes (particularly on soil stockpiles and on access roads close to gullies until road drainage is established). The eroded sediment may also have a high nutrient or contaminant content which can contribute to the enrichment and contamination of downstream waters. Impacts on surface water quality will typically be of short duration (i.e. during and immediately after a storm event). It is considered that the watercourses will be able to recover relatively rapidly through natural processes; timescales are likely to be weeks to months depending on weather and the flow regime.

The impacts associated with land clearance and earthworks at the site are likely to be short to medium term and of **Moderate** magnitude and **Moderate - High** significance prior to mitigation for the watercourses

7.5 Mitigation

Demolition Phase

As previously mentioned, demolition works are minor and prior to the start of demolition works an asbestos survey and contaminated land assessment (targeted to the identified sources, not site wide) will be completed. Remedial measures if required, will be completed, and all identified fuel storage tanks will be removed from site following best practice, with all underlying soil and groundwaters tested.

The potential magnitude of the impact form the demolition works is considered to be **Negligible** and the overall impact significance is considered to be **Negligible.**

Construction and Operation Phase

Potential impacts from site works to soil, groundwater, surface water and human health have been identified. The significance of these impacts has been assessed based on the sensitivity of each receptor and the expected magnitude of the potential impacts.

Where impacts are identified as being significant, mitigation measures will be required to minimise the impacts or reduce the likelihood of an impact occurring. For the purposes of this

assessment, significant impacts are considered to be impacts above minor significance, summarised in Table 7.8 below;

Table 7.8: Summary of Potential Significant Impacts

Receptor	Risk	Significance
Surface Waters	Impact and / or contamination of surface waters from site activities (includes contaminants relating to the construction works and sediment from soil movement and earthwork's)	Moderate to High Based on hydrological link to identified designated sites

In order to minimise the potential effects during the construction phase of the development, in line with the identified risks / pathway detailed in the previous section, a Construction and Environmental Monitoring Plan (CEMP) has been prepared and is presented as Chapter 17 of the EIS.

The construction contractor will ensure that site personnel are trained to be familiar with the current legislation and to comply with the requirements of the CEMP.

Specific mitigation measures required to maintain soil quality during the Construction and Pre-Commissioning Phase include spillage prevention, bunding and restrictions near drains and watercourses, to avoid impacts. Materials will be stored, where practicable, with secondary containment and a full method statement to address construction risks and avoid impacts.

Activities near to drains and sensitive soil will be controlled appropriately and in accordance with best practice to avoid adverse impacts.

There will be dedicated plant and vehicle refuelling areas within the construction sites, which will be situated away from surface waters, groundwater and surface water drains. Secondary containment will be provided by forming an impermeable bund (i.e. a wall) around the refuelling area to provide containment in the event of a spill or rupture. Storage tanks and secondary bunding will be sufficient to contain at least 110% of the volume of fuel being stored.

Refuelling will only take place in a designated site compound (outside buffer zone) and on hard-standing, to prevent contamination into the underlying strata. The compound will be set up in a location on the up-gradient boundary of the site (western portion of the site). The compound will not be located on the down-gradient boundary of the site or within the 10m buffer zone.

Fuel for plant will be stored in a bunded locked fuel bowser in the site compound and will be constructed in line with the recommendations provided in PPG 1, PPG 2 and the Control of Pollution (Oil Storage) Regulations (Northern Ireland) 2010.

Plant will be tracked to the fuel bowser for re-fuelling, which will be located away from any surface water drainage. Drip trays or nappy sacks will be used during the refuelling process. Petrol will be stored in 5ltr plastic proprietary marked fuel containers and stored in locked steel containers within the site compound, funnels or re-fuelling hoses will be used for re-fuelling plant.

A spill kit will be kept at the site compound within easy access to the fuel storage. Care is to be taken during deliveries to ensure that no over filling occurs.

Chemicals and materials will be clearly labelled and Material Safety Data Sheets (MSDS) will be displayed at point of storage. Chemical and material storage areas will be well maintained, neat and tidy, with adequate inventory control. Chemical storage will be weather-proofed and on bunded hardstanding. The bunds and hardstanding will be impermeable and resistant to the materials being stored.

No stockpiles will be located within 50m of a watercourse. Stockpiles will generally be less than 2 m high. Stockpiles will not be located on unstable slopes. Stockpiles will be covered to prevent erosion as required. Run-off collection and management systems shall be used to remove pathways which enable the entrained sediment to enter watercourses.

Surface water runoff control measures for earthworks will be undertaken where required and will generally comprise infiltration and cut-off trenches, formed at suitable locations to intercept flows and reduce the velocity and sediment content. The gradient of the trenches will be as flat as possible to avoid high velocities during storm events. Throughout the lifespan of the site works inspection and cleaning of blockages within the site drainage will be carried out.

The timing of construction activities in the development site will be important in limiting the potential for adverse impacts to surface waters. Where possible, construction in the immediate vicinity of watercourses will be carried out during dry weather, when the nearby watercourses have low or no flow and surface water runoff will be minimal.

Natural drainage patterns, in particular in the vicinity of surface water crossings will, where necessary, be maintained. Natural flows will, where necessary, be maintained. Existing artificial drainage to be diverted maintaining gravity flows.

Direct discharge of surface run-off to watercourses will be avoided as far as possible. Surface water runoff control measures for earthworks will generally comprise infiltration and cut-off

trenches, formed at suitable locations to intercept flows and reduce velocity and sediment content. Ditches and lateral drains alongside the construction works areas (including pipeline trench activities, foundations and access roads) will be appropriately sized. Drainage systems shall be generally designed to be gravity controlled to avoid disturbance of settled silts. Drainage systems will be aligned with natural drainage patterns.

Prior to the start of site works, a silt curtain will be installed along the entire length of both watercourses within and adjacent the site. This will ensure a formal boundary is placed between the site / site works and the adjacent watercourses. The purpose of this membrane will be to prevent any sediment / silt associated with run-off from the site entering the watercourse.

The silt curtain will be inspected prior to the start of site works and on a daily basis throughout the duration of the construction works. Should any defects in the silt curtain be observed, works will immediately cease until repairs have been made.

The silt curtain will be installed at the outset of the site works, before soil stripping has begun (if required) and vehicles start tracking over the site.

A 10m buffer zone will be in operation between the identified watercourses and the following operations;

- Refuelling of vehicles;
- Storage of fuel, oil and chemicals;
- Stockpiles of materials and / or waste arising;
- Washing areas;
- Concrete Mixing;
- Any other activities likely to present a contamination risk to the adjacent watercourse.

None of the above-mentioned operations will be permitted to be undertaken within the 10m buffer zone. The 10m buffer zone will be marked out on the surface of the site, at the start of the construction works and all site workers fully informed on the purpose of the buffer zone.

7.6 Assessment of Residual Effects

The assessment of the significance of residual impacts assumes full application and effectiveness of the mitigation measures and the implementation of the CEMP.

Following implementation of the proposed mitigation measures, potential impacts in relation to surface waters for the proposed development will be avoided, reduced or off-set as far as is practicable. Residual impacts are those that remain once the measures have been

implemented and are considered that the significance of the residual impacts will be **Negligible to Minor** (relating to surface water).

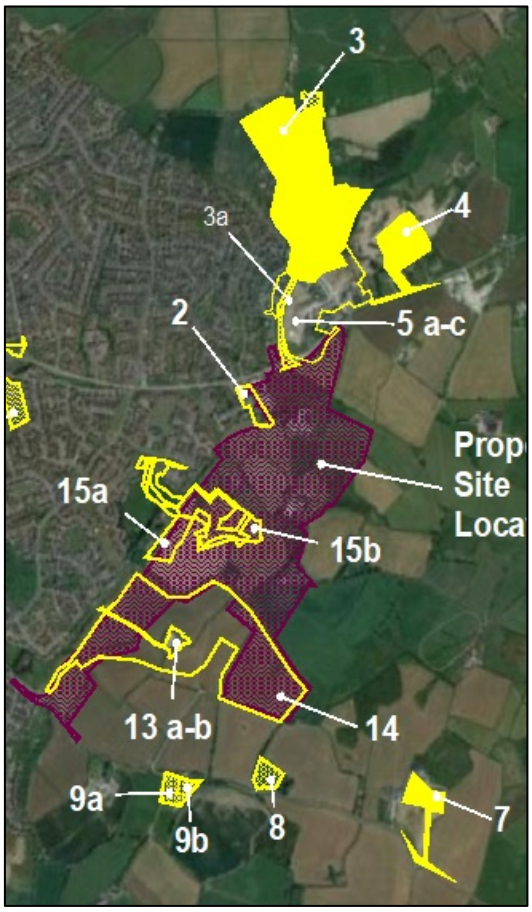
The impacts to soils, groundwater and geology are also considered to remain **Minor** to **Negligible** (pre-mitigation) with no significant additional mitigation required (to those already specified for protection to surface waters).

7.7 Cumulative Impact Assessment

The following planned developments, located in proximity to the site (within a 350-400m radius), have been identified and have been considered / assessed with respect to the potential for cumulative impact.

The site locations are presented in Figure 7.3 and full details of the sites and proposed developments, application reference numbers, descriptions etc is presented in 4.1.3 of the ES.

Table 7.3: Nearby Development Sites, Bowtown Road, Newtownards



- **Sites 3 and 3a** – Granted residential housing schemes 185 No. and 8 No. units per site, located on lands to the east of 1-11 Old Forge Avenue 2-8 and 17-19 Old Forge Drive and 110b 110c and 110d Movilla Road south of 110a Movilla Road west of 112 Movilla Road Wright Waste Management Ltd. and 124a Movilla Road and north of First Street Rivenwood and First Avenue Rivenwood Newtownards. This a development of a greenfield site located within a similar hydrogeological setting to this application. The majority of surface water will be managed at source and allowed to infiltrate to the underlying geology or be taken up by plants. Foul water management and potable water supply are to be by connection to public utility and drainage network. No long-term abstraction of groundwater is associated with the development. Risks of short-term impact on water quality during the construction phase are to be suitably mitigated through relevant local water management and pollution prevention measures. This site is at significant distance and up-gradient from the application site. No adverse cumulative impacts identified;
- **Site 4** – Small extension to existing commercial unit. Scale of development is such that no adverse cumulative impacts identified;
- **Sites 5a – 5c** – Granted development for >100 residential units at Rivenwood. This a development of a greenfield site located within a similar hydrogeological setting to this application. The majority of surface water will be managed at source and allowed to infiltrate to the underlying geology or be taken up by plants. Foul water management and potable water supply are to be by connection to public utility and drainage network. No long-term abstraction of groundwater is associated with the development. Risks of short-term impact on water quality during the construction phase are to be suitably mitigated through relevant local water management and pollution prevention measures. This site is at significant distance and up-gradient from the application site. No adverse cumulative impacts identified;
- **Sites 15a and 15b** – Permission refused and therefore considered not to be significant. No adverse cumulative impacts identified;
- **Sites 9a and 9b** – Single residential unit and detached garage at 87 Bowtown Road. Scale of development is such that no adverse cumulative impacts identified;
- **Site 7** – Extension / alteration of existing residential dwelling at 88 Bowtown Road. Scale of development is such that no adverse cumulative impacts identified;
- **Sites 13a and 13b** – Barn conversion to 3 No. residential dwellings and 1 No. new single residential dwelling, lands at 17 Ballyreagh Road. Scale of development is such that no adverse cumulative impacts identified;
- **Site 14** – Application withdrawn and therefore considered not to be significant. No adverse cumulative impacts identified;

Overall, there are no cumulative, direct or indirect, impacts in respect to land and soil.

Chapter 8: Population (Socio-Economic)

8.1 Introduction

Statement of Authority

The Socio-Economic Impact Assessment (SIA) was prepared by Pragma Planning & Development Consultants Limited, Chartered Town Planners and Chartered Surveyors. It followed the methodology set out in "Methods of Environmental Impact Assessment" (4th Edition) Therivel/Woods.

Introduction

Socio-Economic Impact Assessment is an assessment of the effects of a project on people and population and has been defined as: -

> *"..the systematic advanced appraisal of the impacts on the day to day quality of life of people and communities when the environment is affected by development…" Bowles 1981*

It has also been defined as: -

> *"…the consequences to human populations of any public or private actions that alter the ways in which people live work play relate to one another, organise to meet their needs and generally cope as members of society." Interorganisational Committee on Guidelines and Principles for Social Assessment 1994*

In short, Socio-Economic Impact Assessment is the assessment of the people impacts of development i.e. it seeks to identify the impacts on people and who benefits and loses.

The project under assessment is a residential development of 675 units and associated landscaping and highway works, which is located on a 43 hectare (106 acres) site at Ballyreagh Road/Bowtown Road, Newtownards comprised of the NS19 residential zoning and the NS43 open space zoning in the adopted Ards and Down Area Plan 2015 (ADAP). The total scheme development is planned to take approximately 10 years to complete and will be undertaken in a series of phased development segments. It is envisaged that the scheme may create employment for a maximum number of 90 people per annum during the lifetime of the

construction operation. Once complete, the proposed development will yield a projected population of approximately 1,627 [1] people.

The site is located within the existing development limit of Newtownards as defined by the ADAP. The site is partially zoned for housing in ADAP, the key site requirements of which give a range of residential densities up to 25 dwellings per hectare, the figure of 675 units that the work is based on is derived from a density towards the lower end of the range in the plan.

8.2 Methodology

The Approach

The methodology used was derived from Methods of Environmental Impact Assessment and encompassed a sequential approach involving: -

- Establishing the baseline socio-economic data
- Determining and predicting impacts
- Drawing conclusions and proposing mitigation

Baseline Information

A first principle baseline was established using published statistics and other information in relation to: -

- Population; age, sex, ethnicity, structure, economic activity and wealth
- Households; members, occupation, tenure, type, car ownership, amenities and composition
- Local Services; education, health, leisure, emergency
- Domestic Rates, Capital Values

Information was sourced from the Northern Ireland Statistics and Research Agency.

The socio-economic information was available through NISRA at a localised, ward, level. It was determined that given the scale of the zoning and the town the relevant catchment would be an outer area of Newtownards.

[1] Calculation based on Newtownards Average Family Size of 2.41 – Source: NISRA

Impact Prediction

Having established the baseline socio-economic information/profile, an assessment as to what, if any, impacts the development may have on the local and wider catchment area must subsequently be determined. In this regard, it was concluded that any predicted impacts would be either Pre-Completion or Post-Completion Impacts.

With respect to Pre-Completion, impacts likely to have effect on the local or wider catchment area are predicted to take the following form: -

- Impacts resulting from any in-migration of workers to the construction site;
- The possible effects (if any) of Demographic changes to the existing population structure as a result of any in-migration;
- Impacts on local service provision (education, health, etc.) and the local housing market as a result of any in-migration; and
- Economic effects to the local economy as a result of any in-migration.

With respect to Post-Completion i.e. 2030 and beyond, impacts likely to have effect on the local or wider catchment area are predicted to take the following form: -

- Impacts resulting from the completed development;
- The possible effects (if any) of demographic changes to the existing population structure as a result of any residential composition within the completed development;
- Impacts on the housing market, education and other services (education, refuse collection) as a result of the completed development; and
- Economic effects to the local/wider economy as a result of new expenditure arising from the completed development population.

It is worth noting at this point that the projected population of the development is 1,627 people. NISRA gives the population of Newtownards in 2017 as 28,970 and hence the proposal if fully developed and occupied today would account for around 5.6% of the total population of the town. Population growth in Newtownards between 2011 and 2017 was 0.56% per annum. Therefore at 2035 when the development is complete the projected population of Newtownards would be approximately 31,839 and the projected population of the project would account for 5.1%.

It is also worth noting that traditionally a low percentage of new development is purchased by people from outside the district at around 20% of new sales. Applying that figure to the

proposal equates to a total of 325 people migrating to the district – 1% of the population of Newtownards. It is this figure which represents the true basis of any impact and is therefore negligible.

Proposed Development

The development proposal is to develop a new community on the NS19 lands utilising the NS43 lands as an integrated parcel of open space to serve the development and the wider community.

Impact prediction takes account of all elements of the proposals.

8.3 Baseline Information

General Findings

As detailed above, and as the first principle point of reference, it is necessary to provide a general overview of the local and wider catchment areas. This information is collated from the 2011 Census and NISRA annual population projections as produced at www.nisra.gov.uk and www.ninis.gov.uk. In short, the information shows that at the widest level, Newtownards is relatively prosperous in comparison to other towns/cities and local government districts; there is relatively low unemployment in the area at 4.66% of the economically active population in contrast to the NI average of 5.7%; economic inactivity was 32.46% against 26.2% in NI as a whole (although this may in part be due to the aging nature of the population) and 68.15% of the population lived in housing that they owned (with 29.38% owning their homes outright). In addition, the wider District is overwhelmingly white (98.54%) in its race composition, it is overwhelmingly Christian (88.17%) breaking down into 13.12% Roman Catholic and 75.05% Protestant in its religious composition, it is largely an urbanised geographical area and for the most part, its population structure is centred around the traditional nuclear family.

With respect to the provision of education, there are a range and mix of schools in both the wider and local area serving the main class and religious groupings within the Education Board, Catholic Maintained and Integrated sectors. In particular, and at the local level, there are 8 primary schools operating in Newtownards with a further 12 in the wider area and 2 secondary schools in Newtownards with a further 6 operating in the wider area.

With respect to the provision of health services, primary health care services are provided at Ards Community Hospital and also at Bangor Community Hospital. With respect to General Practitioner provision, there are 11 Health Centres within the district. Most of these services are

located within the various settlements in the district with Old Mill Surgery located within Ards Community Hospital, with respect to the NS19 in particular, the nearest is Old Mill Surgery, which is over 2 miles from the site. Lastly, and in respect of Social Services care, this is administered from Newtownards for both the local and wider catchment areas.

Finally, and with respect to recreation, recreational infrastructure and recreation areas in the vicinity of the site can be found at the Ards Blair Maine Wellbeing and Leisure Complex, where a series of indoor and outdoor facilities are provided, including several swimming pools, fitness suite, studios, function room and all-weather pitches. There are further facilities at Aurora Complex in Bangor.

8.4 Impact Prediction – Construction and Operational Phases

Development Characteristics

The development characteristics, defined in socio-economic terms, are: -

1. The total value of the development works is estimated at approximately £325,000,000;
2. The total construction timescale is estimated at 10 years with an average rate of completions of 67 dwellings per year;
3. The total construction of the proposed development will be undertaken in 4 phases as shown in Chapter 2;
4. The development contract(s) will be let to contractors from both the local/wider area and outside who will be responsible for all civil engineering/housing construction and landscaping works;
5. Partnerships with local contractors will be entered into to deliver the development;
6. It is estimated that on establishment approximately 35 personnel will be immediately employed for site set-out works. However, it is estimated that this figure may rise to a figure in the region of approximately 90 personnel per annum during the principle years of construction;
7. A proportion of the estimated 90 personnel may be employed continuously or re-employed following contract/tender renewal throughout the lifetime of the project;
8. Post completion, the final owners of the development will be responsible for maintaining the open space.

The development is a housing scheme and as such its purpose is to contribute to meeting housing needs in the town. Accordingly, in the above context together with the scale of the

development, the construction phase effects from the proposals are assessed as negligible, with the exception of the effect on labour resources (below). With this exception, the impact prediction focuses on the operational phase effects.

Construction Phase Effects on Labour Resources

Within the wider catchment area of Ards and North Down the unemployment rate is 3.93%, well below the UK national average. This represents a pool of around 709 people in the immediate area and approximately 3,900 in the wider district from which to recruit appropriate personnel who while they are not currently working are able to do so.

Therefore, it is not anticipated that any nominated contractor(s) would experience difficulty in either recruiting or supplying personnel if the current rates are maintained to the end of the construction period and therefore any impact will be negligible. Indeed the development opens up an opportunity for the local population to be trained in construction trades.

The overall availability of staff to other companies is unlikely to be prejudiced through the recruitment of an estimated maximum 90 personnel in any one year for the project and it will not, in itself, cause labour rates to rise. The cumulative impact of all construction projects in the wider catchment area may cause an increase in labour rates although the availability of potential employees in the wider area suggests that this is unlikely. Nevertheless, this is part of the macro-economic cycle and where there are any increased costs on this project, they will be met by the developer and/or the appointed contractor(s).

Effects on Population

The development programme is to construct the 675 dwellings over a 10 year period with around 67 completions per annum with approximately 163 people moving into the development. Construction is likely to commence in 2023 with completion of the whole development in 2033. Allowing for market fluctuations and delays, it is assumed that the total population of 1,627 people will be situ by 2033.

The bulk of the impacts of the scheme will be on the population of the host wards, Loughries and Gregstown. NISRA estimates show that Loughries had a base population of 3,556 in 2011 and Gregstown 4,444. The estimates provide a growth rate of 0.56% per annum between 2011 and 2017. A robust assumption that that growth rate would be maintained has been made. Accordingly, the base population will increase by 2033 to 4,043 in Loughries and 5053 in Greystown.

The structure of this population was estimated from the population structure in Newtownards town and compared to the structure in the two wards. From this, impacts on the whole

population structure were assessed, the findings of which are detailed in Table 8.1 below. (N.B. It was assumed that employment draw would be spread evenly across the age groups although it was also assumed that no in-migration would occur in the over 65 age groups).

Table 8.1: Population Effects

Age Group	Newtownards Pop.	%	Estimated Additional Population from NS19	Loughries Ward Population 2033	Greystown Ward Population 2033	Population Increase 2033
0 – 15	5683	20.2	329	817	1021	2166
16 – 29	4740	16.9	275	683	854	1812
30 – 64	13366	47.7	776	1929	2410	5115
65+	4261	15.2	247	615	768	1630
Total	28050	100	1627	4043	5053	10723

Having regard to the above, the assessment concluded that when assessed against the 2015 NISRA estimates, the overall effect on population structure in the host wards was to increase the overall population by around 18% above the projected base with the majority of the increase in the children and economically active age groups. While this is a major impact, the effect is to add to the economic activity in the area through an increase in the numbers of economically active people. The effect of this was therefore assessed as major-positive as the bulk of the population increase lies in the economically active age groups.

As noted in 8.2 in-migration to the development from outside the district is anticipated to be around 20%, meaning that of the total population in NS19 1,302 will have moved from elsewhere in the town and district. The origin of these families is uncertain however, the district has 40 wards over which the population could be spread. Even taking the remainder of Newtownards into account, and not accounting for the rural parts of the district, the residual 2033 population is projected to be 22,618 leading to a 5.8% effective transfer of population spread over a 10 year period. In practice this will be less as the development will attract from the rest of the district as well but taken on its own a 5.8% population loss spread over a 10 year period is not significant.

Effects on Housing

In terms of housing, the most robust case for determining the impact of in-migration of 13.5 households per annum (on the basis set out under section 2.3 above – a total of 135 dwellings over the lifetime broken down over the 10 years of construction) during the timeframe of the construction on the local and/or wider housing sector, is to determine the effects of the development on both the rented and owner occupation housing sectors.

The wards hosting the development are Loughries which contains the majority of the development at around 550 dwellings and Greystown which contains the remaining 125 dwellings. In the 2011 Census the total number of households in Loughries was 1,399 and the Census also provides figures of 74.55% of households in owner occupation and 22.09% of households in renting; these percentages equate to 1,043 and 309 households in owner occupation and renting respectively. This percentage split is tilted in Loughries towards owner occupation when compared to the whole of Newtownards, which broke down into 68.15% owner occupied and 28.6% rented in the 2011 Census.

In Greystown, 73.50% of households were owner occupied and 23.06% were rented, these equate to 1,240 owner occupied households and 389 renting households, based on the 1,687 households in the ward reported by the Census. Similar to Loughries, household structure in Greystown is tilted towards owner occupation compared to the rest of Newtownards.

It should firstly be noted that the NISRA figures do not allocate all households to a tenure type so there are discrepancies between the total household numbers and the breakdown into owner occupation and renting. Nonetheless, there is sufficient information in the figures to allow a review to be made.

Given the density of development proposed in the master plan and allowing for the potential of lands to be purchased by developers (of the land owners in NS19/NS43) only Wirefox and Fraser Homes are active house builders it is likely that the overwhelming majority of house sales will be for owner occupation.

Thus of the 67 dwellings per annum we have considered a split of 80% owner occupied and 20% rented. Overall, therefore of the total of 675 dwellings, when completed, 540 will be in owner occupation and 135 will be rented. In any one year, 54 dwellings completed would be owner occupied and 13 would be rented.

Assuming no other growth in households in the two wards, the housing structure in the area on completion will be 2,823 households in owner occupation (an increase from 2,283) and 833 households in rented accommodation (an increase from 698). The effect of the development is to increase the proportion of owner occupation from 74.55% to just over 78%. It is considered

therefore that there will be a slight positive impact on housing structure as it is re-balanced towards owner occupation.

Cumulative Effects

Around 170 dwellings have been completed at NS20, Rivenwood, which has an overall capacity of between 1,159 and 1,449 dwellings based on the density range given in the zoning head note. Given the density of the current development, it is likely the final density at Rivenwood will be closer to the lower density in the range. We have therefore adopted a final total number of dwellings at NS20 of 1,160 with a build out rate of approximately 80 dwellings per annum, with Fraser Houses developing 50 each year and other landowners the remaining 30, giving a total build out timescale of between 14 and 15 years. In accordance with the mean household size of 2.41 in Newtownards the total projected population for NS20 is 2,795 people. NS20 lies mainly within the Loughries ward with around 28% of the zoning within the Movilla ward as a result 835 of the 1,160 new dwellings will be in Loughries ward.

Cumulatively with the development at NS20 the effects on housing and population in the two host wards will be: -

- An increase in the total population in the host wards of 3,640 people representing an additional 1,510 dwellings;
- An increase of around 40% over the existing population;
- With a split of 80% owner occupied and 20% rented and assuming no other changes, the overall proportion of owner occupation in the host wards will rise to 3,491 an increase of 35% from the base of 2,283;
- The households in rented accommodation will rise to 1,137 an increase from the base of 698 of 39%;
- The split in tenure will alter from 74.5% owner occupation to 25.5% renting in 2011 to 75.4% owner occupied and 24.6% renting

The cumulative effect of developing both NS19 and NS20 in a relatively short timeframe of around 10-15 years produces significant increases in the numbers of people and households in the host wards. The nature of these effects can only be assessed in terms of their impact on local services.

8.5 Effects on Education

In terms of education, the most robust case for predicting the effects of the development is to firstly determine the number of schoolchildren likely to require schooling at any one time up to the end of the period of construction and secondly to determine what, if any surplus places

within each of the school sectors i.e. nursery/primary/secondary and grammar may or may not exist during this timeframe.

In Newtownards information has been sourced from the Education Authority in the form of its Strategic Area Plan – Providing Pathways. Following the review of public administration and the assimilation of some of the functions of the Education and Library Boards into a unitary Education Authority the 11 new local government district boundaries were adopted by the EA for their forward planning districts.

On a wider area basis for Ards and North Down the Strategic Area Plan predicts impacts in terms of population change in respect to those age groups most likely to be in full time education administered by the EA, those are broken down into two broad groups: 0 – 15 years and 16 – 19 years. With respect to Ards and North Down it is likely to see the largest fall (of all the LGDs) in numbers of children in the 0 – 15 years category at 2.3% whilst seeing a modest increase in the 16 – 19 years group of 0.9%.

The EAs Providing Pathways document provides summary data for Primary and Post-Primary education[2]. Table 8.3 below provides the summary data included in Providing Pathways for Primary Schools (broken down by Management Type).

Table 8.3 Primary School Numbers

Management type	Number of schools	Total approved enrolments	Total actual enrolments	Super-numerary admissions	Number of available places	Number of schools with > 5% surplus or > £75,000	Number of schools with > 5% deficit or >£75,000
Controlled	32	10,598	9,667	279	1,241	13	1
Catholic Maintained	9	2,226	1,651	47	622	2	-
Controlled Integrated	4	1,137	1,075	18	118	4	-
Totals	**45**	**13,961**	**12,393**	**344**	**1,981**	**19**	**1**

The figures above demonstrate a surplus of school places across all sectors which the proposal will help to reduce.

[2] Education Authority Providing Pathways Strategic Area Plan 2017 - 2020

Table 8.4 below provides the summary data included in Providing Pathways for Post-primary Schools (broken down by Management Type).

Table 8.4 Post Primary School Numbers

Management type	Number of schools	Total approved enrolments	Total actual enrolments	Super-numerary admissions	Number of available places	Number of schools with >5% Surplus or >£75,000)	Number of schools with >5% Deficit or >£75,000)	Entitlement Framework - Number of schools compliant KS4	Entitlement Framework Number of schools compliant Post-16
Controlled	6	5,570	5,215	92	496	4	-	4	2
Voluntary	2	1,910	1,951	42	2	n/a		1	2
Catholic Maintained	2	1,045	804	67	358	1	1	2	1
Controlled Integrated	1	500	580	71	0	-	-	-	-
Grant Maintained Integrated	1	500	576	45	0	n/a		1	-
Totals	**12**	**9,525**	**9,126**	**317**	**856**	**5**	**1**	**8**	**5**

The figures demonstrate an availability of post-primary school places in the controlled, voluntary and Catholic Maintained sectors which the proposal will help to reduce.

The 675 households planned for the proposals will generate 330 school age children and as a consequence a primary school is not planned for the development as there are nearly 2000 available places in primary schools and 856 available places in secondary schools in the area.

The EA continues to monitor schools provision in the area and has been consulted in respect to these proposals.

Cumulative Effects

Although there are sufficient numbers of primary and post primary school places available to accommodate NS19, the development of NS20 will generate a further 569 school age children a combined total of 899. The NS21 zoning will generate a further 245 school age children.

NS20 incudes a proposal for a primary school on a site of 2 hectares, which is sufficient to accommodate a two class-entry primary school with approximately 420 places. Its development as part of NS20 therefore represents a significant off-setting of the numbers of

primary school pupils, which as demonstrated above is where any potential likely shortage of places is likely to occur.

8.6 Other Services

With respect to GP provision available healthcare is shown in table 8.6.

Table 8.6 – Health Facilities

Type	Number	Location	Facilities Offered
Acute Hospital	1	Dundonald	Accident and Emergency, north west cancer unit
Community Hospital	2	Newtownards	Minor Injuries Unit X Ray Department GP Wards (including out of hours) Outpatients Department
		Bangor	Social and Primary Care Services Outpatients Department Therapy and Rehabilitation Centre X Ray Department Minor Injuries Unit
GP Practices	17	Comber Comber Health Centre Dr Robert Henry Surgery The Surgery	 Dr. Semple & Partners Dr. Whiteside & Partners – 3 GPs Dr. Whiteside Dr. McKeown & Partners – 3 GPs
		Ballywalter Ballywalter Health Centre	4 GPs
		Conlig Green Road Medical Centre	Dr. Jackson & Partners – 2 GPs

		Kircubbin Loughview Surgery	 4 GPs
		Bangor Bangor Health Centre	 Dr. Crawford & Partners – 7 GPs Dr. Drew & Partners – 3 GPs Drs. Kenny, Moynihan, Scott – 3 GPs Dr. Reid & Partners – 5 GPs
		Newtownards Church Street Surgery Old Mill Surgery Killynether Practice Regency Medical Centre	 Dr. Armstrong & Partner – 2 GPs Dr. Hyland & Partners – 3 GPs Dr. Kennedy & Partners – 3 GPs Dr. Winter & Partners – 9 GPs Dr. Neoh & Partners – 5 GPs Dr. Webb & Partners – 4 GPs

Table 8.6 shows that distribution of facilities is not concentrated but are scattered across the wider Ards and North Down area in a range and variety of locations with a concentration of services in the main towns of Bangor and Newtownards.

The proposals recognise this and a health centre is not included.

In respect to refuse collection, the council regularly reviews its collection provision taking into consideration predicted future demand and when and where appropriate, they may employ or purchase additional resources to cater for any increase in the level of the required service. As detailed below, when completed, the proposal adds approximately £815,000 to the rates base of the town from which such services will be funded.

Accordingly, these aspects are assessed as having neutral impacts.

Cumulative Effects

In addition to the available services above, the NS20 zoning includes provision for the development of a "Healthy Living Centre" to accommodate medical and fitness facilities. It appears likely that additional GP services will be provided.

8.7 Economic Effects

The employment levels created by the development have been calculated above, approximated 90 full time construction jobs will be created during the construction phase.

A net benefit or positive impact will arise in terms of the rates income the site will generate, which will rise as development progresses, in current figures, the rates income from the development on completion has been calculated at £813,206 per annum[3].

Ards and North Down Council has recently published its Preferred Options Paper as part of the background information gathering a survey of the main town centres has been undertaken and was published with the POP – The Town Centres and Retailing Position Paper.

The headline figures from the surveys of non-residential units in the town centre undertaken by the Council include findings that 23% of all non-residential units are in comparison retail use, 6% are in convenience use (although there is no major anchor unit), 17% of units are in retail service use, 11% are in financial/professional services use and 12% in sui generis leisure uses (cafés, restaurants, bars, hotels, leisure centres, gaming/amusement arcades). The majority of the units are in the independent sector with some occupied by multiple retailers.

In addition, the surveys found that 13% of non-residential units in the town centre were vacant although the majority of these vacancies are located in peripheral areas and as such are not considered to impact negatively on the town centres.

These figures show a generally healthy town centre with some structural issues – a high level of vacancy (albeit in peripheral locations), a general lack of convenience shopping and significantly no major food store being three such issues.

The population of the completed NS19 development has been calculated above at 1,627 people. Estimates suggest that expenditure levels per head in 2015 were approximately £1900 for food shopping (in 2012 prices) and £1850 for comparison shopping (in 2012 prices).

[3] Calculated from Department of Finance Rates Calculator based on capital value of £153,746 per dwelling from Department of Finance NI House Price Index

These indicate that the total spending power of the proposal would be approximately £3.1M for food shopping and approximately £3M for comparison goods. As rates of expenditure rise over the long term, these are considered to be the base case levels.

Estimates suggest that discount retailers (B&M or similar) turn over at approximately £3,250 per sq m and with an expenditure of £3.1M on convenience goods by residents of the proposals that they therefore could support an additional 950 sq m of convenience retail.

The thrust of retail planning is a town centre first approach and this general principle, the relatively modest scale of retailing that could be supported at the proposals and the levels of vacancy in the town centre have led to the conclusion that only small-scale retailing will be proposed as part of the development and the majority of the spending will be pushed to the town centre and to the existing local and district centres in Newtownards.

In respect to existing local centres Stratheden Heights Local Centre is located approximately 350 – 400m from the edge of the proposals to the north, additionally there is further small-scale convenience shopping available at Abbot Link.

Cumulative Effects

While the proposals reflect planning policy and environmental practice to support town centres as the most sustainable locations for retailing and commercial activities the cumulative developments at NS20 and NS21 contain provision for a local centre with shops and small scale services.

The overall numbers of houses in NS19 and NS20 is 1,835 (675 on NS19 and 1,160 at NS20) and gives a projected population of 4,422. Based on the expenditure figures per head above the combined zonings will generate £8.4M in food expenditure and £8.18M in comparison goods expenditure (both in 2012 prices). This is a significant level of expenditure that will not be wholly taken up by the local facilities planned in the zonings and will, particularly in the case of comparison goods, help support town centre shopping, while also providing additional expenditure flow to the existing retail facilities in the local area.

The additional expenditure is expected to strengthen these facilities.

8.5 Conclusions

In broad population terms the introduction of 1627 additional people through the erection of 675 dwellings at NS19 will not create a profound effect on the overall population of the host ward. When analysed in greater detail, the effects on the population structure are beneficial, additional economic activity is supported and there is a significant increase in rates income. The effects are, accordingly classed as neutral or slightly beneficial.

Education provision will be affected, in particular there is an over capacity of primary school places in the area. The proposal will assist in the fulfilling of these places making the schools more viable and efficient. This has been assessed as having a slightly beneficial effect.

There is a further positive economic effect on retailing in the town.

Cumulatively the development of NS19 and NS20 significantly increase the resident population in the area. These developments could therefore result in significant impact on local services; however, it is considered that despite the increase in population the effects will not be major, for the following reasons: -

- Overall levels of in-migration are low and the developments result in a re-distribution of population within the district rather than a significant level of new population;
- Medical facilities are widely distributed throughout the borough;
- Education is currently under subscribed, particularly at primary level;
- Retail provision in the developments will not soak up all expenditure leaving a significant proportion of spending power to be distributed to local shops and the town centre

8.6 Mitigation Measures

The primary effects of the development are in the alterations to the population of the town and the host ward that take place as a result of its existence. These have been assessed as major but as producing positive outcomes as a result of the increased economic activity that is brought.

In respect to public services and the town centre of Newtownards there is available capacity to accommodate the development.

Cumulatively the developments at NS19 and NS20 include services provision in the form of a primary school and local medical facilities that will off-set the impact on services that could result from the increase in population.

Accordingly no mitigation measures are proposed at this stage.

8.7 Residual Impacts

No residual impacts are predicted.

Chapter 9: Air Quality

9.1 Introduction

RPS has been commissioned by Pragma Planning and Development Consultants Ltd to undertake an air quality assessment in relation to the proposed residential and mixed used development at Bowtown, Newtownards. The site currently consists of agricultural fields with a number of farm groups and individual dwellings mixed into the area.

9.1.1 Site Location

The proposed development (see Figure A in Appendix 1 for indicative site boundary) is located on the eastern boundary of Newtownards. It is approx. 600 meters north of the shoreline of Strangford Lough, bound to the north by the B172 Movilla Road and to the south by the Bowtown Road. The western boundary of the site is in close proximity to the residential Abbot Drive area and the eastern boundary is open countryside.

9.1.2 Project Description

The proposed development will occupy a land area of just over 41 hectares. It will comprise 675 no dwellings. These will be a mix of apartments, town houses, semi-detached and detached houses. A mixed used High Street is proposed for the core of the development and this is intended to meet local needs in terms of convenience shopping, child care and related facilities. A local distributor road will run through the development connecting Bowtown Road to Movilla Road, the road is to accommodate a bus route. A pedestrian and cycleway network is also to be provided. The proposed development is located within the administrative area of Ards & North Down Borough Council.

9.2 Policy and Legislative Context

Air pollution can have an effect on people's health. Exposure to air pollution can have long-term effects on health, it also has negative impacts on the environment. The UK government's and devolved administrations' primary objective is to ensure that all members of the public should have access to outdoor air without significant risk to their health, where this is economically and technically feasible.

9.2.1 EU Legislation

The following EU Directives set limits for air pollutants in ambient air:

9.2.1 EU Legislation

The following EU Directives set limits for air pollutants in ambient air:

• Cleaner air for Europe (CAFÉ directive – 2008/50/EC)

• Air quality 4th daughter directive

9.2.2 UK air quality strategy

Local authorities are responsible for reviewing the state of air quality in their district council area. To assist them with this process, an air quality strategy (AQS) has been devised for the UK. This sets out standards and objectives for the air quality pollutants causing the problems and enables councils to review air quality in their area against these. Northern Ireland departments also have a responsibility to ensure limit values, target values and alert thresholds for specified pollutants are not exceed. The AQS is presented in two volumes:

- Volume 1 of the UK air quality strategy
- Volume 2 of the UK air quality strategy

In most cases, the AQS objectives are identical to the EC Directive limit values, the only differences being the more stringent dates by which the former must be achieved.

9.2.3 Northern Ireland legislation

The EU Air Quality Directives are transposed in Northern Ireland by the Air Quality Standards Regulations (Northern Ireland) 2010. The 2010 Regulations have been revised and are now entitled Air Quality Standards (Amendment) Regulations (Northern Ireland) 2017 which transpose the European Directive 2008/50/EC on ambient air quality etc. and Directive 2004/107/EC relating to arsenic etc. in ambient air. These regulations place a duty on NI government departments to monitor levels of air pollutants specified in the Air Quality Directives and ensure compliance with limit values for these pollutants. District councils have a duty to review and assess air quality within their districts, under Part III of The Environment Order (NI) 2002.

Where UK AQS objectives are breached, or are likely to be breached, then district councils have to declare an air quality management area, and produce, along with relevant authorities (for example, DfI Roads in the case of road traffic air pollution) and action plan to address the air quality problems.

The Air Quality Standards (Amendment) Regulations (NI) 2017 prescribe the relevant authorities and set out the air quality objectives to be achieved, and cover aspects of air quality management areas and action plans.

9.2.4 Summary of Key Legislation

9.2.4.1 The 2008 Ambient Air Quality Directive (2008/50/EC)

The 2008 Ambient Air Quality Directive (2008/50/EC) aims to protect human health and the environment by avoiding, reducing or preventing harmful concentrations of air pollutants; it sets legally binding concentration-based limit values, as well as target values. There are also information and alert thresholds for reporting purposes. These are to be achieved for the main air pollutants: particulate matter (PM_{10} and $PM_{2.5}$), nitrogen dioxide (NO_2), sulphur dioxide (SO_2), ozone (O_3), carbon monoxide (CO), lead (Pb) and benzene. The 2008 directive is currently transcribed into UK legislation and in Northern Ireland by the Air Quality Standards Regulations (Northern Ireland) 2010. The 2010 Regulations have been revised and are now entitled Air Quality Standards (Amendment) Regulations (Northern Ireland) 2017 which transpose the European Directive 2008/50/EC on ambient air quality etc. and Directive 2004/107/EC relating to arsenic etc. in ambient air. Both Directives were amended by Commission Directive 2015/1480 and the definition of Directive 2008/50/EC and Directive 2004/107/EC are made accordingly.

Member states must comply with the limit values (which are legally binding on the Secretary of State) and the Government and devolved administrations operate various national ambient air quality monitoring networks to measure compliance and develop plans to meet the limit values. For the purposes of this assessment, the limit values set out in the Air Quality Standards Regulations 2017 and the objective levels specified under the current UK AQS have been used. There is no legal requirement to meet objectives set within the UK AQS except where equivalent limit values are set within the EU Directives. The limit values and objectives relevant to this assessment are summarised in Table 9.1.

Table 9.1: Air Quality Objectives included in Regulations for the purpose of LAQM in Northern Ireland

Pollutant	Air Quality Objective		To be achieved by
	Concentration	Measured as	
Nitrogen Dioxide	40 µg.m^{-3} 200 µg m^{-3} not to be exceeded more than 18times a year	Annual mean 1 hour mean	31 December 2005 31 December 2005
Particulate Matter (PM10)	40 µg.m^{-3} 50 µg.m^{-3}, not to be exceeded more than 35 times a year	Annual mean 24 hour mean	31 December 2005 31 December 2004
Particulate Matter (PM2.5) *20% on 11 June 2008, decreasing on the next 1 January and every 12 months thereafter by equal annual percentages to reach 0% by 1 January 2015*	25 µg.m^{-3} (target)	Annual mean	1 January 2015

The air quality objectives applicable to Local Air Quality Management (LAQM) in Northern Ireland are shown in Table 9.1. This table shows the objectives in units of microgrammes per cubic metre µg/m^3. The UK National Air Quality Strategy (UKNAQS) is the method used for the implementation of the air quality limit values in England, Scotland, Wales and Northern Ireland, and provides a framework for improving air quality and protecting human health from the effects of air pollution.

For each nominated pollutant, the UKNAQS sets clear, measurable, outdoor air quality standards and target dates by which these must be achieved. The combined standard and target date is referred to as the 'objective level' for that pollutant. Adopted national standards are based on the recommendations of the European Union (EU) Air Quality

Limit Values and have been translated into a set of Statutory Objectives within The Air Quality Standards Regulations (Northern Ireland).

9.2.4.2 Environment (Northern Ireland) Order 2002

This policy guidance is principally for district councils in Northern Ireland to have regard to in carrying out their LAQM duties under Part III of the Environment (Northern Ireland) Order 2002.This guidance is intended to enable district councils to improve on the service they already provide in tackling poor air quality. Under the Environment (Northern Ireland) Order 2002 it is a requirement to publish an Air Quality Strategy and establish a system of LAQM. Local authorities are required to review air quality in their area and to designate Air Quality Management Areas (AQMA) where air quality objectives are unlikely to be met.

Where an AQMA has been declared an Air Quality Action Plan, aimed at reducing pollutant levels to meet the objectives, needs to be produced. Part 1 of this Policy Guidance provides an overview of the local air quality management system and the various considerations that district councils should bear in mind. Part 2 points the reader towards other sources of advice, as well as Practice Guidance on some of the more effective and ambitious measures that district councils may wish to consider. This guidance complements the revised Technical Guidance, LAQM TG (16).

9.2.4.3 Local Air Quality Management Technical Guidance 2016

Local Air Quality Management Technical Guidance LAQM.TG16 supersedes all previous versions. It is designed to support local authorities in carrying out their duties under the Environment Act 1995, the Environment (Northern Ireland) Order 2002, and subsequent regulations.

Authorities will continue to appraise air quality, with the main emphasis on those pollutants shown to be challenging in respect of compliance i.e. Nitrogen Dioxide (NO_2), Particulate Matter (PM_{10}) and Sulphur Dioxide (SO_2), whilst introducing a new role for local authorities to work towards reducing levels of $PM_{2.5}$ in England and a statutory objective for this pollutant in Scotland. At the core of LAQM delivery are three pollutant objectives; these are:

- Nitrogen Dioxide (NO_2),
- Particulate Matter (PM_{10}), and;
- Sulphur Dioxide (SO_2).

All current AQMA's across the UK are declared for one or more of these pollutants, with NO_2 accounting for the majority. It is a statutory requirement for local authorities to regularly review and assess air quality in their area and take action to improve air quality when objectives set out in regulation cannot be met.

Reflecting feedback under the LAQM review process, the UK Government has decided to retain Benzene, 1,3 -Butadiene, Carbon Monoxide and Lead in regulations for England. In recognition of the fact that all of the objectives for these pollutants have been met for several years and are well below limit values, local authorities in England do not have to report on these pollutants unless local circumstances indicate otherwise. These pollutants remain a statutory reporting requirement in Scotland, Wales and Northern Ireland.

As of January 2016, there are more than 700 AQMAs currently declared across the UK (nearly 600 of which are in England). Of these, the vast majority (over 90%) are related to road traffic emissions, where attainment of the annual mean objective for nitrogen dioxide (NO_2) is considered unlikely, sometimes in association with exceedances of the 24-hour mean PM_{10} objective, or in Scotland the annual mean PM_{10} objective. Examples of where air quality objective may apply is given in Table 9.2.

Table 9.2: Example of Where Air Quality Objectives Apply

Averaging Period	Objectives should apply at:	Objectives should generally not apply at:
Annual-mean	All locations where members of the public might be regularly exposed. Building façades of residential properties, schools, hospitals, care homes.	Building façades of offices or other places of work where members of the public do not have regular access. Hotels, unless people live there as their permanent residence. Gardens of residential properties. Kerbside sites (as opposed to locations at the building's façades), or any other location where public exposure is expected to be short-term.
Daily-mean	All locations where the annual-mean objective would apply, together with hotels. Gardens of residential properties	Kerbside sites (as opposed to locations at the building's façade), or any other location where public exposure is expected to be short-term

Hourly-mean	All locations where the annual and 24 hour mean would apply. Kerbside sites (*e.g. pavements of busy shopping streets*). Those parts of car parks, bus stations and railway stations etc which ware not fully enclosed, where members of the public might reasonably be expected to spend one hour or more. Any outdoor locations to which the public might reasonably be expected to spend 1-hour or longer	Kerbside sites where the public would not be expected to have regular access

By comparison, there are very few AQMAs associated with domestic, industrial or other transport-related emissions, although in Northern Ireland a number of AQMAs have been declared as a consequence of pollution associated with the residential heating sector (Defra, 2016).

9.3 Assessment Methodology

9.3.1 Approach

9.3.1.1 Key Elements

The approach is consistent with the Environmental Protection United Kingdom (EPUK)/Institute of Air Quality Management (IAQM) Land-Use Planning & Development Control: Planning for Air Quality document, the IAQM Guidance on the assessment of dust from demolition and construction and, where relevant, Defra's Local Air Quality Management Technical Guidance: LAQM.TG (16). The assessment includes the key elements listed below:

- Reference to official government estimates from Defra, publicly available air quality monitoring data for the area, and relevant Air Quality Review and Assessment documents for the local authority (The latest report available at the time of writing of this AQIA is the 2018 Updating and Screening Assessment for Ards and North Down Borough Council. In fulfilment of Environment (Northern Ireland) Order 2002 Local Air Quality Management June 2018);
- BCC's Air Quality and Land Use Planning Guidance is referenced;

- Design Manual for Roads & Bridges (DMRB) Volume 11, Section 3, Part 1, HA207/07 Air Quality is referenced; and,
- A qualitative assessment of likely construction-phase impacts without mitigation and controls in place.

Air quality guidance advises that the organisation engaged in assessing the overall risks should hold relevant qualifications and/or extensive experience in undertaking air quality assessments. The RPS air quality team members involved at various stages of this assessment have professional affiliations that include; Members of the Institute of Air Quality Management (MIAQM) and Chartered Scientist (CSci).

9.3.1.2 Summary of Pollutants Considered

9.3.1.2.1 Construction Phase

Dust: Refers to all airborne particulate matter (PM) - that is, solid particles that are suspended in air, or have settled out onto a surface after having been suspended in air. The term 'dust' covers all airborne particulates it includes the particulates that give rise to soiling, poor health and environmental damage.

Particulate matter (PM_{10} and $PM_{2.5}$): Particulate matter (PM) is a complex assemblage of non-gaseous material of varied chemical composition. It is categorised by the size of the particle (for example PM_{10} is particles with a diameter of less than 10 microns (mm)). Most PM emissions in Newtownards are caused by road traffic, with engine emission and tyre and brake wear being the main sources. Construction sites, with high volumes of dust and emissions from machinery are also major sources of local PM pollution, along with fires, including the burning of waste.

Other Emissions: Regarding exhaust emissions from construction-related vehicles (contractors' vehicles and Heavy Goods Vehicles (HGVs), diggers, and other diesel-powered vehicles), these are unlikely to have a significant impact on local air quality except for large, long-term construction sites - the EPUK/IAQM Land-Use Planning & Development Control: Planning For Air Quality document indicates that air quality assessments should include developments increasing annual average daily Heavy Duty Vehicle (HDV) traffic flows by more than 25 within or adjacent to an AQMA and more than 100 elsewhere. The aforementioned EPUK/IAQM thresholds are not expected to be exceeded for any individual road during the construction phase of this project; therefore, construction-vehicle exhaust emissions have not been assessed specifically but rather discussed and mitigation measures suggested as best practice.

9.3.1.2.2 Operational Phase

For the operational phase of the development, the main pollutants from road traffic with potential for local air quality impacts are nitrogen oxides (NOx) and particulate matter (PM_{10}). Emissions of total NOx from combustion sources comprise nitric oxide (NO) and nitrogen dioxide (NO_2). The NO oxidises in the atmosphere to form NO_2. The assessment of operational impacts usually therefore focuses on changes in NO_2 and PM_{10} concentrations. In addition to traffic derived emissions of oxides of nitrogen, combustion plants associated with some development proposals may also be a source of air pollution.

9.3.2 Construction Phase – Methodology

9.3.2.1 Dust and Particulates

Dust is the generic term used to describe particulate matter in the size range 1-75 µm in diameter. Particles greater than 75 µm in diameter are termed grit rather than dust. Dusts can contain a wide range of particles of different sizes. The normal fate of suspended (i.e. airborne) dust is deposition. The rate of deposition depends largely on the size of the particle and its density; together these influence the aerodynamic and gravitational effects that determine the distance it travels and how long it stays suspended in the air before it settles out onto a surface. In addition, some particles may agglomerate to become fewer, larger particles; whilst others react chemically.

The effects of dust are linked to particle size and two main categories are usually considered:

- PM_{10} particles, those up to 10 µm in diameter, remain suspended in the air for long periods and are small enough to be breathed in and so can potentially impact on health; and,
- Dust, generally considered to be particles larger than 10 µm which fall out of the air quite quickly and can soil surfaces (e.g. a car, window sill, laundry). Additionally, dust can potentially have adverse effects on vegetation and fauna at sensitive habitat sites.

The IAQM Guidance on the assessment of dust from demolition and construction sets out 350 m as the distance from the site boundary and 50 m from the site traffic route(s) up to 500 m of the entrance, within which there could potentially be nuisance dust and PM_{10} effects on human receptors. For sensitive ecological receptors, the corresponding distances are 50 m in both cases. These distances are set to be deliberately conservative.

9.3.2.2 Human Receptors Definition

A '*human receptor*', refers to any location where a person or property may experience the adverse effects of airborne dust or dust soiling, or exposure to particulates over a time period relevant to the air quality objectives, as defined in the Government's technical guidance for Local Air Quality Management. In terms of annoyance effects, this will most commonly relate to dwellings, but may also refer to other premises such as buildings housing cultural heritage collections (e.g. museums and galleries), vehicle showrooms, food manufacturers, electronics manufacturers, amenity areas and horticultural operations (e.g. salad or soft-fruit production).

9.3.2.3 Sensitivities of People and Property Receptors to Dust

9.3.2.3.1 High Sensitivity

Principles: Users can reasonably expect enjoyment of a high level of amenity; or the appearance, aesthetics or value of their property would be diminished by soiling; and the people or property would reasonably be expected to be present continuously, or at least regularly for extended periods as part of the normal pattern of use of the land.

Indicative examples: Dwellings, Museums and other culturally important collections. Medium and long-term car parks and car showrooms.

Proposed redevelopment examples: There are residential properties in close proximity to the proposed development.

9.3.2.3.2 Medium Sensitivity

Principles: Users would expect to enjoy a reasonable level of amenity but would not reasonably expect to enjoy the same level of amenity as in their home; or the appearance, aesthetics or value of their property could be diminished by soiling; or the people or property wouldn't reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land.

Indicative examples: Parks, Places of work

Proposed redevelopment examples: Offices and places of work are not prevalent in the area.

9.3.2.3.3 Low Sensitivity

Principles: the enjoyment of amenity would not reasonably be expected; or there is property that would not reasonably be expected to be diminished in appearance, aesthetics or value by soiling; or there is transient exposure, where the people or property

would reasonably be expected to be present only for limited periods of time as part of the normal pattern of use of the land.

Indicative examples: Playing fields, farmland (unless commercially-sensitive horticultural). Footpaths and roads. Short-term car parks.

Proposed development examples: There are footpaths in close proximity to the proposed development.

9.3.2.4 Sensitivities of People and Property Receptors to PM_{10}

9.3.2.4.1 High Sensitivity

Principles: Locations where members of the public are exposed over a time period relevant to the air quality objective (in the case of the 24-hour objective for PM_{10}, a relevant location would be one where individuals may be exposed for eight hours or more in a day).

Indicative Examples: Residential properties. Schools, hospitals and residential care homes.

Proposed Development Examples: There are residential properties in close proximity to the proposed development.

9.3.2.4.2 Medium Sensitivity

Principles: Locations where the people exposed are workers and exposure is over a time period relevant to the air quality objective (in the case of the 24-hour objective for PM_{10}, a relevant location would be one where individuals may be exposed for eight hours or more in a day).

Indicative Examples: Office and shop workers (but generally excludes workers occupationally exposed to PM_{10} as protection is covered by Health and Safety at Work legislation).

Proposed Development Examples: Offices and places of work are not prevalent in the area.

9.3.2.4.3 Low Sensitivity

Principles: Locations where human exposure is transient exposure.

Indicative Examples: Public footpaths, playing fields, parks. Shopping streets

Proposed Development Examples: There are footpaths in close proximity to the proposed development.

9.3.2.5 IAQM Sensitive Ecological Receptors Definition

An '*ecological receptor*' refers to any sensitive habitat affected by dust soiling. This includes the direct impacts on vegetation or aquatic ecosystems of dust deposition, and the indirect impacts on fauna (e.g. on foraging habitats). For locations with a statutory designation, e.g. Special Areas of Conservation (SACs) and Sites of Special Scientific Interest (SSSIs – known as A (Areas) of SSIs in Northern Ireland), consideration should be given as to whether the particular site is sensitive to dust and this will depend on why it has been designated. Some non-statutory sites (i.e. local wildlife sites) and/or locations with very specific sensitivities may also be considered if appropriate.

The site of the proposed project is not located within the boundary of any statutory or non-statutory designated sites of international, national or local nature conservation importance. There are however a number of designated sites within the Zone of Influence (ZoI) of the proposed project.

The proposed development is not situated within or adjacent to any site designated on account of ecology or nature conservation. The site lies in relative proximity to Outer Ards ASSI which lies approximately 0.2 km to the north of the site at its closest point and is separated from the proposals by an area of existing urban development.

The Outer Ards ASSI occupies an area of some *1116.16* hectares and is designated on account of the supported geological interest, in addition to its coastal habitats including dune and maritime grassland, maritime heath, cliff ledge vegetation, saltmarshes, fens and flushes in addition to marine plant communities; and the supported bird populations including an internationally significant population of arctic tern *Sterna paradise*, sandwich tern *Sterna scandvicensis* and light-bellied brent goose *Branta bernicla hrota* among others.

The DMRB provides a series of traffic screening criteria. These include the change in AADT flows on a given road of 1000 vehicles (LGV) or 200 heavy duty vehicles (HDVs). The increases in traffic flows for this proposed redevelopment do not meet the criteria set out by the DMRB. Impacts on ecological receptors can therefore be screened out. In addition, with regard to road traffic emissions small quantities of heavy metals released during combustion and from vehicle wear and tear, may accumulate in soils near the road. However, such emissions cannot be reliably quantified or the negative ecological effects determined. The proposed development is located in an urban area. Impact on ecological receptors can be scoped out and is no longer considered in this assessment. This is reiterated as required throughout the report.

9.3.2.6 Source Pathway Receptor

9.3.2.6.1 General Background

Concentration-based limit values and objectives have been set for the PM_{10} suspended particle fraction, but no statutory or official numerical air quality criterion for dust annoyance has been set at a UK, European or World Health Organisation (WHO) level. Construction dust assessments have tended to be risk based, focusing on the appropriate measures to be used to keep dust impacts at an acceptable level.

Consistent with the recommendations in the IAQM dust guidance, a risk-based assessment has been undertaken for the development, using the well-established source-pathway-receptor approach:

- The dust impact (the change in dust levels attributable to the development activity) at a particular receptor will depend on the magnitude of the dust source and the effectiveness of the pathway (i.e. the route through the air) from source to receptor.
- The effects of the dust are the results of these changes in dust levels on the exposed receptors, for example annoyance or adverse health effects. The effect experienced for a given exposure depends on the sensitivity of the particular receptor to dust. An assessment of the overall dust effect for the area as a whole has been made using professional judgement taking into account both the change in dust levels (as indicated by the Dust Impact Risk for individual receptors) and the absolute dust levels, together with the sensitivities of local receptors and other relevant factors for the area.

The dust risk categories that have been determined for each of the four activities (demolition, earthworks, construction and trackout) have been used to define the appropriate site-specific mitigation measures based on those described in the IAQM dust guidance. The guidance states that provided the mitigation measures are successfully implemented, the resultant effects of the dust exposure will normally be "not significant". This assessment does not consider the air quality impacts of dust from any contaminated land or buildings contaminants. If contaminated land is identified on the site of the proposed development, the impacts will be assessed in other technical discipline reports - this is not detailed further in this report.

9.3.2.6.2 Building Contamination - Asbestos

Asbestos, including asbestos fibres, is treated as a special material under all types of regulation and as such has its own exposure limits. It is subject to high levels of regulation and control, for example through The Control of Asbestos Regulations (NI) 2012 came into force on 6 April 2012, updating previous asbestos regulations to take account of the European Commission's view that the UK had not fully implemented the EU Directive on exposure to asbestos (Directive 2009/148/EC).. It is essential that these regulations are followed for controlling asbestos emissions. A refurbishment / demolition survey is required where the premises, or part of it, need upgrading, refurbishment or demolition.

A Refurbishment / demolition survey aims to ensure that; nobody will be harmed by work on (Asbestos Containing Material) ACM in the premises or equipment; and that such work will be done by the right contractor in the right way. The survey must locate and identify all ACM before any structural work begins at a stated location or on stated equipment at the premises. It involves destructive inspection and asbestos disturbance. Depending on the ACM found, licensed removal and disposal will be required. The asbestos demolition survey (required for this project) is not presented in this AQIA rather the asbestos works are a matter principally for HSENI and will be dealt with as required through appropriate survey, reporting, removal and disposal as required.

9.3.2.6.3 Detailed demolition and construction dust assessment

Appendix 9.1 of this document contains a detailed construction dust assessment.

9.3.2.7 Operational Phase Methodology

9.3.2.7.1 DMRB Screening Method – Traffic derived atmospheric pollution

The Highways Agency's Design Manual for Roads and Bridges (DMRB) Vol.11 Screening Model was referenced to consider if the traffic levels associated with the redevelopment met criteria requiring assessment. Through the acquisition of data from monitoring locations in the UK, the DMRB model can be used to predict concentration levels of NOx, NO_2, PM_{10}, CO, benzene, and 1,3 butadiene in addition, the model can be used to 'predict the number of exceedences of 50 $\mu g.m^{-3}$ as a 24-hour mean PM_{10} concentration' (DEFRA, 2009).

The DMRB screening method can be used to estimate NO_2 and PM_{10}, concentrations for comparison with AQS standards and objectives. This is an initial test to establish whether a more detailed assessment is required. If it is predicted that the air quality criteria would be exceeded, then the DMRB advises that detailed dispersion modelling is undertaken.

There are two fundamental applications of the DMRB Screening Model. The first, commonly referred to as the Local Air Quality Assessment, is the estimation of roadside air pollution concentrations, associated with new or modified road schemes. The other application, known as the regional impact assessment, is an estimation of total annual emissions arising from a road scheme. The local air quality assessment, using the DMRB, allows the user to specify up to 15 separate road links. The regional assessment can accommodate many more links.

The DMRB provides estimates of annual average concentrations of the pollutants. Values are derived from these annual averages for comparison with air quality objectives and guidelines. The derivations from annual mean values are based on observed statistical frequency distributions of pollutant concentrations in the UK and take into account the normal variability in traffic activity and weather conditions that give rise to high levels of pollution.

To work effectively, the model requires the input of traffic data, namely:

- Distance from receptor to centre of roads;
- Average daily vehicle flows and speeds;
- Road type (motorway or A road, other urban roads, other roads);
- The proportion of light and heavy duty vehicles;
- Background concentrations of pollutants; and
- Present and predicted future traffic emissions (accounting for legislation).

This assessment follows the approach set out by the DMRB Volume 11, Section 3, Part 1 (HA, 2007) for a 'simple' assessment of local air quality. The assessment considers the effect on air quality using the following scenarios:

- Current (2017) "Base Year Scenario": using traffic flow data for 2017, traffic emission and background pollution concentration for 2017, without the proposed redevelopment;
- Opening Year (2031) "Do - Minimum Scenario": using traffic flow data, traffic emission rate factors and background pollutant concentrations for 2031, without the proposed development in place;
- Opening Year (2031) "Do - Something Scenario": using traffic flow data, traffic emission rate factors and background pollutant concentrations for 2031, with the proposed development in place.

DMRB Local Assessment

The approach to considering an assessment or screening it out follows the guidance set out by the DMRB Volume 11, Section 3, Part 1 (HA, 2007). Requirements for a local air quality assessment emanate from the following criteria being met:

- Road alignment change by 5m or more; or
- Daily traffic flows change by 1000 Annual Average Daily Traffic (AADT) or more; or
- Heavy Duty Vehicles (HDV) flows change by 200 AADT or more; or
- Daily average speed change by 10km/hr or more; or
- Peak hour speed change by 20km/hr or more.

DMRB Regional Assessment

For regional air quality, the roads/link that meet the following criteria require assessment:

- a change of more than 10% in AADT; or
- a change of more than 10% in the number of HDVs; or
- a change in daily average speed of more than 20km/hr.

Appendix 9.3 details modelled outputs.

9.3.2.7.2 Emissions from combustion units

Final details of these are not known at this early stage of the project. It is very common in applications of this nature that full design information is not available at planning application stage but rather developed later in the project design (detailed design). It is recommended that the requirement to provide a short technical report of energy centre-plant emissions is procured as a pre-commencement task, secured through an appropriately worded planning condition if required. Section 5.3 details information known at this stage in relation to the proposed combustion systems and sets out the appropriate legislation.

9.3.2.7.3 Sensitive Receptors

The air quality assessment predicts the impacts at locations that could be sensitive to any changes. Such sensitive receptors should be selected where the public is regularly present and likely to be exposed over the averaging period of the objective. Sensitive receptors for this assessment have been selected at representative properties where pollutant concentrations and/or changes in pollutant concentrations are anticipated to be greatest, these are detailed in Appendix 9.2.

9.3.2.7.4 Short term: Hourly-Mean AQS Objective for NO_2

In order to refer to the likelihood of exceedance of the hourly-mean AQS objectives for NO_2 and the daily-mean AQS objective for PM_{10}, the following relationships between the short-term and the annual-mean is usually considered at each receptor location.

Research undertaken in support of LAQM.TG (16) has indicated that the hourly-mean limit value and objective for NO_2 is unlikely to be exceeded at a roadside location where the annual-mean NO_2 concentration is less than 60 $\mu g.m^{-3}$. In May 2008, a re-analysis of the relationship between annual and hourly-mean NO_2 concentrations was undertaken using data collated from 2003. The conclusions and recommendations of that report are:

"*Analysis shows that statistically, on the basis of the dataset available here, the chance of measuring an hourly nitrogen dioxide objective exceedance whilst reporting an annual-mean NO_2 of less than 60 $\mu g.m^{-3}$ is very low…*"

It is therefore recommended that local authorities continue to use the threshold of 60 $\mu g.m^{-3}$ NO_2 as the guideline for considering a likely exceedance of the hourly-mean nitrogen dioxide objective.

9.3.2.7.5 Short term: Daily-Mean AQS Objective for PM_{10}

The number of exceedances of the daily-mean AQS objective for PM_{10} of 50 $\mu g.m^{-3}$ may be estimated using the relationship set out in LAQM.TG (16):

Number of Exceedances of Daily Mean of 50 $\mu g.m^{-3}$ = -18.5 + 0.00145 * (Predicted Annual-mean PM_{10})3 + 206 / (Predicted Annual-mean PM_{10} Concentration)

This relationship suggests that the daily-mean AQS objective for PM_{10} is likely to be met if the predicted annual-mean PM_{10} concentration is 31.8 $\mu g.m^{-3}$ or less. The daily mean objective is not considered further within this assessment if the annual-mean PM_{10} concentration is predicted to be less than 31.5 $\mu g.m^{-3}$.

9.3.2.7.6 Long Term

Annual-mean NOx and PM_{10} (and $PM_{2.5}$) concentrations have been predicted at selected sensitive receptors using the DMRB Screening Model/Method Spreadsheet, then added to relevant background concentrations. Primary NO in the NO_X emissions is converted to NO_2 to a degree determined by the availability of atmospheric oxidants locally and the strength of sunlight. For road traffic sources, annual-mean NO_2 concentrations have been derived from the modelled road-related annual-mean NOx concentration using the Defra LAQM.TG(16) calculator.

9.3.2.7.7 Fugitive PM_{10} Emissions

Transport PM_{10} emissions arise from both the tailpipe exhausts and from fugitive sources such as brake and tyre wear and re-suspended road dust. Improvements in vehicle technologies are reducing PM_{10} exhaust emissions; therefore, the relative importance of fugitive PM_{10} emissions is increasing. Current emission factors for particulate matter include brake dust and tyre wear (which studies suggest may account for approximately one-third of the total particulate emissions from road transport); however, no allowance is made for re-suspended road dust as this remains unquantified.

9.3.2.8 Significance Criteria for Development Impacts on the Local Area

The rationale for describing the impact of the proposed development is derived from the Environmental Protection UK (EPUK) and IAQM guidance (EPUK & IAQM) "Land-Use Planning & Development Control: Planning for Air Quality (Jan 2017)" (paragraphs 6.25-6.39), which has replaced "Development Control: Planning for Air Quality (2010 Update)".

There is a two stage process to be followed in the assessment of air quality impacts;

- a qualitative or quantitative description of the impacts on local air quality arising from the development; and
- a judgement on the overall significance of the effects of any impacts

The suggested framework for describing the impacts is set out in Table 6.3 of the EPUK & IAQM guidance document and is shown in Table 9.3 in this report. The term Air Quality Assessment Level (AQAL) has been adopted as it covers all pollutants, i.e. those with and without formal standards. AQAL is used to include air quality objectives or limit values where these exist. The Environment Agency uses a threshold criterion of 10% of the short term AQAL as a screening criterion for the maximum short term impact. The EPUK & IAQM guidance adopts this as a basis for defining an impact that is sufficiently small in magnitude to be regarded as having an insignificant effect.

Table 9.3: Impact descriptors for individual receptors

Long term average Concentration at receptor in assessment year	% Change in concentration relative to Air Quality Assessment Level (AQAL)			
	1	2-5	6-10	>10
75% or less of AQAL	Negligible	Negligible	Slight	Moderate
76-94% of AQAL	Negligible	Slight	Moderate	Moderate
95-102% of AQAL	Slight	Moderate	Moderate	Moderate
103-109% f AQAL	Moderate	Moderate	Substantial	Substantial
110% or more of AQAL	Moderate	Substantial	Substantial	Substantial

Explanation

AQAL = Air Quality Assessment Level, which may be an air quality objective, EU limit or target value, or an Environment Agency 'Environmental Assessment Level (EAL)'.

The Table is intended to be used by rounding the change in percentage pollutant concentration to whole numbers, which then makes it clearer which cell the impact falls within. The user is encouraged to treat the numbers with recognition of their likely accuracy and not assume a false level of precision. Changes of 0%, i.e. less than 0.5% will be described as Negligible.

The Table is only designed to be used with annual mean concentrations.

Descriptors for individual receptors only; the overall significance is determined using professional judgement. For example, a 'moderate' adverse impact at one receptor may not mean that the overall impact has a significant effect. Other factors need to be considered.

When defining the concentration as a percentage of the AQAL, use the 'without scheme' concentration where there is a decrease in pollutant concentration and the 'with scheme;' concentration for an increase.

The total concentration categories reflect the degree of potential harm by reference to the AQAL value. At exposure less than 75% of this value, i.e. well below, the degree of harm is likely to be small. As the exposure approaches and exceeds the AQAL, the degree of harm increases. This change naturally becomes more important when the result is an exposure that is approximately equal to, or greater than the AQAL.

It is unwise to ascribe too much accuracy to incremental changes or background concentrations, and this is especially important when total concentrations are close to the AQAL. For a given year in the future, it is impossible to define the new total concentration without recognising the inherent uncertainty, which is why there is a category that has a range around the AQAL, rather than being exactly equal to it.

The rationale for the assessment of significance is derived from the EPUK & IAQM Guidance (paragraphs 7.1-7.12 referring to Table 6.3) and relates to Table 9.3. Impacts

on air quality, whether adverse or beneficial, will have an effect on human health that can be judged as 'significant' or 'not significant'. An 'impact' is the change in the concentration of an air pollutant, as experienced by a receptor. This may have an 'effect' on the health of a human receptor, depending on the severity of the impact and other factors that may need to be taken into account. The impact descriptors set out in Table 9.3 are not, of themselves, a clear and unambiguous guide to reaching a conclusion on significance. These impact descriptors are intended for application at a series of individual receptors. Whilst it may be that there are 'slight', 'moderate' or 'substantial' impacts at one or more receptors, the overall effect may not necessarily be judged as being significant in some circumstances.

Any judgement on the overall significance of effect of a development will need to take into account factors such as:

- the existing and future air quality in the absence of the development;
- the extent of current and future population exposure to the impacts, and
- the influence and validity of any assumptions adopted when undertaking the prediction of impacts.
- other factors may be relevant in individual cases.

In this case, the development is not in an AQMA. The impacts descriptor table acknowledges this and points to a conclusion of significant effect in cases where concentrations of a regulated pollutant are in excess of the objective value. Where the baseline concentrations are close to the objective value at a receptor, but not exceeding it, a case may be made for the development's predicted contribution being significant. It will always be difficult, however, to attribute the exceedance of an objective to any individual source.

9.3.2.9 Guidance for undertaking an assessment

9.3.2.9.1 Belfast City Councils (BCC) Air Quality and Land Use Planning Guidance*

This guidance note for developers and air quality consultants by BCC aims to assist developers in considering air quality in advance of submitting a planning application. Appendix 1 of the guidance lists developments that may require an air quality assessment. Relevant types of developments are shown in Table 9.4.

**Although a BCC based document, the guidance still provides useful reference point for assessing developments in the absence of an ANDBC equivalent.*

Table 9.4: BCC Criteria for Air Quality Assessments

Criteria	Does this proposed development satisfy the criteria?
1. Developments located in, or which may have an effect on sensitive areas e.g. AQMA's;	**No**
2. Developments that introduce new exposure close to existing sources defined as areas where residents of a proposed development could be exposed to air quality in excess of National or European standards;	**No**
3. Developments that have the potential to increase traffic flows or congestion in an area. A 5% increase in traffic flows Annual Average Daily Traffic (AADT) in an area where traffic flows are in excess of 10,000 AADT would be considered significant;	**No** *There are traffic flows the increase more than 5% but all of these flows are below 10,000 AADT.*
4. Proposals that include large car parks or where a significant increase in the existing car parking provision is proposed. A large car park is defined as having 300 spaces or more. A significant increase is defined as a 25% increase in car park spaces in excess of 300 spaces;	**No**
5. Developments that lead to an increase of vehicle movements greater than 60 vehicle movements in an hour;	**No**
6. Developments that have a particularly sensitive end use e.g. crèches, hospitals and care homes;	**No**
7. Developments where the construction work has the potential to impact upon nearby residents; and	**Yes**
8. Any development that has the potential to adversely impact upon the Air Quality Action Plan (AQAP) or its implementation.	**No** *ANDBC do not have any AQAP*

The development meets some the criteria set out in the guidance document. An air quality impact assessment may be undertaken according to the BCC criteria.

9.3.2.9.2 Land Use Planning & Development Control: Planning for Air Quality (IAQM, 2017)

This IAQM document sets out indicative criteria for requiring an air quality assessment. These points are set out in Table 9.5.

Table 9.5: IAQM Indicative criteria for requiring an air quality assessment.

The development will:	Indicative Criteria to Proceed to an Air Quality Assessment a	Does this proposed development satisfy the criteria?
1. Cause a significant change in Light Duty Vehicle (LDV) traffic flows on local roads with relevant receptors. (LDV = cars and small vans <3.5t gross vehicle weight)	A change of LDV flows of: - more than 100 AADT within or adjacent to an AQMA - more than 500 AADT elsewhere	**Yes**
2. Cause a significant change in Heavy Duty Vehicle (HDV) flows on local roads with relevant receptors. (HDV = goods vehicles + buses >3.5t gross vehicle weight).	A change of HDV flows of: - more than 25 AADT within or adjacent to an AQMA - more than 100 AADT elsewhere.	**No**
3. Realign roads, i.e. changing the proximity of receptors to traffic lanes.	Where the change is 5m or more and the road is within an AQMA.	**No**
4. Introduce a new junction or remove an existing junction near to relevant receptors	Applies to junctions that cause traffic to significantly change vehicle accelerate/decelerate, e.g. traffic lights, or roundabouts.	**No**
5. Introduce or change a bus station.	Where bus flows will change by: - more than 25 AADT within or adjacent to an AQMA - more than 100 AADT elsewhere	**No**

6. Have an underground car park with extraction system.	The ventilation extract for the car park will be within 20 m of a relevant receptor. Coupled with the car park having more than 100 movements per day (total in and out).	**No**
7. Have one or more substantial combustion processes, where there is a risk of impacts at relevant receptors. NB. this includes combustion plant associated with standby emergency generators (typically associated with centralised energy centres) and shipping	Typically, any combustion plant where the single or combined emission rate is less than 5 mg/sec* is unlikely to give rise to impacts, provided that the emissions are released from a vent or stack in a location and at a height that provides adequate dispersion. In situations where the emissions are released close to buildings with relevant receptors, or where the dispersion of the plume may be adversely affected by the size and/or height of adjacent buildings (including situations where the stack height is lower than the receptor) then consideration will need to be given to potential impacts at much lower emission rates. Conversely, where existing nitrogen dioxide concentrations are low, and where the dispersion conditions are favourable, a much higher emission rate may be acceptable.	*Full details are not known at this early stage in the project. Full specification of combustion systems will be defined at detailed design stage.*

**As a guide, the 5 mg/s criterion equates to a 450 kW ultra-low NOx gas boiler or a 30kW CHP unit operating at <95mg/Nm3.*

The proposed development meets some criteria requiring a proposal to be supported with an air quality assessment according to the IAQM criteria.

9.3.2.9.3 Design Manual for roads and Bridges (DMRB) Volume 11

The approach to considering an assessment (local assessment) or screening it out follows the guidance set out by the DMRB Volume 11, Section 3, Part 1 (HA, 2007). For this proposed development none of the criteria are met. There is not predicted to be any significant change in traffic volumes when the proposed development is operational compared to the existing baseline scenario. In addition to this, in terms of designated ecological sites, the proposed development site is not located within or in close proximity to relevant ecological features pertaining to considering impacts from air quality. Designated site that should be considered for assessment are those which the designated features are sensitive to air pollutants, either directly or indirectly, and which could be adversely affected by the effect of local air quality on vegetation with the following nature conservation sites: SACs (SCIs or SACs), SPAs, pSPAs, ASSIs and Ramsar sites.

For regional air quality none of the 3 criteria are met. There is not predicted to be any significant change in traffic volumes when the new development is operational compared to the existing baseline scenario. Therefore, there is no significant regional air quality impact from the proposed development and a regional assessment is scoped out and no longer considered in this report.

Air quality can be scoped out in terms of the DMRB guidance and an assessment is not required either for local or regional impacts.

9.3.2.10 Summary of air quality threshold for assessment/screening out

Table 9.6 gives a summary of the justification of undertaking an air quality assessment in support of the proposed development.

Table 9.6: Justification for an air quality assessment.

Guidance Document	Criteria Met?
Construction: IAQM (2014): Guidance on the Assessment of Dust from Demolition and Construction	✓**Yes**
Construction: Belfast City Council's Air Quality and Land Use Planning Guidance	✓**Yes**
Operational: IAQM (2017) Land-Use Planning & Development Control: Planning for Air Quality	✓**Yes**
Operational: Belfast City Council's Air Quality and Land Use Planning Guidance	✓**Yes**

Operational: Design Manual for Roads and Bridges (DMRB) Volume 11, Section 3 Part 1 HA 207/07 Air Quality – Local Assessment	✗**No**
Operational: Design Manual for Roads and Bridges (DMRB) Volume 11, Section 3 Part 1 HA 207/07 Air Quality – Regional Assessment	✗**No**

✗ **Does not meet criteria** ✓ **Meets criteria and assessed**

9.4 Baseline

9.4.1 Ards and North Down Borough Council (ANDBC)

9.4.1.1 ANDBC Air Quality Management Areas (AQMAs)

There are no current AQMAs in ANDBC. The local authority revoked (on 01st December 2007) an AQMA, which had previously been declared for Particulate Matter PM_{10} in 2005 in an urban area in Ards.

9.4.1.2 ANDBC Air Quality Reports

ANDBC last undertook an updating and screening assessment (USA) of air quality in 2015, followed by two progress reports carried out in 2016 and 2017. This is under accordance with the provisions of the Environment Act 1995 and subsequent regulations, where local authorities have a duty to review and assess air quality in their areas on a periodic basis to identify areas where air quality objectives are at risk of exceedance. It is compulsory for a USA to be prepared every three years by all local authorities in the UK.

ANDBC has completed a 2018 USA in accordance with the provisions of the Environment (Northern Ireland) Order 2002, the Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2007 and the relevant Policy and Technical Guidance documents. Within this report, no exceedances of the Air Quality Strategy objectives for 2017 were identified. Monitoring was carried out throughout 2018, on the main arterial route into Belfast City and hot spots around the Borough where traffic congestion is common at rush hour. Planned housing developments, such as one in the Movilla area of Newtownards, were examined by the Environmental Department and were found to have no significant impact on air quality.

In the 2018 report, ANDBC claim to be actively working towards improving air quality within the Borough, as air quality will be a considered in their Local Development Plan. For example, in 2017 Council approved plans to extend the Comber Green Way to Newtownards with a possible future extension to Donaghadee. This is a popular cycle and pedestrian route that connects with the Belfast cycle route and so will give easy access to the new Rapid Transport System from Dundonald through Belfast City Centre.

ANDBC has one automatic monitoring site on the A2 Holywood, which monitors NO_2 and PM_{10}. Manual calibrations are carried out every two weeks by the local air quality officer. Air Quality Data Management (AQDM) are employed to then ratify and validate the data. A specialist engineer is also employed to service and maintain the site as required.

Table 9.7: Details of ANDBC Automatic Monitoring Sites

Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	Relevant Exposure	Distinct to kerb	Pollutants Monitored	In AQMA?
Marine Parade Holywood A2	Roadside	339481	379328	Yes – 30m	4.6m	Nitrogen dioxide (NO_2), and particulate matter (PM_{10})	No

Table 9.8: Results of ANDBC Automatic Monitoring for NO_2: Comparison with Annual Mean Objective

Site Name	Annual Mean Concentration (µg.m^{-3})						
	Within AQMA?	Valid data capture for 2017 b	2013* c	2014* c	2015* c	2016 c	2017
Marine Parade Holywood A2	No	96.8%	29	30	26	30	25

In bold, exceedance of the NO_2 annual mean AQS objective of 40µg.m^{-3}

b i.e. data capture for the full calendar year (e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%)

c Means should be "annualised" as in Boxes 7.9 and 7.10 of LAQM.TG16, if valid data capture is less than 75%

*Annual mean concentrations for previous years are optional.

Table 9.9: Results of ANDBC Automatic Monitoring for NO_2: Comparison with 1-hour Mean Objective

Site Name	Number of Hourly Means > 200 µg.m^{-3}					
	Valid Data Capture 2017% b	**2013* c**	**2014* c**	**2015* c**	**2016 c**	**2017 c**
Marine Parade Holywood A2	96.8	2	0	0	1	1

In bold, exceedance of the NO_2 hourly mean AQS objective (200 µg.m^{-3}– not to be exceeded more than 18 times per year)

*b i.e. data capture for the full calendar year (e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%), c If the data capture for full calendar year is less than 85%, include the 99.8th percentile of hourly means in brackets , * Number of exceedances for previous years is optional*

9.4.1.2.1 Non-Automatic Monitoring Sites (Diffusion Tubes)

ANDBC has 15 NO_2 diffusion tube sites at roadside and background sites, as shown in Figure 9.1. Five of these are positioned along the A2 main arterial route into Belfast and the remainder of the tubes are at relevant exposure at various hotspots where there is traffic congestion at rush hour in Newtownards, Comber and Holywood.

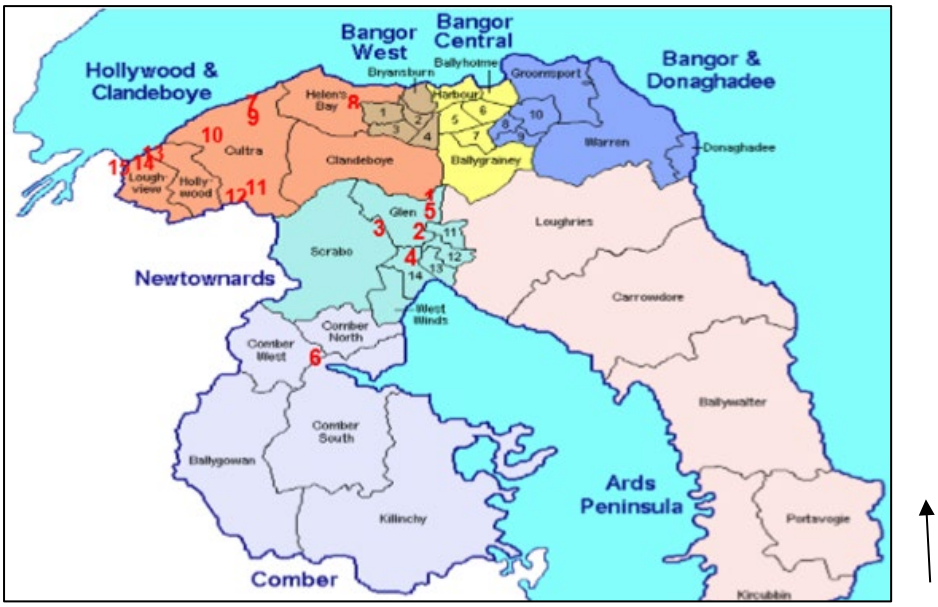
Table 9.10: Results of ANDBC NO_2 Diffusion Tube 2013 – 2017

		Annual Mean Concentration (µg.m^{-3})				
ANDBC Diffusion Tube Number	**Location**	**2013**	**2014**	**2015**	**2016**	**2017**
1	19 Islandmore Ave – N'Ards	11	9	11	12	12
2	19 Bangor Road – N'Ards	28	23	26	28	28
3	103 Church St. – N'Ards	25	22	24	23	24
4	67 South St. – N'Ards	24	22	24	26	26
5	82 Francis St. – N'Ards	23	22	24	24	25
6	11 High St. – Comber	30	27	30	32	32
7	Seahill	10	8	10	11	11
8	A2 Ballyrobert	30	24	26	31	28
9	A2 Seahill	16	10	12	15	13
10	A2 Cultra	21	17	20	23	21
11	1 Craigantlet Road	19	21	23	25	25
12	The Cottages - Craigantlet	17	15	15	19	19
13	High Street – Holywood	24	23	23	21	21
14	A2 Flats – Holywood (1)	-	-	33	37	36
15	As Flats – Holywood (2)	-	-	32	33	37

In bold, exceedance of nitrogen dioxide annual mean AQS objective of 40 µg.m^{-3}are highlighted in bold.

Underlined, nitrogen dioxide annual mean more than 60 µg.m^{-3} indicating a potential exceedance of the hourly mean.

Figure 9.1 Location of the ANDBC diffusion tubes (*From ANDBC USA, 2018*)



The results of the diffusion tube studies for the past five years, shown in Figure 9.2, do not show any particular trends, with all results within the objective. The two diffusion tubes on the A2 Flats Holywood are close to the objective but the Automatic site within 200m to these is showing a much lower result; this may be due to the close proximity to the road and traffic lights. However, this will not affect the application site as they are not located near it.

Sites 7-10 are the locations of the diffusion tubes closest to the application site and their levels do not exceed the AQS limit. The highest of these readings was 31 µg.m^{-3} at Site 8 in 2016, however this level then decreased in 2017 so does not show any signs of rising.

Figure 9.2 ANDBC diffusion tube results 2013 – 2017

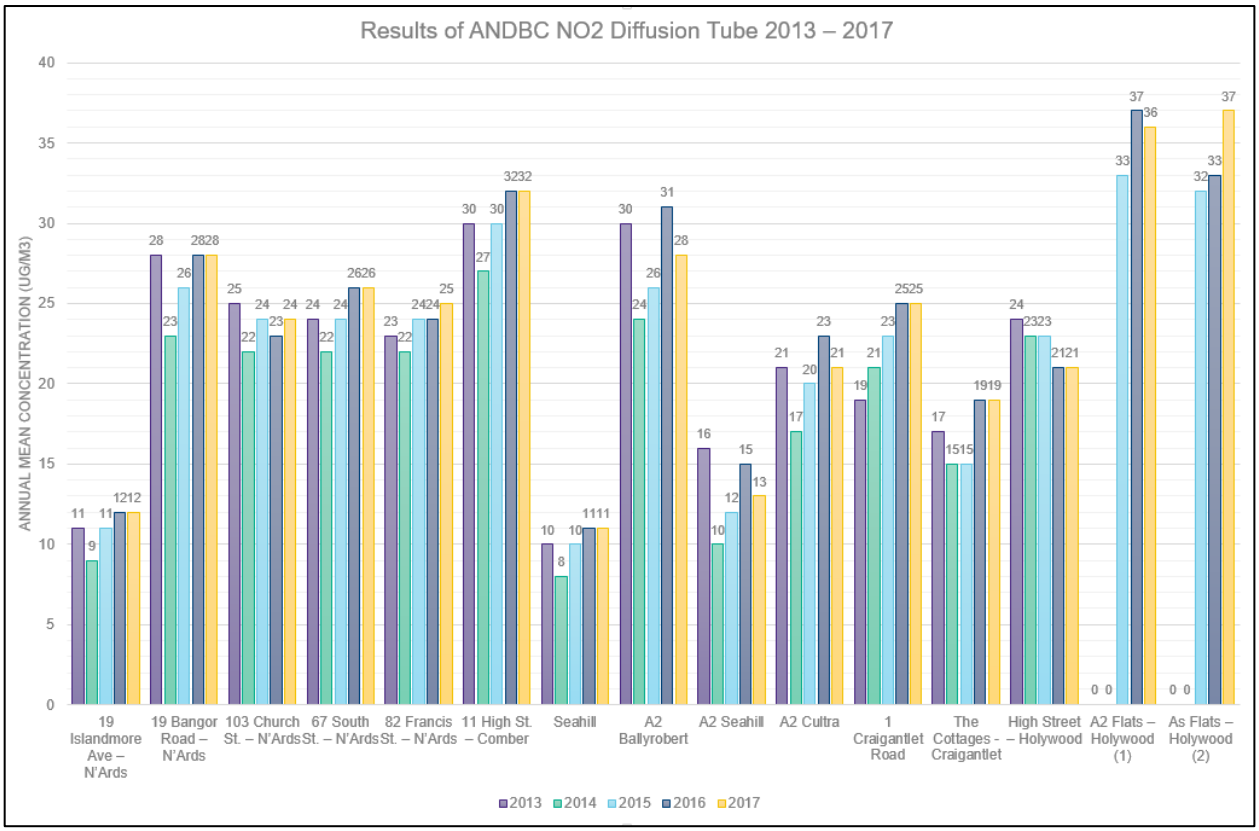


Figure 9.2 shows there were no exceedances of the AQS objectives according to the monitoring data collected since the last USA. All monitored pollutant concentrations have been below their respective air quality objective limits at relevant exposure.

The 2018 USA report showed that there were no monitoring sites at relevant exposure within the Council Area that showed exceedances of air quality objectives. Although the two NO_2 tube sites in Holywood at an apartment block on the A2 were below the objective, their levels increased in 2016 and remained high in 2017; showing the highest levels along this main route to Belfast. Monitoring continues in 2018 to assess the area as the building of a shopping and residential complex commenced in 2017 adjacent to the apartment block which may restrict the air flow further. As shown in Figure 9.1, the two discussed NO_2 tube sites in Holywood are not located near the proposed application site.

9.4.2 DEFRA Background Levels

9.4.2.1 Introduction to Defra background levels

A user guide has been compiled by Bureau Veritas in the role of Project Manager for the Local Air Quality Management (LAQM) Helpdesk.

Air pollution background concentration maps are published by Defra and the Devolved Administrations to assist local authorities in carrying out Review and Assessment of local air quality as part of their duties under the Environment Act 1995. The purpose of this user guide is to explain the background maps and the related tools that are available, and to provide guidance on their use. This user guide consolidates previously available information and guidance to local authorities on background concentration maps and supporting tools.

UK background maps are made available for a reference year and projected future years for a range of pollutants including oxides of nitrogen (NOx), nitrogen dioxide (NO_2) and particulate matter (PM_{10} and $PM_{2.5}$). The Scottish Government publishes separate maps for use by Scottish authorities and these are also mentioned in this guide. Maps with Northern Ireland coordinate references are also available.

New background maps are released by Defra periodically due to updates to the underlying data, including emissions factors. Local authorities should use the most up-to-date data and supporting tools made available, which have been updated for their use with the 2017 reference year maps.

For NOx, NO_2, PM_{10} and $PM_{2.5}$ the current reference year is 2017. For sulphur dioxide (SO_2), benzene, carbon monoxide (CO) and 1,3-butadiene, the current reference year is 2001 as it has not been necessary to update the forecasts because ambient concentrations rarely exceed the Air Quality Strategy (AQS) objectives for these pollutants. For 2010 and 2011 reference years, correction factors are available to counter the effects of unusual meteorology on NO_2 (2010 only) and PM_{10} (2011 only).

A number of techniques and tools are available to support and help local authorities in their use of the background maps. The techniques that are detailed include:

- Removing the Influence of Unusual Pollution Years;
- NO_2 Adjustment for NOx Sector Removal;
- Using Background Maps to Adjust Monitoring Data;
- Reference Year Queries and Data Availability; and,
- Manipulation of Background Maps without GIS (Geographical Information System).

The tools are:

- NOx to NO_2 Calculator;

- NO_2 Adjustment for NOx Sector Removal Tool; and,
- Year Adjustment Factors.

9.4.2.1.1 Main purpose

The main purpose of the background maps is to provide estimates of background concentrations for specific pollutants. These can then be used in air quality assessments to better understand the contribution of local sources to total pollutant concentrations. They provide information on how pollutant concentrations change over time and across a wide area. They also provide an estimated breakdown of the relative sources of pollution. The maps allow for the assessment of new pollutant sources that are introduced into an area and the impact they may have upon local air quality.

9.4.2.1.2 Definition of Background Concentrations

The total concentration of a pollutant comprises those from explicit local emission sources such as, roads, chimney-stacks, etc., and those that are transported into an area by the wind from further away. If all the local sources were removed, all that would remain is that which comes in from further away; it is this component that is called 'background'.

In many situations the background contribution may represent a significant or dominant proportion of the total pollutant concentration, so it is important that authorities give this careful consideration. A good understanding of background concentrations is important when completing air quality assessments as this in turn allows for a good understanding of local pollutant sources.

9.4.2.1.3 Data Content and Format

Local Authorities

Background maps are available for each local authority in England, Wales, Scotland and Northern Ireland. It is possible to select the preferred pollutant and the year desired using the data selector drop-down on the background maps area of the UK-AIR website.

Pollutants

The background maps contain estimates of pollutant concentrations based on an average over a year (annual average) for the following pollutants:

- 2001 - SO_2, CO, Benzene, 1,3-butadiene
- 2017 – NOx, NO2, PM10, PM2.5

Spatial and Temporal Resolution

The background pollutant concentration maps are presented in 1km x 1km grid squares across England, Wales, Scotland and Northern Ireland. The current version of the background maps (reference year 2017) contains estimates for NOx, NO_2, PM_{10} and $PM_{2.5}$ for the period 2017 through to 2030.

For SO_2, CO, benzene and 1,3-butadiene the data are available in the 2001 reference year maps for the years, 2001, 2003 and 2010. Year adjustment factors can be used to adjust this data.

Source Sectors

The background map total concentrations for NOx, PM_{10} and $PM_{2.5}$ are made up of contributing source sectors. The source sectors include transport, industry and commercial. Source sectors are also split into those emitted from within a grid square and those that enter the grid square from outside. In presenting the data in this way the individual sectors can be subtracted from the total background where a more detailed local assessment is to be carried out for that sector.

This approach reduces the risk of double counting pollutant concentrations by avoiding the inclusion of both the estimated background component and the detailed sector component being evaluated. Section 4.2.2 details Defra background area sources for in relation to the proposed development.

9.4.2.2 Defra Background Values for this assessment

The Defra levels for a co-ordinate (X350500, Y381500) in close proximity to the proposed development site are as follows (for 2019):

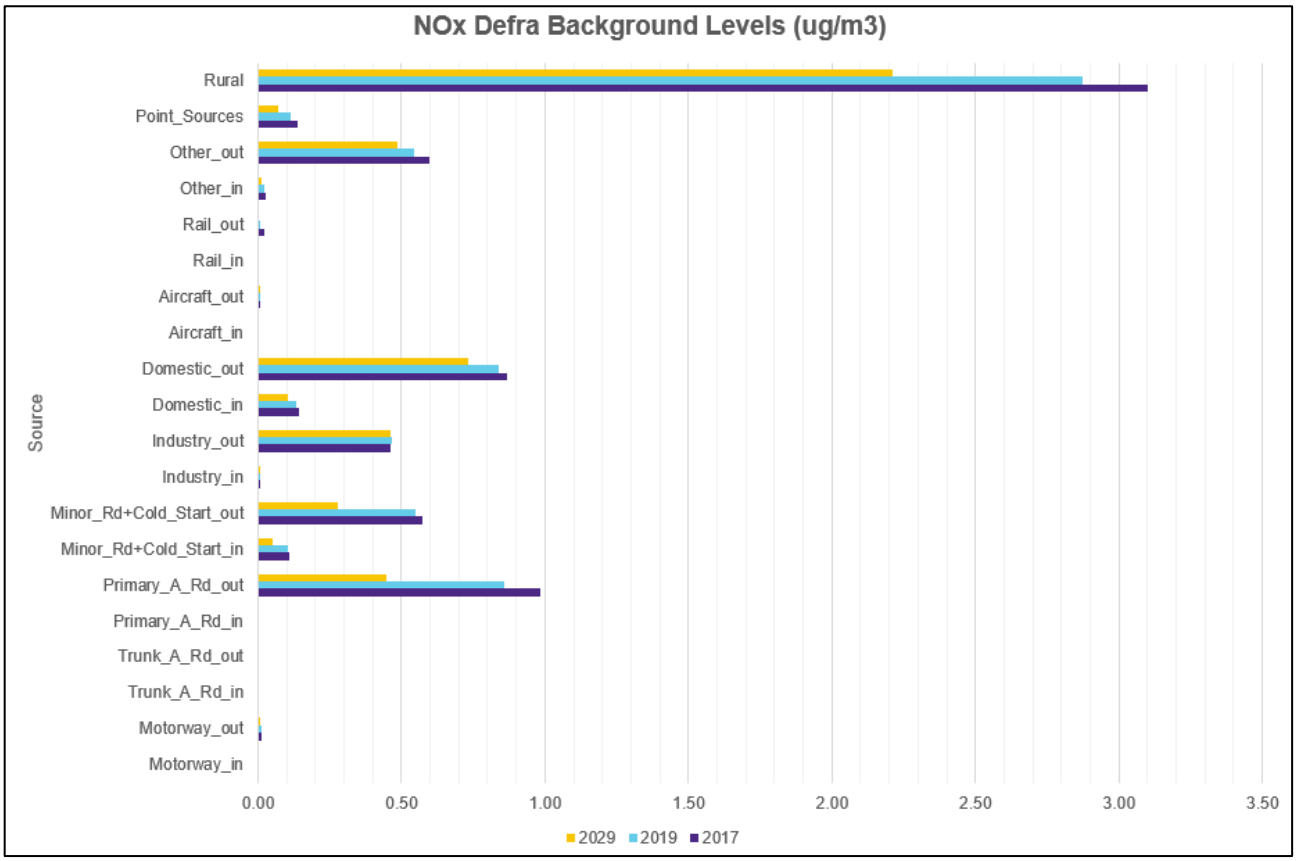
- NOx Annual Mean 6.55 $\mu g.m^{-3}$
- Nitrogen Dioxide Annual Mean 5.11 $\mu g.m^{-3}$
- Particulate Matter (PM_{10}) Annual Mean 9.71 $\mu g.m^{-3}$
- Particulate Matter ($PM_{2.5}$) Annual Mean 5.7 $\mu g.m^{-3}$

A full breakdown of the sources of each pollutant for 2016, 2019 and 2031 are detailed in Tables 9.11a – 9.11c for Defra location B as illustrated in Figure 9.6.

Table 9.11a: Nitrogen Dioxide µg.m^{-3}- DEFRA Background Pollutant Levels (X351500, Y373500)

Year	2017	2017	Year	2019	2019	Year	2029	2029
Source	NOx	NO2	Source	NOx	NO2	Source	NOx	NO2
Motorway_in_17	0.00	Total Nitrogen Dioxide	Motorway_in_19	0.00	Total Nitrogen Dioxide	Motorway_in_24	0.00	Total Nitrogen Dioxide
Motorway_out_17	0.01		Motorway_out_19	0.01		Motorway_out_24	0.01	
Trunk_A_Rd_in_17	0.00		Trunk_A_Rd_in_19	0.00		Trunk_A_Rd_in_24	0.00	
Trunk_A_Rd_out_17	0.00		Trunk_A_Rd_out_19	0.00		Trunk_A_Rd_out_24	0.00	
Primary_A_Rd_in_17	0.01		Primary_A_Rd_in_19	0.00		Primary_A_Rd_in_24	0.00	
Primary_A_Rd_out_17	0.98		Primary_A_Rd_out_19	0.86		Primary_A_Rd_out_24	0.45	
Minor_Rd+Cold_Start_in_17	0.11		Minor_Rd+Cold_Start_in_19	0.10		Minor_Rd+Cold_Start_in_24	0.05	
Minor_Rd+Cold_Start_out_17	0.57		Minor_Rd+Cold_Start_out_19	0.55		Minor_Rd+Cold_Start_out_24	0.28	
Industry_in_17	0.01		Industry_in_19	0.01		Industry_in_24	0.01	
Industry_out_17	0.46		Industry_out_19	0.47		Industry_out_24	0.46	
Domestic_in_17	0.14		Domestic_in_19	0.13		Domestic_in_24	0.11	
Domestic_out_17	0.87		Domestic_out_19	0.84		Domestic_out_24	0.73	
Aircraft_in_17	0.00		Aircraft_in_19	0.00		Aircraft_in_24	0.00	
Aircraft_out_17	0.01		Aircraft_out_19	0.01		Aircraft_out_24	0.01	
Rail_in_17	0.00		Rail_in_19	0.00		Rail_in_24	0.00	
Rail_out_17	0.02		Rail_out_19	0.01		Rail_out_24	0.00	
Other_in_17	0.03		Other_in_19	0.02		Other_in_24	0.01	
Other_out_17	0.59		Other_out_19	0.55		Other_out_24	0.49	
Point_Sources_17	0.14		Point_Sources_19	0.11		Point_Sources_24	0.07	
Rural_17	3.10		Rural_19	2.87		Rural_24	2.21	
Total_NOx_17	**7.05**	**5.48**	**Total_NOx_19**	**6.55**	**5.11**	**Total_NOx_24**	**4.89**	**3.85**

Figure 9.3 Nitrogen Dioxide µg.m^{-3}- DEFRA Background Pollutant Levels (X351500, Y373500)



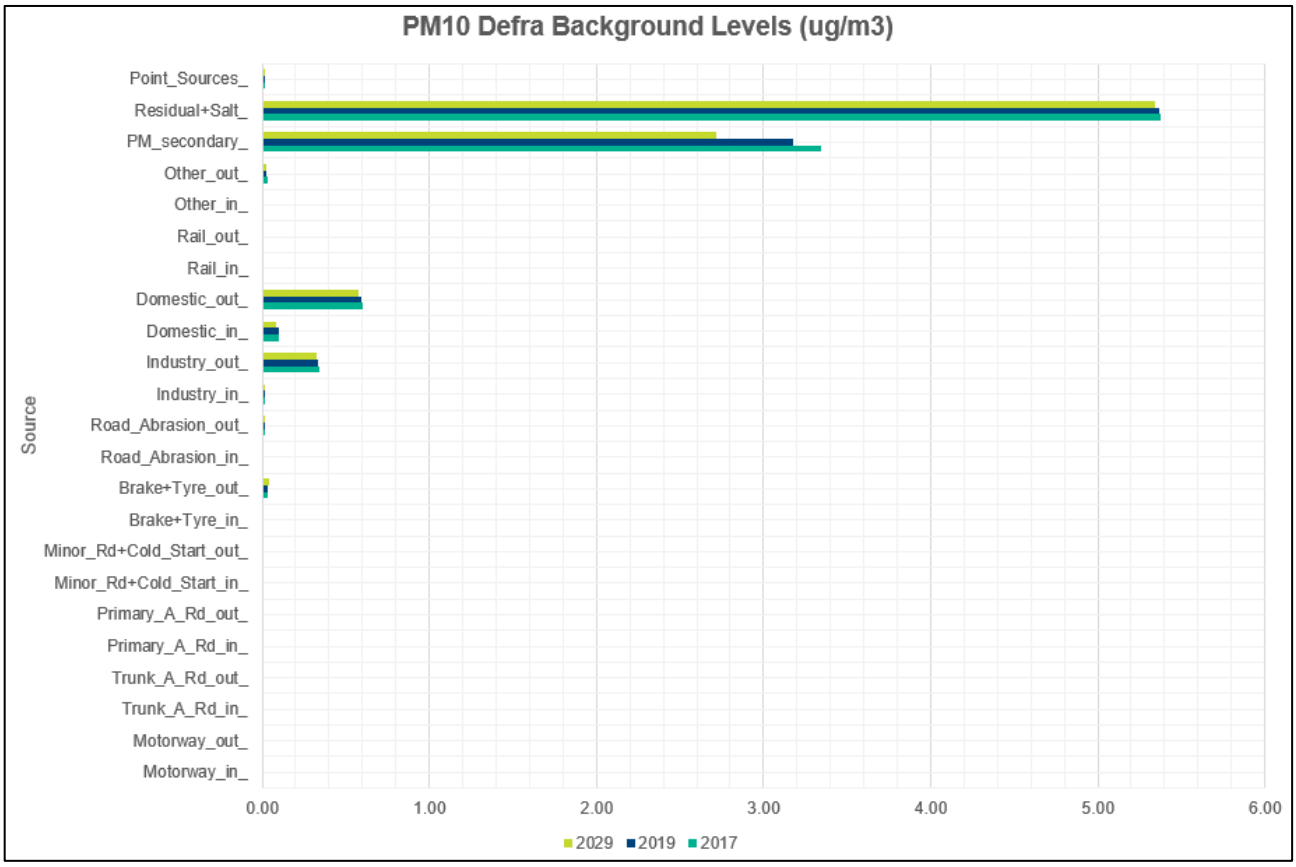
The largest NOx pollution source for 2017 is Rural followed by Domestic - Domestic, institutional and commercial space heating. The largest NOx pollution source for 2019

and 2024 is Rural followed by Domestic - Domestic, institutional and commercial space heating.

Table 9.11b: Particulate Matter PM_{10} µg.m^{-3} - DEFRA Background Pollutant Levels (X351500, Y373500)

Year	2017	Year	2019	Year	2029
Source	**PM10**	**Source**	**PM10**	**Source**	**PM10**
Motorway_in_17	0.00	Motorway_in_19	0.00	Motorway_in_29	0.00
Motorway_out_17	0.00	Motorway_out_19	0.00	Motorway_out_29	0.00
Trunk_A_Rd_in_17	0.00	Trunk_A_Rd_in_19	0.00	Trunk_A_Rd_in_29	0.00
Trunk_A_Rd_out_17	0.00	Trunk_A_Rd_out_19	0.00	Trunk_A_Rd_out_29	0.00
Primary_A_Rd_in_17	0.00	Primary_A_Rd_in_19	0.00	Primary_A_Rd_in_29	0.00
Primary_A_Rd_out_17	0.01	Primary_A_Rd_out_19	0.01	Primary_A_Rd_out_29	0.00
Minor_Rd+Cold_Start_in_17	0.00	Minor_Rd+Cold_Start_in_19	0.00	Minor_Rd+Cold_Start_in_29	0.00
Minor_Rd+Cold_Start_out_17	0.01	Minor_Rd+Cold_Start_out_19	0.01	Minor_Rd+Cold_Start_out_29	0.00
Brake+Tyre_in_17	0.00	Brake+Tyre_in_19	0.00	Brake+Tyre_in_29	0.00
Brake+Tyre_out_17	0.04	Brake+Tyre_out_19	0.04	Brake+Tyre_out_29	0.04
Road_Abrasion_in_17	0.00	Road_Abrasion_in_19	0.00	Road_Abrasion_in_29	0.00
Road_Abrasion_out_17	0.02	Road_Abrasion_out_19	0.02	Road_Abrasion_out_29	0.02
Industry_in_17	0.02	Industry_in_19	0.02	Industry_in_29	0.02
Industry_out_17	0.34	Industry_out_19	0.34	Industry_out_29	0.32
Domestic_in_17	0.10	Domestic_in_19	0.10	Domestic_in_29	0.09
Domestic_out_17	0.60	Domestic_out_19	0.60	Domestic_out_29	0.57
Rail_in_17	0.00	Rail_in_19	0.00	Rail_in_29	0.00
Rail_out_17	0.00	Rail_out_19	0.00	Rail_out_29	0.00
Other_in_17	0.00	Other_in_19	0.00	Other_in_29	0.00
Other_out_17	0.03	Other_out_19	0.03	Other_out_29	0.03
PM_secondary_17	3.34	PM_secondary_19	3.18	PM_secondary_29	2.72
Residual+Salt_17	5.37	Residual+Salt_19	5.36	Residual+Salt_29	5.35
Point_Sources_17	0.02	Point_Sources_19	0.02	Point_Sources_29	0.01
Total_PM10_17	**9.90**	**Total_PM10_19**	**9.71**	**Total_PM10_29**	**9.18**

Figure 9.4: Particulate Matter PM_{10} µg.m^{-3} - DEFRA Background Pollutant Levels (X351500, Y373500)

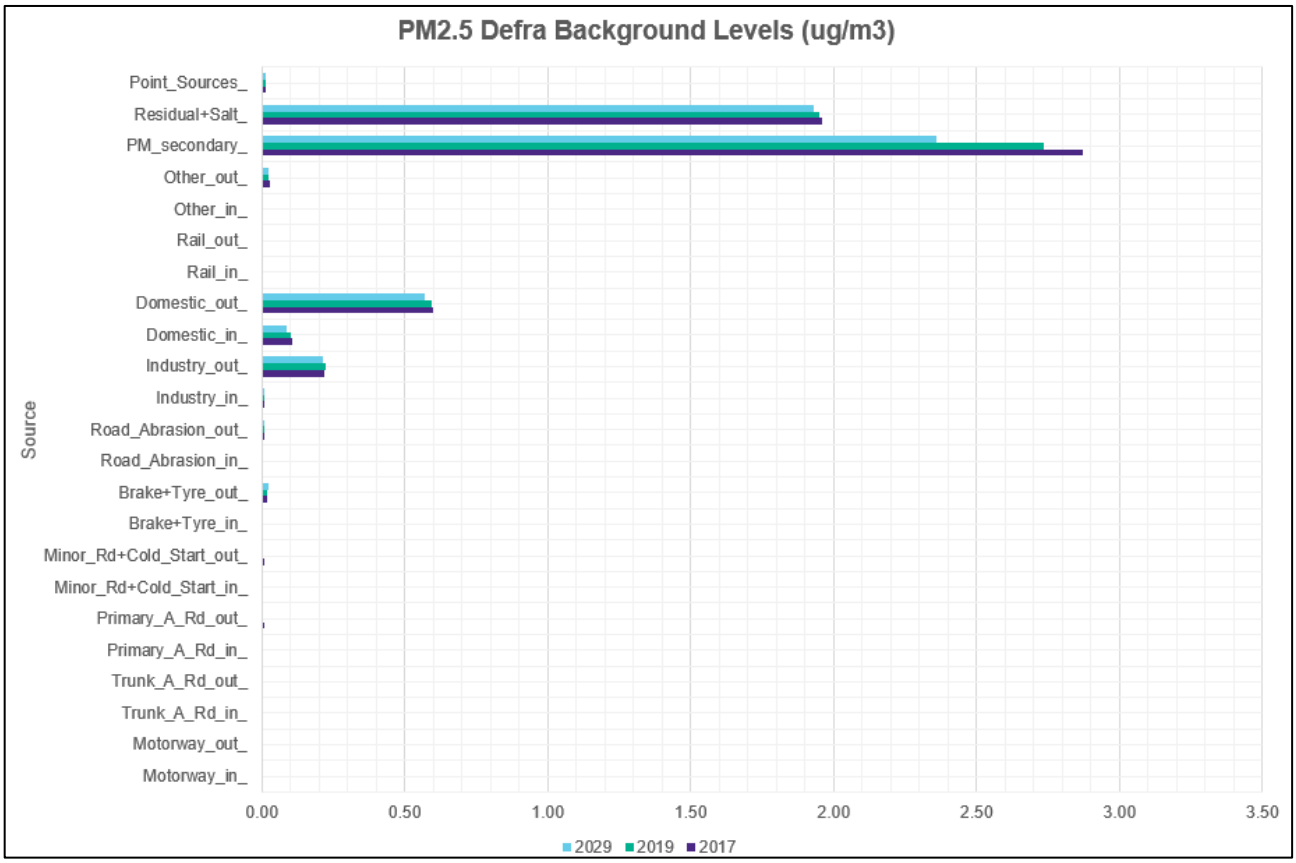


The largest PM_{10} pollution source for 2016, 2019 and 2024 is *Residual & Salt* - Sea salt, calcium and iron rich dusts followed by PM secondary.

Table 9.11c: Particulate Matter $PM_{2.5}$ µg.m^{-3} - DEFRA Background Pollutant Levels (X351500, Y373500)

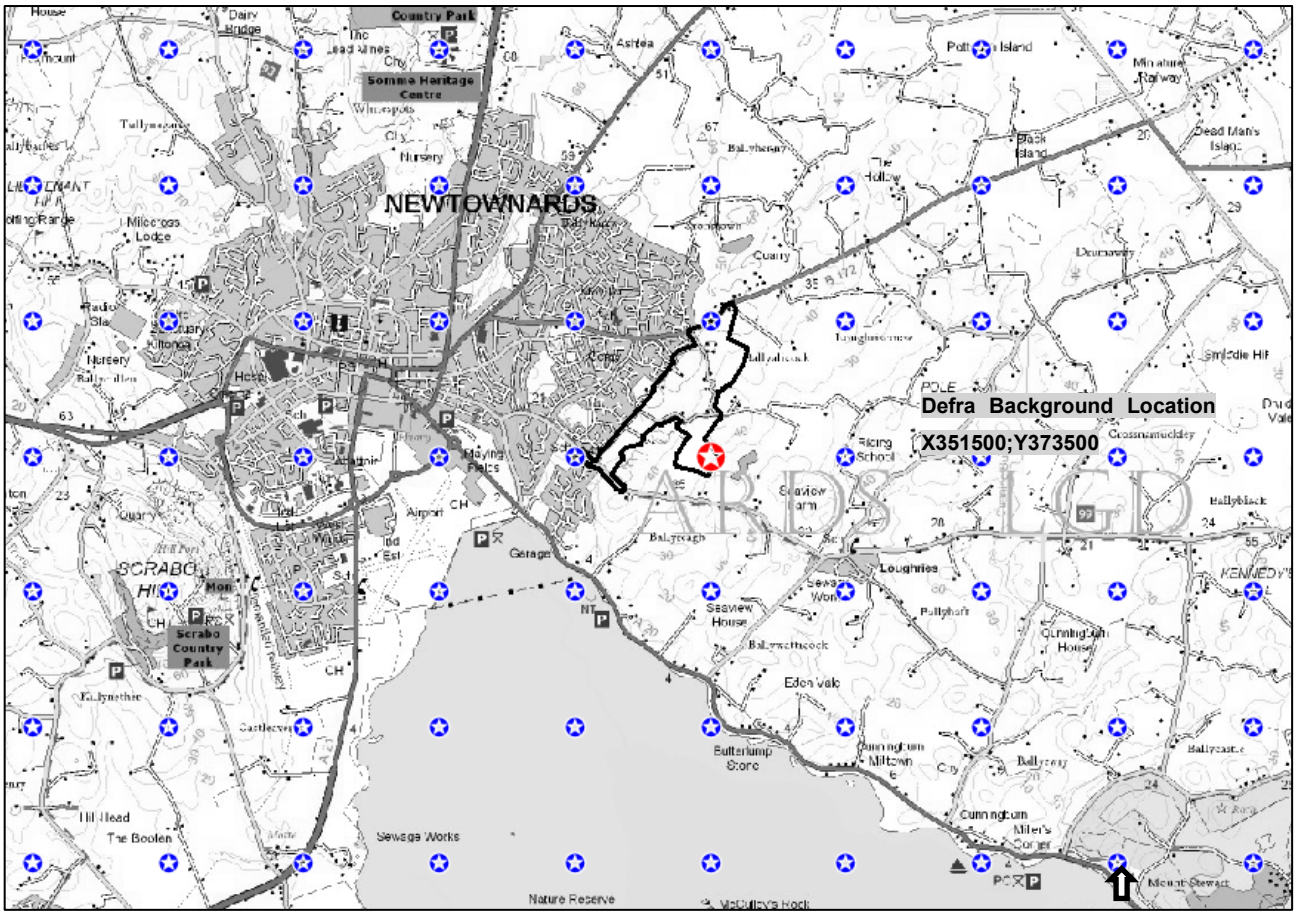
Year	2017	Year	2019	Year	2029
Source	**PM2.5**	**Source**	**PM2.5**	**Source**	**PM2.5**
Motorway_in_17	0.00	Motorway_in_19	0.00	Motorway_in_29	0.00
Motorway_out_17	0.00	Motorway_out_19	0.00	Motorway_out_29	0.00
Trunk_A_Rd_in_17	0.00	Trunk_A_Rd_in_19	0.00	Trunk_A_Rd_in_29	0.00
Trunk_A_Rd_out_17	0.00	Trunk_A_Rd_out_19	0.00	Trunk_A_Rd_out_29	0.00
Primary_A_Rd_in_17	0.00	Primary_A_Rd_in_19	0.00	Primary_A_Rd_in_29	0.00
Primary_A_Rd_out_17	0.01	Primary_A_Rd_out_19	0.01	Primary_A_Rd_out_29	0.00
Minor_Rd+Cold_Start_in_17	0.00	Minor_Rd+Cold_Start_in_19	0.00	Minor_Rd+Cold_Start_in_29	0.00
Minor_Rd+Cold_Start_out_17	0.01	Minor_Rd+Cold_Start_out_19	0.01	Minor_Rd+Cold_Start_out_29	0.00
Brake_tyre_in_17	0.00	Brake+Tyre_in_19	0.00	Brake+Tyre_in_29	0.00
Brake_tyre_out_17	0.02	Brake+Tyre_out_19	0.02	Brake+Tyre_out_29	0.02
Road_Abrasion_in_17	0.00	Road_Abrasion_in_19	0.00	Road_Abrasion_in_29	0.00
Road_Abrasion_out_17	0.01	Road_Abrasion_out_19	0.01	Road_Abrasion_out_29	0.01
Industry_in_17	0.01	Industry_in_19	0.01	Industry_in_29	0.01
Industry_out_17	0.22	Industry_out_19	0.22	Industry_out_29	0.22
Domestic_in_17	0.11	Domestic_in_19	0.10	Domestic_in_29	0.09
Domestic_out_17	0.60	Domestic_out_19	0.59	Domestic_out_29	0.57
Rail_in_17	0.00	Rail_in_19	0.00	Rail_in_29	0.00
Rail_out_17	0.00	Rail_out_19	0.00	Rail_out_29	0.00
Other_in_17	0.00	Other_in_19	0.00	Other_in_19	0.00
Other_out_17	0.03	Other_out_19	0.03	Other_out_29	0.02
PM_secondary_17	2.87	PM_secondary_19	2.74	PM_secondary_29	2.36
Residual+Salt_17	1.96	Residual+Salt_19	1.95	Residual+Salt_29	1.93
Point_Sources_17	0.01	Point_Sources_19	0.01	Point_Sources_29	0.01
Total_PM2.5_17	**5.86**	**Total_PM2.5_19**	**5.70**	**Total_PM2.5_29**	**5.25**

Figure 9.5: Particulate Matter $PM_{2.5}$ µg.m^{-3} - DEFRA Background Pollutant Levels (X351500, Y373500)



The largest $PM_{2.5}$ pollution source for all years is PM Secondary. Residual & Salt - Sea salt, calcium and iron rich dusts is the second highest pollutant.

Figure 9.6 Defra Background Locations



Defra location (X351500, Y373500) is the closest to the proposed development site. This is highlighted on the figure.

9.5 Impact Assessment

9.5.1 Assessment of Construction Phase

9.5.1.1 Construction Dust

The type of activities that could cause fugitive dust emissions are: demolition; earthworks; handling and disposal of spoil; wind-blown particulate material from stockpiles; handling of loose construction materials; and movement of vehicles, both on and off site. The level and distribution of construction dust emissions will vary according to factors such as the type of dust, duration and location of dust-generating activity, weather conditions and the effectiveness of suppression methods.

The main effect of any dust emissions, if not mitigated, could be annoyance due to soiling of surfaces, particularly windows, cars and laundry. However, it is normally possible, by

implementation of proper control, to ensure that dust deposition does not give rise to significant adverse effects, although short-term events may occur (for example, due to technical failure or exceptional weather conditions). The following assessment, using the IAQM methodology, predicts the risk of dust impacts and the level of mitigation that is required to control the residual effects to a level that is "not significant".

9.5.1.2 Risk of Dust Impact

9.5.1.2.1 Source

Table 9.12 summaries the dust emissions sources.

Table 9.12: Dust Sources Assessed

Source
Demolition
Earthworks
Construction
Trackout

9.5.1.2.2 Pathway and Receptor - Sensitivity of the Area

All earthworks and construction activities are assumed to occur within the site boundary. As such, receptors at distances within 20 m, 50 m, 100 m, 200 m and 350 m of the site boundary have been identified and are illustrated in Figure 9.7. The sensitivity of the area has been classified and the results are provided in Table 9.13 below.

Figure 9.7 Construction Dust Assessment – Distance Bandings (m) from Site Boundary

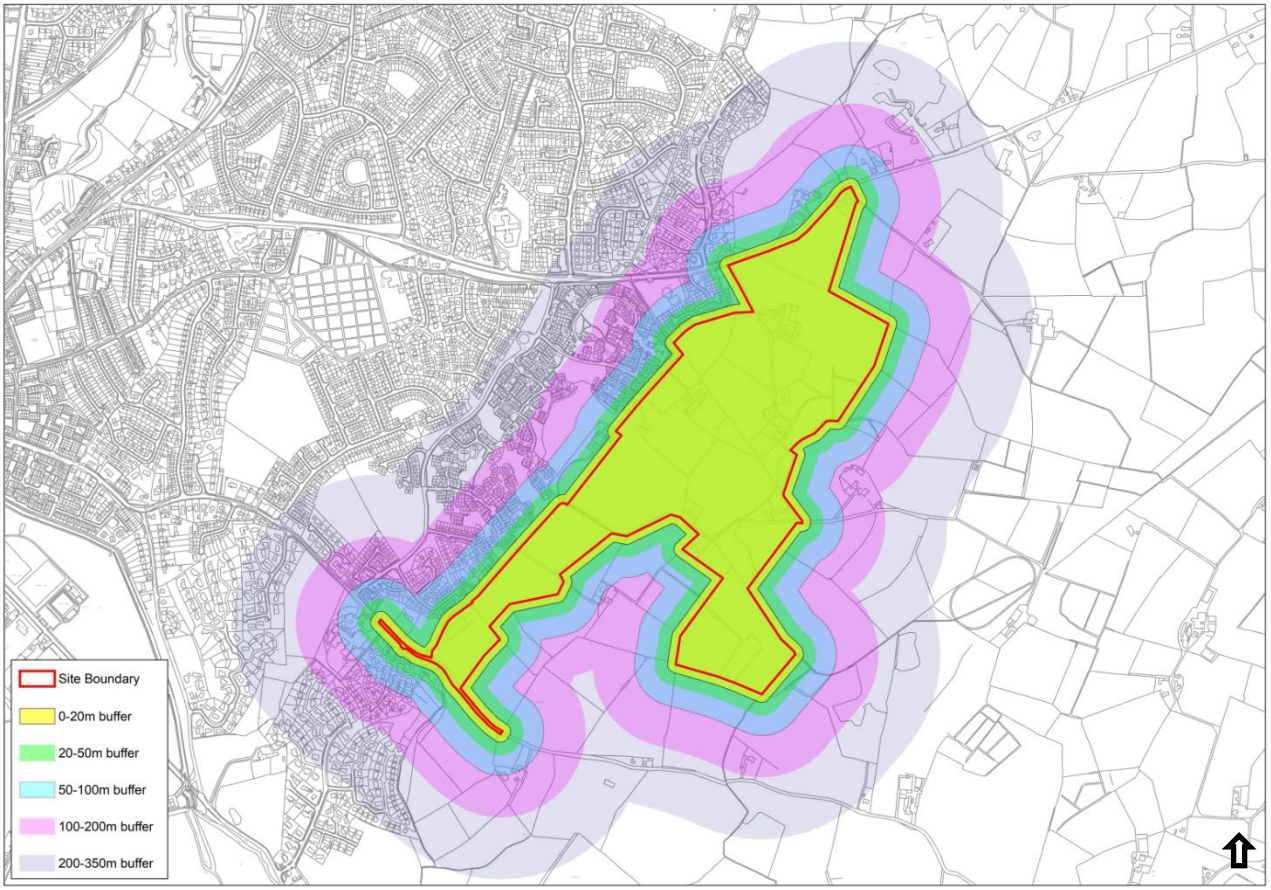


Table 9.13: Sensitivity of the Surrounding Area for Demolition, Earthworks and Construction

Potential Impact	Sensitivity of the Surrounding Area	Reason for Sensitivity Classification
Dust Soiling	High	10 – 100 high sensitivity receptors located within 50 m of the site boundary (Appendix 9.1 Table A5).
Human Health	High	Background annual-mean PM10 concentration for the assessment = 9.71 µg.m^{-3}. 10 – 100 high sensitivity receptors located within 50 m of the site boundary and PM10 concentrations less than 24 µg.m^{-3} (Appendix 9.1 Table A6).

The Dust Emission Magnitude for trackout is classified as medium and trackout may occur on roads up to 200 m from the site. The sensitivity of the area has been classified and the results are provided in Table 9.14 below.

Table 9.14: Sensitivity of the Surrounding Area for Trackout

Potential Impact	Sensitivity of the Surrounding Area	Reason for Sensitivity Classification
Dust Soiling	High	10 – 100 high sensitivity receptors located within 50 m of the site boundary (Appendix 9.1 Table A5).
Human Health	High	Background annual-mean PM10 concentration for the assessment = 9.71 µg.m^{-3}. 10 – 100 high sensitivity receptors located within 50 m of the site boundary and PM10 concentrations less than 24 µg.m^{-3} (Appendix 9.1 Table A6).

9.5.1.2.3 Overall Dust Risk

The Dust Emission Magnitude has been considered in the context of the Sensitivity of the Area (Appendix 9.1 Table A8 and Appendix 9.1 Table A11) to give the Dust Impact Risk. Table 9.15 summarises the Dust Impact

Table 9.15: Dust Impact Risk for Demolition, Earthworks, Construction and Trackout

Source	Sensitivity	Dust Emission Magnitude	Risk
Demolition	High	Medium	**Medium**
Earthworks	High	Large	**High**
Construction	High	Large	**High**
Trackout	High	Medium	**Medium**

Taking the site as a whole, the overall risk is deemed to be 'medium-high'. The mitigation measures appropriate to a level of risk for the site as a whole and for each of the phases are set out in Section 6.

Mitigation measure are detailed in this report that will control dust during the demolition and construction phases of the proposed development this will reduce the risk to

negligible/not significant. Provided this package of mitigation measures (set out in this report) are implemented, the residual construction dust effects will not be significant.

The IAQM dust guidance states that; "For almost all construction activity, the aim should be to prevent significant effects on receptors through the use of effective mitigation. Experience shows that this is normally possible. Hence the residual effect will normally be 'not significant'." (IAQM, 2014).

The IAQM dust guidance recommends that significance is only assigned to the effect after the activities are considered with mitigation in place.

9.5.2 Assessment of Operational Phase – Traffic

This section of the report summarises the future operational-phase air quality impacts of the key pollutants associated with the development traffic of the proposed development.

Nitrogen Dioxide

Table 9.16 presents the annual-mean NO_2 concentrations predicted at existing receptors.

Table 9.16 Predicted Annual-Mean NO_2 Impacts at Representative Receptors

Nitrogen Dioxide	Receptor	Without 2031 (ug/m3)	With 2031 (ug/m3)	2031 Actual Difference (ug/m3)	2031 % Change	Overall Significance
1	Receptor A	7.69	9.48	1.79	23	Moderate
2	Receptor B	7.5	9.21	1.71	23	Moderate
3	Receptor C	5.09	6.92	1.83	36	Moderate
4	Receptor D	5.02	6.77	1.75	35	Moderate

Predicted annual-mean NO_2 concentrations in the opening year at existing receptors are below the AQS objective for NO_2. When the magnitude of change is considered in the context of the absolute concentrations, the impact descriptor is categorised as 'moderate'. As all predicted annual-mean NO_2 concentrations are below 60 $\mu g.m^{-3}$, the hourly-mean objective for NO_2 is likely to be met at all receptors. The short-term impact can be considered "negligible" and is not considered further within this assessment.

Overall, the impact on the surrounding area from NO_2 is considered to be acceptable, using the criteria adopted for this assessment and based on professional judgement.

Particulate Matter (PM_{10})

Table 9.17 presents the annual-mean PM_{10} concentrations predicted at existing receptors.

Table 9.17 Predicted Annual-Mean PM_{10} Impacts at Representative Receptors

Particulate Matter (10)	Receptor	Without 2031 (ug/m3)	With 2031 (ug/m3)	2031 Actual Difference (ug/m3)	2031 % Change	Overall Significance
1	Receptor A	9.94	10.30	0.36	4	Negligible
2	Receptor B	9.90	10.24	0.34	3	Negligible
3	Receptor C	9.42	9.78	0.36	4	Negligible
4	Receptor D	9.41	9.75	0.34	4	Negligible

Predicted annual-mean PM_{10} concentrations in the opening year at existing receptors are well below the AQS objective for PM_{10}. When the magnitude of change is considered in the context of the absolute concentrations, the impact descriptor at all receptors is categorised as 'negligible'.

As all predicted annual mean PM_{10} concentrations are below 31.5 µg.m-3, the daily-mean PM_{10} objective is expected to be met at all receptors. The short-term impact can be categorised as "negligible" and is not considered further within this assessment.

Overall, the impact on the surrounding area from PM_{10} is considered to be acceptable, using the criteria adopted for this assessment and based on professional judgement.

9.5.3 Assessment of Operational Phase – Heating Systems

9.5.3.1 Medium Combustion Plant Directive and Specified Generators

9.5.3.1.1 Introduction

The Pollution Prevention and Control (Industrial Emissions) Regulations (Northern Ireland) 2013 were amended in February 2018 to transpose the requirements of the Medium Combustion Plant Directive (MCPD –Directive (EU) 2015/2193 of 25 November 2015 on the limitation of emissions of certain pollutants into the air from medium combustion plants).

Medium Combustion Plants (MCPs) are used to generate heat and for power generation. MCPs are a source of air pollution and many are not currently regulated in the UK. The Government's primary driver for action on air quality is the impact it can have on health

and the environment. A cleaner, healthier environment benefits people and the economy. The MCPD fills the regulatory gap at EU level between large combustion plants (> 50 MW) covered by the Industrial Emissions Directive and smaller appliances (< 1 MW) covered by the *Ecodesign Directive*. The amendment also introduces emission controls on generators. For MCPs, the purpose of the MCPD is to improve air quality. All combustion plant between 1 and 50 MW (net rated thermal input) are required to obtain a permit or be registered.

From 20 December 2018 new medium combustion plant will need to be registered or have obtained a permit and comply with Emission Limit Values (ELVs) in respect of sulphur dioxide (SO_2), nitrogen oxides (NOx) and dust, set out in tables in MCPD – see details in Annex II, Part 2 of the Directive. The ELVs to be applied are dependent on plant, fuel type and size. Existing plant (i.e. those which were put into operation before 20 December 2018) will need to have obtained a permit or be registered and comply as follows:

Size	Register/permit	Comply with ELV's
5-50MW	1 Jan 2024	1 Jan 2025
1-5MW	1 Jan 2029	1 Jan 2030

9.5.3.1.2 Permitting

The Chief Inspector (NIEA) and District Councils will be required to review and issue permits to medium combustion plants. Plant located on Part A and Part B sites regulated under the 2013 Regulations will be dealt with by the Chief Inspector, while plant not on already regulated sites will be dealt with by the District Council of the area in which the plant is located. Annex I of the MCPD details the information to be submitted in the registration permit application process.

9.5.3.1.3 Flexibilities

There are a number of exclusions from the scope of MCPD (detailed in Article 2(3)) e.g. combustion plant used to propel a vehicle, ship or aircraft; turbines and engines used on offshore platforms; some driers; and thermal oxidisers. There are a number of exemptions listed (Article 6). Plants subject to these exemptions will still need permitted/ registered but are exempt (sometimes on a temporary basis) from compliance with ELVs e.g. plant operating under a certain number of hours, plant at gas compressor stations, small and micro isolated systems etc. These have been adopted in the Northern Ireland Regulations.

9.5.3.1.4 Monitoring

The operator must carry out monitoring of emissions after granting of a permit, and then at the following frequency:

Size	Monitoring frequency	Pollutants to be monitored
20-50MW	Annual	Those laid down in ELV tables plus carbon monoxide
1-20MW	One every 3 years	Those laid down in ELV tables plus carbon monoxide

A reduced frequency is allowed for plant operating under the limited hours exemption but monitoring will be required no less than once every 5 years. No person shall operate an installation or mobile plant after the prescribed date except under and to the extent authorised by a permit granted by the enforcing authority.

9.5.3.1.5 Specified generators

A specified generator (SG) is any combustion plant used for the purpose of generating electricity; or any group of such combustion plant located at the same site, operated by the same operator, and having the same purpose, between 1 and 50MW and less than 50MW. If the SG is used to meet a capacity agreement or an agreement to provide balancing services then all plant less than 50MW is included. All specified generators are required to obtain a permit either from their District Council or IPRI, unless they are an excluded generator.

9.5.3.1.6 Excluded generators

Generators in sites permitted under Chapter II and III of the Industrial Emissions Directive and emergency back-up generators operated for the purpose of testing for no more than 50 hours per year are exempt from these controls.

A backup generator means a generator that is operated for the sole purpose of providing power at a site during an onsite emergency. Operators can test their backup generators to ensure they can be relied on. Operators should maintain records of annual hours of testing for each individual generator to ensure the exclusion criteria can be demonstrated.

Mobile generators do not fall within the definition of "generator" under the Regulations, with two exceptions –

1. if they are connected to an electricity transmission system or distribution system, or
2. if they are connected to other apparatus, equipment or appliances at a site and are performing a function that could be performed by generator that is not mobile.

Mobile, in relation to a generator, means it is designed to move or be moved from place to place. Whether a generator is mobile will be determined by taking account of how long it has been on a site, the nature of the site and whether it is under construction or finished.

9.5.3.1.7 Permit Controls

The enforcing authority must ensure that from the relevant date specified generators are operated to:

- *comply with emission limit value (ELV) for nitrogen oxides of 190mg/Nm^3,*
- *where secondary abatement is needed to meet ELV,*
- *existing generator, or new generator that was an existing generator, must get to standard after 20mins of commencing operation,*
- *other new generator within 10 mins of commencing operation,*
- *no persistent dark smoke.*

9.5.3.1.8 The Regulators

The Industrial Pollution and Radiochemical Inspectorate (IPRI) of the Northern Ireland Environment Agency (NIEA) regulate the larger and potentially more polluting Part A and B Activities. Where Part C activities take place on a NIEA permitted site NIEA will also be the regulator for the activity by way of variation to an existing permit. District Councils regulate smaller installations (Part C installations) for emission to air only.

9.5.3.2 Proposed Building Heating

Final details of the proposed combustion units are not known at this early stage of the project. It is very common in applications of this nature that full design information is not available at planning application stage but rather developed later in the project design (detailed design). It is recommended that the requirement to provide a short technical

report of energy centre-plant emissions is procured as a pre-commencement task, secured through an appropriately worded planning condition if required.

In general, for a redevelopment like this, the contribution of emissions from the gas fired units are not likely to be significant in terms of nitrogen dioxide concentrations. The mitigation measures and restriction of nitrogen dioxide releases are within the design of the new modern boilers. Levels specified by manufacturers shall be referenced and the proposed termination point of the boilers (when defined) will enable dispersion at an elevated level above ground level dispersion is higher at more elevated positions due to increased wind speeds.

9.6 Mitigation Measures

9.6.1 Construction Phase

Construction impacts associated to the proposed development will result in the generation of dust and PM_{10}. However, it is considered that employment of construction best practice should ensure that no problematic dust or PM_{10} concentrations occur during the construction process. The IAQM guidance outlines a number of site specific mitigation measures based on the assessed site risk.

The suggested mitigation measures are detailed as follows:

9.6.1.1 Communications

With respect to communications, the following will be implemented:

1. Develop and implement a stakeholder communications plan that includes community engagement before work commences on site;
2. Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environmental manager/engineer or the site manager;
3. Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions (the plan can adopt these measures and be presented in conjunction with a Construction Environmental Management Plan (CEMP));
4. Appropriate training will be provided to all staff to ensure that they are aware of and understand the dust control and other environmental control measures; and,
5. Display the head or regional office contact information.

To be implemented before works commence on site and training given as appropriate by the appointed contractor.

9.6.1.2 Site Management

With respect to site management, the following will be implemented:

1. Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken;
2. Make the complaints record available to the relevant regulatory authorities when asked;

3. Record any exceptional incidents that cause dust and/or air emissions, either on or offsite, and the action taken to resolve the situation in an environmental log book;
4. Undertake twice weekly on-site and off-site inspection, to visually monitor dust, record inspection results and make the log available to the local authority as required;
5. Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site;
6. Fully enclose site or specific operations where there is a high potential for dust production;
7. Keep site fencing, barriers and scaffolding clean using wet methods;
8. Remove materials that have a potential to produce dust from site as soon as possible, unless being reused on site.
9. Avoid site runoff of water or mud;
10. Use covered skips;
11. No bonfires and burning of waste materials on site;
12. Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction (For example, suitable local exhaust ventilation systems);
13. Use enclosed chutes and conveyors and covered skips;
14. Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate;
15. Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment as appropriate;
16. Ensure equipment is readily available on site to clean any dry spillages and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.

To be implemented during works as required by the appointed contractor.

9.6.1.3 Demolition

With respect to demolition, the following will be implemented:

1. Soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust);
2. Ensure effective water suppression is used using demolition operations. Hand held sprays are more effective than hoses attached to equipment as the water can be directed to where it is needed. In addition, high volume water suppression systems, manually controlled can produce fine water droplets that effectively bring down dust particles to the ground;
3. Bag and remove any biological debris or damp such material before demolition
4. **ALL Asbestos Containing Materials (ACMs)** to be removed before demolition. This should be undertaken as required by a licensed asbestos removal contractor.

To be implemented before the main construction works as required by the appointed contractor.

9.6.1.4 Construction

With respect to construction, the following will be implemented:

1. Avoid scabbling (roughening of concrete surfaces) if possible;
2. Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place;
3. Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and store in silos with suitable emission control systems to prevent escape of material and overfilling during delivery;
4. For smaller supplies of fine powder materials ensure bags are sealed after use and stored appropriately to prevent dust.

To be implemented during works as required by the appointed contractor.

9.6.1.5 Vehicle Movement and Vehicle Emissions

As with any construction site, there are associated vehicle movement, emissions and plant use. With respect to vehicle movement and vehicle emissions, the following will be implemented:

1. Ensure all vehicles switch off engines when stationary and not in immediate use - no idling vehicles (emissions to air controlled);
2. All plant utilised should be regularly inspected (emissions to air controlled);
3. Visual monitoring of plant will include: Ensuring no black smoke is emitted other than during ignition (emissions to air controlled);
4. Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable;
5. Ensuring exhaust emissions are maintained to comply with the appropriate manufacturers limits (emissions to air controlled);
6. Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport;
7. Use water assisted dust sweeper on the access and local roads, to remove, as necessary, any material tracked out of the site.

To be implemented throughout by the appointed contractor.

9.6.1.6 Final Comment on Mitigation Measures

Even with a rigorous DMP in place, it is not possible to guarantee that the dust mitigation measures will be effective all the time, and if, for example, dust emissions occur under adverse weather conditions, or there is an interruption to the water supply used for dust suppression, the local community may experience occasional, short-term dust annoyance. The likely scale of this would not normally be considered sufficient to change the conclusion that with mitigation the effects will be '*not significant*'.

With suggested mitigation measures in place and adoption of recommendations as detailed, risk of air quality impact during the construction phase will be controlled and managed by principal contractor and not result in significant impacts. All records will be held at the site offices. The records will be made available on site to the officers of Ards and North Down Borough Council (ANDBC) representative as requested.

9.7 Conclusion

This assessment has considered dust effects during the demolition and construction phase and the air quality impacts during the operational phase of the proposed development.

Impacts during the construction phase, such as dust generation and plant/vehicle emissions, are predicted to be of short duration and only relevant during the construction phase. The results of the risk assessment of construction dust impacts undertaken using the IAQM dust guidance, indicates that before the implementation of mitigation and controls, the risk of dust impacts will be 'medium-high'. Implementation of the mitigation measures described in the IAQM construction dust guidance should reduce the residual dust effects to a level categorised as "not significant/negligible".

The magnitude of the effects of changes in traffic flow as a result of the proposed development, with respect to nitrogen dioxide and particulate matter exposures for modelled existing receptors, is determined to be 'negligible - moderate'. Using professional judgement, the resulting air quality effect of the proposed development is considered to be 'not significant' overall. The proposed development does not, in air quality terms, conflict with national or local policies. There are no constraints to the development in the context of air quality.