

This study has indicated that the proposed facility will not have any detrimental impact on the underlying aquifer or more importantly any wells in the area. The GSI well data has indicated a high density of wells within the vicinity predominantly designated as domestic or agricultural use. It is safe to assume that there are houses in the area which have wells not on the GSI maps.

The response matrix would indicate that vulnerability rating assigned to the site would be “R1” and an “R3”. The site has over 1m soil/ subsoil thickness throughout the site indicating that development is acceptable with respect to groundwater protection. It is important to recognise that the proposed facility is being designed with a view to being built and operated with best practice procedures in mind. The tank work will be sealed; the drainage network will be attenuated; flow will be restricted, and interceptors will be placed prior to any discharge. The facility will utilise two retention ponds to limit the discharge to the network.

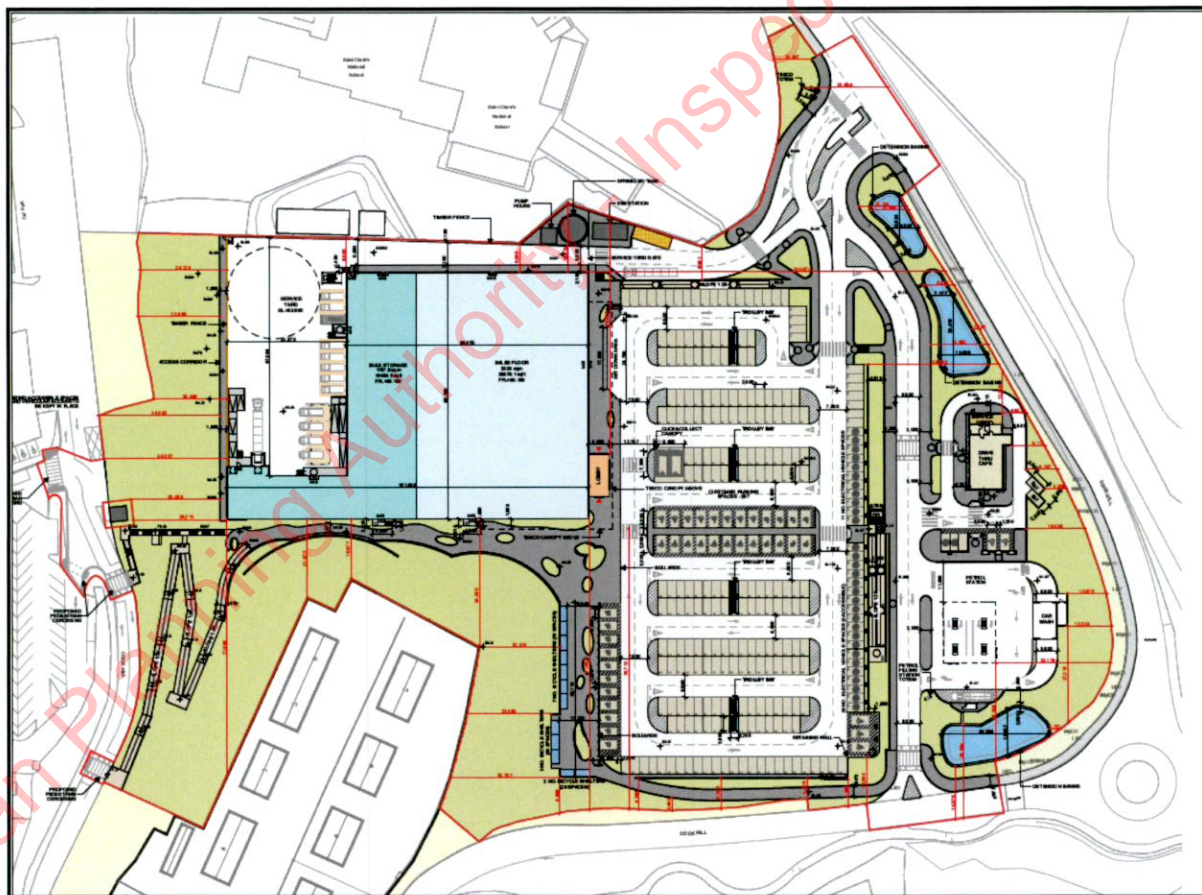
8.5 Characteristics of the Proposed Development

The development will consist of the construction of a single storey retail unit of c. 5,197 sq.m gross floor area (c. 2,194 sq.m convenience net sales area and c. 957 sq.m comparison net sales area) including a licensed alcohol sales area and service yard; a drive thru café unit (c.174 sq.m gross floor area) with external seating and 5 no. car parking spaces and 2 no. set down bay areas; a petrol filling station including car wash/jet wash (c. 89 sq.m), a forecourt canopy (covers c. 255 sq.m. and 4.8m in height); signage including elevational and 2 no. totem signs; 297 no. car parking spaces and 120 no. cycle parking spaces; a "Click and Collect" facility; Grocery Home Shopping delivery vehicle docking area; access points from Cock Hill Road; pedestrian linkages with the Town Centre by way of the provision of a sloped pedestrian walkway and steps on the western boundary of the site with 4 no. pedestrian crossings on Cock Hill Road and; all ancillary site development works, landscaping, fencing, enabling works and site services.

Please refer to **Chapter 2** for the full description of development.

An extract from the planning drawings can be seen in **Figure 8.12**.

Figure 8.12 – Extract from Site Plan (Joseph Doyle Architects)



8.6 Predicted Effects of the Proposed Development

The assessment focuses on predicted effects in relation to hydrology and hydrogeology. The assessment relates to effects occurring during both the construction and operational phases of the development.

Based on the dataset obtained during the desk study, intrusive site investigation, and anecdotal evidence collected the following risk assessment has been carried out. This identifies the relevant sources, pathways and receptors (pollutant linkages) and assigns a qualitative risk classification of 'low, moderate or high' risk to the identified Potential Pollutant Linkages (PPLs).

For a risk from ground contamination to exist, a contaminant source, pathway for migration and viable receptor must exist. The presence of all three of these elements is known as a 'pollutant linkage'.

The likely potential pollutant linkages identified as a result of this assessment and specific for the site have been provided in the initial CSM. The model has been based upon the site setting at the time of the assessment, the land use (current and reasonably foreseen future use) of the surrounding area and the state what the proposal is (i.e. development, ongoing use, etc.).

As well as identifying the potential pollutant linkages the model includes a preliminary assessment of risk based upon the probability of impact and the likely severity of impact in the context of the site setting and proposed future site use.

The criteria used for the risk assessment classifications as detailed in the CSM table are based on those presented in *CIRIA Report 552* and pages 33 to 35 of *R&D66:2008* publication.

8.6.1 Do-Nothing Scenario

If the proposed development does not proceed there would be no additional impact on the local water systems. The current rate of surface water run-off would continue to operate in its natural state.

Under the 'Do Nothing' scenario there would be no change to the current land use of the site.

Fluvial flooding events would continue as they have historically in this area with the existing floodplains.

Groundwater status would also remain unchanged if the existing land use continued.

8.6.2 Receptor Sensitivity

The sensitivity of the receptors identified during the study of hydrological & hydrogeological features within the vicinity of the site are summarised in **Table 8.15**.

Table 8.15 – Receptor Sensitivity

Receptor	Receptor Importance	Receptor Sensitivity	Rationale
Groundwater	Local Level	High	<p>The Killashandra Groundwater Body is a Locally Important Aquifer - Bedrock which is Generally moderately productive rendering this groundwater body's importance as moderate.</p> <p>The Cavan Groundwater Body is a Poor Aquifer - Bedrock which is Generally Unproductive except for Local Zones rendering this groundwater body's importance as low.</p> <p>The groundwater vulnerability varies throughout the site from "Low" to "Extreme" according to the GSI map viewer. However, the trial pit excavations have revealed at least 4.8m of soil/subsoil cover exists, with 7 out of 9 boreholes indicating a soil cover of over 8m throughout the site. The groundwater table is adjudged to be >6.22m below ground level (bgl) in the east of the site. Overburden water was encountered at 1.24m bgl in the west. Based on the vulnerability mapping criteria a soil / subsoil thickness of 3-5m in a low permeability (clay) soil is classed as "High".</p> <p>The response matrix (Table 8.14) would indicate that vulnerability rating assigned to the site would be "R1 Acceptable, subject to normal good practice" and "R3, not generally acceptable, unless a consistent minimum thickness of 1 m of soil and subsoil can be demonstrated". This indicates that the development location is acceptable with respect to groundwater protection.</p>
Surface Water	EU Level	Extreme	<p>The site is hydraulically connected via the Cavan & Annalee River to the Lough Oughter SPA & SAC which is protected by EU Legislation, hence this receptor's importance and sensitivity is considered to be "Extreme".</p>

8.6.3 Sources - Construction Phase

The construction phase is likely to yield the most potentially significant effects on the surrounding water environment. Potential construction phase effects are considered in detail below and summarised in Table 8.16.

Increased Run-off and Sediment Loading

During the initial stages of the construction phase, enabling works will consist of stripping/ removal and infilling of the top layer of soil/ subsoil to achieve the desired site levels. Earthworks will then follow to facilitate the construction of foundations, the installation of services/drainage infrastructure and road construction which will also lead to the removal of extensive vegetation cover. The resulting stockpiles of the displaced soils and sediments, in the absence of suitable mitigation, will be susceptible to erosion during this period. This can create a potential pathway for silt and sediment to migrate off-site into surrounding water courses via wind-blown dust or run-off in times of inclement weather. The potential consequence for surface water receptors in this circumstance is elevated levels of silt and suspended solids. This in turn can lead to water quality degradation leading to aesthetic issues, decline in fisheries resources and serious ecological degradation of aquatic biota.

The subsoil beneath the site consists primarily of a slightly sandy, gravelly clay with some locations containing gravel infill. These sediments present a moderate susceptibility of becoming entrained in

surface water run-off and to being blown out of a stockpile by moderate to strong breezes and carry a moderate risk of migrating into surface water receptors.

Uncontrolled releases of sediment run-off would result in a **negative, slight to moderate, temporary effect** on the water quality of the Killymooney Stream/ Aghnaskerry River to the east of the site, which is hydraulically connected to Green Lough, Cavan River, Annelee River and Lough Oughter SPA and SAC. No effect is anticipated to groundwater receptors in this instance.

Accidental Spillages of Harmful Substances

During the construction phase, there is a possibility of a spillage of contaminants such as fuels, oils, chemicals and cement material, posing a potential risk to surface and groundwater quality. Fuels, oils and chemicals have a number of hazardous properties, and the constituents of concrete are alkaline and corrosive. Each one of these substances can have a significant deleterious effect on water quality and aquatic life should any become entrained in the receiving water environment.

The drainage characteristics of the site area outlined in **Section 8.4.7** concluded that the Qbar value for the site of 22.48 l/s, meaning in the event of any spillages, contamination would likely become entrained in surface water run-off and migrate into the adjacent surface watercourse, the Killymooney Stream/ Aghnaskerry River east of the site and subsequent downstream receptors.

The groundwater vulnerability assessment in **Section 8.4.14** concluded that groundwater vulnerability at the site was classed as 'high' due to the shallow depth <10m of low permeability clay subsoils beneath the site. These conditions offer some protection to groundwater receptors providing a natural barrier between the potential release of harmful substances and the groundwater body below, impeding vertical migration throughout the soils.

Uncontrolled releases of hydrocarbons, chemicals or cement would result in a **negative, moderate to significant, temporary effect** on the water quality of the Killymooney Stream/ Aghnaskerry River and downstream receptors Green Lough, Cavan River, Annelee River and Lough Oughter SPA and SAC.

Increased Groundwater Vulnerability

The removal and disturbance of a of soil required in order to achieve construction ground level on the site is anticipated during the construction phase which carries the potential to increase the vulnerability of a groundwater body to incidences of contamination at surface level.

Excavation works required to bring the site to the desired finished floor level and lay the foundations and drainage infrastructure will extend to depths of approximately 2m – 2.5m bgl extending into slightly sandy, gravelly clay subsoils. The groundwater vulnerability assessment in **Section 8.4.14** concluded that groundwater vulnerability throughout the site varies from 'moderate' to 'high', based on current soil / subsoil depths. GSI maps and geotechnical site investigations suggest a minimum subsoil depth of 4.8m throughout the site. An excavation depth of 2.5m bgl at the rear of the proposed supermarket for the loading bay may increase the vulnerability in this area from 'high' to 'extreme'.

The removal of soil/subsoil cover during the construction phase would have a **negative, significant, long-term effect** on groundwater vulnerability on the proposed development site.

Excavation of Bedrock Aquifer

The depth to bedrock beneath the proposed facility varies throughout the site with some borehole evaluations encountering obstructions at 4.8m bgl and others exceeding the 10m bgl borehole assessment depth. As depicted in **Figure 8.9**, groundwater wells in the surrounding area generally encounter bedrock at depths between 2m to 19.8m bgl. Given that the site is already near the finished site levels with infill required throughout most of the site rather than excavation the maximum depths of excavations required to level the site is anticipated at ca. 2.5m bgl and is confined to the northwest of the site. Interaction with bedrock is possible but not expected. Predicted effects will have **negative, significant, long-term effect** on hydrogeology.

Excavation of Contaminated Soils

The excavation and construction activities will cause quantities of excavated materials to be reused on site or removed from site for disposal or recovery. The site is a greenfield site and historical mapping does not suggest any incidences of land use which might result in the contamination of soils. Previous civil work was conducted at the site in circa late 2010-2013 which resulted in the current site topography. Furthermore, a geotechnical site investigation conducted at the site in July 2022 indicated that during the previous scope of works the peat layer located in the sites southeast was extracted infilled with engineered material that was compacted in a systematic manner. The investigation did not detect any evidence of contaminated soils. It is not anticipated contaminated soils will be encountered during construction activities hence no adverse effects on the groundwater or surface water quality is expected as a result of contaminated soils.

The site construction management plan will include a set of procedures to be implemented in the incidence of contaminated soils encountered nonetheless despite **negligible impact or lack of significance** to hydrogeology and hydrology.

Conversion of Permeable Soils to Hard standing

The construction phase will involve the gradual conversion of the existing greenfield site to areas of hardstanding. Under this scenario, the risk of flooding within the receiving catchment will increase due to an increase in impervious land area and associated drainage systems, which leads to a large increase in volume and intensity of surface water run-off within a given catchment. The encroachment of urban development onto existing flood plains can lead to a reduction in flood storage capacity, with a resultant increase in flood risk both upstream and downstream.

The increase in impervious area means that a greater proportion of the incident rainfall will appear in the drainage system as surface run-off. The provision of sealed pipes to convey run-off from the site to existing watercourses will result in larger (concentrated) volumes being discharged at point locations within a shorter duration, thereby increasing flood risks. Road embankments may encroach onto

existing floodplains and lead to a reduction in flood storage capacity, exposing property owners and ecosystems living within or near the floodplain to an increased risk of flooding.

In the absence of mitigation, the predicted effects of the proposed development resulting in an increase of flood risk to the receiving catchment are **negative, significant and long-term**.

Table 8.16 – Construction Phase Effects (Unmitigated)

Receptor	Potential Environmental Effects	Quality	Significance	Duration
Groundwater Killashandra & Cavan Groundwater Body	Accidental Spillages of Harmful Substances	Negative	Moderate to Significant	Temporary
	Increased Groundwater Vulnerability	Negative	Significant	Long-Term
	Excavation of Bedrock Aquifer	Negative	Significant	Long-Term
	Excavation of Contaminated Soils	Unlikely	Negligible Impact	Unlikely
Surface Water Lough Oughter SPA & SAC (via Killymooney Stream/ Aghnaskerry River, Green Lough, Cavan & Annalee River)	Increased Run-off and Sediment Loading	Negative	Slight to Moderate	Temporary
	Accidental Spillages of Harmful Substances	Negative	Moderate to Significant	Temporary
	Excavation of Contaminated Soils	Unlikely	Negligible Impact	Unlikely
	Conversion of Permeable Soils to Hard standing	Negative	Moderate	Temporary

8.6.4 Sources - Operational Phase

Potential operational phase effects are considered in detail below and summarised in **Table 8.17**.

Contaminated Run-off

Run-off from impermeable areas within the proposed development site such as roads and car parking areas are likely to contain potentially polluting substances such as hydrocarbons, heavy metals and sodium chloride arising from de-icing of these surfaces during winter months.

No discharge from the site is anticipated to any local surface water courses however in the absence of suitable design & mitigation measures, there would be a **negative, moderate to significant, temporary effects** on the water quality of the Killymooney Stream/ Aghnaskerry River to the east of the site, which is hydraulically connected to Green Lough, Cavan River, Annelee River and Lough Oughter SPA and SAC.

Foul Water

The proposed development is to be connected to the Cavan Town public wastewater treatment plant (WWTP). The WWTP has capacity for 30,000 population equivalent (PE) and as of the 2021 annual Irish Water report the facility had a remaining capacity for 9142 PE. The treated plant is a “type 3P – Tertiary P” system which ensures lower phosphorus outflow levels from the plant.

During incidences of leakage foul water would likely follow preferential pathways created by permeated backfill and infiltrate into the site drainage system ultimately impacting both surface water and

groundwater receptors. Adverse effects associated with foul water leakages consist of contamination relating to the of the following:

- Pathogens, (E. Coli etc.)
- Elevated levels of ammonia and nitrate
- Elevated levels of phosphorus

Such leakages could lead to eutrophication within the Killymooney Stream/ Aghnaskerry River located to the sites east and the subsequent downstream Green Lough, Cavan & Annalee River and the Lough Oughter SPA & SAC lake complex, and to the Cavan and/or Killashandra groundwater bodies leading to degradation of water quality with negative consequences for aquatic life. Overall, the predicted effects of foul water leakage on hydrological & hydrogeological receptors are **negative, moderate to significant and short-term**.

On-Site Flooding

A flood event occurring on the developed site would cause the Sustainable Urban Drainage Infrastructure (SuDS) to become overwhelmed, creating additional pathways for potential contaminants to migrate off-site into downstream receptors along with elevated flow rates.

A Stage 2 Flood Risk Assessment (FRA) was submitted along with this EIAR. It concluded that given the sites current and proposed elevations the development is located within a Flood Zone C and should not be at risk of flooding or of further increasing flood risk elsewhere.

Overall, the predicted effects of the occurrence of a flood event on hydrological receptors are **negative, imperceptible** and **short-term** to hydrogeology and hydrology.

Conversion of Permeable Soils to Hard standing

The operational phase will see large swathes of the existing greenfield site converted to areas of hardstanding. Under this scenario, the risk of flooding within the receiving catchment will increase due to an increase in impervious land area and associated drainage systems, which leads to a large increase in volume and intensity of surface water run-off within a given catchment. The encroachment of urban development onto existing flood plains can lead to a reduction in flood storage capacity, with a resultant increase in flood risk both upstream and downstream.

The increase in impervious area means that a greater proportion of the incident rainfall will appear in the drainage system as surface run-off. The provision of sealed pipes to convey run-off from the site to existing watercourses will result in larger (concentrated) volumes being discharged at point locations within a shorter duration, thereby increasing flood risks. Road embankments may encroach onto existing floodplains and lead to a reduction in flood storage capacity, exposing property owners and ecosystems living within or near the floodplain to an increased risk of flooding.

In the absence of mitigation, the predicted effects of the proposed development resulting in an increase of flood risk to the receiving catchment are **negative, slight to significant** and **long-term to permanent**.

Table 8.17 – Operation Phase Effects Summary (Unmitigated)

Receptor	Potential Environmental Effects	Quality	Significance	Duration
Groundwater Killashandra & Cavan Groundwater Body	Contaminated Run-off	Negative	Moderate to Significant	Temporary
	Foul Water	Negative	Moderate to Significant	Short-Term
	Conversion of Permeable Soils to Hard standing	Negative	Slight	Permanent
Surface Water Lough Oughter SPA & SAC (via Killymooney Stream/ Aghnaskerry River, Green Lough, Cavan & Annalee River)	Contaminated Run-off	Negative	Moderate to Significant	Temporary
	Foul Water	Negative	Moderate to Significant	Short-Term
	On-Site Flooding	Negative	Imperceptible	Short-Term
	Conversion of Permeable Soils to Hard standing	Negative	Significant	Long-Term

8.7 Mitigation Measures

Mitigation measures proposed in this section relate primarily to the preservation of the existing subterranean drainage regime, the protection of groundwater receptors and the protection of surface water receptors.

Mitigation measures proposed in this section relate primarily to the preservation of the existing subterranean drainage regime, the protection of groundwater receptors and the protection of surface water receptors.

8.7.1 Construction Phase

General Mitigation Measures

A Construction Environmental Management Plan (CEMP) will be prepared and implemented by the main contractor during the construction phase. This is a practical document which will include detailed procedures to address the main potential effects on surface water and groundwater.

Increased Run-off and Sediment Loading

The main pollutants of site water are silt, fuel/oil, concrete and chemicals. There are a number of steps outlined below to eliminate contamination of site surface water runoff. The below recommendations are advised with reference to the Northern Regional Fisheries Board recommendations for protection of adjacent water courses during the construction phase:

- Harmful materials such as fuels, oils, greases, paints and hydraulic fluids must be stored in bunded compounds well away from storm water drains and gullies. Refueling of machinery should be carried out using drip trays.
- A temporary drainage system will be established complete with oil interceptors and settlement ponds to remove contaminants from run-off, prior to discharge off-site.
- Stockpile areas for sands and gravel should be kept to minimum size, well away from storm water drains and gullies leading off-site.
- Covers are to be provided over soil stockpiles when high wind and inclement weather are encountered if required.
- Silt fencing to be erected along high flow areas
- Site drains into a designed drainage network along the Cock Hill road which feeds into a detention basin before discharging to the Killymooney Stream/ Aghnaskerry River

Accidental Spillages of Harmful Substances

The following measures will minimise the risk of a release of fuels, oils, chemicals or cement products at the site:

- Establishment of bunded oil and chemical storage areas.
- Refuelling of mobile plant in designated areas provided with spill protection.

- Fuel bowsers to be located in bunded areas which can cater for 100% of the primary vessel capacity.
- Only appropriately trained site operatives permitted to refuel plant and machinery on-site.
- Regular inspections carried out on plant and machinery for leaks and general condition.
- Emergency response plan.
- Spill kits readily available throughout the site.
- Use of ready-mixed supply of wet cement products.
- Scheduling cement pours for dry days.

Increased Groundwater Vulnerability / Excavation of Bedrock Aquifer

An excavation depth of 2m - 2.5m bgl would increase the vulnerability in particular areas of the site from 'high' to 'extreme'. Mitigation measures to ensure maximum protection of groundwater include:

- Installation of hard-surfaced areas with adequate surface water drainage, interceptor and attenuation networks to elimination percolation of contaminants to underlying groundwater in any areas where the storage of hazardous materials will be present. Establishment of a bunded location or use of portable bunds for refuelling of mobile plant and machinery
- Excavations to be backfilled as soon as possible to prevent any infiltration of contaminants to the subsurface and the aquifer.
- Landscaping to take place as soon as possible to reduce weathering.

Excavation of Contaminated Soils

The existing site consists of exposed soil and subsoil. The land was previously pasture before 2010 with a tertiary road running from the southwest corner to the northeast of the site. The ground level throughout the site has been altered since 2010 and contaminated material would have been removed and disposed of during the previous scope works in late 2010 during the construction of the realigned Cock Hill road. Deep excavations are not envisaged for the site and the excavation of contaminated material is not expected on site.

Nonetheless, during construction, all excavated materials will be visually assessed for contamination. Any contaminated material detected will be sent for analysis to a suitable environmental laboratory and subsequently quantified, segregated and transported for disposal by a licenced contractor.

Conversion of Permeable Soils to Hard standing

The proposed development has been assessed in relation to Sustainable Urban Drainage Systems (SuDS) in accordance with the guidelines of the GSDSDS, the SuDS Manual Ciria C753, and the Cavan County Development Plan 2022 - 2028.

Based on the above guidance documents, as part of the surface water drainage proposal, several SuDS measures have been provided to treat surface water runoff, to replicate the natural characteristics of

the greenfield runoff and minimise the environmental impact. The SuDS measures included within the proposal for the site are as follows:

- Construction of detention basins with restricted outflow rates equal or less than the greenfield run-off rates, $Q_{bar-rural}$
- Car park is to be constructed with a permeable paving with an underlying stone sub-base
- Rainwater harvesting on all buildings.
- Stone media at the location of the underground attenuation tank systems
- Filter drains along verges
- Tree-pits at localised tree locations
- Petrol Interceptors to treat the surface water runoff prior discharging to the existing stormwater outflow

8.7.2 Operational Phase

Contaminated Runoff

The $Q_{bar-rural}$ was calculated for each catchment. Drainage systems will be designed to attenuate excess surface water runoff with suitable storage volumes for each character and reduce the outflow rate to below the estimated greenfield rate before discharging into the existing surface water network to the south east. It is proposed to provide a series of Sustainable Urban Drainage Systems (SuDS) such as detention ponds, permeable paving, filter drains, and petrol interceptor in order to treat surface runoff at high level and ground level.

Foul Water

Based on the population equivalent (PE) for the proposed development of #, the volume of foul water generated from the proposed development was calculated at # m^3/day . The proposed foul network will be gravity fed to the southeast of the site from where it will be pumped via a rising main up to the south of the proposed development into the existing public foul network.

Increased Groundwater Vulnerability

The proposed finished ground level will be up to 2.5m below the existing elevation of the site in certain places, increasing the vulnerability of the underlying aquifer from 'High' to 'Extreme' to the rear of the proposed supermarket. Mitigation measures to ensure maximum protection of groundwater include:

- Installation of hard-surfaced areas with adequate surface water drainage, interceptor and attenuation networks to elimination percolation of contaminants to underlying groundwater in any areas where the storage of hazardous materials will be present.
- The service yard to the rear of the supermarket is to be completely bunded and will have a Finished Floor Level (FFL) of 1.75m below the current ground level.

On-Site Flooding

The existing flood risk to the proposed site is low with the proposed site located in 'Flood Zone C'. An area to the east of the site is designated a "Flood Zone A & B" under the Cavan CDP 2022-2028. However, an assessment of the proposed flood levels from an adjacent CFRAM node and the current and proposed site levels indicate that the area in question is currently 4.05m above the highest flood extents predicted in a 0.1% AEP event. Storm water attenuation measures including the construction of tanks and ponds along with permeable paving are included in the proposed development to reduce to overall point source outflows. The supermarket roof will be drained via a siphonic drainage system with the harvested water being feed into storm water distribution boxes situated in the car park.

Increase in Flood Risk to Receiving Catchment

The $Q_{bar_{rural}}$ was calculated for the catchment. Drainage systems will be designed to attenuate excess surface water runoff with suitable storage volumes for the site and reduce the outflow rate to below the estimated greenfield rate before discharging into the local storm water network to the east and southeast. It is proposed to provide a series of Sustainable Urban Drainage Systems (SuDS) such as permeable paving, filter drains, and petrol interceptor in order to treat surface runoff at high level and ground level.

8.8 Monitoring

8.8.1 Construction Phase

Surface water monitoring is proposed during construction of the development. A water sample from the Killymooney Stream/ Aghnaskerry River at sampling locations upstream and downstream of the site should be collected prior to commencement in order to ascertain the baseline conditions. Regular sampling of the Killymooney Stream/ Aghnaskerry River should be carried out from the same upstream and downstream locations during the construction period. Weekly sampling is proposed as well as additional sampling following an event such as heavy rainfall or an accidental spillage. Analysis for total suspended solids, pH and total petroleum hydrocarbons would allow for the detection of sediment loading, concrete pollution or spillages of hydrocarbons.

It is likely that dewatering will be required during excavations across the site due to shallow groundwater levels and the likely quality of runoff / construction waters generally. Dewatering will require treatment of the pumped water before discharge to a sewer under a section 4 discharge license. Continuous monitoring of the discharged treated water is recommended.

8.8.2 Operational Phase

Following the completion of the construction phase of the development, surface water quality monitoring will continue until such time that stable hydrochemistry is observed (in line with baseline conditions). Thereafter, monitoring of water quality during the operational phase is not required (Outside of maintenance required for development drainage and attenuation infrastructure).

8.9 Residual Effects

According to Environmental Protection Agency guidelines, Residual Impact is described as ‘the degree of environmental change that will occur after the proposed mitigation measures have taken place.’ The mitigation strategy above recommends actions which can be taken to reduce or offset the scale, significance and duration of the effects on the surrounding hydrological and hydrogeological features.

The purpose of this assessment is to specify mitigation measures where appropriate to minimise the ‘risk factor’ to all aspects of the water environment such as to minimize the potential for hydrocarbons to contaminate the streams or groundwater, reduce the risk of erosion and run-off, etc. This ‘risk factor’ is reduced or offset by recommending the implementation of a mitigation strategy in each area of the study. On the implementation of this mitigation strategy, the potential for impact will be lessened.

A site-specific Construction Environmental Management Plan (CEMP) will be devised and implemented throughout the duration of the construction phase. This document will contain all the necessary procedures required to prevent and minimise any environmental risks posed by the project on the surrounding environment.

8.9.1 Construction Phase

A summary of the predicted effects associated with the construction phase in terms of quality, significance, and duration, along with the proposed mitigation measures and resulting residual effects are summarised in **Table 8.18**.

The overall impact anticipated by the construction phase of the project following the implementation of suitable mitigation measures is considered to be neutral to **negative, imperceptible to slight**, and **temporary**.

8.9.2 Operational Phase

A summary of the predicted effects associated with the operational phase in terms of quality, significance, and duration, along with the proposed mitigation measures and resulting residual effects are summarised in **Table 8.19**.

The overall impact anticipated by the operational phase of the project following the implementation of suitable mitigation measures is considered to be neutral to **negative, slight**, and **short term to long term**. There are no controlled or uncontrolled emissions anticipated as a result of the proposed development.

Table 8.18: Summary of predicted construction phase impacts, mitigation measures and residual impact

Potential Source	Environmental Receptor	Impact Description	Quality	Significance	Duration	Mitigation	Residual Impact
Increased Run-off and Sediment Loading	Surface Water Lough Oughter SPA & SAC (via Killymooney Stream/ Aghnaskerry River, Green Lough, Cavan & Annalee River)	Erosion of stockpiles of exposed soils leading to migration of silt into surface water receptors via dust and run-off	Negative	Slight to Moderate	Temporary	<ul style="list-style-type: none"> A temporary drainage system will be established complete with oil interceptors and settlement ponds to remove contaminants from run-off, prior to discharge off-site. Stockpile areas for sands and gravel should be kept to minimum size, well away from storm water drains and gullies leading off-site. Covers are to be provided over soil stockpiles when high wind and inclement weather are encountered if required. Silt fencing All site drainage feed through a detention basin before discharging to Killymooney Stream/ Aghnaskerry River 	Neutral, Slight, Temporary
	Groundwater Killashandra & Cavan Groundwater Bodies Locally Important & Poor Aquifer	Loose sediments becoming entrained in open excavations and infiltrating downwards into aquifer	Negative	Moderate	Temporary	<ul style="list-style-type: none"> Excavations to be backfilled as soon as possible to prevent any infiltration of contaminants to the subsurface and the aquifer. Employee the use of silt fences where appropriate Landscaping to take place as soon as possible to reduce weathering. 	Neutral, Slight, Temporary
Accidental Spillages of Harmful Substances	Surface Water Lough Oughter SPA & SAC (via Killymooney Stream/ Aghnaskerry River, Green Lough, Cavan & Annalee River)	Spillage of contaminants such as fuels, oils, chemicals and cement material and subsequent migration into surface water receptors	Negative	Moderate to Significant	Temporary	<ul style="list-style-type: none"> Harmful materials such as fuels, oils, greases, paints and hydraulic fluids must be stored in bunded compounds well away from storm water drains and gullies. Refuelling of machinery should be carried out using drip trays. A temporary drainage system will be established complete with oil interceptors and settlement ponds to remove contaminants from run-off, prior to discharge off-site. 	Negative, Slight, Temporary
	Groundwater Killashandra & Cavan	Spillage of contaminants becoming entrained in open	Negative	Moderate to Significant	Temporary	<ul style="list-style-type: none"> Stockpile areas for sands and gravel should be kept to minimum size, well away from storm water drains and gullies leading off-site. 	Neutral, Slight, Temporary

Potential Source	Environmental Receptor	Impact Description	Quality	Significance	Duration	Mitigation	Residual Impact
Increased Groundwater Vulnerability	Groundwater Bodies Locally Important & Poor Aquifer	excavations and infiltrating downwards into aquifer				<ul style="list-style-type: none"> Covers are to be provided over soil stockpiles when high wind and inclement weather are encountered if required. Portable bunds to be used during refuelling activities 	
	Groundwater Killashandra & Cavan Groundwater Bodies Locally Important & Poor Aquifer	An excavation depth of 2.5-3m bgl would increase the vulnerability in particular areas of the site from 'high' to 'extreme'	Negative	Significant	Long-Term	<ul style="list-style-type: none"> Excavations to be backfilled as soon as possible to prevent any infiltration of contaminants to the subsurface and the aquifer. Employee the use of silt fences where appropriate Landscaping to take place as soon as possible to reduce weathering. 	Negative, Slight, Temporary
Excavation of Bedrock Aquifer	Groundwater Killashandra & Cavan Groundwater Bodies Locally Important & Poor Aquifer	Potential removal of bedrock in certain parts of the site during foundation construction	Negative	Significant	Long-Term		Negative, Slight, Temporary
	Surface Water Lough Oughter SPA & SAC (via Killymooney Stream/ Aghnaskerry River, Green Lough, Cavan & Annalee River)	The existing site consists of exposed soil & subsoil. The site had extensive groundworks conducted in 2010-2013 which involved the removal of a tertiary road network. Removal of pre-existing pipes in east of site. Excavation of contaminated soils is unlikely.	Unlikely	Negligible Impact	Unlikely	<ul style="list-style-type: none"> Previous civil work conducted on site during realignment of Cock Hill road which involved the removal of peat layer and insertion of engineered infill No sign of contamination note during site investigations Procedure in place for incidence of contaminated land within CEMP Contaminated soils encountered to be tested, quantified, segregated and transported for disposal by a licenced contractor 	Unlikely, Negligible, Unlikely
Excavation of Contaminated Soils	Groundwater Killashandra & Cavan Groundwater Bodies Locally Important & Poor Aquifer		Unlikely	Negligible Impact	Unlikely		Unlikely, Negligible, Unlikely

Potential Source	Environmental Receptor	Impact Description	Quality	Significance	Duration	Mitigation	Residual Impact
Conversion of Permeable Soils to Hard standing	Surface Water Lough Oughter SPA & SAC (via Killymooney Stream/ Aghnaskerry River, Green Lough, Cavan & Annalee River)	The construction phase will involve the gradual conversion of the existing site to areas of hardstanding. Under this scenario, the risk of flooding within the receiving catchment will increase due to an increase in impervious land area and associated drainage systems, which leads to a large increase in volume and intensity of surface water runoff within a given catchment.	Negative	Moderate	Temporary	<ul style="list-style-type: none"> Construction of detention basins Carpark to be constructed of permeable surface Stone media at the location of the underground attenuation tank systems Filter drains along verges Tree-pits at localised tree locations Petrol Interceptors to treat the surface water runoff prior discharging to the designated marsh areas. 	Negative, Slight, Temporary

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Table 8.19: Summary of predicted operational phase impacts, mitigation measures and residual impact

Potential Source	Environmental Receptor	Impact Description	Quality	Significance	Duration	Mitigation	Residual Impact
Contaminated Run-off	Surface Water Lough Oughter SPA & SAC (via Killymooney Stream/ Aghnaskerry River, Green Lough, Cavan & Annalee River)	Run-off from impermeable areas within the proposed development site discharging into surface water bodies	Negative	Moderate to Significant	Temporary	<ul style="list-style-type: none"> Drainage systems will be designed to attenuate excess surface water runoff with suitable storage volumes Reduction of outflow rate to below the existing greenfield runoff rate before discharging into the existing storm network Installation of Sustainable Urban Drainage Systems (SuDS) features such as permeable paving, detention basins, filter drains, and petrol interceptors 	Neutral, Slight, Long-term
	Groundwater Killashandra & Cavan Groundwater Bodies Locally Important & Poor Aquifer	Run-off from impermeable areas within the proposed development site infiltrating downwards through soils into aquifer	Negative	Moderate to Significant	Temporary	<ul style="list-style-type: none"> Installation of hard-surfaced areas with adequate surface water drainage, interceptor and attenuation networks to elimination percolation of contaminants to underlying groundwater in any areas where the storage of hazardous materials will be present. The service yard to the rear of the supermarket is to be completely bounded 	Neutral, Imperceptible, Long-term
Foul Water	Surface Water Lough Oughter SPA & SAC (via Killymooney Stream/ Aghnaskerry River, Green Lough, Cavan & Annalee River)	Leakage of untreated foul water and infiltration via preferential pathways to site drainage system and subsequent discharge to surface water receptors	Negative	Moderate to Significant	Short-Term	<ul style="list-style-type: none"> All sewage infrastructure to be installed in accordance with the relevant industry standards and pressure tested/CCTV surveyed prior to commissioning to ensure absence of defects Programme of inspection and maintenance to ensure any defects are repaired 	Negative, Slight, Long-term
	Groundwater Killashandra & Cavan Groundwater Bodies Locally Important & Poor Aquifer	Leakage of untreated foul water and infiltration downwards through sediments into aquifer	Negative	Moderate to Significant	Short-Term	<ul style="list-style-type: none"> Development will utilise the existing spare capacity in the Cavan Town WWTP The treatment plant will be specified and installed by an appropriately qualified technician and will be subject to regular desludging and maintenance, subject to manufacturers recommendations. 	Negative, Slight, Long-term

Potential Source	Environmental Receptor	Impact Description	Quality	Significance	Duration	Mitigation	Residual Impact
On-Site Flooding	Surface Water Lough Oughter SPA & SAC (via Killymooney Stream/ Aghnaskerry River, Green Lough, Cavan & Annalee River)	Flooding of the eastern area of the site designated a Flood Zone A & B in the CDP Plan	Negative	Imperceptible	Short-Term	<ul style="list-style-type: none"> The proposed Finished Floor Levels are 4.05m above the estimated 1 in 1000-year return period fluvial flood event water levels based on CFRAM flood levels, placing the development within Flood Zone C The proposed stormwater management system is designed in accordance with industry standards and is projected to emulate the current greenfield runoff rates calculated at the site. 	Unlikely, Negative, Unlikely
Conversion of Permeable Soils to Hard standing	Surface Water Lough Oughter SPA & SAC (via Killymooney Stream/ Aghnaskerry River, Green Lough, Cavan & Annalee River)	The construction phase will involve the gradual conversion of the existing site to areas of hardstanding. Under this scenario, the risk of flooding within the receiving catchment will increase due to an increase in impervious land area and associated drainage systems, which leads to a large increase in volume and intensity of surface water runoff within a given catchment	Negative	Significant	Long-Term	<ul style="list-style-type: none"> Sustainable Urban Drainage Systems (SuDS) such as permeable paving, filter drains, and petrol interceptor in order to treat surface runoff at high level and ground level Drainage systems will be designed to attenuate excess surface water runoff with suitable storage volumes for the site and reduce the outflow rate to below the estimated greenfield rate before discharging into the marsh 	Neutral, Slight, Long-term

8.9.3 Summary of Significant Effects

The receptors for this assessment are considered to be local surface water receptors named Killymooney Stream/ Aghnaskerry River, Green Lough, Cavan, Annalee River and the Lough Oughter SPA & SAC; and a Locally Important and Poor aquifer beneath the site named the Killashandra & Cavan Groundwater Bodies, respectively. Whilst the development proposals have the potential to cause detrimental effects to sensitive receptors identified, the recommended mitigation measures will ensure that the risk of potential effects are reduced to negligible.

8.9.4 Statement of Significance

The significance of impact upon shallow soils, drift deposits, and bedrock geology have been assessed for both during the construction and operational phases. The results of the assessment are presented on **Table 8.18** and **Table 8.19**.

Where a potential effect has been identified, the significance of effect upon these receptors ranges from slight to significant.

Where a potential effect has been identified, mitigation measures have been provided which if implemented reduces the effect of significance to '*imperceptible*' or '*slight*'. The mitigation steps are presented in **Section 8.6** of this chapter.

8.10 Reinstatement

Not Applicable.

8.11 Interactions and Potential Cumulative Effects

8.11.1 Interactions

Hydrology is linked with hydrogeology and geology. In terms of hydrogeology specifically, the recharge capacity at the site will be diminished as a function of surface sealing, which has the potential to adversely enhance flood events downstream of the site. This is addressed in the above sections in regard to flood risk assessment and mitigation i.e. attenuation and SUDs.

Hydrology is also linked with ecology and biodiversity as the surface water bodies noted in proximity to the site also serve as habitats to local species of flora and fauna; and they also act as pathways to ecologically protected areas, as discussed in **Chapter 9**. With the successful implementation of adequate mitigation measures potential hazards will be managed and the likelihood of environmental incidents occurring is very low. Any potential impacts are therefore resolved or minimized.

8.11.2 Potential Cumulative Effects

Construction Phase

The phasing/commencement of any other permitted developments in the locality could potentially result in the scenario where a number of other construction sites are in operation at the same time as the proposed development.

Considering the mitigation measures outlined in this report and the expected residual effect pending successful implementation of those measures, the development is not considered to significantly contribute to cumulative adverse impacts to the associated hydrological network. However, assuming all potential construction activities require similar mitigation, socio cumulative impacts could potentially arise, for example; excessive loading of foul sewer systems with construction water trade effluents.

Operational Phase

In the absence of mitigation measures, surface sealing (paving, buildings on previously exposed ground), reduction in recharge to groundwater, and rapid transmission of runoff to surface water systems has the potential to significantly contribute to the cumulative / catchment hydrological response to rainfall.

Considering the mitigation measures outlined in this report and the expected residual effect pending successful implementation of those measures, the development is not considered to significantly contribute to cumulative adverse impacts to the associated hydrological network.

In terms of future projected projects, there are 4 no. proposed developments set within the vicinity of the proposed development likely to commence during the project construction phase, as summarised in **Table 8.20**. Given the relatively minor scale of these developments, any cumulative impacts are anticipated to be **Negative, Not Significant, Temporary**.

Table 8.20. Proposed Developments within the site vicinity

Reg. Ref.	Location	Description of Development	Decision	Distance	Anticipated Cumulative Effect
CCC Reg. Ref. 21528	Aghnaskerry, Co. Cavan	Demolish existing derelict dwelling house and erect 26 no. 3-bed semi-detached dwellings	Permission Granted by CCC 26/05/2022 Subject of current appeal with ABP	ca. 317m NE	Negative, Not Significant, Temporary
CCC Reg. Ref. 2163	Gaelscoil Bhreifne Tullymongan Lower and Aghnaskerry, Cavan	Single storey extension to existing school, alterations to site layout with a new access via service road	Permission Granted by CCC 21/05/2022 Development commenced 08/07/2021	ca. 180m N	Negative, Not Significant, Temporary
CCC Reg. Ref. 20145	Aghnaskerry, Tullymongan Lower, Cavan	Change of use of existing dwelling to pre/after school care facility with associated alterations to elevations, outdoor play area and pedestrian path access from adjoining Gaelscoil Bhreifne	Permission Granted by CCC 22/10/2021	ca. 180m N	Negative, Not Significant, Temporary
CCC Reg. Ref. 20376	Gaelscoil Bhreifne Tullymongan Lower and Aghnaskerry, Cavan	Construct new roadway and entrance junction along the L2543 Cavan Town Eastern Access Road/ Cock Hill Road, alterations to existing public roadway to include new right turn lane and footpath, safety barrier, public playground area, pathways, public lighting, landscaping, boundary treatments and all ancillary site works	Permission Granted by CCC 03/03/2021	Adjacent to the site boundary to the NE	Negative, Not Significant, Temporary
CCC Reg. Ref. 18141	Tullymongan Lower, Cavan, Co. Cavan	Change of use of existing residential convent building to educational school building	Permission Granted by CCC 18/08/2018 Development commenced 08/07/2021	ca. 180m N	Negative, Not Significant, Temporary

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9.0 Biodiversity

9.1 Introduction

9.1.1 Aim of The Report

This biodiversity chapter (Chapter 9) is an Ecological Impact Assessment (EclA) which addresses the potential ecological impacts that may occur in the future on the terrestrial and aquatic ecology of a site at Tullymongan Lower, Cavan, Co. Cavan and its surrounding environs should this proposed development for Tesco Ireland be allowed to proceed.

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

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

9.2 Consultation

ORS have been commissioned to assess the potential impacts of the proposed development in terms of terrestrial and aquatic ecology during the construction and operational phases.

The principal members of the ORS EIA team involved in this assessment include the following persons:

- **Principal Ecologist & Lead-Author:**
Noreen McLoughlin – B.A (Hons) (Zoology), MSc (Freshwater Ecology), CIEEM. Current Role: Owner and principal ecologist at Whitehill Environmental. Experience ca. 16 years.
- **Project Scientist & Reviewer:**
Luke Martin - B.A. (MOD) (Natural Sciences), M.Sc. (Sustainable Energy and Green Technology), CEnv, MIEEnvSc. Current Role: Senior Environmental Consultant. Experience ca. 10 years.

Consultation between ORS and other members of the planning/design team was made in order to obtain information required to assess the potential construction and operational phase impacts on terrestrial and aquatic ecology. Pre-planning meetings were held with Cavan County Council on 6th August 2020, 13th October 2020, 30th September 2021 and 8th November 2022.

9.3 Legislation, Policy and Guidance

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

9.3.1 Legislative and Policy Context

Guidance Documents

This chapter was carried out in accordance with the following guidance documents and relevant literature:

- EPA, (2022). Guidelines on the Information to be Contained in Environmental Impact Assessment Reports.
- Bailey, M. & Rochford, J. (2006) Otter survey of Ireland 2004 / 2005. Irish Wildlife Manuals No. 23. National Parks & Wildlife Service. DoEHLG.
- Bowers Marriott, B. (1997) Practical Guide to Environmental Impact Assessment: A Practical Guide. Published by McGraw-Hill Professional, 1997, 320 pp.
- CIEEM (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland. CIEEM, 2018
- Cummins, S; Fisher, J; Gaj McKeever, R; McNaghten, L & Crowe, O. (2010) Assessment of the Distribution and abundance of Kingfisher Alcedo atthis and other riparian birds on six SAC river systems in Ireland. NPWS & Birdwatch Ireland.
- Department of the Environment, Heritage and Local Government (2009) Appropriate Assessment of Plans and Projects in Ireland – Guidance for Planning Authorities.
- Dwyer, (2000) Protecting Nature in Ireland, The NGO Special Areas of Conservation Shadow List. Published by the Irish Peatland Conservation Council, Dublin.
- EPA (2001) Parameters of Water Quality - Interpretation and Standards. Environmental Protection Agency, Ireland.
- EPA (2002) Guidelines on the Information to be contained in Environmental Impact Statements. Environmental Protection Agency, Ireland.
- EPA (2003) Advice Notes on Current Practice in the Preparation of Environmental Impact Statements. EPA, Wexford, Ireland.
- EPA (2012) Guidance on the setting of trigger values for storm water discharges to off site surface waters at EPA licensed IPPC and waste facilities. EPA, Wexford.
- Fossit, J.A. (2000) A Guide to Habitats in Ireland. The Heritage Council, Kilkenny.
- Hayden, T. & Harrington, R. (2000) Exploring Irish Mammals. Dúchas the Heritage Service, Town House Dublin.
- Institute of Environmental Assessment (1995) Guidelines for Baseline Ecological Assessment. Institute of Environmental Assessment, Great Britain.
- IUCN (2003) Red List of Threatened Species. International Council for Conservation of Nature and Natural Resources.

- Kurz, I. and Costello, M.J. (1999) An Outline Of The Biology, Distribution And Conservation Of Lampreys In Ireland. F. Marnell (ed.), Irish Wildlife Manuals, No. 5.
- Ó Néill L. (2008) Population dynamics of the Eurasian otter in Ireland. Integrating density and demography into conservation planning. PhD thesis. Trinity College, Dublin.
- Natura Environmental Consultants (2005) Draft Habitat Survey Guidelines: A Standard Methodology for Habitat Survey and Mapping in Ireland. The Heritage Council, Kilkenny.
- NPWS (2008) Conservation Status in Ireland of Habitats and Species listed in the European Council Directive on the Conservation of Habitats, Flora and Fauna 92/43/EEC
- NRA (2004) Guidelines for Assessment of Ecological Impacts of National Road Schemes. National Roads Authority, Dublin.
- Smith G. F., O'Donoghue P., O'Hora K. and Delaney E. (2010.) Best Practice Guidance for Habitat Survey and Mapping. Heritage Council.
- Whilde, A. (1993) Threatened Mammals, Birds, Amphibians and Fish in Ireland. Irish Red Data Book 2: Vertebrates. HMSO, Belfast.

Legislative Context

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

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

The Birds Directive (Council Directive 2009/147/EC) recognises that certain species of birds should be subject to special conservation measures concerning their habitats. The Directive requires that Member States take measures to classify the most suitable areas as Special Protection Areas (SPAs) for the conservation of bird species listed in Annex 1 of the Directive. SPAs are selected for bird species (listed in Annex I of the Birds Directive), that are regularly occurring populations of migratory bird species and the SPA areas are of international importance for these migratory birds.

The EU Habitats Directive (92/43/EEC) requires that Member States designate and ensure that particular protection is given to sites (Special Areas of Conservation) which are made up of or support particular habitats and species listed in annexes to this Directive.

The Water Framework Directive (WFD) (2000/60/EC), which came into force in December 2000, establishes a framework for community action in the field of water policy. The overall aim of the

WFD is the eventual achievement of good status in all waterbodies. The WFD was transposed into Irish law by the European Communities (Water Policy) Regulations 2003 (S.I. 722 of 2003). The WFD rationalises and updates existing legislation and provides for water management on the basis of River Basin Districts (RBDs). RBDs are essentially administrative areas for coordinated water management and are comprised of multiple river basins (or catchments), with cross-border basins (i.e. those covering the territory of more than one Member State) assigned to an international RBD. Ireland is now within the 3rd cycle of the WFD (2022 – 2027).

Planning Policies

National:

Nationally, the Government’s commitment to sustainable development is set out in a number of documents including the National Planning Framework and the National Development Plan 2018 – 2027.

Regional:

Planning at the regional level is now guided by the Regional Spatial and Economic Strategy (RSES). The RSES is a strategic plan which identifies regional assets, opportunities and pressures and provides appropriate policy responses in the form of Regional Policy Objectives.

Local:

Planning policy at the local level is currently provided by the Cavan Development Plan 2017 – 2023. This plan contains a number of objectives and policies relevant to ecology, biodiversity, green infrastructure and nature conservation. These are summarised in Table 9.1. The new Cavan County Development Plan 2022 – 2028 will shortly be published and these policies will be reviewed.

Table 9.1 – Regional Policies Relevant to Ecology and Nature Conservation

Policy / Objective Ref	Description
NHEP1	To protect, conserve, manage, enhance and safeguard natural amenity assets and natural heritage features for future generations while maximising their recreational, amenity and tourism potential for the present generation by resisting development that could have a negative impact.
NHEP2	To maximise the social, economic and environmental benefits that may be derived from the conservation and management of Cavan’s Natural Heritage and green infrastructure.
NHEP4	To protect, manage, conserve and seek to enhance the County’s biodiversity.
NHEP5	To integrate biodiversity consideration into all County activities through the County Biodiversity Action Plan process.
NHEP6	To ensure the protection of species of flora and fauna afforded legal protection under Irish and European Legislation.
NHEP7	To assess the impact of biodiversity of proposals for large developments, particularly those on Greenfield sites, or in environmentally sensitive

	areas. Such developments must include measures for the enhancement and protection of biodiversity.
NHEO2	To promote the conservation of biodiversity outside of designated areas, including features such as wetlands, woodlands, hedgerows and uplands.

Heritage Plans

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

The Cavan Heritage Plan 2018-2023 and the Cavan Biodiversity Action Plan 2010 – 2015 identifies a number of objectives and policies in order to protect the natural heritage and biodiversity of the Cavan area.

9.3.2 Study Area

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

9.3.3 Desk Based Studies

The desk study involved the examination of aerial photographs, current and historical maps and plans and drawings of the site. In addition, information was collated on designated nature sites within a 5-15 km radius of the proposed site and on protected and rare species within the 1km square of the site.

The following websites were used to access information and data:

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

9.3.4 Field Based Studies

A visit to the site of the proposed development at the Tullymongan Lower site conducted on November 11th 2022, when relevant field notes, species lists and photographs were taken. The

site was surveyed in accordance with the Heritage Council's *Habitat Survey Guidelines* (Smith et al., 2010) and the Institute of Environmental Assessment's *Guidelines for Baselines Ecological Assessment* (IEA, 1995). Habitats within the application site were classified in accordance with Level 3 of *A Guide to Habitats in Ireland* (Fossit, 2000). These habitats are denoted in the text along with their habitat code. Any bird and mammal activity was also noted.

Seasonal Constraints

Given the limited habitats on the site, there were no seasonal constraints associated with the habitat assessment element of the field work for this EclA.

9.3.5 Impact Assessment Methodology

Evaluation of Ecological Features

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

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

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

- International
- National (Ireland)
- Regional (East)
- County (Cavan)
- District (Ballymore Eustice)
- Local/Townland (Tullymongan Lower)

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

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

Assessment of Impacts

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

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

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

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

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

The identification of the range of potential impacts which can reasonably be expected to occur should the proposed developments receive planning consent.

The consideration of the systems and processes in place to avoid, reduce and mitigate the possible effects of these impacts.

The identification of opportunities for ecological enhancement within the site.

Impacts are defined as being positive, negative, or neutral. A significant impact is defined as an impact upon the integrity of a defined ecosystem and/or the conservation status of a habitat or species within a given area. Where a potential negative impact has been identified, mitigation

measures have been formulated using best practices techniques and guidance to prevent, reduce or offset the impact.

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9.4 Receiving Environment

This section of the chapter provides the baseline information in terms of ecology (terrestrial and aquatic receptors).

The current application site is 3.86 hectares in area. It is located in a sub-urban area on the eastern outskirts of Cavan town, approximately 118m east of Main St. The site is bounded by the grounds of St Clare's National School to the north, by the Cock Hill Road to the west, east and south. The Cock Hill Road forms part of the Eastern Access Road to Cavan Town Centre. A 17-unit single storey detached residential development named Saint Francis' Estate is directly adjacent to the south-west of the site with the development spread across both carriageways of the Cock Hill Road. Directly to the south, across the Cock Hill Road, is a larger residential development named Lakeview with ca. 98 units.

The underlying geology has a major influence on topographical, hydrogeological and hydrological features within the site vicinity, hence this chapter is closely linked to the next chapter (Chapter 8 – Hydrology and Hydrogeology).

The receiving environment is described below for the proposed development under the following headings:

- Designated Sites
- Flora
- Fauna
- Aquatic Environment

9.4.1 Site Location & General Description

Site location maps can be seen in Figures 9.1 and 9.2.

Figure 9.1 – Site Location Map. The Application Site is Pinned.

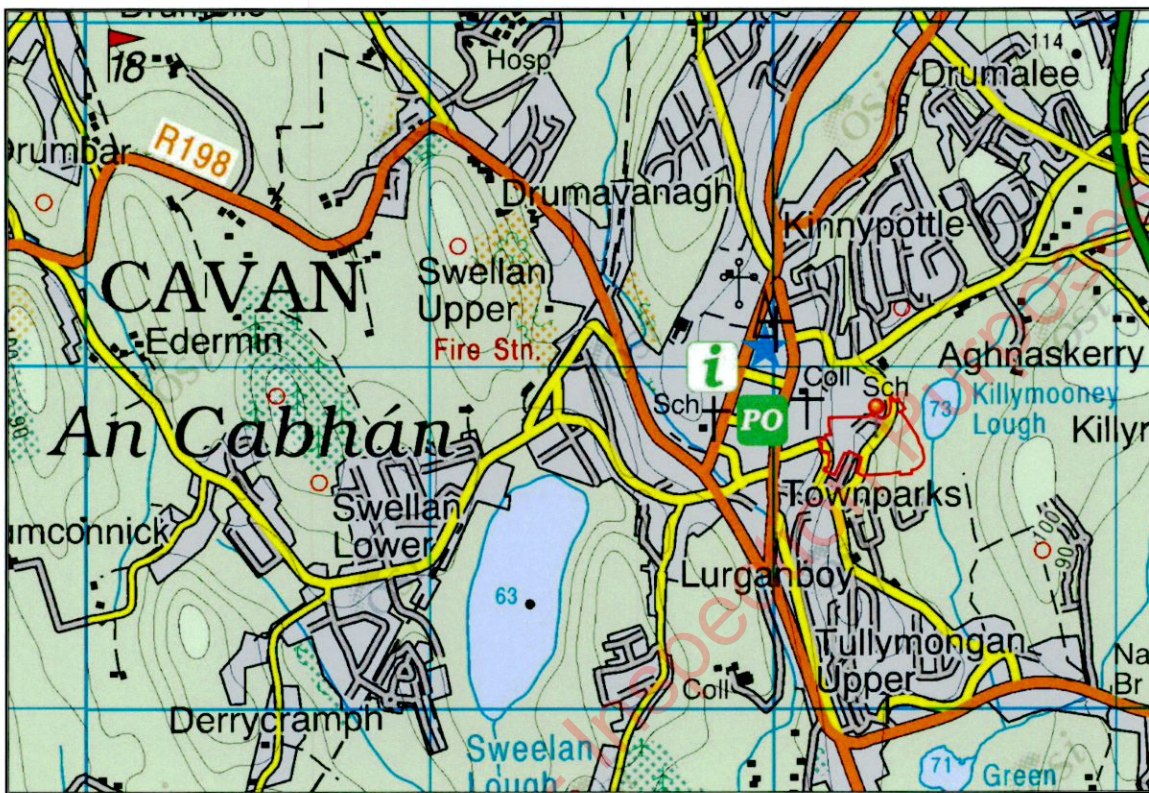
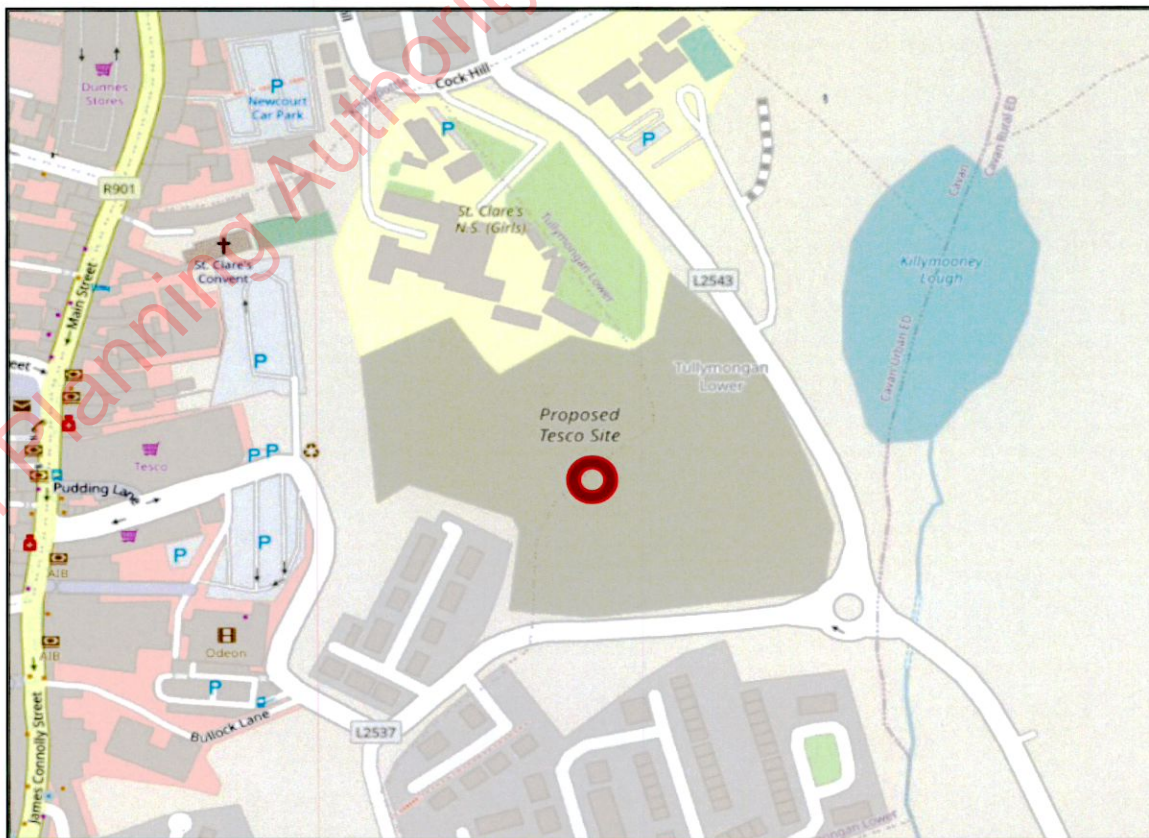


Figure 9.2 – Site Location Map.



Land Use and Habitats Surrounding the Site

Using up to date aerial photographs, an overview of the land-use and habitats surrounding the application site was assessed and noted. The land-use to the west, south and north of the site predominantly consists of the sub-urban and urban areas of Cavan. Buildings and artificial surfaces and amenity grasslands and gardens are the habitats commonly associated with these areas. Beyond the urban fabric of Cavan, agriculture is the dominant land use and improved agricultural grassland is the dominant habitat. Other habitats represented locally include unimproved and wet grasslands, hedgerows, treelines and watercourses. The site is also close to Killymooney Lough and its riparian reed and grassland habitats.

An overview of these habitats can be seen in the aerial photograph in **Figure 9.3**.

Figure 9.3 – Aerial Photograph Showing Habitats Surrounding the Study Area (Zoom Earth)



9.4.2 Designated Sites

Natura 2000 Sites

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

There are two Natura 2000 sites within 15km of this proposed development. These sites are summarised in **Table 9.2**. The location of the application site in relation to these designated areas is shown in **Figure 9.4** and a full synopsis of these sites can be read online on the website of the National Parks and Wildlife Service (www.npws.ie).

Table 9.2 – Natura 2000 Sites within 15km of the Proposed Development

Site Name & Code	Distance from Site	Qualifying Interests
Lough Oughter and Associated Loughs SAC 000007	3.4km north-west	<ul style="list-style-type: none"> • Natural eutrophic lakes with Magnopotamion or Hydrocharition-type vegetation • Bog woodland • Otter <i>Lutra lutra</i>
Lough Oughter Complex SPA 004049	3.7km north-west	<ul style="list-style-type: none"> • Great Crested Grebe (<i>Podiceps cristatus</i>) • Whooper Swan (<i>Cygnus cygnus</i>) • Wigeon (<i>Anas penelope</i>) • Wetlands & Waterbirds

The generic conservation objectives of the SACs are:

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

The generic conservation objectives of the SPAs are:

- To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA.

The favourable conservation status of a habitat is achieved when:

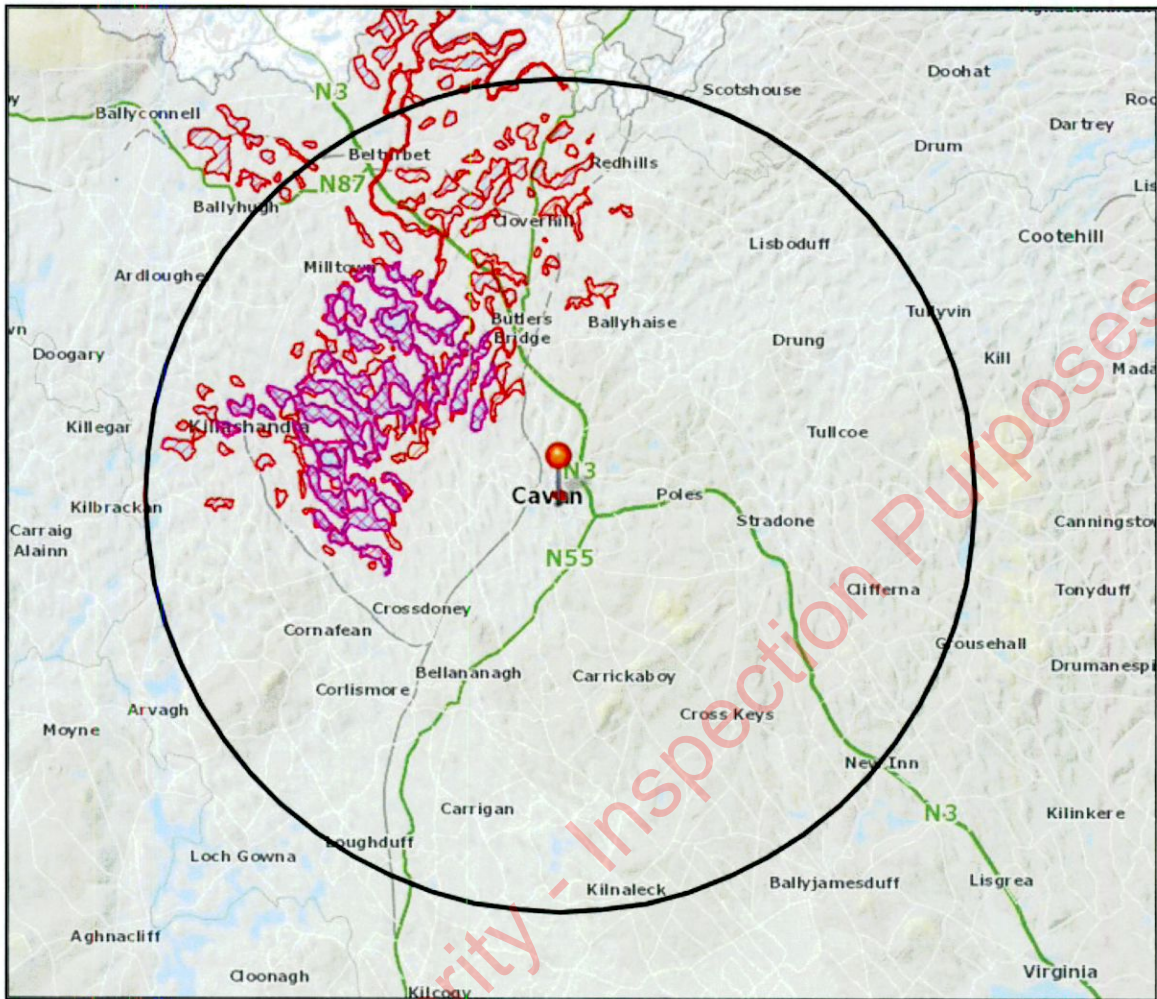
- Its natural range and area it covers within that range is stable or increasing and the specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future;
- The conservation status of its typical species is favourable.

The favourable conservation status of a species is achieved when:

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

As potential significant effects upon the sites identified could not be ruled out, a separate NIS as required under Article 6 of the EU Habitats Directive has been submitted as part of this application. This NIS will allow the competent authority to undertake its statutory obligations with regards to Appropriate Assessment.

Figure 9.4 – Designated Sites within 15km of the Application Site (Pinned). SACs – Red Hatching, SPAs – Pink Hatching.



Nationally Important Sites

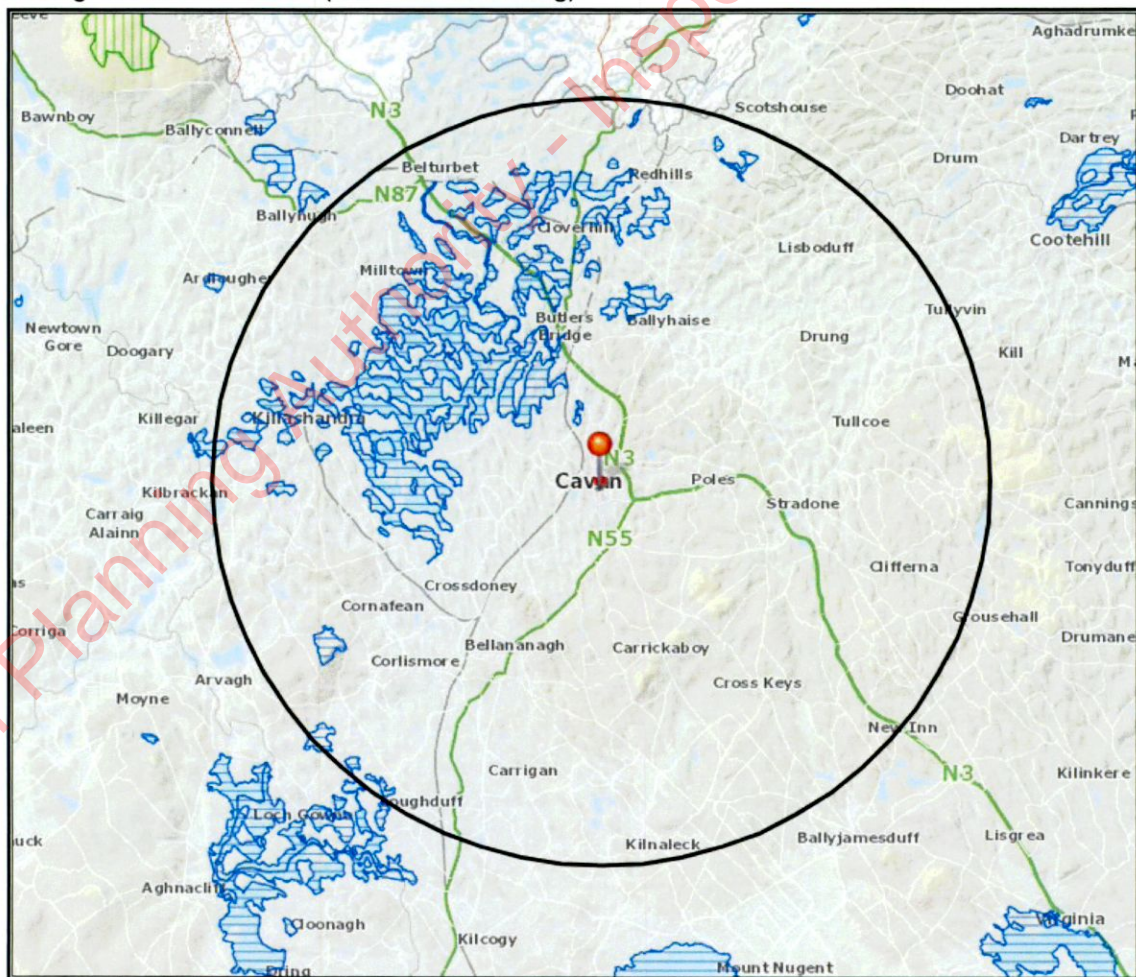
The application site is not within or immediately adjacent to any nationally designated site, such as a Natural Heritage Area or a proposed Natural Heritage Area. It is within 5km of nine sites that have been designated as proposed Natural Heritage Areas.

These sites are summarised in **Table 9.3** and a map showing their locations relative to the application site is shown in **Figure 9.5**.

Table 9.3 – Nationally Important Sites within 15km of the Proposed Development

Site Name & Code	Distance from Site
Drumkeen House Woodland pNHA 000980	2.2km north
Lough Oughter and Associated Loughs pNHA 000007	3.4km north-west
Bruse Hill pNHA 000002	11.6km south-west
Drumcor Lough pNHA 001814	13.2km north
Annagheane Lough pNHA 001836	13.6km north
Lough Garrow and Lough Gubdoo pNHA 000984	13.9km north
Cordonaghy Bog pNHA 000978	14.2km south-west
Lough Gowna pNHA 000992	14.2km south-west
Glasshouse Lake pNHA 000983	14.3km west

Figure 9.5 – The Proposed Application Site at Tullymongan Lower in Relation to proposed Natural Heritage Areas within 15km (Blue Cross Hatching)



9.4.3 Flora

Habitats within the Study Area

No part of the site lies within any area that is designated for nature conservation purposes. Historically as determined from an examination of old aerial photos, the site and the lands surrounding St Francis' Estate and St Clare's National School were agricultural in nature and grasslands, hedgerows and treelines were the dominant habitats within the application site as well as in the lands surrounding Killymooney Lough. However, the construction of the Eastern Access Road (Cock Hill Road) to the east altered this entire landscape, leading to the conversion of agricultural land to built/ excavated land. Significant excavations took place and now the application site is at a significantly lower level than St Francis's Estate, with a steep cliff of loose rock forming the boundary between these two areas.

The application site is greenfield however it is dominated by a heavily modified and previously excavated and infilled area. The dominant habitats within the application site include areas of spoil and bare ground (Habitat Code ED2), small patches of dry meadows and grassy verges (GS2) and treelines (WL2). These habitats are described in greater detail below whilst a habitat map is illustrated in **Figure 9.6**. A full list of the plant species recorded from the study area is shown in **Appendix 9.1** and photos of the site can be seen in **Appendix 9.2**.

Habitat Descriptions

Spoil and Bare Ground ED2

The application site is dominated by loose stone and gravel that is largely devoid of any vegetation with the exception of some scattered ruderal plants such as colts foot *Tussilago farfara*. This habitat has no biodiversity value.

Dry Meadows and Grassy Verges GS2

This habitat was noted to occur in along the verges of the site along Cock Hill Road to the east and south. It also occurs in association with the treeline boundary to the west and in the south-western corner of the site behind the residential estate. Grasses are unmanaged and tussocky here and cock's foot grass *Dactylis glomerata* and meadow grasses *Poa* sp. were common. The broadleaved species noted were typical of this habitat and included ragwort *Jacobaea vulgaris*, spear thistle *Cirsium vulgare*, autumn hawkbit *Scorzoneroides autumnalis*, short-fruited willowherb *Epilobium obscurum*, common hogweed *Heracleum sphondylium*, nettle *Urtica dioica*, red clover *Trifolium pratense* and rosebay willowherb *Chamaenerion angustifolium*. There were some broadleaved seedlings and immature shrubs / trees noted growing here including broom *Cytisus scoparius*, birch *Betula* sp., willow *Salix* sp. and pedunculate oak *Quercus robur*.

Treelines (WL1)

Although the site is largely devoid of mature vegetation, the original treeline along the Cock Hill Road to the west remains generally intact and possibly supplemented with additional planting. This treeline occurs on a steep embankment that slopes down towards Cock Hill Road to the west as it leads down to the existing carpark and Tesco shop. Common species in this treeline include birch, pedunculate oak and beach *Fagus sylvatica*. Gorse *Ulex europaeus* was also frequent.

Overall Evaluation of Habitats within the Site

Overall, the biodiversity of this application site is generally of low value. The habitats within it are generally highly modified. The grassy verge habitats would provide some suitable sources of nectar for local populations of pollinating insects in the summer months. The treeline along the western site boundary is of higher biodiversity value and this would provide some suitable nesting and perching sites for birds within an urban environment.

The site was also considered in terms of its connectivity to Killymooney Lough, a small lake that lies approximately 40m east of the application site. The riparian habitats around this lake include wet grassland and reed swamp habitats. There is no connectivity between the application site and Killymooney Lough and there are no riparian or wetland habitats within the application site.

Rare and Protected Plant Species

An examination of the website of the National Parks and Wildlife, the National Biodiversity Data Centre and the Online Atlas of Vascular Plants for Ireland revealed that there are no records for any plant species protected under the Flora Protection Order from within the 10km square (H40) of the proposed application sites. The majority of the habitats within the site are all highly modified and no protected plant species were noted within the site.

Invasive Species

No non-native invasive species that are regulated for control under the European Communities (Birds and Natural Habitats) Regulations 2011 (SI 477) were recorded from within the study area. Particular attention was paid to the potential presence of Japanese knotweed *Fallopia japonica*, which is very common in urban areas and disturbed ground in Ireland. This species has been recorded from within the 1km of this application site (H4204).

Figure 9.6: Habitat Classification



9.4.4 Fauna

Protected Mammals

Records from the National Biodiversity Data Centre reveal the presence of the following protected mammals from within the 10km square (H40) of this proposed application site:

- Eurasian Badger (*Meles meles*)
- Eurasian Red Squirrel (*Sciurus vulgaris*)*
- European Otter (*Lutra lutra*)
- Lesser Noctule (*Nyctalus leisleri*)
- Nathusius's Pipistrelle (*Pipistrellus nathusii*)
- Pine Marten (*Martes martes*)
- Pipistrelle (*Pipistrellus pipistrellus sensu lato*)
- Soprano Pipistrelle (*Pipistrellus pygmaeus*)
- West European Hedgehog (*Erinaceus europaeus*)*

*Indicates that records for this species exist from the 1km square, i.e., N4204.

All these species are protected under the Irish Wildlife Acts. In addition, the otter *Lutra lutra* is protected under Annex II of the European Habitats Directive. The field survey of the site found no badger setts present within the site, and no obvious worn tracks or trails that could be attributed to badgers. There are no freshwater or riparian habitats within the site, therefore the site is not suitable for use by the otter. However, the lands to the west of the site around Killymooney Lough remain optimal for the otter and as part of the surveys for a separate residential development (Planning Reference: 21/528) evidence for the presence of the otter around Killymooney Lough was noted.

There are no buildings within the application site that would be used by roosting or hibernating bats and the treeline along the western site boundary is likely to be of limited value for bats.

The site is of limited value for mammals in a local context.

Birds

No birds of conservation concern were noted within the site during the site survey. The site is of extremely limited value for birds. The treeline along the western perimeter provides the only habitat for nesting within the site and given the urban context of this treeline its overall value to local birds is likely to be limited. The birds observed on the day of the survey included magpie *Pica pica* and hooded crow *Corvus cornix*.

Amphibians, Reptiles and Invertebrates

There are no habitats within the application site suitable for amphibians (common frog or smooth newt) or reptiles (lizard). The grassy verges within the site are likely to provide sources of nectar for a common range of aerial invertebrates in the spring and summer months.

9.4.5 Aquatic Environment

Water Features and Quality

Surface Waters

The application site is located within the Erne Hydrometric Area (36) and Catchment (36), and the Cavan Sub-Catchment (010) and Sub-Basin (010). There are no water courses within the application site. The site is 43m west of Killymooney Lough. This is a small lake that occurs along the Killymooney Lough Stream [First Order Stream, EPA Code: IE_NW_36C020300]. The Killymooney Lough Stream rises in lands approximately 762m upstream of Killymooney Lough. The stream flows in a southerly direction, through Killymooney Lough until its confluence with the Green Lough Stream [Third Order Stream, EPA Code: IE_NW_36C020300]. This Green Lough stream flows in a southerly and then northerly direction until its confluence with the Cavan River, at a point approximately 1.1km south-west of the application site.

The Cavan River is a tributary of the Erne system. It flows east of Cavan Town in a northerly / north-westerly direction through Coalpit Lough, then Derrygid Lough. It meets the Annalee River south-west of Butlers Bridge.

The EPA have classified the ecological status of the Killymooney Lough Stream, the Green Lough Stream and the Cavan River at points close to the application site as poor¹. The ecological status of the Annalee River varies from poor to moderate. In 2020, the EPA noted a Q value of 3-4 from the Green Lough Stream from the Bridge near Breffni Park, which is approximately 1km south of the application site. Further downstream in the Cavan River near Drumkeen House, a Q3 was noted. A Q3-4 is indicative of moderate ecological status and a Q3 is indicative of poor status and both of these are unsatisfactory. Under the requirements of the Water Framework Directive, any status below good (Q4) is unsatisfactory and all watercourses must achieve good status under the requirements of this Directive. An extract from the EPA maps showing WFD status is presented in **Figure 9.7**. A summary of most recent Biological Q-ratings from the watercourses at points close to the site is provided in **Table 5.4**.

Table 9.4 – Biological Q Values for Local Watercourses (Source, EPA).

Station ID	Station Name	2020 Result
RS36G010040	Green Lough Stream	3-4
RS36C020300	Cavan – Br. SE Drumkeen House	3

¹ Taken from <https://gis.epa.ie/EPAMaps/>. Period for WFD Status 2013 – 2018.

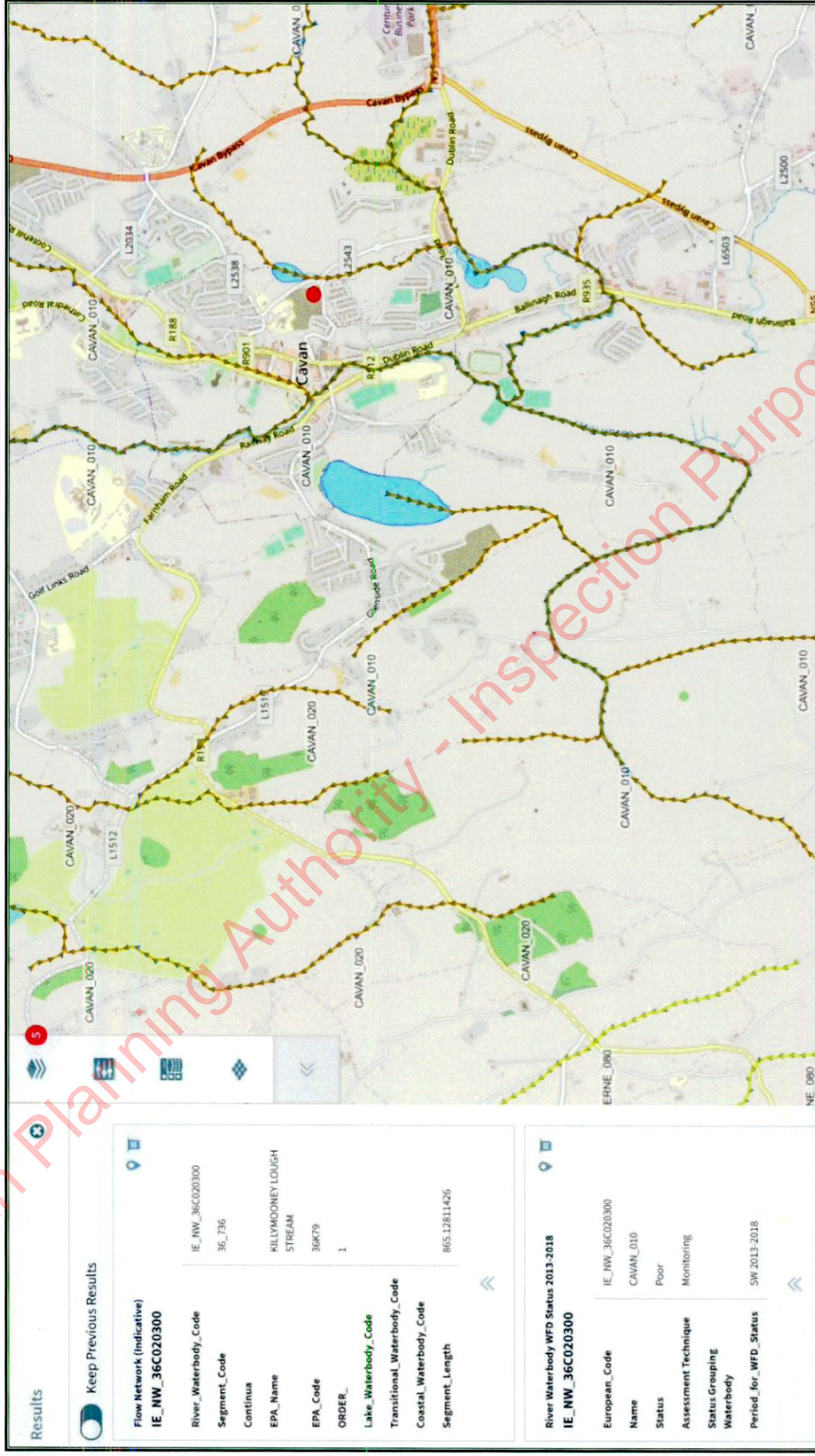
Ground Water

The application site straddles the Cavan Groundwater Body (East) and the Killeshandra Groundwater Body (West). The overall Water Framework Directive status of both these waterbodies is noted as good.

The area underlying the proposed site itself has a mixture of 'Moderate' to 'High' groundwater vulnerability in the centre and west of the site with a smaller area to the east of the site classified as 'Extreme'.

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Figure 9.7 – The Proposed Application Site (Red Dot) and Local WFD Status



9.4.6 Ecological Evaluation

Summary of the Value of the Application Site

The site at Tullymongan Lower is within 15km of two sites designated under the Natura 2000 network, i.e., the Lough Oughter and Associated Loughs SAC and the Lough Oughter Complex SPA. These sites are 3.4km and 3.7km north-west of the site respectively. The site is also within 15km of nine sites designated as Natural Heritage Areas (NHAs and pNHAs). The closest pNHA to the site is the Drumkeen House Woodland pNHA and this is 2.2km north of the site.

Within the application site itself, the dominant habitat is spoil and bare ground. This habitat has no biodiversity value. Other habitats present include strips of dry meadows and grassy verges and treelines. The dry meadows and grassy verges are well represented in the local area and are considered to be of low biodiversity value locally. The treeline along the western boundary is the most important ecological features on the site, however it is quite isolated in this urban environment and it does not provide connectivity to other treelines, woodlands or areas of higher biodiversity value outside of the site.

Overall, it is considered that the site is of limited value for fauna, including birds, bats and terrestrial mammals.

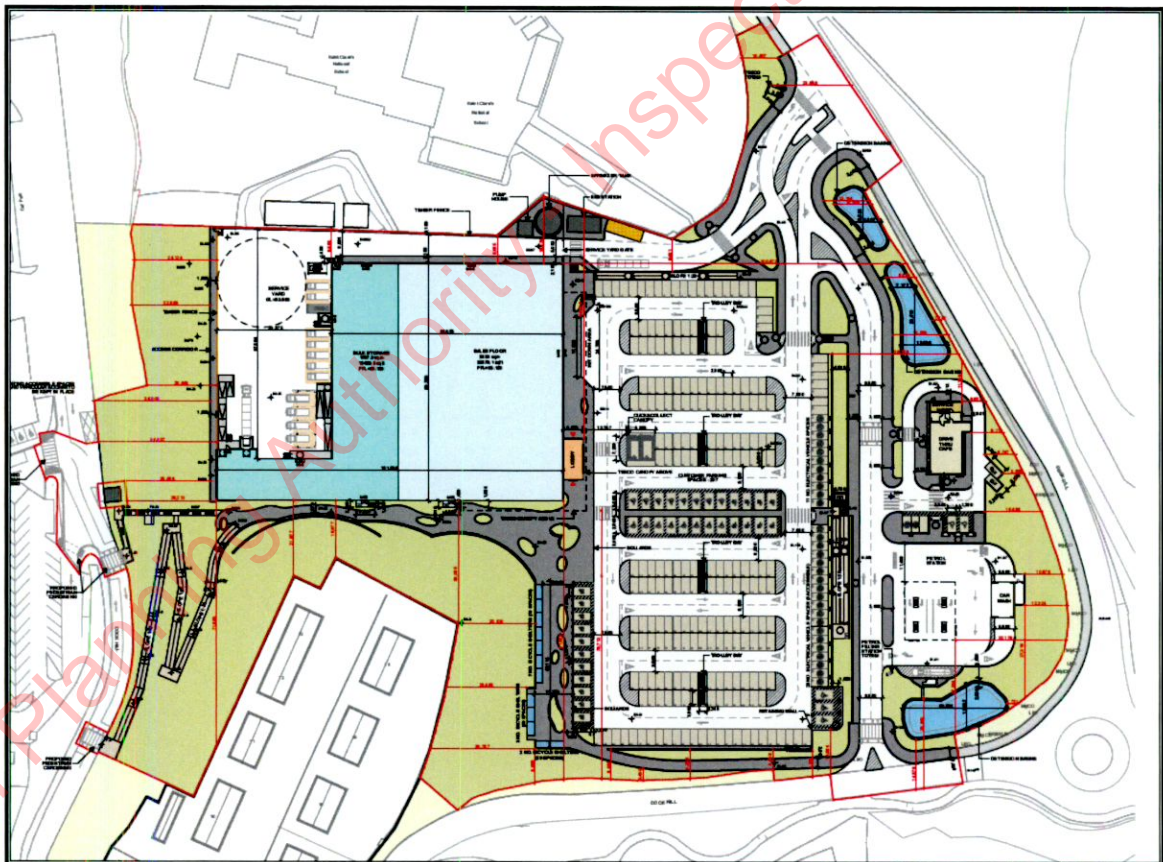
9.5 Characteristics of the Proposed Development

The development will consist of the construction of a single storey retail unit of c. 5,197 sq.m gross floor area (c. 2,194 sq.m convenience net sales area and c. 957 sq.m comparison net sales area) including a licensed alcohol sales area and service yard; a drive thru café unit (c.174 sq.m gross floor area) with external seating and 5 no. car parking spaces and 2 no. set down bay areas; a petrol filling station including car wash/jet wash (c. 89 sq.m), a forecourt canopy (covers c. 255 sq.m. and 4.8m in height); signage including elevational and 2 no. totem signs; 297 no. car parking spaces and 120 no. cycle parking spaces; a "Click and Collect" facility; Grocery Home Shopping delivery vehicle docking area; access points from Cock Hill Road; pedestrian linkages with the Town Centre by way of the provision of a sloped pedestrian walkway and steps on the western boundary of the site with 4 no. pedestrian crossings on Cock Hill Road and; all ancillary site development works, landscaping, fencing, enabling works and site services.

Please refer to **Chapter 2** for the full description of development.

An extract from the planning drawings can be seen in **Figure 9.8**.

Figure 9.8 – Extract from Site Plan (Joseph Doyle Architects)



9.6 Predicted Effects of the Proposed Development

9.6.1 Potential Effects upon Designated Sites

Natura 2000 Sites

The application site is 3.4km south-east of the Lough Oughter and Associated Loughs SAC and 3.7km south-east of the Lough Oughter Complex SPA. There are no watercourses on the site itself and direct surface water between the application site and these Natura 2000 sites does not exist. However, the application site is 43m west of Killymooney Lough and it is 33m west of the Killymooney Lough Stream. The Killymooney Lough Stream provides a hydrological pathway to the Lough Oughter SAC / SPA via the Green Lough Stream, the Cavan River and the Annalee River. The overall hydrological distance is ~8.9km.

Therefore, in accordance with the tenets of the precautionary principle and in the absence of mitigation, an accidental pollution event of sufficient magnitude which might occur during the construction or operation or the proposed development, either alone or in-combination with other developments, could potentially affect the water quality in the Killymooney Lough Stream to an extent that could undermine the favourable conservation status of the QIs of the Lough Oughter and Associated Loughs SAC and the Lough Oughter Complex SPA.

Should suitable mitigation measures not be implemented, then the following potential impacts upon the Lough Oughter and Associated Loughs SAC and the Lough Oughter Complex SPA Natura 2000 sites may occur:

- Deterioration of water quality in the Lough Oughter and Associated Loughs SAC and the Lough Oughter Complex SPA arising from pollution to surface or groundwaters during site preparation and construction.
- Deterioration of water quality in the Lough Oughter and Associated Loughs SAC and the Lough Oughter Complex SPA arising from pollution to surface or groundwaters during the operation of the proposed development;
- Cumulative impacts with other proposed/existing developments.

These impacts could give rise to negative effects upon the QIs of these sites. Any negative effects on the Lough Oughter and Associated Loughs SAC and the Lough Oughter Complex SPA could be significantly negative at an international scale. An NIS as required under Article 6 of the EU Habitats Directive has been submitted as part of this application. This NIS will allow the competent authority to undertake its statutory obligations with regards to Appropriate Assessment.

Natural Heritage Areas

The application site is not within or adjacent to any site designated as a Natural Heritage Area. The closest pNHA to the site is the Drumkeen House Woodland pNHA, which is 2.2km north of the site. There will be no loss or fragmentation of any habitats within this pNHA arising from the development. There will be no negative impacts upon water quality in this pNHA arising from the development.

The Lough Oughter and Associated Loughs pNHA encompasses largely the same boundary as the Lough Oughter and Associated Lough SAC. Therefore, in the absence of mitigation, impacts upon this pNHA are the same as those that were identified for the Lough Oughter and Associated Loughs SAC in the previous section.

9.6.2 Potential Effects - Construction Phase

Should the developments at the application site at Tullymongan Lower be allowed to proceed then the following impacts will / may occur during the site preparation and construction of the proposed development.

Habitat Loss and Fragmentation

The dominant habitat within the application site is Spoil and Bare Ground. This habitat has no ecological value and therefore its loss constitutes a negligible ecological impact. However, any loss or fragmentation of the treeline along the western boundary of the application site would constitute a permanent negative local impact. Immediate loss would arise from felling, whilst a reduction in the overall health or life span of the trees could arise due to damage or compaction of roots due to the storage of soil, machinery or other heavy material within the Root Protection Zone. Any loss or fragmentation of this treeline would also have a slight negative impact upon the local biodiversity value of the area, whilst bird nesting and perching sites may also be lost.

There were few trees within the treeline that offered high potential for roosting bats, but overall, the treeline might be of some value for local populations of bats foraging over the area.

Disturbance to Local Wildlife

The removal of treeline vegetation during the bird nesting season could result in direct mortality of birds or the destruction of their eggs. In addition, during site preparation and construction, local populations of birds and mammals may be disturbed by the increase in noise, traffic and human activity. This disturbance would be temporary and having regards to the relatively low value of this urban and disturbed site for birds and other wildlife, this disturbance is considered insignificant.

Pollution to Surface and Ground Water

During the initial stages of the construction phase, extensive earthworks will be carried out to facilitate the construction of the foundations for the buildings, car parks and access road, the installation of services/drainage infrastructure, the installation of the infrastructure for the fuel

pumps, etc. In the absence of mitigation, these works have the potential to generate run-off into the Killymooney Lough Stream which lies ca. 40m east of the application site.

The site is located within an area that ranges from moderate to extreme groundwater vulnerability. A detailed hydrogeological report (Chapter 8 of the EIA) for the site was carried out by ORS and this identified the possible risk to ground water quality arising from the proposed development. If appropriate mitigation measures are not taken during the construction of the proposed development, then there is the possibility that water quality in the Killymooney Lough Stream and its downstream receptors may be negatively impacted upon due to the run-off of soil or silt from the site.

In addition, during construction there is also the possibility of a spillage of contaminants such as fuels, oils, chemicals and cement material, posing a potential risk to surface and groundwater quality. Fuels, oils and chemicals have a number of hazardous properties, and the constituents of concrete are alkaline and corrosive. Each one of these substances could have a significant deleterious effect on water quality and aquatic life in the Killymooney Lough Stream and its downstream receptors.

Any deterioration in ground or surface water locally could lead to deteriorations in water quality in Lough Oughter and Associated Loughs SAC and the Lough Oughter SPA and subsequent significant negative effects upon the qualifying interests for which these sites have been designated for.

9.6.3 Potential Effects - Operational Phase

The following impacts may arise during the operation of the site that would affect the ecology / biodiversity of the site and its surrounding environs.

Disturbance to Local Wildlife

The operation of the site will be associated with an overall increase in human activity, noise and lighting on the site. However, having regards to the overall low value of the site to mammals, this impact is **not considered significant**.

Contaminated Run-Off

Run-off from impermeable areas within the proposed development site such as roads, filling station and car parking areas are likely to contain potentially polluting substances such as hydrocarbons, heavy metals and sodium chloride arising from de-icing of these surfaces during winter months. This run-off could be mobilised to the Killymooney Lough stream which lies ca. 40m from the site. This could result in pollution of this watercourse and further downstream in the Lough Oughter SAC / SPA. This could be a **significant long-term impact**.

Foul Water

The proposed development is to be connected to the Cavan Town public wastewater treatment plant (WWTP). This WWTP has capacity for 30,000 population equivalent (PE) and as of the 2021 annual Irish Water report the facility had a remaining capacity for 9142 PE. The treated

plant is a “type 3P – Tertiary P” system which ensures lower phosphorus outflow levels from the plant.

During incidences of leakage foul water would likely follow preferential pathways created by permeated backfill and infiltrate into the site drainage system ultimately impacting both surface water and groundwater receptors. Adverse effects associated with foul water leakages consist of contamination relating to the of the following:

- Pathogens, (E. Coli etc.)
- Elevated levels of ammonia and nitrate
- Elevated levels of phosphorus

Such leakages could lead to eutrophication within the Killymooney Stream located to the sites east and the subsequent downstream Green Lough, Cavan & Annalee River and the Lough Oughter SPA & SAC lake complex, and to the Cavan and/or Killashandra groundwater bodies leading to degradation of water quality with negative consequences for aquatic life. Overall, the predicted effects of foul water leakage on the ecological receptors are **not considered to be significant**.

Flood Events

A flood event occurring on the developed site would cause the Sustainable Urban Drainage Infrastructure (SuDS) to become overwhelmed, creating additional pathways for potential contaminants to migrate off-site into downstream receptors along with elevated flow rates. The site is located within Flood Zone C and the overall flood risk of the site is **considered to be low**.

Fire and Resultant Firewater

Having regards to the presence of a fuelling station and flammable substances on the site, there is a risk of fire at the premises during the operational phase. In the event of a fire, significant quantities of water resources will be utilised to quench the fire. Water used to quench a fire is known as “firewater”. Firewater is known to contain the following harmful substances:

- Products of combustion
- Extinguishing foam / fluid
- Hazardous substances (fuels, oils & chemicals)

Due to the presence of these hazardous substances, firewater poses a significant risk to surface and groundwater quality. Uncontrolled releases of firewater would result in negative, significant, temporary effects on the water quality of the watercourse to the east of the site and in downstream receptors including the Killymooney Lough Stream, the Green Lough Stream, the Cavan River, the Annalee River and subsequently in the Lough Oughter SAC / SPA. Impacts upon groundwater could also arise.

9.7 Mitigation Measures

In order to avoid any reductions in water quality in the area surrounding the application site in Tullymongan Lower, a number of mitigation measures must be implemented and followed. These measures will protect the surface and ground water quality locally and will subsequently prevent significant effects upon the Lough Oughter and Associated Loughs SAC and the Lough Oughter Complex SPA. Measures have also been suggested that will help to protect or enhance the local biodiversity of the surrounding area and to ensure the protection of local wildlife. The implementation of these site-specific mitigation measures will ensure the protection of Natura 2000 habitats and species, and the local non-designated ecological receptors. These mitigation measures are also included in the accompanying NIS report.

9.6.1 Construction Phase

General Mitigation Measures

Site preparation and construction must be confined to the development site only and it must adhere to all the mitigation measures outlined in this Chapter and the accompanying NIS. Work areas should be kept to the minimum area required to carry out the proposed works and the area should be clearly marked out in advance of the proposed works.

It is recommended that all these measures, along with measures contained in the NIS are included in a Construction and Environmental Management Plan. This plan should be submitted to Cavan County Council prior to commencement for approval.

Increased Run-off and Sediment Loading

The main pollutants contained in construction site water include silt, fuel/oil, concrete and chemicals. There are a number of steps outlined below to eliminate contamination of site surface water runoff. The below recommendations are advised:

- Harmful materials such as fuels, oils, greases, paints and hydraulic fluids must be stored in bunded compounds well away from storm water drains and gullies. Refuelling of machinery should be carried out using drip trays.
- A temporary drainage system will be established complete with oil interceptors and settlement ponds to remove contaminants from run-off, prior to discharge off-site.
- Stockpile areas for sands and gravel should be kept to minimum size, well away from storm water drains and gullies leading off-site.
- Run-off from machine service and concrete mixing areas must be contained on site;
- All material and earth removed should be stockpiled within a bunded area or within a geotextile barrier until required for use.
- Covers are to be provided over soil stockpiles when high wind and inclement weather are encountered if required.

Where concrete is being poured on site, the following concrete / aggregate management measures should include:

- Best practice in bulk-liquid concrete management must be employed on site addressing pouring and handling, secure shuttering, adequate curing times etc.
- Where concrete shuttering is used, measures should be put in place to prevent against shutter failure and control storage, handling and disposal of shutter oils.
- Ready mix concrete wagons and mixers should be washed off site to minimise emissions into any local watercourses.
- Activities which result in the creation of cement dust should be controlled by dampening down the areas.
- Raw and uncured waste concrete should be disposed of by removal from the site or by burial on the site in a location and manner which will not impact upon the local watercourses.

Any excavated material arising from the construction process must not be disposed of within any designated site. It must be used responsibly within the boundary of the application site or disposed of in a licensed facility using a registered contractor.

Accidental Spillages of Harmful Substances

The following measures will minimise the risk of a release of fuels, oils, chemicals or cement products at the site:

- Establishment of bunded oil and chemical storage areas.
- Re-fuelling of mobile plant in designated areas provided with spill protection.
- Fuel bowsers to be located in bunded areas which can cater for 100% of the primary vessel capacity.
- Only appropriately trained site operatives permitted to refuel plant and machinery onsite.
- Regular inspections carried out on plant and machinery for leaks and general condition.
- Emergency response plan.
- Spill kits readily available throughout the site.
- Use of ready-mixed supply of wet cement products.
- Scheduling cement pours for dry days.

Conversion of Permeable Soils to Hard standing

The proposed development has been assessed in relation to Sustainable Urban Drainage Systems (SuDS) in accordance with the guidelines of the GSDS, the SuDS Manual Criteria C753, and the Cavan County Development Plan 2021 - 2027. Based on the above guidance documents, as part of the surface water drainage proposal, several SuDS measures have been provided to treat surface water runoff, to replicate the natural characteristics of the greenfield runoff and minimise the environmental impact. The SuDS measures included within the proposal for the site are as follows:

- Rainwater harvesting on all buildings.
- Detention basins
- Filter drains along verges
- Tree-pits at localised tree locations
- Petrol Interceptors

Protection of Biodiversity Features within the Site

The treelines and hedgerows within the site remain the most important ecological feature within the site itself. These treelines must be retained, with the exception of those diseased or decaying trees that need to be removed for safety purposes. The protection of the trees and their associated Root Protection Zone (RPA) is vital to maintain the health and long-term viability of the remaining trees. Therefore, it is recommended that prior to site works that the RPA of these treelines is fenced off and tree protection measures are put in place. The RPA of a treeline generally is as wide as the width of the largest crown along that treeline.

It is recommended that any trees that require removal are felled outside of the bird nesting season (March to August) and under the supervision of a professional arborist. It is best practice to remove these trees by soft felling (limb by limb) in order to allow any birds to escape.

Prior to the removal of any trees on site, especially older trees with features such as cracks, fissures and ivy, should be inspected by a bat ecologist prior to removal, as these types of trees often have ivy, fissures and cracks that make them suitable for roosting or hibernating bats. If bats are roosting in the trees, a derogation license for the removal of these bats will be required from the National Parks and Wildlife Service.

9.6.2 Operational Phase

Landscaping and Lighting

The landscaping of the site offers the potential for biodiversity enhancements within the site. Future landscaping of the site should adhere to the following recommendations:

- A landscape plan should be prepared for the site and this plan should include for the planting of natural grassland areas within the site, along with the maintenance of the existing treelines in the site. Plants with a biodiversity value should be used in the final landscaping scheme, i.e., either native plants or non-native that have good sources of nectar for insects.
- Natural verges along the treelines that are to be retained should be retained and managed appropriately for the benefit of wildlife. They should not be sprayed with herbicide and a low intensity mowing or strimming regime should be incorporated. This will benefit local pollinators.
- Lighting should be kept to a minimum around the remaining trees on the site. Light must not be directed at any tree or around the eaves of the existing house. Guidelines from Bat

Conservation Ireland are available for considering how to avoid light pollution of the trees to allow for uninterrupted feeding, commuting and roosting of bats.

Contaminated Runoff

The Qbar rural was calculated for each catchment. Drainage systems will be designed to attenuate excess surface water runoff with suitable storage volumes for each character and reduce the outflow rate to below the estimated greenfield rate before discharging into the existing surface water network to the south east. It is proposed to provide a series of Sustainable Urban Drainage Systems (SuDS) such as detention basins, permeable paving, filter drains, and petrol interceptor in order to treat surface runoff at high level and ground level

Foul Water

Based on the population equivalent (PE) for the entire proposed development of 75, the volume of foul water generated from the proposed development was calculated at 7.5 m³/day. The proposed foul network will be gravity fed to the southeast of the site from where it will be pumped via a rising main up to the south of the proposed development into the existing public foul network.

Increased Groundwater Vulnerability

The proposed finished ground level will be up to 2.5m below the existing elevation of the site in certain places, increasing the vulnerability of the underlying aquifer from 'High' to 'Extreme' to the rear of the proposed supermarket. Mitigation measures to ensure maximum protection of groundwater include:

- Installation of hard-surfaced areas with adequate surface water drainage, interceptor and attenuation networks to elimination percolation of contaminants to underlying groundwater in any areas where the storage of hazardous materials will be present.
- The service yard to the rear of the supermarket is to be completely bunded and will have a Finished Floor Level (FFL) of 1.75m below the current ground level.

9.8 Monitoring

9.7.1 Construction Phase

Surface water monitoring is proposed during construction of the development. A water sample from the Killymooney Stream/ Aghnaskerry River at sampling locations upstream and downstream of the site should be collected prior to commencement in order to ascertain the baseline conditions. Regular sampling of the Killymooney Stream/ Aghnaskerry River should be carried out from the same upstream and downstream locations during the construction period. Weekly sampling is proposed as well as additional sampling following an event such as heavy rainfall or an accidental spillage. Analysis for total suspended solids, pH and total petroleum hydrocarbons would allow for the detection of sediment loading, concrete pollution or spillages of hydrocarbons.

It is likely that dewatering will be required during excavations across the site due to shallow groundwater levels and the likely quality of runoff / construction waters generally. Dewatering will require treatment of the pumped water before discharge to a sewer under a section 4 discharge license. Continuous monitoring of the discharged treated water is recommended.

9.7.2 Operational Phase

Following the completion of the construction phase of the development, surface water quality monitoring will continue until such time that stable hydrochemistry is observed (in line with baseline conditions). Thereafter, monitoring of water quality during the operational phase is not required (Outside of maintenance required for development drainage and attenuation infrastructure).

9.9 Residual Effects

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

9.9.1 Summary of Significant Impacts

Impacts to ecological receptors posed by the proposed development are not anticipated to be significant. Whilst the development proposals have the potential to cause detriment to the sensitive receptors identified, the recommended mitigation measures will ensure that the risk of potential impacts are reduced to negligible and in one case positive with respect to the upgrade to the public realm.

9.9.2 Statement of Significance

Where a potential impact has been identified, the significance of impact upon these receptors ranges from *slight* to *moderate*. Where a potential impact has been identified, mitigation measures have been provided which if implemented reduces the impact of significance to *negligible*.

9.10 Reinstatement

Not Applicable.

9.11 Interactions and Potential Cumulative Effects

9.11.1 Interactions

Local ecological conditions interact with other environmental attributes as follows:

- Hydrology & Hydrogeology (Chapter 8) - Stockpiling of dry, loose sediments can lead to entrainment of sediments or uncontrolled releases of contaminated water into water bodies and thus lead to negative impacts on aquatic organisms.

7.11.2 Cumulative Effects

The cumulative assessment is concerned with the potential effects of the proposed development, in combination with any other projects or plans that are likely to be associated with the receiving environment to the proposed development, or that are likely to occur in the foreseeable future.

In terms of future projected projects, there are no significant proposed developments set within the vicinity of the proposed development. It is not expected that any significant cumulative impacts will arise.

In terms of future projected projects, there are 4 no. proposed developments set within the vicinity of the proposed development likely to commence during the project construction phase, as summarised in **Table 9.5**. Given the relatively minor scale of these developments, any cumulative impacts are anticipated to be **Negative, Not Significant, Temporary**.

Table 9.5. Proposed Developments within the site vicinity

Reg. Ref.	Location	Description of Development	Decision	Distance	Anticipated Cumulative Effect
CCC Reg. Ref. 21528	Aghnaskerry, Co. Cavan	Demolish existing derelict dwelling house and erect 26 no. 3-bed semi-detached dwellings	Permission Granted by CCC 26/05/2022 Subject of current appeal with ABP	ca. 317m NE	Negative, Not Significant, Temporary
CCC Reg. Ref. 2163	Gaelscoil Bhreifne Tullymongan Lower and Aghnaskerry, Cavan	Single storey extension to existing school, alterations to site layout with a new access via service road	Permission Granted by CCC 21/05/2022 Development commenced 08/07/2021	ca. 180m N	Negative, Not Significant, Temporary
CCC Reg. Ref. 20145	Aghnaskerry, Tullymongan Lower, Cavan	Change of use of existing dwelling to pre/after school care facility with associated alterations to elevations, outdoor play area and pedestrian path access from adjoining Gaelscoil Bhreifne	Permission Granted by CCC 22/10/2021	ca. 180m N	Negative, Not Significant, Temporary
CCC Reg. Ref. 20376	Gaelscoil Bhreifne Tullymongan Lower and Aghnaskerry, Cavan	Construct new roadway and entrance junction along the L2543 Cavan Town Eastern Access Road/ Cock Hill Road, alterations to existing public roadway to include new right turn lane and footpath, safety barrier, public playground area, pathways, public lighting, landscaping, boundary treatments and all ancillary site works	Permission Granted by CCC 03/03/2021	Adjacent to the site boundary to the NE	Negative, Not Significant, Temporary
CCC Reg. Ref. 18141	Tullymongan Lower, Cavan, Co. Cavan	Change of use of existing residential convent building to educational school building	Permission Granted by CCC 18/08/2018 Development commenced 08/07/2021	ca. 180m N	Negative, Not Significant, Temporary

Cavan Planning Authority - Inspection Purposes Only!

10.0 Waste Management

10.1 Introduction

This chapter of the EIAR has been prepared to estimate the likely significant effects of the waste arisings generated from the proposed development in Cavan Town, County Cavan. The proposed site is located ca. 200m east from the Cavan Town Centre and 180m east of the existing Tesco superstores. The proposed development is located in the Local Authority of Cavan County Council.

This chapter includes a description of the site, the type of wastes to be generated from the development during both the construction and the operational phase. The overall objective of this chapter is to assess the potential impacts of the proposed development and ensure that the proposed development will achieve optimum levels of waste reduction, reuse, and recycling in line with the relevant legislation.

10.2 Consultation

ORS have been commissioned to assess the potential impacts of the proposed development in terms of waste management during the construction and operational phases.

The principal members of the ORS EIA team involved in this assessment include the following:

- **Project Scientist & Lead-Author:**

Ross Kearney – PgD Env. (Post Graduate Diploma in Environmental Protection), MCIWEM.
Current Role: Senior Environmental Consultant. Experience ca. 7 years

- **Co-Author & Reviewer:**

Alan Kiernan - BEnvSc, P. G. Dip Env Engineering, MCIWEM. Current Role: Associate Director, Environmental Consultant. Experience ca. 20 years.

- **Project Scientist & Quality Assurance:**

Oisín Doherty - B.Sc. (Hons), M.Sc. (Environmental Management), CEnv, MIEEnvSc. Current Role: Senior Environmental Consultant. Experience ca. 14 years.

Pre-planning meetings were held with Cavan County Council on 6th August 2020, 13th October 2020, 30th September 2021 and 8th November 2022.

10.3 Legislation, Policy and Guidance

A standalone Construction Environment Management Plan (CEMP) and a standalone Operational Waste Management Plan (OWMP) have also been prepared for both phases of the proposed development. They are submitted in conjunction with this EIAR. Similar to the CEMP and OWMP, this chapter of the EIAR has been prepared to ensure all waste management throughout this project is conducted in line with the current legal and industry standards

10.3.1 Desktop Study

A comprehensive desk study was undertaken to assess the policies and legislation associated with the waste management in Ireland and their applicability to the proposed development. The baseline information that is detailed in this section of the assessment was obtained from publicly available information. These documents will promote the sustainable management of wastes arising at the development in accordance with legislative requirements and best practice standards.

The following documents and sources were referenced:

- Best Practice Guidelines for the Preparation of Waste Management Plans for Construction and Demolition Projects, 2006.
- Construction and Demolition Waste Management: A handbook for Contractors and Site Managers, published by FAS and the Construction Industry Federation in 2002
- Waste Management Act 1996 as amended and the associated Sub-ordinate legislation.
- Protection of the Environment Act 2003 as amended.
- Litter Pollution Act 1997 as amended.
- The Connacht/Ulster Region Waste Management Plan.
- The Cavan County Development Plan 2022-2028.
- The Cavan County Council Waste Management Segregation, Storage and Presentation of Household and Commercial Waste Bye-Laws 2019.
- Department of Environment and Local Government (DoELG) Waste Management – Changing Our Ways, A Policy Statement (1998).
- Department of Environment and Local Government (DoELG) Preventing and Recycling Waste – Delivering Change (2002)
- Making Irelands Development Sustainable – Review, Assessment and Future Actions (2002)
- Taking Stock and Moving Forward, Department of the Environment and Local Government, April 2004.
- Department of Environment, Heritage and Local Government, A Resource Opportunity, Waste Management Policy in Ireland (2012)
- Environmental Protection Agency (EPA) National Waste Database Reports
- European Waste Catalogue and Hazardous Waste List.
- EPA Waste Classification – List of Waste & Determining if Waste is Hazardous or Non-Hazardous
- British Standards BS 5906:2005 Waste Management in Buildings – Code of Practice.

10.3.2 Site Investigation

No site investigation was undertaken as part of the assessment contained within this chapter.

10.3.3 Impact Assessment Methodology

Once the identification of the baseline environs was conducted, the available data was then utilised to identify and assess the potential impacts posed by the development on the waste infrastructure within the area. The impact assessment rationale outlined in the 2022 EPA Guidelines will be applied to each chapter of the study.

10.3.4 Impacts Appraisal

- **Direct Impact:** where the existing baseline in the immediate vicinity of the proposed development is altered by activities associated with the construction or operational phases of said development.
- **Indirect Impact:** where the baseline beyond the proposed development is altered by activities associated with the construction or operational phases of said development.
- **No Significant Impact:** The proposed development has neither a positive nor negative impact upon the waste infrastructure.

10.3.5 Legislation & Guidance

National Level

In Ireland, waste policies are centred around the EU waste hierarchy model which focuses on a tiered system for waste management, these include prevention and minimization, reuse, recycling, recovery, and disposal. The main objective of the waste hierarchy is to promote a circular economy and prevent waste from going for incineration/landfill. To manage waste, the government has published a series of policy documents to sustainably manage the waste produced in Ireland.

In 1998 the Government policy document “Changing our Ways” was published with the sole objective on reducing our reliance on landfills and to source other methods of waste management. Within this document a target of at least 35% recycling of municipal (i.e household, commercial and non-process industrial) waste was proposed.

Then in 2002 a further policy document ‘Preventing and Recycling Waste – Delivering Change’ was published. Within this document several programmes were proposed to increase recycling of waste and divert waste from landfills. It was also in this document that waste minimisation was identified as a priority, stating where possible, waste at source should be reduced.

The progress that was made since the publication of “Changing our Ways” in 1998 was reviewed in 2004. In April 2004 a review document titled “Taking Stock and Moving Forward” was published with the aim of accessing the progress made regarding waste management in Ireland. The document considered the developments that were made at the time since the policy framework and the local authority waste management plans were implemented and to identify measures that could be put in place to further enhance the progress towards the objectives outlined in the policy document. One significant finding with the review document in 2004 noted the challenges in the coming years was

the increasing of the dry recyclable collection services and the implementation country-wide of an organic waste collections system for households.

Some years later in July 2012 a revised Government policy document titled 'A Resource Opportunity Waste Management Policy in Ireland' was published. This policy built on the progress of the past decade, it stressed the environmental and economic benefits of better waste management, particularly in relation to waste prevention and set further targets and methodologies for the management of waste streams. This policy document sets the measures through which Ireland will make further progress to transition to a recycling society and virtually eliminate the use of landfills in the country. Mandatory Regional Waste Management Plans would ensure the delivery of the policy.

In September 2020 the Irish Government released a policy document outlining a new action plan for Ireland to cover the period of 2020-2025. This plan 'A Waste Action Plan for a Circular Economy' was prepared in response to the 'European Green Deal' which sets a roadmap for a transition to a new economy, where climate and environmental challenges are turned into opportunities.

It aims to fulfil the commitment in the Programme for Government to publish and start implementing a new National Waste Action Plan. It is intended that this new national waste policy will inform and give direction to waste planning and management in Ireland over the coming years. It will be followed later this year by an All of Government Circular Economy Strategy. The policy document shifts focus away from waste disposal and moves it back up the production chain. To support the policy, regulations are already being used (Circular Economy Legislative Package) or in the pipeline. The policy document contains over 200 measures across various waste areas including Circular Economy, Municipal Waste, Consumer Protection & Citizen Engagement, Plastics and Packaging, Construction and Demolition, Textiles, Green Public Procurement and Waste Enforcement.

One of the first actions to be taken is the development of a high-level, whole of Government Circular Economy Strategy to set a course for Ireland to transition across all sectors and at all levels of Government toward circularity. This strategy was issued for public consultation in April 2021.

Since 1998, the Environmental Protection Agency (EPA) has produced periodic National Waste Database Reports that detail estimates for household and commercial waste generation in Ireland and the level of recycling, recovery, and disposal of these materials. In the most recent EPA waste data release in December 2021 (latest reference year 2019) the following trends were recorded:

Generated – Ireland produced 3.1 million tonnes of municipal waste in 2019. This is a six percent increase since 2018. Of this, 52% came from households and 48% from commercial sources. This amounted to 628 kg of municipal waste per person in Ireland in 2019.

Managed – Of the 3.1 million tonnes of municipal waste generated in Ireland in 2019, 37% was recycled (down slightly from 38% in 2018), 46% was used in energy recovery (up from 43% in 2018) and 15% was landfilled (up slightly from 14% in 2018)

Unmanaged – Waste that is not collected or brought to a waste facility and is therefore likely to cause pollution in the environment because it is burned, buried, or dumped. An estimated further 48,660 tonnes of household waste was unmanaged in Ireland in 2019.

Recovered – The amount of waste recycled, used as a fuel in incinerators, or used to cover landfilled waste. Ireland is heavily reliant on export markets for final treatment of municipal waste. In 2019, some 1.2 million tonnes representing 40% of Ireland's municipal waste was exported, up from 35% in 2018. Of the municipal waste exported in 2019, 701,000 tonnes went for recycling, 447,000 tonnes went for energy recovery and 90,000 for composting.

Recycled – The waste broken down and used to make new items. Recycling also includes the breakdown of food and garden waste to make compost. Ireland's municipal waste recycling rate was at 37% in 2019, which is down 1% from 2018.

Disposed – the waste landfilled or burned in incinerators without energy recovery. 15% of municipal waste was disposed to landfill, while 46% was incinerated in 2019.

The strategy for the management of waste from the construction phase is in line with the requirements of the “*Best Practice Guidelines for the Preparation of Waste Management Plans for Construction and Demolition Projects*”, 2006. The guidance document “*Construction and Demolition Waste Management: A handbook for Contractors and Site Managers*”, published by FAS and the Construction Industry Federation in 2002.

There are currently no Irish guidelines on the assessment of operational waste generation and guidance is taken from industry guidelines, British Standards 5906 “Waste Management in buildings – Code of Practice” and other relevant studies and reports.

Regional Legislation

In the past, Waste Management practices were regulated and controlled by several documents that have been published on a local level. This practice has now been superseded by the establishment of the following regional waste management authorities: the Southern Region, Eastern-Midlands Region, and Connacht-Ulster Region. The application site is located in the Connacht-Ulster Region. In 2015 the Connacht-Ulster Region Waste Management Plan 2015-2021 was published.

Connacht/Ulster Region Waste Management Plan 2015 - 2021

The Waste Management Plan 2015-2021 for the Connacht-Ulster Region is the most recent plan published for the region. It is the framework for the prevention and management of waste in a safe and sustainable manner. The Connacht-Ulster Region Waste Management Plan (CUWMP) was prepared by the Local Authorities of the Connacht-Ulster Region. The new region stretches from Galway in the west, to Donegal in the north and to Monaghan in the northeast and in total consists of 9 local authorities of which Cavan County council is one. The region has appointed Mayo County Council, as the regional lead, to act on behalf of the other authorities with responsibility for the successful implementation of the plan

The region covers 37% of the land mass of the country with a population of 837,350 thousand people. The settlement patterns show the region is predominantly rural with 66% of people living in these areas and communities. The CUWMP provides policy direction and targets to be achieved, as well as a roadmap of actions to be taken.

The CUWMP set out three strategic targets for waste management for the region:

- A 1% reduction per annum in the quantity of household waste generated per capita over the period of the plan.
- A recycling rate of 50% of managed municipal waste by 2020 was to be achieved.
- To Reduce to 0% the direct disposal of unprocessed residual municipal waste to landfill (from 2016 onwards) in favour of higher value pre-treatment processes and indigenous recovery practices.

The waste plan contains a comprehensive list of policies to achieve the overarching strategy and targets of the plan, these and the roles and responsibilities involved within the Connacht-Ulster Region are discussed further in the accompanying OWMP.

Local Legislation

Cavan County Development Plan 2022-2028

The proposed development is located in the Local Authority area of Cavan County Council. Waste Management policies and objectives in Cavan are reflective of the overarching EU, National and Regional policy, and legislation. The Plan came into effect on Monday, 11 July 2022. Two authorities remain in waste collection and one local authority landfill remains open in county Cavan; however waste management is now very much a private sector activity while the role of the local authorities is largely confined to regulation and educational activities.

The Council's strategy for sustainable environmental management seeks to conform to European and National Waste Strategies in matters relating to the production, handling, treatment, and disposal of waste within the county and to co-operate with and participate in the preparation of regional plans for the collection, treatment, handling, and disposal of waste. The County development plan sets out objectives towards waste management within the county, the objectives most relevant to the proposed development are discussed further in the accompanying OWMP.

Cavan County Council Bye-Laws 2019

Cavan County Council, pursuant to Section 35(1) of the Waste Management Act 1996 and Section 199(1) of the Local Government Act 2001 and in accordance with Part 19 of the Local Government Act 2001, implemented the bye-laws referred to as Cavan County Council (Segregation, Storage and Presentation of Household and Commercial Waste) Bye-laws, 2019. These bye-laws entered into force on the 3rd day of December 2019. The Bye Laws set out the requirements with regard to the maintenance, use and storage of waste containers, prohibited waste types, as well as information on collection including collection times. Schedule 1 of the Bye-Laws sets out the list of recyclable kerbside wastes. The obligations on segregation, storage and presentation apply to all commercial wastes in County Cavan and are discussed further in the associated OWMP.

10.4 Receiving Environment

This section of the chapter provides the baseline information in relation to waste management that exists in the vicinity of the proposed development. The subject site occupies a total area of approximately 4.126 ha and is situated at Cock Hill, Cavan Town, Co. Cavan.

As stated above, two authorities remain in waste collection and one local authority landfill remains open in county Cavan, however waste management is now very much a private sector activity while the role of the local authorities is largely confined to regulation and educational activities. A list a private licensed waste handling contractors available in county Cavan can be viewed on the National Waste Collection Permit Office website or on the Cavan County Council website.

The closest waste management facility to the proposed development is run by Oxigen Environmental ca. 1.75km east of the eastern boundary of the subject site. Other companies within proximity of the site include Cavan Waste Disposal Ltd. ca. 2km to the southeast or McElvaney's Waste and Recycling centre approx. 3.7km northeast from the sites' eastern boundary.

With regard to waste management, the proposed development will generate waste materials during both the construction and operational phases of which are discussed in section 13.6 of this chapter and in more detail in the respective CEMP and OWMP.

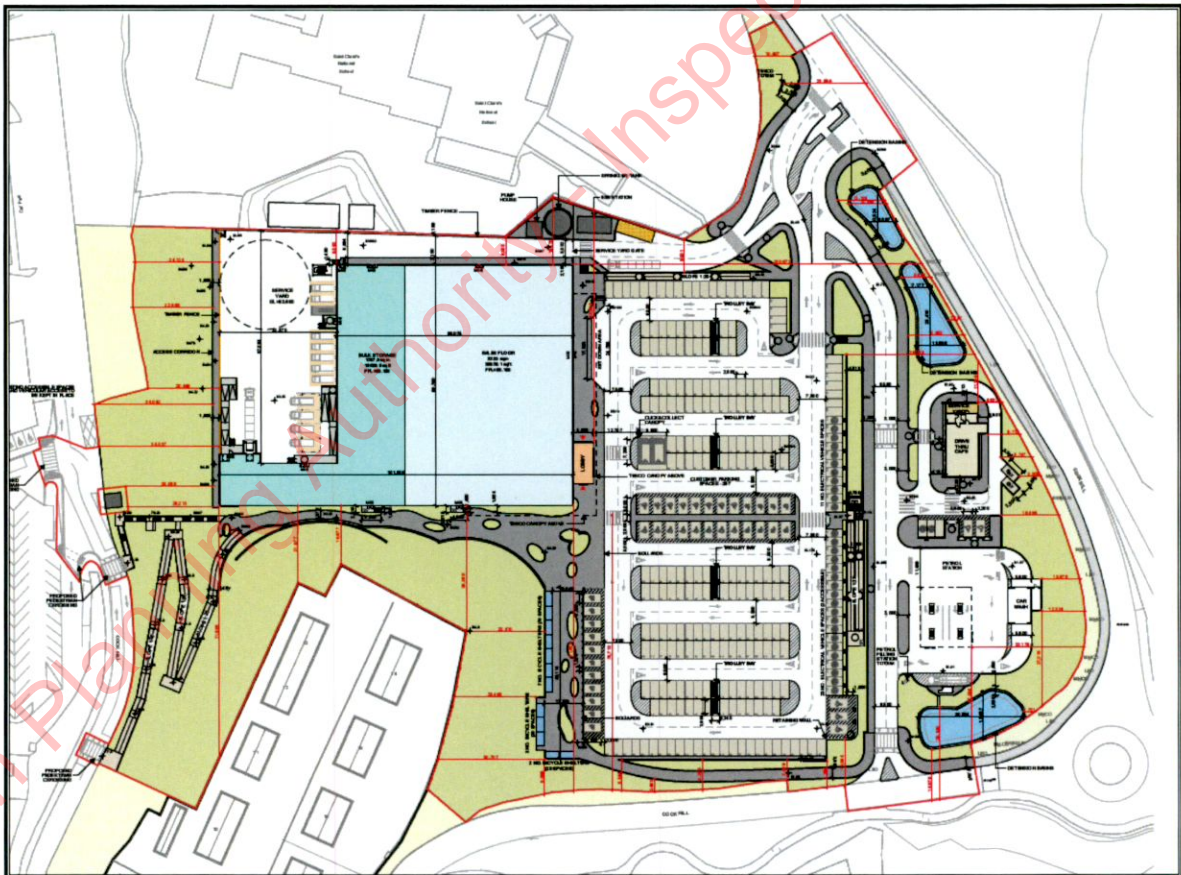
10.5 Characteristics of the Proposed Development

The development will consist of the construction of a single storey retail unit of c. 5,197 sq.m gross floor area (c. 2,194 sq.m convenience net sales area and c. 957 sq.m comparison net sales area) including a licensed alcohol sales area and service yard; a drive thru café unit (c.174 sq.m gross floor area) with external seating and 5 no. car parking spaces and 2 no. set down bay areas; a petrol filling station including car wash/jet wash (c. 89 sq.m), a forecourt canopy (covers c. 255 sq.m. and 4.8m in height); signage including elevational and 2 no. totem signs; 297 no. car parking spaces and 120 no. cycle parking spaces; a "Click and Collect" facility; Grocery Home Shopping delivery vehicle docking area; access points from Cock Hill Road; pedestrian linkages with the Town Centre by way of the provision of a sloped pedestrian walkway and steps on the western boundary of the site with 4 no. pedestrian crossings on Cock Hill Road and; all ancillary site development works, landscaping, fencing, enabling works and site services.

Please refer to **Chapter 2** for the full description of development.

An extract from the planning drawings can be seen in **Figure 10.1**.

Figure 10.1 – Extract from Site Plan (Joseph Doyle Architects)



When considering a development of this nature, the potential impacts arising from waste must be considered for two distinct stages of the development:

- Construction phase, and;
- Operational phase.

10.5.1 Construction Phase

The Construction phase will yield surplus materials such as broken or off-cuts of timber, plasterboard, concrete, tiles, bricks, etc. Waste from packaging (cardboard, plastic, timber) and oversupply of materials may also be generated. The construction contractor will be required to ensure that oversupply of materials is kept to a minimum and opportunities for reuse of suitable materials is maximised, a standalone Construction Environmental Management Plan (CEMP) has been prepared as part of this application. The CEMP will provide practical guidelines and information on the proper management of waste produced during the construction phase of this project. In addition, excavations will be required to facilitate construction. The main non-hazardous and hazardous waste streams that are likely to be generated by the removal of existing hardstanding on site, site preparation and construction activities at site are shown in **Table 10.1** below.

Table 10.1 Typical C&D non-hazardous and hazardous waste streams.

Waste Material	EWC Code
Concrete, bricks, tiles, ceramic	17 01 01-03 & 06-07
Wood, glass and plastic	17 02 01-04
Bituminous mixtures, coal tar and tarred products	17 03 01-03
Metals (including their alloys)	17 04 01-07 & 09-10
Soil and stones	17 05 03-04
Gypsum-based construction material	17 08 02
Mixed C&D waste	17 09 04
Electrical and electronic components	20 01 35-36
Batteries and accumulators	20 01 33-34
Liquid fuels	13 07 01-03
Paints	08 01 12
Chemicals (solvents, pesticides, paints, adhesives, detergents etc.)	20 01 13, 19, 27-30
Insulation materials	17 06 04

It has been estimated that the total volume of material to be cut (The earth that is removed from an area) will be ca. 9,945.20 m³. Estimated fill (The earth that is brought into an area) on the site will be ca. 8,821.73m³. The net fill therefore required is approximately ca. 1,123.47m³. There are limited opportunities for reuse of excavated material onsite and excess material may require removal offsite for reuse, recovery and/or disposal, as appropriate.

Environmental soil analysis will be carried out prior to construction on a number of the soil samples in accordance with the requirements for acceptance of waste at landfills (Council Decision 2003/33/EC Waste Acceptance Criteria). This legislation sets limit values on landfills for acceptance of waste material based on properties of the waste including potential pollutant concentrations and leachability.

Surplus soils/stones may be suitable for acceptance at either inert or non-hazardous soil recovery facilities/landfills in Ireland or, in the event of hazardous material being encountered, be transported for treatment/recovery or exported abroad for disposal in suitable facilities.

Excavation works will be required to be carefully monitored by a suitably qualified person to ensure potentially contaminated soil is identified and segregated from any uncontaminated soil, where encountered. Additional soil testing may be required in order to reclassify soil and the material will be required to be classified as hazardous or non-hazardous using the HazWasteOnline application (or other similar application) and then classified as inert, non-hazardous or hazardous in accordance with the EC Council Decision 2003/33/EC for acceptance of waste at landfills.

Discussions about the acceptance of the material should be undertaken with individual landfill operators before removal of any material from site is carried out and further investigation may be required to satisfy the operators waste acceptance requirements. Contaminated material will be required to be removed from site for treatment or disposal as appropriate. The contaminated material may be suitable for recovery or disposal in Ireland depending on the limitations of the facilities licence.

10.5.2 Operational Phase

The proposed development will give rise to a variety of waste streams when the development is complete and operational. An Operational Phase Waste Management Plan (OWMP) which accompanies this EIAR has been prepared for the proposed development as a standalone document. This OWMP will ensure all waste management during the operational phase is conducted in line with the current legal and industry standards and will help to ensure that the development meets the targets outlined in the *Connacht/Ulster Region Waste Management Plan 2015 – 2021*.

During the operational phase of the proposed development, all staff will be encouraged to promote, waste prevention, minimisation, reuse, recycling, and recovery in accordance with the Cavan County Development Plan 2022-2022 waste management objective number 6. All waste materials will be segregated into appropriate categories and will be stored in appropriate bins or other suitable receptacles in a designated, easily accessible areas of the site. Table 10.2 below summaries the various waste streams and the anticipated management strategy to be used for typical wastes to be generated at a development of this scale and nature.

Typical Waste Categories

The typical waste that will be generated at the proposed development once operational will include the following:

- Biodegradable food waste (organic waste).
- Dry mixed recyclables (DMR) – including cardboard, non-confidential paper, newspapers, leaflets, aluminium cans, tins, Tetra Pak cartons, plastic bottles.
- Glass.
- Category 3 food waste - Organic food waste, Category 1 waste (raw meat, fish and/or poultry)
- Plastic packaging – can go into DMR waste or General depending on plastic type.
- Mixed non-recyclables (MNR)/General waste.

- Waste Electrical and Electronic Equipment including batteries (WEEE).
- Detergents and Cleaning Products.

Wastes should be segregated into the appropriate waste types to ensure compliance with waste legislation and guidance while maximising the re-use, recycling, and recovery of waste diversion from landfill wherever possible. **Table 10.2** below summarises the various waste streams and the anticipated management strategy to be used for typical wastes to be generated at a development of this scale and nature.

Table 10.2 - Typical operational phase waste streams and management strategy

Waste Type	Hazardous	Onsite Storage Method	Removal Offsite
Dry Mixed Recyclables (DMR)	N	Segregated bins and/or compaction/bailing	Recycle
Mixed Non-Recyclables	N	Segregated bins and/or compaction	Recovery/Disposal
Food waste Category 1 (Organics) Category 3 (Meat)	N/Y	Segregated bins Clean triple bagged, leak proof lined cage	Composting Incineration
Glass (segregated by colour)	N	Segregated bins	Recycle
WEEE	Y	Segregated bins	Return to supplier
Cleaning Products	Y/N	Segregated bins	Disposal

All waste leaving site will be recycled or recovered, with the exception of those waste streams where appropriate recycling/recovery facilities are currently not available. All waste leaving the site will be transported by suitable permitted contractors and taken to suitably permitted or licenced facilities. All waste leaving the site will be recorded and copies of relevant documentation maintained.

European Waste Codes

During the construction and operational hazardous waste will be generated in various forms, these include, WEEE, batteries, fluorescent tubes, paints, cleaning products etc. Any waste classed as hazardous will be stored in designated area(s) and will be removed off site by suitably authorised waste contractor(s).

In 1994, the “European Waste Catalogue and Hazardous Waste List” was published by the European Commission. Their purpose was to provide for the classification of all non-hazardous and hazardous wastes. They were designed to form a consistent waste classification system across the EU. In Ireland, they form the basis for all national and international waste reporting obligations, such as those associated with waste licences and permits, the EPA National Waste Database and the transport of waste.

In 2002, the EPA has published a document titled the “European Waste Catalogue and Hazardous Waste List”, which is a condensed version of the original two documents and their subsequent amendments.

This document has been replaced by the “EPA Waste Classification – List of Waste & Determining if Waste is Hazardous or Non-Hazardous” in June 2015. Under the classification system, different types of wastes are fully defined by a code. The list of waste code for typical waste materials expected to be generated during the operation of the proposed development are provided in **Table 10.3** below.

Figure 10.3 – EWCs of typical non-hazardous and hazardous wastes*

Waste Type	EWC Code
Biodegradable Kitchen Waste	20 01 08
Paper and Cardboard	20 01 01
Glass	20 01 02
Plastic	20 01 39
Metals	20 01 40
Textiles	20 01 11
Edible Oil & Fat	20 01 25/26
Chemicals (solvents*, pesticides*, paints & adhesives, detergents etc.)	20 01 13*/19*/27*/28/29*/30
Batteries and Accumulators*	20 01 33*/34
Waste Electrical and Electronic Equipment (WEEE)*	20 01 35*/36
Fluorescent tubes and other mercury-containing waste*	20 01 21*
Bulky Waste	20 03 07
Mixed Municipal Waste	20 03 01
Green Waste	20 02 01

10.6 Predicted Effects of the Proposed Development

10.6.1 Construction Phase

The construction phase of the project will generate a range of non-hazardous and hazardous waste materials from which there is a risk of potential impact. The Construction Environmental Management Plan (CEMP) provides an outline of the commitments in relation to management of the site throughout the construction phase, to ensure that construction activities have the least impact on the surrounding environment.

This CEMP has been prepared to provide an outline for the management of waste during the construction phase of the project, it will ensure that there are no significant impacts from waste generated throughout the project by methods such as safe and secure storage of waste and raw materials, proper segregation etc.

Below is an outline of the objectives in relation to waste management from the CEMP:

- Ensure that all activities on site are effectively managed to minimise the generation of waste and to maximise opportunities for reuse and recycling of waste materials.
- Ensure that all wastes generated onsite are removed from site by an appropriately permitted waste contractor and that all wastes are disposed of at an appropriate licensed/permitted facility in accordance with the Waste Management Act 1996 as amended.
- Ensure that an adequate system is in place for the management, storage, segregation, and recycling of waste.
- Outline how the measures proposed above shall be implemented.

The use of authorised waste hauliers and permitted/licensed waste facilities will ensure that the waste materials generated from the removal of the hardstanding area, site preparation and construction activities are appropriately managed off site. The potential impacts of handling and treatment of waste off site at permitted/licensed facilities are considered in the authorisation of these waste facilities. Waste materials will be required to be temporarily stored on site pending collection by a waste contractor. Dedicated segregated areas for waste skips and bins will need to be identified across the site, signage will be erected to aid and promote waste segregation as much as possible. These areas will need to be easily accessible to waste collection vehicles and for segregation, it is an offence to obstruct permitted waste collectors from accessing the waste storage areas to service these areas.

Any opportunities for waste materials to be reused off-site will be encouraged and recommended will provide positive impacts in the resourcing of materials for other developments and reduce the requirement for raw material extraction therefore have a positive impact on the greater waste infrastructure.

The potential impacts on the environment from waste generation during the construction phase are expected to be likely, **negative, moderate and temporary**.

10.6.2 Operational Phase

Given the nature of the development, the generation of waste materials during the operational phase is an unavoidable impact, typical waste streams during the operational phase are listed in table 10.2 above. There is a number of waste contractors operating in the Cavan area who are permitted to collect waste. Examples of contractors include Oxigen Environmental, Cavan Waste Disposal Limited, McElvaney's Waste & Recycling, among others. Details of waste collection permits (granted, pending, and withdrawn) for the Region are available from the National Waste Collection Permit Office (i.e., Offaly County Council).

Networks of waste collection, treatment, recovery, and disposal infrastructure are in place in the region to manage waste efficiently from this type of development. Waste which is not suitable for recycling is typically sent for energy recovery or landfill. As reported in the Connacht-Ulster Waste Management Plan 2015 - 2021, there is two remaining active landfills in the region, one at Rathroeen, Ballina, Mayo operated by Mayo County Council and the second at Scotch Corner, Castleblayney, Monaghan operated by Monaghan County Council. There are two other landfills in the region that have significant remaining constructed capacity but it is not deemed financially viable to open them at this time: one is located in Corranure, Co. Cavan and owned by Cavan County Council, the other is East Galway Residual Landfill, Ballinasloe, County Galway. Further details of the waste handling facilities within the county and waste region are discussed in the OWMP.

Failure to implement best practice for waste management (separation, segregation etc), and the use of non-permitted waste contractors or unauthorised facilities would give rise to inappropriate management of waste and potentially result in negative environmental impacts or pollution such as litter issues or the presence of vermin within the development and the surrounding areas.

As a result of the proposed development the potential impact of operational waste generation is expected to be **negative, moderate to significant, long-term.**

10.6.3 'Do Nothing' Scenario

If the proposed development was not to go ahead there would be no construction waste or operational waste generation at the site and no increased demand on the local waste infrastructure.

10.7 Mitigation Measures

10.7.1 Construction Phase

To help mitigate any potential impacts from the proposed development a project specific CEMP has been prepared in line with the requirements of the guidance document issued by the Department of Environment Heritage and Local Government (DoEHLG). Adherence with this CEMP will control and promote effective waste management taking the waste hierarchy into consideration (prevention, minimisation, reuse, recycling, recovery, and disposal of waste material generated during the construction phase of the proposed development).

Where possible, this cut material will be reused on site. Correct classification and segregation of the excavated material is required to ensure that any potentially contaminated materials are identified and handled in a way that will not impact negatively on workers as well as on water and soil environments, both on and offsite.

As per the CEMP, there will be a number of mitigation methods put in place which are listed in section 10.8.1 above. These mitigation measures will ensure that the waste arisings from the construction phase of the development is dealt with in compliance with the provisions of the *Waste Management Act 1996*, as amended, associated Regulations, the *Litter Pollution Act 1997*, the *Connacht/Ulster Waste Management Plan (2015 - 2021)* and the Cavan County Council Bye Laws 2019. It will also ensure optimum levels of waste reduction, reuse, recycling, and recovery are achieved and will encourage sustainable consumption of resources and promotion of a circular economy.

10.7.2 Operational Phase

During the Operational phase of the development there will be various waste streams generated which are listed in section 10.6.2.1 above. As per the legislation, regulations, and bye-laws all waste materials will be segregated into appropriate receptacles and stored in appropriate bins located in a designated waste storage area that is easily accessible to the contracted waste collection provider and employees but not to members of the public as outlined in the OWMP. All waste receptacles used will comply with the BS EN 840 2012 standard for performance requirements of mobile waste containers. All waste will need to be presented for collection in a manner that will not endanger health, create a risk to traffic, harm the environment or create a nuisance through odours or litter.

All mitigation measures during the operational phase (as per the OWMP) will ensure the waste arisings from this development is dealt with in compliance with the provisions of the *Waste Management Act 1996*, as amended, associated Regulations, the *Litter Pollution Act 1997*, the *Connacht/Ulster Waste Management Plan (2015 - 2021)* and the Cavan County Council Bye-Laws 2019. It will also ensure optimum levels of waste reduction, reuse, recycling, and recovery are achieved, lessen the burden on the waste infrastructure and promote a circular economy.

10.8 Monitoring

10.8.1 Construction Phase

It is important that during the construction phases of the development that the waste generation volumes are calculated, recorded, and compared to the targets outlined within the CEMP. The Construction Project Manager shall take primary responsibility for the minimisation and prevention of waste generation. The CEMP recommends the following initiatives should be implemented to assist in this task:

- Materials to be ordered on an “as needed” basis to prevent oversupply and material build up on site.
- Appropriate storage facilities should be provided to ensure materials are correctly handled and stored thus reducing damage to materials.
- Material ordering shall coincide with the programme of works to reduce the need to store materials on site.
- Sub-contractors will be responsible for the management of their wastes.

It is proposed that a review of waste management practices will form part of regular site inspection audits to be carried out by the construction contractor. This information should be forwarded to the Construction Project Manager to assist in determining the best methods for waste minimisation, reduction, re-use, recycling, and disposal as the works progress.

10.8.2 Operational Phase

It is important that during the operational phase of the development that the waste generation volumes are calculated, recorded, and compared to the targets outlined within the OWMP. It is the responsibility of all involved in handling the waste to ensure proper separation and segregation, to ensure all receptacles are maintained and presented in a safe and clean manner and that all opportunities to recycle or reuse are utilised where possible in line with Tesco’s active waste policies. The OWMP provides further details in the estimated waste arisings from the proposed development the kinds of receptacles available to manage said waste and ways to help promote a circular economy and more sustainable operations within the proposed development.

10.9 Residual Effects

According to Environmental Protection Agency guidelines, a residual effect is described as ‘the degree of environmental change that will occur after the proposed mitigation measures have taken place.’ The mitigation strategy above recommends actions which can be taken to reduce or offset the scale, significance, and duration of the effects from the estimated waste arisings

The purpose of this assessment is to specify mitigation measures where appropriate to minimise the ‘risk factor’ to all aspects of the generated waste and surrounding environment such as to minimize the potential damage to the environment from litter and potential vermin and to reduce the overall demand on the waste service systems by promoting the waste hierarchy (reduce, reduce, recycle etc. This ‘risk factor’ is reduced or offset by recommending the implementation of a mitigation strategy in each area of the study. On the implementation of this mitigation strategy, the potential for impact will be lessened.

The site-specific Construction Environmental Management Plan (CEMP) and Operational Waste Management Plan (OWMP) will be implemented throughout the duration of the construction and operational phases respectively. This document will contain all the necessary procedures required to prevent and minimise any environmental risks from waste arisings produced by the project.

The overall impact anticipated by both phases of the project following the implementation of suitable mitigation measures is considered to be **neutral to negative, slight, and short term to long term**.

10.9.1 Summary of Significant Impacts

The criteria for this assessment are considered to be the waste management within the proposed development itself, the surrounding environment (litter pollution and vermin) and the greater waste infrastructure within the region. Whilst the development proposals have the potential to cause significant effects to assets identified, the recommended mitigation measures will ensure that the risk of potential effects are reduced. Adherence to best practice, will promote a sustainable and circular approach during both the construction and operational phases.

10.9.2 Statement of Significance

The significance of impact from the waste arisings has been assessed for both the construction and operational phases of the proposed development at Cavan Town.

Where a potential impact has been identified, the significance of impact upon these assets’ ranges from “**moderate**”.

Where a potential impact has been identified, mitigation measures have been provided which if implemented reduces the impact of significance to ‘**slight**’.

10.10 Reinstatement

Not Applicable.

10.11 Interactions and Potential Cumulative Impacts

10.11.1 Interactions

Potential interactions during the construction phase may occur between waste management and human health (Chapter 5) and air quality (Chapter 12) in the event that waste streams identified are not managed appropriately.

Potential interactions during the operational phase may occur between waste management and human health (Chapter 5) in the event that waste is not managed appropriately by the facility, resulting in litter and vermin.

10.11.2 Potential Cumulative Effects

Construction Phase

The mitigation measures outlined in the CEMP and throughout this chapter should be applied during the entirety of the construction phase of the proposed development. This will ensure any significant cumulative impacts from the potential waste arisings to the greater waste infrastructure and environment are controlled.

Initial assessment suggests there is sufficient capacity in the local waste collection and disposal network to ensure that all construction waste is removed from site and disposed of in an environmentally sustainable and responsibly manner. In the event that the local waste capacity is stretched, where necessary, appropriate waste management facilities outside the local area will need to be considered.

As a result of the mitigation measures outlined in the CEMP and given the nature of the proposed development, there are no anticipated cumulative impacts in relation to construction waste generation as a result of the proposed development. Therefore no additional monitoring is proposed in relation to potential cumulative construction impacts.

Operational Phase

As stated previously given the nature of the proposed development impacts from waste arisings are unavoidable. The development of the proposed site along with other developments capable of having in-combination effects could potentially result in an increased demand on the operational waste infrastructure in the wider Cavan area. However, it should be noted an existing Tesco superstore already exists with Cavan town and the current waste services within the region have proven capable of managing the existing demand in the area. The replacement of the of the existing store with the proposed development would result in a negligible to slight demand on the waste services.

As a result of the mitigation measure outlined within the OWMP, there are no anticipated cumulative impacts in relation to operational waste generation as a result of the proposed development. No additional monitoring is recommended in relation to potential operational phase cumulative impacts.

In terms of future projected projects, there are 4 no. proposed developments set within the vicinity of the proposed development likely to commence during the project construction phase, as summarised in **Table 10.4**. Given the relatively minor scale of these developments, any cumulative impacts are anticipated to be **Neutral, Imperceptible, Temporary**.

Table 10.4. Proposed Developments within the site vicinity

Reg. Ref.	Location	Description of Development	Decision	Distance	Anticipated Cumulative Effect
CCC Reg. Ref. 21528	Aghnaskerry, Co. Cavan	Demolish existing derelict dwelling house and erect 26 no. 3-bed semi-detached dwellings	Permission Granted by CCC 26/05/2022 Subject of current appeal with ABP	ca. 317m NE	Neutral, Imperceptible, Temporary
CCC Reg. Ref. 2163	Gaelscoil Bheifne Tullymongan Lower and Aghnaskerry, Cavan	Single storey extension to existing school, alterations to site layout with a new access via service road	Permission Granted by CCC 21/05/2022 Development commenced 08/07/2021	ca. 180m N	Neutral, Imperceptible, Temporary
CCC Reg. Ref. 20145	Aghnaskerry, Tullymongan Lower, Cavan	Change of use of existing dwelling to pre/after school care facility with associated alterations to elevations, outdoor play area and pedestrian path access from adjoining Gaelscoil Bheifne	Permission Granted by CCC 22/10/2021	ca. 180m N	Neutral, Imperceptible, Temporary
CCC Reg. Ref. 20376	Gaelscoil Bheifne Tullymongan Lower and Aghnaskerry, Cavan	Construct new roadway and entrance junction along the L2543 Cavan Town Eastern Access Road/ Cock Hill Road, alterations to existing public roadway to include new right turn lane and footpath, safety barrier, public playground area, pathways, public lighting, landscaping, boundary treatments and all ancillary site works	Permission Granted by CCC 03/03/2021	Adjacent to the site boundary to the NE	Neutral, Imperceptible, Temporary
CCC Reg. Ref. 18141	Tullymongan Lower, Cavan, Co. Cavan	Change of use of existing residential convent building to educational school building	Permission Granted by CCC 18/08/2018 Development commenced 08/07/2021	ca. 180m N	Neutral, Imperceptible, Temporary

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11.0 Noise & Vibration

11.1 Introduction

This section of the EIAR has been prepared by ORS to identify and assess the potential noise and vibration impacts associated with the proposed scheme consisting of a Tesco supermarket; a revised site plan layout with a new internal access road, a drive-through restaurant and a petrol filling station. Car parking is provided to the east of the supermarket (297 no. spaces, including accessible 'parent & child' spaces, vehicular charging points and 'set-down' spaces) with vehicular access provided via a new junction at the south of the site onto the Cock Hill Road.

This chapter has been prepared by Dr. Conor Tonra who is a Director with Patel Tonra Ltd. (PTL). Conor has been working in the field of Acoustics since 1994; he has completed the IOSH Diploma in Environmental Noise. He has extensive knowledge in aspects of environmental noise monitoring, analysis, impact assessment and reporting and has prepared environmental impact assessments reports for various major developments.

This chapter includes a description of the receiving ambient noise climate in the vicinity of the subject site, an assessment of the potential noise and vibration impact associated with the proposed development during both the short-term construction phase and the long-term operational phase on its surrounding environment. The assessment of direct, indirect and cumulative noise and vibration impacts on the surrounding environment have been considered as part of the assessment.

During the construction phase, the range of activities with potential to generate noise and vibration emissions to off-site sensitive receptors will include site preparation works, construction of the proposed development and erection of any temporary buildings/compounds that may be required.

During the operational phase, the potential sources of noise are those associated with additional vehicular traffic on public roads, car parking, store deliveries and any proposed new building services plant items that are to be provided.

The significance of impacts has been assessed in accordance with the EPA Guidelines on the information to be contained in Environmental Impact Assessment Reports, May 2022.

With regard to the quality of the impact, ratings may have positive, neutral or negative applications. The significance of an impact on the receiving environment is described in the range between imperceptible and profound. The duration of impacts as described in the EPA Guidelines are presented on a scale between momentary and permanent.

Noise and vibration emissions from the development will vary in terms of quality, duration and magnitude. The following sections analyse the expected construction and operational phase noise and vibration impacts both in terms of the proposed assessment criteria and the expected impacts in terms of the significant effects.

11.2 Consultation

ORS in partnership with Patel Tonra Ltd. (PTL) have been commissioned to assess the potential impacts of the proposed development in terms of noise and vibration during the construction and operational phases.

The principal members of the ORS EIA team involved in this assessment include the following persons:

- **Noise Modeller & Lead-Author:**

Dr. Conor Tonra – BSc (Analytical Science), PhD (Physical Chemistry), MIEMA, CEnv, Certificate in Training and Continuing Education, IOSH Environmental Noise Competency Certificate
Current Role: Principal Consultant/Company Director of *Patel Tonra Ltd.* Experience ca. 30 years

- **Project Coordinator & Reviewer:**

Luke Martin - B.A. (MOD) (Natural Sciences), M.Sc. (Sustainable Energy and Green Technology), CEnv, MIEEnvSc. Current Role: Senior Environmental Consultant. Experience ca. 10 years.

Consultation between ORS and other members of the planning/design team was made in order to obtain information required to assess the potential construction and operational phase impacts on ambient noise levels in the site vicinity. Pre-planning meetings were held with Cavan County Council on 6th August 2020, 13th October 2020, 30th September 2021 and 8th November 2022.

11.3 Legislation, Policy and Guidance

A review of relevant standards and guidelines has been conducted to set noise and vibration criteria for the developments' construction and operational phases;

- Baseline noise monitoring has been undertaken to characterise the receiving noise environment;
- Predictive calculations have estimated the likely noise emissions during the construction phase at nearest noise sensitive locations (referred to as NSLs from hereon, outlined in ref. Figure 1.1);
- Predictive calculations have assessed potential impacts associated with the developments' operation at NSL's surrounding the development, and;
- A schedule of mitigation measures has been proposed to reduce potential impacts relating to noise and vibration to and from the proposed development.

11.3.1 Legislation, Policy and Guidance

In preparing this noise and vibration chapter, reference is made to the following documents and Standards:

- EPA Guidelines on the information to be contained in Environmental Impact Assessment Reports (2022)
- Guidelines for Planning Authorities and An Bord Pleanála on Carrying Out EIA – (Department of Housing, Planning and Local Government - August 2018)
- Cavan County Council's (CCC) Noise Action Plan 2019 to 2024 (NAP)
- ISO 1996-2:2017 Acoustics -- Description, measurement and assessment of environmental noise -- Part 2: Determination of sound pressure levels
- ISO 9613 (1996): Acoustics – Attenuation of sound outdoors – Part 2: General method of calculation
- BS 5228:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Part 1: Noise
- BS 5228:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Part 2: Vibration
- British Standard BS 6472 (1992): Guide to Evaluation of human exposure to vibration in buildings (1Hz to 80Hz).
- BS8233:2014 Guidance on sound insulation and noise reduction for buildings
- BS4142:2014+A1: 2019 Methods for Rating and Assessing Industrial and Commercial Sound'
- World Health Organisation (WHO) Guidelines for Community Noise
- World Health Organisation (WHO) Night Noise Guidelines for Europe (2009)
- Design Manual for Roads and Bridges (DMRB), Highways England Company Limited, Transport Scotland, The Welsh Government and The Department for Regional Development (Northern Ireland)
- Calculation of Road Traffic Noise (CRTN), 1998, Department of Transport, Welsh Office (UK)

- ISBN 3-936385-26-2 / ISSN 0723-0028 “Parking Area Noise - Recommendations for the Calculation of Sound Emissions of Parking Areas, Motorcar Centers and Bus Stations as well as of Multi-Storey Car Parks and Underground Car Parks”, 6. Revised Edition
- Guidelines for the Treatment of Noise and Vibration in National Road Schemes”, Transport Infrastructure Ireland (TII), October 2004.
- Good Practice Guidance for the Treatment of Noise during the Planning of National Road Schemes, Transport Infrastructure Ireland (TII), March 2014)
- Safety, Health and Welfare at Work (General Application) Regulations 2007 (Statutory Instrument No. 299 of 2007)

Relevant noise & vibration criteria for the developments’ construction and operational phases, along with the methodology for conducting baseline noise surveys, are outlined below

11.3.2 Construction Phase

Noise

The closest neighbouring NSLs to the proposed development are the residential dwellings primarily to the west (Cock Hill housing estate) and south (Lakeview housing estate) of the site. The distance between the construction site and nearby NSLs varies, the closest distance between the site and neighbouring dwelling will be approximately 30 metres, but generally construction works will occur between 30 and 250 metres from existing dwellings, depending on the location where specific works are occurring.

There are no statutory limits with respect to construction noise in Ireland, additionally, limits for construction noise are not outlined in Cavan County Council’s (CCC) Noise Action Plan 2019 to 2024 (NAP). However, the CCC NAP, Section 2 “Existing Noise Management Legislation and Guidance” provides an overview of existing noise management legislation, regulations and guidance in Ireland and regional scale. Section 2.1.2 states the following in relation to construction noise:

“The National Roads Authority (NRA) now Transport Infrastructure Ireland (TII) published the document “Guidelines for the Treatment of Noise and Vibration in National Road Schemes” (2004), Good Practice Guidance for the Treatment of Noise during the Planning of National Road Schemes’ in 2014 which sets out the procedure to be followed in respect of the planning and design of national road schemes. These guidelines set out limits for noise related to both the construction and traffic flow on new road schemes”.

The TII overall acceptable levels of construction noise, which should not be exceeded at noise sensitive locations during the construction phase of a development, are set out in **Table 11.1**.

Table 11.1: TII Maximum Permissible Noise Levels at the Facade of Dwellings during Construction

Days and Times	Noise Levels (dB re. 2×10^{-5} Pa)	
	$L_{Aeq}(1hr)$	L_{Amax}
Monday to Friday 07:00 to 19:00hrs	70	80
Monday to Friday 19:00 to 22:00hrs	60*	65*
Saturdays 08:00 to 16:30hrs	65	75
Sundays & Bank Holidays 08:00 to 16:30hrs	60*	65*

Note * Construction activity at these times, other than that required for emergency works, will normally require the explicit permission of the relevant local authority.

BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites is considered to represent the industry standard methodology for the assessment of construction noise and describes two methods for deriving noise significance thresholds for construction sites.

BS 5228:2009+A1:2014 (Appendix E.1) describes a method for identifying 'Potential significance based upon noise change'. Following this methodology, BS 5228:2009+A1:2014 designates a noise sensitive location (NSL) into a specific category based on pre-existing ambient noise levels and then sets a threshold noise value that, if exceeded, indicates a significant construction noise impact.

Table 11.2 presents the threshold values for significant noise impacts for weekday daytime and Saturday morning activity.

Table 11.2: BS 5228 Construction Noise Thresholds for Significant Effects

Assessment category and threshold value period (L_{Aeq})	Threshold value, in decibels (dB)		
	Category A ^A	Category B ^B	Category C ^C
Daytime (07:00 – 19:00) and Saturdays (07:00 – 13:00)	65	70	75

- **Category A:** threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are less than these values.
- **Category B:** threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are the same as category A values.
- **Category C:** threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are higher than category A values.
- 19:00 – 23:00 weekdays, 13:00 – 23:00 Saturdays and 07:00 – 23:00 Sundays.

Annex E.2 of BS 5228-1:2009+A1:2014 also provides the following comments in relation to 'Potential significance based on fixed noise limits':

"Noise from construction and demolition sites should not exceed the level at which conversation in the nearest building would be difficult with the windows shut. The noise can be measured with

a simple sound level meter, as we hear it, in A-weighted decibels (dB(A))– see note below. Noise levels, between say 07.00 and 19.00 hours, outside the nearest window of the occupied room closest to the site boundary should not exceed:

- 70 decibels (dBA) in rural, suburban and urban areas away from main road traffic and industrial noise;
- 75 decibels (dBA) in urban areas near main roads in heavy industrial areas.

These limits are for daytime working outside living rooms and offices. In noise-sensitive situations, for example, near hospitals and educational establishments – and when working outside the normal hours say between 19.00 and 22.00 hours – the allowable noise levels from building sites will be less: such as the reduced values given in the contract specification or as advised by the Environmental Health Officer (a reduction of 10 dB(A) may often be appropriate). Noisy work likely to cause annoyance locally should not be permitted between 22.00 hours and 07.00 hours.”

Taking account of the measured ambient noise levels, CCC recommendations and BS 5228 significance thresholds, the recommended noise limits for construction activity are as follows:

Monday to Friday	07.00 – 19.00	70 dB LAeq,11hr
Saturday	07.00 – 13.00	70 dB LAeq,6hr

It is assumed that construction works will take place during normal working hours only. Permission will be requested from the Local Authority in the event that works are required to take place outside of the above hours.

Vibration

Following the same approach, BS 5228-2:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites. Vibration recommends that, for soundly constructed residential property and similar structures that are generally in good repair, a threshold for minor or cosmetic (i.e. non-structural) damage should be taken as a peak component particle velocity (in frequency range of predominant pulse) of 15mm/s at 4Hz increasing to 20mm/s at 15Hz and 50mm/s at 40Hz and above.

The standard also notes that below 12.5 mm/s PPV the risk of damage tends to zero. The recommended construction vibration criteria are presented in **Table 11.3**.

Table 11.3: Vibration Criteria During Construction Phase

Allowable vibration (in terms of peak particle velocity) at the closest part of sensitive property to the source of vibration, at a frequency of:-		
Less than 15Hz	15 to 40Hz	40Hz and above
15 mm/s	20 mm/s	50 mm/s

11.3.3 Operational Phase

Noise

Building Services Plant

Reference is made to British Standard BS 4142:2014+A1: 2019: 'Methods for Rating and Assessing Industrial and Commercial Sound' (BS 4142) in setting criteria for any new mechanical plant items. This standard outlines methods for analysing building services plant sound emissions to residential receptors. BS 4142 is frequently referenced in Planning Conditions and is widely considered the 'industry standard' methodology for the assessment of industrial noise to residential receptors.

BS 4142 describes methods for rating and assessing sound of an industrial and/or commercial nature, using outdoor sound levels to assess the likely effects of sound on people who might be inside or outside a dwelling upon which the sound is incident.

The BS 4142 assessment methodology compares the measured external background sound level (in the absence of plant items) to the rating sound level, of the plant items, when operational. Where sound emissions are found to be tonal, impulsive, intermittent or to have other sound characteristics that are readily distinctive against the residual acoustic environment, BS4142:2014 advises that penalties be applied to the specific level to arrive at the rating level.

Based upon measured day and night-time background sound levels on the site, appropriate plant noise criteria to nearby dwellings are as follows:

Daytime	(07:00 to 23:00hrs)	50 dB LAeq,1hr
Night-time	(23:00 to 07:00hrs)	40 dB LAeq,15min

Plant noise emissions should not contain any characteristics that would warrant any acoustic feature penalties under the BS 4142:2014 assessment procedure.

Additional Road Traffic on Public Roads

The potential noise impact associated with the proposed development introducing additional traffic onto the existing road networks has been considered. **Table 11.4** states the likely impact associated with any particular change in traffic noise level (Source DMRB, 2012).

Table 11.4: DMRB impact associated with change in traffic noise level (long term)

Noise Change (dB LA10,18hr)	Magnitude of Impact
0	No Change
0.1 - 2.9	Negligible
3 - 4.9	Minor
5 - 9.9	Moderate
10+	Major

Table 11.4 has presented the DMRB (2012) likely impacts associated with long-term change in traffic noise level, the corresponding significance of impact presented in the ‘EPA Guidelines on the information to be contained in Environmental Impact Assessment Reports (EIAR), May 2022 is presented in **Table 11.5** for consistency in wording and terminology for the assessment of impact significance.

Table 11.5: DMRB impact associated with change in traffic noise level (Updated)

Noise Change (dB $L_{A10,18hr}$)	Magnitude of Impact	Impact Guidelines on the Information to be contained in EIAR (EPA)
0	No Change	Imperceptible
0.1 - 2.9	Negligible	Not Significant
3 - 4.9	Minor	Slight
5 - 9.9	Moderate	Moderate
10+	Major	Significant, Very Significant, Profound

Other Noise Sources

For any other noise sources such as Car Parking on-site and Store Deliveries, appropriate guidance on internal noise levels for dwellings is contained within World Health Organization Guidelines (for Community Noise), which states the following.

“World Health Organisation (WHO) Guidelines

WHO guidelines make numerous recommendations for noise levels in specific environments in order to minimise the health impact of environmental noise. In the context of the WHO definition of health as, “...a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity”, these guideline values can be seen as aspirational targets based on the precautionary principle. The guidelines set out a number of external and internal values for daytime and night time noise levels which aim to minimise all identified adverse health effects, including annoyance, for residential properties and other noise sensitive premises. Examples of the WHO ‘Guideline values for Community Noise’ in specific environments’ are:

$L_{Aeq, day} \leq 55\text{dB}$ outdoor living area, to avoid serious annoyance;

$L_{Aeq, day} \leq 50\text{dB}$ outdoor living area, to avoid moderate annoyance;

$L_{Aeq, day} \leq 35\text{dB}$ dwelling indoors, to avoid moderate annoyance;

$L_{Aeq, night} \leq 30\text{dB}$ inside bedrooms, to avoid sleep disturbance;

$L_{Aeq, night} \leq 40\text{dB}$ outside bedrooms with open window, sleep disturbance;

$L_{AFmax, night} \leq 45dB$ noise maxima inside bedrooms, to avoid sleep disturbance.

The WHO Night Noise Guidelines for Europe (2009) were subsequently developed to provide expertise and scientific advice in developing future standards in the area of night noise exposure control. The document presents guidelines values with the intention of preventing the harmful effects of noise. These are grouped into biological effects, sleep quality, well-being and medical conditions. It is recommended that the population should not be exposed to night noise levels greater than 40 dB of L_{night} , outside (a long-term eight-hour average between 23:00 and 07:00 hrs). The level can be considered a health-based limit value necessary to protect the public, including most of vulnerable groups such as children, the chronically ill and the elderly, from the adverse health effects of night noise. Adverse health effects are observed among the exposed population between”.

Based upon the above guidelines, noise criteria from site operation to nearby dwellings are as follows:

Daytime	(07:00 to 23:00hrs)	50 dB LAeq,1hr
Night-time	(23:00 to 07:00hrs)	40 dB LAeq,15-min

Vibration

Guidance as to an acceptable magnitude of vibration during the operational phase of the development is best taken from British Standard BS 6472 (1992): Guide to Evaluation of human exposure to vibration in buildings (1Hz to 80Hz). The Standard contains recommendations that continuous vibration in residential buildings should not exceed nominally 0.3mm/s by daytime and 0.2mm/s by night-time.

No significant sources of vibration are expected to arise during the operational phase of the development. Operational vibration has therefore not been addressed further in this chapter.

11.4 Receiving Environment

11.4.1 Background

This section of the chapter provides the baseline information in relation to noise that exists in the vicinity of the proposed development. The subject site occupies a total area of approximately 4.126 ha and is situated at Cock Hill, Cavan Town, Co. Cavan.

A baseline noise survey has been undertaken as part of the planning application prepared for the proposed development.

The survey was conducted in general accordance with ISO 1996-2:2017 Acoustics -- Description, measurement and assessment of environmental noise -- Part 2: Determination of sound pressure levels. Specific details are set out in the following sections..

11.4.2 Choice of Measurement Locations

Three Noise Monitoring Locations (NML's) surrounding the site were selected for the noise survey; each of these locations are described in turn below.

NML1: at the (current) site entrance, close to the Cock Hill Road, at the eastern boundary of the site, at the location of the proposed eastern site entrance; also close to the location of the new primary school (NSL, currently under construction);

NML2: at the western boundary of the site immediately adjacent to the residential dwellings (NSLs) that adjoin that site boundary, and are closest to the site in the Cock Hill residential estate, ca. 30 metres from the development footprint.

NML3: in the Lakeview residential estate located to the south of the site, immediately adjacent to the residential dwellings (NSLs) that are closest to the southern site entrance, ca. 50 metres from the entrance.

The position of each noise measurement location in relation to the site boundary are identified in **Figure 11.1**.

Figure 11.1: Site Location Plan Indicating Baseline Noise Monitoring Locations

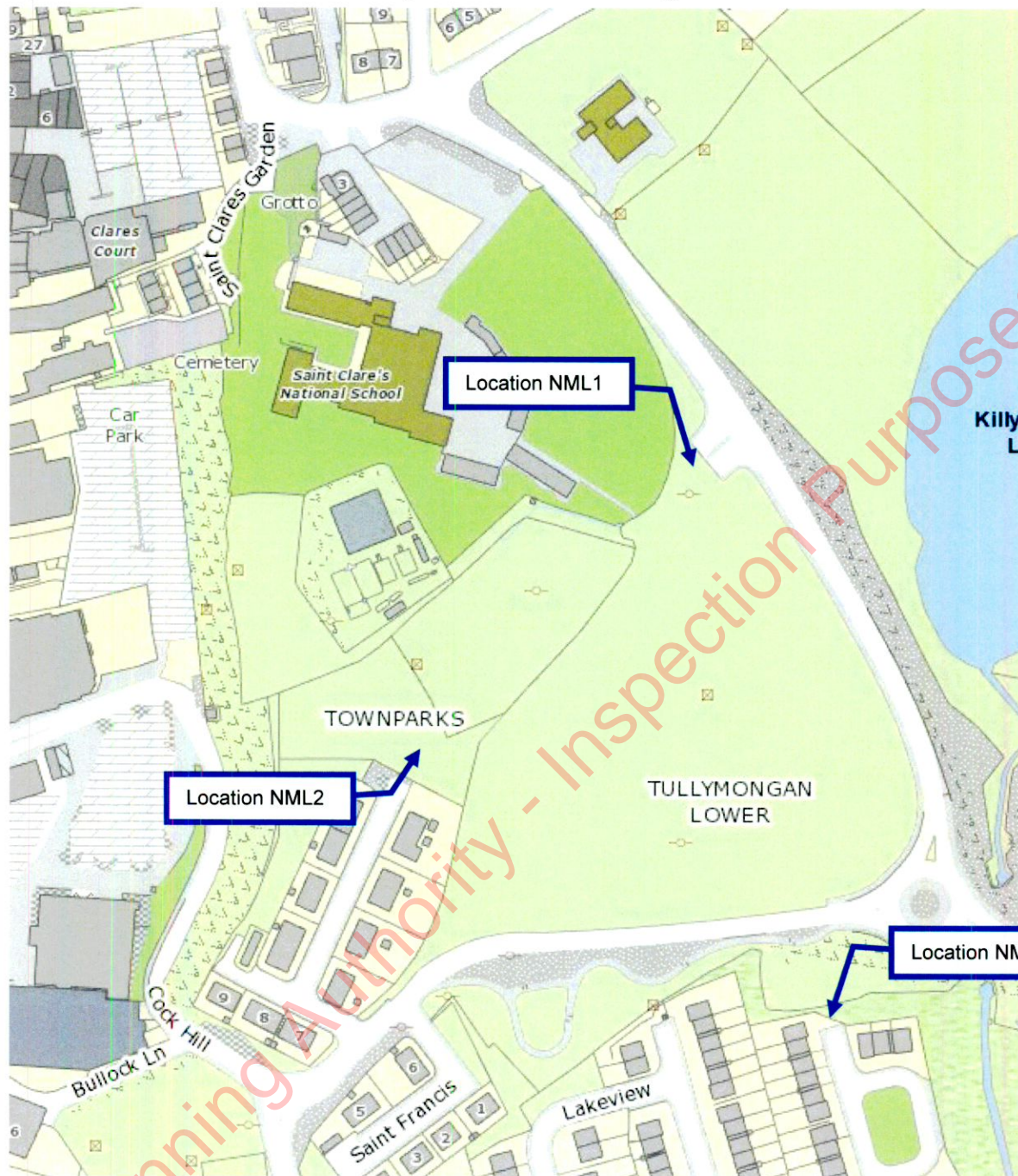


Figure 11.2: Photograph showing baseline noise measurement position NML1



Figure 11.3: Photograph showing baseline noise measurement position NML2

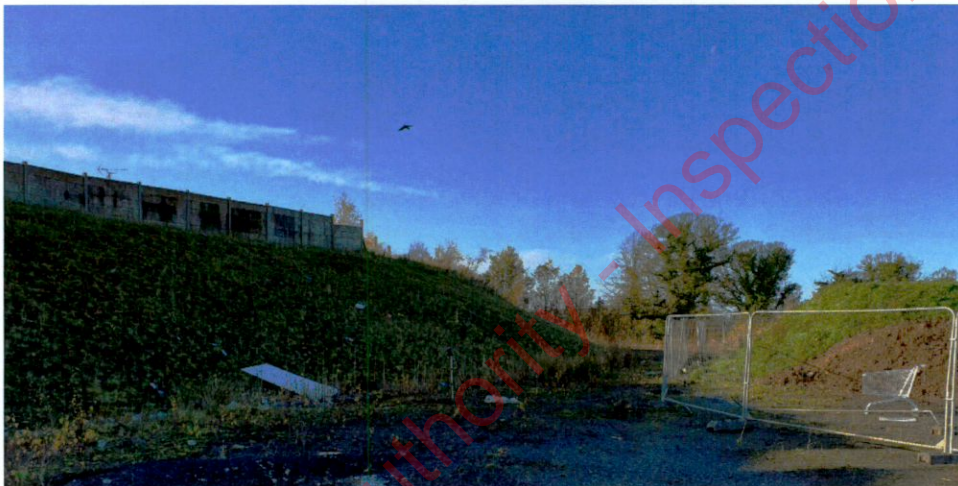


Figure 11.4: Photograph showing baseline noise measurement position NML3



11.4.3 Survey Periods

Daytime, evening and night-time attended noise measurements were conducted between 11:14hrs on 15th November 2022 to 02:10hrs on 16th November 2022.

The weather during the daytime survey was dry and sunny with temperatures in the range 8 to 10 degrees, wind speeds of 2-3 m/s in southerly and south-easterly directions.

The weather during the night-time survey was dry and clear with temperatures in the range 4 to 6 degrees, wind speeds of 2-4 m/s in southerly, south-easterly and easterly directions.

11.4.4 Instrumentation

Measurements were made using a Quest Technologies Sound Level Meter (Type 1) SE/DL and Real Time Frequency Analyser. Sample periods were 15-minute log periods. The instrumentation was calibrated using a Quest Technologies QC 20 Calibrator. Calibration certificates are available on request.

11.4.5 Measurement Parameters

The noise survey results are presented in decibels (dB), using the following parameters:

$L_{Aeq,T}$ is the equivalent continuous sound level and is used to describe a fluctuating sound as a single value over the sample period (T).

$L_{AFmax,T}$ The maximum A-weighted sound pressure level occurring within a specified time period (T). Measured using the "Fast" time weighting.

$L_{AF10,T}$ Refers to those A-weighted noise levels in the top 10 percentile of the sampling interval; it is the level which is exceeded for 10% of the measurement period (T). It is used to determine the intermittent high noise level features of locally generated noise and usually gives an indicator of the level of road traffic. Measured using the "Fast" time weighting.

$L_{AF90,T}$ Refers to those A-weighted noise levels in the lower 90 percentile of the sampling interval (T). It is the level which is exceeded for 90% of the measurement period. It will therefore exclude the intermittent features of traffic and is used to describe a background level without contribution from intermittent sources. Measured using the "Fast" time weighting.

All sound levels in this report are expressed in terms of decibels (dB) relative to 2×10^{-5} Pa.

11.4.6 Baseline Noise Survey Results

Location NML1

Table 11.6 presents a summary of the daytime (i.e. 07:00 to 19:00), evening (i.e. 19:00 to 23:00) and night-time (i.e. 23:00 to 07:00hrs) noise levels measured at Location NML1.

Table 11.6: Summary of Measured Baseline Noise Levels at Location NML1

Date and Start Time	Measured Noise Levels (dB re. 2×10^{-5} Pa)			
	$L_{Aeq,15min}$	$L_{Amax,15min}$	$L_{A10,15min}$	$L_{A90,15min}$
15 November 2022 at 11:29	56	72	59	50
15 November 2022 at 12:30	58	78	60	52
15 November 2022 at 15:16	63	87	63	55
15 November 2022 at 21:23	52	65	56	45
15 November 2022 at 23:15	48	64	50	41
16 November 2022 at 00:24	44	62	45	36
16 November 2022 at 01:29	41	60	42	33

During the noise survey, the dominant noise sources were noted to be from construction noise on adjacent site (daytime only), occasional local road traffic and distant road traffic, birdsong and occasional pedestrian activity.

Daytime ambient noise levels were in the range 56 to 63 dB $L_{Aeq,15min}$. The daytime background noise was in the range 50 to 55 dB $L_{A90,15min}$.

Evening and Night-time ambient noise levels were in the range 41 to 52 dB $L_{Aeq,15min}$. The night-time background noise was in the range 33 to 45 dB $L_{A90,15min}$.

Location NML2

Table 11.7 presents a summary of the daytime (i.e. 07:00 to 19:00), evening (i.e. 19:00 to 23:00) and night-time (i.e. 23:00 to 07:00hrs) noise levels measured at Location NML2.

Table 11.7: Summary of Measured Baseline Noise Levels at Location NML2

Date and Start Time	Measured Noise Levels (dB re. 2×10^{-5} Pa)			
	$L_{Aeq,15min}$	$L_{Amax,15min}$	$L_{A10,15min}$	$L_{A90,15min}$
15 November 2022 at 11:47	42	64	43	39
15 November 2022 at 12:49	44	58	46	40
15 November 2022 at 15:34	49	67	51	43
15 November 2022 at 21:41	41	55	44	38
15 November 2022 at 23:34	39	55	41	34
16 November 2022 at 00:42	38	54	41	32
16 November 2022 at 01:47	36	59	39	30

During the noise survey, the dominant noise sources were noted to be from construction noise on adjacent site (daytime only), occasional local road traffic and distant road traffic, birdsong and occasional pedestrian activity (schoolyard playground).

Daytime ambient noise levels were in the range 42 to 49 dB $L_{Aeq,15min}$. The daytime background noise was in the range 39 to 43 dB $L_{A90,15min}$.

Evening and Night-time ambient noise levels were in the range 36 to 41 dB $L_{Aeq,15min}$. The night-time background noise was in the range 30 to 38 dB $L_{A90,15min}$.

Location NML3

Table 11.8 presents a summary of the daytime (i.e. 07:00 to 19:00), evening (i.e. 19:00 to 23:00) and night-time (i.e. 23:00 to 07:00hrs) noise levels measured at Location NML3.

Table 11.8: Summary of Measured Baseline Noise Levels at Location NML3

Date and Start Time	Measured Noise Levels (dB re. 2×10^{-5} Pa)			
	$L_{Aeq,15min}$	$L_{Amax,15min}$	$L_{A10,15min}$	$L_{A90,15min}$
15 November 2022 at 12:08	46	65	48	42
15 November 2022 at 13:10	51	76	51	43
15 November 2022 at 15:56	49	61	51	46
15 November 2022 at 22:10	44	54	47	41
15 November 2022 at 23:58	39	49	41	36
16 November 2022 at 01:04	37	56	39	32
16 November 2022 at 02:10	35	53	37	31

During the noise survey, the dominant noise sources were noted to be from occasional local road traffic and distant road traffic, birdsong and occasional pedestrian activity.

Daytime ambient noise levels were in the range 46 to 51 dB $L_{Aeq,15min}$. The daytime background noise was in the range 42 to 46 dB $L_{A90,15min}$.

Evening and Night-time ambient noise levels were in the range 35 to 44 dB $L_{Aeq,15min}$. The night-time background noise was in the range 31 to 41 dB $L_{A90,15min}$.

Traffic Flows during Baseline Noise Survey

Where appropriate, EPA noise mapping will be used, in combination with a review of available and historic TII traffic count data for nearby traffic counters, in order to estimate the effect of potential reduced traffic flows. The estimated reduction will be calculated and the baseline data will be corrected in order to correct for any potential impacts where appropriate.

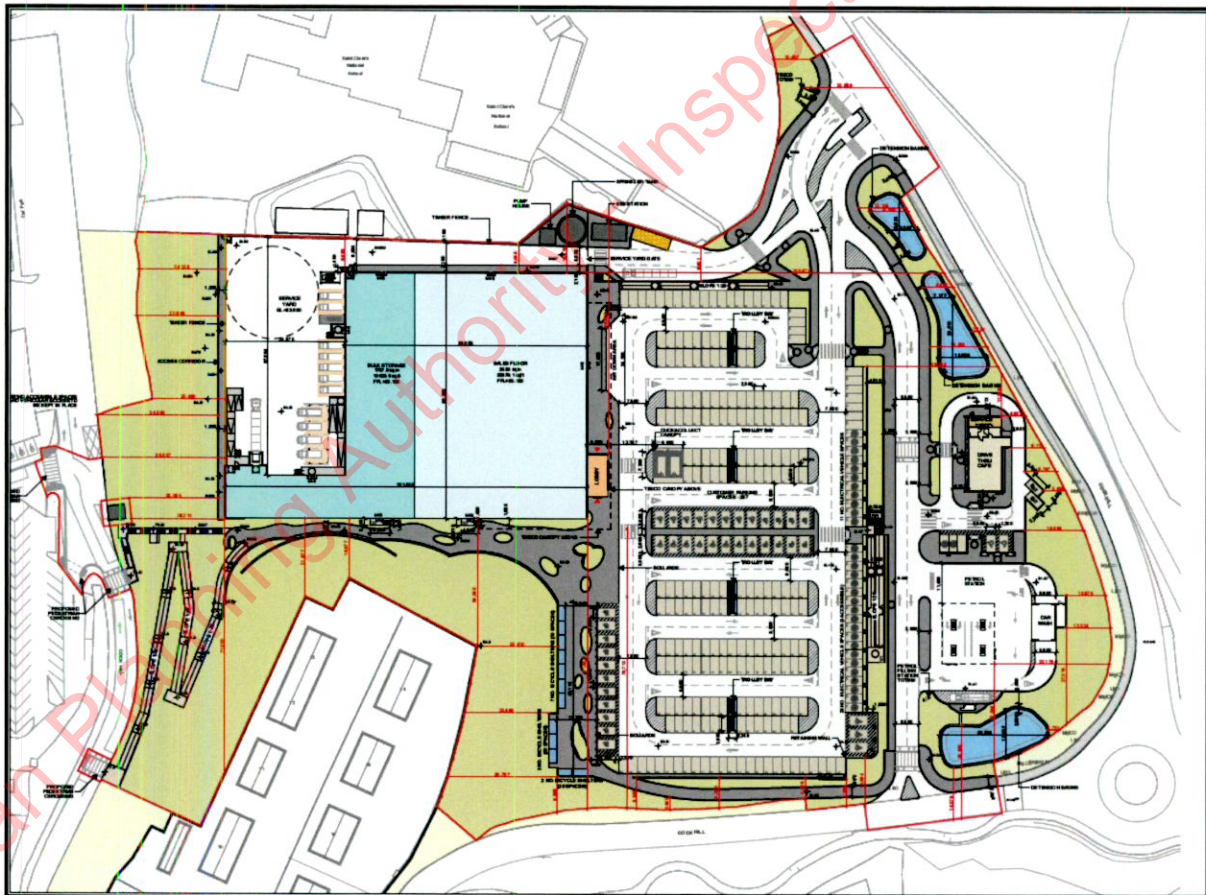
11.5 Characteristics of the Proposed Development

The development will consist of the construction of a single storey retail unit of c. 5,197 sq.m gross floor area (c. 2,194 sq.m convenience net sales area and c. 957 sq.m comparison net sales area) including a licensed alcohol sales area and service yard; a drive thru café unit (c.174 sq.m gross floor area) with external seating and 5 no. car parking spaces and 2 no. set down bay areas; a petrol filling station including car wash/jet wash (c. 89 sq.m), a forecourt canopy (covers c. 255 sq.m. and 4.8m in height); signage including elevational and 2 no. totem signs; 297 no. car parking spaces and 120 no. cycle parking spaces; a "Click and Collect" facility; Grocery Home Shopping delivery vehicle docking area; access points from Cock Hill Road; pedestrian linkages with the Town Centre by way of the provision of a sloped pedestrian walkway and steps on the western boundary of the site with 4 no. pedestrian crossings on Cock Hill Road and; all ancillary site development works, landscaping, fencing, enabling works and site services.

Please refer to **Chapter 2** for the full description of development.

An extract from the planning drawings can be seen in **Figure 11.5**.

Figure 11.5 – Extract from Site Plan (Joseph Doyle Architects)



11.6 Predicted Effects of the Proposed Development

11.6.1 Background

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

- construction phase, and;
- operational phase.

Construction Phase

During the construction phase the main site activities will include site clearance, ground excavation works and provision of infrastructure, construction of the buildings, road construction and landscaping. Potential impacts during the construction phase will be **short-term**.

Operational Phase

Operational phase outward noise impacts will be long-term and will typically consist of:

- noise from new building services plant;
- noise from store deliveries;
- increased noise due to additional vehicular traffic on public roads, and;
- car parking on site.

Potential impacts during the operational phase will be **long-term**.

11.6.2 Do-Nothing Scenario

If the proposed development does not proceed there would be no additional impact on the local ambient noise and vibration conditions.

Under the 'Do Nothing' scenario there would be no change to the current land use of the site. There will be no impact on noise/vibration to surrounding receptors.

11.6.3 Potential Effects – Construction Phase

Noise

During the construction phase the main site activities will include site clearance, ground excavation works and provision of infrastructure, construction of the retail and commercial buildings, road construction and landscaping. Potential impacts during the construction phase will be short term.

BS 5228-1:2009+A1:2014 provides catalogue of source noise levels for various construction plant, machinery and activity, along with a clear methodology and procedure for the prediction of noise from construction to sensitive receptors. This allows for an indicative assessment of the likely impacts of construction activity to nearby dwellings.

Table 11.9 presents construction plant items that are considered to be typical for a site of this nature, along with the BS5228-1 reference noise emission values at the nominal distance of 10 metres.

Table 11.9: Typical Construction Plant Items and BS5228-1 Reference Noise Emission Values

Phase	Item of Plant (BS 5228-1 Ref.)	Construction Noise Level at Reference Distance (10m) dB L _{Aeq,1hr}
Site Preparation	Wheeled Loader Lorry (C2.28)	74
	Diesel Generator (C4.76)	61
	Track Excavator (C2.22)	72
	Dozer (C2.13)	78
	Dump Truck (C4.2)	78
Foundations	Tracked Excavator (C3.24)	74
	Concrete Pump (C3.25)	78
	Compressor (C3.19)	75
	Poker Vibrator (C4.33)	78
General Construction	Tower Crane (C4.48)	76
	Articulated lorry (C12.10)	77
	Hand tools	81
	Pneumatic Circular Saw (D7.79)	75
	Internal fit – out	70
Landscaping	Dozer (C2.13)	78
	Dump Truck (C4.2)	78
	Surfacing (D8.25)	68

The nearest third-party noise sensitive locations to the proposed construction works are the properties to the west (at ca. 30m) and south (at ca. 50m) of the site boundary.

The closest works area is approximately 30m from the nearest properties with the remainder of works taking place across the site at varying distances. In order to assess a worst-case scenario, construction noise levels at distances of 30m, 50m and 100m have been used although a prediction to 10m distance is also provided as a reference in **Table 11.9**.

The calculations also assume that the equipment will operate for 66% of a typical 12-hour working day and that a standard site hoarding, typically 2.4m height will be provided around the perimeter of the construction site for the duration of works. **Table 11.10** summarises the construction noise predictions.

Table 11.10: Typical Construction Noise Predictions at Various Distances

Phase	Predicted	Predicted	Predicted
	Construction Noise	Construction Noise	Construction Noise
	Level	Level	Level
	dB L _{Aeq,11hr} at 30m	dB L _{Aeq,11hr} at 50m	dB L _{Aeq,11hr} at 100m
Site Preparation	68	63	56
Foundations	68	63	56
General Construction	69	64	58
Landscaping	66	61	55

With consideration of the site location, the likely construction phase activities, the distances from these works to nearby dwellings and the proposed construction noise criteria (i.e. 70 dB L_{Aeq,11hr} for weekday daytime periods) it is **not** expected that potentially significant noise impacts will be encountered when works are occurring, with approximately 30 metres as the closest point to neighbouring dwellings.

Though no significant noise generation is expected from the construction project, noise mitigation measures will be put in place during construction in order to reduce related impacts as far as is reasonably practicable. The use of best practicable means (BMP) to control emissions can constitute a ground of defence against charges that a nuisance is being caused. Typical mitigation measures that should be considered are presented in the relevant sections of this document.

Vibration

With consideration of the distance from site boundaries to nearby sensitive receptors, and proposed general methods of construction, it is projected that vibration emissions to nearby receptors will be not significant. Vibration mitigation measures are, however, presented in the relevant sections of this document in order to ensure that construction vibration emissions are adequately controlled.

11.6.4 Operational Phase

Noise from new Building Services Plant

Any new proposed building services plant, such as extract fans, condensers, air handling units and pumps shall be designed and specified such that cumulative noise emissions do not exceed the following criteria, at the external façade of existing noise sensitive locations:

- Daytime/Evening (07:00 to 23:00 hours): 50 dB L_{Aeq,1hr}
- Night (23:00 to 07:00 hours): 40 dB L_{Aeq,15min}

Plant noise emissions should not contain any characteristics that would warrant any acoustic feature penalties under the BS 4142:2014 assessment procedure.

Adherence to the noise criteria outlined above will ensure that impacts are low, when assessed in accordance with British Standard BS4142:2014+A1: 2019: 'Methods for Rating and Assessing Industrial and Commercial Sound'.

Noise from Store Deliveries

The noise from Service Yard / Delivery Activity has been assessed to the nearest noise sensitive locations NML1 – NML3. The distance from the perimeter of the service yard to these nearest noise sensitive locations is approximately as follows:

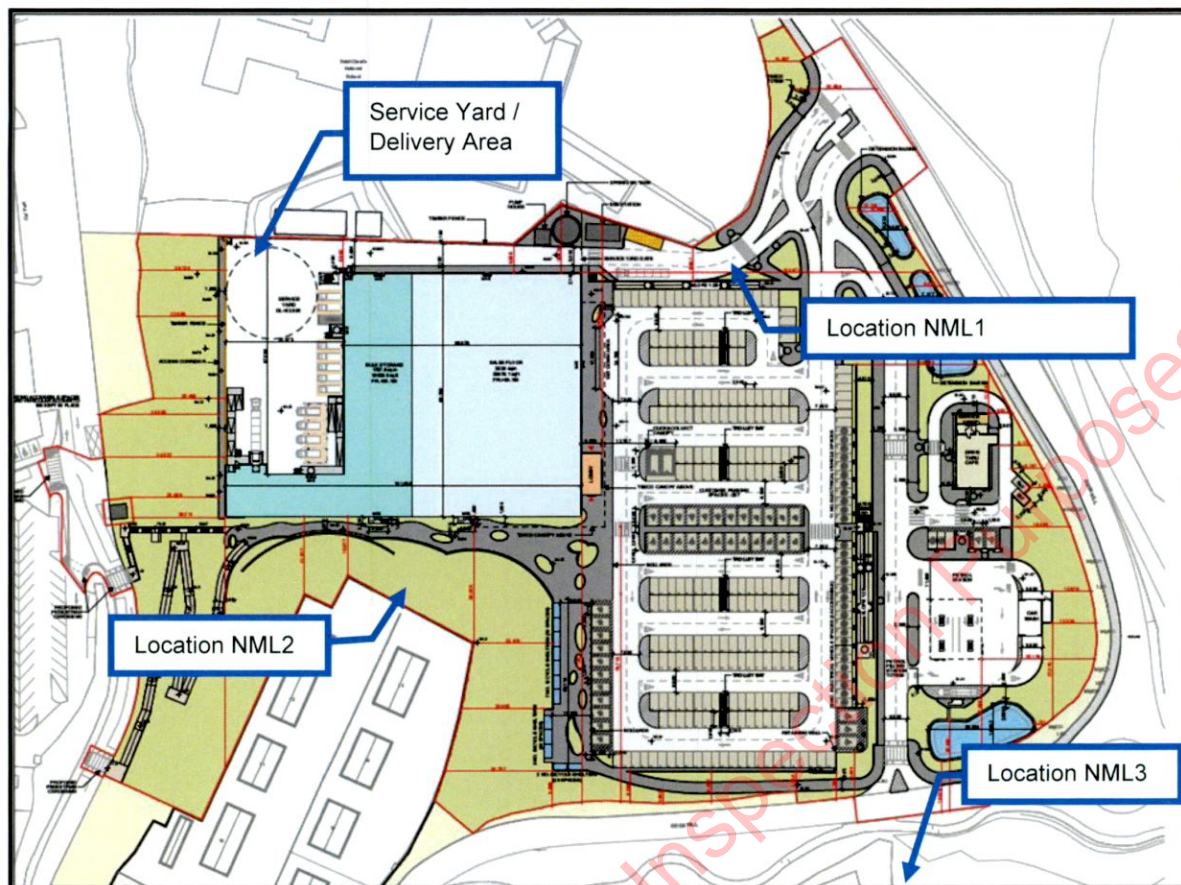
- NML1: 160 m
- NML2: 100 m
- NML3: 280 m

Information relating to deliveries has been provided by the client and are reproduced below:

- The store's operational hours will be Monday to Sunday 07:00 – 23:00hrs;
- Deliveries to the store are intended via HGV twice daily – 1 for Fresh food delivery & 1 for Ambient food delivery; and
- Delivery Hours will be subject to route planning from the Tesco Distribution centre. However, it is likely that deliveries will occur in the early morning period between ~05:00 and 07:30hrs.

The service yard/delivery area is located to the west of the site where delivery vehicles will pull into the designated area and then unload their vehicle. Goods will then be rolled into the main building, before the delivery vehicle leaves the site.

Figure 11.5: Proposed Site Plan Indicating Service Yard Location



The noise levels generated by Service Yard / Delivery Activity have been calculated based on source levels taken from ORS’s database, which are presented in **Table 11.11** below.

Table 11.11: Noise Levels for Typical Loading Bay Activity

Activity	Sound Pressure Level (dB $L_{Aeq,T}$ at 10 metres)	Duration of Activity	Source Height (m)
Truck arriving & reversing into internal loading bay (including reversing alarm)	69	2-minutes	1.5
Truck being unloaded	65	15-minutes	1.5
Truck departing from internal loading bay	71	1-minute	1.5

On the basis of the above source noise levels, with corrections applied regarding activity duration, distance and screening due to the proposed boundary walls, **Table 11.12** presents the results of the noise calculations from Service Yard / Delivery Activity to the nearby receptors.

Table 11.12: Service Yard / Delivery Activity Noise Calculations at Dwellings

Receptor	Calculated External Noise Level at Receptor (dB L _{Aeq,T})	Noise Criteria (dB L _{Aeq,T})	Complies?
NML1	29	Daytime (07:00-23:00hrs): 50 dB L _{Aeq,1hr}	✓
NML2	34		✓
NML3	27	Night-time (23:00-07:00hrs): 40 dB L _{Aeq,15-min}	✓

Calculations indicate that additional noise mitigation measures are required with regard to the operation of the proposed Service Yard / Delivery area.

Increased Noise due to Additional Vehicular Traffic on Public Roads

A traffic impact assessment has been prepared as part of this EIAR. Information provided by the traffic consultant (Sytra Ltd) was provided to ORS Ltd. and this information has been used to determine the predicted change in noise levels in the vicinity of the adjacent road network along which traffic will travel to and from the site. Traffic data for the following scenarios has been reviewed in preparing this assessment:

- Base AADT for Years 2025 (Opening Year) and 2040 (Opening Year + 15 Years), and;
- Base + Development AADT for Years 2025 (Opening Year) and 2040 (Opening Year + 15 Years).

AADT flow data has been used to assess the potential change in noise levels along the adjacent roads between the base year and the scenarios incorporating future site traffic. Changes in road traffic noise on the local road network have been considered using prediction guidance contained within Calculation of Road Traffic Noise (CRTN) issued by the Department of Transport in 1988. The future traffic flow data takes account of the proposed development. **Tables 11.13** and **11.14** summarise the calculated change in road traffic noise level for the assessment years.

Table 11.13: Assessment of Change in Traffic Noise Levels on Roads Surrounding the Site (AADT: Base 2025 vs Base + Development 2025)

Road Link	AADT Traffic Flows		Predicted Change in Noise Level, dB (L _{A10})
	Do Nothing (2025)	Do Something (2025)	
Cock Hill (North)	5685	7662	+1.1
Cock Hill (West)	3191	3350	+0.2
Ardkeen East	6176	7420	+0.8
Arkeen West	4104	4264	+0.2
Cock Hill (South)	6757	7809	+0.6
R212 East	15656	16357	+0.1
R212 West	12505	12760	+0.1

Table 11.14: Assessment of Change in Traffic Noise Levels on Roads Surrounding the Site (AADT: Base 2040 vs Base + Development 2040)

Road Link	AADT Traffic Flows		Predicted Change in Noise Level, dB (L _{A10})
	Do Nothing (2040)	Do Something (2040)	
Cock Hill (North)	6301	8279	+1.2
Cock Hill (West)	3537	3696	+0.2
Ardkeen East	6845	8089	+0.7
Arkeen West	4549	4709	+0.1
Cock Hill (South)	7489	8542	+0.6
R212 East	17353	18055	+0.2
R212 West	13861	14116	+0.1

The calculated increase in noise level is less than 2.5 dB along all roads assessed, referring to **Table 11.5** confirms that this calculated change in noise level is '**Negligible**' and the associated impact is '**Not Significant**'.

Car Parking on Site

The noise from vehicular use within the car park has been assessed to the nearest noise sensitive locations NML1 to NML3. Information relating to the use of the car park have been provided by the client and are reproduced below:

- Number of Car Parking Spaces: 297 No.
- Typical Operating Hours: Daytime (07:00 – 23:00hrs)

Information relating to typical noise levels from car parks is provided in ISBN 3-936385-26-2 / ISSN 0723-0028 "Parking Area Noise - Recommendations for the Calculation of Sound Emissions of Parking Areas, Motorcar Centres and Bus Stations as well as of Multi-Storey Car Parks and Underground Car Parks", 6. Revised Edition.

This Standard describes methods for establishing and calculating source noise levels from car parks of different type, capacity, intensity of use and construction; including Supermarket Car Parks.

Section 8.2 (of The Standard) entitled Parking Areas at Ground Level, prescribes a calculation method for Normal Case as follows:

$$L_{w''} = L_{w0} + K_{PA} + K_I + K_D + K_{Str0} + 10 \cdot \lg(B \cdot N) - 10 \cdot \lg(S/1m^2) \text{ in dB(A)}$$

Where: $L_{w''}$ = Plane-specific sound power level of all processes in the parking area.

L_{w0} = Initial sound power level for one motion/hr (Ref. Table 30: 65.4 dB(A) for supermarket (inc. shopping trolley on asphalt).

K_{PA} = Correction for parking area type (Ref. Table 34: shopping trolley on asphalt + 3dB(A)).

K_I = Correction for impulse character (Ref. Table 34: +4 dB(A)).

K_D = Correction for traffic passaging and searching for carport in the driving lanes = $2.5 \times \lg(f \cdot B - 9)$.

K_{Str0} = Correction for lane surfaces (0 dB(A)).

f = Carports per unit of the reference value (0.07 for Supermarkets).

B = Reference quantity of car parking spaces (297 No.)

N = Motion frequency during the daytime period (6am - 22pm) = 0.07 (Ref. Table 33 - 0.07 - Large Consumer Market).

S = Total area resp. partial area of the parking area.

On the basis of the above calculation, a plane-specific sound power level ($L_{w''}$) of 88 dB(A) has been calculated for the proposed car park. Annex A of ISBN 3-936385-26-2 describes the method to follow to calculate the sound level at an assessment location (i.e. residential buildings) and recommends noise propagation calculations are carried out in accordance with ISO 9613-2. **Table 11.15** presents the results of the noise calculations from car park use to the nearby receptors.

Table 11.15: Car Park Noise Calculations at Neighbouring Dwellings

Receptor	Calculated External Noise Level at Receptor (dB L _{Aeq,T})	Noise Criteria (dB L _{Aeq,T})	Complies?
NML1	50	Daytime (07:00-23:00hrs): 50 dB L _{Aeq,1hr}	✓
NML2	48	Night-time (23:00- 07:00hrs): 40 dB L _{Aeq,15-min}	✓
NML3	50		✓

Calculations indicate that additional noise mitigation measures are not required with regard to the operation of the proposed Car Park.

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11.7 Mitigation Measures

11.7.1 Construction Phase

With regard to construction activities, best practice control measures for noise and vibration from construction sites are found within BS 5228:2009+A1:2014 'Code of Practice for Noise and Vibration Control on Construction and Open Sites Parts 1 and 2'. Whilst construction noise and vibration impacts are calculated to be within the criteria set out in this document for the majority of the time, the contractor will ensure that all necessary noise and vibration control measures will be used, in order to ensure impacts to nearby residential noise sensitive locations are not significant.

The following mitigation measures are required during the construction of the proposed development:

- Use of a site hoarding, minimum 2.4m height to be erected around the perimeter of the construction site for the duration of works where the distance of works is 30m or less to nearby noise sensitive locations;
- Limiting the hours of construction to the following:

Monday to Friday	07.00 – 19.00
Saturday	07.00 – 13.00

In exceptional circumstances, and subject to agreement with CCC, extended hours of operation may be applied for. In such instances an assessment of potential noise impacts shall be carried out in advance of works taking place, and submitted to CCC, as part of the extended hours request.

- Monitoring levels of noise and vibration during critical periods and at sensitive locations;
- Maintaining site access roads even so as to mitigate the potential for vibration from lorries;
- Selection of plant with low inherent potential for generation of noise and/ or vibration;
- Erection of barriers as necessary around items such as generators or high duty compressors;
- Situate any noisy plant as far away from sensitive properties as is reasonably practicable and the use of vibration isolated support structures where necessary;
- Establishing channels of communication between the contractor/developer, Local Authority and residents, and;
- Appointing a site representative responsible for matters relating to noise and vibration.

During the construction phase all scaffolding, hoarding and cranes would only be in use for as long as necessary to facilitate the construction of the proposed development. The impact of these is considered negligible. No additional mitigation is required.

11.7.2 Operational Phase

Noise from new Building Services Plant

Any proposed new plant shall be designed and specified such that noise emissions do not exceed the following criteria, at the external façade of existing and/or proposed new noise sensitive locations:

- Daytime (07:00 to 23:00 hours) 50 dB LAeq,1hr, and;
- Night (23:00 to 07:00 hours) 40 dB LAeq,15min.

Where necessary noise mitigation measures shall be installed in order to ensure that the above plant noise limits are not exceeded. Such measures may include attenuators to the atmosphere side of supply/extract fans, acoustic barrier screens to chillers/condensers and, where required, acoustic louvres to plantrooms. During the design process the position, finished floor level, height and massing of the proposed development were technically assessed to reduce and mitigate any potential effect on the daylight, sunlight and overshadowing of the adjacent properties. This informed the final design. The impact of the proposed development is considered negligible.

Noise from Store Deliveries

During the operational phase of the development, noise mitigation measures with respect to store deliveries on site are not deemed necessary.

Increased Noise due to Additional Vehicular Traffic on Public Roads

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

Car Parking on Site

During the operational phase of the development, noise mitigation measures with respect to car parking on site are not deemed necessary.

11.8 Monitoring

The appointed contractor will be required to monitor levels of noise and vibration during critical construction periods at nearby sensitive locations and/or development site boundaries.

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11.9 Residual Effects

According to Environmental Protection Agency guidelines, a residual Impact is described as 'the degree of environmental change that will occur after the proposed mitigation measures have taken place.' The mitigation strategy above recommends actions which can be taken to reduce or offset the scale, significance and duration of the effects on the surrounding receptors from effects posed by noise or vibration.

11.9.1 Construction Phase

During the construction phase of the project there will be some negative impact on nearby noise sensitive locations due to noise/vibration emissions from construction activity. The implementation of suitable control measures will ensure that the impact is minimized. The residual impact from construction is as follows.

Table 11.16: Construction Phase Residual Noise/Vibration Impacts

Quality	Significance	Duration
Negative	Moderate	Short-term

In terms of the noise exposure of construction workers, the Safety, Health and Welfare at Work (General Application) Regulations 2007 (Statutory Instrument No. 299 of 2007) provides guidance in terms of allowable workplace noise exposure levels for employees. The Regulations specify two noise Action Levels at which the employer is legally obliged to reduce the risk of exposure to noise. The appointed contractor will be required to comply with the Regulations and provide appropriate noise exposure mitigation measures where necessary.

The noise exposure level to off-site receptors during the construction phase will be below the lower Action Level and therefore the risk of noise exposure resulting in hearing damage to off-site receptors is not significant.

In terms of construction noise emissions to nearby off-site receptors, provided that noise emissions are controlled to comply with the recommended significance thresholds, as outlined in previous sections, and considering the short-term nature of the works, the potential health impacts associated with construction noise is not significant.

11.9.2 Operational Phase

The anticipated residual impact from the operational phase of the development is summarised as follows.

Table 11.17: Operational Phase Residual Noise/Vibration Impacts

Quality	Significance	Duration
Negative	Not Significant	Long-term

The operational phase outward noise emissions will be controlled to comply with the recommended World Health Organisation (WHO) Guidelines, the potential health impacts associated with operational phase site noise emissions are not significant

11.9.3 Statement of Significance

The significance of impact upon local noise & vibration conditions have been assessed for the construction phase. In this instance the anticipated impacts are ***slight to moderate***, but short term.

The significance of impact upon local noise & vibration conditions have been assessed for the operational phase. In this instance the anticipated impacts are ***not significant***.

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11.10 Reinstatement

Not Applicable.

11.11 Interactions and Potential Cumulative Effects

13.8.1 Interactions

Local noise conditions will be influenced by the outcome of other environmental attributes assessed within this EIAR as follows:

- Traffic and Transportation (Chapter 6) - Noise and vibration interacts with Roads and Traffic and information provided in the Traffic Chapter has been used in preparing this EIAR Noise & Vibration Chapter.

11.8.2 Cumulative Effects

Construction Phase

The phasing/commencement of any other permitted developments in the locality could potentially result in the scenario where a number of other construction sites are in operation at the same time as the proposed development. The location of any other nearby construction sites in relation to each other and to nearby noise sensitive locations, means that there is a general low risk of cumulative construction noise emissions resulting in an exceedance of the relevant criteria.

Operational Phase

The location of the proposed development site in relation to nearby noise sensitive locations and the distance from the proposed development site in relation to other nearby lands means that there is minimal risk of cumulative operational phase noise emissions resulting in an exceedance of the relevant criteria. No additional mitigation measures are therefore required.

In terms of future projected projects, there are 4 no. proposed developments set within the vicinity of the proposed development likely to commence during the project construction phase, as summarised in **Table 11.18**. Given the relatively minor scale of these developments, any cumulative impacts are anticipated to be **Not Significant, Temporary**.

Table 11.18. Proposed Developments within the site vicinity

Reg. Ref.	Location	Description of Development	Decision	Distance	Anticipated Cumulative Effect
CCC Reg. Ref. 21528	Aghnaskerry, Co. Cavan	Demolish existing derelict dwelling house and erect 26 no. 3-bed semi-detached dwellings	Permission Granted by CCC 26/05/2022 Subject of current appeal with ABP	ca. 317m NE	Not Significant, Temporary
CCC Reg. Ref. 2163	Gaelscoil Bhrefine Tullymongan Lower and Aghnaskerry, Cavan	Single storey extension to existing school, alterations to site layout with a new access via service road	Permission Granted by CCC 21/05/2022 Development commenced 08/07/2021	ca. 180m N	Not Significant, Temporary
CCC Reg. Ref. 20145	Aghnaskerry, Tullymongan Lower, Cavan	Change of use of existing dwelling to pre/after school care facility with associated alterations to elevations, outdoor play area and pedestrian path access from adjoining Gaelscoil Bhrefine	Permission Granted by CCC 22/10/2021	ca. 180m N	Not Significant, Temporary
CCC Reg. Ref. 20376	Gaelscoil Bhrefine Tullymongan Lower and Aghnaskerry, Cavan	Construct new roadway and entrance junction along the L2543 Cavan Town Eastern Access Road/ Cock Hill Road, alterations to existing public roadway to include new right turn lane and footpath, safety barrier, public playground area, pathways, public lighting, landscaping, boundary treatments and all ancillary site works	Permission Granted by CCC 03/03/2021	Adjacent to the site boundary to the NE	Not Significant, Temporary
CCC Reg. Ref. 18141	Tullymongan Lower, Cavan, Co. Cavan	Change of use of existing residential convent building to educational school building	Permission Granted by CCC 18/08/2018 Development commenced 08/07/2021	ca. 180m N	Not Significant, Temporary

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12.0 Air Quality and Climate

12.1 Introduction

This chapter comprises of an assessment of the air quality and climate within the vicinity of the site and the surrounding environs. The potential effects posed by the construction and operational phases of the proposed development are investigated, and suitable mitigation measures are recommended to minimise effects on local climate and air quality. The proposed site is located ca. 200m east from the Cavan Town Centre and 180m east of the existing Tesco superstores. The proposed development is located in the Local Authority of Cavan County Council.

The objectives of this chapter are.

- To provide a baseline assessment of the receiving environment in terms of air quality and climate.
- To identify any potential negative effects posed by the construction and operational phases of the proposed development.
- To propose suitable mitigation measures to prevent or reduce the significance of the negative effects identified.
- To consider any significant residual effects of cumulative effects posed by the proposed development.

12.2 Consultation

ORS have been commissioned to assess the potential effects of the proposed development in terms of land, soils, geology and hydrogeology during the construction and operational phases.

The principal members of the ORS EIA team involved in this assessment include the following persons:

- **Project Scientist & Lead-Author:**
Cormac Dunne – B.A. (MOD) (Environmental Science), M.Sc. (Civil Engineering), MCERTs, MIEEnvSc, MIAQM. Current Role: Senior Environmental Scientist. Experience ca. 17 years.
- **Project Manager & Reviewer:**
Luke Martin - B.A. (MOD) (Natural Sciences), M.Sc. (Sustainable Energy and Green Technology), CEnv, MIEEnvSc. Current Role: Senior Environmental Consultant. Experience ca. 10 years.

Consultation between ORS and other members of the planning/design team was made in order to obtain information required to assess the potential construction and operational phase effects on local air quality and climate. Pre-planning meetings were held with Cavan County Council on 6th August 2020, 13th October 2020, 30th September 2021 and 8th November 2022.

12.3 Legislation, Policy and Guidance

The methodology used to produce this chapter included a review of relevant legislation and guidance, a desk study, an evaluation of potential effects, qualitative analysis, semi-quantitative analysis, an evaluation of significance of the effect and an identification of measures to avoid and mitigate effects.

12.3.1 Legislation, Policy and Guidance

This chapter was carried out in accordance with the following guidance documents:

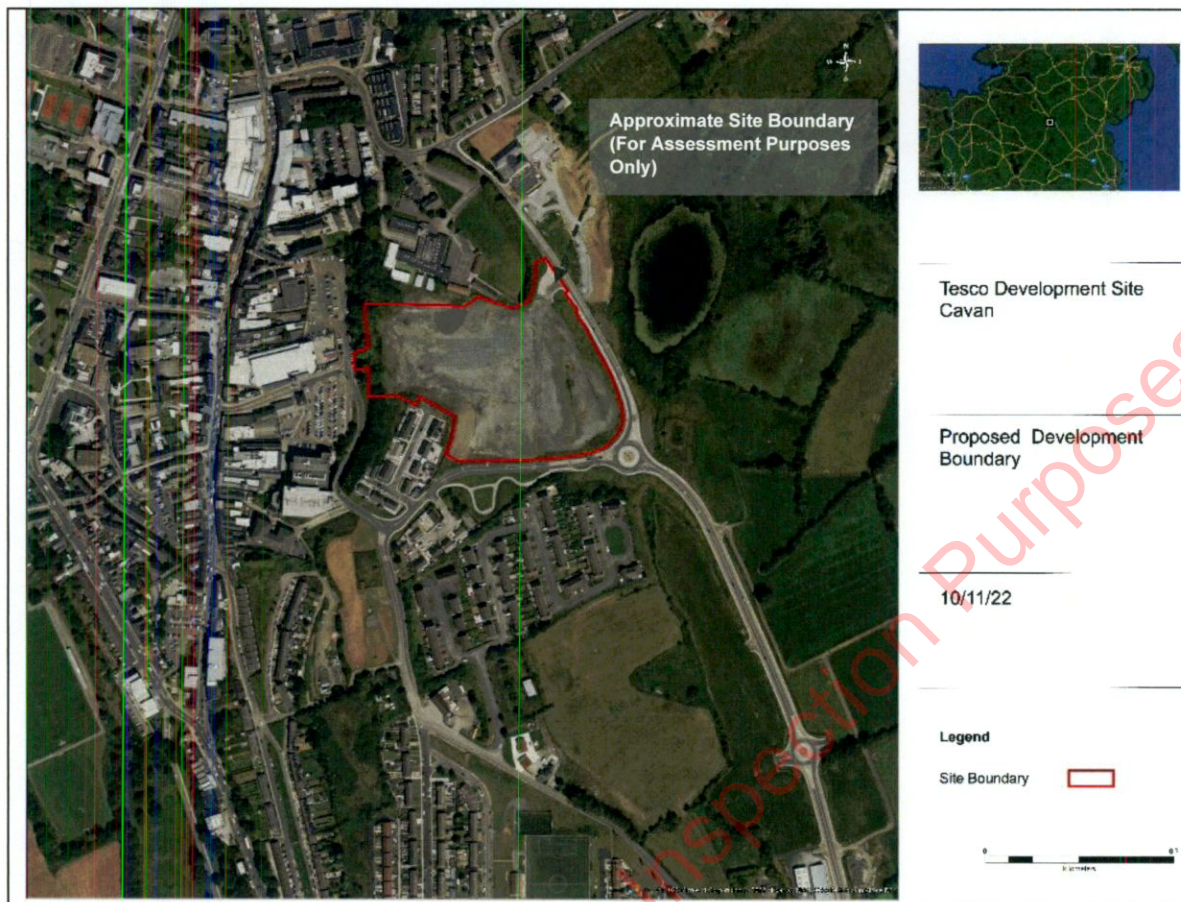
- EPA, (2022). Guidelines on the Information to be Contained in Environmental Effect Assessment Reports.
- Institute of Air Quality Management (IAQM) (2014) Guidance on the Assessment of Dust from Demolition and Construction Version 1.1.
- EPA (2019) Air Dispersion Modelling from Industrial Installations Guidance Note (AG4).
- DEFRA, (2016a) Air emissions risk assessment for your environmental permit.
- DEFRA, (2016b) Assess the effect of air emissions on global warming.
- Transport Infrastructure Ireland (2011) Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes.
- UK DEFRA (2018) Part IV of the Environment Act 1995: Local Air Quality Management (LAQM) Technical Guidance (TG16).
- UK DEFRA (2016c) Part IV of the Environment Act 1995: Local Air Quality Management (LAQM) Policy Guidance (PG16).
- UK Highways Agency (2007) Design Manual for Roads and Bridges, Volume 11, Section 3, Part 1 - HA207/07 (Document & Calculation Spreadsheet).
- Highways England, LA 105 of the Design Manual for Roads and Bridges (2019)
- World Health Organisation (2006) Air Quality Guidelines - Global Update 2005 (and previous Air Quality Guideline Reports 1999 & 2000)
- An BRE (2003) Controlling Particles, Vapours & Noise Pollution from Construction Sites

12.3.2 Desktop Study

A desk study was undertaken in order to collate and review background information in advance of the site survey. The desk study involved the following;

- EPA Ambient Air Monitoring Station Data (EPA web page)
- Air Quality in Ireland Reports 2017 – 2021 (EPA web page)
- Meteorological Data 2017 – 2022 (Met Éireann)
- Local Terrain Data (OSI)
- Government of Ireland (2021) Climate Action Plan 2021
- Transport Infrastructure Ireland (2011) Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes (DoEHLG)
- Other Maps and plans published by the Ordnance Survey of Ireland (OSI)
- Reports, maps and data published by the Environmental Protection Agency (EPA).

Figure 12.1 Proposed site development boundary



12.3.3 Air Quality Assessment

An air quality assessment is undertaken to inform the decision making regarding the development. Almost all development will be associated with new emissions if the development is considered in isolation. In most cases, therefore, development will be associated with adverse effects. These effects require quantification and evaluation in the context of air quality objectives and existing air quality.

Development brings opportunities for reducing emissions at a wider level using more efficient technologies and better designed buildings, which could well displace emissions elsewhere, even if they increase at the development site. Conversely, development can also have adverse consequences for air quality at a wider level through its effects on trip generation.

Where an air quality assessment is identified as being required, this may be either a Simple or a Detailed Assessment. A Simple Assessment is one relying on already published information and without quantification of effects. A Detailed Assessment that is completed with the aid of a predictive technique, such as a dispersion model.

The significance criteria used throughout this assessment to rate the effects to air quality and climate are based on those outlined within the EPA Guidance document Guidelines on the information to be contained in Environmental Effect Assessment Reports (2022).

The assessment addresses effects during both the construction and operational phases of the proposed development. The approach taken for assessing the potential air quality effects of the proposed development may be summarised as follows:

- characterisation of baseline local air quality;
- qualitative effect assessment of construction phase of the development;
- effect assessment of air quality effects of the proposed development whilst it is operational; and
- recommendation of mitigation measures, where appropriate, to ensure any adverse effects on air quality are minimised.

Methodology for Assessing Ambient Air Effects - Construction Emissions

Regarding the construction stage of the planned development the most likely effect on air quality will be from construction dust emissions (nuisance dust & PM10/PM2.5 emissions) associated with activities such as excavations, infilling materials, stock piling and movement of vehicles, for the purposes of this assessment the Institute of Air Quality Management (IAQM) construction dust guidance (IAQM, 2014) was utilized.

To assess the potential effects accordingly, construction activities are divided into 4 categories:

- Demolition (not required in this assessment)
- Earthworks
- Construction; and
- Trackout (described as the transport of dust and dirt from the construction / demolition sites onto public road network, where it may be deposited and then re-suspended by vehicles using the network).

A qualitative assessment of construction dust has been undertaken in line with the IAQM 2014 guidance. The study area for this assessment was 350m from the proposed development boundary and or within 50m of the roads used by construction vehicles on the public road up to 500 m from the site entrance.

The first stage is to assess the requirement for an evaluation. The requirement for an assessment is based on distances of human and/or ecological receptors of the site.

Human receptors are within 350m of the site boundary, but none are located within 50m of the trackout route; consequently, construction dust has the potential to cause an adverse effect on the locality. No designated ecological receptors are within 50m of the trackout route or site boundary; therefore, construction dust will not have the potential to effect adversely on ecological receptors.

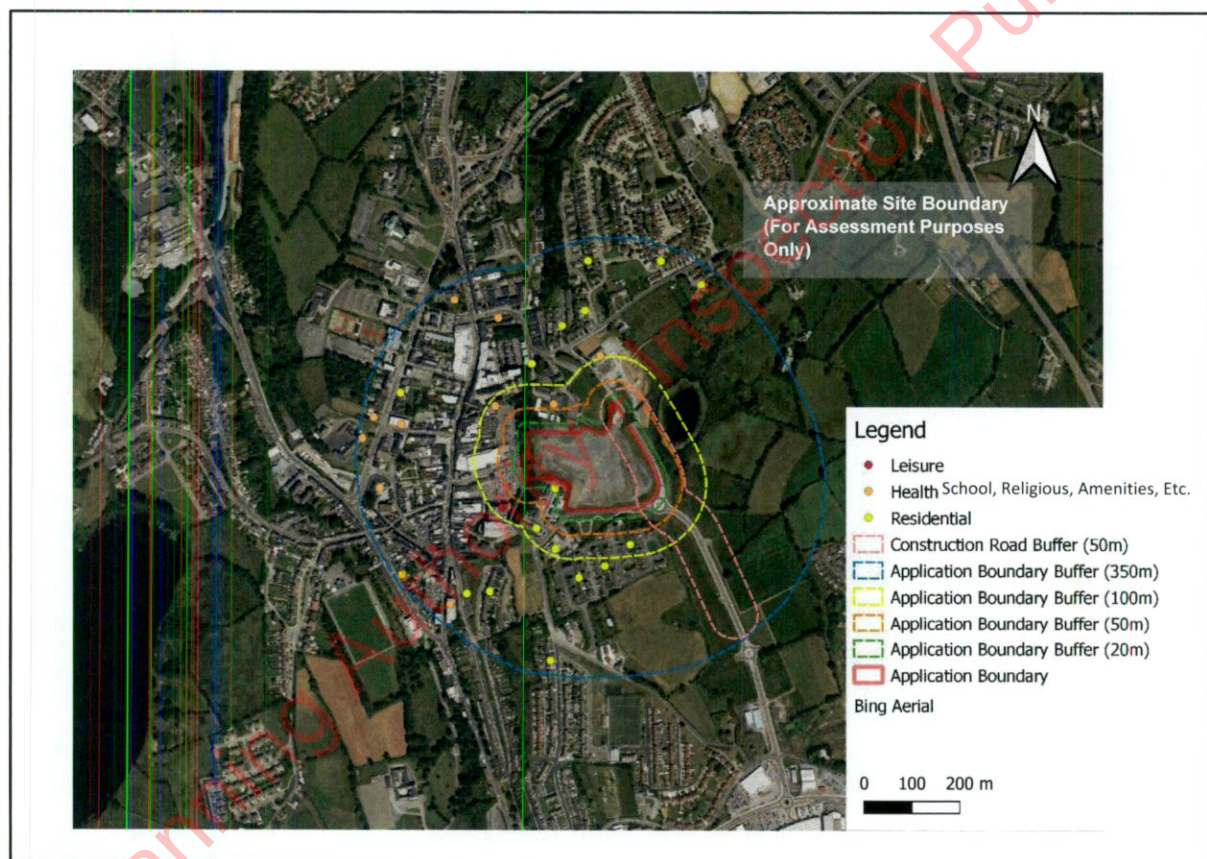
There are approximately 22 residential, amenity, health and leisure receptor clusters within 350 meters of the site boundary and none within 50 metres of applicable construction routes. The number includes buildings and clusters of receptors e.g., apartment blocks and housing estates and not the individual residences contained within these.

Human receptors are largely housing estates located to the South & North of site. There is a school located within 30-35m of the site boundary and there are many commercial receptors located at varying distances and directions from the site boundary to the West & North-West.

The nearest human & residential receptor to the site is a residential housing estate located approximately 5m South-West of the site boundary area. There are places of work, commercial and retail, which are located close by also (less than 50m) to the West of the site boundary. Dust will be created during the construction of the proposed development which may have adverse effects on local sensitive receptors e.g. residents living nearby.

The construction dust assessment study area including identified receptors is included as part of **Figure 12.2**.

Figure 12.2 Site boundary, buffer zones and receptor locations



The construction on site effect has been assessed qualitatively to evaluate the risk of dust effects and decide suitable mitigation measures to control risk appropriately. The degree of mitigation advised for each activity is then established, being proportionate with the associated risk (Low, Medium or High risk). In accordance with the IAQM construction dust guidance, mitigation is advised for all risk levels.

Construction phase traffic also has the potential to effect air quality and climate. The UK DMRB guidance (UK Highways Agency, 2007), states that road links meeting one or more of the following criteria (described below) can be defined as being 'affected' by a proposed development and should be included in the local air quality assessment. The use of the UK guidance is recommended by the TII

(2011) in the absence of specific Irish guidance, this approach is considered best practice and can be applied to any development that causes a change in traffic.

- Annual average daily traffic (AADT) changes by 1,000 or more;
- Heavy duty vehicle (HDV) AADT changes by 200 or more;
- A change in speed band;
- A change in carriageway alignment by 5m or greater.

The construction stage traffic will not increase current levels by 1,000 AADT or 200 HDV AADT and therefore does not meet the above scoping criteria. Consequently, a detailed air assessment of construction stage traffic emissions has been scoped out from any further assessment as there is no potential for significant effects to air quality.

Methodology for Assessing Ambient Air Effects - Operational Emissions

Possible effects from the operation of the development will be long-term in nature and will comprise of emissions from vehicular sources and minor emissions from new building facilities. As emissions from new building facilities are deemed not significant (due to the sites primary reliance on heat and power from the national grid instead of onsite generation), the primary source of air emission contaminants during the operational phase will be from traffic to and from the site.

Assessment of operational traffic emissions associated with the proposed development was carried out using the UK DMRB spreadsheet. The modelling assessment determined that the change in emissions of NO₂ & PM₁₀ at nearby sensitive receptor road links because of the proposed development will be imperceptible. Therefore, the operational phase effect to air quality is long-term, localised, neutral and imperceptible (see Section 12.5 for more detail).

The evaluation of air quality affects from traffic (both operational & construction) was completed utilising methodology proposed by the UK DEFRA (2016b). This approach involves modelling by way of the UK DMRB Screening Model (Version 1.03c, July 2007), the NO_x to NO₂ Conversion Spreadsheet (Version 6.1, October 2017) (UK DEFRA, 2017), and following guidance issued by the TII (2011), UK Highways Agency (2007), UK DEFRA (2016a; 2016b; UK DETR 1998) and the EPA (2015; 2017).

The TII guidance (2011) states that the air quality assessment must progress to detailed modelling if:

- Concentrations exceed 90% of the air quality limit values when assessed by the screening method; or
- Sensitive receptors exist within 50m of a complex road layout (e.g. grade separated junctions, hills etc).

The UK DMRB guidance – UK Highways (LA 105, 2019 & 2007 guidance), on which the TII guidance (2011) is based, states that road links meeting one or more of the following criteria can be defined as being 'affected' by a proposed development and should be included in the local air quality assessment:

- Road alignment change of 5 metres or more;
- Daily traffic flow changes by 1,000 AADT or more;

- HGV flows change by 200 vehicles per day or more;
- Daily average speed changes by 10 km/h or more; or
- Peak hour speed changes by 20 km/h or more.

Guidance from Transport Infrastructure Ireland (TII, 2011) advises the use of the UK Highways Agency DMRB spreadsheet tool for evaluating the air quality effects from road schemes. The DMRB spreadsheet tool was last reviewed in 2007 and allows for modelled years up to 2025. Vehicle emission standards up to Euro V are contained but since 2017, Euro 6d standards are appropriate for the new fleet. In addition, the model does not allow for electric or hybrid vehicle use. Therefore, this is a slightly outdated assessment tool. The LA 105 guidance document states that the DMRB spreadsheet tool may still be used for simple air quality assessments where the possibility of exceeding the air quality standards is low. Due to its use of a “dirtier” fleet, vehicle emissions would be higher than more modern models and therefore any results will be robust in nature and will deliver a worst-case assessment.

12.3.4 Climate Change Assessment

The methodology to assess the effect posed by the proposed development to climate change was derived in accordance with the established assessment methodology published by the UK Environment Agency (DEFRA, 2016b). According to this guidance assessment of climate change comprises two distinct areas:

- **Climate Change Mitigation** – an assessment of likely significant effects upon climate change resulting from the project and their mitigation, including an estimate of greenhouse gas (GHG) emissions; and
- **Climate Change Adaptation** – an assessment of likely significant effects of climate change upon the project, including its vulnerability and the need for any adaptation measures to ensure project resilience to projected climate change scenarios.

The UK Climate Change Risk Assessment (2022) offers guidance on possible sensitive receptors, **Table 12.1** sets out a summary of climate change risks and opportunities related to the planned development.

Table 12.1 Climate Change Risk Assessment

Climate Change Effect	Risk	Opportunity	Receptor(s)
Increase in winter mean temperature	<ul style="list-style-type: none"> • Risk to species and habitats from changing climate space 	<ul style="list-style-type: none"> • New species colonisation and increased climate space • Improved health and wellbeing during construction • Reduced energy use and GHG emissions 	<ul style="list-style-type: none"> • Habitats and species • Construction employees and equipment • Energy infrastructure and climatic system

<p>Increased summer mean and daily maximum temperature</p>	<ul style="list-style-type: none"> • Changing climate space • Increased energy demand from additional cooling in buildings • Overheating effecting health and wellbeing • Ground movement due to ground movement and differential settlement 	<ul style="list-style-type: none"> • New species colonisation and increased climate space 	<ul style="list-style-type: none"> • Habitats and species • Energy infrastructure and climatic system • Building occupants • Buildings and infrastructure
<p>Decrease in summer rainfall</p>	<ul style="list-style-type: none"> • Water restrictions • Fresh water supplies • Ground movement and differential settlement 	<p>-</p>	<ul style="list-style-type: none"> • Habitats and species • Building operations • Building infrastructure
<p>Increase in winter rainfall</p>	<ul style="list-style-type: none"> • Increased flood risk • Ground movement and differential settlement 	<p>-</p>	<ul style="list-style-type: none"> • Building infrastructure and building occupants • Building infrastructure

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12.4 Receiving Environment

12.4.1 Air Quality

A review of publicly available information was conducted to determine the baseline air quality within the region. This investigation comprised the quantification of targeted pollutants or contaminants of concern, already in existence in the ambient air, within the vicinity of the proposed site. The source of these substances can be derived from agriculture, domestic, construction, industrial processes and transport.

The main air quality pollutants relevant to this evaluation are considered to be NO₂, PM₁₀ and PM_{2.5}. These contaminants are regarded as the three most significant air pollutants released by vehicular combustion processes or produced by vehicle emissions in the atmosphere through chemical reactions once released. These pollutants are regarded to have the greatest potential result in harmful effects to human health.

A desk study was carried out applying data gathered from the EPA website (airquality.ie). A monitoring station is based in Cavan Town which monitors PM₁₀ & PM_{2.5} and has been in operation since July 2020. Carrick-on-Shannon lies approximately 48km to the West and measures NO₂, PM₁₀ and PM_{2.5}, Longford Town situated 39km Southwest also has a monitoring station which measures PM₁₀ & PM_{2.5} while Kilkitt station positioned 33km East monitors NO₂. NO₂, PM₁₀ and PM_{2.5} monitoring data recorded for 2021 are shown in Table 12.2.

Table 12.2: Regional ambient levels of air quality pollutants (airquality.ie)

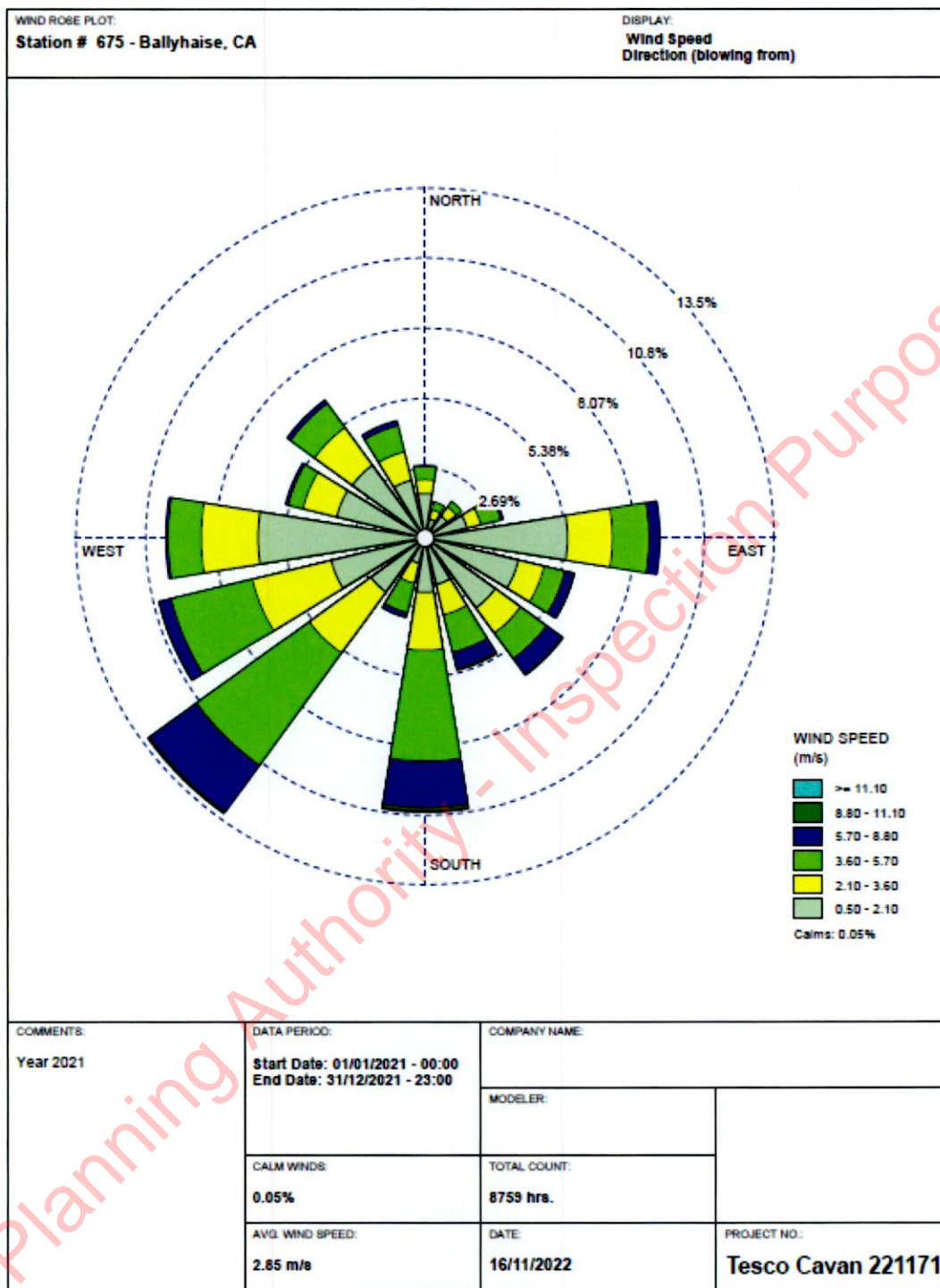
Site	2021 (µg/m ³)		
	NO ₂	PM ₁₀	PM _{2.5}
Cavan Town	-	10.6	7.4
Longford Town	-	13.9	9.4
Kilkitt, Co. Monaghan	2.4	7.8	-
Carrick-on-Shannon, Co. Leitrim	11.2	9.4	5.9
Air quality standard	40	40	25

No exceedances of the air quality standards (AQSs) were recorded at the Cavan Town monitoring site for PM₁₀ & PM_{2.5}. No exceedances of the AQS were recorded at the Kilkitt or Carrick-on-Shannon monitoring sites for NO₂ (which would both be situated in Air Quality Zone D, similar to Cavan Town). Therefore, exceedances of the relevant AQSs at the subject site for these parameters are not expected.

12.4.2 Wind

A key meteorological parameter which influences the dilution and dispersal of airborne contaminants is wind speed and direction. A wind chart reflecting hourly data arising from the Ballyhaise Automatic Weather Station (AWS) is included in Figure 12.3 & Figure 12.4 overleaf.

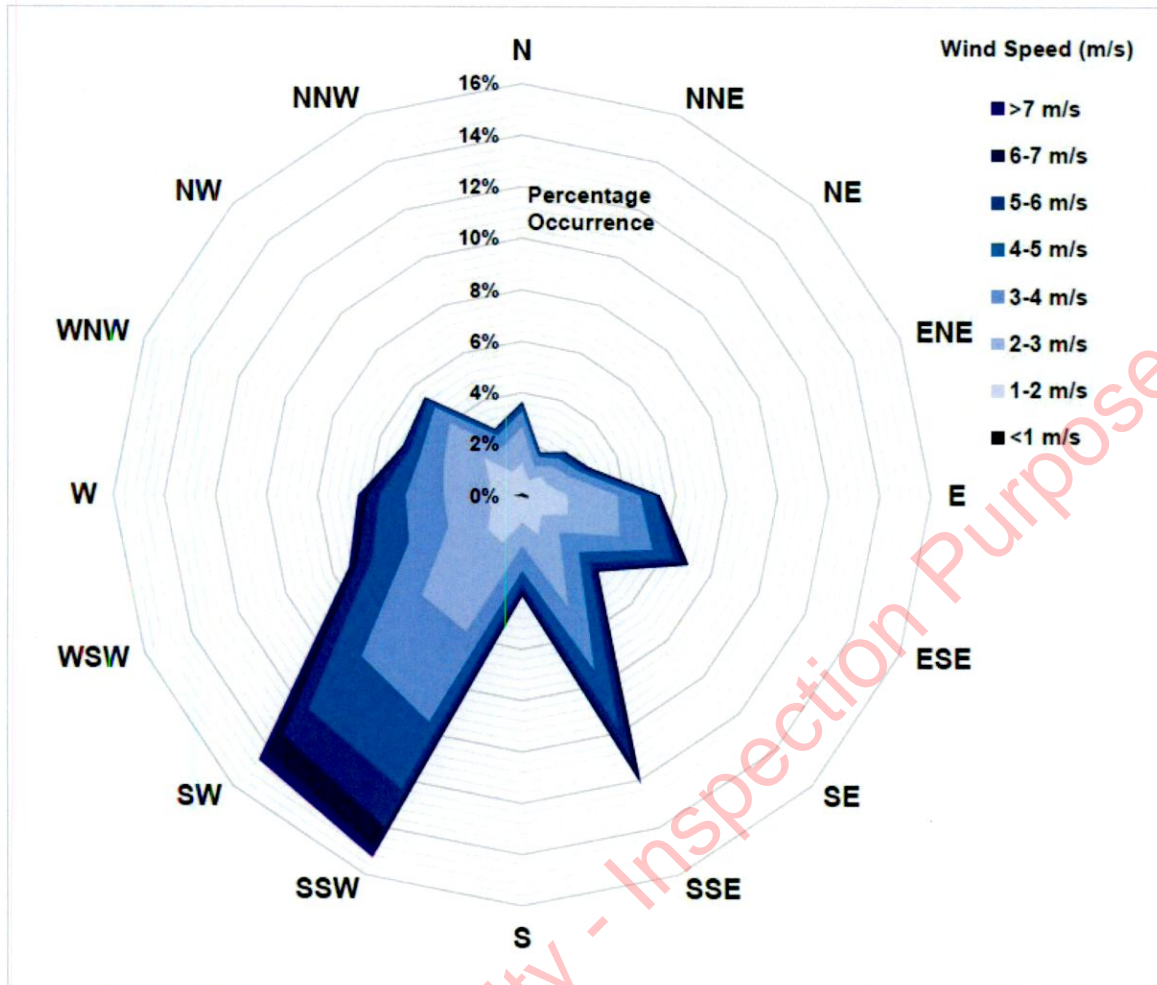
Figure 12.3: Prevailing Wind Direction 2021 Hourly Data (Ballyhaise AWS)



The prevailing wind direction is from South-West.

Average wind speed for the monitoring period in 2021 was 2.85 m/s with the highest wind speed (11.8 m/s) recorded on the 23rd of February and the lowest wind speed (below detection) recorded for days in August and October.

Figure 12.4: Wind Rose for Ballyhaise Weather Station 2003 - 2022



12.4.3 Climate

Climate change, or global warming, arises from the emission of excessive greenhouse gases such as carbon dioxide (CO₂) into the atmosphere. Some of the effects will be disruptive, affecting whole ecosystems, our biodiversity and food systems, with consequences for human welfare and health. Changing weather patterns and more extreme weather events will put property and livelihoods at risk and place new demands on our infrastructure, our water supplies, and how we manage our urban and rural environments.

The expected climate change effects for Ireland are:

- Average annual temperature to increase, milder winters, and a longer growing season.
- Average spring and summer rainfall to reduce, with extended dry periods.
- More frequent heavy rainfall in autumn and winter.
- A changed biodiversity: Some plant and animal species may not adapt in time.

Ireland at present experiences a maritime climate, with prevailing south-westerly winds hailing from the Atlantic Ocean. Maritime climates experience generally cool summers and mild winters, with a much

smaller annual temperature range. The influence of maritime conditions decrease with distance from the Atlantic Coast.

The nearest meteorological station to the planned development site that has a substantial record of data is Clones, an inland monitoring station. Weather monitoring ceased at the Clones meteorological station in 2007. **Table 12.3** displays the average observed climate data for this site 1978 – 2007 available on the Met Eireann website (<https://www.met.ie/climate/30-year-averages>).

Table 12.3: Baseline Climatic Conditions (Clones Monitoring Station, 1981 – 2007)

Month	Max. temp. (°C)	Min. temp. (°C)	Days of air frost (days)	Daily sunshine (hours)	Rainfall (mm)	Days of rainfall ≥1 mm (days)	Monthly mean wind speed (knots)
January	7.2	1.6	9.4	1.5	87.6	15	9.2
February	7.8	1.6	8.5	2.2	71	12	9.4
March	9.7	3	5	3	84	15	9.4
April	12.1	4.2	2.5	4.6	61.6	12	7.9
May	15.1	6.5	0.4	5.6	63.4	12	7.2
June	17.4	9.5	0	4.6	70.9	12	6.7
July	19.2	11.4	0	4.4	70.8	13	6.3
August	18.8	11.1	0	4.2	88.7	13	6.3
September	16.6	9.2	0	3.6	76.2	13	7
October	13.1	6.6	1.1	2.8	102.7	15	7.8
November	9.8	3.9	4.2	1.8	85.1	14	8.2
December	7.6	2.3	7.4	1.2	98.4	15	8.7
Annual	12.9	5.9	38.4	3.3	960.4	161	7.8

The climate data derived from the Clones meteorological station reveals that during the monitoring period, the wettest months within the region tend to be from October to January. High levels of precipitation during these months provides a dampening effect for potential air emissions, lessening a pathway between sources and potential receptors.

12.4.5 Air Policy Objectives

EU & National Policy Objectives

Ireland ratified the Gothenburg Protocol at the 1979 UN Convention on Long Range Transboundary Air Pollution. The European Union directive on ambient air quality assessment and management came into effect in September 1996 96/62/EC and describes the policy framework for 12 air pollutants identified to have harmful effects on human health and the environment. Air quality limit levels (i.e. ambient

pollutant concentrations not to be breached), for the pollutants are described through a series of daughter directives. The first daughter directive, 1990/30/EC, sets limit values for NO₂, amongst other pollutants, in ambient air. Following the daughter directives, EU council directive 2008/50/EC came into effect in June 2008, combining the existing air quality legislation. Directive 2008/50/EC was transposed into Irish national legislation in 2011 through the Air Quality Standards Regulations 2011. The directive consolidated the four daughter directives and one council decision into a single directive on air quality. The new directive also introduced a new limit value for fine particulate matter, PM_{2.5}, but does not alter the existing air quality standards.

National emission reduction obligations defined targets for the main air pollutants to be attained in 2020 and into the future and to also contain emission reduction obligations for PM_{2.5}. In relation to Ireland, 2020 emission targets are 25 kt for SO₂ (65% below 2005 levels), 65 kt for NO_x (49% reduction), 43 kt for VOCs (25% reduction), 108 kt for NH₃ (1% reduction) and 10 kt for PM_{2.5} (18% reduction). The National Emissions Ceiling Directive (NECD - European Commission Directive 2001/81/EC) also proposed the same limit values as the Gothenurg Protocol (1999).

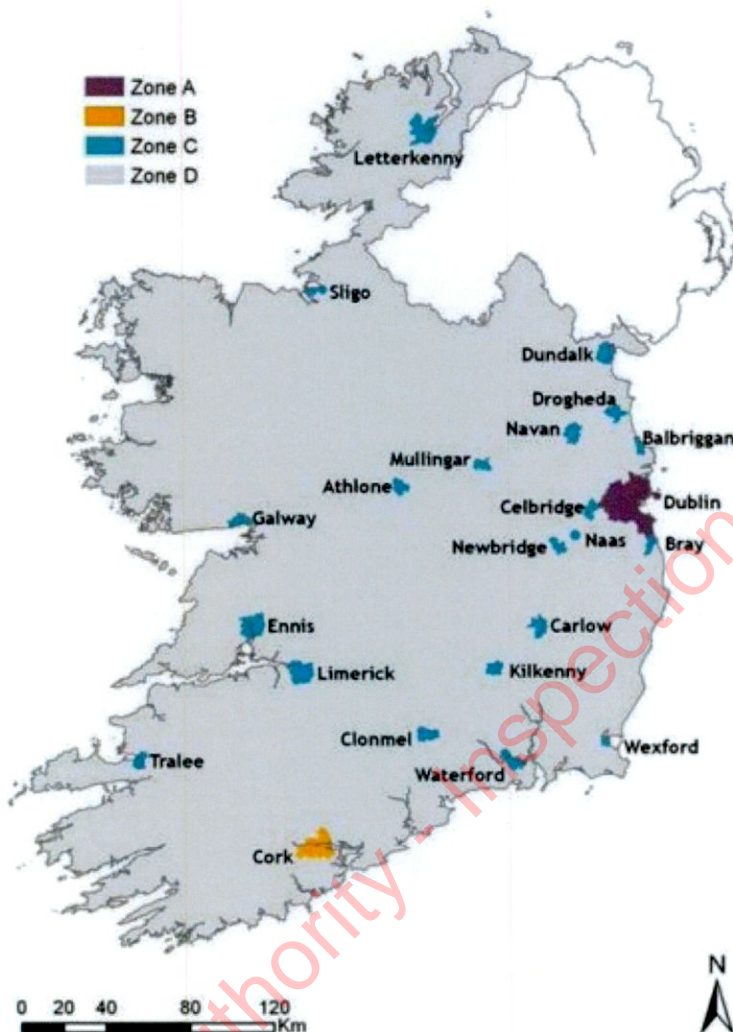
On a national level, the Air Pollution Act (1987) is the main legislation concerning air quality in Ireland and defines the process by which local authorities can take steps which are deemed necessary to manage air pollution appropriately.

As described above, the Air Quality Standards Regulations transpose Directive 2008/50/EC into Irish law. Limit values for various pollutants in ambient air are described in these regulations. With regard to this project/development the ambient background pollutant levels deemed applicable for human health and the environment in terms of annual mean concentrations for NO₂, PM_{2.5} and PM₁₀ are described below:

- NO₂ – 40 µg/m³
- PM₁₀ – 40 µg/m³
- PM_{2.5} – 25 µg/m³

It is also important to note that 4 air quality zones have been established in Ireland for evaluation and management purposes. Dublin is categorized as Zone A and Cork as Zone B. Zone C consists of 23 towns with a population of greater than 15,000. The remainder of the country, which denotes rural Ireland but also includes all towns with a population of less than 15,000, is defined as Zone D. The development site lies within Zone D.

Figure 12.5: Air Framework Directive Zones (EPA, Air Quality in Ireland Report 2016)



Local Policy Objectives

A review of the draft Cavan County Development Plan (2022 – 2028) was carried out to determine the policies and objectives relevant to the improvement of air quality throughout the region.

Air Quality Development Objectives:

AQ 01 - Promote the preservation of best ambient air quality compatible with sustainable development in accordance with the EU Ambient Air Quality and Cleaner Air for Europe (CAFE) Directive (2008/5/0/EC) and ensure that all air emissions associated with new developments are within Environmental Quality Standards, as set out in the Air Quality Standards Regulations 2011 (S.I. No. 180 of 201) (or any updated/superseding documents).

12.4.6 Climate Policy Objectives

EU & National Policy Objectives

Ireland ratified the United Nations Framework Convention on Climate Change in April 1994 and the Kyoto Protocol in principle in 1997 and formally in May 2002. For the purposes of the European Union burden sharing agreement under Article 4 of the Kyoto Protocol, in June 1998, Ireland agreed to limit the net growth of the six Greenhouse Gases under the Kyoto Protocol to 13% above the 1990 level over the period 2008 to 2012.

The UNFCCC is continuing detailed negotiations in relation to GHGs reductions and in relation to technical issues such as Emission Trading and burden sharing. The most recent Conference of the Parties to the Convention (COP27) took place in Sharm El-Sheikh, Egypt from the 6th to the 18th November 2022 and focussed on advancing the implementation of the Paris Agreement. The Paris Agreement was established at COP21 in Paris in 2015 and is an important milestone in terms of international climate change agreements. The “Paris Agreement”, agreed by 200 nations, has a stated aim of limiting global temperature increases to no more than 2°C above pre-industrial levels with efforts to limit this rise to 1.5°C. The aim is to limit global GHG emissions to 40 gigatonnes as soon as possible whilst acknowledging that peaking of GHG emissions will take longer for developing countries. Contributions to greenhouse gas emissions will be based on Intended Nationally Determined Contributions (INDCs) which will form the foundation for climate action post 2020.

The EU, on the 23rd/24th of October 2014, agreed the “2030 Climate and Energy Policy Framework”. The European Council endorsed a binding EU target of at least a 40% domestic reduction in greenhouse gas emissions by 2030 compared to 1990. The target will be delivered collectively by the EU in the most cost-effective manner possible, with the reductions in the Emission Trading Scheme (ETS) and non-ETS sectors amounting to 43% and 30% by 2030 compared to 2005, respectively. Secondly, it was agreed that all Member States will participate in this effort, balancing considerations of fairness and solidarity. The policy also outlines, under “Renewables and Energy Efficiency”, an EU binding target of at least 27% for the share of renewable energy consumed in the EU in 2030.

The Climate Action and Low Carbon Development Act 2015 identifies plans to be drafted and accepted by the Government in relation to climate change for the purpose of a transition to a low carbon, climate resilient and environmentally sustainable economy. The act required the establishment of the Climate Change Advisory Council and the establishment and approval by the government of a National Mitigation Plan (to be published every five years), National Adaptation Framework and an Annual Transition Statement. The first National Mitigation Plan for Ireland was published in July 2017 and defines the central roles of the key Ministers accountable for the sectors covered by the Plan – Electricity Generation, the Built Environment, Transport and Agriculture. This first Plan defines the initial foundations to be implemented to transition Ireland to a low carbon, climate resilient and environmentally sustainable economy by 2050. The Plan also includes over 100 individual actions for various Ministers and public bodies to take forward.

In addition to the publication of the National Mitigation Plan (DCCA, 2017), the government also publishes a Climate Action Plan, i.e. Climate Action Plan 2021 (Government of Ireland, 2021).

The Climate Action Plan outlines the current status across key sectors including Electricity, Transport, Built Environment, Industry and Agriculture and outlines the various broadscale measures required for each sector to achieve ambitious decarbonisation targets. The Climate Action Plan also details the required governance arrangements for implementation including carbon-proofing of policies, establishment of carbon budgets, a strengthened Climate Change Advisory Council and greater accountability to the Oireachtas.

The national policy position for Climate Change establishes a vision for Ireland of low-carbon by 2050 (80% reduction on 1990 emissions) across the electricity generation, built environment and transport sectors; and in parallel, an approach to carbon neutrality in the agriculture and land use sectors, including forestry.

Monitoring and evaluation is required to ensure measurable progress at county level linked to the Government's Climate Action Plan 2019 – To Tackle Climate Breakdown which includes 183 actions across 12 sectors of Irish society.

Local Policy Objectives

A review of the draft Cavan County Development Plan (2022 – 2028) was carried out to determine the policies and objectives relevant to climate action throughout the region. It was acknowledged in the draft plan that decarbonising society is now a challenge for the planning system. The way energy is used and generated in terms of carbon footprint, management of waste and emissions, and protection of the biosphere, are now sharply in focus. The plan states that this will require a cross-cutting approach across a range of policy areas of the Development Plan. Mitigating and adapting to climate change must be an overarching principle of the Core Strategy.

Climate Change Mitigation Measures:

Climate change mitigation measures listed in the draft plan of relevance to the proposed retail development include the following:

1. Support energy-efficient building design and emission reduction measures.
2. Promote building of energy efficient homes/density appropriate to demographics and with greatest infrastructure provision
3. Promote renewable and low carbon energy
4. Support waste prevention and water conservation measures

Climate Change Adaptation Measures:

Climate change adaptation measures listed in the draft plan of relevance to the proposed retail development include the following:

1. Promote the use of green roofs and natural ventilation.

2. Integrate climate adaptation measures for Protected Structures at risk directly or indirectly as a result of climate change.
3. Provide green infrastructure to provide shade in urban areas
4. Provide building methods and materials to reduce the effects of heat stress

Climate Change Policy Objectives:

CC 01 - Support the implementation and achievement of European, national, regional and local objectives for climate adaptation and mitigation as detailed in the following documents, taking into account other provisions of the Plan (including those relating to land use planning, energy, sustainable mobility, flood risk management and drainage) and having regard to the Climate mitigation and adaptation measures which have been outlined through the policy objectives in this Development Plan:

- Climate Action Plan (2019 and any subsequent versions).
- National Climate Change Adaptation Framework (2018 and any subsequent versions).
- Any Regional Decarbonisation Plan prepared on foot of commitments included in the NWRA RSES.
- Relevant provisions of any Sectoral Adaptation Plans prepared to comply the requirements of the Climate Action and Low Carbon Development Act 2015, including those seeking to contribute towards the National Transition Objective, to pursue, and achieve, the transition to a low carbon, climate resilient and environmentally sustainable economy by the end of the year 2050.
- Cavan County Council Climate Change Adaptation Strategy 2019-2024.

CC 05 - Contribute towards climate mitigation and adaptation, taking into account other provisions of the Plan (including those relating to land use planning, energy, sustainable mobility, flood risk management and drainage).

CC 07 - Provide for a reduction in energy demand and greenhouse gas emissions by providing for consolidated future development which supports sustainable travel patterns in line with the County Core Strategy.

CC 11 - Work in collaboration with the Sustainable Energy Authority Ireland and relevant stakeholders to deliver a number of sustainable energy communities throughout the County.

CC 12 - Incorporate energy efficiency measures, including passive and active solar gain, photovoltaic ready house and smart technology in all new buildings. Aim to ensure all new buildings are zero carbon.

CC 15 - Seek to ensure primacy for transport options that provide for unit reductions in carbon emissions. This can most effectively be done by promoting public transport, walking and cycling, and by actively seeking to reduce car use in circumstances where alternative options are available.

CC 16 - Maintain existing green infrastructure and encourage and facilitate, in consultation with relevant stakeholders, the development of green infrastructure that recognises the synergies that can be achieved with regard to the following:

- Provision of open space amenities.
- Sustainable management of water.
- Protection and management of biodiversity.
- Protection of cultural heritage.
- Protection of protected landscape sensitivities.

CC 18 - Complete a detailed local survey and audit of greenhouse gas emissions for the County in order to effectively target and reduce greenhouse gas emissions in a targeted approach at the County level and support the development of a Regional Inventory of GHG Emissions.

CC 19 - Seek the integration of positive climate change mitigation and adaptation measures in all planning applications.

CC 20 - Support the establishment of a Climate Change Unit in Cavan County Council.

CC 23 - Integrate climate considerations into the design, planning and construction of all construction projects, including roads, bridges, public realm.

CC 24 - Commence preparation a Cavan County Renewable Energy Strategy within 6 months of the adoption of this plan.

12.4.3 Future Climate Conditions

EPA report, High-resolution Climate Projections for Ireland – A Multimodel Ensemble Approach, Report No. 339 details projected future baseline conditions. The report indicates that mid-century mean annual temperatures are predicted to rise by 1.3 – 1.6°C under worse case scenarios and incidences of heatwaves are expected to rise by the middle of the century. The coldest 5% of daily minimum temperatures are projected to rise by 1–2.4°C. Incidences of intense precipitation occurrences are predicted to increase over the year as a whole and in the winter and autumn months, with “likely” predicted increases of 5–19%. The number of extended dry periods (defined as at least 5 consecutive days for which the daily precipitation is less than 1mm) is also projected to increase substantially by the middle of the century over the full year and for all seasons except spring. The projected increases in dry periods are largest for summer.

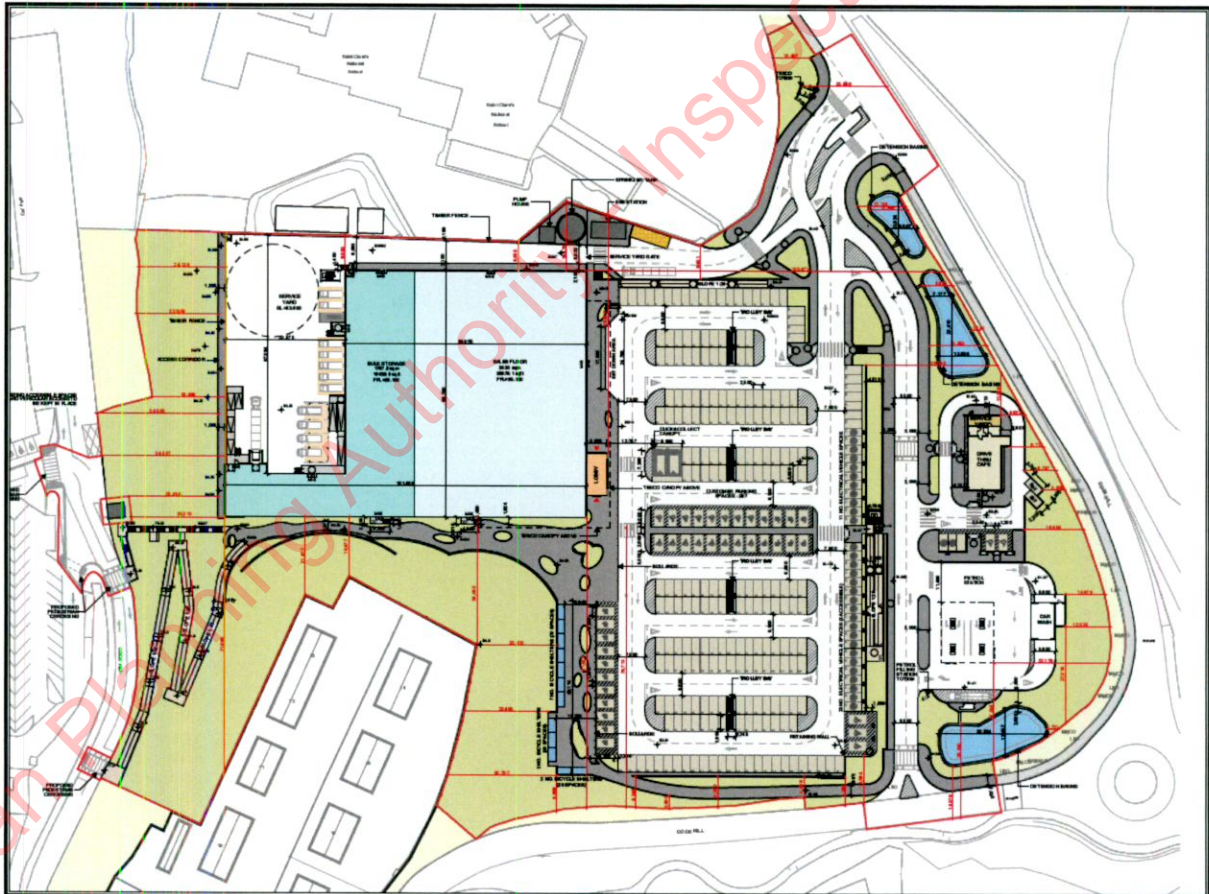
12.5 Characteristics of the Proposed Development

The development will consist of the construction of a single storey retail unit of c. 5,197 sq.m gross floor area (c. 2,194 sq.m convenience net sales area and c. 957 sq.m comparison net sales area) including a licensed alcohol sales area and service yard; a drive thru café unit (c.174 sq.m gross floor area) with external seating and 5 no. car parking spaces and 2 no. set down bay areas; a petrol filling station including car wash/jet wash (c. 89 sq.m), a forecourt canopy (covers c. 255 sq.m. and 4.8m in height); signage including elevational and 2 no. totem signs; 297 no. car parking spaces and 120 no. cycle parking spaces; a "Click and Collect" facility; Grocery Home Shopping delivery vehicle docking area; access points from Cock Hill Road; pedestrian linkages with the Town Centre by way of the provision of a sloped pedestrian walkway and steps on the western boundary of the site with 4 no. pedestrian crossings on Cock Hill Road and; all ancillary site development works, landscaping, fencing, enabling works and site services.

Please refer to **Chapter 2** for the full description of development.

An extract from the planning drawings can be seen in **Figure 12.6**.

Figure 12.6 – Extract from Site Plan (Joseph Doyle Architects)



12.6 Predicted Effects of the Proposed Development

The assessment focuses on predicted effects in relation to air quality and climate. The assessment relates to effects occurring during both the construction and operational phases of the development.

12.6.1 Receptors and Sensitivity

Construction

Regarding the construction stage of the planned development the most likely effect on air quality will be from construction dust emissions (nuisance dust & PM₁₀/PM_{2.5} emissions) associated with activities such as excavations, infilling materials, stock piling and movement of vehicles.

The planned development is deemed moderate in scale and nature and is classified as such with respect to “Potential for Construction Dust Effects (TII, 2011)” therefore there is the potential for significant dust soiling 50m from the construction source (TII 2011) (**Table 12.4**).

Construction dust usually deposits within 200m of a construction area, however the bulk of this deposition will occur within the first 50m. There are a small number (<10) of sensitive receptors (residential receptors) within 50m of the site. Therefore, the surrounding area can be classified as low risk with respect to construction dust effect in this regard. Emission effects from planned construction are finite and short-term, mitigation measures (outlined in **Section 12.6**) will also be in place through this stage leading to air quality effects that will temporary, negligible & short-range.

Table 12.4: Potential for Construction Dust Effects (TII, 2011)

Source		Potential Distance for Significant Effects (Distance From Source)		
Scale	Description	Soiling	PM10	Vegetation Effects
Major	Large construction sites, with high use of haul roads	100m	25m	25m
Moderate	Moderate sized construction sites, with moderate use of haul roads	50m	15m	15m
Minor	Minor construction sites, with limited use of haul roads	25m	10m	10m

IAQM (2014) conditions described in **Appendix 12.1** were also considered, these detail how the estimation of dust emission magnitudes (prior to mitigation) for demolition (not required at this site), earthworks, construction and track out actions which are shown in **Table 12.5** were completed.

Table 12.5 Summary of Dust Emissions Magnitudes (Before Mitigation).

Activity	IAQM Criteria	Dust Emission Magnitude
Earthworks	Total site area where earthworks may occur is >10,000m² Undeveloped land –soil type may include potentially dusty soil	Medium

	<p>The number of heavy earth moving vehicles active at any one time is estimated to be approximately 5-10</p> <p>The height of bunds on site will be 4-8m</p> <p>The total material to be moved is estimated to be <20,000 tonnes</p> <p>Earthworks may occur in both wet and dry months.</p>	
Construction	<p>Total building volume will approximately be <25,000m³.</p> <p>Construction materials are expected to be potentially dusty.</p> <p>On-site concrete batching are not expected to be proposed.</p>	Medium
Trackout	<p>Number of heavy vehicles per day out of the site is estimated to be 10-50</p> <p>Vehicle may travel on unpaved roads 50-100m</p> <p>The surface type of the site has the potential to be dusty</p>	Medium

According to IAQM construction dust guidance the following factors are considered with regard to sensitivity of an area:

- The sensitivity of specific receptors in the locality;
- The quantity and location of the receptors;
- With regard to the human health assessment, the areas background annual mean PM10 concentration; and
- Site specific factors, such as whether there are natural shelters, such as trees, to reduce the risk of wind-blown dust.

Human and ecological receptors are assessed against the potential effect from the associated construction of the development and HGV routes which could generate trackout. It is expected that site traffic will access/egress the site Cock Hill Rd. on the NE site boundary.

Table 12.6 describes the established sensitivity of the locality with the factors specified that guided the assessment (please refer to Appendix 12.1 for more information). Construction activities are applicable up to 350m from the planned development site boundary, however trackout actions are only deemed applicable 50m from the periphery of the route and up to 500m from the exit of the site (for larger sites), in accordance with IAQM construction dust guidance. Online NPWS (National Parks and Wildlife Services) databases were used to locate sensitive ecological receptors in the vicinity of the planned development. Human receptors were determined by referring to online satellite imagery (see Figure 12.2).

Table 12.6 Sensitivity of the area

Potential Effect		Sensitivity of the surrounding area		
		Earthworks	Construction	Trackout
Dust soiling	Receptor sensitivity	High	High	High

	Number of receptors	1-10	1-10	1-10
	Distance from the source	<20m	<20m	<20m
	Overall Sensitivity of the Area	Medium	Medium	Medium
Human health	Receptor sensitivity	High	High	High
	Number of receptors	1-10	1-10	1-10
	Distance from the source	<20m	<20m	<20m
	Overall Sensitivity of the Area	Low	Low	Low
Ecological	Receptor sensitivity	N/A		

According to the National Parks and Wildlife Services website (<https://www.npws.ie/>) there are no ecologically designated sites (Special Protection Areas, Special Areas of Conservation or Natural Heritage Areas) within 50 m of the site boundary or potential routes along which trackout could arise therefore construction dust would not have an effect on any ecological receptors.

Construction - Risk of Effects

The dust emission magnitude described in **Table 12.5** has been merged with the sensitivity of the area in **Table 12.6** to establish the risk of effects of construction activities before mitigation. These have been assessed considering risk categories of each activity in **Appendix 12.1**.

Dust risk effects from construction activities are classified as varying between low and medium risk, as is shown in **Table 12.7**. Mitigation measures to decrease construction phase effects are defined based on this assessment in **Section 12.6**.

Table 12.7 Summary of Dust Risk from Construction Activities

Potential Impact	Dust Risk Impact		
	Earthworks	Construction	Trackout
Dust soiling	Medium risk	Medium risk	Low risk
Human health	Low risk	Low risk	Low risk

12.6.2 Do-Nothing Scenario

The Do-Nothing scenario relates to the preservation of the current site with no planned development occurring. In this situation, air quality will continue as per the baseline levels described in Section 12.4 and will alter with respect to changes in the local & wider area (this includes but is not limited to: affects

from new potential developments, road layout / traffic patterns, upgrades/developments to vehicle technology etc.). Considering this, the do-nothing scenario can be deemed neutral in terms of air quality and climate.

Based on the data compiled during the desk study, and the resulting air emissions risk assessment it was concluded that the concentration of contaminants of concern, arising because of the proposed development are not significant.

Construction Traffic Emissions

To remain as conservative as possible traffic emissions with regard to construction were assessed also. Emissions associated with construction traffic can affect local air quality. In particular, the proposed routes used for deliveries and any sensitive receptors that line these routes may experience effects to local air quality.

The potential effect of construction traffic associated with this proposal was estimated as a worst case Annual Average Daily Traffic (AADT) scenario of 200 (which is approximately 2 to 4 times the expected peak AADT to assume worst case potential effect) with a mean traffic speed of 20km/hr. Effects associated with construction traffic will be negligible as can be observed in **Table 12.8**.

Table 12.8 Projected construction traffic concentration contribution

Link Location	Carbon monoxide Annual mean (mg/m ³)	Benzene Annual mean (µg/m ³)	Oxides of nitrogen Annual mean (µg/m ³)	Particulate Matter 10µm Annual mean (µg/m ³)	Days > 50 (µg/m ³)
Worst case receptor 3m from road centreline on any road	< 0.003	< 0.0003	<0.7	<0.14	0

12.6.3 Construction Phase – Air Effects

According to IAQM guidance designating significance of site activities without mitigation is not recommended, the ‘negligible’ category does not require mitigation. For the purposes of this EIAR chapter & to assess significant effects correctly, negligible, low, medium & high risk will represent slight, moderate & significant levels of significance, as shown in **Table 12.9** below.

Table 12.9 Air quality effects (Construction Stage)

Risk (IAQM)	Significance (EPA)
High	Significant, Very Significant, Profound
Medium	Moderate
Low	Slight
Negligible	Not significant, Imperceptible

Where appropriate dust management measures and construction stage mitigation methods are in place it is predicted that all construction effects would not be significant. Possible climate change effects are considered not significant and appropriately mitigated during the construction stage. Hence, residual effects are not significant when appropriate mitigation measures are utilized.

12.6.4 Operation Phase - Air Effects

LA105 DMRB guidance gives details for assessing significance of air quality effects of a development in relation to nitrogen dioxide (NO₂) and particulate matter (PM₁₀). **Table 12.10** below describes the corresponding terms used to describe the level of significance from the DMRB in conjunction with EPA EIAR guidance.

Table 12.10 Air quality effects (Operational Stage)

Magnitude of change in annual mean NO ₂ or PM ₁₀ (µg/m ³)	Magnitude (DMRB)	Significance (EPA)
>4 (>10%)	Large	Significant, Very Significant, Profound
>2 (>5%)	Medium	Moderate
>0.4 (>1%)	Small	Slight
<0.4 (<1%)	Negligible	Not significant, Imperceptible

Applicable air quality standards are not expected to be breached at the planned development during operation. Traffic input data (supplied by SYSTRA Limited) is included in Appendix 12.2. The DMRB Screening Method spreadsheet was used to forecast pollution concentrations at 3 receptor positions (see Appendix 12.3 for more detail). A robust and conservative approach was utilized when assuming background concentrations where it was assumed that site was comparable to Carrick-on-Shannon (11.2 µg/m³ for NO₂) and Longford Town (13.9µg/m³ for PM₁₀ and 9.4 µg/m³ for PM_{2.5}). **Table 12.11** shows the results of “Do Minimum” (DM) & “Do Something” scenarios for 2025 assuming (as a worst case scenario), receptors are 3m away from road links and 5% of the total AADT is comprised of HGVs.

Table 12.11 Projected NO₂ and PM₁₀ traffic concentrations

Receptor	NO ₂				PM ₁₀			
	DM (µg/m ³)	DS (µg/m ³)	Change (µg/m ³)	Magnitude	DM (µg/m ³)	DS (µg/m ³)	Change (µg/m ³)	Magnitude
R1	13.6	13.8	0.2	Negligible	14.7	14.8	0.1	Negligible
R2	16.1	16.3	0.2	Negligible	15.7	15.8	0.1	Negligible
R3	14.0	14.5	0.5	Small	14.9	15.1	0.2	Negligible

12.6.5 Operational Phase – Climate Effects

The planned development will produce GHG emissions during operation due to the necessity to heat, cool and power the buildings relying on mains power to do so. An approximation of the planned developments annual energy requirement has been projected to be 2,160kWh/yr. As per SEAI data conversion factors, the emission factor for CO₂ per unit of energy for electricity (2021) is 345.8 gCO₂/kWh. The factor has been used in conjunction with the developments annual energy requirement as shown in **Table 12.12**.

Table 12.12 Estimated Operational Phase GHG Emissions from Energy

Parameter	Value
Annual energy demand of development	2,160 kWh
GHG Emissions	746,928 gCO ₂ eq / 0.746tCO ₂ eq

The proposed development will increase CO₂ emissions by 0.0000019% of Ireland's EU 2020 emissions target for CO₂ (37,651,000 t/annum) and 0.0000022% of the 2030 target (32,860,000 t/annum). Therefore, the impact of the proposed development on national GHG emissions is not significant in terms of Ireland's obligations under the EU 2020 target.

The effect of the planned developments traffic emissions of CO₂ were evaluated also by way of the DMRB screening spreadsheet (see **Table 12.13**). The output from the screening model shows that the effect of the planned development will be to raise CO₂ emissions by <0.001% of Ireland's EU 2020 and 2030 emission objectives for CO₂. Therefore, the effect of the planned development on Ireland's GHG emissions is considered insignificant with regard to national commitments under the EU 2020 objectives.

Table 12.13 Predicted CO2 traffic concentrations

		CO2	
DM (tonnes/annum)	DS (tonnes/annum)	Change (tonnes/annum)	Magnitude and significance
559	631	72	0.0002% (2024 target, negligible, not significant) 0.0002% (2030 target, negligible, not significant)
Ireland's 2024 emissions target			40,113 kilotonnes/annum
Ireland's 2030 emissions target			33,381 kilotonnes/annum

Target emissions taken from Regulation (EU) 2018/842 of the European Parliament and of the Council of 30 May 2018 on binding annual greenhouse gas emission reductions by Member States from 2021

to 2030 contributing to climate action to meet commitments under the Paris Agreement and amending Regulation (EU) No 525/2013

GHG emissions will also be generated as a result of other operational activities such as mains water consumption, wastewater treatment and the transport and treatment of waste, emissions from such sources are likely to be small compared to emissions from energy consumption. Therefore, these other activities are excluded from the assessment.

Potential Climate Effects

The following relate to climate change mitigation and adaptation:

- Heightened temperatures could have a favourable effect during winter construction by improving working conditions, construction productivity and reducing health and safety risks linked with snow and ice;
- Heightened summer temperatures could have negative effects, posing potential health and safety risks linked with heat exposure and dehydration;
- Reduced summer rainfall may effect water supplies;
- Heightened temperatures may have a favourable effect during the development's operational phase by reducing space heating demand and associated GHG emissions. However, increased temperatures may have a negative effect by increased cooling demand and the associated GHG emissions;
- Heightened rainfall leading to increased flooding risks;
- Greater GHG emissions from construction and operational phase plant and vehicles.

The anticipated total magnitude of change on climate is not significant, negative and long-term. A flooding risk can be initiated by an increased or altered pluvial (rainfall) intensity. However, a flood risk assessment has been carried out as part of the planning application and processes to relieve these potential flooding conditions have been included as part of the design stage.

It is anticipated that the development will not have a significant effect on local air quality, with residual effects of the development also deemed to be adequate regarding air quality during operation. Climate change effects are also considered not significant. To remain as conservative and robust as possible best practice processes have been suggested to reduce the effect of the development on air quality nonetheless.

12.7 Mitigation Measures

The continuous management of fugitive dust will inhibit significant emissions and counteract unsuccessful attempts to mitigate dust once it has been created. The assigned vendor will be responsible for the control and ongoing monitoring of the dust management plan throughout the entire construction period. The aim of dust management is to safeguard against significant dust nuisance. To achieve a transparent and regulated approach, the following managed plan has been developed, this is guided by best practice from Ireland Ireland, the UK (IAQM 2014, BRE 2003, Scottish Office 1996 and UK ODPM 2002). and the USA (USEPA 1997).

12.7.1 Construction Phase

Site Dust Management Plan

The aim is to provide appropriate site supervision by inhibiting dust to develop to unsuitable airborne levels at source. This is to be accomplished by appropriate site strategy and well known/established control procedures.

Throughout the construction planning stage, the location of activities and storage piles will acknowledge and recognise nearby sensitive receptors/locations and existing prevailing winds to inhibit the chance of significant dust nuisance/soiling (see **Figure 12.3** for windrose for Ballyhaise Meteorological Station).

The prevailing wind is mainly southerly to south-westerly therefore construction compounds and storage piles should be located downwind of sensitive receptors/locations to decrease the likelihood for nuisance dust to affect/occur at sensitive receptors.

Suitable site supervision will involve the capacity to respond to unfavourable weather conditions by restricting construction activities on-site or by immediate effective control measures prior to the likelihood of nuisance incidences.

Throughout periods where rainfall greater than 0.2mm/day, dust generation is generally suppressed (BRE 2003, UK ODPM 2002). The likelihood for significant dust incidences is also connected to threshold wind speeds greater than 10 m/s (19.4 knots) (at 7m above ground) to displace loose material from storage piles and other exposed materials (USEPA 1986). Due care should be integrated into site works during periods of high wind as these are times where the possibility for significant dust emissions is highest. The prevailing meteorological conditions in the site locality are favourable for dust suppression on average for the majority of an average meteorological year. However, there will be instances where due diligence will be necessary to ensure dust nuisance events are not experienced.

Below details examples of the methods that shall be used during periods of unfavourable meteorological events:

- Contractors shall have good site management procedures throughout the construction works to avoid the creation of airborne dust. Contractors are obliged to guarantee that sufficient preventive measures to limit dust generation are employed through suitable method statements, accounting for the risks and mitigation measures described in the CEMP;

- Throughout working hours, dust control procedures will be assessed as appropriate, subject to the prevailing meteorological conditions;
- The name and contact details of an appropriate person to contact concerning air quality and dust issues shall be exhibited on the site boundary, this notice board should also detail head/regional office contact details;
- It is advisable that community engagement commence before works begin on site describing the nature and duration of the works to local residents and businesses.
- Where complaints are received concerning dust, records will be maintained including likely causes and suitable action taken to alleviate any issues as a result of the construction. During the management of any complaints this will be in agreement with a suitable Complaints Procedure.
- During activities which pose a high probability of dust production and/or during periods of adverse weather conditions the rate of site inspections should be increased.
- Site inspections will be completed frequently to monitor compliance with dust control strategies set out in the CEMP and the results recorded of these inspections, including nil returns.
- The dust reduction strategies should be evaluated at regular intervals during the project to preserve the effectiveness of the techniques employed and to safeguard the minimisation of dust using best practice and procedures. In the event of dust spoiling/nuisance occurring beyond the boundary of the site, site activities will be assessed, and suitable measures utilized to negate the nuisance. Outlined dust mitigation measures to be employed are described below.
- Create and employ a stakeholder communications plan that includes community relations before work begins on site.
- Fully enclose certain operations, where possible, when there is a high possibility for dust generation.
- Prevent site runoff of water or mud.
- Keep site barriers and fencing clean using watering procedures.
- Get rid of materials that have the capability to produce dust from site immediately, unless being reused on site.
- Prevent the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where possible.
- Use cutting or grinding equipment fitted with suitable dust suppression techniques such as water sprays or local extraction.
- Make certain an adequate water supply is available on the site for effective dust/particulate matter suppression/mitigation.
- Use enclosed shoots and conveyors and covered skips.
- Reduce drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever possible.
- Make certain 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.
- Strictly no bonfires or burning of waste materials on site.

Site Roads / Haulage Route

Construction HGV/truck activities on site roads (especially unpaved roads) can be a substantial source of fugitive dust if suitable control measures have not been applied. The use of speed restrictions is commonly the most effective way of suppressing dust on unpaved haul roads. Various studies have proven that this method can have an effectiveness varying from 25 to 80% (UK ODPM 2002):

- A speed limit of 15km/hr will be applied as an effective control measure for dust for on-site vehicles utilizing unpaved road surfaces.
- Entrance gates should be located at a minimum 10m from local sensitive receptors as much as is reasonably practical/possible.
- Watering of the site will be utilized during periods of prolonged dry weather to ensure unpaved or areas associated with problematic dust are kept moist. Frequency of watering will be dependent on weather conditions, vehicle activity and soil type, dust suppression such as sprinklers, bowsers etc. should be available during the construction phase.
- A road sweeper will be applied as required to control mud and dust on the roads.
- All vehicles must switch off engines once stationary i.e. no idling vehicles on site.
- Use water aided dust sweepers on the access and local roads to eliminate dust/mud as required.
- Vehicles entering and leaving sites must be covered to prevent dusty emissions from materials during transport.
- Document all inspections of haul roads and any follow-up action in a site logbook.
- Employ a wheel washing system with rumble grids to remove collected dust and mud prior to leaving the site where reasonable.
- Sand and other aggregates must be stored in bunded areas and are not allowed to dry out and become airborne, unless this is required, in which case ensure that appropriate additional control measures are in place.
- Bulk cement and other fine powder materials must be delivered in covered tankers and stored in silos with suitable control systems to negate escape from material and overfilling during delivery.

Land Stripping / Earth Moving

Land stripping / earth-moving works throughout periods of high winds and dry weather conditions can be a significant cause of dust.

- Throughout dry and windy periods, and when there is a possibility of dust nuisance, watering shall be performed to ensure moisture content of materials being relocated is high enough to increase the stability of the soil and thus suppress dust.
- During times of very high winds (gales), actions likely to generate significant dust emissions should be rescheduled until the gale has receded.
- Revegetate earthworks and exposed areas/soil stockpiles to stabilize surfaces as soon as practicable
- Use hessian mulches where it is not possible to revegetate or cover with topsoil, as soon as is practicable

- Only remove covers in small areas during work and not all at once.

Storage Piles

The position and moisture content of storage piles are key factors which determine their capacity for dust emissions. The below measures shall be utilized to minimise fugitive dust formation from storage piles:

- Overburden material shall be shielded from exposure to wind by storing the material in sheltered regions of the site. Where possible storage piles should be positioned downwind of sensitive receptors.
- Adequate watering will take place to ensure the moisture content is high enough to suppress dust. The watering of stockpiles has been found to have an 80% control efficiency (UK ODPM 2002).
- Plan site layout so that machinery and dust causing activities including stockpiling are located away from receptors, as far as is possible.
- Erect solid screens or barriers around dusty activities or the site boundary which are at least as high as any stockpiles on site. she

Site Traffic on Public Roads

Escape of debris, aggregates and fine material onto public roads should be decreased to a minimum by utilizing the following measures:

- Vehicles delivering or collecting material with capacity for dust emissions shall be covered with tarp always, to limit the blow-off of dust.
- A wheel wash facility should be installed near the entrance of the construction site, where feasible. All trucks leaving the site must pass through the wheel wash. In addition, public roads outside the site shall be regularly inspected for cleanliness, as a minimum daily, and cleaned as necessary.

Summary of Dust Mitigation Measures

The constant control of fugitive dust will maintain the prevention of significant emissions, instead of an inefficient attempt to manage them once they have been released. The main elements with respect to control of dust will be:

- The design of a site policy on dust and the allocation of the site management responsibilities for dust issues.
- The creation of a documented system for managing site practices regarding dust control.
- The development of a method by which the functionality of the dust minimisation plan can be consistently monitored and assessed; and
- The requirement of effective procedures to handle any complaints.

These procedures will be strictly monitored and assessed continuously throughout the construction stage. In the occurrence of dust nuisance outside the site boundary, activities likely to raise dust would be restricted and adequate procedures applied to resolve the problem before the recommencement of construction operations.

Climate and Regional Air Quality

Various site-specific mitigation methods can be applied throughout the construction stage of the proposed development to support emissions reduction. The restriction of on-site or delivery vehicles from leaving engines idling, even over brief periods. Reducing waste of materials due to inadequate timing or over stocking of materials on site will assist to minimise the carbon footprint of the site.

Traffic

Traffic emissions associated with site have been projected as not significant therefore no detailed mitigation/remediation related to air and climate emissions from traffic have been described.

12.7.2 Operational Phase - Process Emissions

The planned development is not expected to have a significant effect on local air quality, and the residual effects of the development on air quality during operation are expected to be suitable. Throughout the operational phase, likely climate change effects are considered to be not significant. Best practice techniques measures have been recommended nonetheless to minimise the effect of the development on the air quality.

12.8 Monitoring

Given the scale of the proposed development monitoring of air emissions is deemed surplus to requirements during the construction phase. The mitigation measures proposed in **section 12.7** should provide sufficient management of impacts to local air quality.

No point source emissions to air are proposed within the development hence monitoring of air quality during the operational phase is not required.

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12.9 Residual Effects

Residual Effect are described as ‘the degree of environmental change that will occur after the proposed mitigation measures have taken place according to Environmental Protection Agency guidelines. Mitigation procedures described above advise actions which can be undertaken to counteract or reduce the significance, scale and extent of the effects surrounding air quality or climate.

The goal of this assessment is to identify mitigation measures where suitable to reduce the ‘risk factor’ to all facets of air quality such as to decrease the potential for air quality limits to be breached etc. This associated ‘risk factor’ is decreased or negated by proposing the operation of a mitigation strategy in each area of the study. On the realization of this mitigation strategy, the potential for effect will be reduced.

A CEMP specific to the site will be developed and employed during the construction phase. This document will include all the required processes required to negate and minimise any environmental risks caused by the development on the surrounding environment.

12.9.1 Construction Phase

A summary of the predicted effects related to the construction stage in terms of quality, significance, and extent, along with the proposed mitigation methods and resulting residual effects are described in **Table 12.14**.

The overall effect expected by the construction phase of the project following the implementation of suitable mitigation measures is considered to be **negative, imperceptible to slight, and temporary**.

12.9.2 Operational Phase

A summary of the predicted effects related to the operation stage in terms of quality, significance, and extent, along with the proposed mitigation methods and resulting residual effects are described in **Table 12.15**.

The overall effect anticipated by the operation phase of the project following the implementation of suitable mitigation measures is considered to be **neutral to negative, imperceptible to slight, and temporary to short term**.

Table 12.14: Summary of predicted construction phase effects, mitigation measures and residual effect

Potential Source	Environmental Receptor	Effect Description	Quality	Significance	Duration	Mitigation	Residual Effect
Fuel Storage	Site personnel/local environment/local receptors	Fumes released to the environment	Negative	Slight	Temporary	<ul style="list-style-type: none"> Temporary Fuels used during construction will be stored in sealed containers. 	Negative, Imperceptible, Temporary
Stockpiling	Site personnel/local environment/local receptors	Dust from stockpile leaving site boundary into nearby properties/amenities or local roads	Negative	Significant	Temporary	<ul style="list-style-type: none"> At the construction planning stage, the siting of activities and storage piles will take note of the location of sensitive receptors and prevailing wind directions in order to minimise the potential for significant dust nuisance. During dry and windy periods, and when there is a likelihood of dust nuisance, watering shall be conducted to ensure moisture content of materials being moved is high enough to increase the stability of the soil and thus suppress dust 	Negative Moderate, Temporary
Use of heavy plant / multiple plant use	Site personnel, air pollution, local receptors	Air emissions	Negative	Slight	Temporary	<ul style="list-style-type: none"> The Contractor must monitor performance of plant and machinery to ensure that the proposed mitigation measures are implemented and that dust effects and nuisance are minimised. The prevention of on-site or delivery vehicles from leaving engines idling, even over short periods. 	Neutral, Not significant Temporary
Topsoil stripping	Site personnel/local environment/local receptors	Dust leaving site boundary into nearby local receptors/amenities	Negative	Significant	Temporary	<ul style="list-style-type: none"> During working hours, dust control methods will be monitored as appropriate, depending on the prevailing meteorological conditions. During periods of very high winds (gales), activities likely to generate significant dust emissions should be postponed until the gale has subsided. 	Negative, Moderate Temporary

Potential Source	Environmental Receptor	Effect Description	Quality	Significance	Duration	Mitigation	Residual Effect
Construction and operation of compound buildings and amenities	Site personnel/local environment/local receptors	Dust leaving site boundary into nearby local receptors/amenities	Negative	Slight	Temporary	<ul style="list-style-type: none"> Overburden material shall be protected from exposure to wind by storing the material in sheltered regions of the site. Where possible storage piles should be located downwind of sensitive receptors. Sufficient watering will take place to ensure the moisture content is high enough to suppress dust. Implementation of Construction Environmental Management Plan. The specification of a site policy on dust and the identification of the site management responsibilities for dust issues. The development of a documented system for managing site practices with regard to dust control. The development of a means by which the performance of the dust minimisation plan can be regularly monitored and assessed. The specification of effective measures to deal with any complaints received. The name and contact details of a person to contact regarding air quality and dust issues shall be displayed on the site boundary, this notice board should also include head/regional office contact details site. A complaints register will be kept on site detailing all telephone calls and letters of complaint received in connection with dust nuisance or air quality concerns, together with details of any remedial actions carried out. At all times, the procedures put in place will be strictly monitored and assessed. 	Negative, Not significant Temporary

Potential Source	Environmental Receptor	Effect Description	Quality	Significance	Duration	Mitigation	Residual Effect
						<ul style="list-style-type: none"> The dust minimisation measures shall be reviewed at regular intervals during the works to ensure the effectiveness of the procedures in place and to maintain the goal of minimisation of dust through the use of best practice and procedures. Record any exceptional incidents that cause dust and/or air emissions, either on or off site and the action taken to resolve the situation in a dedicated logbook. 	

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Potential Source	Environmental Receptor	Effect Description	Quality	Significance	Duration	Mitigation	Residual Effect
Constructing and operating site access roads	Local receptors, roads and environment	Site and delivery vehicles travelling on unsealed roads	Negative	Moderate	Temporary	<ul style="list-style-type: none"> A speed restriction of 15 km/hr will be applied as an effective control measure for dust for onsite vehicles using unpaved site roads. Access gates to the site shall be located at least 10m from sensitive receptors, where possible Watering shall be conducted during sustained dry periods to ensure that unpaved areas are kept moist. Any hard surface roads will be swept to remove mud and aggregate materials from their surface while any unsealed roads shall be restricted to essential site traffic only. Vehicles delivering or collecting material with potential for dust emissions shall be enclosed or covered with tarpaulin at all times to restrict the escape of dust. A wheel wash facility shall be installed if feasible. All trucks leaving the site must pass through the wheel wash. Public roads outside the site shall be regularly inspected for cleanliness, as a minimum on a daily basis, and cleaned as necessary. 	Negative, Slight Temporary

Table 12.15: Summary of predicted operational phase effects, mitigation measures and residual effect

Potential Source	Environmental Receptor	Effect Description	Quality	Significance	Duration	Mitigation	Residual Effect
Road Traffic	Local receptors, roads and environment	Vehicles travelling to/from the development	Neutral	Not significant	Long-term	<ul style="list-style-type: none"> • Effective speed limits in place. • Good house-keeping & road sweeping as necessary. • Promote the use of sustainable transport. 	Neutral Imperceptible Long-term

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12.9.3 Summary of Significant Effects

This assessment concentrates on the possible effects of the planned development on the environment with respect to air quality and climate. The possible effects during the construction and operational stages have been studied.

12.9.4 Construction

The survey area for the construction phase assessment extends up to 350m from the boundary of the site and within 50m of the routes used by construction vehicles on the public road network and up to 500m from the site entrances. Human receptors have been located within the study area and evaluated appropriately. No ecological receptors are positioned within the survey area, therefore, assessment of potential effect on ecological receptors was scoped out of the assessment.

The possible effects on air quality from construction dust have been assessed using a qualitative risk assessment. The potential changes that could occur from the proposed development have been identified and the magnitude of that change assigned. Considering the mitigation linked with the proposed development design, good practice construction techniques and pollution prevention measures that will be adhered to as part of the CEMP, the magnitudes of all predicted changes to air quality during construction are not significant. Consequently, it is concluded that there are no significant effects on air quality from dust arising during the construction phase of the proposed development.

Possible effects from the construction of the development will be temporary in nature, site activities will comprise of (but not be limited to): soil stripping, excavation, installation of infrastructure, landscaping, construction of roads & buildings etc.

12.9.5 Operational

The potential effects on air quality from the operation of the site have been considered using a semi quantitative air dispersion model DMRB spreadsheet. The potential differences that could occur from the proposed development have been assessed and the magnitude of that change designated. The magnitudes of all predicted alterations to air quality during the operational phase are negligible. It is therefore concluded that the effects on air quality from traffic arising from the operation of the proposed development are not significant.

There will be no significant contribution from the proposed development to climate change or greenhouse gas emissions during construction and operational phase. Possible effects from the operation of the development will be long-term in nature and will comprise of emissions from vehicular sources.

12.10 Reinstatement

Not Applicable

12.11 Interactions and Potential Cumulative Effects

12.11.1 Interactions

Potential interactions between air quality and other aspects might include Lands, Soils & Geology (Chapter 7) and Waste Management (Chapter 10) in the event that adequate dust suppression methods are not deployed, or good housekeeping practices are not adhered to, during the construction phase.

The dust mitigation measures outlined in the CEMP, should be applied throughout the construction phase of the proposed development. All other possible permitted developments in the region are also expected to agree and follow a site-specific CEMP that will adequately control emissions from construction. This will ensure any significant cumulative effects on air quality are prevented.

Similar to construction phase effects, any other permitted developments are anticipated to follow best practice mitigation measures to reduce emissions to air. Consequently, significant GHG emissions and breach of the relevant AQSs is considered unlikely and cumulative operational phase effects are considered not significant. Therefore, no further mitigation measures are required.

12.11.2 Potential Cumulative Effects

The phasing/commencement of any other permitted developments in the locality could potentially result in the scenario where a number of other construction sites are in operation at the same time as the proposed development.

In terms of future projected projects, there are 4 no. proposed developments set within the vicinity of the proposed development likely to commence during the project construction phase, as summarised in **Table 12.16**. In periods of dry weather, the cumulative effect of truck movements from each constructions has the potential to lead to a slight impact on local air quality. Given the relatively minor scale of these developments, any cumulative impacts are anticipated to be **Negative, Slight, Temporary**.

Table 7.14. Proposed Developments within the site vicinity

Reg. Ref.	Location	Description of Development	Decision	Distance	Anticipated Cumulative Effect
CCC Reg. Ref. 21528	Aghnaskerry, Co. Cavan	Demolish existing derelict dwelling house and erect 26 no. 3-bed semi-detached dwellings	Permission Granted by CCC 26/05/2022 Subject of current appeal with ABP	ca. 317m NE	Negative, Slight, Temporary
CCC Reg. Ref. 2163	Gaelscoil Bhrefine Tullymongan Lower and Aghnaskerry, Cavan	Single storey extension to existing school, alterations to site layout with a new access via service road	Permission Granted by CCC 21/05/2022 Development commenced 08/07/2021	ca. 180m N	Negative, Slight, Temporary
CCC Reg. Ref. 20145	Aghnaskerry, Tullymongan Lower, Cavan	Change of use of existing dwelling to pre/after school care facility with associated alterations to elevations, outdoor play area and pedestrian path access from adjoining Gaelscoil Bhrefine	Permission Granted by CCC 22/10/2021	ca. 180m N	Negative, Slight, Temporary
CCC Reg. Ref. 20376	Gaelscoil Bhrefine Tullymongan Lower and Aghnaskerry, Cavan	Construct new roadway and entrance junction along the L2543 Cavan Town Eastern Access Road/ Cock Hill Road, alterations to existing public roadway to include new right turn lane and footpath, safety barrier, public playground area, pathways, public lighting, landscaping, boundary treatments and all ancillary site works	Permission Granted by CCC 03/03/2021	Adjacent to the site boundary to the NE	Negative, Slight, Temporary
CCC Reg. Ref. 18141	Tullymongan Lower, Cavan, Co. Cavan	Change of use of existing residential convent building to educational school building	Permission Granted by CCC 18/08/2018 Development commenced 08/07/2021	ca. 180m N	Negative, Slight, Temporary

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13.0 Microclimate

13.1 Introduction

This chapter comprises an assessment of the Daylight, Sunlight and Overshadowing; and local Wind Patterns (collectively known as the local microclimate) within the site and the surrounding environs. The potential effects posed by the construction and operational phases of the proposed development are investigated, and suitable mitigation measures are recommended to minimise effects on the local microclimate receptors.

The objectives of this chapter are.

- To provide a baseline assessment of the impact of the proposed development on the provision of daylight and sunlight to the surrounding residential properties; and
- Assess the impact of the proposed development on the provision of sunlight to neighbouring amenity space.
- Determination of the baseline classification of the site with respect to The Beaufort Scale for Wind on Land using publicly available data from the nearest Met Eireann weather station.
- To provide a baseline assessment to determine if there is a risk to pedestrian comfort due to elevated wind speeds occurring at ground level as a result of the proposed development.
- Risk assessment of the potential for elevated wind speeds to occur at the site when the final constructed retail unit is in place.

13.2 Consultation

ORS have been commissioned to assess the potential impacts of the proposed development in terms of microclimate during the construction and operational phases.

Microclimate is the suite of climatic conditions measured in localized areas near the earth's surface. These environmental variables — which include light and wind speed — provide meaningful indicators for habitat selection and other ecological activities. This chapter deals specifically with light, specifically daylight, sunlight and overshadowing, and wind.

The principal members of the ORS EIA team involved in this assessment include the following persons:

- **Daylight, Sunlight and Overshadowing Modeller & Co-Author:**
John Healy – Diploma Architectural Technology, M.Sc Environmental Design of Buildings, PG Dip Digital Media MSc Current Role: Daylight and Sunlight Consultant and Director of *Digital Dimensions*. Experience ca. 10 years
- **Wind Assessor & Lead-Author:**
Luke Martin - B.A. (MOD) (Natural Sciences), M.Sc. (Sustainable Energy and Green Technology), CEnv, MIEEnvSc. Current Role: Senior Environmental Consultant. Experience ca. 10 years.

Consultation between ORS, Digital Dimensions, and other members of the planning/design team was made in order to obtain information required to assess the potential construction and operational phase impacts on local microclimate. Pre-planning meetings were held with Cavan County Council on 6th August 2020, 13th October 2020, 30th September 2021 and 8th November 2022.

13.3 Legislation, Policy and Guidance

The methodology used to produce this chapter included a review of relevant legislation and guidance, a desk study and an evaluation of potential effects, an evaluation of significance of the effect and an identification of measures to avoid and mitigate effects.

13.3.1 Legislation, Policy and Guidance

This chapter was carried out in accordance with the following guidance documents:

- EPA (2017) Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports.
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (August 2018).
- The BRE Guide, Site Layout Planning for Daylight and Sunlight, A Guide to Good Practice, 2011..
- Mayor of London's Office (2014) Sustainable Design and Construction, Supplementary Planning Guidance, The London Plan 2011.
- Wind Microclimate Guidelines: For Developments in the City of London, City of London Corporation, 2019.
- Department of Housing, Planning and Local Government (2018), 'Urban Development and Building Heights – Guidelines for Planning Authorities'.
- Lawson, T.V., (2001), 'Building Aerodynamics', Imperial College Press, London.
- Asfour, O.S., (2010), 'Prediction of wind environment in different grouping patterns of housing blocks', Energy and Buildings, Elsevier.
- Ma, T., & Chen, T., (2010), 'Classification and pedestrian-level wind environment assessment among Tianjin's residential area based on numerical simulation', Urban Climate, Elsevier.
- Nagib, H.M., & Corke, T.C., (1983), 'Wind Microclimate around buildings: Characteristics and Control, Journal of Wind Engineering and Industrial Aerodynamics', Elsevier.
- Carpentieri, M., et al. (2009), 'Three-Dimensional Mapping of Air Flow at an Urban Canyon Intersection', Boundary-Layer Meteorology, Springer.

13.3.2 Daylight, Sunlight and Overshadowing

Daylight to existing dwellings and relevant building uses

The preliminary assessment entails analysing the environment in plan, section and building use. Windows and amenity areas are selected to be tested for potential impact from the proposed development. Only windows that serve habitable rooms are considered relevant when assessing daylight.

A proposed development could potentially have a negative effect on the level of daylight that a neighbouring property receives, if the obstructing building is large in relation to their distance from the existing dwelling. The BRE guidelines (2022) recommend that: “Loss of light to existing windows need not be assessed if the distance of each part of the new development from the existing window is three or more times its height above the centre of the existing window.”

The diffuse light of the existing building may be adversely affected if part of a new building measured in a vertical section perpendicular to the main window wall of an existing building, from the centre of the lowest window, subtends an angle of more than 25° to the horizontal. If a window falls within a 45° angle both in plan and elevation with a new development in place, then the window may be affected and should be assessed.

Sunlight to gardens and open spaces

An assessment of Sun on the Ground is used of sunlight analysis on external spaces. This is undertaken for the March 21st. The BRE guidelines (2022) recommends that for an area to appear adequately sunlit throughout the year, at least half of the amenity area should receive at least two hours of sunlight on 21 March. If as a result of new development an existing garden or amenity area does not meet the above, and the area which can receive two hours of sun on 21 March is less than 0.8 times its former value, then the loss of sunlight is likely to be noticeable.

Overshadowing

Shadow diagrams are a visual aid to understand where possible shading may occur. The use of shadow diagrams as an assessment method should be taken over the course of the day and not a specific time due to the transient nature of the sun and the shade caused by obstructions.

If a space is used all year round, the equinox on the 21 March is the best date for which to prepare shadow plots as it gives an average level of shadowing. Lengths of shadows at the autumn equinox (21 September) will be the same as those for 21 March, so a separate set of plots for September is not required.”

The guidelines recommends that “Sunlight at an altitude of 10° or less does not count”. In Winter even low buildings will cast long shadows and it is common for large areas of the ground to be in shadow throughout the day especially in a built up area as the sun barely rises above an altitude of 10° during the course of the day. Below are the times for the Equinox and Solstice that the sun is above 10° altitude rounded to the nearest half hour.

- Equinox: Between 8:30 and 17:30
- Summer Solstice: Between 6:30 and 20:00
- Winter Solstice: Between 10:30 and 14:00

Description of Effects

The BRE guidelines (2022) sets out criteria for classification for assessment of impact where a new development affects a number of existing buildings or open spaces in relation to an Environmental

Impact Assessment. The guide does not give a specific range or percentages but sets out parameters set out below.

Where the loss of skylight or sunlight does not meet the guidelines, the impact is assessed as minor, moderate or major adverse. Factors tending towards a minor adverse impact include:

- only a small number of windows or limited area of open space are affected
- the loss of light is only marginally outside the guidelines
- an affected room has other sources of skylight or sunlight
- the affected building or open space only has a low level requirement for skylight or sunlight
- there are particular reasons why an alternative, less stringent, guideline should be applied.

Factors tending towards a major adverse impact include:

- a large number of windows or large area of open space are affected
- the loss of light is substantially outside the guidelines
- all the windows in a particular property are affected
- the affected indoor or outdoor spaces have a particularly strong requirement for skylight or sunlight, eg a living room in a dwelling or a children's playground.

Beneficial impacts occur when there is a significant increase in the amount of skylight and sunlight reaching an existing building where it is required, or in the amount of sunlight reaching an open space. Beneficial impacts should be worked out using the same principles as adverse impacts. Thus a tiny increase in light would be classified as a negligible impact, not a minor beneficial impact."

13.3.3 Wind Analysis

Wind currents around buildings affect people and the environment inside or nearby in many ways. Effects include:

- Pedestrian Discomfort
- Smoke and Fume Dispersion
- Wind Created Noise
- Heat Loss
- Infiltration / internal flow within buildings and hazards to nearby aircraft.

The wind patterns induced by large buildings are felt predominantly in the surrounding streets and plazas. The types of wind currents experienced at a microclimate level can be described in fluid dynamic terms as follows:

- **Vortical Flows:** flows in which the fluid revolves around an axis line. Examples of vortices include stirred fluids, whirlpools, tropical cyclones or tornadoes. On a microclimate level, these flows are experienced as gentle eddies or swirls in the air.
- **Separated Flows:** detachment of a boundary layer of flow from a surface into a 'wake'. A wake can be described as a moving or stationary blunt body, i.e., a building. Flow separation can occur when wind moves externally around a body, or internally within an enclosed passageway. Flow

separation results in reduced lift and increased pressure drag, caused by the pressure differential between the front and rear surfaces of the object.

- **Three-Dimensional Flows:** Fluid motion is chaotic, moving in all directions.

The impact of these flow types on the microclimate of buildings, on wind loads to surfaces, and on pedestrian comfort can be very strong. Depending on the size and scale of a project, assessment of the baseline wind conditions can be of great importance to the design of the project in order to avoid and adverse effects on the local conditions.

According to the 'Urban Development and Building Heights, Guidelines for Planning Authorities (Government of Ireland, December 2020)' document, specific wind impact assessment of the microclimatic effects should be performed for 'buildings taller than prevailing building heights in urban areas'. **Table 13.4** below outlines the general expectations for the types of wind microclimate studies required for various building heights.

Table 13.4 Wind Analysis Criteria (City of London)

Building Height	Recommended Approach to Wind Microclimate Studies
Similar or lower than the average height of surrounding buildings Up to 25m in Change of Level (CoL)	Wind studies are not required, unless sensitive pedestrian activities are intended (e.g. around hospitals, transport hubs, etc.) or the project is located on an exposed location
Up to double the average height of surrounding buildings 25m to 50m in CoL	Computational (CFD) Simulations OR Wind Tunnel Testing
Up to 4 times the average height of surrounding buildings 50m to 100m for CoL	Computational (CFD) Simulations AND Wind Tunnel Testing Where both wind tunnel and CFD are required, the two wind modelling approaches must be carried out by independent consultants. Where there are differences between wind tunnel and CFD results, a report should be prepared to identify potential reasons for differences, sensitivity checks (e.g. grid sensitivity, surround extend sensitivity, turbulence generation in the wind tunnel, etc.) and a summary of the most representative set of wind conditions around the proposed scheme.
High-Rise Above 100m	Early-Stage Massing Optimization: Wind Tunnel Testing OR Computational (CFD) Simulations Detailed Design: Wind Tunnel Testing AND Computational (CFD) Simulations to demonstrate the performance of the final building design

There are five key steps to a successful wind microclimate study:

1. Selection of the appropriate wind statistics for the site (Met Eireann)
2. Consideration of the main design features of the proposed project and screening against the criteria outlined in **Table 13.4**, above to determine the extent of wind analysis required.
3. Determining the impact of the proposed development, through computational fluid dynamics (CFD) tools and/or wind tunnel testing, which provide a set of 'speed-up' ratios,
4. Combination of speed-up ratios with wind statistics to obtain comfort ratings,
5. Comparison of comfort ratings with intended pedestrian activities using the criteria provided in this guideline, as well as interpretation and presentation of results.

Wind Assessment Criteria

Wind comfort, and the criterion used to evaluate this perception, is based upon numerical concepts to capture how people feel in differing wind conditions, at varying activity levels.

To test and determine the level of pedestrian wind comfort in an urban area, the local wind speed must be related to empirical data retrieved from the nearest meteorological station. Once retrieved, the probability of the local wind speed exceeding the given threshold wind speeds defined by wind comfort criteria can be determined.

The effects of wind speed on human beings are subjective and can be perceived differently, depending upon an individual's sensitivity to wind (age, health, clothing etc.). For the purposes of wind studies, Pedestrian Wind Comfort is measured as a function of the frequency of wind speed threshold exceeded based on the pedestrian activity. The following "Wind comfort criteria" detailed in **Table 13.5**, is an internationally recognised standard with which all wind studies assessed.

Only gust winds are considered in the safety criterion. Gusts cause the majority of cases of annoyance and distress and are assessed in addition to average wind speeds. Gust speeds should be divided by 1.85 and these "gust equivalent mean" (GEM) speeds are compared to the same criteria as for mean hourly wind speeds.

Table 13.5: Wind Analysis Criteria (City of London)

Category	Mean & GEM ¹ wind speed	Beaufort Scale	Wind Type	Description
Frequent Sitting	2.5m/s	0-1	Light Air	Acceptable for frequent outdoor sitting use, e.g. restaurant, café.
Occasional Sitting	4m/s	2-3	Light to Gentle Breeze	Acceptable for occasional outdoor seating, e.g. general public outdoor spaces, balconies and terraces intended for occasional use, etc.
Standing	6m/s	4	Moderate Breeze	Acceptable for entrances, bus stops, covered walkways or passageways beneath buildings.
Walking	8m/s	5	Fresh Breeze	Acceptable for external pavements, walkways.
Uncomfortable	>8m/s	5-6	Strong Breeze	Not comfortable for regular pedestrian access.
Unsafe Frail	>15m/s	7-8	Near to Full Gale	Unsafe for elderly and disabled receptors.

Unsafe All	>20m/s	9	Strong Gale	Unsafe for all human receptors.
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¹GEM – Gust Equivalent Mean (5% equivalent)

Significance criteria

Whether a condition is significant or not depends on whether the condition requires mitigation. The tables in the following sections also include a column that defines if mitigation measures are necessary.

The significance of on-site and off-site measurement locations are defined by comparing the wind comfort/safety levels with the intended pedestrian activity at each location, using the criteria outlined in **Table 13.6**, overleaf.

Table 13.6: Criteria for rating significance for on-site & off-site receptors (City of London)

Importance	Receptors	
	On-Site	Off-Site
Major Adverse	Conditions are 'unsafe'.	Conditions that were 'safe' in the baseline scenario become 'unsafe' as a result of the Proposed Development. OR Conditions that were 'suitable' in terms of comfort in the baseline scenario become 'unsuitable' as a result of the Proposed Development. OR Conditions that were 'unsafe' in the baseline scenario are made worse as a result of the Proposed Development.
Moderate Adverse	Conditions are 'unsuitable' (in terms of comfort) for the intended pedestrian use.	Conditions that were 'suitable' in terms of comfort in the baseline scenario are made windier (by at least one comfort category) as a result of the Proposed Development, but remain 'suitable' for the intended pedestrian activity.
Negligible	Conditions are 'suitable' for the intended pedestrian use	Conditions remain the same as in the baseline scenario.
Moderately Beneficial	Conditions are calmer than required for the intended pedestrian use (by at least one comfort category).	Conditions that were 'unsuitable' in terms of comfort in the baseline scenario become 'suitable' as a result of the Proposed Development. OR Conditions that were 'unsafe' in the baseline scenario are made better as a result of the Proposed Development (but not so as to make them 'safe').
Majorly Beneficial	N/A	Conditions that were 'unsafe' in the baseline scenario become 'safe' as a result of the Proposed Development.

A breach of the criteria as outlined above requires a consideration of:

- Siting of major routes and/or outdoor activity areas.
- Mitigation measures to limit/prevent impact on both on-site and off-site receptors.

If the predicted wind conditions exceed the threshold, then conditions are unacceptable for the type of pedestrian activity and mitigation measure should be implemented into the design.

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13.4 Receiving Environment

13.4.1 Background

This section of the chapter provides the baseline information in relation to microclimate that exists in the vicinity of the proposed development. The subject site occupies a total area of approximately 3.86 ha (9.53 acres) and is situated at Cock Hill, Cavan Town, Co. Cavan.

The receiving environment is described below for the proposed development under the following headings:

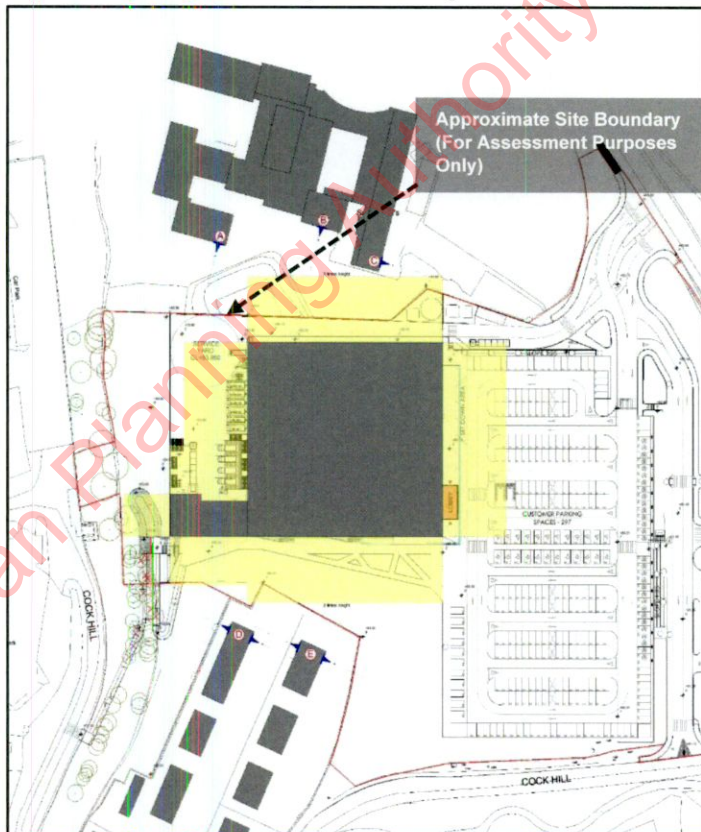
- Daylight, Sunlight & Overshadowing
- Prevailing Local Wind Conditions

13.4.2 Daylight, Sunlight and Overshadowing

The site for the proposed development is in Cavan Town located in the townlands of Townparks and Tullymongan Lower. The site is bounded to the West by the back lands of Main Street, to the North by St. Clare's National School, to the East and South by Cock Hill Road. There is a small housing estate, St. Francis's, Cock Hill to the Southwest.

St. Clare's National School has planning permission for an extension, which includes playing pitches to the south of their site. This extension and ground works have been assessed in this report for potential impact on daylight, sunlight and overshadowing. **Figure 13.1** details potential receptors identified within the zone of influence of the proposed development.

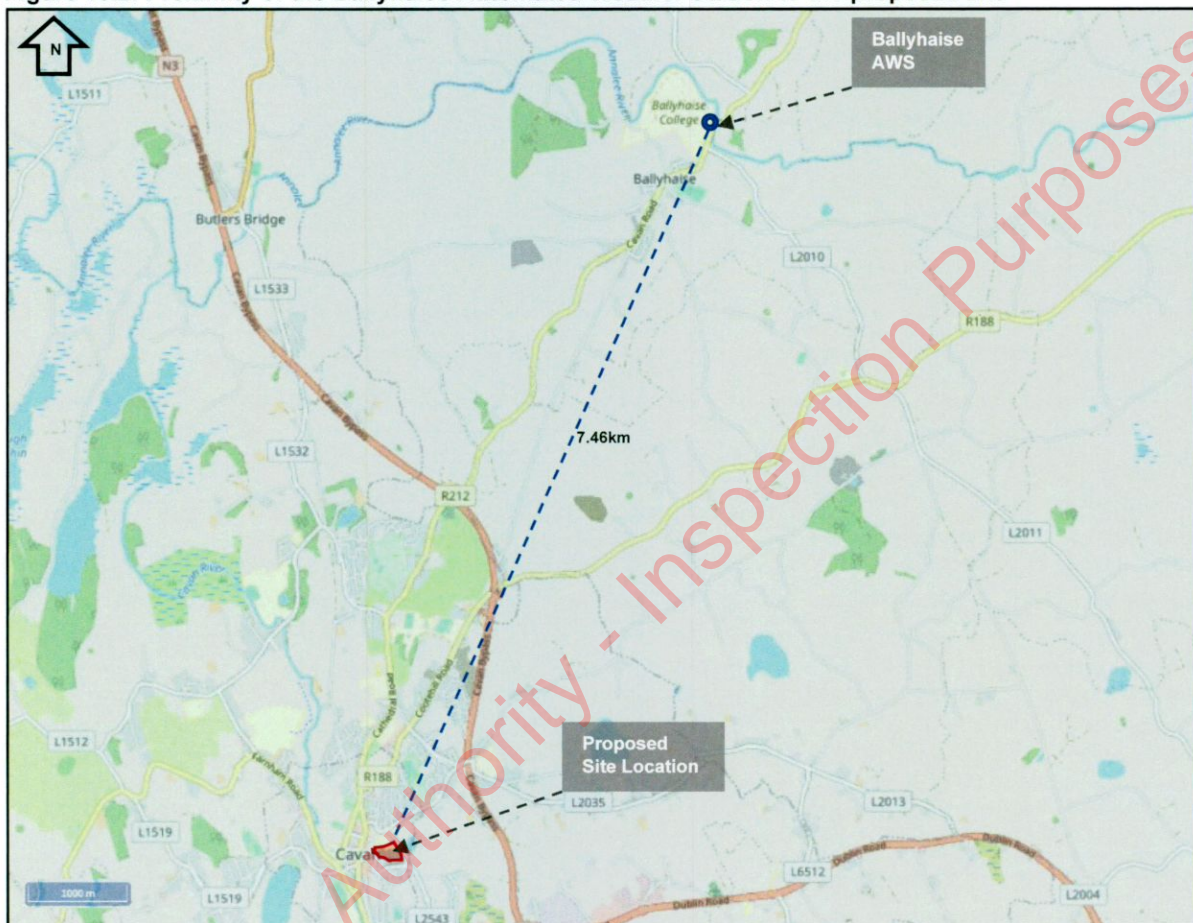
Figure 13.1 Proposed site plan showing the zone of influence on adjacent properties



13.4.3 Wind

This wind analysis considers the complete development being exposed to the prevailing wind conditions at the site. The nearest synoptic weather station to the proposed site, with a complete data set for wind speed and direction, is the Ballyhaise Automatic Weather Station (AWS), situated within the grounds of Teagasc Agricultural College. This weather station is located ca. 7.46km northeast of the proposed site, as illustrated in **Figure 13.2**, below.

Figure 13.2: Proximity of the Ballyhaise Automated Weather Station to the proposed site



Data collected from Ballyhaise Weather Station was used to develop a wind profile for the proposed site location. Wind data has been collected at this weather station since the 8th of October 2003 until the present day.

Transferability of Data

The Ballyhaise Weather Station is located on a hill, similar to that of the proposed site location at Cock Hill. The Weather station elevation above sea level is 78mOD compared to the proposed finished floor level of 85.150mOD of the retail unit at Cock Hill. The wind data at Ballyhaise is hence deemed to be broadly comparable to conditions at the proposed site.

Wind Data

Based on an analysis of the 18-year data set, the average windspeed predicted to occur at the proposed site is 3.33 metres per second (m/s).

Figure 13.4 below outlines the average wind speed distribution predicted at the site throughout a given year. This indicates the percentage of days per month during which winds reach a certain speed. Calmer conditions (<6 m/s) are most likely to occur between May and September. The occurrence of windier conditions (>6 m/s) steadily become more likely from September to January, with conditions slacking off once more from February to May.

Figure 13.4: Wind Speed Diagram for Ballyhaise AWS

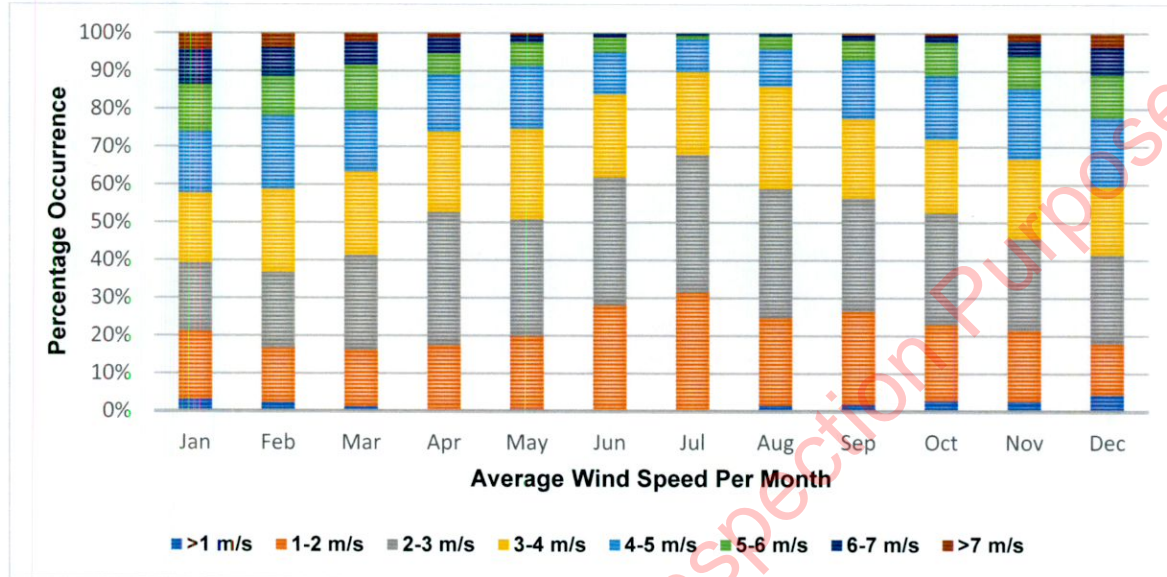
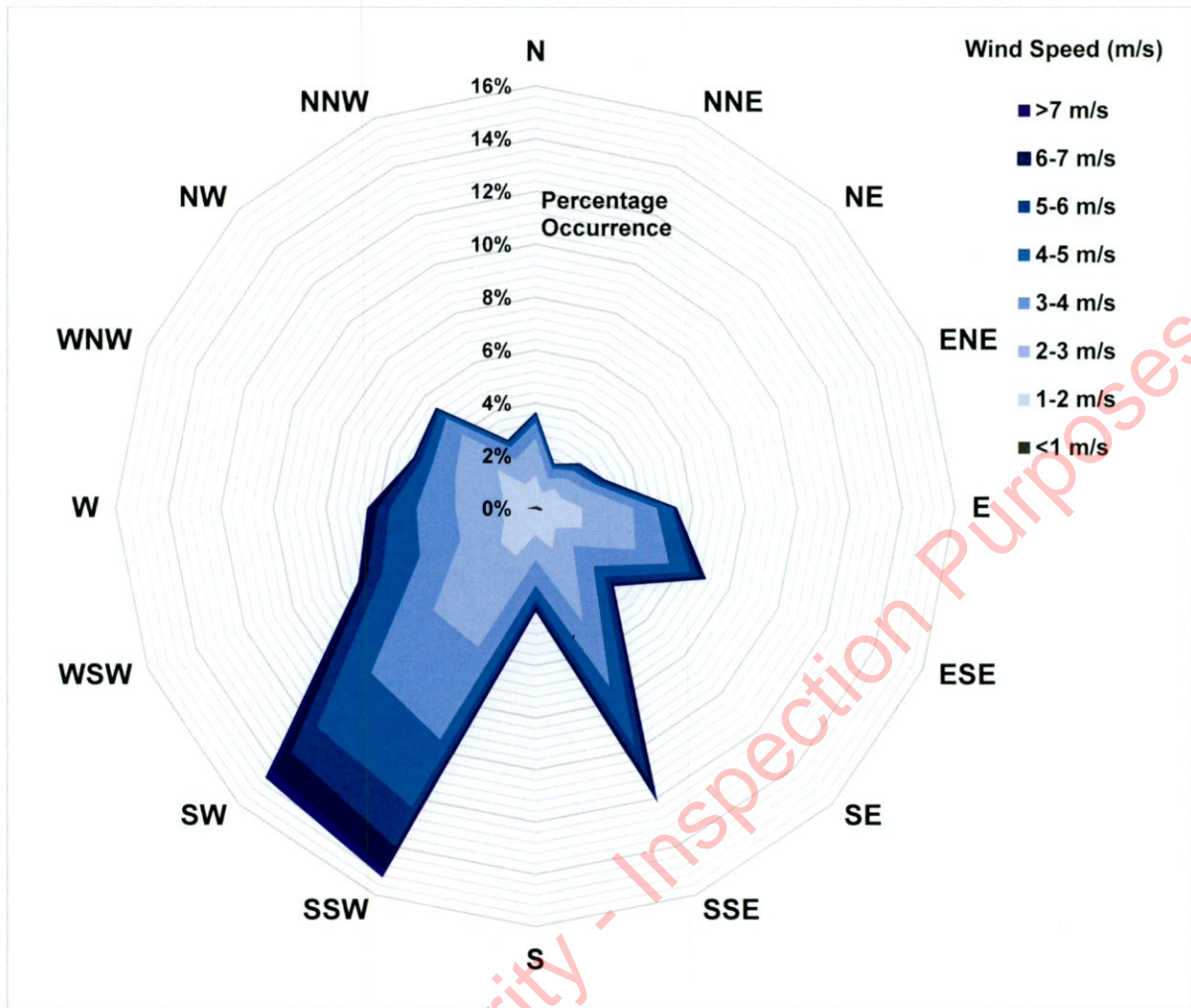


Figure 13.3 displays a wind rose for Cavan, using the 18-year data set from Ballyhaise AWS. This chart indicates how many hours per year the wind blows from a particular direction. The prevailing wind direction at the proposed site is from a southwesterly direction.

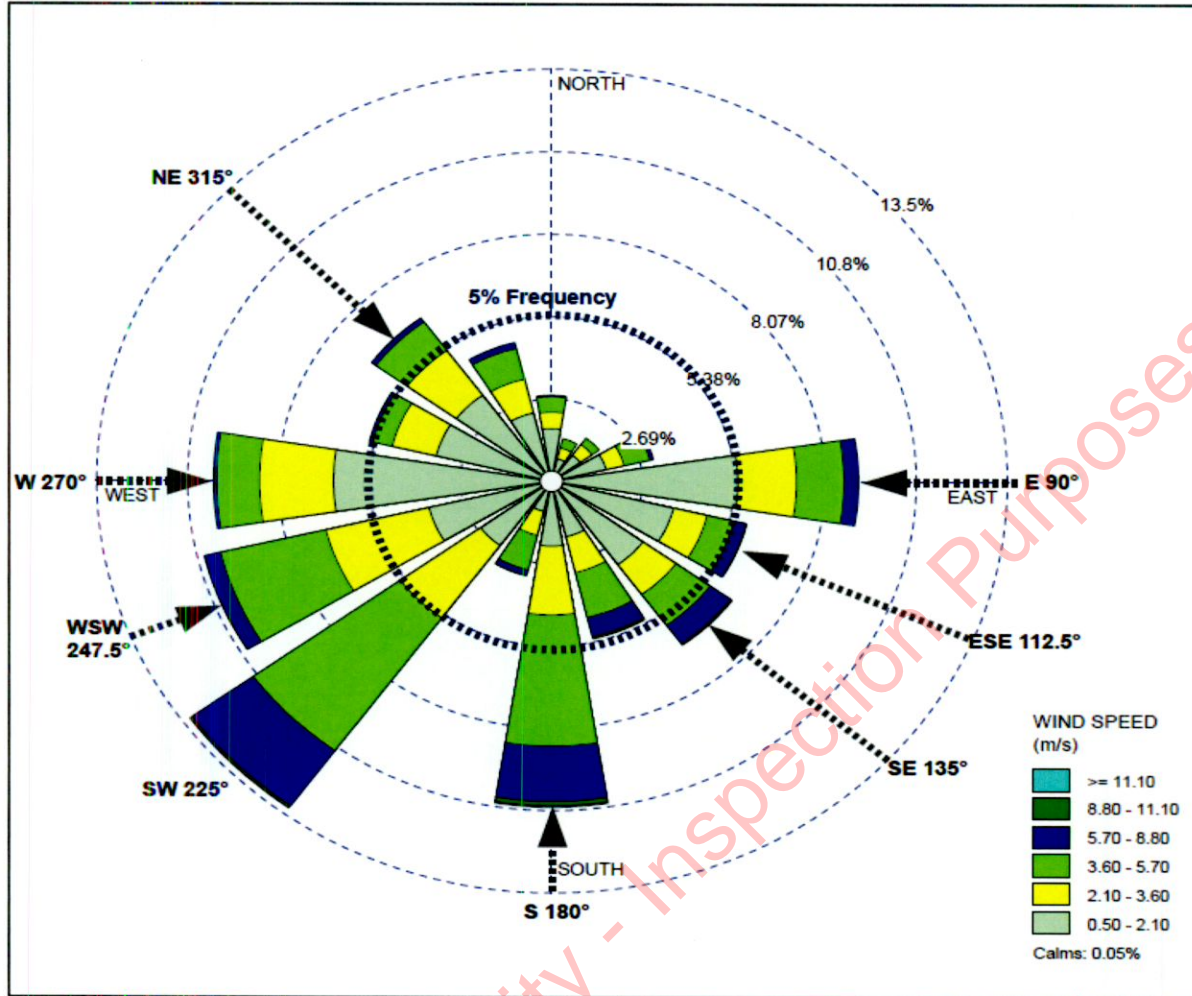
Figure 13.3: Wind Rose for Ballyhaise Weather Station 2003 – 2022 - Windspeeds and Direction



The wind rose in **Figure 13.4** is derived from 2021 data only. Comparison with the wind rose in **Figure 13.3**, derived from an 18-year dataset, wind speeds have been lower than average last year. The prevailing wind direction remains relatively consistent with the 18-year average, with a gentle southwesterly breeze as the predominant wind conditions.

The assessment of wind comfort levels at the new development will be based on the dominating wind directions throughout the year. Based on the criterion of occurrence frequency, if the proposed site is exposed to a wind from a specific direction for more than 5 percent of the time, then the microclimate analysis should consider the impact of this wind (accounting for its direction and most frequent speed) on the local microclimate. **Figure 13.4** overleaf and **Table 13.7**, characterise the most prevalent wind directions, which exceed the 5% threshold.

Figure 13.4: Wind Rose for Ballyhaise Weather Station (2021 data only) (AERMOD)



13.4.4 Wind Modelling

The proposed development will consist of the construction of a mixed-use retail development comprising a retail building (3,333m²), Storage Area (1,767.9m²), Petrol Filling Station with Drive-Thru Café, Car Park totaling 297 spaces, a service yard and works to the public realm to improve pedestrian access.

The existing level of the site ranges in elevation from 81.037mOD towards the southeast, to 84.946mOD towards the northwest of the site. The tallest structure proposed will be the retail unit, the apex of which will be ca. 7.8m in height. The peak of this roof will be 3-4 metres lower than the existing residential housing located to the southwest of the site.

Referring to **Table 13.4**, the Wind Analysis Criteria set by the City of London states that the threshold for triggering a full-scale computational (CFD) wind simulation is a change of level of 25 metres hence a basic wind screening assessment was deemed sufficient for this wind study.

As detailed in **Table 13.7**, winds emerging from a total of 8 no. directions were adjudged to exceed the 5% threshold. The cumulative average velocity of the 8 no. prevailing winds is 3.4 metres per second. The cumulative average places the local wind conditions at 2-3 on the Beaufort Scale, described as a "Gentle Breeze".

Table 13.7: Prevailing Wind Analysis - Direction & Average Wind Speed (Ballyhaise AWS 2003 – 2022)

Qualifying* Wind Direction	Frequency (%)	Average Velocity (m/s)	Beaufort Scale	Prevailing Wind Type
SW 225°	12.8%	3.8 m/s	2-3	Light to Gentle Breeze
S 180°	10.1%	3.2 m/s		
WSW 247.5°	9.8%	3.5 m/s		
W 270°	9.4%	3.4 m/s		
E 90°	8.9%	2.7 m/s		
NE 315°	7.2%	2.6 m/s		
SE 135°	6.9%	3.2 m/s		
ESE 112.5°	6.2%	3.1 m/s		
Cumulative Average Velocity:		3.4 m/s		

*Qualifying Wind Direction - Any direction in which the wind blows >5% of the year, at the site.

Comparison of the average wind speed at the site of 3.4 m/s with the Beaufort scale detailed in **Table 13.8** below describes the baseline site conditions as a “Gentle Breeze”. The Beaufort Scale for Wind on Land is used to express average wind speed as a value which can be used to predict potential wind-related impacts such as tree movement or building damage. Under the prevailing wind conditions expected on site, leaves and small twigs can be observed in constant motion and light flags would be extended.

Table 13.8: Beaufort Scale

Beaufort Number	Wind Speed (m/s)	Description	Effects on Land
0	0.0 - 0.2	Calm	Calm, smoke rises vertically
1	0.5 - 1.5	Light Air	Smoke drift indicates wind direction; vanes do not move
2	1.6 - 3.3	Light Breeze	Wind felt on face; leaves rustle, vanes begin to move
3	3.4 - 5.4	Gentle Breeze	Leaves, small twigs in constant motion, light flags extended
4	5.5 - 7.9	Moderate Breeze	Dust leaves and loose paper raised up; small branches move
5	8.0 - 10.7	Fresh Breeze	Small trees begin to sway
6	10.8 - 13.8	Strong Breeze	Large branches of trees in motion
7	13.9 - 17.1	Near Gale	Whole trees in motion; resistance felt in walking against wind
8	17.2 - 20.7	Gale	Twigs and small branches broken off trees
9	20.8 - 24.4	Strong Gale	Slight structural damage; slates blown from rooves
10	24.5 - 28.4	Storm	Seldom experienced on land; trees broken; structural damage occurs
11	28.5 - 32.6	Violent Storm	Very rarely experienced on land; widespread damage
12	>32.7	Hurricane	Violence and destruction

Further comparison of the baseline wind conditions with **Table 13.5: Wind Analysis Criteria**, describes these conditions as “acceptable for occasional outdoor seating, e.g. general public outdoor spaces, balconies and terraces intended for occasional use, etc”.

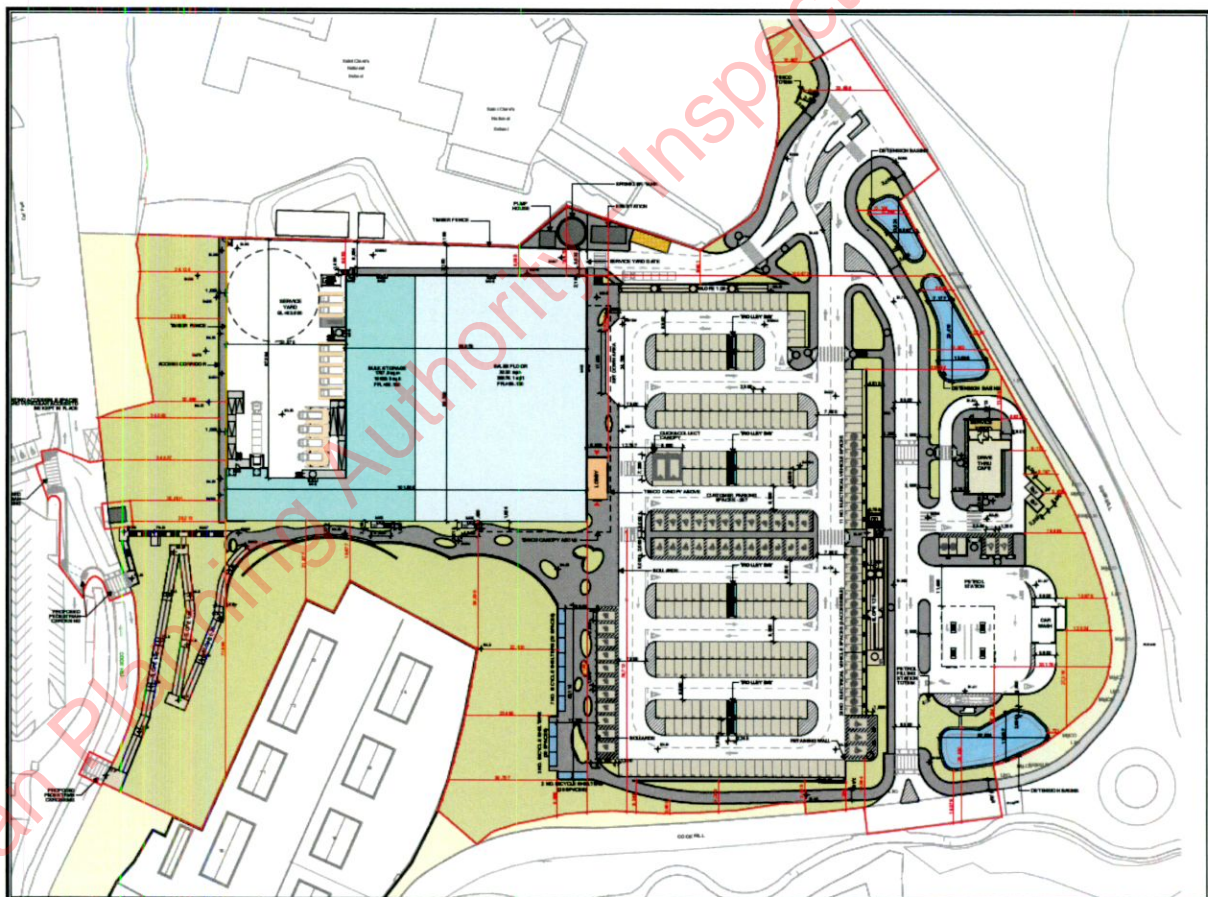
13.5 Characteristics of the Proposed Development

The development will consist of the construction of a single storey retail unit of c. 5,197 sq.m gross floor area (c. 2,194 sq.m convenience net sales area and c. 957 sq.m comparison net sales area) including a licensed alcohol sales area and service yard; a drive thru café unit (c.174 sq.m gross floor area) with external seating and 5 no. car parking spaces and 2 no. set down bay areas; a petrol filling station including car wash/jet wash (c. 89 sq.m), a forecourt canopy (covers c. 255 sq.m. and 4.8m in height); signage including elevational and 2 no. totem signs; 297 no. car parking spaces and 120 no. cycle parking spaces; a "Click and Collect" facility; Grocery Home Shopping delivery vehicle docking area; access points from Cock Hill Road; pedestrian linkages with the Town Centre by way of the provision of a sloped pedestrian walkway and steps on the western boundary of the site with 4 no. pedestrian crossings on Cock Hill Road and; all ancillary site development works, landscaping, fencing, enabling works and site services.

Please refer to **Chapter 2** for the full description of development.

An extract from the planning drawings can be seen in **Figure 13.5**.

Figure 13.5 – Extract from Site Plan (Joseph Doyle Architects)



13.6 Predicted Effects of the Proposed Development

13.6.1 Do-Nothing Scenario

If the proposed development does not proceed there would be no additional impact on the microclimate.

Under the 'Do Nothing' scenario there would be no change to the current land use of the site. There will be no impact on daylight/sunlight/overshadow to surrounding receptors. Local wind patterns will remain unaffected.

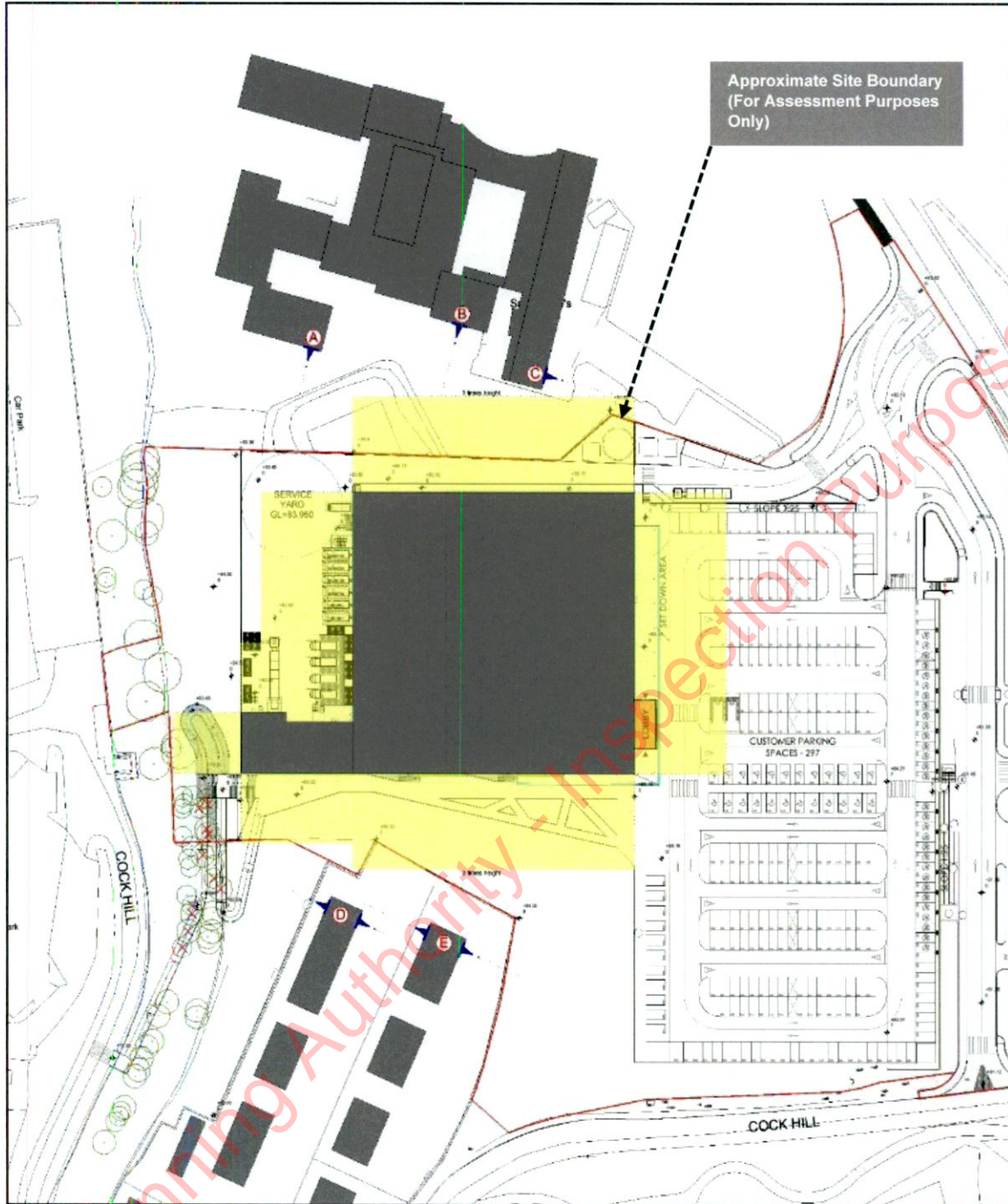
13.6.2 Potential Receptors

Daylight Sunlight and Overshadowing

A total of 5 no. potential receptors were identified towards the north and south of the development labelled A-E in **Figure 13.5**.

- A. St. Clare's School, Cavan; located ca. 37m north of the proposed structure.
- B. St. Clare's School, Cavan. located ca. 59m north of the proposed structure.
- C. St. Clare's School, Cavan. located ca. 49m northwest of the proposed structure.
- D. Residential Unit; located ca. 37m southwest of the proposed structure.
- E. Residential Unit; located ca. 45m southwest of the proposed structure.

Figure 13.5 Proposed site plan outlining potential receptors



Wind - Pedestrian Comfort

Potential receptors for the wind assessment are all pedestrian circulation routes, building entrances and leisure open areas within the site and in neighbouring adjacent areas. Strong winds have the potential to have a significant effect on other receptors, including air quality, biodiversity and water quality. Such impacts are dealt with in other chapters within this study hence pedestrian comfort has been identified as the only receptor within this chapter, with respect to wind.