



CELBRIDGE HAZELHATCH MOBILITY CORRIDOR

Section 177AE Appendices to the Environmental Report



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Appendices

Appendix 4.1	Traffic & Transport Supporting Information
Appendix 4.1A	Description of Existing Road Network
Appendix 5.1	Noise & Vibration Supporting Information
Appendix 5.1A	Relevant Noise Legislation, Policy and Guidance
Appendix 5.1B	Baseline Noise Survey Methodology
Appendix 5.1C	Baseline Noise Survey Data
Appendix 5.1D	Noise Modelling Methodology
Appendix 5.1E	Construction Noise Source Data
Appendix 5.1F	Operational Noise Predictions
Appendix 6.1	Air Quality Supporting Information
Appendix 6.1A	Relevant Guidelines, Policy and Legislation
Appendix 6.1B	Assessment Methodology
Appendix 6.1C	Construction Dust Assessment Methodology
Appendix 7.1	Climate Supporting Information
Appendix 7.1A	Relevant Guidelines, Policy and Legislation
Appendix 7.1B	EU and National Targets and Objectives
Appendix 7.1C	Whole Life Carbon (WLC) Assessment
Appendix 8.1	Landscape and Visual Supporting Information
Appendix 8.1A	Relevant Guidelines, Policy and Legislation
Appendix 8.1B	Methodology
Appendix 8.1C	Assessment Criteria and Significance
Appendix 8.1D	Landscape Character Assessment of County Kildare
Appendix 8.1E	Visual Impact Assessment (Construction and Operational Phase)
Appendix 8.1F	Residential Visual Impact Assessment (Construction and Operational Phase)
Appendix B	Photomontages
Appendix 9.1	Biodiversity Supporting Information
Appendix 9.1A	Relevant Guidelines, Policy and Legislation
Appendix 9.1B	Detailed Methods for Field Surveys
Appendix 9.1C	Designated Sites for Nature Conservation
Appendix 9.1D	Results – Detailed Habitat Descriptions
Appendix 9.1E	Results – Invasive Alien Plant Species
Appendix 9.1F	NDBC Desk Study Results
Appendix 9.1G	Results – Fauna
Appendix 9.1H	Important Ecological Features
Appendix 9.1I	Assessment of Effects
Appendix 9.1J	Application for Derogation
Appendix 10.1	Cultural Heritage Supporting Information
Appendix 10.1A	Relevant Guidelines, Policy and Legislation

Section 177AE Appendices to the Environmental Report

Appendix 10.1B	Glossary of Effects and Assessment Methodology
Appendix 10.1C	Detailed archaeological and historical development of the study area
Appendix 10.1D	Recorded Archaeological and Architectural Heritage Sites within 250m of the Proposed Development
Appendix 10.1E	Wireframes / Heritage Photomontages
Appendix 11.1	Material Assets Supporting Information
Appendix 11.1A	Impact Magnitude

Appendix 4.1 Traffic & Transport Supporting Information

APPENDIX 4.1A DESCRIPTION OF EXISTING ROAD NETWORK

The R403 approaches from the west as the Clane Road and English Row, and from the east as the Dublin Road. Within the town centre English Row forms part of the commercial centre of the town and is characterised as an historic urban street with narrow traffic lanes and footpaths. The Clane Road is similarly narrow as it runs parallel to the River Liffey with high historic walls along both sides. The Clane Road straightens and widens as it turns westwards towards Shackleton Road with additional lane width and narrow hard strips less than 0.5m wide developing and a variable width verge along the eastern side. Hard shoulders or hard strips are not present in the section parallel to the River Liffey.

The Dublin Road is generally straight with narrow hard strips less than 0.5m wide on both sides. A footpath and high stone wall are present along the northern side with a grass verge developing approximately 1.3km east of the existing bridge. Limited pedestrian facilities vary intermittently with a grass verge along the southern side.

The R405 approaches from the north as the Maynooth Road / Main Street and from the south as the Hazelhatch Road. Main Street forms the core part of the commercial centre of the town and has large numbers of pedestrian traffic. The 350m section of Main Street parallel to the River Liffey comprises two traffic lanes with intermittent parking and generally wide footpaths on both sides. There are a number of traffic calming measures including refuge traffic islands and raised pedestrian crossings. As the alignment turns away from the River Liffey and towards Maynooth the traffic lanes and footpath widths become variable and generally narrower. There are no on-street parking spaces and commercial premises make way for residential buildings. On-road advisory cycle lanes are introduced at the junction with Shackleton Road travelling north along the R405 Maynooth Road.

Between Celbridge town centre and Hazelhatch Train Station the R405 Hazelhatch Road is more urban in nature in the northern section but then enters a more rural setting in the southern section. South of the existing bridge the northern end of Hazelhatch Road forms part of a poorly aligned junction with the R403, while the southern end connects to a roundabout adjacent to Hazelhatch Train Station. Cross sectional widths and elements vary along the route. Pedestrian facilities are present along the western side of the Hazelhatch Road in the form of a footpath on the northern section and a shared path south of Hazelhatch Park. An intermittent footpath is present along parts of the eastern side and intermittent verges are present on both sides. Hard strips less than 0.5m develop in the southern section and along with cycle facilities which are located on the western side.

The L1016 Newtown Road (also known locally as the Ardclough Road) approaches Celbridge from the southwest. It is generally comprised of a two-lane road with narrow hard strips less than 0.5m wide and a footpath along the eastern side. It also has a number of constantly varying cross sectional elements such as intermittent verges, an intermittent footpath along the western side and an intermittent high stone wall immediately adjacent to the hard strip. Newtown Road also contains a narrow section of road approximately 450m in length without centreline markings starting to the west of Simmonstown Manor approximately 500m from the existing river crossing.

The existing River Liffey Bridge is a protected structure and the views upstream and downstream are protected views and therefore the improvements that can be undertaken are limited. The bridge is substandard in terms of cross-sectional width, vertical geometry and junction layout on both the north and south sides. Traffic counts undertaken in May 2019 show that the existing bridge carries over 15,500 vehicles per day and generates significant queuing in the AM and PM peak periods. Celbridge's single river crossing point results in a lack of circulation and permeability within the town centre and throughout the general road network in the study area.

The general topography of Celbridge is flat to undulating and hence the vertical geometry of the road network is largely of a high standard. The horizontal geometry is sub-standard at numerous points through the existing road network but particularly along R405 Main Street / Maynooth Rd and L1016 Newtown Road. The combination of high existing traffic flows and sub-standard existing road layout results in delays for road users within Celbridge. This affects both traffic commuting to areas outside of Celbridge and local traffic.

Appendix 5.1 Noise and Vibration Supporting Information

APPENDIX 5.1A RELEVANT NOISE LEGISLATION, POLICY AND GUIDANCE

Specifically in relation to Noise and Vibration, the following principal European and National legislation, policy and guidance documents are relevant and have been given consideration in the preparation of the assessment:

EU Legislation

- Commission Delegated Directive (EU) 2021/1226 of 21.12.2020 amending, for the purpose of adapting to scientific and technical progress, Annex II of Directive 2002/49/EC of the European Parliament and the Council as regards common noise assessment methods;
- Commission Directive (EU) 2015/996 of 19 May 2015 establishing common noise assessment methods according to Directive 2002/49/EC;
- EU Directive 2011/92/EU as amended by Directive 2014/52/EU on the assessment of the effects of certain public and private projects on the environment; and
- European Council Directive 2002/49/EC relating to the assessment and management of environmental noise (the Environmental Noise Directive).

National Legislation

- European Communities (Environmental Noise) (Amendment) Regulations 2021, S.I. No. 663 of 2021;
- European Communities (Environmental Noise) Regulations (S.I. No. 549 of 2018);
- EC (Environmental Noise) Regulations 2006 (S.I. No. 140/2006); and
- EC Noise Emission by Equipment for Use Outdoors (Amendment) Regulations (S.I. No. 241 / 2006).

Policy

- Kildare County Development Plan 2023 – 2029;
- Dublin Agglomeration Draft Noise Action Plan 2024 – 2028;
- Kildare County Council Draft Noise Action Plan 2024 – 2028; and
- The National Planning Framework Objective 65

Guidance

There is no specific legislation relating to road traffic noise and vibration. However, there is a considerable body of standards and guidance which apply to the measurement and treatment of noise and vibration for roads developments and are listed as follows:

- International Organization for Standardization (2024) ISO 9613-2:2024 Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation;
- Highways England (2020) LA 111 Sustainability & Environment Appraisal Noise and Vibration, Rev. 2, Design Manual for Roads and Bridges;
- Quagliata, A., ed., Ahearn, A., Boeker, E., Roof, C., Volpe, J., Meister, L., Singleton, H. (2018) Transit Noise and Vibration Impact Assessment Manual, Federal Transit Administration Report No. 0123
- International Organization for Standardization (2017) ISO 1996-2:2017 Acoustics – Description, measurement and assessment of environmental noise – Part 2: Determination of sound pressure levels;
- International Organization for Standardization (2016) ISO 1996-1:2016 Acoustics – Description, measurement and assessment of environmental noise – Part 1: Basic quantities and assessment procedures;
- DIN 4150-3 2016 Edition, Vibrations in Buildings – Part 3: Effects on structures;
- Institute of Environmental Management & Assessment (IEMA) [2014] Guidelines for Environmental Noise Impact Assessment, Version 1.2;
- NRA (2014) Good Practice Guidance for the Treatment of Noise during the Planning of National Road Developments;

Section 177AE Appendices to the Environmental Report

- British Standards Institution (2009) BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Part 1: Noise;
- British Standards Institution (2009) BS 5228-2:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Part 2: Vibration;
- NRA (2004) Guidelines for the Treatment of Noise and Vibration in National Road Developments;
- International Organization for Standardization (2003) ISO 2631-2:2003 Mechanical vibration and shock - Evaluation of human exposure to whole-body vibration - Part 2: Vibration in buildings (1 Hz to 80 Hz);
- Abbott and Nelson (2002) Converting the UK traffic noise index $L_{A10,18h}$ to EU noise indices for noise mapping. Traffic Research Laboratory;
- International Organization for Standardization (1997) ISO 2631-1:1997/AMD 1:2010. Mechanical vibration and shock – Evaluation of human exposure to whole-body vibration - Part 1: General requirements;
- British Standards Institution (1993) BS 7385-2:1993 Evaluation and measurement for vibration in buildings. Guide to damage levels from groundborne vibration;
- International Organization for Standardization (1993) ISO 9613-1:1993 Acoustics – Attenuation of sound during propagation outdoors – Part 1: Calculation of the absorption of sound by the atmosphere;
- UK Department of Transport (Welsh Office) [1988] Calculation of Road Traffic Noise (CRTN).

APPENDIX 5.1B BASELINE NOISE SURVEY METHODOLOGY

Site-specific baseline noise surveys were undertaken on the 24th of June and the 30th of July 2024 to quantify the existing noise environment. Measurements were undertaken in accordance ISO 1996, the NRA Guidelines for the Treatment of Noise and Vibration in National Road Developments (2004) and the supplemental Good Practice Guidance for the Treatment of Noise during the Planning of National Road Developments (2014). The sound level meters and acoustical calibrator used for the surveys were within specified manufacturer periods of calibration.

Unattended Measurements

Unattended measurements were undertaken at two locations for a period of 24 hours each using a Svantek SV-307A noise monitoring station. The microphone was mounted on a tripod at a height of 4 m above ground level, as the nearest NSLs were two-storey properties. The meter was calibrated prior to and directly after noise monitoring using a Svantek SV-36 acoustical calibrator (114 dB noise source at 1,000 Hz). The calibrations were within the acceptable range of 0.5 dB deviation. The measured LAeq,1hr noise levels were used to calculate the Lden values at the monitoring locations. Meteorological conditions over the 24 hours were captured by a weather station attached to the Svantek SV-307A tripod.

Attended Measurements

Attended short-term measurements were undertaken at five locations in accordance with the NRA Guidelines (2004) and NRA Good Practice Guidance (2014). This involved undertaking a series of three 15-minute measurements over any three consecutive hours between 10:00 and 17:00 hrs. Measurements were undertaken using a Brüel and Kjaer 2250 sound level meter mounted at a height of 1.5 m above ground level. The meter was calibrated before and after the series of three measurements and calibrations were within the acceptable range of 0.5 dB deviation.

Details on the NMLs are presented in **Table 5.1** and are illustrated in **Figure 5-1**. Photographs of each NML are provided below.

Table 5.1: Baseline Noise Monitoring Locations

NML	Coordinates (ITM)		Location Description	Survey Type
	X	Y		
NML1	696722	732571	Outside a dwelling on Priory Lodge approx. 20 m from the junction between the R403 road and the Texaco service station.	Attended
NML2	696602	732505	Outside a dwelling in a residential estate along Abbey Green.	Attended
NML3	696681	732350	At the end of a cul-de-sac in a residential estate along Riverview, Abbey Farm.	Attended
NML4	696843	732176	In the rear garden of a dwelling on The Court, Temple Manor residential estate.	Unattended
NML5	697559	731548	In the garden of a dwelling off Simmonstown Manor.	Attended
NML6	698063	731667	In the garden of a dwelling along Hazelhatch Road.	Unattended
NML7	698144	731446	In the garden of a dwelling along Hazelhatch Road approx. 70 m from the roundabout linking Hazelhatch Road and Loughlinstown Road.	Attended

Meteorological Conditions

The weather conditions on the 24th of June were dry and sunny, with temperatures during the daytime survey period ranging from 21 to 23°C. Temperatures reached a low of 17°C during the night-time period. The average wind speeds during the daytime attended survey and throughout the night were less than 2 m/s and generally came from a south-westerly direction.

The weather conditions on the 30th of July were dry and mild, with temperatures during the daytime survey period ranging from 16 to 19°C. Temperatures reached a low of 10°C during the night-time period. The average wind speeds during the daytime attended survey and throughout the night were less than 2 m/s and generally came from a northerly direction.



Figure 5-1 Noise Monitoring Locations



Plate 5-1: Photographs of NML1



Plate 5-2: Photographs of NML2



Plate 5-3: Photographs of NML3



Plate 5-4: Photographs of NML4



Plate 5-5: Photographs of NML5



Plate 5-6: Photographs of NML6



Plate 5-7: Photographs of NML7

APPENDIX 5.1C BASELINE NOISE SURVEY DATA

Table 5.2: Attended Baseline Noise Survey Results

Location	Date and Time	Duration	Measured Noise Levels			Derived LA10,18hour	Derived Lden	Notes
			LAeq	LA _{F10}	LA _{F90}			
NML1	24/06/2024 10:00	15:00	55.3	58.4	45.3	57	59	Road traffic noise (RTN) from Clane Rd. was dominant, with moderately frequent breaks in traffic and a relatively high HGV percentage. Other noise sources included distant RTN, occasional vehicle passbys on Priory Lodge, vehicle movements and activity at the petrol station opposite NML, local activity, birdsong, light vegetation rustle, distant aircraft flyover and some intermittent lawnmowing at a nearby property during round 3.
	24/06/2024 11:01	15:00	54.4	57.3	45.5			
	24/06/2024 12:00	15:00	56.2	58.9	46.0			
NML2	24/06/2024 10:21	15:00	55.2	56.9	43.0	58	60	Local RTN on Abbey Green was dominant when present and vehicle passbys were frequent. Other noise sources included RTN from Clane Rd., vegetation rustle from surrounding trees in stronger gusts, vehicle movements and activity at the nearby petrol station, birdsong and local works at a nearby property during round 2.
	24/06/2024 11:19	15:00	56.5	58.8	44.1			
	24/06/2024 12:20	15:00	57.0	60.9	44.1			
NML3	30/07/2024 10:53	15:00	46.0	47.0	36.6	46	49	Distant RTN was the primary source. Other noise sources included local and distant lawnmowing, local activity on the green, birdsong, faint river flow noise and occasional vehicles on the estate road.
	30/07/2024 13:43	15:00	46.9	47.9	39.8			
	30/07/2024 14:02	15:00	46.2	44.9	37.7			
NML5	30/07/2024 10:04	15:00	35.3	37.8	30.5	38	43	Noise sources included distant RTN, light vegetation rustle, birds moving in surrounding vegetation, light birdsong, distant aircraft noise, distant train noise, very occasional vehicles passing on the local road outside the property, distant tractor noise during round 3 and occasional local domestic activity during round 3.
	30/07/2024 11:39	15:00	36.1	38.7	30.9			
	30/07/2024 12:52	15:00	37.7	40.3	31.9			
NML7	30/07/2024 10:27	15:00	52.9	56.5	38.0	56	58	RTN on R405 dominant when present but not continuous. Other noise sources included local domestic activity inside the property, distant RTN, distant aircraft noise, light birdsong, distant train noise and tractor noise in a nearby field.
	30/07/2024 12:00	15:00	53.7	57.6	43.3			
	30/07/2024 13:12	15:00	51.3	55.8	38.5			

Table 5.3: Unattended Baseline Noise Survey Results – NML4

NML4			
Date and Time	L_{Aeq}	L_{AF10}	L_{AF90}
24/06/2024 10:00	49.7	47.1	36.8
24/06/2024 11:00	50.9	48.1	36.3
24/06/2024 12:00	50.5	49.7	35.6
24/06/2024 13:00	51.0	49.2	38.3
24/06/2024 14:00	52.1	54.5	39.1
24/06/2024 15:00	51.8	52.5	40.1
24/06/2024 16:00	46.5	48.9	39.6
24/06/2024 17:00	44.8	45.7	39.0
24/06/2024 18:00	53.8	54.2	39.4
24/06/2024 19:00	53.6	49.6	37.0
24/06/2024 20:00	51.0	49.0	36.9
24/06/2024 21:00	41.7	43.6	32.9
24/06/2024 22:00	37.7	40.8	31.1
24/06/2024 23:00	34.0	37.5	28.2
25/06/2024 00:00	32.4	34.5	28.7
25/06/2024 01:00	29.9	31.6	27.1
25/06/2024 02:00	28.9	30.1	26.4
25/06/2024 03:00	29.7	30.7	26.5
25/06/2024 04:00	40.8	40.7	29.0
25/06/2024 05:00	46.3	48.2	35.5
25/06/2024 06:00	51.8	49.7	37.8
25/06/2024 07:00	55.9	54.0	37.8
25/06/2024 08:00	48.5	49.5	39.9
25/06/2024 09:00	46.4	48.1	39.0
L_{A10,18hour}	48		
L_{den}	53		

Table 5.4: Unattended Baseline Noise Survey Data – NML6

NML6			
Date and Time	L _{Aeq}	L _{AF10}	L _{AF90}
24/06/2024 10:00	53.8	58.4	35.3
24/06/2024 11:00	53.8	58.3	36.2
24/06/2024 12:00	53.9	58.3	39.3
24/06/2024 13:00	53.7	58.3	37.8
24/06/2024 14:00	53.8*	59.8	37.5
24/06/2024 15:00	56.5*	63.2	41.3
24/06/2024 16:00	55.5	59.6	40.0
24/06/2024 17:00	56.4	59.8	44.5
24/06/2024 18:00	55.1	59.3	43.6
24/06/2024 19:00	55.1	58.6	41.4
24/06/2024 20:00	53.2	58.2	37.7
24/06/2024 21:00	51.5	56.6	35.8
24/06/2024 22:00	49.8	54.5	31.3
24/06/2024 23:00	47.3	49.9	24.3
25/06/2024 00:00	44.7	43.5	23.6
25/06/2024 01:00	42.7	38.7	24.4
25/06/2024 02:00	36.4	31.4	22.5
25/06/2024 03:00	36.5	30.9	22.2
25/06/2024 04:00	44.8	41.1	21.9
25/06/2024 05:00	51.8	55.2	30.1
25/06/2024 06:00	56.3	60.2	44.3
25/06/2024 07:00	56.5	60.2	45.4
25/06/2024 08:00	56.2	60.0	41.9
25/06/2024 09:00	54.0	58.4	39.8
L_{A10,18hour}	58		
L_{den}	57		

* Noise data likely attributable local sources (i.e. activity at the residence) was removed from the baseline measurements.

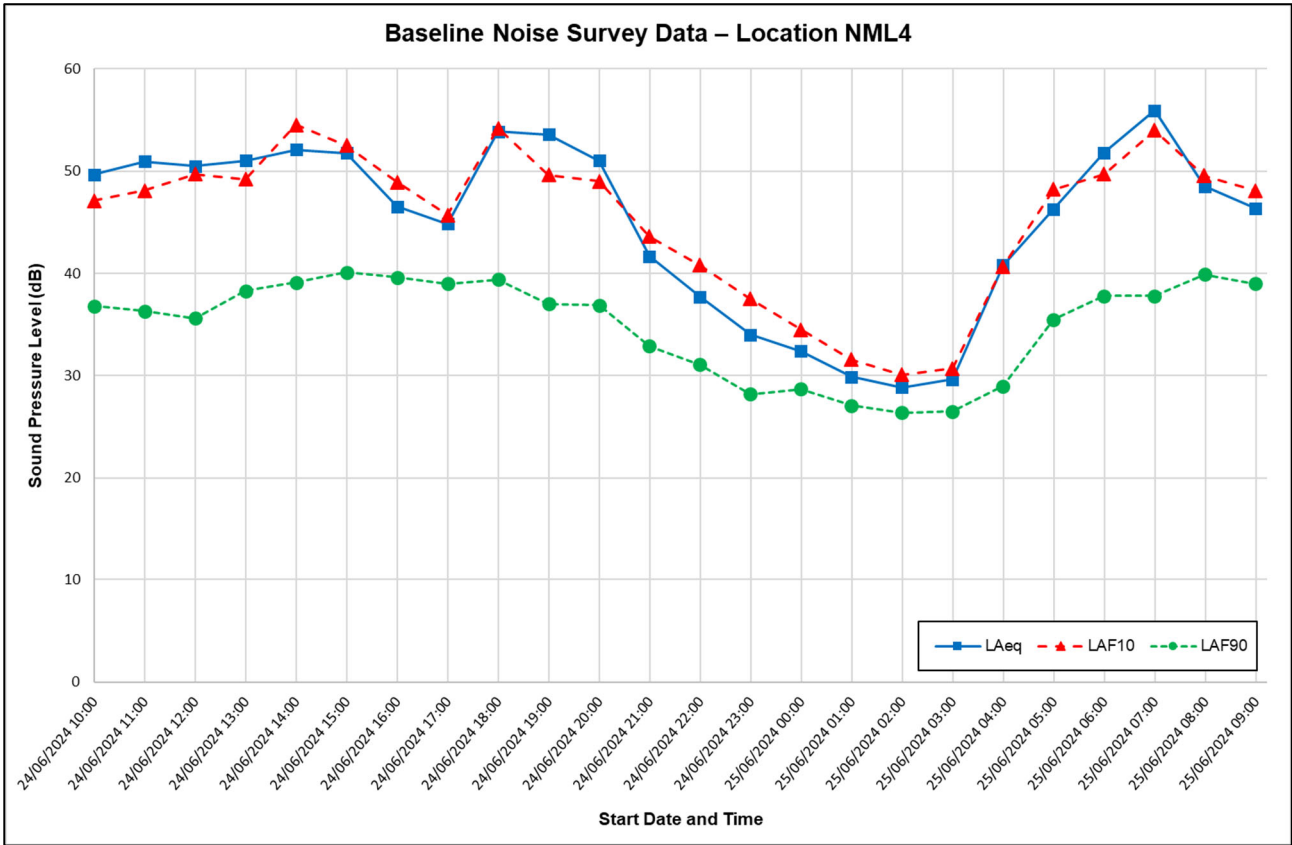


Figure 5-2 Unattended Baseline Noise Survey Data – NML4

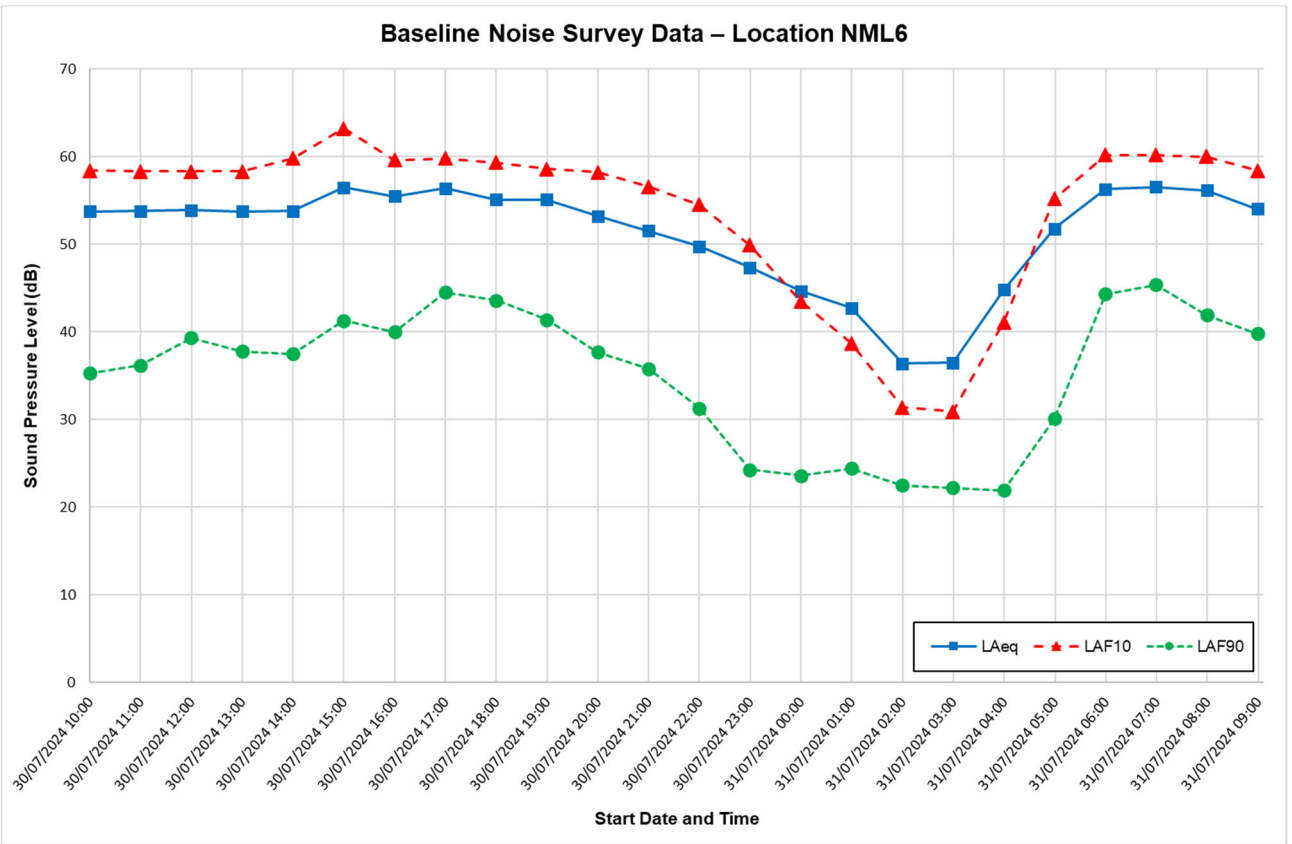


Figure 5-3 Unattended Baseline Noise Survey Results – NML6

APPENDIX 5.1D NOISE MODELLING METHODOLOGY

Predictor LimA 7810 noise modelling software was used to predict the noise impact from the operational and construction phases of Proposed Scheme. For the construction phase, noise levels were predicted using the methodology set out in ISO 9613 parts 1 and 2 and consisted of the following:

- Plant items which will likely remain in a fixed position during operation were modelled as point sources. Likely percentage on-times were used to adjust the plants' sound power levels.
- Plant items which will likely be slow moving within the construction area were summed and modelled as an area source encompassing the whole construction area footprint. Likely percentage on-times were used to adjust the plants' sound power levels.
- Plant items which will likely be moving to and from the construction areas were modelled as moving sources along defined haul routes.
- Where construction activities are to be undertaken along the length of the Proposed Scheme (e.g. road formation, landscaping etc.), specific sections in close proximity to NSLs were chosen for modelling.

Traffic noise levels were predicted using the methodology set out in the Calculation of Road Traffic Noise (CRTN) with the application of the relevant conversion factors as detailed in the NRA Guidelines (2004) and the updated advice on using CRTN recommended in the NRA *Good Practice Guidance* (2014). The CRTN method of predicting noise from a road development consists of the following five elements:

1. Divide the road development into segments so that the variation of noise within this segment is small;
2. Calculate the basic noise level at a reference distance of 10 m from the nearside carriageway edge for each segment;
3. Assess for each segment the noise level at the reception point taking into account distance attenuation and screening of the source line;
4. Correct the noise level at the reception point to take account of site layout features including reflections from buildings and facades, and the size of source segment; and
5. Combine the contributions from all segments to give the predicted noise level at the receiver location for the whole road development.

Inputs to the Noise Model

- Road alignments based on the proposed design and OSi mapping.
- Topographical data was provided by Murphy Geospatial.
- OSi mapping was used for identifying building footprints, existing roads including centrelines and road extents.
- GeoDirectory data from Q3 2024 was used to identify NSLs. This was supplemented with a review of aerial imagery and site visits to identify the receptor height (i.e. single storey, two storey or other).
- Traffic volumes, percentage of heavy goods vehicles (HGVs) and average speeds used in the noise model were provided by the traffic modelling team.
- The road surfaces modelled were based on road surfaces provided in "*Structural Evaluation and Pavement Investigation of Eight No. Local and Regional Road Sections, Celbridge, Co. Kildare*" (Pavement Management Services Ltd, June 2023).
- Construction plant lists for each construction activity, including number of plant items and percentage on-times, were developed in consultation with the design team.

Noise predictions were undertaken for 503 receptor locations. At some of these locations, predictions were undertaken adjacent to multiple façades and elevations (depending on the number of storeys) as the most exposed façade is not obvious.

The prediction method took the following factors into account: hourly traffic flow rate, traffic speed (speed limit), percentage of heavy commercial vehicles. Other information required for the calculation included road surface and gradient; ground type; height of noise source; shielding of barriers and cuttings; reflections at facades and from nearby buildings; angle of view of the road.

In accordance with the NRA Good Practice Guidance (2014) the extent of the noise model not only includes the Proposed Scheme, but it also included areas where traffic flows were shown to be reduced by 20% or more, and where existing flows were shown to be increased by 25% or more.

Noise Model Verification

The purpose of validating the noise model is to ensure the input data is correct and to confirm the noise modelling software is correctly interpreting the input data. The NRA Guidelines (2004) state:

“... whilst there is no need for further validation of the established CRTN prediction methodology, the Authority considers that the noise models themselves should be validated in order to ensure that the roads, topography and other crucial features have been correctly represented and incorporated into the model. This could be done in a number of ways, for example, the survey results could be compared with the predicted results obtained using traffic data that are representative of the conditions during the period when the survey was conducted. The exact method of validation is left to the discretion of the Acoustic Engineer.”

The models used in this study were verified by ensuring the vertical alignment was transferred directly from the planning drawings; road sections were assigned correct road surface types and traffic flows and speeds were coordinated with the traffic section. The topography, buildings and receiver heights were checked for consistency.

The following scenarios were modelled:

- Opening Year 2025: Do-Minimum and Do-Something scenarios;
- Design Year 2040: Do-Minimum and Do-Something scenarios;
- Opening Year 2025: Do-Something scenario with mitigation; and
- Design Year 2040: Do-Something scenario with mitigation.

The NRA Guidelines (2004) require predictions to be reported for the Opening Year (2025) and for a Design Year (2040), 15 years after opening. Noise levels in the Design Year differ from those in the Opening Year by different amounts at some receptor locations and hence, the predicted noise levels from both the opening year and design year are considered.

Free-field traffic noise levels were predicted at a total of 503 receptors. For some receptors, several locations around the building have been modelled, given their proximity to both existing roads and the Proposed Scheme. All receptors were modelled at heights of 1.5 and 4.0 m above ground level at a minimum corresponding to ground floor and first floor levels, respectively. Some receptor locations had a higher number of floors and these were modelled as appropriate. Conversely, some receptors were single-storey and only results at ground floor height were considered for those locations. For all other locations, the highest predicted noise level from each case (i.e. 1.5 m and 4.0 m height receiver point) have been presented.

APPENDIX 5.1E CONSTRUCTION NOISE SOURCE DATA

The following tables describe the input data for construction activities modelled in the noise and vibration assessment presented in **Chapter 5** of the Environmental Report.

Table 5.5: Plant for Site Enabling Works – Site Compounds

Plant	BS 5228 Ref.	Description	Sound Power Level
Tracked Excavator	C.2.5	Clearing Site	104
Road Lorry (Full)*	C.6.21	Haulage	108
Dozer	C.5.12	Spreading Chipping/Fill	105
Vibratory Roller	C.5.28	Rolling and Compaction	105
Dump Truck (Tipping Fill)	C.2.30	Distribution of Material	107
Lorry with Lifting Boom	C.4.53	Lifting	105

* Drive-by maximum sound level

Table 5.6: Plant for Site Enabling Works – Site Clearance & Fencing

Plant	BS 5228 Ref.	Description	Sound Power Level
Chainsaw ¹	Manufacturer's Datasheet	Stihl MS461 Chainsaw	117
Woodchipper ¹	Manufacturer's Datasheet	QuadTrak 160	116
Mulcher ¹	Manufacturer's Datasheet	BE TMS 2300 Mulcher	115
Tracked excavator	C.4.63	Ground Excavation/Earthworks/Trenching	105
Road lorry (full)*	C.6.21	Haulage	108
Articulated dump truck*	C.6.18	Haulage	114
Dozer*	C.2.1	Clearing Site	103

* Drive-by maximum sound level

¹ Will only be required where vegetation and trees are to be removed.

Table 5.7: Plant for Demolitions

Plant	BS 5228 Ref.	Description	Sound Power Level
Pulveriser Mounted on Excavator	C.1.4	Breaking Up Concrete	104
Wheeled Excavator	C.5.11	Removing Broken Material	101
Road Lorry (Full)*	C.6.21	Haulage	108
Backhoe Mounted Hydraulic Breaker	C.5.1	Breaking Road Surface	116

* Drive-by maximum sound level

Table 5.8: Plant for Earthworks

Plant	BS 5228 Ref.	Description	Sound Power Level
Tracked excavator	C.4.63	Trenching	105
Road lorry (full)*	C.6.21	Haulage	108
Articulated dump truck*	C.6.18	Haulage	114
Vibratory roller	C.5.25	Rolling and compaction	103
Dozer *	C.2.1	Clearing Site	103

* Drive-by maximum sound level.

Table 5.9: Plant for Culvert Works

Plant	BS 5228 Ref.	Description	Sound Power Level
Tracked Excavator	C.5.35	Trenching	102
Vibratory Roller*	C.5.21	Rolling and Compaction	108
Lorry with Lifting Boom	C.4.53	Lifting	105
Concrete Mixer Truck	C.4.27	Pumping Concrete	107
Wheeled Mobile Crane	C.5.37	Lifting	104
Vibratory Plate (Petrol)	C.2.41	Rolling and Compaction	108

* Drive-by maximum sound level.

Table 5.10: Plant for Drainage and Utilities

Plant	BS 5228 Ref.	Description	Sound Power Level
Tracked excavator	C.4.63	Trenching	105
Road lorry (full)*	C.6.21	Haulage	108
Vibratory plate (petrol)	C.2.41	Rolling and compaction	108

Table 5.11: Plant for Road Formation and Road Pavement

Plant	BS 5228 Ref.	Description	Sound Power Level
Dozer	C.5.12	Spreading chipping/fill	105
Road lorry (full)*	C.6.21	Haulage	108
Grader *	C.6.31	Levelling haul road	114
Tracked excavator	C.5.35	Trenching	102
Road roller*	C.5.19	Rolling and compaction	108
Asphalt paver (+ tipper lorry)*	C.5.32	Paving	112
Vibratory roller (not vibrating)*	C.5.23	Rolling and compaction	111
Paving train	D.8.20	Slipforming concrete road	109
Mini planer	C.5.9	Road planing	96
Wheeled excavator	C.5.11	Removing broken road surface	101
Road sweeper	C.4.90	Sweeping and dust suppression	104

* Drive-by maximum sound level

Table 5.12: Plant for Cycle Tracks and Footpaths

Plant	BS 5228 Ref.	Description	Sound Power Level
Road lorry (full)*	C.6.21	Haulage	108
Tracked excavator	C.5.35	Trenching	102
Vibratory roller (not vibrating)*	C.5.23	Rolling and compaction	111
Truck mounted concrete pump + boom arm	C.4.30	Pumping concrete	107
Paving train	D.8.20	Slipforming concrete road	109
Wheeled excavator	C.5.11	Removing broken road surface	101

* Drive-by maximum sound level.

Table 5.13: Plant for Bridge Construction

Phase	Plant	BS 5228 Ref.	Description	Sound Power Level
Hardstandings Works	Road lorry (full)*	C.6.21	Haulage	108
	Dump truck (tipping fill)	C.2.30	Distribution of material	107
	Tracked excavator	C.2.19	Ground Excavation/earthworks	105
	Dozer	C.5.12	Spreading chipping/fill	105
	Vibratory roller	C.5.27	Rolling and compaction	95
	Tracked excavator	C.4.65	Trenching	99
Substructure Works	Tracked excavator	C.5.35	Trenching	102
	Mini excavator with hydraulic breaker	C.5.2	Breaking road surface	111
	Road lorry (full)*	C.6.21	Haulage	108
	Road roller*	C.5.19	Rolling and compaction	108
	Crawler mounted rig (piling)	C.3.22	Continuous flight auger piling - cast in situ	108
	Lorry with lifting boom	C.4.53	Lifting	105
	Wheeled mobile crane	C.5.37	Lifting formwork for underpass	104
	Truck mounted concrete pump + boom arm	C.4.30	Pumping concrete	107
	Hand-held circular saw (petrol-cutting concrete)	C.4.72	Cutting concrete blocks / paving slabs	107
	Lorry with lifting boom	C.4.53	Lifting	105
Superstructure Works	Wheeled mobile crane	C.5.37	Lifting formwork for underpass	104
	Tracked mobile crane	C.4.50	Lifting	99
	Truck mounted concrete pump + boom arm	C.4.30	Pumping concrete	107
	Hand-held pneumatic breaker	C.1.6	Breaking up concrete	111
	Hand-held circular saw (petrol-cutting concrete)	C.4.72	Cutting concrete blocks / paving slabs	107
	Poker vibrator	C.4.34	Concreting other	97
	Road lorry (full)*	C.6.21	Haulage	108

* Drive-by maximum sound level.

Table 5.14: Plant for Signage, Road Marking, Lighting and Traffic Signals

Plant	BS 5228 Ref.	Description	Sound Power Level
Lorry with lifting boom	C.4.53	Lifting	105
Lifting platform	C.4.57	Lifting	95
Wheeled excavator	C.5.11	Removing material	101
Road sweeper**	C.4.90	Application of road marking thermoplastics	104

**Used as a proxy for road marking equipment

Table 5.15: Plant for Landscaping

Plant	BS 5228 Ref.	Description	Sound Power Level
Tractor (towing equipment)	C.4.74	Moving equipment	108
Tractor (towing equipment)	C.4.74	Moving equipment	108
Tracked excavator	C.5.35	Trenching	102
Articulated dump truck*	C.6.18	Haulage	114
Articulated dump truck	C.6.26	Dumping load	107
Loading sand to lorry	C.10.7	General wheeled loader operations	105
Dumper* ¹	C.4.6	Distribution of Materials	107

* Drive-by maximum sound level.

¹ To be used in conjunction with the tracked excavator where working space is insufficient for larger plant to operate.

APPENDIX 5.1F CONSTRUCTION VIBRATION

Construction vibrations arise during piling, rock breaking and use of heavy construction equipment close to sensitive properties. Construction vibrations propagate through the ground to a receiver by means of surface and, to a lesser extent, shear and compressional waves. The amplitude of the waves decreases rapidly with distance from the source due to geometrical spreading and energy losses within the ground (material damping). This means that construction-related vibration is only significant close to the source.

BS 5228-2 includes 174 datasets of ground borne vibration measurements. Of the extensive data collated in BS 5228-2, only one set was measured over 100 m from the source. The vast majority of measurements were taken within 50 m, indicating the limited scale of impact for construction vibrations. Consideration of potential vibration impacts has therefore been limited to properties within 50 m of the site boundary, or in the case of structures of significant intrinsic value (i.e. protected structures), a radius of 300 m has been considered.

Wiss (1981) presents a methodology and typical values for vibrations due to construction activities. Geometric spreading means that vibration levels decrease exponentially as the distance from the source increases. The exponent value lies between 1.0 and 2.0 and Wiss (1981) suggests a relatively common value of 1.5. Typical construction activities as part of the Proposed Scheme include rock-breaking, rolling, compaction and earthmoving. **Table 5.16** shows a range of vibration source levels at 7.6 m.

Table 5.16: Vibration source levels for Construction Equipment¹

Equipment	PPV at 7.6 m (mm/s)
Vibratory Roller	5.3
Large Rock-Breaker	2.3
Large Bulldozer	2.3
Auger piling	2.3
Loaded trucks	1.9
Jackhammer	0.9
Small bulldozer	0.1

Using a conservative approach, where losses due to material damping are ignored, vibration levels can therefore be estimated at a distance using the following formula, where D = distance from the source to the NSL in metres:

$$PPV_{NSL} = PPV_{Source} \times \left[\frac{7.6}{D} \right]^{1.5}$$

¹ Compiled from: Quagliata, A., ed., Transit Noise and Vibration Impact Assessment Manual, FTA Report No. 0123, September 2018 and BS 5228

APPENDIX 5.1G OPERATIONAL NOISE PREDICTIONS

Table 5.17: Operational Noise Predictions

Receptor ID*	Description	Coordinates (ITM)		Predicted Noise Levels Opening Year (2025)		Predicted Noise Levels Design Year (2040)	
		X	Y	Do-Minimum	Do-Something	Do-Minimum	Do-Something
R1	Residential	696655.9	732621.3	60	60	60	60
R2	Residential	696648.3	731013.9	66	65	67	66
R3	Residential	696895.1	732018.7	47	53	47	54
R3a	Residential	696891.1	732030.3	43	47	43	47
R4	Residential	696647.1	732021.4	68	67	67	67
R5	Residential	696873.5	732021.0	44	51	44	51
R5a	Residential	696880.4	732031.4	44	47	44	48
R6	Residential	696693.9	732032.9	60	60	59	59
R6a	Residential	696705.2	732030.0	44	46	44	46
R7	Residential	696727.3	732033.0	47	47	47	47
R7a	Residential	696738.1	732024.5	44	46	44	46
R8	Residential	696871.1	732037.6	44	47	44	48
R8a	Residential	696863.8	732026.9	43	45	43	45
R9	Residential	696814.5	732030.7	44	51	45	51
R9a	Residential	696805.7	732038.0	44	46	44	47
R10	Residential	696764.0	732040.5	46	48	46	48
R10a	Residential	696754.1	732033.1	44	45	44	45
R11	Residential	696918.6	732034.3	47	55	48	55
R11a	Residential	696909.5	732042.7	44	48	43	48
R12	Residential	696861.3	732043.9	44	48	44	48
R12a	Residential	696853.1	732041.5	43	46	43	46
R12b	Residential	696854.4	732033.0	42	44	42	45
R13	Residential	696822.0	732040.4	44	51	44	51
R13a	Residential	696813.7	732047.8	44	46	44	46
R14	Residential	696697.8	732046.8	60	59	59	59
R14a	Residential	696709.1	732043.8	45	46	45	46
R15	Residential	696755.2	732049.4	45	47	45	47
R15a	Residential	696746.1	732041.7	45	46	45	46
R16	Residential	696925.6	732044.1	48	55	48	56
R16a	Residential	696915.9	732052.4	43	49	43	49
R17	Residential	696820.3	732058.4	44	46	44	46
R17a	Residential	696829.2	732050.9	43	46	43	46
R18	Residential	696931.7	732054.0	48	56	48	56
R18a	Residential	696922.1	732062.1	43	50	43	50

Section 177AE Appendices to the Environmental Report

Receptor ID*	Description	Coordinates (ITM)		Predicted Noise Levels Opening Year (2025)		Predicted Noise Levels Design Year (2040)	
		X	Y	Do-Minimum	Do-Something	Do-Minimum	Do-Something
R19	Residential	696750.1	732060.2	44	46	44	47
R19a	Residential	696738.2	732057.6	46	47	46	46
R20	Residential	696701.9	732061.0	60	59	59	59
R20a	Residential	696713.1	732057.9	45	46	45	46
R21	Residential	696835.3	732061.7	43	46	43	46
R21a	Residential	696827.2	732069.1	44	46	44	46
R22	Residential	696937.6	732064.0	47	56	48	57
R22a	Residential	696928.5	732071.9	44	51	43	51
R23	Residential	696738.7	732075.2	48	48	47	48
R23a	Residential	696750.3	732071.8	44	46	44	46
R24	Residential	696706.0	732075.1	60	60	59	59
R24a	Residential	696717.0	732071.9	46	47	46	47
R25	Residential	696893.5	732069.4	43	49	44	50
R25a	Residential	696884.4	732077.7	44	48	43	48
R26	Residential	696941.6	732082.4	49	60	49	60
R26a	Residential	696942.8	732074.9	48	57	48	58
R26b	Residential	696934.1	732082.1	46	54	45	55
R27	Residential	696844.3	732083.3	45	49	45	49
R27a	Residential	696848.2	732076.5	43	48	44	48
R27b	Residential	696833.8	732081.6	45	48	44	48
R28	Residential	696901.0	732077.8	45	51	45	52
R28a	Residential	696891.8	732086.2	43	49	43	49
R29	Residential	696747.3	732090.1	50	50	49	50
R29a	Residential	696756.3	732082.2	44	46	44	46
R30	Residential	696709.9	732089.0	60	60	59	59
R30a	Residential	696721.0	732085.9	46	47	46	47
R31	Residential	696907.2	732087.7	46	53	46	53
R31a	Residential	696898.2	732096.1	44	50	44	51
R32	Residential	696860.0	732099.3	46	50	46	50
R32a	Residential	696869.0	732091.0	42	48	43	48
R33	Residential	696755.7	732099.3	49	50	48	50
R33a	Residential	696764.6	732091.5	44	46	44	46
R34	Residential	696715.3	732104.5	60	60	60	59
R34a	Residential	696725.6	732099.5	45	46	44	46
R35	Residential	696913.3	732097.6	46	55	46	55
R35a	Residential	696903.8	732106.1	46	53	46	53
R36	Residential	696867.7	732108.1	46	50	46	51

Section 177AE Appendices to the Environmental Report

Receptor ID*	Description	Coordinates (ITM)		Predicted Noise Levels Opening Year (2025)		Predicted Noise Levels Design Year (2040)	
		X	Y	Do-Minimum	Do-Something	Do-Minimum	Do-Something
R36a	Residential	696876.5	732099.7	43	49	43	50
R37	Residential	696763.7	732108.5	49	50	49	50
R37a	Residential	696772.6	732100.8	44	46	44	46
R38	Residential	696920.1	732114.6	49	60	49	61
R38a	Residential	696920.1	732114.6	50	61	50	61
R38b	Residential	696911.6	732114.8	48	59	48	59
R38c	Residential	696921.0	732106.1	47	58	47	58
R39	Residential	696873.8	732117.8	47	52	47	52
R39a	Residential	696882.7	732109.4	44	51	44	51
R40	Residential	696771.8	732117.8	51	52	50	52
R40a	Residential	696780.7	732110.1	44	46	44	46
R41	Residential	696725.0	732118.6	59	59	59	59
R41a	Residential	696734.2	732110.9	44	46	44	45
R42	Residential	696840.1	732117.6	43	49	43	50
R42a	Residential	696831.1	732125.8	48	50	48	50
R43	Residential	696779.8	732127.2	52	53	51	52
R43a	Residential	696786.5	732129.3	51	52	51	52
R43b	Residential	696788.8	732119.5	44	47	44	47
R44	Residential	696879.6	732127.7	48	55	48	56
R44a	Residential	696888.6	732119.4	45	53	45	53
R45	Residential	696737.5	732127.0	58	58	57	58
R45a	Residential	696746.5	732119.3	46	48	46	48
R46	Residential	696677.4	732122.2	70	69	69	69
R47	Residential	696895.7	732136.0	51	61	50	62
R47a	Residential	696895.7	732136.0	50	61	49	61
R47b	Residential	696887.5	732136.2	49	59	49	60
R47c	Residential	696896.4	732127.9	45	56	45	56
R48	Residential	696845.1	732128.5	43	50	43	51
R48a	Residential	696835.9	732136.8	48	51	48	51
R49	Residential	696747.0	732138.0	57	58	57	58
R49a	Residential	696753.2	732141.3	55	57	55	57
R49b	Residential	696756.2	732130.3	46	49	46	49
R50	Residential	696850.9	732138.4	45	52	45	52
R50a	Residential	696841.8	732146.8	49	52	48	52
R51	Residential	696803.7	732146.4	52	54	52	53
R51a	Residential	696813.7	732139.5	45	49	45	50
R52	Residential	696847.4	732156.8	50	55	50	55

Section 177AE Appendices to the Environmental Report

Receptor ID*	Description	Coordinates (ITM)		Predicted Noise Levels Opening Year (2025)		Predicted Noise Levels Design Year (2040)	
		X	Y	Do-Minimum	Do-Something	Do-Minimum	Do-Something
R52a	Residential	696856.6	732148.7	45	53	45	54
R53	Residential	696809.0	732156.6	53	54	52	54
R53a	Residential	696819.4	732149.5	45	50	45	50
R54	Residential	696863.3	732165.5	52	62	52	62
R54a	Residential	696863.3	732165.5	51	61	51	61
R54b	Residential	696855.0	732165.4	52	59	51	60
R54c	Residential	696864.2	732157.3	46	56	46	56
R55	Residential	696815.0	732166.4	53	55	53	55
R55a	Residential	696824.9	732159.6	45	51	45	52
R56	Residential	696755.1	732173.5	60	60	59	59
R56a	Residential	696766.8	732177.4	56	57	56	57
R56b	Residential	696768.1	732169.3	43	46	43	46
R57	Residential	696820.9	732176.5	54	58	53	58
R57a	Residential	696830.9	732169.6	45	53	45	53
R58	Residential	696835.7	732186.6	54	61	54	61
R58a	Residential	696827.7	732185.5	54	58	54	59
R58b	Residential	696837.9	732178.8	47	56	47	56
R59	Residential	696526.1	732190.5	51	51	50	51
R60	Residential	697494.7	732200.6	61	63	61	63
R61	Residential	696780.2	732202.4	60	61	59	60
R61a	Residential	696789.3	732209.1	59	60	59	60
R61b	Residential	696789.7	732189.1	45	51	45	51
R62	Residential	696533.4	732197.2	51	51	51	51
R63	Residential	696555.3	732220.7	52	52	51	51
R64	Residential	696562.9	732224.7	52	53	52	52
R65	Residential	696511.2	732236.9	45	45	45	45
R66	Residential	696571.8	732233.4	53	53	52	53
R67	Residential	696580.0	732242.8	53	53	52	53
R68	Residential	696545.1	732254.7	44	44	43	44
R69	Residential	696538.4	732261.6	44	45	44	45
R70	Residential	696590.1	732257.5	53	53	52	53
R71	Residential	696530.9	732272.9	44	44	43	44
R72	Residential	696596.9	732267.4	53	53	52	53
R73	Residential	696525.5	732275.9	43	44	43	44
R74	Residential	696910.8	732269.8	53	57	52	57
R74a	Residential	696912.4	732279.9	55	57	55	57
R75	Residential	696518.5	732282.3	43	44	43	44

Section 177AE Appendices to the Environmental Report

Receptor ID*	Description	Coordinates (ITM)		Predicted Noise Levels Opening Year (2025)		Predicted Noise Levels Design Year (2040)	
		X	Y	Do-Minimum	Do-Something	Do-Minimum	Do-Something
R76	Residential	696603.7	732277.2	53	53	52	53
R77	Residential	696511.2	732288.7	43	44	43	44
R78	Residential	696611.4	732287.3	53	53	52	53
R79	Residential	696503.2	732295.1	43	44	43	44
R80	Residential	696618.4	732296.9	53	54	53	53
R81	Residential	696493.8	732304.1	43	44	43	44
R82	Residential	696549.1	732311.1	45	46	45	46
R83	Residential	696537.0	732313.5	45	46	45	46
R84	Residential	696557.9	732313.5	46	46	46	46
R84a	Residential	696565.3	732300.5	44	44	44	44
R85	Residential	696475.4	732311.8	43	43	43	44
R86	Residential	696626.2	732306.6	53	54	53	54
R87	Residential	696575.0	732305.6	44	45	44	45
R88	Residential	696529.9	732318.1	44	45	44	46
R89	Residential	697456.5	732317.5	66	65	66	66
R90	Residential	696584.2	732313.6	44	45	44	45
R91	Residential	696527.0	732321.9	44	46	44	46
R92	Residential	696631.5	732317.7	53	54	53	54
R93	Residential	696591.2	732321.6	45	46	45	46
R94	Residential	696524.2	732330.5	45	46	45	46
R95	Residential	696636.9	732328.5	53	55	53	55
R96	Residential	696595.9	732328.2	46	47	45	47
R97	Residential	696516.8	732340.1	45	46	45	47
R98	Residential	696602.0	732337.5	45	47	45	47
R99	Residential	696642.0	732339.7	53	55	53	56
R100	Residential	696487.8	732345.9	44	45	44	45
R101	Residential	696605.8	732350.2	50	50	50	51
R102	Residential	696647.8	732350.6	53	55	53	55
R103	Residential	696484.9	732359.8	42	44	42	44
R104	Residential	696608.5	732361.1	52	52	52	52
R105	Residential	696919.1	732365.3	62	61	61	61
R105a	Residential	696925.8	732350.0	57	58	57	57
R106	Residential	696654.4	732360.1	53	56	53	56
R107	Residential	697046.9	732350.8	50	50	49	50
R107a	Residential	697051.0	732343.2	45	49	46	49
R108	Residential	696474.7	732369.5	42	43	42	43
R109	Residential	696472.4	732371.9	42	43	42	43

Section 177AE Appendices to the Environmental Report

Receptor ID*	Description	Coordinates (ITM)		Predicted Noise Levels Opening Year (2025)		Predicted Noise Levels Design Year (2040)	
		X	Y	Do-Minimum	Do-Something	Do-Minimum	Do-Something
R110	Residential	696518.5	732374.3	46	47	46	47
R111	Residential	696663.0	732368.1	53	58	53	58
R111a	Residential	696661.7	732374.5	53	58	53	58
R112	Residential	696464.2	732377.0	42	43	42	43
R113	Residential	696509.7	732381.9	45	46	45	46
R114	Residential	696604.8	732379.9	51	53	51	53
R115	Residential	696460.1	732384.0	42	43	42	43
R116	Residential	696503.3	732385.5	44	46	44	46
R117	Residential	696593.8	732390.3	51	52	51	53
R118	Residential	696494.6	732393.8	44	45	44	46
R119	Residential	696583.5	732394.7	49	50	49	50
R120	Residential	696449.0	732393.9	42	43	42	43
R121	Residential	696487.3	732398.7	43	44	43	44
R122	Residential	696484.2	732402.2	43	45	43	45
R123	Residential	696923.4	732403.9	68	67	67	66
R123a	Residential	696922.4	732395.5	65	65	65	64
R124	Residential	696550.3	732400.8	49	50	48	50
R125	Residential	696541.7	732412.3	46	48	46	48
R126	Residential	696532.1	732414.5	44	44	43	45
R127	Residential	696479.1	732412.6	43	45	43	45
R128	Residential	696523.2	732418.3	44	45	44	45
R129	Residential	696933.6	732422.2	70	69	69	68
R129a	Residential	696936.7	732414.0	64	64	64	63
R130	Residential	696436.0	732417.5	44	45	44	45
R131	Residential	696480.0	732425.0	43	45	43	45
R132	Residential	696513.5	732425.4	43	44	43	45
R133	Residential	697328.8	732424.6	66	64	65	65
R134	Residential	697374.6	732427.4	63	62	63	63
R135	Residential	696481.4	732433.9	43	44	43	44
R136	Residential	696567.8	732442.2	51	52	51	53
R137	Residential	696552.3	732446.2	49	50	49	50
R138	Residential	696486.1	732440.8	44	45	44	45
R139	Residential	696542.8	732448.7	49	50	49	50
R140	Residential	696533.3	732451.3	47	49	46	49
R141	Residential	696523.6	732453.9	46	48	46	49
R142	Residential	696488.9	732449.4	44	45	44	45
R143	Residential	696437.7	732451.2	44	45	44	45

Section 177AE Appendices to the Environmental Report

Receptor ID*	Description	Coordinates (ITM)		Predicted Noise Levels Opening Year (2025)		Predicted Noise Levels Design Year (2040)	
		X	Y	Do-Minimum	Do-Something	Do-Minimum	Do-Something
R144	Residential	696494.5	732455.6	44	46	44	46
R144a	Residential	696477.7	732462.5	44	45	44	45
R145	Residential	696440.9	732459.2	44	45	44	45
R146	Residential	696494.4	732471.7	46	47	46	48
R146a	Residential	696497.3	732462.0	45	47	45	47
R147	Residential	696445.3	732468.4	45	46	45	46
R148	Residential	697265.0	732476.1	66	64	65	65
R149	Residential	696585.4	732474.2	51	55	51	55
R149a	Residential	696580.1	732470.2	48	54	47	55
R150	Residential	696448.7	732476.5	45	46	45	46
R151	Residential	696570.3	732472.0	47	54	47	54
R151a	Residential	696576.1	732485.0	47	51	47	51
R152	Residential	696558.4	732475.4	46	53	46	54
R153	Residential	696548.7	732477.5	46	53	46	53
R154	Residential	696539.3	732479.5	46	53	46	53
R155	Residential	696453.6	732485.5	46	48	46	48
R156	Residential	696529.2	732481.5	45	49	45	49
R157	Residential	696523.1	732499.4	45	47	45	47
R158	Residential	696457.0	732493.5	46	48	46	48
R159	Residential	696513.9	732503.7	45	47	45	47
R160	Residential	696504.3	732506.3	48	49	48	49
R161	Residential	696464.8	732506.2	48	49	48	49
R162	Residential	696597.6	732516.8	58	60	58	60
R163	Residential	696768.6	732513.5	59	60	59	60
R163a	Residential	696763.5	732503.0	55	59	55	59
R163b	Residential	696779.7	732517.1	58	56	58	56
R164	Residential	696467.1	732516.4	48	50	48	50
R165	Residential	696585.6	732523.3	58	59	59	60
R166	Residential	696574.3	732529.3	59	60	59	60
R167	Residential	697203.6	732528.4	66	65	66	66
R168	Residential	697012.4	732518.5	66	65	65	64
R168a	Residential	697002.4	732515.7	63	62	63	62
R169	Residential	696464.6	732531.6	48	50	49	50
R170	Residential	696562.9	732534.7	59	60	59	60
R171	Residential	696550.6	732537.9	58	59	58	59
R172	Residential	696537.8	732540.5	58	59	58	59
R173	Residential	696457.5	732541.1	51	51	51	52

Section 177AE Appendices to the Environmental Report

Receptor ID*	Description	Coordinates (ITM)		Predicted Noise Levels Opening Year (2025)		Predicted Noise Levels Design Year (2040)	
		X	Y	Do-Minimum	Do-Something	Do-Minimum	Do-Something
R174	Residential	696525.3	732542.6	58	59	58	59
R175	Residential	696653.8	732542.9	66	67	66	67
R176	Residential	696441.3	732543.1	49	50	50	50
R177	Residential	696433.1	732545.8	49	50	49	50
R178	Residential	696498.7	732565.5	60	61	60	61
R179	Residential	696486.7	732569.9	60	61	60	61
R180	Residential	696476.2	732572.6	60	61	60	61
R181	Residential	696465.2	732576.2	59	61	60	61
R182	Residential	696454.1	732579.4	59	61	60	61
R183	Residential	696442.4	732582.0	59	60	59	61
R184	Residential	696431.4	732585.2	59	60	59	61
R185	Residential	696687.8	732579.5	60	62	60	63
R185a	Residential	696687.8	732579.5	58	61	58	61
R186	Residential	696691.0	732578.0	60	63	60	63
R186a	Residential	696691.0	732578.0	58	61	58	62
R187	Residential	696697.0	732578.3	60	63	60	64
R187a	Residential	696697.0	732578.3	58	62	58	62
R188	Residential	696698.9	732578.4	60	63	60	64
R188a	Residential	696698.9	732578.4	58	62	58	62
R189	Residential	696704.6	732578.6	60	63	60	63
R189a	Residential	696704.6	732578.6	58	62	58	62
R190	Residential	696706.6	732578.6	60	63	60	63
R190a	Residential	696706.6	732578.6	58	62	58	62
R191	Residential	696679.5	732579.9	59	62	60	62
R191a	Residential	696679.5	732579.9	57	60	57	61
R192	Residential	696712.2	732578.7	60	63	60	63
R192a	Residential	696712.2	732578.7	58	62	58	62
R193	Residential	696715.2	732580.2	59	63	60	63
R193a	Residential	696715.2	732580.2	58	62	58	62
R194	Residential	696676.2	732578.8	61	63	61	63
R194a	Residential	696676.2	732578.8	59	62	59	62
R195	Residential	696670.2	732579.4	61	63	61	64
R195a	Residential	696670.2	732579.4	60	62	60	62
R196	Residential	696724.2	732581.0	59	62	59	63
R196a	Residential	696724.2	732581.0	57	61	58	62
R197	Residential	696668.4	732579.6	61	63	61	64
R197a	Residential	696668.4	732579.6	60	62	60	62

Section 177AE Appendices to the Environmental Report

Receptor ID*	Description	Coordinates (ITM)		Predicted Noise Levels Opening Year (2025)		Predicted Noise Levels Design Year (2040)	
		X	Y	Do-Minimum	Do-Something	Do-Minimum	Do-Something
R198	Residential	696662.7	732580.5	62	63	62	64
R198a	Residential	696662.7	732580.5	60	62	60	62
R199	Residential	696727.6	732580.1	60	63	60	63
R199a	Residential	696727.6	732580.1	58	61	58	62
R200	Residential	696660.9	732580.7	62	64	62	64
R200a	Residential	696660.9	732580.7	60	62	60	62
R201	Residential	696655.0	732581.3	62	63	62	63
R202	Residential	696733.0	732581.3	60	62	60	62
R202a	Residential	696733.0	732581.3	58	61	58	61
R203	Residential	696653.1	732581.5	62	63	62	63
R204	Residential	696734.8	732581.5	60	62	60	62
R204a	Residential	696734.8	732581.5	58	61	58	61
R205	Residential	696647.4	732583.6	62	63	62	63
R206	Residential	696740.6	732582.4	60	62	60	62
R207	Residential	696742.5	732582.8	60	62	60	62
R208	Residential	696748.6	732583.8	60	61	60	61
R209	Residential	696751.2	732585.6	59	60	59	61
R210	Residential	696758.7	732587.8	59	59	59	59
R211	Residential	696762.0	732587.4	60	59	60	59
R212	Residential	696767.8	732589.4	60	59	60	59
R213	Residential	696769.5	732590.0	60	59	60	59
R214	Residential	696775.0	732591.8	60	59	60	59
R215	Residential	696776.7	732592.4	60	59	60	59
R216	Residential	696782.4	732594.3	60	59	60	59
R217	Residential	696784.9	732596.6	59	58	60	59
R218	Residential	696792.6	732599.9	59	58	59	59
R219	Residential	696796.2	732600.1	60	59	60	59
R220	Residential	696801.2	732602.9	60	59	60	59
R221	Residential	696802.8	732603.7	60	59	60	59
R222	Residential	696519.1	732609.8	68	69	68	69
R222a	Residential	696527.1	732612.8	64	65	64	65
R223	Residential	696808.0	732606.4	60	59	60	59
R224	Residential	696809.7	732607.2	60	59	60	59
R225	Residential	696694.7	732609.6	49	51	49	51
R226	Residential	696684.9	732609.5	50	51	50	52
R227	Residential	696815.1	732610.1	60	59	60	59
R228	Residential	696698.7	732609.9	49	51	49	51

Section 177AE Appendices to the Environmental Report

Receptor ID*	Description	Coordinates (ITM)		Predicted Noise Levels Opening Year (2025)		Predicted Noise Levels Design Year (2040)	
		X	Y	Do-Minimum	Do-Something	Do-Minimum	Do-Something
R229	Residential	696680.9	732610.0	51	52	51	52
R230	Residential	696702.5	732610.2	48	51	49	51
R231	Residential	696706.3	732610.4	48	50	48	50
R232	Residential	696721.8	732611.5	48	49	48	49
R233	Residential	696677.1	732610.4	51	52	51	52
R234	Residential	696710.0	732610.7	48	50	48	50
R235	Residential	696673.3	732610.9	52	53	52	53
R236	Residential	696713.9	732610.9	48	50	48	50
R237	Residential	696817.2	732612.8	60	58	60	59
R238	Residential	696717.8	732611.2	48	49	48	50
R239	Residential	696669.5	732611.3	52	53	52	53
R240	Residential	696665.7	732611.8	53	54	53	54
R241	Residential	696662.7	732629.0	56	56	56	56
R242	Residential	696729.1	732612.3	47	49	47	49
R242a	Residential	696734.3	732613.5	47	49	47	49
R243	Residential	696738.1	732614.3	46	48	46	48
R244	Residential	696824.9	732617.8	60	58	60	59
R245	Residential	696741.8	732615.2	46	48	46	48
R246	Residential	696530.3	732622.6	61	62	61	62
R246a	Residential	696517.1	732625.0	61	62	61	62
R247	Residential	696745.5	732616.0	46	48	46	48
R248	Residential	696749.2	732616.8	46	47	46	47
R249	Residential	696828.1	732618.5	61	59	61	59
R250	Residential	696756.9	732618.6	46	46	46	46
R251	Residential	696752.8	732617.7	46	47	46	47
R252	Residential	696833.0	732622.0	61	59	61	59
R253	Residential	696765.6	732621.7	46	46	46	46
R254	Residential	696834.4	732623.2	61	59	61	59
R255	Residential	696769.1	732623.3	46	46	46	46
R256	Residential	696838.8	732626.5	61	59	61	59
R257	Residential	696498.5	732627.0	64	66	65	66
R257a	Residential	696506.9	732631.5	59	60	59	60
R258	Residential	696772.7	732625.0	46	46	46	46
R259	Residential	696776.3	732626.7	46	46	46	46
R260	Residential	696840.5	732627.6	61	59	61	59
R261	Residential	696534.2	732632.9	57	58	57	59
R262	Residential	696489.3	732630.4	64	66	65	66

Section 177AE Appendices to the Environmental Report

Receptor ID*	Description	Coordinates (ITM)		Predicted Noise Levels Opening Year (2025)		Predicted Noise Levels Design Year (2040)	
		X	Y	Do-Minimum	Do-Something	Do-Minimum	Do-Something
R263	Residential	696779.9	732628.3	46	46	46	46
R264	Residential	696845.0	732631.1	61	59	61	59
R265	Residential	696783.4	732630.0	46	46	46	46
R266	Residential	696846.5	732632.2	61	59	61	59
R267	Residential	696786.9	732631.6	46	46	46	46
R268	Residential	696479.4	732633.8	64	66	65	66
R269	Residential	696790.6	732633.3	47	46	46	46
R270	Residential	696850.4	732637.0	61	59	61	59
R271	Residential	696798.4	732638.1	47	46	47	46
R272	Residential	696469.7	732638.3	64	65	64	65
R273	Residential	696801.9	732640.6	47	46	47	46
R274	Residential	696459.6	732641.7	64	65	64	65
R275	Residential	696805.1	732642.9	47	47	47	47
R276	Residential	696808.2	732645.1	47	47	47	47
R277	Residential	696449.7	732645.1	64	65	64	65
R278	Residential	696811.3	732647.3	47	47	47	47
R279	Residential	696439.1	732643.4	66	67	66	68
R280	Residential	696814.5	732649.6	48	47	48	47
R281	Residential	696577.9	732654.1	55	56	55	56
R282	Residential	696817.7	732662.3	49	48	49	48
R283	Residential	696887.2	732655.2	66	64	66	64
R284	Residential	696583.1	732658.6	55	56	55	56
R285	Residential	696878.0	732653.7	63	61	63	61
R286	Residential	696872.8	732656.1	61	59	61	59
R287	Residential	696506.4	732663.1	51	51	51	52
R288	Residential	696871.1	732656.9	60	58	60	59
R289	Residential	696865.8	732659.2	59	57	59	57
R290	Residential	696511.2	732667.2	51	53	51	53
R291	Residential	696864.0	732660.0	57	55	57	55
R292	Residential	696497.5	732667.3	46	47	46	47
R293	Residential	696591.7	732664.3	56	56	56	56
R294	Residential	696858.9	732662.6	55	53	55	54
R295	Residential	696856.5	732665.1	54	52	54	52
R296	Residential	696598.7	732667.4	57	58	57	58
R297	Residential	696509.0	732676.4	48	49	48	50
R298	Residential	696493.3	732672.3	44	45	45	46
R299	Residential	696855.1	732682.6	55	53	55	53

Section 177AE Appendices to the Environmental Report

Receptor ID*	Description	Coordinates (ITM)		Predicted Noise Levels Opening Year (2025)		Predicted Noise Levels Design Year (2040)	
		X	Y	Do-Minimum	Do-Something	Do-Minimum	Do-Something
R300	Residential	696845.0	732668.9	52	51	52	51
R301	Residential	696504.5	732681.7	48	49	48	49
R302	Residential	696615.9	732678.3	64	64	64	64
R303	Residential	696847.5	732686.1	53	52	53	52
R304	Residential	696488.8	732677.7	45	46	45	47
R305	Residential	696642.1	732672.3	64	64	64	64
R306	Residential	696844.0	732687.7	53	51	53	51
R307	Residential	696840.5	732689.4	53	51	53	51
R308	Residential	696500.3	732686.7	48	49	48	49
R309	Residential	696837.1	732691.0	53	51	53	51
R310	Residential	696484.6	732682.6	45	46	45	46
R311	Residential	696833.6	732692.6	52	51	52	51
R312	Residential	696573.6	732682.1	51	52	51	52
R313	Residential	696829.3	732694.5	53	51	53	51
R314	Residential	696496.1	732691.8	47	49	48	49
R315	Residential	696653.7	732689.9	59	59	59	59
R316	Residential	696480.2	732695.6	45	46	45	46
R317	Residential	696822.0	732697.8	52	51	52	51
R318	Residential	696817.8	732699.8	52	50	52	50
R319	Residential	696491.7	732697.0	47	49	47	49
R320	Residential	696814.3	732701.4	51	50	51	50
R321	Residential	696810.8	732703.0	51	50	51	50
R322	Residential	696807.2	732704.6	51	50	51	50
R323	Residential	696660.0	732698.4	55	55	55	55
R324	Residential	696560.7	732690.5	49	50	49	51
R325	Residential	696803.7	732706.3	51	50	51	50
R326	Residential	696475.4	732701.1	46	47	46	47
R327	Residential	696800.2	732707.8	51	50	51	50
R328	Residential	696796.2	732709.7	50	49	50	49
R329	Residential	696487.5	732703.0	47	49	47	49
R330	Residential	696587.9	732695.5	52	53	52	53
R331	Residential	696473.7	732703.1	46	47	46	47
R332	Residential	696788.7	732713.1	50	49	50	49
R333	Residential	696784.5	732715.1	50	49	50	49
R334	Residential	696485.0	732712.5	46	47	46	47
R335	Residential	696781.0	732716.7	50	49	50	49
R336	Residential	696601.0	732702.3	59	59	59	59

Section 177AE Appendices to the Environmental Report

Receptor ID*	Description	Coordinates (ITM)		Predicted Noise Levels Opening Year (2025)		Predicted Noise Levels Design Year (2040)	
		X	Y	Do-Minimum	Do-Something	Do-Minimum	Do-Something
R337	Residential	696469.4	732708.2	46	47	46	47
R338	Residential	696662.9	732708.6	54	54	54	54
R339	Residential	696777.5	732718.3	50	49	50	49
R340	Residential	696774.1	732719.9	50	49	50	49
R341	Residential	696608.5	732716.2	63	63	63	63
R342	Residential	696480.7	732717.6	45	47	45	47
R343	Residential	696770.5	732721.5	50	49	50	49
R344	Residential	696767.0	732723.1	50	49	50	49
R345	Residential	696762.8	732725.0	50	49	50	49
R346	Residential	696476.3	732722.7	45	46	45	46
R347	Residential	696542.1	732715.4	50	51	50	51
R348	Residential	696755.4	732728.5	50	49	50	49
R349	Residential	696751.2	732730.4	50	49	50	49
R350	Residential	696547.0	732718.4	49	50	49	50
R351	Residential	696747.7	732732.0	50	49	50	49
R352	Residential	696553.7	732722.6	49	49	49	50
R353	Residential	696662.4	732718.8	54	54	54	54
R354	Residential	696744.2	732733.6	50	49	50	49
R355	Residential	696740.7	732735.2	50	49	50	49
R356	Residential	696731.3	732721.6	49	50	49	50
R357	Residential	696558.4	732725.5	49	49	49	49
R358	Residential	696725.9	732724.0	49	50	49	50
R359	Residential	696722.8	732726.7	49	50	49	50
R360	Residential	696566.1	732730.5	49	49	49	49
R361	Residential	696960.0	732738.1	66	64	66	65
R362	Residential	696570.8	732733.4	49	50	49	50
R363	Residential	696658.8	732728.5	54	54	54	54
R364	Residential	696710.8	732732.6	49	49	49	49
R365	Residential	696530.8	732740.4	45	46	45	46
R366	Residential	696577.5	732737.7	50	51	50	51
R367	Residential	696582.9	732739.4	52	52	52	52
R368	Residential	696528.0	732745.1	45	46	45	47
R369	Residential	696590.5	732742.1	58	58	57	58
R370	Residential	696648.3	732739.6	59	59	59	59
R371	Residential	696595.9	732743.6	59	59	59	59
R372	Residential	696608.9	732753.8	63	63	63	63
R373	Residential	696717.8	732747.7	50	50	50	50

Section 177AE Appendices to the Environmental Report

Receptor ID*	Description	Coordinates (ITM)		Predicted Noise Levels Opening Year (2025)		Predicted Noise Levels Design Year (2040)	
		X	Y	Do-Minimum	Do-Something	Do-Minimum	Do-Something
R374	Residential	696523.2	732751.5	45	46	45	47
R375	Residential	696633.5	732755.0	63	63	63	63
R376	Residential	696520.4	732756.2	45	46	45	46
R377	Residential	696515.8	732763.4	45	46	45	46
R378	Residential	696727.6	732759.8	46	46	46	46
R379	Residential	696513.0	732768.3	45	46	45	46
R380	Residential	696709.5	732767.0	47	47	47	47
R381	Residential	696568.6	732779.5	48	49	48	49
R382	Residential	696560.8	732779.0	48	48	48	48
R383	Residential	696573.9	732781.1	49	49	49	49
R384	Residential	696838.6	732753.9	55	54	55	54
R385	Residential	696581.8	732783.4	51	51	51	51
R386	Residential	696970.1	732770.5	63	62	64	62
R387	Residential	696587.1	732785.0	54	54	54	54
R388	Residential	696650.8	732781.4	53	53	53	53
R389	Residential	696594.9	732787.2	57	57	57	57
R390	Residential	696555.0	732785.4	47	47	47	47
R391	Residential	696749.1	732761.9	46	46	46	46
R392	Residential	696607.5	732787.2	63	63	63	63
R392a	Residential	696601.6	732789.2	59	59	59	59
R393	Residential	696552.0	732790.2	47	47	47	47
R394	Residential	696710.9	732788.1	45	46	45	46
R394a	Residential	696721.1	732792.1	45	45	45	45
R395	Residential	697027.0	732786.3	69	67	69	67
R396	Residential	696548.5	732797.5	47	47	47	47
R397	Residential	696569.0	732806.2	49	49	49	49
R398	Residential	696628.3	732808.8	63	63	63	63
R399	Residential	696574.4	732807.8	50	50	50	50
R400	Residential	696582.2	732810.1	52	52	52	52
R401	Residential	696587.6	732811.7	56	56	56	56
R402	Residential	696595.3	732814.0	58	58	58	58
R403	Residential	696602.4	732822.8	62	62	62	62
R403a	Residential	696600.6	732815.5	60	60	60	60
R404	Residential	696883.4	732782.4	58	58	58	58
R405	Residential	696635.9	732826.5	60	60	60	60
R406	Residential	696639.7	732838.6	60	60	59	60
R407	Residential	696641.2	732844.3	59	59	59	59

Section 177AE Appendices to the Environmental Report

Receptor ID*	Description	Coordinates (ITM)		Predicted Noise Levels Opening Year (2025)		Predicted Noise Levels Design Year (2040)	
		X	Y	Do-Minimum	Do-Something	Do-Minimum	Do-Something
R408	Residential	696824.4	732790.0	51	50	51	50
R409	Residential	696640.7	732852.0	60	60	60	60
R410	Residential	697151.1	732907.5	72	71	72	71
R410a	Residential	697145.8	732907.0	72	71	72	71
R411	Residential	697343.9	732939.9	75	75	75	74
R412	Residential	697208.2	732962.5	71	70	71	70
R413	Residential	697319.1	732961.8	76	75	76	75
R414	Residential	696914.1	733008.3	69	68	68	69
R415	Residential	697261.9	733005.7	76	75	76	75
R416	Residential	697273.2	733082.8	73	73	73	73
R417	Residential	697334.3	733203.1	73	73	73	73
R418	Residential	696723.2	730641.5	63	60	65	61
R419	Residential	696995.7	730659.6	56	52	58	52
R420	Residential	696644.1	730680.1	61	61	63	61
R421	Residential	696617.2	730790.6	66	66	68	67
R422	Residential	697270.3	730900.0	57	50	59	53
R423	Residential	697544.2	730939.4	52	49	53	49
R424	Residential	697788.6	731074.3	59	57	61	57
R424a	Residential	697779.1	731067.8	58	56	59	55
R425	Residential	698026.7	731130.8	52	53	53	53
R426	Residential	698042.9	731151.2	53	53	55	53
R427	Residential	698081.2	731176.2	54	54	55	54
R427a	Residential	698070.0	731173.6	54	53	56	53
R428	Residential	698406.1	731169.7	65	65	64	64
R429	Residential	698087.2	731192.5	56	55	58	55
R430	Residential	698141.0	731233.1	62	60	63	60
R431	Residential	698040.6	731222.5	60	58	61	57
R432	Residential	698016.5	731222.8	55	53	56	52
R433	Residential	696675.3	731230.8	64	64	65	64
R434	Residential	698163.5	731251.6	62	61	63	60
R435	Residential	698099.1	731253.8	61	59	63	59
R436	Residential	698210.7	731273.2	67	65	66	65
R437	Residential	698151.9	731295.1	63	61	63	61
R438	Residential	698283.1	731292.6	65	65	65	65
R438a	Residential	698292.4	731297.9	60	61	61	61
R439	Residential	698252.9	731310.3	70	70	70	70
R439a	Residential	698260.2	731315.5	59	59	60	60

Section 177AE Appendices to the Environmental Report

Receptor ID*	Description	Coordinates (ITM)		Predicted Noise Levels Opening Year (2025)		Predicted Noise Levels Design Year (2040)	
		X	Y	Do-Minimum	Do-Something	Do-Minimum	Do-Something
R440	Residential	698173.3	731315.1	65	64	66	64
R441	Residential	698199.6	731320.2	74	72	73	72
R441a	Residential	698200.8	731312.6	71	71	71	70
R442	Residential	698235.3	731333.1	70	69	70	69
R442a	Residential	698233.8	731343.6	66	65	66	65
R442b	Residential	698248.7	731335.7	59	60	60	60
R443	Residential	698482.0	731438.8	65	65	66	66
R443a	Residential	698481.4	731425.9	65	65	65	65
R444	Residential	698150.5	731440.3	68	68	69	68
R445	Residential	696643.3	731497.3	70	70	70	70
R446	Residential	697554.5	731551.8	51	53	52	54
R446a	Residential	697555.1	731540.3	51	53	53	53
R446b	Residential	697521.9	731546.9	44	52	45	52
R447	Residential	698597.2	731591.6	70	70	71	71
R448	Residential	696616.7	731665.4	66	66	65	65
R449	Residential	698058.3	731680.3	64	65	64	65
R450	Residential	696702.5	731721.1	58	59	58	59
R450a	Residential	696709.6	731722.1	56	58	56	58
R451	Residential	697781.3	731811.0	60	56	62	56
R451a	Residential	697775.1	731804.0	58	56	60	56
R451b	Residential	697779.2	731815.3	57	51	58	52
R452	Residential	696636.5	731866.9	68	67	67	67
R453	Residential	696798.7	731875.9	43	46	43	46
R454	Residential	696787.7	731886.7	44	47	44	48
R455	Residential	697783.3	731881.8	59	53	61	54
R455a	Residential	697772.6	731873.7	55	53	55	54
R456	Residential	698018.7	731907.2	61	60	62	60
R457	Residential	696762.2	731911.0	45	49	45	49
R458	Residential	696769.5	731919.5	45	49	45	50
R459	Residential	696778.2	731926.3	45	49	45	50
R460	Residential	696786.9	731933.1	45	50	45	50
R461	Residential	696795.8	731940.3	45	50	45	50
R462	Residential	696805.0	731946.4	45	51	45	51
R463	Residential	696867.2	731956.7	46	53	47	53
R463a	Residential	696866.2	731949.1	46	53	47	53
R464	Residential	696718.2	731950.5	44	45	44	45
R465	Residential	696814.8	731951.7	45	51	45	51

Section 177AE Appendices to the Environmental Report

Receptor ID*	Description	Coordinates (ITM)		Predicted Noise Levels Opening Year (2025)		Predicted Noise Levels Design Year (2040)	
		X	Y	Do-Minimum	Do-Something	Do-Minimum	Do-Something
R466	Residential	696857.9	731962.5	46	52	46	53
R467	Residential	696848.8	731968.6	46	52	46	52
R468	Residential	696721.1	731961.2	44	45	44	45
R468a	Residential	696708.5	731967.2	45	45	45	45
R469	Residential	696839.4	731974.6	45	52	46	52
R470	Residential	696724.4	731972.0	44	46	44	46
R470a	Residential	696711.8	731978.0	45	45	44	45
R471	Residential	696677.7	731977.0	60	60	60	59
R471a	Residential	696689.9	731973.7	44	44	44	44
R472	Residential	696830.7	731981.8	45	52	46	52
R473	Residential	696895.3	731981.4	47	53	47	54
R473a	Residential	696893.6	731990.1	47	53	47	54
R474	Residential	696727.1	731982.5	44	46	44	46
R474a	Residential	696714.6	731988.7	45	46	45	45
R475	Residential	696681.6	731991.1	60	60	60	59
R475a	Residential	696693.7	731987.9	44	44	43	44
R476	Residential	696884.2	731996.4	47	53	47	53
R477	Residential	696872.2	731998.5	45	49	45	49
R478	Residential	696730.2	731992.8	44	46	44	46
R478a	Residential	696717.6	731999.2	45	46	45	46
R479	Residential	696862.7	732004.5	45	49	45	50
R480	Residential	696685.5	732005.0	60	60	59	59
R480a	Residential	696697.0	731999.5	43	44	43	44
R481	Residential	696853.4	732010.5	45	52	45	52
R482	Residential	696733.2	732003.9	45	46	45	46
R482a	Residential	696720.3	732009.8	45	46	45	45
R483	Residential	696792.3	732012.6	45	50	45	50
R484	Residential	696844.0	732016.5	45	51	45	51
R485	Residential	696782.8	732020.7	46	50	46	51
R486	Residential	696689.4	732019.1	60	60	59	59
R486a	Residential	696701.5	732015.9	45	46	44	45
R487	Residential	696735.9	732014.4	44	47	44	47
R487a	Residential	696723.1	732020.6	45	46	45	46
R488	Residential	696846.5	732024.4	45	51	45	52
R489	Residential	696797.8	732028.9	45	47	44	47
R490	Residential	698775.1	732128.6	73	74	74	74
R491	Residential	697922.8	732188.9	62	60	62	60

Receptor ID*	Description	Coordinates (ITM)		Predicted Noise Levels Opening Year (2025)		Predicted Noise Levels Design Year (2040)	
		X	Y	Do-Minimum	Do-Something	Do-Minimum	Do-Something
R492	Residential	697580.7	732239.3	62	61	61	62
R493	Residential	697714.7	732305.5	64	63	64	64
R494	Residential	697859.8	732433.6	69	68	70	68
R495	Residential	698805.2	732473.4	68	69	69	69
R496	Residential	697847.6	732561.0	71	70	71	70
R497	Residential	697743.4	732659.0	67	67	67	66
R498	Residential	697738.4	732664.7	70	70	70	69
R499	Residential	697571.0	732750.5	71	70	70	69
R500	Residential	697629.0	733050.2	73	73	73	72
R501	Residential	698283.2	733320.3	73	73	74	74
R502	Residential	696907.4	732024.2	47	54	48	54
R502a	Residential	696901.2	732035.0	44	48	43	48
R503	Residential	697901.0	732034.9	68	66	68	67
R503a	Residential	697884.0	732040.9	61	59	62	59

* For some receptors, several locations around the building have been modelled, given their proximity to both existing roads and the Proposed Scheme. These locations have been denoted with letters 'a', 'b' and 'c'.

Table 5.18: Predicted Traffic Noise Levels with Mitigation

Receptor ID	Description	Predicted Noise Levels Design Year (L _{den})			Significance Rating
		Do-Minimum	Do-Something with Mitigation	Difference	
R38	Residential	49	56	7	Moderate
R38a	Residential	50	58	8	Moderate
R38b	Residential	48	55	7	Moderate
R38c	Residential	47	56	9	Moderate
R47	Residential	50	58	8	Moderate
R47a	Residential	49	56	7	Moderate
R47b	Residential	49	56	7	Moderate
R54	Residential	52	59	7	Moderate
R54a	Residential	51	57	6	Moderate
R54b	Residential	51	57	6	Moderate
R58	Residential	54	58	4	Not Significant
R58a	Residential	54	57	3	Not Significant
R61	Residential	59	59	0	Neutral
R61a	Residential	59	59	0	Neutral
R185	Residential	60	61	1	Not Significant
R185a	Residential	58	57	-1	Not Significant (Positive)

Section 177AE Appendices to the Environmental Report

Receptor ID	Description	Predicted Noise Levels Design Year (L _{den})			Significance Rating
		Do-Minimum	Do-Something with Mitigation	Difference	
R186	Residential	60	61	1	Not Significant
R186a	Residential	58	58	0	Neutral
R187	Residential	60	62	2	Not Significant
R187a	Residential	58	58	0	Not Significant
R188	Residential	60	62	2	Not Significant
R188a	Residential	58	58	0	Neutral
R189	Residential	60	62	2	Not Significant
R189a	Residential	58	58	0	Neutral
R190	Residential	60	62	2	Not Significant
R190a	Residential	58	58	0	Neutral
R191	Residential	60	60	0	Neutral
R191a	Residential	57	57	0	Neutral
R192	Residential	60	62	2	Not Significant
R192a	Residential	58	58	0	Neutral
R193	Residential	60	61	1	Not Significant
R193a	Residential	58	58	0	Neutral
R194	Residential	61	62	1	Not Significant
R194a	Residential	59	59	0	Neutral
R195	Residential	61	62	1	Not Significant
R195a	Residential	60	60	0	Neutral
R196	Residential	59	61	2	Not Significant
R196a	Residential	58	58	0	Neutral
R197	Residential	61	62	1	Not Significant
R197a	Residential	60	60	0	Neutral
R198	Residential	62	62	0	Neutral
R198a	Residential	60	60	0	Neutral
R199	Residential	60	61	1	Not Significant
R199a	Residential	58	58	0	Neutral
R200	Residential	62	62	0	Neutral
R200a	Residential	60	60	0	Neutral
R202	Residential	60	61	1	Not Significant
R202a	Residential	58	57	-1	Not Significant (Positive)
R204	Residential	60	60	0	Neutral
R204a	Residential	58	57	-1	Not Significant (Positive)
R206	Residential	60	60	0	Neutral
R207	Residential	60	60	0	Neutral

Receptor ID	Description	Predicted Noise Levels Design Year (L _{den})			Significance Rating
		Do-Minimum	Do-Something with Mitigation	Difference	
R208	Residential	60	59	-1	Not Significant (Positive)
R209	Residential	59	59	0	Neutral

Appendix 6.1 Air Quality Supporting Information

APPENDIX 6.1A RELEVANT GUIDELINES, POLICY AND LEGISLATION

The key legislation and guidance referenced in the preparation of the Air Quality assessment is outlined below and has informed the assessment.

Legislation

In terms of legislation for air quality, this is presented on two separate levels as follows:

- Ambient air quality legislation for the protection of human health; and
- National emissions legislation for transboundary pollution.

The ambient air quality standards in Ireland are outlined in the Air Quality Standards Regulations 2011 (S.I. No. 180 of 2011) (as amended) by the Air Quality Standards (Amendment) and Arsenic, Cadmium, Mercury, Nickel and Polycyclic Aromatic Hydrocarbons in Ambient Air (Amendment) Regulations 2016 (S.I. 659 of 2016) and Ambient Air Quality Standards Regulations 2022 (S.I. No. 739 of 2022) (“the Air Quality Regulations”), which incorporate the ambient air quality limits set out in Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe (known as the CAFE Directive²), for a range of air pollutants.

The Air Quality Regulations set limit values for the pollutants nitrogen dioxide (NO₂) and nitrogen oxides (NO_x), particulate matter (PM) with an aerodynamic diameter of less than 10 microns (PM₁₀), PM with an aerodynamic diameter of less than 2.5 microns (PM_{2.5}), lead (Pb), sulphur dioxide (SO₂), benzene and carbon monoxide (CO) as presented in **Table 6.1**.

Table 6.1: Air Quality Regulations (based on the CAFE Directive)

Pollutant	Regulation	Limit Type	Value
Nitrogen Dioxide	S.I. 180 of 2011	Hourly limit for protection of human health - not to be exceeded more than 18 times/year	200µg/m ³ NO ₂
		Annual limit for protection of human health	40µg/m ³ NO ₂
Nitrogen Oxides (NO + NO ₂)		Critical limit for the protection of vegetation and natural ecosystems	30µg/m ³ NO + NO ₂
Lead	S.I. 180 of 2011	Annual limit for protection of human health	0.5µg/m ³
Sulphur Dioxide	S.I. 180 of 2011	Hourly limit for protection of human health - not to be exceeded more than 24 times/year	350µg/m ³
		Daily limit for protection of human health - not to be exceeded more than three times/year	125µg/m ³
		Critical limit for the protection of vegetation and natural ecosystems (calendar year and winter)	20µg/m ³
Particulate Matter (as PM ₁₀)	S.I. 180 of 2011	24-hour limit for protection of human health - not to be exceeded more than 35 times/year	50µg/m ³
		Annual limit for protection of human health	40µg/m ³
Particulate Matter (as PM _{2.5})	S.I. 180 of 2011	Annual limit for protection of human health	25µg/m ³

² The CAFE Directive replaced the previous Council Directive 96/62/EC of 27 September 1996 on ambient air quality assessment and management and daughter directives, Council Directive 1999/30/EC of 22 April 1999 relating to limit values for sulphur dioxide, nitrogen dioxide and oxides of nitrogen, particulate matter and lead in ambient air and Directive 2000/69/EC of the European Parliament and of the Council of 16 November 2000 relating to limit values for benzene and carbon monoxide in ambient air.

Pollutant	Regulation	Limit Type	Value
Benzene	S.I. 180 of 2011	Annual limit for protection of human health	5µg/m ³
Carbon Monoxide	S.I. 180 of 2011	8-hour limit (on a rolling basis) for protection of human health	10mg/m ³

On a national level, Ireland is a party to the Convention on Long Range Transboundary Air Pollution (CLRTAP) under which certain transboundary air pollutants are controlled. For EU Member States, implementation of the Gothenburg Protocol (a daughter protocol of the CLRTAP) is achieved through limits set out in Directive 2001/81/EC of the European Parliament and of the Council of 23 October 2001 on national emission ceilings for certain atmospheric pollutants ("the NEC Directive") which has been amended by Directive (EU) 2016/2284.

The NEC Directive sets national emission ceilings for key pollutants including particulate matter (PM₁₀ (particles with a diameter of 10 microns or less) and PM_{2.5} (particles with a diameter of 2.5 microns or less)), sulphur dioxide (SO₂), nitrogen oxides (NO_x), ammonia (NH₃) and Volatile Organic Compounds (VOCs). The aim of the Directive is to cut the negative impacts of air pollution on human health by almost half by 2030. Reducing levels of illness, including respiratory and cardiovascular diseases and premature death is the main priority.

Ireland's emissions ceilings under the first NEC Directive applied until December 2019 with reference to 2005 as the base year. Article 4(1) and Annex II of the Directive (as amended) then sets out new reduction commitments which apply from 2020 to 2029, and from 2030 onwards as shown in **Table 6.2**.

Table 6.2: Ireland's National Emissions Ceiling Directive 2020 and 2030 Targets

Pollutant	2010-20 Targets under 2001/81/EC (kilotonnes)	Targets under 2016/2284/EU (kilotonnes)	
		2020	2030
SO ₂	42	25.574	10.960
NO _x	65	66.836	40.626
NM VOC	55	56.335	51.077
NH ₃	116	112.066	107.539
PM _{2.5}	N/A	15.606	11.229

Policy

European Policy

On 12 May 2021, the European Commission (EC) adopted the EU Action Plan: 'Towards a Zero Pollution for Air, Water and Soil' which was a key deliverable of the European Green Deal. The relevant targets for 2030 of this plan to this assessment are listed as follows:

- Improving air quality to reduce the number of premature deaths caused by air pollution by 55%.
- Reducing by 25% the EU ecosystems where air pollution threatens biodiversity.

Furthermore, as part of the European Green Deal, in October 2022 the EC proposed to revise the Ambient Air Quality Directives to align more closely with the recommendations of the World Health Organization (WHO). The purpose of this proposal is to:

- Put the EU on track to achieve zero pollution for air by 2050.
- Foresee a regular review of the air quality standards, in line with latest scientific evidence.
- Further improve the legal framework, providing more clarity on access to justice, damage redress, effective penalties, and better public information on air quality.
- Support local authorities in achieving cleaner air by strengthening air quality monitoring, modelling, and air quality plans.

- Merge the current two Directives into one and streamline provisions to clarify and simplify the rules.

National Policy

Nationally, Project Ireland 2040 the National Planning Framework cite air quality as a National Policy Objective 64 as follows:

Improve air quality and help prevent people being exposed to unacceptable levels of pollution in our urban and rural areas through integrated land use and spatial planning that supports public transport, walking and cycling as more favourable modes of transport to the private car, the promotion of energy efficient buildings and homes, heating systems with zero local emissions, green infrastructure planning and innovative design solutions.

In addition, the Clean Air Strategy for Ireland was published by the Department of the Environment, Climate and Communications (DECC) in April 2023 (DECC, 2023) with the following aims:

- To set the appropriate targets and limits to ensure continuous improvements in air quality across the country, to deliver health benefits for all.
- To ensure the integration of clean air considerations into policy development across Government.
- To increase the evidence base that will help us to continue to evolve our understanding of the sources of pollution and their impacts on health, in order to address them more effectively.
- To enhance regulation required to deliver improvements across all pollutants.
- To improve the effectiveness of our enforcement systems.
- To promote and increase awareness of the importance of clean air, and the links between cleaner air and better health.
- To develop the additional targeted/specific policy measures as required to deal with national or local air quality issues.

Following the EU policy, the national strategy commits to setting more stringent legal limits for ambient air quality taking into full consideration the new WHO guideline limits and the proposal for a new EU Ambient Air Quality Directive with achievement of final WHO Guidelines Value by 2040. In addition, interim values are proposed for 2026 and 2030 to track progress to meeting the WHO Guidelines by 2040.

Regional Policy

Kildare County Council has monitoring and enforcement responsibilities and powers under a range of Air Quality legislation, including:

- The Air Pollution Act 1987 (Solid Fuels) Regulations 2022 (I. No. 529 of 2022);
- The European Union (Paints, Varnishes, Vehicle Refinishing Products and Activities) Regulations 2012 (I. No. 564 of 2012);
- The European Union (Installations and Activities Using Organic Solvents) Regulation 2012 (I. No. 565 of 2012);
- The Waste Management (Prohibition of Waste Disposal by Burning) Regulations 2009 (I. No. 286 of 2009);
- The Air Pollution Act 1987 (Petroleum Vapour Emissions) Regulations 1997 (I. No. 375 of 1997);
- The Air Pollution Act 1987.

Guidance

The assessment utilises the predictive approaches of the following TII guidance documents:

- TII Air Quality Assessment of Specified Infrastructure Projects – Overarching Technical Document PE-ENV-01106 (December 2022) (TII, 2022a);
- TII Air Quality Assessment of Proposed National Roads - Standard PE-ENV-01107 (December 2022) (TII, 2022b);
- TII Road Emissions Model (REM): Model Development Report GE-ENV-01107 (December 2022) (TII, 2022c).

In addition, the following non-legislative guidance is applied to this assessment:

- Institute of Air Quality Management (IAQM) (2024) Guidance on the assessment of dust from demolition and construction;
- World Health Organization (WHO) (2021). WHO global air quality guidelines: particulate matter (PM_{2.5} and PM₁₀), ozone, nitrogen dioxide, sulphur dioxide and carbon monoxide;
- Technical Instructions on Air Quality Control – TA Luft, German Federal Ministry for Environment, Nature Conservation and Nuclear Safety, (July 2002).

The WHO Guidelines are particularly pertinent in relation to the statutory limits for the protection of human health as presented in **Table 6.1**. The WHO Guidelines are based on reducing the risk to human health and in some cases the levels differ from the statutory limits as these limits are based on balancing health risks with technological feasibility, economic considerations, and various other political and social factors in the EU. The 2021 Air Quality Guidelines (AQG) and interim targets recommended by the WHO are presented in **Table 6.3**. These guidelines are not legally binding; however, they do provide WHO Member States with an evidence-informed tool to inform legislation and policy. The levels are presented as an ultimate guideline as well as a series of interim targets which are proposed as incremental steps in a progressive reduction of air pollution and are intended for use in areas where pollution is high.

Table 6.3: WHO Recommended Air Quality Guideline (AQG) Levels and Interim Targets (2021)

Pollutant	Averaging Time	Interim Target				AQG
		1	2	3	4	
PM _{2.5} (µg/m ³)	Annual	35	25	15	10	5
	24-hour	75	50	37.5	25	15
PM ₁₀ (µg/m ³)	Annual	70	50	30	20	15
	24-hour	150	100	75	50	45
O ₃ (µg/m ³)	Annual	100	70	-	-	60
	24-hour	160	120	-	-	100
NO ₂ (µg/m ³)	Annual	40	30	20	-	10
	24-hour	120	50	-	-	25
SO ₂ (µg/m ³)	24-hour	125	50	-	-	40
CO (mg/m ³)	24-hour	7	-	-	-	4

APPENDIX 6.1B ASSESSMENT METHODOLOGY

Desktop Study

The baseline ambient air quality environment has been characterised through a desk study of publicly available published data sources and baseline ambient monitoring surveys undertaken in the area by the EPA.

A desk-based air quality assessment was carried out following TII's guidelines. The guideline states that wherever possible, use should be made of existing quality assured air quality data such as that undertaken by the EPA. Air quality monitoring programmes have been undertaken in recent years by the EPA. The most recent EPA Annual Air Quality in Ireland reports detail the range and scope of monitoring undertaken throughout Ireland and data from these reports is referenced to inform the baseline air quality.

A review of potentially sensitive ecological areas has also been conducted using the National Parks and Wildlife Services (NPWS) online mapping services.

Construction Dust

Construction dust is assessed in accordance with the procedures outlined in the IAQM '*Guidance on the assessment of dust from demolition and construction*' (2024) as recommended in the TII Guidelines.

The criteria for appraisal of the magnitude of dust emissions is reviewed for each site compound or area under the headings of demolition, earthworks, construction and track-out based on a series of criteria set out by the IAQM. The risk of potential for dust impacts with respect to dust nuisance, human health and ecology are a function of magnitude of the dust generation at each construction site in combination with the sensitivity of the surrounding area as per IAQM.

Road Traffic

Emissions from road transport when the road is operational have been calculated using the TII Road Emissions Model (REM). The REM calculates road transport emissions integrating the traffic volumes/speeds for light and heavy vehicles on the Proposed Scheme with Irish fleet composition information. Traffic data has been provided by the Traffic and Transportation Team.

Emission changes from revised traffic patterns and road layouts are quantified using the TII REM. This tool includes the following traffic and fleet mix information:

- Traffic information from the TII National Transport Model which provides validated estimates of the volumes of light and heavy vehicles, and the speed at which they travel, on the National Roads Network;
- A Fleet Mix database developed by researchers in the Energy Policy and Modelling Group at University College Cork for cars based on economic projections, and for other light and heavy vehicles by AECOM. The Fleet Mix database is underpinned by the Central Statistics Office's goods vehicles registration data (both heavy and light goods vehicles); and
- Emission Rate Database derived from the European Environment Agency's (EEA) COPERT Emissions Tool - the EU industry standard vehicle emissions calculator – published in the EMEP/EEA air pollutant emission inventory guidebook. These data were adjusted further using data published in the UK by DEFRA.

The traffic data for the Proposed Scheme have been input to the model to generate vehicle emissions for total national emissions. The tool does this by multiplying together the classified vehicles in the default Fleet Mix Database with the speed-based emission rates in the specified Emissions Rate Database and the proposed traffic flows for the Proposed Scheme.

Under EU and national policy on electric vehicles and fuel and engine technology, the proportions of the different vehicle classifications (EURO classification) will change over time because it is expected the fleet will move towards increased adoption of newer and relatively lower emission vehicles in the future, including greater uptake of hybrid (HEV), battery-electric (BEV) and alternative fuelled vehicles. The extent of this change is unknown, so the results are generated for three separate Fleet Databased scenarios within the REM model as follows:

- Business as Usual (BaU) scenario; i.e. excluding strategic policy interventions for reduction of CO₂, etc, and based on existing trends in vehicle purchasing and turnover of vehicles out of the vehicle fleet;

Section 177AE Appendices to the Environmental Report

- Climate Action Plan (CAP) based on achieving increases in EVs including 151,000 passenger car EV and PHEVs by 2025 and 840,000 passenger car EV and PHEVs by 2030; and
- An intermediate case using linear extrapolation to a central value between BaU and CAP for each vehicle sub-classification.

The BaU represents a scenario whereby there is no progression in reducing the average tailpipe greenhouse gas emissions per vehicle while the CAP scenario assumes a full implementation of current CAP policy and targets. Results for all three scenarios are presented within this assessment.

APPENDIX 6.1C CONSTRUCTION DUST ASSESSMENT METHODOLOGY

Defining Dust Emission Magnitude (Step 2A IAQM Guidance)

Demolition

Dust emission magnitude from demolition can be classified as small, medium, or large and are described as follows:

- Large: Total building volume $>75,000\text{m}^3$, potentially dusty construction material (e.g. concrete), on-site crushing and screening, demolition activities $>12\text{m}$ above ground level;
- Medium: Total building volume $12,000\text{m}^3 - 75,000\text{m}^3$, potentially dusty construction material, demolition activities $6\text{--}12\text{m}$ above ground level; and
- Small: Total building volume $<12,000\text{m}^3$, construction material with low potential for dust release (e.g. metal cladding or timber), demolition activities $<6\text{m}$ above ground, demolition during wetter months.

Earthworks

Earthworks will primarily involve excavating material, haulage, tipping, and stockpiling. This may also involve levelling the site and landscaping. Dust emission magnitude from earthworks can be classified as small, medium, or large and are described as follows:

- Large: Total site area $>110,000\text{m}^2$, potentially dusty soil type (e.g. clay, which will be prone to suspension when dry due to small particle size), >10 heavy earth moving vehicles active at any one time, formation of bunds $>6\text{m}$ in height;
- Medium: Total site area $18,000\text{m}^2 - 110,000\text{m}^2$, moderately dusty soil type (e.g. silt), $5\text{--}10$ heavy earth moving vehicles active at any one time, formation of bunds $3\text{m} - 6\text{m}$ in height; and
- Small: Total site area $<18,000\text{m}^2$, soil type with large grain size (e.g. sand), <5 heavy earth moving vehicles active at any one time, formation of bunds $<3\text{m}$ in height.

Construction

Dust emission magnitudes from construction can be classified as small, medium, or large and are described as follows:

- Large: Total building volume $>75,000\text{m}^3$, on site concrete batching, sandblasting;
- Medium: Total building volume $12,000\text{m}^3 - 75,000\text{m}^3$, potentially dusty construction material (e.g. concrete), on site concrete batching; and
- Small: Total building volume $<12,000\text{m}^3$, construction material with low potential for dust release (e.g. metal cladding or timber).

Track-out

Factors which determine the dust emission magnitude are vehicle size, vehicle speed, vehicle numbers, geology, and duration. Track-out refers to the dirt, mud, or other debris tracked or carried onto the public road network on the wheels of vehicles exiting construction sites. Dust emission magnitude from Track-out can be classified as small, medium or large and are described as follows:

- Large: >50 Heavy Duty Vehicle (HDV) ($>3.5\text{t}$) outward movements in any one day, potentially dusty surface material (e.g. high clay content), unpaved road length $>100\text{m}$;
- Medium: $20\text{--}50$ HDV ($>3.5\text{t}$) outward movements in any one day, moderately dusty surface material (e.g. high clay content), unpaved road length $50\text{m} - 100\text{m}$; and
- Small: <20 HDV ($>3.5\text{t}$) outward movements in any one day, surface material with low potential for dust release, unpaved road length.

Defining Sensitivity of the Area (Step 2B IAQM Guidance)

Receptor Sensitivity

Receptor sensitivity can be described as follows with respect to nuisance dust as per the IAQM Guidance:

- **High sensitivity receptor with respect to dust nuisance – surrounding land where:**
 - Users can reasonably expect enjoyment of a high level of amenity;
 - The appearance, aesthetics or value of their property would be diminished by soiling;
 - The people or property would reasonably be expected to be present continuously, or at least regularly for extended periods, as part of the normal pattern of use of the land; or
 - Examples include dwellings, museums and other culturally important collections, medium and long-term car parks and car showrooms.
- **Medium sensitivity receptor with respect to dust nuisance – surrounding land where:**
 - Users would expect to enjoy a reasonable level of amenity, but would not reasonably expect to enjoy the same level of amenity as in their home;
 - The appearance, aesthetics or value of their property could be diminished by soiling;
 - The people or property would not reasonably be expected to be present continuously or regularly for extended periods as part of the normal pattern of use of the land; or
 - Indicative examples include parks and places of work.
- **Low sensitivity receptor with respect to dust nuisance – surrounding land where:**
 - The enjoyment of amenity would not reasonably be expected;
 - Property would not reasonably be expected to be diminished in appearance, aesthetics, or value by soiling;
 - There is transient exposure, where the people or property would reasonably be expected to be present only for limited periods of time as part of the normal pattern of use of the land; or
 - Indicative examples include playing fields, farmland (unless commercially sensitive horticultural), footpaths, short term car parks and roads.

Receptor sensitivity can be described as follows with respect to human health as per the IAQM Guidance:

- **High sensitivity receptor with respect to human health – surrounding land where:**
 - Locations where members of the public are exposed over a time period relevant to the air quality objective for PM₁₀ (in the case of the 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day); or
 - Indicative examples include residential properties. Hospitals, schools, and residential care homes should also be considered as having equal sensitivity to residential areas for the purposes of this assessment.
- **Medium sensitivity receptor with respect to human health – surrounding land where:**
 - Locations where the people exposed are workers, and exposure is over a time period relevant to the air quality objective for PM₁₀ (in the case of the 24-hour objectives, relevant location would be one where individuals may be exposed for eight hours or more in a day); or

- Indicative examples include office and shop workers but will generally not include workers occupationally exposed to PM₁₀, as protection is covered by Health and Safety at Work legislation.
- **Low sensitivity receptor with respect to human health – surrounding land where:**
 - Locations where human exposure is transient; or
 - Indicative examples include public footpaths, playing fields, parks, and shopping streets.

Receptor sensitivity can be described as follows with respect to ecology as per the IAQM Guidance:

- **High sensitivity receptor with respect to ecology – surrounding land where:**
 - Locations with an international or national designation and the designated features may be affected by dust soiling; or
 - Indicative examples include a Special Area of Conservation (SAC) designated for acid heathlands or a local site designated for lichens adjacent to the demolition of a large site containing concrete (alkali) buildings.
- **Medium sensitivity receptor with respect to ecology – surrounding land where:**
 - Locations where there is a particularly important plant species, where its dust sensitivity is uncertain or unknown; or
 - Locations with a national designation where the features may be affected by dust deposition.
 - Indicative example is a Site of Special Scientific Interest (SSSI) with dust sensitive features.
- **Low sensitivity receptor with respect to ecology – surrounding land where:**
 - Locations with a local designation where the features may be affected by dust deposition; or
 - Indicative example is a local Nature Reserve with dust sensitive features.

Determining the Sensitivity of the area for dust soiling, human health and ecological impacts

Table 1, Table 2 and Table 3 show how the sensitivity of the area may be determined for dust soiling, human health and ecosystem impacts respectively.

Table 1: Determining Sensitivity of the Area - Dust Soiling Effects on People and Property (from IAQM Guidance)

Receptor Sensitivity	Number of Receptors	Distance from Source (m)			
		<20	<50	<100	<250
High	>100	High	High	Medium	Low
	10 - 100	High	Medium	Low	Low
	1 - 10	Medium	Low	Low	Low
Medium	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low

Table 2: Determining Sensitivity of the Area to PM₁₀ Human Health Impacts (from IAQM Guidance)

Receptor Sensitivity	Annual Mean PM ₁₀ Concentration	Number of Receptors	Distance from Source (m)			
			<20	<50	<100	<250
High	> 32µg/m ³	>100	High	High	High	Medium
		10 - 100	High	High	Medium	Low
		1 – 10	High	Medium	Low	Low

Receptor Sensitivity	Annual Mean PM ₁₀ Concentration	Number of Receptors	Distance from Source (m)			
			<20	<50	<100	<250
Medium	28µg/m ³ - 32µg/m ³	>100	High	High	Medium	Low
		10 - 100	High	Medium	Low	Low
		1 – 10	High	Medium	Low	Low
	24µg/m ³ – 28µg/m ³	>100	High	Medium	Low	Low
		10 - 100	High	Medium	Low	Low
		1 – 10	Medium	Low	Low	Low
	< 24µg/m ³	>100	Medium	Low	Low	Low
		10 - 100	Low	Low	Low	Low
		1 – 10	Low	Low	Low	Low
	> 32µg/m ³	>10	High	Medium	Low	Low
		1 – 10	Medium	Low	Low	Low
	28µg/m ³ - 32µg/m ³	>10	Medium	Low	Low	Low
		1 - 10	Low	Low	Low	Low
	24µg/m ³ - 28µg/m ³	>10	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low
	< 24µg/m ³	>10	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low
Low	-	1+	Low	Low	Low	Low

Table 3: Sensitivity of the Area to Ecological Impacts (from IAQM Guidance)

Receptor Sensitivity	Distance from Source (m)	
	<20	<50
High	High	Medium
Medium	Medium	Low
Low	Low	Low

Define the Risk of Impacts (Step 2C)

The dust emission magnitude determined at Step 2A should be combined with the sensitivity of the area determined at Step 2B to determine the risk of impacts with no mitigation applied. The matrices in Table 4, Table 5, Table 6 and Table 7 provide a method of assigning the level of risk for each activity. This should be used to determining the level of mitigation that must be applied.

Table 4: Risk of Dust Impacts - Demolition

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Medium Risk
Medium	High Risk	Medium Risk	Low Risk
Low	Medium Risk	Low Risk	Negligible

Table 5: Risk of Dust Impacts - Earthworks

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Table 6: Risk of Dust Impacts – Construction

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Table 7: Risk of Dust Impacts – Track Out

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Appendix 7.1 Climate Supporting Information

APPENDIX 7.1A RELEVANT GUIDELINES, POLICY AND LEGISLATION

In relation to climate, the following legislation is relevant for this assessment:

- Climate Action and Low Carbon Development Act 2015 ('the 2015 Act'); and
- Climate Action and Low Carbon Development (Amendment) Act 2021 ('the 2021 Amendment Act').

The **National Policy Position on Climate Action and Low Carbon Development (2014)** recognises the threat of climate change for humanity; anticipates and supports mobilisation of a comprehensive international response to climate change, and global transition to a low-carbon future; recognises the challenges and opportunities of the broad transition agenda for society; and aims, as a fundamental national objective, to achieve transition to a competitive, low-carbon, climate-resilient and environmentally sustainable economy by 2050.

The **Climate Action and Low Carbon Development Act 2015** facilitates the approval of plans for Ireland in relation to climate change to aid the transition to a low carbon, climate resilient and environmentally sustainable economy by the end of 2050. In line with this objective, a national mitigation plan and national adaptation framework were required to be produced by the Minister to the Government for approval. The **Climate Action and Low Carbon Development (Amendment) Act 2021** further strengthens the governance framework on climate action, and through this Act, Ireland has:

- Set economy-wide carbon budgets and sectoral emission ceilings (SECs) for the periods 2021-25 and 2026-30;
- Established pathways to deliver the SECs, incorporating 26 MtCO₂eq. in unallocated emissions savings for the second carbon budget period; and
- Defined a delivery approach through specific measures and actions to meet emissions ceilings, which are estimated to require €119bn in capital investment between 2022-2030.

The 2021 Act places the national climate objective of achieving, by no later than 2050, the "transition to a climate resilient, biodiversity-rich, environmentally sustainable, and climate-neutral economy" on a statutory footing. The 2021 Amendment Act also replaced the 2015 Act's requirement for a National Mitigation Plan with a requirement for the preparation of an annual update to the Climate Action Plan and to prepare, not less frequently than once every five years, a national long term climate action strategy.

The first **Climate Action Plan 2019 (CAP19)** was formulated on a non-statutory basis. It set out many measures, key objectives and targets to address the climate change agenda. There have since been two updates building on the 2019 plan – the first in 2021 (CAP21) which set out a wide range of policies aimed at decarbonisation in relation to the particular sectors of the economy, the second in 2022 (CAP23), the third in 2023 (CAP24). The DECC is required to publish an update to the CAP annually.

The **Climate Action Plan 2024 (CAP24)** is the third annual update to Ireland's CAP19 and the second to be prepared under the Climate Action and Low Carbon Development (Amendment) Act 2021. CAP24 builds upon the measures and actions of CAP23. The CAP24 outlines the actions required to 2035 and beyond to achieve the ambition of halving Ireland's GHG emissions by the end of the decade and aiming for carbon neutrality by 2050. CAP24 sets out a number of high-impact actions that need to be taken. Covering the following sectors: electricity, industry, enterprise, housing, heating, transport, agriculture, waste, and the public sector.

The Climate Action Plan 2025 (CAP25) is the fourth annual update to Ireland's CAP19 and the third statutory annual update to be prepared under the Climate Action and Low Carbon Development (Amendment) Act 2011. CAP25 outlines the actions required to 2035 and beyond to achieve the ambition of halving Ireland's GHG emissions by the end of the decade and aiming for carbon neutrality by 2050. CAP25 sets out a number of high-impact actions that need to be taken. Transport actions for 2025 reflect continuation of, and are in line with, agreed policies set out in CAP23 and CAP24. No change has been made to the key performance indicators provided in CAP24, to set out the level of change required to meet a 50% compliant pathway. Also, the key active travel action from CAP24 remains unchanged as Action TR/25/7: Advance roll-out of walking/cycling infrastructure in line with National Cycle Network and CycleConnects plans.

The 2021 Act also requires local authorities to prepare **Local Authority Climate Action Plans (LA CAPs)** and formal instruction was issued by the Minister of the DECC in February 2023 to all local authorities to prepare their plans, with guidelines prepared to assist LAs in their preparation. These plans will help ensure that the national climate objective can be achieved through all levels of the planning hierarchy, from the

Climate Action Plan, down through the three Regional Spatial and Economic Strategies (RSESs) and forthcoming **Regional Renewable Electricity Strategies** [yet to be prepared], and through the LA CAPs.

The **Long-term Strategy on Greenhouse Gas Emissions Reductions** was published in July 2023 as part of the actions proposed under CAP23 and as a requirement under the Climate Action and Low Carbon Development (Amendment) Act 2021. This strategy sets out indicative pathways, beyond 2030, towards achieving carbon neutrality for Ireland by 2050. A long-term strategy is also a requirement of the Regulation on the governance of the energy union and climate action (EU) 2018/1999. It covers the following with a perspective of at least 30 years:

- Total greenhouse gas emission reductions and enhancements of removals by sinks;
- Emission reductions and enhancements of removals in individual sectors, including electricity, industry, transport, the heating and cooling and buildings sector (residential and tertiary), agriculture, waste and land use, land-use change and forestry (LULUCF);
- Expected progress on transition to a low greenhouse gas emission economy, including greenhouse gas intensity, CO₂ intensity of gross domestic product, related estimates of long-term investment, and strategies for related research, development and innovation;
- The expected socio-economic effect of the decarbonisation measures, including aspects related to macro-economic and social development, health risks and benefits and environmental protection; and
- Links to other national long-term objectives, planning and other policies and measures, and investment.

Kildare Climate Action Plan 2024 - 2029

- Enable enhanced access to Maynooth train station, such as through improved footpaths, safe cycle lanes, local bus services, Park and Ride, etc., to maximise the modal shift potential of the local rail network, having due regard to environmental sensitivities such as the receiving water environment, biodiversity, European sites local air quality, cultural heritage.
- Promote active travel initiatives in the town to enable greater uptake of walking and cycling with a focus on strategic hubs such as the train station, the university and the town centre, having due regard to environmental sensitivities such as the receiving water environment, biodiversity, European sites local air quality, cultural heritage.

Adaptation

First published in 2018, the **National Adaptation Framework** contained Ireland's strategy for the application of climate adaptation measures to reduce the vulnerability of the State to the negative effects of climate change, and to seek opportunities for any positive effects that may occur. This framework is currently being reviewed in line with the requirements of the Climate Action and Low Carbon Development Act 2015-2021 and an update to the NAF has been published for public consultation. Following consultation, the new NAF will be finalised and will replace the 2018 NAF.

Twelve **Sectoral Climate Change Adaptation Plans** were published in June 2020 in line with the National Adaptation Framework and CAP19. These sectoral plans identified the key risks faced across sectors including agriculture, biodiversity, built and archaeological heritage, transport infrastructure, electricity and gas networks, communications, flood risk management, water quality and services infrastructure and health. The plans detail the approach being taken to address these risks and build climate resilience for the future. The plans include actions that:

- Mainstream adaptation into key sectoral plans and policies;
- Identify and understand the key vulnerabilities, risks, and opportunities facing specific sectors, as well as major risks cross cutting different sectors;
- Ensure climate-proofing of strategic emergency planning;
- Identify and collect information on the costs and benefits of adaptation within specific sectors;
- Build capacity within sectors to cope with climate change;
- Identify and address key research gaps within their sectors;
- Improve co-ordination with the local government sector; and
- Develop appropriate monitoring and verification systems within sectors.

Carbon Budgets

In relation to carbon budgets, the Climate Action and Low Carbon Development (Amendment) Act states ‘A carbon budget, consistent with furthering the achievement of the national climate objective, shall be proposed by the Climate Change Advisory Council, finalised by the Minister and approved by the Government for the period of 5 years commencing on the 1 January 2021 and ending on 31 December 2025 and for each subsequent period of 5 years (in this Act referred to as a ‘budget period’).

The carbon budget is to be produced for three sequential budget periods, as shown in **Table 7.4**. The carbon budget can be revised where new obligations are imposed under the law of the European Union or international agreements or where there are significant developments in scientific knowledge in relation to climate change. In relation to the sectoral emissions ceiling, the Minister for the Environment, Climate and Communications (the Minister for the Environment) shall prepare and submit to government the maximum amount of GHG emissions that are permitted in different sectors of the economy during a budget period and different ceilings may apply to different sectors. The sectoral emission ceilings for 2030 were published July in 2022 and are shown in **Table 7.5**.

Table 7.4: 5-Year Carbon Budgets 2021-2025, 2026-2030 and 2031-2035 (Department of the Taoiseach, 2022)

Budget Period	Carbon Budget	Reduction Required
2021-2025	295 Mt CO ₂ e	Reduction in emissions of 4.8% per annum for the first budget period.
2026-2030	200 Mt CO ₂ e	Reduction in emissions of 8.3% per annum for the second budget period.
2031-2035	151 Mt CO ₂ e	Reduction in emissions of 3.5% per annum for the third provisional budget.

Table 7.5: Sectoral Emission Ceilings 2030 (Department of the Taoiseach, 2022)

Sector	Baseline (Mt CO ₂ e)	Carbon Budgets (Mt CO ₂ e)		2030 Emissions (Mt CO ₂ e)	Indicative Emissions % Reduction in Final Year of 2025- 2030 Period (Compared to 2018)
	2018	2021-2025	2026-2030		
Transport	12	54	37	6	50
Electricity	10	40	20	3	75
Built Environment - Residential	7	29	23	4	40
Built Environment - Commercial	2	7	5	1	45
Agriculture	23	106	96	17.25	25
Land Use, Land-use Change and Forestry (LULUCF)	5	TBC	TBC	TBC	TBC
Industry	7	30	24	4	35
Other (F-gases, waste, petroleum refining)	2	9	8	1	50
Unallocated Savings	-	7	5	-5.25	-
Total	68	TBC	TBC	-	-
Legally Binding Carbon Budgets and 2030 Emission Reduction Targets	-	295	200	-	51

APPENDIX 7.1B EU AND NATIONAL TARGETS AND OBJECTIVES

The **European Green Deal** is the EU's long-term growth strategy which aims to make Europe climate-neutral by 2050 and put renewable energy at the heart of the energy system. As part of the Green Deal, with the **European Climate Law**, the EU has set itself a binding target of achieving climate neutrality by 2050. As an intermediate step towards climate neutrality, the EU has raised its 2030 climate ambition, committing to cutting emissions by at least 55% by 2030. The EU is working on the revision of its climate, energy and transport-related legislation under the so-called 'Fit for 55 package' in order to align current laws with the 2030 and 2050 ambitions.

The **Fit for 55 Package** comprises a set of proposals to revise and update EU legislation and includes for new initiatives with the overall aim of ensuring that EU policies are in line with the Council and the European Parliament's climate goals of reducing net GHG emissions by at least 55% by 2030. It includes for an update to the **Emissions Trading Scheme (ETS)** with new provisions such as extension to cover maritime emissions and a revision of rules applying to the aviation sector. The changes to the EU ETS have now been agreed under **Directive 2023/959** (amending Directive 2003/87/EC and Decision (EU) 2015/1814) and were to be implemented in national regulation by December 31, 2023, at the latest.

The 2020 **EU Effort Sharing Decision (ESD)** target commits Ireland to reducing emissions from those sectors that are not covered by the emissions trading scheme (i.e. agriculture, transport, residential, non-energy intensive industry, commercial services, and waste) to 20% below 2005 levels. The Non-ETS (Emissions Trading System) sector (i.e. road transport, buildings, agriculture, waste and small industry) accounts for approx. 60% of the EU's emissions³, and 78.5% of total emissions in Ireland.⁴ The **Effort Sharing Regulation [ESR] (EU) 2018/842** as amended in March 2023 by **Regulation (EU) 2023/857** enshrines a GHG emissions reduction target for Ireland of -42% by 2030, relative to 2005 levels.

The European Climate Law, **Regulation (EU) 2021/1119**, amends Regulation (EU) 2018/1999. It sets a binding EU target of a net domestic reduction in GHG emissions by at least 55% (compared with 1990 levels) by 2030 and undertakes to set a climate target for 2040 within 6 months of the first global stocktaking under the Paris Agreement. **Regulation (EU) 2018/842** sets binding annual GHG emissions reductions over the 2021–2030 period for Member States in order to fulfil the EU's target of reducing its GHG emissions by 30% below 2005 levels by 2030 in certain sectors listed in Article 2 of the Regulation and also contributes to achieving the objectives of the Paris Agreement.

The **Impact Assessment for the European Climate Law – Stepping up Europe's 2030 Climate Ambition – Investing in a Climate Neutral Future for the Benefit of our People** was published by the EC in 2020, and it raises the EU's climate action ambition through the aim to reduce GHG emissions by 55% by 2030. This plan seeks to reduce GHG emissions across the energy systems (buildings, transport and industry), land-use sectors and through updating of the 2030 Climate and Energy policy framework. This plan provides opportunities to achieve sustainable growth and provides improved clarity to stakeholders on the EU's pathway to climate neutrality by 2050.

The **EU Adaptation Strategy 2021** outlines a long-term vision for the EU to become a climate-resilient society, fully adapted to the unavoidable impacts of climate change by 2050. This strategy aims to reinforce the adaptive capacity of the EU and the world and minimise vulnerability to the impacts of climate change, in line with the Paris Agreement and the European Climate Law. The law recognises adaptation as a key component of the long-term global response to climate change and requires Member States and the Union to enhance their adaptive capacity, strengthen resilience and reduce vulnerability to climate change. It also introduces a requirement for the implementation of national strategies. The three main objectives of this Strategy include improving knowledge and managing uncertainty; supporting policy development at all levels and all relevant policy fields; and speeding up adaptation implementation.

The Climate Action and Low Carbon Development Act 2015 provides a legal definition for adaptation as adjustment to any system designed or operated by humans, including an economic, agricultural, or technological system, or any naturally occurring system, including an ecosystem, that is intended to counteract the effects of climate change, prevent or moderate environmental damage resulting from climate

³ Fit for 55: reducing emissions from transport, buildings, agriculture and waste. Available at: <https://www.consilium.europa.eu/en/infographics/fit-for-55-effort-sharing-regulation/>

⁴ SEAI: Share of greenhouse gas emissions in Ireland in 2022. Available at: [CO₂ Emissions](#) [Accessed April 2024]

change, or confer environmental benefits. In the context of climate change, risks emerge from the interactions between climate change and related hazards (heatwaves, floods, droughts etc.), exposure and vulnerability. Risk is in constant evolution as the frequency and intensity of weather extremes increase and as exposure and vulnerability change. Therefore, adaptation should be seen as iterative risk management process⁵, that responds to the dynamics and evolution of risk, where emphasis is placed on ongoing processes of assessment, action, monitoring, evaluation, learning and improvement. Widespread, pervasive impacts to ecosystems, people, settlements, and infrastructure have resulted from observed increases in the frequency and intensity of climate and weather extremes, including hot extremes on land and in the ocean, heavy precipitation events, drought, and fire weather. These extremes are occurring simultaneously, causing cascading impacts that are increasingly difficult to manage.

A key target for Ireland is a 42% reduction in GHG emissions which is required under the Effort Sharing Regulation. **Table 7.6** compares Ireland's ESR share with the broader EU-wide GHG emissions reduction targets.

Table 7.6: Key Targets for GHG Emissions Reductions by 2030

By 2030	Previous (pre-Fit for 55 Package)	Current	Relative to
EU economy-wide target	40%	At least 55%	1990
EU ETS contribution	43%	62%	2005
EU ESR contribution	30%	40%	2005
<i>Ireland's legally binding ESR target</i>	30%	42%	2005

⁵IPCC (2022). Climate Change 2022: Impacts, Adaptation and Vulnerability
https://report.ipcc.ch/ar6/wg2/IPCC_AR6_WGII_FullReport.pdf

APPENDIX 7.1C WHOLE LIFE CARBON (WLC) ASSESSMENT

Baseline Emissions Assessment

Based on the PAS 2080: 2023 whole lifecycle modular approach, the overall baseline emissions assessment of this project was calculated to be 6,140 tonnes CO₂(eq) (6,140 tonnes CO₂(eq) across a 2.12km road distance; equating to 2,896 tonnes CO₂(eq) per km). The baseline emissions generated at each lifecycle stage can be seen below in **Figure 7-1** and is discussed below.

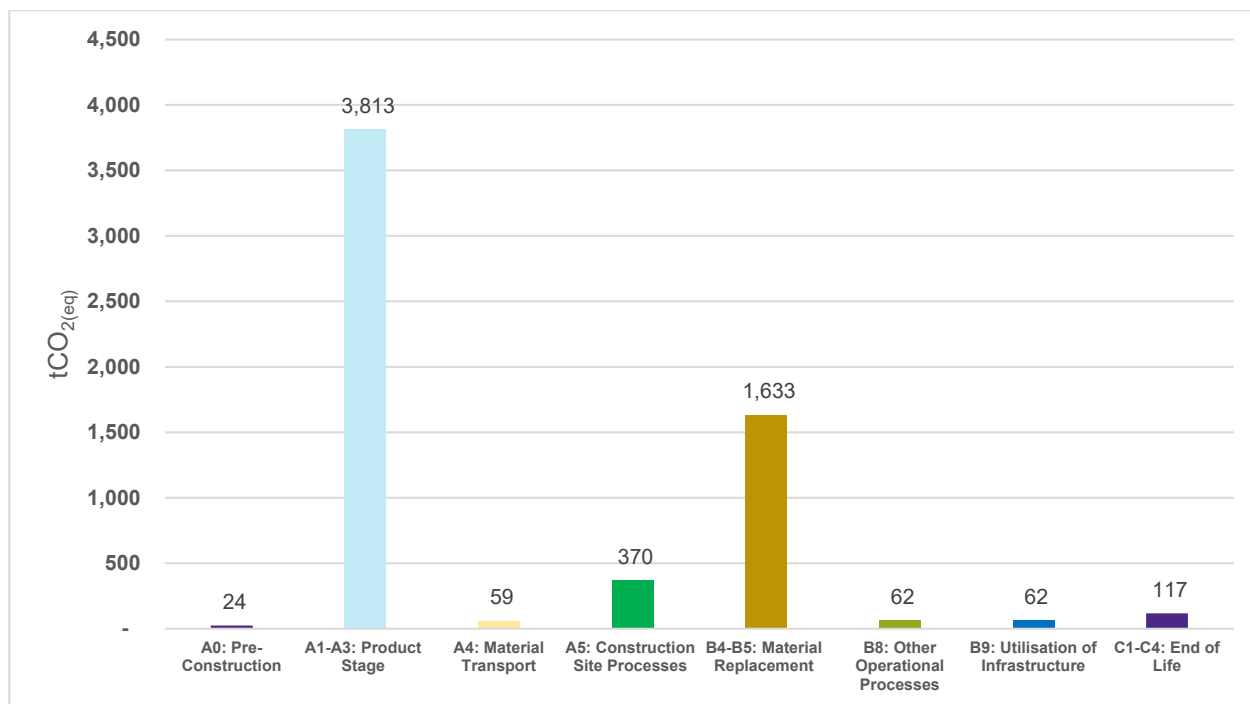


Figure 7-1 CHMC Project Baseline Emissions by Lifecycle Stage

A0: Pre-construction stage

Activities in A0: pre-construction stage includes all the before lifecycle stages, and includes planning costs, land costs, professional fees and taxes incurred. In relation to the proposed scheme, it includes the land clearance that would be involved in preparing the site for the main construction works. The land to be cleared is primarily agricultural land which contains some scrub elements that would be negatively impact the carbon sequestration properties of the land. Overall, the emissions associated with this stage were calculated to be 24 tCO₂(eq); 0.4% of the total emissions baseline.

A1-A3: Product stage

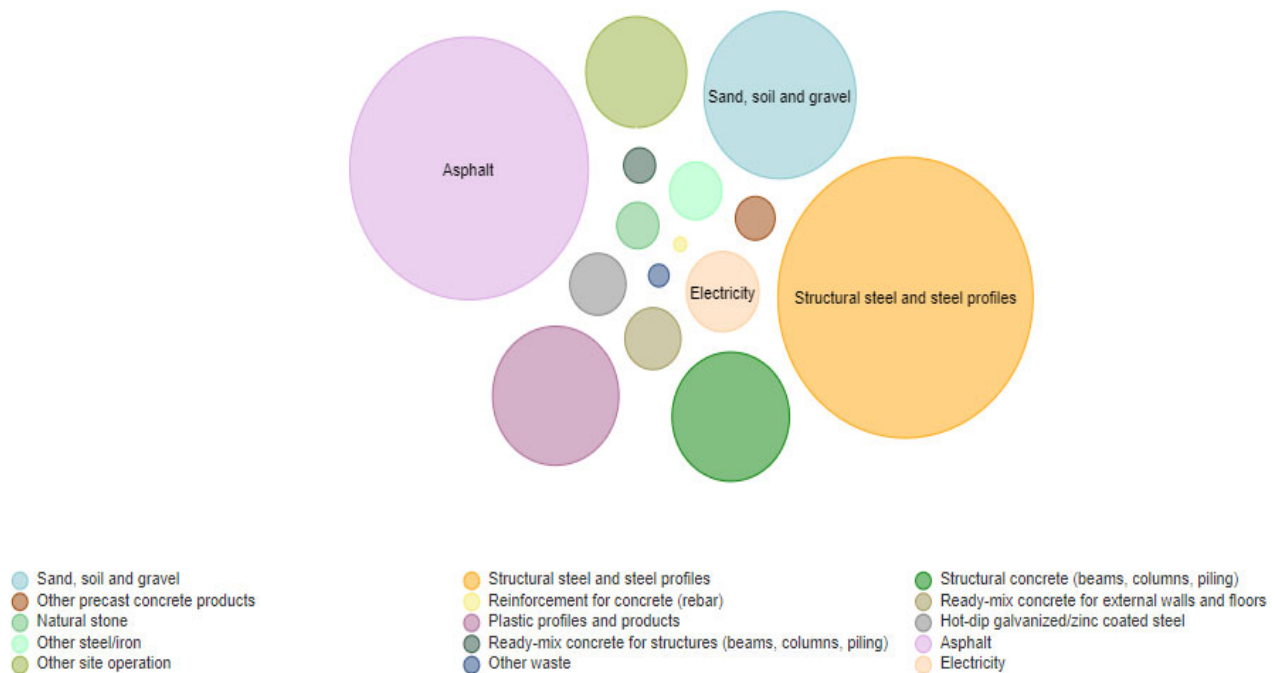
Activities in A1-A3: product stage includes the provision of all materials, products, and energy, as well as waste processing up to the end-of-waste state or disposal of final residues during the product stage⁶. The product stage was found to be the largest contributing factor to the project emissions baseline; equating to 3,813 tonnes CO₂(eq) or 62% of the total emissions baseline.

A breakdown of the materials and the associated tonnes CO₂(eq) and percentage of the total, is set out in **Table 7.7**. Structural steel, required for the bridge construction; imported clay soil; and the asphalt pavements (including the surface, base and binder courses) were identified as the five highest contributors to the A1-3: product stage emissions baseline (as illustrated in **Figure 7-2** below).

⁶ Life Cycle Stages – One Click LCA Help Centre (zendesk.com)

Table 7.7: Product Stage Materials and associated tCO₂(eq)

Material	GHG Emissions tCO ₂ (eq)	% of Total A1-3 Product Stage Emissions Baseline
Structural Steel Profiles	2,230	36
Clay Soil, Gravel Compact Dry Density	645	11
Asphalt Pavement (asphalt Concrete) surface course (wear layer hot mix)	612	10
Asphalt Pavement (asphalt Concrete) base course hot mix	597	10
Asphalt Pavement (asphalt Concrete) binder course, hot mix	475	8
High Density Polyethylene (HDPE) Piping	428	7
Prestressed Concrete Beams	370	6
Other Items	788	13

**Figure 7-2 Total life-cycle impact by Resource Type****A4-5: Construction process stage**

Activities in the A4-5: construction process stage includes all impacts and aspects related to any losses during this construction process stage (i.e. production, transport, and waste processing, and disposal of the lost products and materials)⁶. The construction process stage was developed using assumptions based on the size of the site and specific inputs made available through the EPDs for materials. Using a factor for the site area in metres squared (m²); machine operations, spent hydraulic/machine oils, diesel usage and energy usage were calculated for the construction of the asset based on reasonable construction activities. The distances travelled to site were all assumed to be within 100km. These distances vary as some systems were estimated to be from Dublin port, while most products were assumed to be transported to site from quarries/suppliers in the vicinity. The types of vehicles used for transportation were all Heavy Goods Vehicles (HGVs), with slight exceptions where specialised vehicles, such as concrete transportation, were required.

Total emissions associated with this lifecycle stage were found to be 429 tonnes CO₂(eq) or 7% of the total.

B1-8: Use stage

Activities in the B1-8: use stage considers the overall maintenance, repair and refurbishment required during the design life of the asset. The general minimum requirement to maintain a “long life” flexible pavement design for carrying traffic for at least 40 years is 80 million standard axles (msa). According to AADT traffic estimates from the opening year of 2025 and the design year of 2040 it was estimated that remedial works will be required to be conducted on the road surface every 12-40 years. This maintenance work will take the form of patching and surface replacement in areas where needed, presumably in areas of particularly high traffic.

Using AADT data it was also determined that there will have to be intensive remedial works that will involve the planing of the surface layer and potentially the top of the binder course, to be replaced with a new material; assumed to be required at 40-year intervals. As this may be classified as a regional road, it may be added to the Regional Road Survey; which will require the road to be examined thoroughly every 5 years to locate areas that require immediate rejuvenation, retexturing, crack sealing or joint repair. This pre-emptive work will reduce the need for more extensive redress, particularly regarding the more extensive remediation required at 40-year intervals.

Overall, the total use-stage emissions on this project were found to be 1,757 tonnes CO₂(eq) or 29% of the total, with pavement surface material replacement found to be the second highest contributing factor to the total emissions baseline (27%). If road user emissions are also taken into account in this stage, this results in an increase of 12,928 tonnes CO₂ (eq) per year.

C1-4: End-of-life stage

Activities in the C1-4: end-of-life stage considers the deconstruction and potential demolition of the asset in the future and the treatment of waste associated with this work through the assumed waste streams. The total emissions associated with this stage were found to be 117 tonnes CO₂(eq) or 2% of the total based on an assumed design life of 120 years (this is used as standard across all LCAs on infrastructure projects). As the bridge structure is estimated to exceed the design life of the project there is very little decommissioning or demolition to take place at the end-of-life stage. This is also true of the road pavement and drainage systems. The continued maintenance and upkeep of these systems has reduced the end-of-life section as the operation and maintenance of the infrastructure is updated.

Feasible Carbon Reduction Initiatives

Reducing carbon across the design involves various strategies aimed at minimising the emissions associated with the design, materials, construction processes, and maintenance; with a particular focus on the hotspot areas as identified through the baseline analysis (the road pavements, the bridge structure, and the drainage systems). The carbon reduction initiatives identified were developed broadly through three main aspects which aligned with the PAS 2080: 2023 and TII carbon reduction hierarchies. These initiatives included:

- **Optimising Design**
 - o Prioritising the design to minimise the use of materials and overall construction footprint; and
 - o Designing the scheme in a way that reduces the maintenance required across the life of the asset.
- **Low-Carbon Material Selection**
 - o Choosing low-carbon or recycled materials for road construction, bridge construction, drainage pipes, culverts, and other components; and prioritising materials like recycled plastics, ground granulated blast furnace slag (GGBS), warm-mix asphalts and locally sourced materials for procurement.
- **Construction Practices**
 - o Implementing efficient construction practices to minimise waste and energy use during installation. This includes proper planning, transportation logistics, and on-site management to reduce emissions associated with construction activities;

- Reduce carbon emissions from construction activities by 20% compared to the baseline year by implementing measures such as optimising construction scheduling to minimise idle time for machinery, using low-carbon concrete mixes, and promoting efficient transportation practices;
 - Choose prefabrication and modular construction methods to streamline the installation process and minimise on-site construction time and associated emissions; and
 - Achieve a 15% improvement in energy efficiency during the construction process stage by utilising energy-efficient lighting and construction equipment, and implementing energy management practices on-site.
- **End-of-life activities**
- Increase the percentage of materials recycled or reused during decommissioning and demolition activities.

A number of feasible carbon reduction initiatives were identified by KCC, the Design and Project Team and agreed to be implemented at each lifecycle stage by identification of governance and implementation mechanisms to support the implementation of the Project Carbon Management Plan (post design).

Following a review and quantification of the impact of implementation of each reduction initiative against the baseline assessment, it was determined that implementing the feasible reduction initiatives identified at each stage of the project could overall result in a 43% absolute reduction in the scheme's project WLC carbon footprint (total reduction of **2,638 tCO₂(eq)**); equating to **3,502 tCO₂(eq)** across a 2.12km road distance (equating to **1,664 tCO₂(eq) per km**), compared to the baseline emissions assessment of **6,140 tCO₂(eq)** across a 2.12km road distance (equating to **2,896 tCO₂(eq) per km**). Further details are presented in Table 7.8 below.

Table 7.8: Comparison of Baseline Emissions against reduced Carbon Initiatives

Lifecycle Stage	Baseline Carbon Emissions per Lifecycle Stage (tCO ₂ (eq))	Potential Reduction in Carbon through Identified Feasible Initiatives (tCO ₂ (eq))	% of Total Reduction from overall baseline through each WLC Stage
A0: Pre-construction stage	24	23	1%
A1-A3: Product stage	3,813	1,743	28%
A4-A5: Construction process stage	429	67	1%
B1-B8: Use stage	1,757	736	12%
C1-C4: End-of-life stage	117	69	1%
Total	6,140	2,638	43%

The majority of these reductions would be achieved through sustainable material selection and the implementation of sustainable operational and maintenance practices. The initiatives are set out below.

A0: Pre-construction stage

- Commit to the fleet being powered by renewable sources (electric, hydrogen, hydrogenated vegetable oil) where feasible;
- Commitment to replace and enhance carbon sequestration potential and biodiversity through tree planting initiatives.

A1-A3: Product stage

Road Pavements

- Initial target of 30% Reclaimed Asphalt Pavement (RAP) mix in road pavements;
- A Stone Mastic Asphalt (SMA) Warm Mix for the surface and binder layers of the road surface.

Drainage

- Incorporation of 70% GGBS into design;
- Replace HDPE piping with pre-cast concrete where feasible;

Bridge Structure

- Minimum use of 50% GGBS in the bridge structure;
- Commitment to use 97% recycled steel in all rebar⁷;
- Commitment to use a minimum of 80% recycled steel exclusively in the construction of the bridge. This steel will be sourced from electric arc furnaces as opposed to traditional blast furnace installations;
- Using weathering steel as opposed to painted metal on the bridge;

A4-5: Construction process stage

- Prioritise local suppliers of materials in the procurement process;
- Implementation of construction methods that minimize material waste and energy consumption. Potential for employing prefabricated components or modular construction techniques to streamline the construction process and decrease onsite energy use;
- Implementing waste segregation, recycling, and reuse programs onsite;
- Using energy-efficient construction equipment and machinery powered by cleaner fuels or electricity;
- Incorporating renewable energy sources, these could be in the form of hydrogen powered generators on site, to hydrotreated vegetable oil (HVO) use in machinery.

B1-B8: Use stage

Road Pavements

- Implement a regular inspection plan to identify areas in need of localised repair to increase time required between full resurfacings;
- Use of cold-mix asphalt to repair localised areas where feasible;
- Continued use of warm-mix asphalt to whenever renewal of surface is required;

Structures

- Using weathering steel as opposed to painted metal on the bridge to reduce the need for multiple application of paint for remediation.

C1-4: End-of-life stage

- Diversion of waste material from paving and surfaces for reuse in the local area;
- Reduction in need for waste transportation through circular economy initiatives.

⁷ Commitment to use 97% recycled steel in rebar already made by design team and incorporated into baseline.

Appendix 8.1 Landscape & Visual Supporting Information

APPENDIX 8.1A RELEVANT GUIDELINES, POLICY AND LEGISLATION

Legislation

There is no specific legislation relating to Landscape and Visual Impact Assessment however the Planning and Development Acts, 2000 – 2022, as amended, addresses the topic with respect to land use planning, notably in the context of County Development Plans (CDP). The policy context in relation to the Kildare CDP in which the Proposed Scheme is located is further addressed below..

It is noted that the LVIA methodology, follows the process outlined in the Landscape Character Assessment (LCA) and Landscape and Visual Impact Assessment (LVIA) for Specified Linear Infrastructure Projects: Overarching Technical Document (TII Publication PE-ENV-01101, December 2020), published by Transport Infrastructure Ireland (TII).

Whilst the assessment process is primarily concerned with assessing the visual impacts on Protected Views identified in the Kildare CDP, the assessment also includes an assessment of predicted visual impacts from a range of viewpoints that have been selected to be representative of a range of views that are experienced by a variety of receptors within the study area.

Policy

All portions of the Proposed Scheme and their associated environs are contained within County Kildare and as such the Kildare County Development Plan (2023 – 2027) (“Kildare CDP”) forms the relevant Development Plan, which is discussed below to establish landscape aims, policies and objectives of relevance to this LVIA.

Kildare CDP Landscape, Recreation and Amenity

The overarching aim of the Kildare CDP in relation to Landscape, Recreation and Amenity is *“to provide for the protection, management, and enhancement of the landscape of Kildare to ensure that development does not disproportionately impact on the unique landscape character areas, scenic routes or protected views; and to support the provision of high quality and accessible recreational facilities, amenities and open spaces for residents and visitors to the County, in recognition of the contribution of all forms of recreation to quality of life, personal health and wellbeing.”*

Following a review of the Kildare CDP, the following Policies are considered to be relevant to this LVIA;

- **LR P1:** *Protect and enhance the county’s landscape, by ensuring that development retains, protects and, where necessary, enhances the appearance and character of the existing local landscape.*
- **LR P2:** *Protect High Amenity areas from inappropriate development and reinforce their character, distinctiveness and sense of place.*
- **LR P3:** *Protect, sustain and enhance the established appearance and character of all important views and prospects.*
- **LR P4:** *Protect and maintain the existing recreation infrastructure in County Kildare and support the diversification of the rural economy through the development of the recreational potential of the countryside in accordance with the forthcoming National Outdoor Recreation Strategy, subject to all relevant and cumulative environmental assessments and planning conditions.*
- **LR P5:** *Preserve, manage and maintain to a high standard the existing public parks, open spaces, amenities and recreation facilities throughout the county.*

Following a review of the Kildare CDP, the following Objectives are considered to be relevant to this LVIA;

- **LR O1:** *Ensure that consideration of landscape sensitivity is an important factor in determining development uses. In areas of high landscape sensitivity, the design, type and the choice of location of the proposed development in the landscape will be critical considerations.*
- **LR O2:** *Require a Landscape/Visual Impact Assessment to accompany proposals that are likely to significantly affect:*
 - *Landscape Sensitivity Factors;*

- A Class 4 or 5 Sensitivity Landscape (i.e. within 500m of the boundary);
- A route or view identified in Map V1 - 13.3 (i.e. within 500m of the site boundary).
- All Wind Farm development applications irrespective of location, shall be required to be accompanied by a detailed Landscape/Visual Impact Assessment including a series of photomontages at locations to be agreed with the Planning Authority, including from scenic routes and views identified in Chapter 13
- **LR 03:** Require all Landscape and Visual Impact Assessments of specified linear infrastructure projects to be undertaken in line with the guidance on best practice methodology of the TII publication Landscape Character Assessment (LCA) and Landscape and Visual Impact Assessment (LVIA) of Specified Infrastructure Projects (2020).
- **LR 04:** Ensure that local landscape features, including historic features and buildings, hedgerows, shelter belts and stone walls, are retained, protected and enhanced where appropriate, so as to preserve the local landscape and character of an area.
- **LR 09:** Continue to support development that can utilise existing structures, settlement areas and infrastructure, whilst taking account of local absorption opportunities provided by the landscape, landform and prevailing vegetation.
- **LR 017:** Control development that will adversely affect the visual integrity of Areas of High Amenity by restricting the development of incongruous structures that are out of scale with the landscape within the Areas of High Amenity including advertising signs, hoardings, fencing etc. which create visual clutter and disrupt the open nature of these areas.
- **LR 018:** Facilitate appropriate development in areas of high amenity that can utilise existing structures, settlement areas and infrastructure, taking account of the visual absorption opportunities provided by existing topography and vegetation.
- **LR 026:** Contribute towards the protection of waterbodies and watercourses, including rivers, streams, associated undeveloped riparian strips, wetlands and natural floodplains, from inappropriate development. This will include buffers free of development in riverine and wetland areas, as per chapter 12.
- **LR 029:** Ensure that the Streamside buffer zone (minimum of 10m plus) is kept free from development and existing vegetation is retained undisturbed to contribute to biodiversity and to ensure that bike paths and/or larger footpaths along rivers and streams are provided in the Middle buffer zone (15m-30m), in line with the Inland Fisheries Ireland's publication 'Planning for Watercourses in an Urban Environment – 2020 Update. Planting if required should be in keeping with the recommendations of the All-Ireland Pollinator Plan.
- **LR 032:** Avoid any development that could disrupt the vistas or have a disproportionate impact on the landscape character of the area, particularly upland views, river views, canal views, views across the Curragh, views of historical or cultural significance (including buildings and townscapes), views of natural beauty and specifically those views listed in Tables 13.5 – 13.7 of this plan.
- **LR 033:** Ensure developments (due to excessive bulk, scale, inappropriate siting or siting on steep slopes i.e. >10%) do not have a disproportionate visual impact or significantly interfere with or detract from scenic upland vistas when viewed from nearby areas, scenic routes, viewpoints and settlements.
- **LR 034:** Control development that will adversely affect the visual integrity of distinctive linear sections of water corridors and river valleys and open floodplains.
- **LR 035:** Encourage appropriate landscaping and screen planting of developments along scenic routes. Where scenic routes run through settlements, street trees and ornamental landscaping may be required.
- **LR 037:** Fencing, particularly in commonage, upland, highly scenic or amenity areas, will not be permitted unless such fencing is essential to the viability of farmland. The nature of the material to be used, the height of the fence, and in the case of a wire fence the type of wire to be used, will be taken into account. Stiles or gates may be required at appropriate locations.
- **LR 054:** Ensure any proposed walking or cycling route does not significantly impact the following:
 - Special Areas of Conservation (SACs)

- *Special Protection Areas (SPAs)*
- *Natural Heritage Areas (NHAs)*
- *Other areas of importance for the conservation of flora and fauna.*
- *Known sites of Flora Protection Order species*
- *Zones of Archaeological Potential.*
- *The vicinity of a recorded monument.*
- *Sensitive landscape areas as identified in Chapter 13 of this Plan.*
- *Scenic views and prospects.*
- *Protected Structures.*
- *Established rights of way and walking routes.*
- **LR O83:** *Ensure development proposals provide for hedgerow and woodland creation and augmentation within developments 7 at the start of the construction phase and encourage the block planting of woodland and the joining up of hedgerows and woodlands between developments in order to support habitat creation, in so far as possible.*
- **LR O84:** *Ensure that all development proposals include comprehensive landscaping schemes including trees, suitable to their environment and to require that the planting of same should either be carried out in full as part of Phase 1 for larger phased schemes or prior to the occupation of any units on the overall development site on all other schemes.*

Kildare CDP Landscape Value, Sensitivity and Capacity

The Principal Landscape Character Areas (LCA) of the County have been identified within the Kildare CDP (Chapter 13; Map V1-13.1) and have been assessed in terms of Landscape Sensitivity (illustrated on Map V1-13.2) and classified in relation to capacity for a range of development types (identified on Table 13.3 – *Likely compatibility between a range of land-uses and Principal Landscape Areas*).

It is noted that all LCAs within the CDP have been classified as being of either Class 1 (Low Sensitivity), Class 2 (Medium Sensitivity), Class 3 (High Sensitivity), Class 4 (Special Sensitivity) or Class 5 (Unique Sensitivity).

A review of the Kildare CDP has identified that the LCAs in proximity to the Proposed Scheme are classified as being either Class 1 (Low Sensitivity) or Class 4 (Special Sensitivity). The criteria used in Table 13.2 of the CDP in defining Landscape Sensitivity is detailed below:

- **Class 1:** *Areas with the capacity to generally accommodate a wide range of uses without significant adverse effects on the appearance or character of the area; and*
- **Class 4:** *Significant adverse effects on the appearance or character of the landscape having regard to prevalent sensitivity factors.*

It is noted from a review of Table 13.3 of the Kildare CDP that the LCAs in proximity to the Proposed Scheme have been classified as having either a High or Low / High compatibility for Urbanisation or High or Medium compatibility for Infrastructure development (such as Major Powerlines).

Guidance

The methodology and approach to the assessment contained within the LVIA, and the production of visualisation which accompany the LVIA, have been carried out in accordance with the guidance described in the following documents:

- TII Landscape Character Assessment (LCA) and Landscape and Visual Impact Assessment (LVIA) for Specified Linear Infrastructure Projects: Overarching Technical Document (TII Publication PE-ENV-01101, December 2020) (TII, 2020a);
- TII Landscape Character Assessment (LCA) and Landscape and Visual Impact Assessment (LVIA) of Proposed National Roads: Standards (TII Publication PE-ENV-01102, December 2020) (TII, 2020b); and

Section 177AE Appendices to the Environmental Report

- Technical Guidance Note 06/19 Visual Representation of Development Proposals (The Landscape Institute, 2019).

APPENDIX 8.1B METHODOLOGY

The process set out within the TII Publication PE-ENV-01101 (TII, 2020a), is broadly based on a combination of the approach and methodology set out in the EPA Guidelines for preparing Environmental Impact Assessment Reports (EPA, 2017) and in the Guidelines for Landscape and Visual Impact Assessment, Third Edition (GLVIA3). However, the approach and methodology has been specifically adapted to the delivery of infrastructure projects.

Whilst addressed under a heading of 'The Landscape', LVIA involves two related but separate assessments:

- The assessment of effects on landscape (changes to the landscape character and / or landscape resource); and
- The assessment of visual effects (changes in views, visual amenity and effect on viewers).

The former is concerned with the physical landscape and its characteristics, the latter is usually concerned with viewers, viewpoints, or visual receptors. The effects on the landscape resources and visual receptors (people) have been assessed by considering the proposed change in the baseline conditions (the impact of the Proposed Scheme) against the type of landscape resource or visual receptor (including the importance and sensitivity of that resource or receptor). These factors are determined through a combination of quantitative (objective) and qualitative (subjective) assessment using professional judgement. The assessment methodology is summarised in **Figure 8-3**.

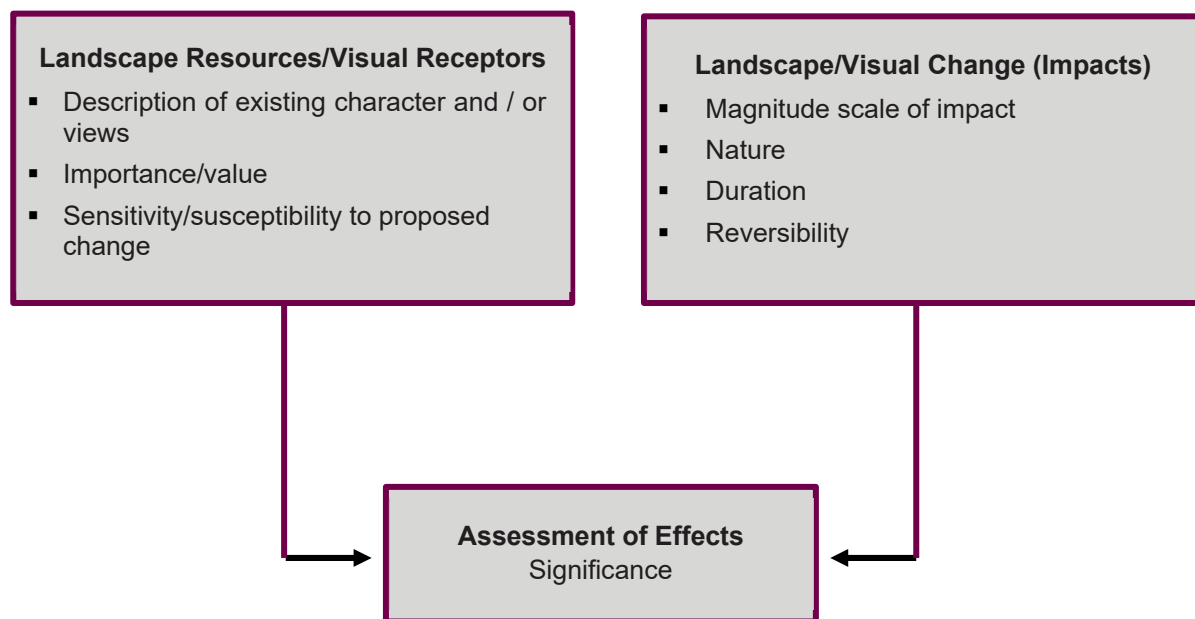


Figure 8-3 Assessment Methodology Summary

The LVIA has considered the potential effects of the Proposed Scheme upon:

- Individual landscape features and elements;
- Landscape character; and
- Visual amenity and the people who view the landscape.

APPENDIX 8.1C ASSESSMENT CRITERIA AND SIGNIFICANCE

The objective of the assessment process is to identify and evaluate the predicted significant effects arising from the Proposed Scheme. Significance is a function of the:

- Sensitivity of the affected landscape or visual receptors, determined through consideration of the susceptibility of the receptor to the type of change arising from the specific proposals and the value attached to the receptor; and
- Secondly its scale or magnitude, derived from a consideration of the size/ scale, geographical extent, duration, and reversibility of the new development.

These definitions recognise that landscapes vary in their capacity to accommodate different forms of development according to the nature of the receiving landscape and the type of change being proposed.

As with any new development, it is acknowledged that the introduction of a new development into the existing landscape or visual context could cause either a deterioration, improvement or neutral impact on the existing landscape or visual resource.

Landscape Impact Assessment

The LVIA firstly assesses how a new development would impact directly on any landscape features and resources. This category of effect relates to specific landscape elements and features (e.g. woods, trees, walls, hedgerows, watercourses) that are components of the landscape that may be physically affected by the Proposed Scheme, such as the removal or addition of trees and alteration to ground cover.

The LVIA then considers impacts on landscape character at two levels. Firstly, consideration is given to how the landscape character is affected by the removal or alteration of existing features and the introduction of new features. This is considered to be a direct impact on landscape character.

Secondly, the indirect impacts of a new development on the wider landscape are considered. The assessment of impacts on the wider landscape is discussed using the surrounding character areas identified in the relevant landscape character assessments. It is acknowledged there is an overlap between perception of change to landscape character and visual amenity, but it should be remembered that landscape character in its own right is generally derived from the combination and pattern of landscape elements, such as woodland, hedgerows and field patterns and usage that are present within a view.

The significance of effects on landscape features and character is determined by considering both the sensitivity of the feature or landscape character and the magnitude of impact.

Consideration of the sensitivity of the landscape resource against the magnitude of impact caused by a new development is fundamental to landscape and visual assessment and these two criteria are defined in more detail below.

Consideration of landscape and visual aspects as it relates to archaeological and cultural heritage are discussed in the Cultural Heritage Impact Assessment (CHIA).

Landscape Significance

The determination of the sensitivity of the landscape receptor is based upon an evaluation of the elements or characteristics of the landscape likely to be affected. The evaluation reflects such factors as its quality, value, contribution to landscape character and the degree to which the element or characteristic can be replaced or substituted.

For this assessment, landscape significance is categorised as:

- **Very High:** Areas of landscape and / or townscape protected by an international or national designation, designated ecological landscapes, Landscape Conservation Areas or UNESCO/ICOMOS Landscape Sites. These are landscapes widely acknowledged for their distinctive features and the quality and value of its elements, and are generally remote or tranquil landscapes with an absence of negative elements;
- **High:** Areas of landscape that are widely acknowledged as containing elements of national importance, and where national designation may apply. A landscape acknowledged for its high quality and value, and which contains features that could not be replaced, though may contain some negative elements, but otherwise contains highly rated landscape elements;

- **Medium:** Areas of landscape that exhibit positive character and which is locally important but may contain some regionally important elements. A landscape of some quality and value but which may have evidence of alteration / degradation or erosion of landscape features resulting in a less distinctive landscape. Areas of landscape with some detracting features present, not designated and which contains elements which could be replaced;
- **Low:** Areas of landscape of local importance but with some degraded elements or conditions, within which change is unlikely to be detrimental. Areas of landscape on the urban fringe/ some peri-urban landscape areas of dereliction with low aesthetic value and few elements of interest.
- **Very Low / Negligible:** Areas of degraded landscape or landscapes dominated by infrastructure with no cultural antiquity, including transport corridors where negative elements dominate the overall character.

As previously discussed, landscape sensitivity is influenced by several factors including susceptibility to change, value and condition. To assist with bringing these factors together, judgements regarding susceptibility and value have been used which define the landscape resource as being either, very low/ negligible, low, medium, high or very high. **Table 8.1** defines the criteria that have guided the judgement as to the overall sensitivity of the Landscape Resource.

Assessments of susceptibility and value of a particular landscape resource may be different and professional judgement will always be used to conclude on the judgement of sensitivity. For example, value may be high, and susceptibility may be low, and a professional judgement will be made to determine whether sensitivity is high, low or in between, supported by narrative explanations.

Table 8.1: Landscape Sensitivity

Definition		Sensitivity
Landscape Susceptibility	Landscape Value	
Exceptional landscape quality, no or limited potential for substitution. Key elements/features well known to the wider public. The landscape receptor is of very high susceptibility to the Project and has little or no tolerance to change.	Nationally/internationally designated/valued landscape, or key elements or features of national/internationally designated landscapes. Little or no tolerance to change	Very High
Strong/distinctive landscape character; absence of landscape detractors. The landscape receptor is of high susceptibility to the Project and has low tolerance to change.	Regionally/nationally designated/valued countryside and landscape features or landscapes judged to be of equivalent value using clearly stated and recognised criteria. Low tolerance to change.	High
Some distinctive landscape characteristics; few landscape detractors. The landscape receptor is of medium susceptibility to the Project and has medium tolerance to change.	Locally or regionally designated/valued countryside and landscape features or landscapes judged to be of equivalent value using clearly stated and recognised criteria. Medium tolerance to change.	Medium
Absence of distinctive landscape characteristics; presence of landscape detractors. The landscape receptor is of low susceptibility to the Project and has high tolerance to change.	Undesignated landscapes and landscape features which have little value to local communities. High tolerance to change	Low
Absence of positive landscape characteristics. Significant presence of landscape detractors. The landscape receptor is of negligible susceptibility to the Project and has very high tolerance to change.	Undesignated landscapes and landscape features which have no particular scenic qualities or are in poor condition or altered by presence of intrusive manmade structures. High tolerance to change.	Very Low / Negligible

Magnitude of Landscape Effect

The Landscape Professional must use their professional experience and judgment in the identification and description of likely significant landscape effects. However, the *'identification and description of landscape effects can only be made once the characteristics, nature and scale and impact of the proposed project is fully analysed, (TII PE-ENV-01101) (TII, 2020a).*

Direct resource changes on the landscape character in the study area are brought about by the introduction of a new development and its impact on the key landscape characteristics. The changes caused to

landscape character because of the Proposed Scheme are evaluated in terms of their size or scale, geographical extent and duration and reversibility.

For the purposes of this LVIA assessment, duration considered to be: Temporary (less than 1 year), short term (1 to 7 years), medium (7 to 15 years), long term (15 – 60 years) and permanent (effects lasting over 60 years). Judgements regarding the magnitude of landscape impact are indicated in **Table 8.2**.

Table 8.2: Magnitude of Landscape Effect

Definition	Magnitude of Effect
Major alteration to, or complete loss of, key landscape characteristics or components of the baseline condition, i.e., predevelopment landscape and/ or introduction of dominant, uncharacteristic elements with the attributes of the receiving landscape	Very High
Notable or long-term change to a widespread area or a notable change in continuous or key landscape characteristics or components, i.e., predevelopment landscape and / or introduction of elements that may be prominent, but may not necessarily be substantially uncharacteristic with the attributes of the receiving landscape.	High
Moderate or longer-term change over a restricted area or a moderate change in key landscape characteristics or components, i.e., predevelopment landscape and or introduction of elements that may not be uncharacteristic with the surrounding landscape.	Medium
Minor short or medium-term change over a restricted area or a minor change in key landscape characteristics or components	Low
Imperceptible change in key landscape characteristics or components	Very Low / Negligible

Visual Impact Assessment

Sensitivity of Visual Receptors

For visual receptors, judgements on significance and sensitivity are closely interlinked. For example, the most valued views are likely to be those which people go and visit because of the available view.

Other factors affecting visual sensitivity include:

- The location and context of the viewpoint;
- The expectations and occupation or activity of the receptor; and
- The importance of the view.

Judgements on the overall visual sensitivity/ susceptibility are provided in **Table 8.3** and overall sensitivity of the visual resource is based on combining judgements on the sensitivity of the human receptor (for example resident, commuter, tourist, walker, recreationist or worker, and the numbers of viewers affected) and judgements on the visual resource significance (for example views experienced from residential properties, workplace, leisure venue, local beauty spot, scenic viewpoint, commuter route, tourist route or walkers' route).

Table 8.3: Visual Resource Sensitivity

Definition		Sensitivity
Viewer susceptibility	Value of value	
Visitors drawn to a particular view (usually promoted or in a designated landscape), including those who have travelled to experience the views. The viewer is of very high susceptibility and has little or no tolerance to change.	Views from nationally and internationally known viewpoints which are designated and are or are associated with internationally designated landscapes or key features or elements of nationally designated landscapes or are linked to important and popular visitor attractions. The view would have Little or no tolerance to change.	Very High
Residents. People engaged in quiet outdoor recreation where landscape is an important part of the experience. The viewer is of high susceptibility and has little tolerance to change.	Views from residential property. Public rights of way, National Trails, long distance walking routes and nationally designated countryside/landscape features with public access. The view would have low tolerance to change.	High

Definition		Sensitivity
Viewer susceptibility	Value of value	
Observers enjoying the countryside from vehicles on quiet/promoted routes. People engaged in outdoor sport or recreation which may involve appreciation of views (e.g. cyclists, golfers). The viewer is of medium susceptibility and has medium tolerance to change.	Views from local roads and routes crossing designated countryside/landscape features as well as promoted paths. The view would have medium Tolerance to change.	Medium
People engaged in outdoor sport or recreation which does not involve appreciation of views. The viewer is of low susceptibility and has high tolerance to change.	Views from workplaces, main roads and undesignated countryside/landscape features. The view would have high tolerance to change.	Low
People at work where the setting is not important to the quality of working life. Road users (commuters) where the view is incidental to the journey. The viewer is of negligible susceptibility and has high tolerance to change.	Views from within and of undesignated landscapes with significant presence of landscape detractors. The view would have high tolerance to change.	Very Low/ Negligible

Magnitude of Visual Effect

The magnitude of impact on the visual resource results from the scale of change in the view, with respect to the loss or addition of features in the view, and changes in the view composition. Important factors to be considered include proportion of the view occupied by a new development, and distance and duration of the view. Other vertical features in the landscape and the backdrop to the Proposed Scheme will all influence resource change. Judgements regarding the magnitude of visual impact are provided in **Table 8.4**.

Table 8.4: Magnitude of Visual Effect

Definition	Magnitude
Major alteration to, or completed loss of, key visual characteristics or components of the visual baseline condition. Effects are likely to be experienced at a very large scale, considered permanent and irreversible.	Very High
Notable or longer-term change to a widespread area or view or a notable change in key visual characteristics or components.. Composition of the view would alter. View character may be partially changed through the introduction of features which, though uncharacteristic, may not necessarily be visually discordant.	High
Moderate or longer-term change over a restricted area or view or a moderate change in key visual characteristics or components	Medium
Minor short or medium-term change over a restricted area or view or a minor change in the key visual components. Composition and character of view substantially unaltered.	Low
imperceptible change to the key visual characteristics or components of the view.	Negligible / Very Low

Significance of Landscape and Visual Effects

The purpose of this LVIA is to determine, in a transparent way, the likely significant landscape and visual effects of a new development. It is accepted that, due to the nature and scale of the development proposed, the development could potentially give rise to some notable landscape and visual effects.

Significance can only be defined in relation to each particular development and its specific location. The relationship between receptors and effects is not typically a linear one. It is for each LVIA to determine how judgements about receptors and effects should be combined to derive significance and to explain how this conclusion has been arrived at.

The identification of significant effects would not necessarily mean that the effect is unacceptable in planning terms. What is important is that the likely effects on the landscape and visibility are transparently assessed and understood in order that the determining authority can bring a balanced, well-informed judgement to bear when making the planning decision.

Section 177AE Appendices to the Environmental Report

The significance of effects on landscape, views and visual amenity have been judged according to a seven-point scale: Profound, Very Significant, Significant, Moderate, Slight, Not Significant and Imperceptible as presented in **Table 8.5**, which contains a description of the significance of effect criteria.

Table 8.5: Significance of Effect

Landscape Resource	Visual Resource	Significance of Effect
Where the project would not alter the landscape character of the area.	Where the project would retain existing views.	Imperceptible
Where proposed changes would have an indiscernible effect on the character of an area.	Where proposed changes would have a barely noticeable effect on views/visual amenity.	Not Significant
Where proposed changes would be at slight variance with the character of an area.	Where proposed changes to views, although discernible, would only be at slight variance with the existing view.	Slight
Where proposed changes would be noticeably out of scale or at odds with the character of an area.	Where proposed changes to views would be noticeably out of scale or at odds with the existing view.	Moderate
Where proposed changes would be uncharacteristic and/or would significantly alter a valued aspect of (or a high quality) landscape.	Where proposed changes would be uncharacteristic and/or would significantly alter a valued view or a view of high scenic quality.	Significant
Where proposed changes would be uncharacteristic and/or would significantly alter a landscape of exceptional landscape quality (e.g., internationally designated landscapes), or key elements known to the wider public of nationally designated landscapes (where there is no or limited potential for substitution nationally).	Where proposed changes would be uncharacteristic and/or would significantly alter a view of remarkable scenic quality, within internationally designated landscapes or key features or elements of nationally designated landscapes that are well known to the wider public.	Profound

For the purposes of this assessment those effects indicated, in **Figure 8-4** below, as being 'Profound', 'Very Significant' or 'Significant' are regarded as being significant. Effects of 'Slight and lesser significance have been identified within the assessment, though are not considered significant. For those effects indicated as being of 'Moderate' professional judgement has been exercised in determining if the effect is considered to be significant, taking account of site specific or location specific variables which are given different weighting in each instance according to location.

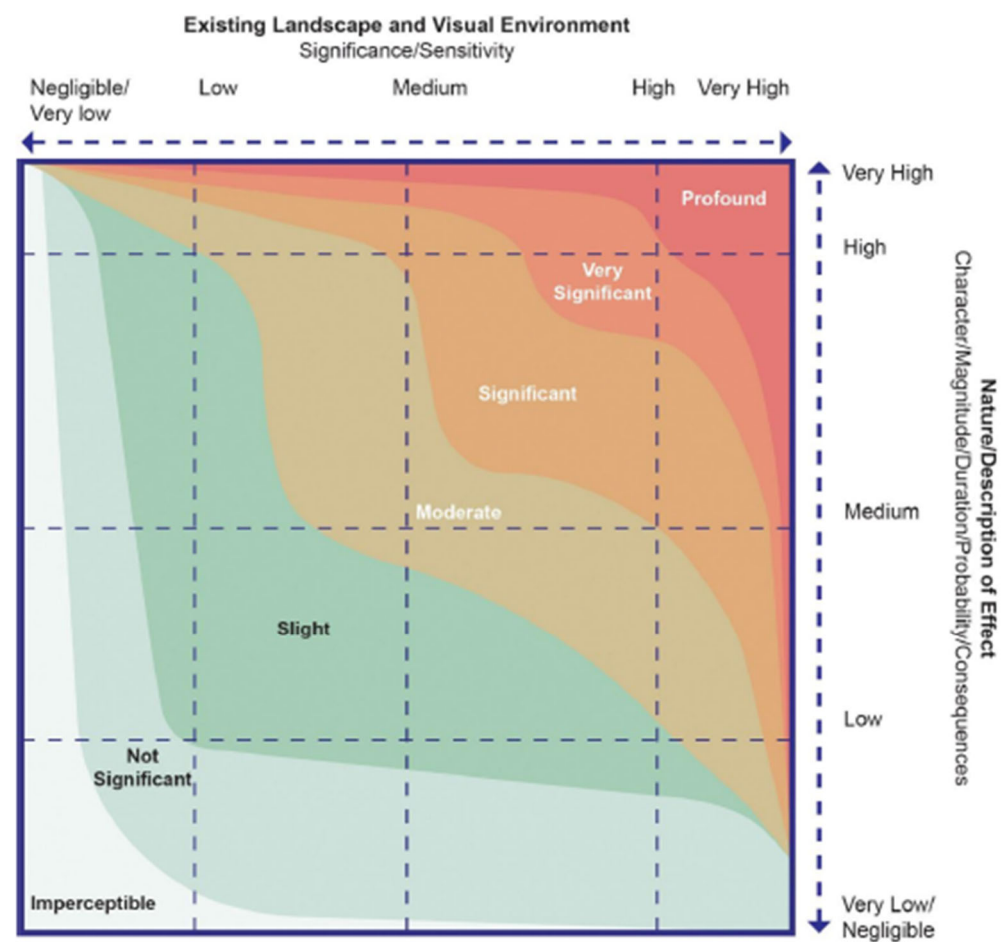


Figure 8-4 Significance of Effect Matrix

A conclusion that an effect is 'significant' should not be taken to imply that a new development is unacceptable. Significance of effect needs to be considered regarding the scale over which it is experienced and whether it is beneficial or adverse.

APPENDIX 8.1D LANDSCAPE CHARACTER ASSESSMENT OF COUNTY KILDARE

Northern Lowlands LCA

The Kildare CDP Landscape Character Assessment describes the Northern Lowlands LCA as an extensive lowland area within the north-east of the County, which is bisected by the River Liffey Valley. The Kildare CDP description further describes the LCA as an area *'characterised by generally flat terrain and open lands with regular (medium sized) field patterns. Hedgerows are generally well maintained and low, with scattered trees along the field boundaries that partially screen the lowest lying areas. Nevertheless, the generally low-lying vegetation of the area allows long-distance and extensive visibility. Distant views include the skylines of the Eastern Uplands, the Newtown Hills to the west, and the Chair of Kildare hilltops to the south-west.*

The predominant landuse in this area is pasture, with large areas of non-irrigated arable lands (mainly tillage). A number of coniferous plantations and deciduous woodlands can also be found, as well as large patches of bogland and peat extraction sites.

Settlement patterns in this area are linked to the closeness of Dublin City. Existing large towns such as Naas, Clane, Celbridge, Leixlip and Maynooth, together with other small villages at the outskirts of major towns and a high density of dispersed rural houses and farm dwellings throughout the countryside, are indicative of a high population density. This character unit contains the largest population concentrations of the county.

Critical Landscape Factors identified in the Landscape Character Assessment, under a variety of headings, are as follows:

- *Smooth terrain and the generally flat topography and landform that characterise this landscape character unit, allow vistas over long distances without disruption. As a result development can have a disproportionate visual impact, due to an inherent inability to be visually absorbed.*
- *Gently undulating topography is presented at certain areas of this character unit, providing the potential for local visual enclosure thereby absorbing development where it does not break the skyline (i.e. it renders visually unobtrusive of the overall landscape scale).*
- *The grassland, tillage fields and generally low hedgerows of this area provide similar characteristics to smooth terrain in landscape terms, and the two are often interrelated due to soil attributes. Grassland vegetation and agricultural crops are usually uniform in appearance, failing to break up vistas, and allowing long distance visibility. Existing low hedgerows partially screen the lowest land parcels, nevertheless the common low vegetation proves unable to visually absorb new development.*
- *Shelter vegetation is represented at some stretches of this unit by coniferous plantations, deciduous woodlands and the presence of trees that grow on field hedgerows. In a similar manner to undulating topography, shelter vegetation has a shielding and absorbing quality in landscape terms. It can provide a natural visual barrier and also adds to the complexity of a vista, breaking it up to provide scale and containment for built forms.*

It is noted that the landscape assessment accompanying the Kildare CDP (Chapter 13, Section 13.3.1) provides categorisation of the Northern Lowlands LCA with regards to Landscape Sensitivity which is identified as:

- *Class 1 – Low Sensitivity; Areas with the capacity to generally accommodate a wide range of uses without significant adverse effects on the appearance or character of the area,*

The Kildare CDP Landscape Character Assessment also determines the impact of development (Chapter 13, Section 13.3.2) on the Northern Lowlands LCA as being highly compatible with a range of development types that include Urbanisation and Infrastructure.

River Liffey LCA

The Kildare CDP Landscape Character Assessment describes the River Liffey LCA as being *'located on the north-eastern quarter of the County, flowing in a north-east to south-east pattern. Many towns have become well established along the riverbanks, such as Leixlip, Celbridge, Clane, Newbridge, Kilcullen and Ballymore Eustace, where the River Liffey flows into Pollaphuca Reservoir.'* The CDP Assessment continues to

describe the River Liffey LCA as a valley which *'is identifiable by its floodplain levels and slopes of naturally occurring shrubs and trees with a slow progression to grasslands. At some sections, pasturelands directly occur on the floodplains, whilst conifer and deciduous forest occupy some other parcels. Large tillage fields with few inner boundaries are also common in this area, with well-trimmed and thus low hedgerows that allow for long-distance visibility.*

This landscape character unit is perceived as having significant landscape value, and as being both special in landscape terms and sensitive to development. It is also perceived as having high amenity value, preferred scenic drives running along its corridor. The river valley is considered to be a landmark of the County - particularly between Kilcullen and Ballymore Eustace. The rich mix of water and land features along the valley and the extent of the corridor, characterise this area of the County.

The fertile Liffey Valley area is well drained providing good soil conditions and the potential for a variety of agricultural and horticultural uses. A large proportion of the river shore is occupied by natural vegetation. Although pasturelands generally occupy the riverbanks, there are also a significant number of large tillage fields. Small parcels of coniferous and deciduous forests also occur along the river valley.

The local population of County Kildare is largely concentrated along the Liffey Valley. Major urban centres include Leixlip, Celbridge, Clane, and Newbridge. Smaller settlements can also be found (e.g. Kilcullen, Ballymore Eustace, Straffan, Athgarvan). Scattered houses and farm structures are dispersed in the rural hinterland. The Liffey Valley embraces a high population density.

Critical Landscape Factors identified in the Landscape Character Assessment, under a variety of headings, are as follows:

- *Smooth terrain and the generally gentle topography and landform that characterise this landscape character unit, allow vistas over long distances without disruption along the river corridor. As a result development on the shores of the river can have a disproportionate visual impact, due to an inherent inability to be visually absorbed.*
- *Undulating topography is presented at some sections of this character unit (particularly to the southeast) where the land gently rises at floodplain slopes. This provides a physical shielding and has the potential to visually enclose the built form within the river valley, where it does not break the skyline*
- *The grassland, tillage fields and generally low hedgerows along the river corridor are commonly uniform in appearance, failing to break up vistas, allowing long distance visibility and proving unable to visually absorb new development.*
- *Shelter vegetation is represented at some stretches of this unit by the presence of natural and native woodland that grows on the floodplains of the river, as well as by conifer plantation in adjacent lands. In a similar manner to undulating topography, shelter vegetation has a shielding and absorbing quality in landscape terms. It can provide a natural visual barrier as well as add to the complexity of a vista*

It is noted that the landscape assessment accompanying the Kildare CDP (Chapter 13, Section 13.3.1) provides categorisation of the River Liffey LCA with regards to Landscape Sensitivity which is identified as:

- *Class 4 – Special Sensitivity; Significant adverse effects on the appearance or character of the landscape having regard to prevalent sensitivity factors.*

The Kildare CDP Landscape Character Assessment also determines the impact of development (Chapter 13, Section 13.3.2) on the River Liffey LCA as being of low compatible with a range of development types that include Urbanisation and Infrastructure.

APPENDIX 8.1E VISUAL IMPACT ASSESSMENT (CONSTRUCTION AND OPERATIONAL PHASE)

A series of 7 representative viewpoints have been selected to illustrate the existing visual context of the Proposed Scheme and as an aid to the visual impact assessment. All the viewpoints selected have been located on publicly accessible roads, footways, and verges.

An assessment of the significance of the predicted visual impact of the Proposed Scheme during the construction and operational phases on these views is provided in the following assessment tables (Table 8.6 to Table).

Table 8.6: Viewpoint 1 – Hazelhatch Roundabout

Viewpoint 1 – Hazelhatch Roundabout			
Grid Ref	298283, 231274	Existing View Figure Number	B.1a
Direction of View	North-west	Approx. Distance to Proposed Scheme	30m
Description of existing view and potential receptors	This viewpoint is located on the footpath immediately adjacent (west) to the R405 (Hazelhatch Road) approximately 30m south of the Proposed Scheme. The view is considered to be representative of views experienced by recreational receptors utilising the way marked route (Arthurs Way), transient receptors on the footpath, transient receptors on the adjacent road network and views available to residential receptors in the immediate vicinity. Views north, as represented in Appendix B; Figure B.1a are generally restricted in nature, and focused along the route of Hazelhatch Road, due to the screening effects of existing built form and vegetation adjacent to the existing road corridor. Distant horizons are not visible in the view due to screening provided by the intervening vegetation cover. The foreground of the view represented in Appendix B; Figure B.1a is comprised of the existing road corridor, adjacent footpath network and existing stone walling marking property boundaries. Mixed species coniferous and deciduous tree species adjacent to the existing road network is visible at carrying distances within the view, providing enclosure. A residential property is partially visible at mid-distance within a small central portion of the view, partially screened by intervening vegetation and forms a minor point of visual interest within the view. Timber poles carrying overhead lines and street lighting columns associated with the existing road network adds verticality to the view, with overhead lines being perceived as an elevated horizon across the central portion of the view. A single large scale pylon carrying overhead lines is visible at mid-distance, though generally viewed as a minor element of the view. Road signs associated with the existing road network are visible throughout the view, though viewed at a lower elevation and visible against a well vegetated backdrop which aids integration.		
Sensitivity	Receptors at this location are judged to be of a medium susceptibility to change in their views given the presence of existing road networks and visual detractors such as overhead lines, pylons and street lighting columns. The viewpoint does not represent a view available from a protected view, and the value of the view available is judged to be low. Overall, taking into account the receptor susceptibility and the value of the view the sensitivity is judged to be medium.		
Magnitude of Change	During the construction phase the main source of impact on this view will be the visibility of machinery and activities associated with carriageway and footpath realignment works in and around the existing roundabout junction within the central portion of the view. Activities and machinery will be visible within the central portion of the view, though such activities will be viewed against a backdrop of existing, retained, vegetation that lies beyond the site boundary and will be perceived well below perceived horizons (refer Appendix B; Figure B1.b) which aids integration and reduces the extent to which such activities will be perceived within the view. The magnitude of visual impact during the construction phase of the Proposed Scheme is judged to be localised and Medium as construction phase operations will be visible across the whole of the view, at close proximity to the viewpoint location.		

Viewpoint 1 – Hazelhatch Roundabout

	During the operational phase new sections of footpaths and vehicle movements associated with the roundabout junction will be perceived at close distance, though viewed as a minor alteration to the existing view. Localised vegetation clearance will be viewed as a minor alteration to the overall view, with new planting associated with the Proposed Scheme helping to mitigate visual impacts and provide integration (refer Appendix B; Figure B.1c and B.1d). Lighting and signage proposed as part of the Proposed Scheme will also be viewed as a minor alteration to elements of the view. Overall the visible portions of the Proposed Scheme will be seen within a small central portion of the view and set against a backdrop of existing vegetation and viewed as a minor alteration to the overall view. The magnitude of visual impact during the operational phase of the Proposed Scheme is judged to be localised and Low as visible portions of the Proposed Scheme, whilst perceived will not significantly alter the character and composition of the view.
Significance of Visual Effect during Construction Phase	Localised Moderate adverse, short-term duration, significant visual effects are predicted to occur during the construction phase of the Proposed Scheme.
Significance of Visual Effect during Operational Phase	Slight, assessed as not significant visual effects are predicted to occur during the operational phase of the Proposed Scheme. Visible portions of the Proposed Scheme will be viewed as a minor addition or alteration to the existing character and composition of the view at the time of scheme opening as proposed areas of planting will not be fully established.

Table 8.7: Viewpoint 2 – Simmonstown Manor Road

Viewpoint 2 – Simmonstown Manor Road			
Grid Ref	697752, 731697	Existing View Figure Number	B.2a
Direction of View	South-west	Approx. Distance to Proposed Scheme	50m
Description of existing view and potential receptors	This viewpoint is located adjacent to the grassed verge which forms the northern edge of the Simmonstown Manor Road, approximately 50m north-east of the Proposed Scheme. The view is considered to be representative of localised views experienced by transient receptors traveling west on the local road network, recreational receptors on the local road network and residential receptor in close proximity. Views from this location, towards the Proposed Scheme, as represented in Appendix B; Figure B.2a are focused along the direction of the Simmonstown Manor Road due to the screening effects of roadside hedgerows and mature tree cover along the northern boundary of the road network. Views of land beyond the road corridor are negated by the hedgerows, such that only upper canopies of trees outside of the landtake boundary are visible as minor elements of the view. Timber poles carrying overhead lines are not visible within the view due to screening effects of the existing vegetation.		
Sensitivity	Receptors at this location are judged to be of a high susceptibility to change in their views. The viewpoint does not represent a view available from a protected view, and the overall value of the view available is judged to be medium. Overall, taking into account the receptor susceptibility and the value of the view the sensitivity is judged to be medium.		
Magnitude of Change	During the construction phase the main source of effect on this viewpoint will be the visibility of machinery and activities associated with the removal of existing roadside hedgerows, the formation of the new embankment associated with the new link road and construction activities associated with the formation of the turning head and pedestrian footpaths associated with the Proposed Scheme. Activities and Machinery will be visible within a very minor, central portion of the view and generally viewed amongst and beyond existing, retained vegetation that lies beyond the site boundary (Appendix B; Figure B.2b) which will aid integration. The magnitude of visual impact during the construction phase of the Proposed Scheme is judged to be localised and Medium as such operations will be perceived within a minor portion of the view, at distance and below perceived horizons formed by adjacent vegetation cover.		

Viewpoint 2 – Simmonstown Manor Road

	During the operational phase new earthworks and vehicle movements associated with the Proposed Scheme will be the main source of visual effect from this viewpoint. Visible portions of the Proposed Scheme will be perceived at mid-distance, set below and amongst existing retained vegetation and perceived as minor alteration to the overall view (refer Appendix B; Figure B.2c and B.2d). The magnitude of visual impact during the operational phase of the Proposed Scheme is judged to be localised and Low as visible portions of the Proposed Scheme will be viewed as a minor alteration to the character and composition of the baseline conditions of the existing view.
Significance of Visual Effect during Construction Phase	Localised Moderate adverse, short-term duration, assessed as significant effects are predicted to occur during the construction phase of the Proposed Scheme. Although construction effects will be of a short-term duration, alterations made to the existing topography, visible as a minor change to the view will remain as the Proposed Scheme becomes operational, and are assessed as not significant.
Significance of Visual Effect during Operational Phase	Slight, assessed as not significant visual effects are predicted to occur during the operational phase of the Proposed Scheme. Whilst portions of the Proposed Scheme will be perceived, they will be seen as a minor alteration to the existing character and composition of the view at the time of scheme opening as proposed areas of planting will not be fully established.

Table 8.8: Viewpoint 3 – The Crescent, Temple Manor

Viewpoint 3 – The Crescent, Temple Manor			
Grid Ref	696934, 732110	Existing View Figure Number	B.3a
Direction of View	North	Approx. Distance to Proposed Scheme	50m
Description of existing view and potential receptors	This viewpoint is located on a pathway, within an area of open space associated with the residential development that lies to the west of the Proposed Scheme and which forms part of the built form associated with Celbridge. The viewpoint is located approximately 50m west of the Proposed Scheme and is considered to be representative of views experienced by recreational receptors and residential receptors in close proximity. Views north and east from the location, as represented in Appendix B, Figure B.3a are constrained by a strong belt of mixed species planting which forms the naturalised edge to the residential development. The foreground of the view is comprised of open grassland areas utilised for a variety of recreational activities by local residents. The screen planting focuses views north, and screens views of existing agricultural land further north and east from this location, such that they are not visible in the view. Large scale pylons carrying overhead lines are visible to the left of the view, partially screened by the existing screen planting, with overhead lines perceived as an elevated horizon line above existing canopies.		
Sensitivity	Receptors at this location are judged to be of a high susceptibility to change in their views. The viewpoint does not represent a view available from a protected view, and the overall value of the view available is judged to be medium. Overall, taking into account the receptor susceptibility and the value of the view the sensitivity is judged to be medium.		
Magnitude of Change	During the construction phase visibility of machinery and activities associated with the formation of the Proposed Scheme will not be perceived in northern or eastern views from this location due to screening provided by intervening vegetation forming the boundary to this residential area (refer Appendix B; Figure B.3b). The magnitude of visual impact during the construction phase of the Proposed Scheme is judged to be Very Low/ Negligible. During the operational phase the Proposed Scheme will not be visible in northern or eastern views due to screening effects of intervening vegetation (refer Appendix B; Figure B.3b). The magnitude of visual impact during the operational phase of the Proposed Scheme is judged to be Very Low / Negligible.		

Viewpoint 3 – The Crescent, Temple Manor

Significance of Visual Effect during Construction Phase	Imperceptible as construction phase operations will be screened in northern and eastern views by intervening vegetation.
Significance of Visual Effect during Operational Phase	Imperceptible assessed as not significant visual effects are predicted to occur during the operational phase as the existing screen planting will prevent views of the Proposed Scheme.

Table 8.9: Viewpoint 4 – Callendars Mill**Viewpoint 4 – Callendars Mill**

Grid Ref	697397, 732233	Existing View Figure Number	B.4a
Direction of View	South-west	Approx. Distance to Proposed Scheme	360m
Description of existing view and potential receptors	This viewpoint is located on a pathway, adjacent to an area of open space associated with the residential development that lies to the east of the Proposed Scheme and which forms part of the built form associated with Celbridge. The viewpoint is located approximately 360m east of the Proposed Scheme and is considered to be representative of views experienced by recreational receptors and residential receptors in close proximity. Views north and west from the location, as represented in Appendix B, Figure B.4a are constrained by boundary walling and mixed specied planting, including trees which forms the western edge to the residential development. The foreground of the view is comprised of open grassland areas utilised for a variety of recreational activities by local residents. The existing boundary walling provides a strong sense of enclosure, whilst planting beyond, visible above the walling, helps to soften and integrate whilst further constraining views. The planting partially screens visibility of large scale pylons, which were visible, form minor points of localised visual interest. Overhead lines are visible, above existing tree canopies within a central portion of the view, whilst a single street lighting column adds further verticality to the view.		
Sensitivity	Receptors at this location are judged to be of a high susceptibility to change in their views. The viewpoint does not represent a view available from a protected view, and the overall value of the view available is judged to be medium. Overall, taking into account the receptor susceptibility and the value of the view the sensitivity is judged to be medium.		
Magnitude of Change	During the construction phase visibility of machinery and activities associated with the formation of the Proposed Scheme will not be visible in views from this location due to screening provided by the intervening wall and vegetation forming the boundary to this residential area (refer Appendix B; Figure B.4b). The magnitude of visual impact during the construction phase of the Proposed Scheme is judged to be Very Low/ Negligible. During the operational phase the Proposed Scheme will not be visible in views due to the screening effects of the intervening wall and vegetation forming the boundary to this residential area (refer Appendix B; Figure B.4b). The magnitude of visual impact during the operational phase of the Proposed Scheme is judged to be Very Low / Negligible.		
Significance of Visual Effect during Construction Phase	Imperceptible as construction phase operations will be screened in views by intervening boundary wall and associated vegetation.		
Significance of Visual Effect during Operational Phase	Imperceptible assessed as not significant visual effects are predicted to occur during the operational phase as the existing screening provided by the boundary walling and planting will prevent views of the Proposed Scheme.		

Table 8.10: Viewpoint 5 – Newton Road

Viewpoint 5 – Newton Road			
Grid Ref	696852, 732316	Existing View Figure Number	B.5a
Direction of View	North-east	Approx. Distance to Proposed Scheme	10m
Description of existing view and potential receptors	This viewpoint is located on the footpath forming the southern edge of Newton Road, Celbridge, approximately 10m from the western extent of the Proposed Scheme, north-east of the residential development at Temple Manor. The view is considered to be representative of views experienced by transient receptors on the local road network and recreational receptors on the footpath. Views north-east from this location, as represented in Appendix B; Figure B.5a are focused in nature due to a combination of existing boundary treatments and vegetation adjacent to Newton Road. Existing boundary walls, comprised of vary forms together with the timber fencing are visible at varying distances within the view and provide a clear edge to the road network. Views of lands beyond, including built form and residential development associated with Celbridge are restricted by the extensive vegetation cover adjacent to the road network. The immediate foreground is comprised of the road and pathway networks with associated street lighting columns partially obscured by vegetation, with only lower portions of the columns visible at varying distances within the view.		
Sensitivity	Transient road receptors are judged to be of a low susceptibility to change in their views, whilst recreational receptors on the footpath are judged to be of a high susceptibility to change in their views. The viewpoint does not represent views available from a Protected View. The overall value of the view available is judged to be medium, due to the influence of the existing road network and the stron boundary defined by walls and fenceing and the lack of visible development and buit form present within the view. Overall, taking into account the receptor susceptibility and the value of the view the sensitivity is judged to be medium.		
Magnitude of Change	During the construction phase the main source of impact on this view will be the visibility of machinery and activities associated with the formation of the new junction, new link road, footpath alignment modifications and associated vegetation removal and localised modifications to existing walls and fencing forming boundaries to Newton Road. Activities and machinery will be fully visible within the central portion of the view, though such activities will be viewed against a backdrop of existing, retained, vegetation that lies beyond the site boundary and will be perceived well below perceived horizons (refer Appendix B; Figure B.5b) which aids integration and reduces the extent to which such activities will be perceived within the view. The magnitude of visual impact during the construction phase of the Proposed Scheme is judged to be localised and Medium as construction phase operations will be visible across a central, focused portion of the view, at close proximity to the viewpoint location. During the operational phase new sections of footpaths and vehicle movements associated with the new mobility corridor at the junction will be perceived at close distance, though generally viewed as a minor alteration to the existing view. Localised vegetation clearance will be viewed as a moderate alteration to the overall view, though new planting associated with the Proposed Scheme will help to mitigate visual impacts and provide integration. Lighting and signage proposed as part of the Proposed Scheme will also be viewed as an alteration to the overall character of the view. A small section of timber noise barrier will be perceived at mid-distance with a minor portion of the view, though viewed as part of the overall changes within the view. Overall the visible portions of the Proposed Scheme will be seen within a central portion of the view and set against a backdrop of existing vegetation and viewed as a moderate alteration to the overall view (refer Appendix B; Figure B.5c and B.5d). The magnitude of visual impact during the operational phase of the Proposed Scheme is judged to be localised and Medium as visible portions of the Proposed Scheme, whilst perceived will not significantly alter the character and composition of the view.		
Significance of Visual Effect during Construction Phase	Moderate, short-term duration, assessed as locally significant visual effects are predicted to occur during the construction phase of the Proposed Scheme.		

Viewpoint 5 – Newton Road

Significance of Visual Effect during Operational Phase	Moderate, assessed as not significant visual effects are predicted to occur during the operational phase of the Proposed Scheme. Whilst portions of the Proposed Scheme are predicted to be visible at close distance, below distant horizon lines, they will not significantly alter the existing character and composition of the view at the time of scheme opening.
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Table 8.11: Viewpoint 6 – Riverview – Abbey Farm

Viewpoint 6 – Riverview – Abbeyfarm			
Grid Ref	696689, 732327	Existing View Figure Number	B.6a
Direction of View	North-east	Approx. Distance to Proposed Scheme	80m
Description of existing view and potential receptors	This viewpoint is located on the existing footpath network within an area of open space adjacent to the River Liffey, south of residential development at Abbeyfarm on the southern outskirts of Celbridge. The view is approximately 80m from the bridge crossing associated with the Proposed Scheme and views are considered to be representative of views primarily experienced by recreational receptors in the vicinity and peripheral views north-east experienced by residential receptors in close proximity. Views north-east from this location, as represented in Appendix B; Figure B.6a are restricted and enclosed by a combination of localised topographical changes and vegetation cover associated with the River Liffey. The immediate foreground of the view is comprised of amenity grassland associated with the open space whilst vegetation to the right of the view is associated with the River Liffey alignment. Vegetation within central and left hand portions of the view are aligned with boundaries associated with the built form of Celbridge which lies beyond. Existing vegetation cover prevents views of surrounding built form associated with Celbridge. Lower portions of a large scale pylon carrying overhead lines is visible to the left of the view, and it is noted that Celbridge Abbey and grounds are not visible due to intervening vegetation forming an effective screen.		
Sensitivity	Recreational receptors and close proximity residential receptors are judged to be of a high susceptibility to change. The views from this location are not representative of views available from a Protected View, however overall value of views experienced are judged to be high, due to the perceived lack of built form influencing the view. Overall, taking into account the receptor susceptibility and the value of the view the sensitivity is judged to be high.		
Magnitude of Change	During the construction phase the main source of effect on this viewpoint will be the visibility of machinery and activities associated with the formation of the proposed overbridge, associated modifications to local topography to form new embankments, vegetation removal and formation of new footpaths providing linkage to existing footpath network. Activities and machinery will be visible across the whole of the view, at mid-distance though generally viewed below existing horizon lines formed by existing vegetation and against the well vegetated backdrop associated with the view, which lies beyond the site boundary (refer Appendix B; Figure B.6b) and which will aid integration. Visibility of construction phase operations will increase short-term during the construction of the bridge, with cranes visible above existing vegetation. The magnitude of visual impact during the construction phase of the Proposed Scheme is judged to be localised and High to Very High as such operations will be visible across the centre of the view, at close distance. During the operational phase the new overbridge, associated embankments and traffic movements across the new bridge will be the primary visual effect on views available from this viewpoint. Visible portions of the Proposed Scheme will be seen across the whole of the view, set against a backdrop of existing vegetation and perceived as a notable alteration to the view (refer Appendix B; Figure B.6c and B.6d). The magnitude of visual impact during the operational phase of the Proposed Scheme is judged to be localised and High as visible portions of the Proposed Scheme will be viewed as a partial alteration to the character and composition of the baseline conditions.		

Viewpoint 6 – Riverview – Abbeyfarm

Significance of Visual Effect during Construction Phase	Very significant, short-term duration, assessed as locally significant visual effects are predicted to occur during the construction phase of the Proposed Scheme. Although construction effects will be of a short-term duration, alterations made to the view will remain as the Proposed Scheme becomes operational.
Significance of Visual Effect during Operational Phase	Very significant, assessed as locally significant visual effects are predicted to occur during the operational phase of the Proposed Scheme. Whilst visible portions of the Proposed Scheme will be viewed well below horizon lines, and amongst retained vegetation they will be seen as a moderate alteration to the existing character and composition of the view at the time of scheme opening as proposed areas of planting will not be fully established. Operational phase effects will occur long-term, gradually decreasing to Moderate, not significant visual effects as the Proposed Scheme becomes an established feature within the overall view and proposed planting establishes.

Table 8.12: Viewpoint 7 – Clane Road, Celbridge

Viewpoint 7 – Clane Road, Celbridge			
Grid Ref	696773, 732559	Existing View Figure Number	B.7a
Direction of View	West	Approx. Distance to Proposed Scheme	35m
Description of existing view and potential receptors	This viewpoint is located on the footpath forming the southern edge of the Clane Road, approximately 35m east of the northern tie in point between the Proposed Scheme and the existing road network. The view is considered to be representative of views primarily experienced by transient receptors on the local road network and recreational receptors on the adjacent footpath. Views west from this location, as represented in Appendix B; Figure B.7a are partially restricted and enclosed in nature by a combination of localised topographical changes, street tree planting and retaining walls forming the northern boundary of Clane Road (visible to the right of the view). Central portions of the view contain visibility of existing built form, service station garage, though this is partially screened by existing street trees and forms a minor element of the overall view. Whilst the view contains visibility of the existing road network, and associated traffic movements, the view does contain positive characteristics and the influence of the surrounding built form is limited in extent due to extensive street tree planting which screens views of built form beyond.		
Sensitivity	Transient receptors on the local roads at this location are judged to be of a low susceptibility to change, whilst recreational receptors on the footpath are judged to be of a high susceptibility to change. The views from this location are not representative of views available from a Protected View, however the overall value of view experienced are judged to be medium, due to the perceived lack of built form influencing the view. Overall, taking into account the receptor susceptibility and the value of the view the sensitivity is judged to be medium.		
Magnitude of Change	During the construction phase the main source of effect on this viewpoint will be the visibility of machinery and activities associated with the realignment of the existing road infrastructure to form the new mobility corridor and junction with the existing Clane Road, including localised topographical changes and modifications to the existing footpath network. Activities and machinery will be visible across a central, narrow portion of the view, generally viewed below perceived horizons formed by existing retained street trees (refer Appendix B; Figure B.7b) which will aid integration. The magnitude of visual impact during the construction phase of the Proposed Scheme is judged to be localised and High as such operations will be visible at close distance. During the operational phase new sections of footpaths and vehicle movements associated with the new junction will be perceived at close distance, though viewed as a minor alteration to the existing view. Localised vegetation clearance will be viewed as a minor alteration to the overall view, with new planting associated with the Proposed Scheme helping to mitigate visual impacts and provide integration. Lighting and signage proposed as part of the Proposed Scheme will also be viewed as a minor alteration to		

Viewpoint 7 – Clane Road, Celbridge	
	elements of the view. New timber noise barriers associated with the Proposed Scheme will be visible in combination with the existing stone walling visible to the right of the view. Overall the visible elements of the Proposed Scheme will be seen across the central portion of the view, at varying distances and will be viewed against a backdrop of existing vegetation and viewed as a minor alteration to the overall view (refer Appendix B; Figure B.7c and B.7d). Prominence of the timber noise panels is reduced by tree canopies associated with existing trees, which aids integration. The magnitude of visual impact during the operational phase of the Proposed Scheme is judged to be localised and Low as visible portions of the Proposed Scheme, whilst perceived will not significantly alter the character and composition of the view.
Significance of Visual Effect during Construction Phase	Localised Significant adverse, short-term duration, assessed as significant visual effects are predicted to occur during the construction phase of the Proposed Scheme.
Significance of Visual Effect during Operational Phase	Localised, Slight, assessed as not significant visual effects are predicted to occur during the operational phase of the Proposed Scheme. Whilst visible portions of the Proposed Scheme will be viewed at close distance, well below distant horizon lines, they will be seen as a minor alteration overall to the existing character and composition of the view at the time of scheme opening as proposed areas of planting will not be fully established.

APPENDIX 8.1F RESIDENTIAL VISUAL IMPACT ASSESSMENT (CONSTRUCTION AND OPERATIONAL PHASE)

An assessment of the predicted visual impacts on residents of residential properties that occur within 300m of the Proposed Scheme has been undertaken and is presented below.

Table 8.13: Summary of Predicted Residential Effects – Pre Establishment

Receptor Location	Viewer Sensitivity	Magnitude of Change	Predicted Visual Effect (Pre-Establishment)
Property to the immediate south-east of the upgraded roundabout junction (R405 / Loughlinstown Road)	High	Low	Slight, not significant
Cluster of 5 residential properties lying to the west of the upgraded roundabout junction (R405 / Loughlinstown Road)	High	Low	Slight, not significant
Properties to the south of the upgraded roundabout junction (R405 / Loughlinstown Road)	High	Negligible	Not Significant
Single property to the east of the Proposed Scheme at Ch 1+900 approx	High	Low	Slight, not significant
Single property to the east of the realigned section of the R405, east of the link road alignment	High	Negligible	Not Significant
Residential properties associated with the Simmonstown Stud Farm, located approximately 200m north of the proposed Simmonstown Road turning head	High	Negligible	Not Significant
Single residential property to the west of the mobility corridor, west of Ch 1+300 approx	High	Medium	Moderate, localised and medium term
Residential properties associated with Temple Grove, including The Copse, The Court and the Crescent	High	Negligible	Not Significant
Single residential property to the east of the mobility corridor, east of Ch 350 approx.	High	Medium	Moderate, localised and medium term
Cluster of residential properties immediately north of the Proposed Scheme tie in with the R403, associated with Priory Lodge	High	Medium	Moderate, localised and medium term

Views north from the identified property to the immediate south-east of the upgraded roundabout junction (R405 / Loughlinstown Road) are screened and restricted in nature by intervening, well vegetated boundaries associated with the local road network, such that the Proposed Scheme will not be visible in northern views. The predicted magnitude of visual impact is judged to be Low and the predicted visual effect Slight and not significant.

For the cluster of 5 residential properties lying to the west of the upgraded roundabout junction (R405 / Loughlinstown Road) it is considered that views north-east are screened by existing garden boundary vegetation, which restricts views towards the Proposed Scheme. Whilst it is considered that vegetation removal required as part of the Proposed Scheme will alter views from these properties, the imbedded soft landscape treatments to new boundaries of the Proposed Scheme will aid in screening. The predicted magnitude of visual impact is judged to be Low and the predicted visual effect Slight and not significant.

For remaining identified properties to the south of the upgraded roundabout junction (R405 / Loughlinstown Road) it is considered that intervening built form and vegetation cover will limit visibility of the Proposed Scheme and the predicted magnitude of visual impact is judged to be Negligible and the predicted visual effect not significant.

A single property to the east of the Proposed Scheme at Ch 1+900 approx. has been identified and assessed. This single property is visible from the existing R405 road, though generally well enclosed by

existing vegetation along the western boundary of the property. Views west from this property include visibility of the existing R405 and traffic movements, and it is considered that the Proposed Scheme will not substantially increase or alter these views, and the predicted magnitude of visual impact is judged to be Low and the predicted visual effect Slight and not significant.

A single property to the east of the realigned section of the R405, east of the link road alignment has been identified and assessed. This single property is visible from the existing R405 road, though well enclosed by existing vegetation along the western boundary of the property. Views west from this property include visibility of the existing R405 and traffic movements, and it is considered that the Proposed Scheme will not substantially increase or alter these views, and the predicted magnitude of visual impact is judged to be negligible and the predicted visual effect not significant.

Residential properties associated with the Simmonstown Stud Farm, located approximately 200m north of the proposed Simmonstown Road turning head have been identified and assessed. Views south from these properties are restricted in nature by a combination of intervening built form associated with the farm and strongly enclosing belts of mature trees, forming field boundaries which will restrict views of the Proposed Scheme. Further screening is provided by well-maintained roadside hedgerows adjacent to the Simmonstown Road and it is considered that the magnitude of visual impact is Negligible and the predicted visual effect not significant.

A single residential property to the west of the mobility corridor, west of Ch 1+300 approx. has been identified and assessed. Existing eastern views from this property are partially restricted by existing garden boundary treatments, with views north and south-east partially screened by existing tree cover. It is considered that the Proposed Scheme will be visible in eastern views from this property, though embedded landscape proposals will aid in integration of the Proposed Scheme once successfully established. The magnitude of visual impact, prior to successful establishment of the soft landscape treatments is judged to be medium and the predicted visual effect moderate, localised and medium term. Following successful establishment, the predicted visual effect is considered to reduce to Slight and not significant.

An area of residential development to the west of the Proposed Scheme, which lies to the immediate south of Newton Road and which includes residential properties associated with Temple Grove, including The Copse, The Court and the Crescent have been identified and assessed. Eastern views from these properties are restricted and constrained by well-established mixed species buffer planting which forms the eastern boundary of this residential development. The mixed species planting forms an effective screen, and it is considered that the Proposed Scheme will not be visible in eastern views from properties identified. It is considered that the magnitude of visual impact is Negligible and the predicted visual effect not significant.

A single residential property to the east of the mobility corridor, east of Ch 350 approx. has been identified and assessed. Existing southern views from this property are partially restricted by existing garden boundary treatments, with views north, west and south-east screened by existing tree cover. It is considered that the Proposed Scheme will be visible in southern views from this property, though embedded landscape proposals will aid in integration of the Proposed Scheme once successfully established. The magnitude of visual impact, prior to successful establishment of the soft landscape treatments is judged to be medium and the predicted visual effect moderate, localised and medium term. Following successful establishment, the predicted visual effect is considered to reduce to Slight and not significant.

A cluster of residential properties immediately north of the Proposed Scheme tie in with the R403, associated with Priory Lodge have been identified and assessed. Existing southern views from these properties are partially restricted by existing street tree planting associated with Priory Lodge and the R403 and contain visibility of the existing R403 road network and built form adjacent. It is considered that elements of the Proposed Scheme, namely timber noise barriers, will be visible in southern views from these properties whilst remaining portions of the Proposed Scheme will become screened in such views. The magnitude of visual impact is judged to be medium and the predicted visual effect moderate, localised and medium term.

Appendix B Photomontages

APPENDIX B

PHOTOMONTAGES

794-NI-P&E-02846 Celbridge Hazelhatch Mobility Corridor
Kildare County Council



Project: 02846
November 2025

CELBRIDGE HAZELHATCH MOBILITY CORRIDOR

PHOTOMONTAGE LIST

FIGURE TITLE

APPENDIX B FIGURE No.

VP01 Hazelhatch Road – roundabout, Existing View
VP01 Hazelhatch Road – roundabout, Model View
VP01 Hazelhatch Road – roundabout, Montage – Day 1
VP01 Hazelhatch Road – roundabout, Montage – Year 10

B.1a
B.1b
B.1c
B.1d

VP02 Simmonstown Manor Road, Existing View
VP02 Simmonstown Manor Road, Model View
VP02 Simmonstown Manor Road, Montage – Day 1
VP02 Simmonstown Manor Road, Montage – Year 10

B.2a
B.2b
B.2c
B.2d

VP03 The Crescent, Temple Manor, Existing View
VP03 The Crescent, Temple Manor, Model View

B.3a
B.3b

VP04 Callendars Mill, Existing View
VP04 Callendars Mill, Model View

B.4a
B.4b

VP05 Newton Road - South, Existing View
VP05 Newton Road - South, Model View
VP05 Newton Road - South, Montage – Day 1
VP05 Newton Road - South, Montage – Year 10

B.5a
B.5b
B.5c
B.5d

VP06 Riverview - Abbey Farm, Existing View
VP06 Riverview - Abbey Farm, Model View
VP06 Riverview - Abbey Farm, Montage – Day 1
VP06 Riverview - Abbey Farm, Montage – Year 10

B.6a
B.6b
B.6c
B.6d

VP07 Clane Road – Approach Station, Existing View
VP07 Clane Road – Approach Station, Model View
VP07 Clane Road – Approach Station, Montage View

B.7a
B.7b
B.7c



Existing View



Map image



Tripod location

Camera	Nikon D600	Easting	298283	Title: Fig No. B.1a VP01 Hazelhatch Road - roundabout Existing View	Details	Drawn by:	GMG	Project: Kildare County Council	Client:		 Making Complex Easy Elmwood House, 74 Boucher Road BELFAST, BT12 6RZ 028 9066 7914
Date	2024.06.26 12:50	Northing	231274		Projection:	IRENET95	Checked:	SA			
View height	1.65 m AGL	Direction	330°		Data Source:	RPS 2024	Job Ref:	02846			
Field of View	65°	Distance	30 m		Status:	For Planning	Date:	Nov 205			



Model View



Map image



Tripod location

Camera	Nikon D600	Easting	298283	Title: Fig No. B.1b VP01 Hazelhatch Road - roundabout Model View	Details	Drawn by:	GMG	Project: Kildare County Council	Client:		 Making Complex Easy Elmwood House, 74 Boucher Road BELFAST, BT12 6RZ 028 9066 7914
Date	2024.06.26 12:50	Northing	231274		Projection:	IRENET95	Checked:	SA			
View height	1.65 m AGL	Direction	330°		Data Source:	RPS 2024	Job Ref:	02846			
Field of View	65°	Distance	30 m		Status:	For Planning	Date:	Nov 2025			



Photomontage



Map image



Tripod location

Camera	Nikon D600	Easting	298283	Title: Fig No. B.1c VP01 Hazelhatch Road - roundabout Photomontage View (Day 1)	Details	Drawn by:	GMG	Project: Kildare County Council	Client:		 Making Complex Easy Elmwood House, 74 Boucher Road BELFAST, BT12 6RZ 028 9066 7914
Date	2024.06.26 12:50	Northing	231274		Projection:	IRENET95	Checked:	SA			
View height	1.65 m AGL	Direction	330°		Data Source:	RPS 2024	Job Ref:	02846			
Field of View	65°	Distance	30 m		Status:	For Planning	Date:	Nov 2025			



Photomontage



Map image



Tripod location

Camera	Nikon D600	Easting	298283	Title: Fig No. B.1d VP01 Hazelhatch Road - roundabout Photomontage View (Year 10)	Details	Drawn by:	GMG	Project: Kildare County Council	Client:		 Making Complex Easy Elmwood House, 74 Boucher Road BELFAST, BT12 6RZ 028 9066 7914
Date	2024.06.26 12:50	Northing	231274		Projection:	IRENET95	Checked:	SA			
View height	1.65 m AGL	Direction	330°		Data Source:	RPS 2024	Job Ref:	02846			
Field of View	65°	Distance	30 m		Status:	For Planning	Date:	Nov 2025			



Existing View



Map image



Tripod location

Camera	Nikon D600	Easting	697752	Title: Fig No. B.2a VP02 Simmonstown Manor Road Existing View	Details	Drawn by:	GMG	Project: Kildare County Council	Client:		 Making Complex Easy Elmwood House, 74 Boucher Road BELFAST, BT12 6RZ 028 9066 7914
Date	2024.06:26 12:23	Northing	731697		Projection:	IRENET95	Checked:	SA			
View height	1.65 m AGL	Direction	210°		Data Source:	RPS 2024	Job Ref:	02846			
Field of View	65°	Distance	50 m		Status:	For Planning	Date:	Nov 2025			



Camera	Nikon D600	Easting	697752	Title: Fig No. B.2c VP02 Simmonstown Manor Road Photomontage View (Day 1)	Details	Drawn by:	GMG	Project: Kildare County Council	Client:  Making Complex Easy	 Elmwood House, 74 Boucher Road BELFAST, BT12 6RZ 028 9066 7914
Date	2024:06:26 12:23	Northing	731697		Projection: IRENET95	Checked:	SA			
View height	1.65 m AGL	Direction	210°		Data Source: RPS 2024	Job Ref:	02846			
Field of View	65°	Distance	50 m		Status: For Planning	Date:	Nov 2025			



Photomontage



Map image



Tripod location

Camera	Nikon D600	Easting	697752	Title: Fig No. B.2d VP02 Simmonstown Manor Road Photomontage View (Year 10)	Details	Drawn by:	GMG	Project: Kildare County Council	Client:		 Making Complex Easy Elmwood House, 74 Boucher Road BELFAST, BT12 6RZ 028 9066 7914
Date	2024.06:26 12:23	Northing	731697		Projection:	IRENET95	Checked:	SA			
View height	1.65 m AGL	Direction	210°		Data Source:	RPS 2024	Job Ref:	02846			
Field of View	65°	Distance	50 m		Status:	For Planning	Date:	Nov 2025			



Model View



Map image



Tripod location

Camera	Nikon D600	Easting	696934	Title: Fig No. B.3b VP03 The Crescent, Temple Manor Model View	Details	Drawn by:	GMG	Project: Kildare County Council	Client:		 Making Complex Easy Elmwood House, 74 Boucher Road BELFAST, BT12 6RZ 028 9066 7914
Date	2024.06:26 11:04	Northing	732110		Projection:	IRENET95	Checked:	SA			
View height	1.65 m AGL	Direction	350°		Data Source:	RPS 2024	Job Ref:	02846			
Field of View	65°	Distance	50 m		Status:	For Planning	Date:	Nov 2025			



Existing View



Map image



Tripod location

Camera	Nikon D600	Easting	697397	Title: Fig No. B.4a VP04 Callendars Mill Existing View	Details	Drawn by:	GMG	Project: Kildare County Council	Client:		 Making Complex Easy Elmwood House, 74 Boucher Road BELFAST, BT12 6RZ 028 9066 7914
Date	2024.06.26 12:09	Northing	732233		Projection:	Checked:	SA				
View height	1.65 m AGL	Direction	220°		Data Source:	Job Ref:	02846				
Field of View	65°	Distance	360 m		Status:	Date:	Nov 2025				



Model View



Map image



Tripod location

Camera	Nikon D600	Easting	697397	Title: Fig No. B.4b VP04 Callendars Mill Model View	Details	Drawn by:	GMG	Project: Kildare County Council	Client:		 Making Complex Easy Elmwood House, 74 Boucher Road BELFAST, BT12 6RZ 028 9066 7914
Date	2024.06:26 12:09	Northing	732233		Projection:	IRENET95	Checked:	SA			
View height	1.65 m AGL	Direction	220°		Data Source:	RPS 2024	Job Ref:	02846			
Field of View	65°	Distance	360 m		Status:	For Planning	Date:	Nov 2025			



Existing View



Map image



Tripod location

Camera	Nikon D600	Easting	696852	Title: Fig No. B.5a VP05 Newton Road - South Existing View	Details	Drawn by:	GMG	Project: Kildare County Council	Client:		 Making Complex Easy Elmwood House, 74 Boucher Road BELFAST, BT12 6RZ 028 9066 7914
Date	2024.06:26 10:42	Northing	732316		Projection:	IRENET95	Checked:	SA			
View height	1.65 m AGL	Direction	50°		Data Source:	RPS 2024	Job Ref:	02846			
Field of View	65°	Distance	10 m		Status:	For Planning	Date:	Nov 2025			



Model View



Map image



Tripod location

Camera	Nikon D600	Easting	696852	Title: Fig No. B.5b VP05 Newton Road - South Model View	Details	Drawn by:	GMG	Project: Kildare County Council	Client:		 Making Complex Easy Elmwood House, 74 Boucher Road BELFAST, BT12 6RZ 028 9066 7914
Date	2024.06:26 10:42	Northing	732316		Projection:	Checked:	SA				
View height	1.65 m AGL	Direction	50°		Data Source:	Job Ref:	02846				
Field of View	65°	Distance	10 m		Status: For Planning	Date:	Nov 2025				



Photomontage



Map image



Tripod location

Camera	Nikon D600	Easting	696852	Title: Fig No. B.5c VP05 Newton Road - South Photomontage View (Day 1)	Details	Drawn by:	GMG	Project: Kildare County Council	Client:		 Making Complex Easy Elmwood House, 74 Boucher Road BELFAST, BT12 6RZ 028 9066 7914
Date	2024.06.26 10:42	Northing	732316		Projection:	Checked:	SA				
View height	1.65 m AGL	Direction	50°		Data Source:	Job Ref:	02846				
Field of View	65°	Distance	10 m		Status:	Date:	Nov 2025				



Photomontage



Map image



Tripod location

Camera	Nikon D600	Easting	696852	Title: Fig No. B.5d VP05 Newton Road - South Photomontage View (Year 10)	Details	Drawn by:	GMG	Project: Kildare County Council	Client:		 Making Complex Easy Elmwood House, 74 Boucher Road BELFAST, BT12 6RZ 028 9066 7914
Date	2024.06:26 10:42	Northing	732316		Projection:	IRENET95	Checked:	SA			
View height	1.65 m AGL	Direction	50°		Data Source:	RPS 2024	Job Ref:	02846			
Field of View	65°	Distance	10 m		Status:	For Planning	Date:	Nov 2025			



Existing View

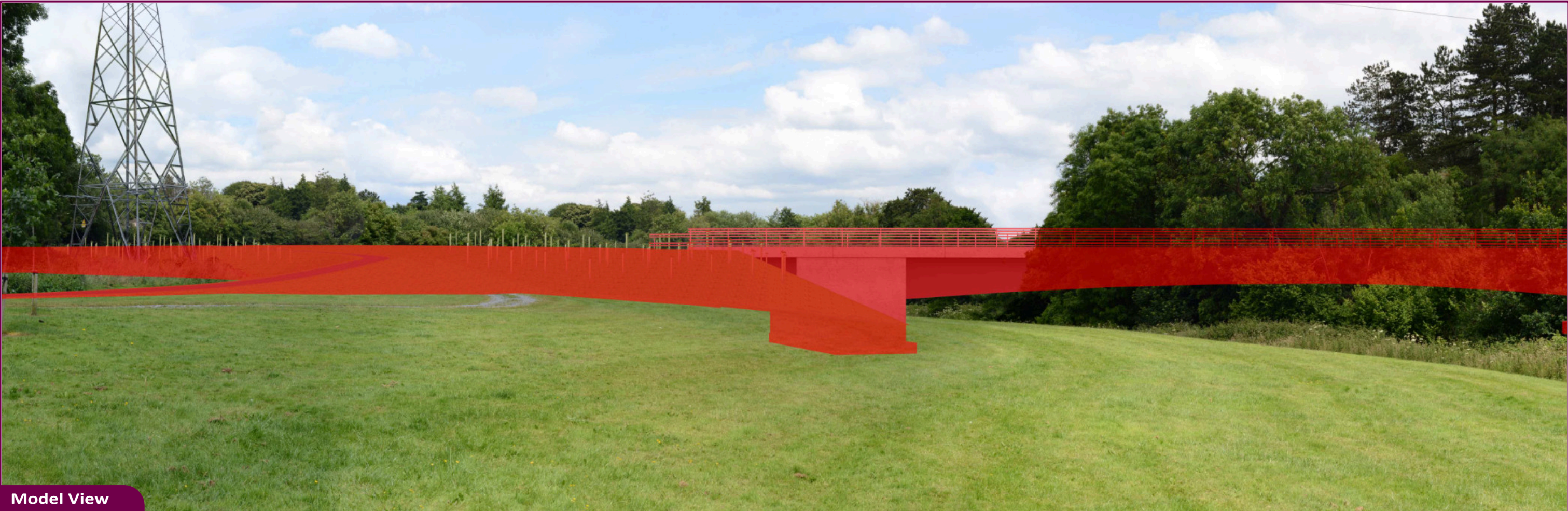


Map image



Tripod location

Camera	Nikon D600	Easting	696689	Title: Fig No. B.6a VP06 Riverview - Abbey Farm Existing View	Details	Drawn by:	GMG	Project: Kildare County Council	Client:		 Making Complex Easy Elmwood House, 74 Boucher Road BELFAST, BT12 6RZ 028 9066 7914
Date	2024.06:26 13:10	Northing	732327		Projection:	IRENET95	Checked:	SA			
View height	1.65 m AGL	Direction	60°		Data Source:	RPS 2024	Job Ref:	02846			
Field of View	65°	Distance	80 m		Status:	For Planning	Date:	Nov 2025			



Model View



Map image



Tripod location

Camera	Nikon D600	Easting	696689	Title: Fig No. B.6b VP06 Riverview - Abbey Farm Model View	Details	Drawn by:	GMG	Project: Kildare County Council	Client:		 Making Complex Easy Elmwood House, 74 Boucher Road BELFAST, BT12 6RZ 028 9066 7914
Date	2024.06:26 13:10	Northing	732327		Projection:	Checked:	SA				
View height	1.65 m AGL	Direction	60°		Data Source:	Job Ref:	02846				
Field of View	65°	Distance	80 m		Status:	Date:	Nov 2025				



Photomontage



Map image



Tripod location

Camera	Nikon D600	Easting	696689	Title: Fig No. B.6c VP06 Riverview - Abbey Farm Photomontage View (Day 1)	Details	Drawn by:	GMG	Project: Kildare County Council	Client:		 Making Complex Easy Elmwood House, 74 Boucher Road BELFAST, BT12 6RZ 028 9066 7914
Date	2024.06:26 13:10	Northing	732327		Projection:	IRENET95	Checked:	SA			
View height	1.65 m AGL	Direction	60°		Data Source:	RPS 2024	Job Ref:	02846			
Field of View	65°	Distance	80 m		Status:	For Planning	Date:	Nov 2025			



Photomontage



Map image



Tripod location

Camera	Nikon D600	Easting	696689	Title: Fig No.B.6d VP06 Riverview - Abbey Farm Photomontage View (Year 10)	Details	Drawn by:	GMG	Project: Kildare County Council	Client:		 Making Complex Easy Elmwood House, 74 Boucher Road BELFAST, BT12 6RZ 028 9066 7914
Date	2024.06:26 13:10	Northing	732327		Projection:	IRENET95	Checked:	SA			
View height	1.65 m AGL	Direction	60°		Data Source:	RPS 2024	Job Ref:	02846			
Field of View	65°	Distance	80 m		Status:	For Planning	Date:	Nov 2025			



Existing View



Map image



Tripod location

Camera	Nikon D600	Easting	696773	Title: Fig No. B.7a VP07 Clane Road - Approach Station Existing View	Details	Drawn by:	GMG	Project: Kildare County Council	Client:		 Making Complex Easy Elmwood House, 74 Boucher Road BELFAST, BT12 6RZ 028 9066 7914
Date	2024.06:26 09:56	Northing	732559		Projection:	Checked:	SA				
View height	1.65 m AGL	Direction	250°		Data Source:	Job Ref:	02846				
Field of View	65°	Distance	35 m		Status:	Date:	Nov 2025				



Model View



Map image



Tripod location

Camera	Nikon D600	Easting	696773	Title: Fig No. B.7b VP07 Clane Road - Approach Station Model View	Details	Drawn by:	GMG	Project: Kildare County Council	Client:		 Making Complex Easy Elmwood House, 74 Boucher Road BELFAST, BT12 6RZ 028 9066 7914
Date	2024.06:26 09:56	Northing	732559		Projection:	IRENET95	Checked:	SA			
View height	1.65 m AGL	Direction	250°		Data Source:	RPS 2024	Job Ref:	02846			
Field of View	65°	Distance	35 m		Status:	For Planning	Date:	Nov 2025			



Photomontage



Map image



Tripod location

Camera	Nikon D600	Easting	696773	Title: Fig No. B.7c VP07 Clane Road - Approach Station Photomontage View	Details	Drawn by:	GMG	Project: Kildare County Council	Client:		 Making Complex Easy Elmwood House, 74 Boucher Road BELFAST, BT12 6RZ 028 9066 7914
Date	2024.06.26 09:56	Northing	732559		Projection:	Checked:	SA				
View height	1.65 m AGL	Direction	250°		Data Source:	Job Ref:	02846				
Field of View	65°	Distance	35 m		Status:	Date:	Nov 2025				

Appendix 9 Biodiversity Supporting Information

APPENDIX 9.1A RELEVANT GUIDELINES, POLICY AND LEGISLATION

Legislative Context

The EclA has been prepared to ensure that the Proposed Scheme is consistent with the relevant legislative protections for habitats and species in Ireland. These include the following legislation:

- EU Habitats and Birds Directive; as transposed into Irish law via the European Communities (Birds and Natural Habitats Regulations 2011 (as amended);
- Wildlife Act 1976 (as amended) and Wildlife (Amendment) Act 2000 (as amended);
- Planning and Development Acts 2000 (as amended); and
- Flora (Protection) Order, 2022.

Planning Policy Context

The EclA has been prepared cognisant of the following National, County and Regional-level planning policy:

- The National Planning Framework (Project Ireland 2040) includes a number of national policies for the protection, conservation and enhancement of natural capital which are potentially relevant to this Proposed Scheme. These include:
 - National Policy Objective 57 which seeks to enhance water quality and resource management through the integration of sustainable water management solutions such as Sustainable Urban Drainage (SUDS);
 - National Policy Objective 59 which seeks to enhance the conservation status and improve the management of protected areas and protected species by implementing relevant EU Directives;
 - National Policy Objective 60 which seeks to conserve and enhance the rich qualities of natural heritage of Ireland; and
 - National Policy Objective 75 which ensures that all projects arising from the National Planning Framework are subject to relevant environmental assessment requirements including Appropriate Assessment (AA). The preamble to this policy also requires all applications for development consents will need to be accompanied, as in this case, by an EclA.
- Kildare County Development Plan 2023-2029 (KCC, 2023) is the key strategy document which structures the proper planning and sustainable development of land-use across County Kildare over the six-year statutory time period of the plan. The Development Plan (the Plan) seeks to address the physical, economic, social, and environmental needs of the community, in terms of supporting structured new development, protecting the environment, enhancing valued assets and amenities. The preparation of the Plan has regard to key recent development trends and national, regional, and local policy documents, in particular, the National Planning Framework (NPF) and the Regional Spatial and Economic Strategy for the Eastern Midland Region (RSES). The plan contains a range of policies, objectives and actions relevant to establishing support and protection of environmental sensitivities for Kildare and its environs including Chapter 5 Sustainable Mobility and Transport, Chapter 6 Infrastructure and Environmental Services, and Chapter 12 Biodiversity and Green Infrastructure.
- County Kildare Biodiversity Plan 2009-2014 (KCC, 2009) is a non-statutory plan that has not yet been superseded by an updated plan. This plan provided a framework for conserving biodiversity and natural heritage at the local level to help achieve national and international targets and also address local issues. It included actions to work towards the raising of awareness, enhancement of protection and management of natural heritage. The objective of the plan were:
 - Objective 1: To facilitate the collection and dissemination of heritage information.
 - Objective 2: To raise public awareness, understanding and appreciation of County Kildare's heritage.
 - Objective 3: To promote best practice in heritage conservation and management.
 - Objective 4: To inform policy and provide advice to Kildare local authorities.

- Celbridge Biodiversity Action Plan 2021-25 is a non-statutory plan and has four main objectives, each with several targets and actions:
 - Objective 1: Making Celbridge wildlife friendly
 - Objective 2: Raising awareness of local wildlife and how to protect it.
 - Objective 3: Collecting evidence to track change and measure success.
 - Objective 4: Build local capacity to manage and record biodiversity.
- In addition to National and County-level planning policy, the 4th National Biodiversity Action Plan (NBAP) 2023-2030 (NPWS, 2024) provides a framework for the conservation and protection of biodiversity in Ireland. The NBAP strives for a “*whole of government, whole of society*” approach to the governance and conservation of biodiversity. The aim is to ensure that every citizen, community, business, local authority, semi-state and state agency has an awareness of biodiversity and its importance, and of the implications of its loss, while also understanding how they can act to address the biodiversity emergency as part of a renewed national effort to “act for nature”.

APPENDIX 9.1B DETAILED METHODS FOR FIELD SURVEYS

Habitats and Flora

A site survey was carried out on 12 and 13 June 2023 to classify habitats using the Heritage Council's habitat classification system (Fossitt, 2000) for terrestrial habitats occurring within the footprint of the Proposed Scheme. A follow-up habitat survey was carried out from 29 April to 2 May 2024 to update the baseline and again on 14 April 2025. The mapping of habitats had cognisance of the Heritage Council's mapping methodology (Smith *et al.*, 2011). The information gained from the survey was used to describe habitat features, and to direct further habitat and species-specific survey work to inform this assessment. 'Target Notes' were recorded as necessary on maps in the field to identify the location of additional ecological features.

Habitat surveys recorded species using an ordinal abundance scale, the DAFOR scale, as detailed in Smith *et al.* (2011). Indicator species for different habitat types or conditions and rare or declining species identified on relevant Red Lists (Wyse Jackson *et al.*, 2016; Lockhart *et al.*, 2012) were also noted, if present.

Vascular plant nomenclature follows that of the Botanical Society of Britain and Ireland (BSBI) 'Complete list of taxon names from the BSBI's database'. As such, any name changes, including those outlined in Stace (2019) are not included. Any bryophyte nomenclature follows the British Bryological Society (Atherton *et al.*, 2010).

Invasive Plants and Animals

Habitat and aquatic surveys in June 2023 recorded the presence and location of any Invasive Alien Plant Species (IAPS) and Invasive Alien Animal Species (IAAS). A follow-up IAPS survey was carried out from 29 April to 2 May 2024 and again on 14 April 2025 to update the baseline. For the purpose of this assessment, IAPS and IAAS are those listed under the Third Schedule of the European Communities (EC) (Birds and Natural Habitats) Regulations 2011 (SI 477 of 2011), as amended and under the First Schedule of the European Union (EU) (Invasive Alien Species) Regulations 2024 (SI 374 of 2024). The species listed on both of these schedules are the same.

Aquatic (Freshwater Ecology)

Aquatic surveys were carried out at three sites on 21 June 2023. Site 1 was on both banks of the Liffey (EPA code: 09L01), approximately 100 m upstream of the Proposed Scheme (ITM 696698, 732238). Site 2 was within the footprint of the Proposed Scheme at Simmonstown Stud, east of Simmonstown Manor road, in an unmapped stream within a drainage ditch running north-south between two fields (ITM 697786, 731600). Site 3 was in Loughlinstown stream (EPA code: 09L21) at Simmonstown Stud within the footprint of the Proposed Scheme (ITM 697274, 731882).

Surveys included an assessment of the physical and physiochemical condition of the river, while also assessing for any potential mammal signs. Macroinvertebrate sampling was completed as well as an assessment of any potential fish and crayfish habitat. Site 3 was dry, so only the physical characteristics of the channel and the surrounding vegetation and land use were assessed.

A macroinvertebrate survey was carried out using a sweep sample, as conditions did not allow for kick sampling. None of the sites were appropriate for Q-value scoring.

The habitat assessment was carried out by visually assessing the bankside and in-stream habitats for habitat suitability for spawning and adult salmonids, juvenile salmonids, lamprey spawning, lamprey nursery habitat, adult lamprey and crayfish.

Updated aquatic surveys were conducted in June 2025 at the three sites previously surveyed in 2023. The surveys assessed physical habitat, water quality, vegetation, macroinvertebrates and fish habitat suitability for key species including salmonids, lamprey and crayfish.

Bats

Preliminary Ground-level Roost Assessment

With cognisance of the Bat Conservation Trust's (BCT) *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (Collins, 2016), a preliminary ground-level roost assessment was carried out during daylight hours, using close focusing binoculars, to identify features with suitability for roosting bats in trees and/or structures within or adjoining the footprint of the Proposed Scheme. This survey was conducted on 5 May 2022 on trees within the footprint of the Proposed Scheme. A follow-up survey was carried out from 29 April to 2 May 2024 to update the baseline and to assess the trees and structures with cognisance of the updated 4th edition of *Bat Surveys for Professional Ecologists: Good practice guidelines* (Collins, 2023).

All trees within or adjoining the footprint of the Proposed Scheme were studied and assessed for the presence of Potential Roost Features (PRFs) including cavities, frost cracks, trunk and branch splits, rot holes, and hollow sections of trunk and branches. The exteriors of all buildings within and adjoining the footprint of the Proposed Scheme were assessed for potential bat access points in features including soffits, roofing tiles and felt, eaves and broken plaster. The results of this assessment were used to grade trees into the categories: NONE (no PRFs in tree or highly unlikely), FAR (further assessment required to establish if PRFs are present), PRF-I (a PRF suitable for an individual bat) and PRF-M (a PRF suitable for multiple bats). Structures were graded into the potential suitability categories: none, negligible, low, moderate and high.

Activity Surveys

Bat activity surveys were carried out on 17 May (dusk survey), 8 June (dusk survey) and 29 September (dawn survey) 2022. Activity surveys were completed with cognisance of the BCT's *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (Collins, 2016). Surveys involved ecologists walking a planned and pre-determined transect route at a constant speed in order to observe, listen for and record bats in flight. Full-spectrum digital-recording bat detectors (*elekon Batlogger M2* detectors) were used.

Observations of bats such as number of bats, flight direction and behaviour (e.g. commuting or foraging) were recorded. Bat activity was also recorded via static detectors (*Titley Scientific Anabat Swift* detectors) deployed on each bank of the River Liffey from May to September 2022.

Updated bat activity was recorded using static detectors in 2025 from April to August. Two bat detectors were deployed and were rotated on a fortnightly basis across 4 survey locations. Static detectors were deployed at the 2 locations previously surveyed on each bank of the River Liffey in 2022. A further 2 locations were also monitored.

Emergence and Re-entry Surveys

Emergence and re-entry surveys were carried out in August 2022 of trees and in August and September 2024 for a structure that was determined to have moderate roosting suitability during the ground-level roost assessment. The purpose of the surveys was to observe the potential roost features during the periods of emergence or re-entry to determine the presence or likely absence of bats at the time of surveying. The 2022 emergence and re-entry surveys were completed with cognisance of the BCT's *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (Collins, 2016). The 2024 emergence surveys were completed with cognisance of the 4th edition of *Bat Surveys for Professional Ecologists: Good practice guidelines* (Collins, 2023). Emergence surveys commenced 15 minutes before sunset and ended two hours after sunset. Re-entry surveys commenced two hours before sunrise and ended 15 minutes after sunrise. Access to the lands surrounding the building in St John of Gods property could not be granted for the August emergence surveys, so vantage points from the neighbouring service station property were used, providing incomplete coverage of the building. Complete coverage of the building was obtained during the September survey. This limitation is discussed in **Chapter 9** of the Environmental Report.

Aerial Inspection Survey and Internal Building Survey

With cognisance of the BCT guidance, an aerial inspection survey was carried out for all trees assessed as being PRF-M during the 2024 ground level assessment or which bats were previously observed emerging from or re-entering. Tree climbing was carried out by trained ecologists on 20 and 21 August 2024 to more fully assess the roosting potential of the trees.

A single building which will be demolished to accommodate the Proposed Scheme was identified as having roosting potential. An internal building inspection of the building was carried out on 08 July 2024. Access was limited to a one-hour period for the inspection, so a complete inspection could not be carried out. This limitation is discussed in **Chapter 9** of the Environmental Report.

Mammals (excluding bats)

Badger

The European badger (*Meles meles*) survey methodology recorded any signs of badger activity, including the presence of setts, foraging evidence, access runs, tracks and prints, with cognisance of Scottish Badgers (2018), NRA (2005b), and Harris *et al.* (1989). Where setts were identified, usage of potential sett entrances and direction of tunnelling was also recorded.

The focus area for the badger survey was, at a minimum, a distance of 150 m from the Proposed Scheme area. The survey was carried out on 13 April 2022 and a follow-up survey was carried out from 29 April to 2 May 2024 to update the baseline.

During the 2024 update surveys, a potential badger sett was identified. As such, trail cameras were used in August and September 2024 to investigate the potential presence of badgers.

Otter

The Proposed Scheme area was assessed for otter (*Lutra lutra*). The survey methodology was cognisant of guidance of the NRA (2006) and included searches for breeding or resting sites within suitable habitats up to 150 m of the footprint of the Proposed Scheme to account for the potential effect of disturbance from noise and vibration. Evidence of otter including spraints, footprints, or feeding remains were recorded, where present.

In addition, any incidental records of otter were noted during the bird surveying effort. The survey was carried out on 13 April 2022 and a follow-up survey was carried out from 29 April to 2 May 2024 to update the baseline.

Other Protected Mammals

During all biodiversity surveys of the site of the Proposed Scheme, the potential was also noted for habitats of other protected terrestrial mammal species to occur including: hedgehog (*Erinaceus europaeus*), pygmy shrew (*Sorex minutus*), pine marten (*Martes martes*), Irish stoat (*Mustela erminea*), red squirrel (*Sciurus vulgaris*), Irish hare (*Lepus timidus hibernicus*), and red deer (*Cervus elaphus*).

Birds

Breeding birds

Breeding bird assessments of the Proposed Scheme site were carried out in April, May, and July 2022. A follow-up survey was carried out on 29 April 2024 to update the baseline. The survey methodology employed was a scaled down version of the British Trust for Ornithology's (BTO) Common Bird Census (CBC) technique (Bibby *et al.*, 2000; Gilbert *et al.*, 1998), which aimed to capture a snap-shot of breeding bird activity within the Proposed Scheme and immediate environs. This method required a competent observer to complete multiple monthly visits, slowly walking transects through the site, recording all birds seen or heard. Species encountered were mapped and coded using standard BTO species codes with categories of breeding evidence then assigned. No attempts were made to locate nests as the survey methods are generally sufficient to determine probable or confirmed breeding. The survey identified all bird species as Low, Medium or High Conservation Concern as per the latest Birds of Conservation Concern in Ireland (BoCCI) listing (Gilbert *et al.*, 2021).

Survey visits were conducted during the morning to coincide with the peak bird activity period and were not made during adverse weather conditions. Transects were chosen to ensure all parts of the survey area were passed within 50 m or less. This was reversed between visits. Areas which were more likely to hold breeding birds, such as waterbodies and hedgerows were included along the route wherever relevant. All bird species encountered within the survey area and immediate environs were recorded, including those in flight over the Proposed Scheme site.

Kingfisher

The following methodology was adapted from Cummins *et al.* (2010). The primary objectives of these surveys are to identify any suitable kingfisher (*Alcedo atthis*) nesting habitat within the Proposed Scheme and determine the presence/absence of foraging kingfisher at the proposed River Liffey crossing.

Specialist kingfisher surveys comprised a combination of a walkover survey of the section of the River Liffey within the Proposed Scheme with a 250 m buffer from the proposed planning boundary lines crossing the

River Liffey on 29 April 2024 and vantage point surveys where the initial walkover survey found suitable viewpoints to observe breeding and/or foraging birds. Vantage point surveys were carried out on 30 April, 28 May, 20 June and 8 July 2024. The vantage point surveys were undertaken in two areas which were deemed potentially suitable for breeding and/or foraging kingfisher. These lasted 2 hours, during which time the surveyor sat at a suitable vantage point (determined following the initial walkover survey), observing the area and recording kingfisher activity.

Barn owl

The following methodology was adapted from Transport Infrastructure Ireland's (TII) *Survey and Mitigation Standards for Barn Owls to inform the Planning, Construction and Operation of National Road Projects* (TII, 2021) and the *Barn Owl Tyto alba Survey Methodology and Techniques for use in Ecological Assessment: Developing Best Practice in Survey and Reporting* (Shawyer, 2011). The primary objectives of these surveys were to determine the presence/absence of barn owl (*Tyto alba*), the usage of foraging barn owl within the area, and where applicable, identify any barn owl breeding locations within the Proposed Scheme site.

Specialist barn owl surveys to determine occupancy and breeding status were carried out during the main nesting period (typically mid-March to mid-July) when the population is sedentary and when it is possible to detect and confirm nesting sites (TII, 2021). It should be noted however that barn owls can have an extended breeding season and may have second broods, so the timing of breeding can vary, and surveys must cater for this.

A desk study was completed to determine if the Proposed Scheme is within the geographical range of barn owls. A desk study searching for records of breeding/foraging barn owl within 5 km (Shawyer, 2011) of the Proposed Scheme was conducted in February 2023. The desk study had particular regard for the following sources:

- Distribution records for barn owl held online by the NBDC⁸;
- Information on barn owl in Kildare – Kildare BirdWatch Ireland Barn Owl Nest Box Scheme⁹; and
- Other sources of information including local farmers, landowners, foresters and reserve wardens. Consideration must always be given to the possible misidentification of barn owls, which is not uncommon in this group of birds.

Following from the desk study, those areas determined to have potential suitability for barn owl were further investigated through field surveys. Two types of field surveys were carried out; daytime site assessments, looking for evidence/suitability for breeding and/or roosting barn owl (carried out on 17 April 2023), and nocturnal vantage point surveys (carried out on 17 April, 16 May and 24 July 2023). The daytime site assessment was repeated on 7 August 2024.

⁸ Assessing records up to 10 years old (from date of search), for an area of 5km from the Proposed Scheme site. Available online at <https://maps.biodiversityireland.ie/Map>. Accessed February 2023.

⁹ Available online at http://www.birdwatchkildare.com/?page_id=138 Accessed February 2023.

APPENDIX 9.1C DESIGNATED SITES FOR NATURE CONSERVATION

The Proposed Scheme is not located within or adjoining any internationally or nationally designated sites for nature conservation. Designated sites for nature conservation within the Study Area (i.e. sites within the Dublin GWB, the Liffey and Dublin Bay catchment, or within Dublin Bay) are detailed in **Table 9.1** and illustrated in **Figure 9-1**.

The closest nationally designated site for nature conservation to the Proposed Scheme is the Grand Canal pNHA (site code 002103), located approximately 680 m south-east. The closest internationally designated site is the Rye Water Valley/Carton SAC (site code 001398), located approximately 4.7 km north of Proposed Scheme.

Table 9.1: Designated sites within the Study Area

Name	Distance (km)	Direction
SAC		
Rye Water Valley/Carton SAC	4.7	North
Glenasmole Valley SAC	12.5	South-east
Wicklow Mountains SAC	13.7	South-east
Red Bog, Kildare SAC	13.7	South
Mouds Bog SAC	20.4	West
South Dublin Bay SAC	20.8	East
North Dublin Bay SAC	23.2	East
Malahide Estuary SAC	26.4	North-east
Baldoyle Bay SAC	27.1	East
Howth Head SAC	29.0	East
Rockabill to Dalkey Island SAC	29.0	East
SPA		
Poulaphouca Reservoir SPA	15.7	South
Wicklow Mountains SPA	17.1	South-east
South Dublin Bay and River Tolka Estuary SPA	20.1	East
North Bull Island SPA	23.2	East
North-West Irish Sea SPA	25.1	East
Malahide Estuary SPA	26.5	North-east
Baldoyle Bay SPA	27.5	East
Dalkey Islands SPA	29.1	East
Howth Head Coast SPA	31.6	East
Ramsar site		
Sandymount Strand/Tolka Estuary	20.8	East
North Bull Island	23.4	East
Broadmeadow Estuary	26.5	North-east
Baldoyle Bay	27.5	East
National Park		
Wicklow National Park	15.1	South-east
pNHA		
Grand Canal pNHA	0.68	South-east
Royal Canal pNHA	4.3	North-east
Rye Water Valley/Carton pNHA	4.7	North
Liffey Valley pNHA	4.9	North-east

Section 177AE Appendices to the Environmental Report

Name	Distance (km)	Direction
Slade Of Saggart And Crooksling Glen pNHA	8.3	South-east
Kilteel Wood pNHA	9.5	South
Lugmore Glen pNHA	9.8	South-east
Donadea Wood pNHA	11.6	West
Dodder Valley pNHA	12.4	South-east
Glenasmole Valley pNHA	12.5	South-east
Red Bog, Kildare pNHA	13.7	South
Liffey At Osberstown pNHA	15.0	South-west
Poulaphouca Reservoir pNHA	15.6	South
North Dublin Bay pNHA	19.8	East
Santry Demesne pNHA	19.9	North-east
Fitzsimon's Wood pNHA	20.1	South-east
Mouds Bog pNHA	20.4	South-west
South Dublin Bay pNHA	20.7	East
Boosterstown Marsh pNHA	21.6	East
Liffey Valley Meander Belt pNHA	21.7	South
Dolphins, Dublin Docks pNHA	21.9	East
Liffey Bank Above Athgarvan pNHA	24.9	South-west
Feltrim Hill pNHA	25.1	North-east
Newtown Marshes pNHA	25.2	South
Curragh (Kildare) pNHA	26.0	South-west
Malahide Estuary pNHA	26.4	North-east
Dalkey Coastal Zone And Killiney Hill pNHA	26.6	East
Baldoyle Bay pNHA	27.1	East
Sluice River Marsh pNHA	27.1	North-east
Hollywood Glen pNHA	28.6	South
Howth Head pNHA	28.7	East
Ballinagee Wood pNHA	29.6	South
Nature Reserve		
North Bull Island	26	East
Baldoyle Estuary	28	East
Wildfowl Sanctuary		
Brittas Ponds	10	South-east
Poulaphuca	21	South
North Bull	26	East

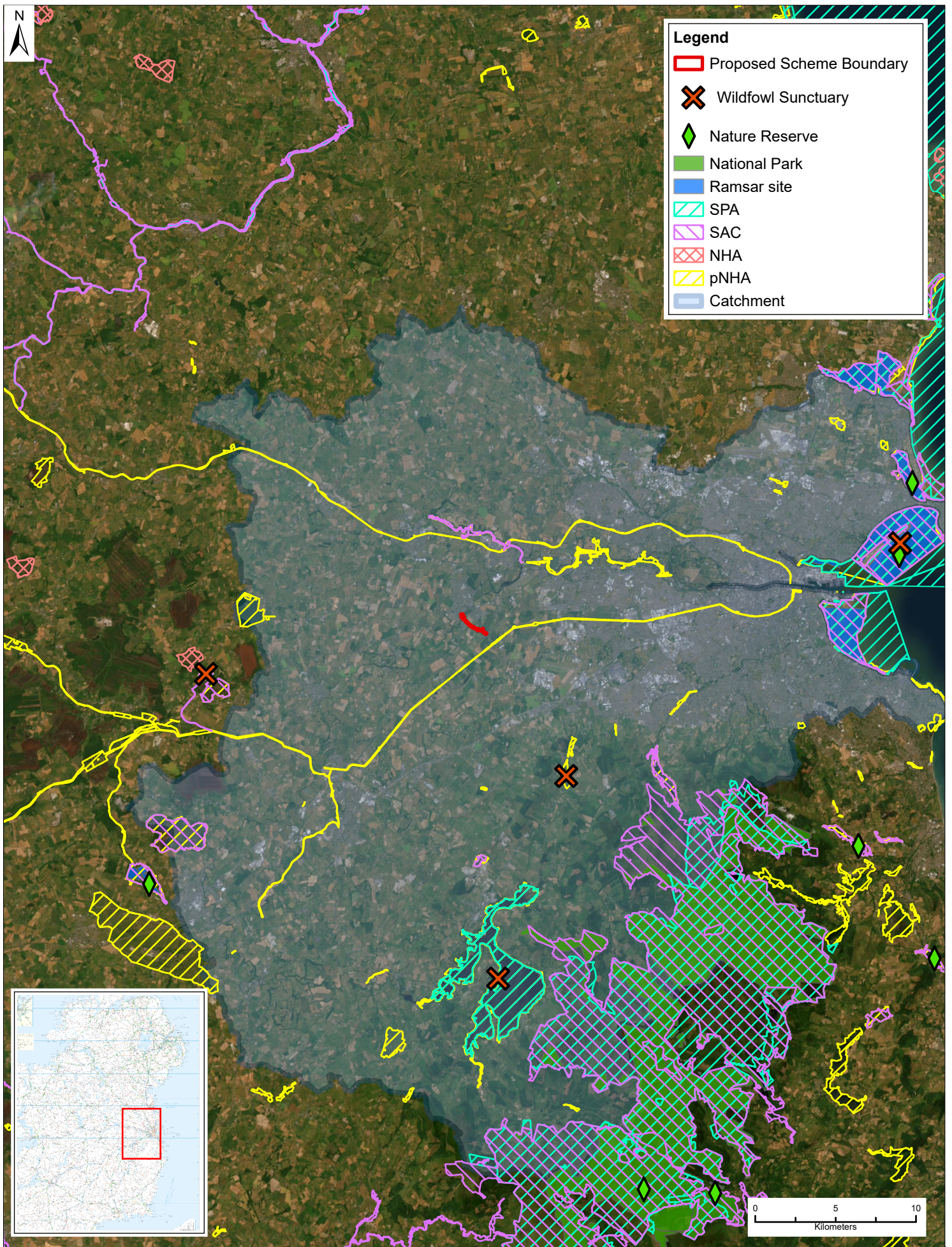


Figure 9-1: Designated Sites for Nature Conservation within the Study Area

Project:
Celbridge Hazelhatch Mobility Corridor



West Pier Business Campus,
Dun Laoghaire,
Co Dublin, Ireland.

Tel: +353 (0) 1 488 2900
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Issue Details

File Identifier: **MDT0902-RPS-00-XX-DR-Z-AG-1030**

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Checked By: **MS** Date: 31/07/2024

Approved By: **LC** Projection: **ITM**

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APPENDIX 9.1D RESULTS - DETAILED HABITATS DESCRIPTIONS

Habitats identified within the Proposed Scheme area are outlined below. Habitats have been classified according to the Irish national standard (Fossitt, 2000), please see **Figure 9-2**.

Cultivated Land

BC2 Horticultural land

There is a nursery within the northern end of the Proposed Scheme with flowerbeds and polytunnels in which various fruits, vegetables and ornamental species were growing.

BC3 Tilled land

One large field of freshly tilled land occurred outside of the boundary of the Proposed Scheme, immediately east of the R405 and north of the Hazelhatch and Celbridge Station carpark.

Built Land

BL1 Stone walls and other stonework

The Proposed Scheme crosses a stone wall which runs along the northern edge of Newtown Road. The wall is in a state of disrepair, varying in height from 0.5 m to 2.5 m. The wall had plants growing along and on it, including ivy (*Hedera helix*), elder (*Sambucus nigra*) and hawthorn (*Crataegus monogyna*).

BL3 Buildings and artificial surfaces

The northern end of the Proposed Scheme crosses large areas of buildings, ancillary built structures and concrete and tarmac pavement.

Disturbed Ground

ED3 Recolonising bare ground

Within the area of the nursery were areas of gravel and small stones that were being recolonised with vegetation. The colonising species included butterfly bush (*Buddleja davidii*), coltsfoot (*Tussilago farfara*), nettle (*Urtica dioica*), kidney vetch (*Anthyllis vulneraria*), oxeye daisy (*Leucanthemum vulgare*), ash (*Fraxinus excelsior*), willowherbs and scarlet pimpernel (*Anagallis arvensis*).

Improved Grassland

GA1 Improved agricultural grassland

Agriculture was the dominant land use across the Proposed Scheme with GA1 the dominant land parcel type south of the River Liffey. This habitat was dominated by grass species. Yorkshire fog (*Holcus lanatus*) and perennial rye grass (*Lolium perenne*) were typically the most abundant, with annual meadow grass (*Poa annua*), bent grasses (*Agrostis* sp.), meadow foxtail (*Alopecurus pratensis*), crested dogs-tail (*Cynosurus cristatus*), sweet vernal grass (*Anthoxanthum odoratum*) and cocksfoot (*Dactylis glomerata*) also present. Other species present were creeping buttercup (*Ranunculus repens*), meadow buttercup (*Ranunculus acris*), creeping thistle (*Cirsium arvense*), meadow thistle (*Cirsium dissectum*), nettle, white clover (*Trifolium repens*), cleavers (*Galium aparine*), common chickweed (*Stellaria media*), common hogweed (*Heracleum sphondylium*) and curled dock (*Rumex crispus*).

GA2 Amenity grassland (improved)

The Proposed Scheme crosses an area of amenity grassland north of the River Liffey. Perennial rye grass was the dominant species in this habitat with annual meadow grass, creeping buttercup, creeping thistle, white clover, dandelion (*Taraxacum officinale* agg.), greater plantain (*Plantago major*), daisy (*Bellis perennis*), and creeping cinquefoil (*Potentilla reptans*) also present.

Semi-Natural Grassland

GS2 Dry meadows and grassy verges

Numerous small areas of dry meadows and grassy verges were observed on the northern half of the Proposed Scheme. This habitat was assigned to grassy areas that were obviously not maintained in any form and could therefore not be included as Amenity Grassland or Improved Agricultural Grassland. These areas contained tall grasses and herbaceous species including fescues (*Festuca* spp.), bramble (*Rubus fruticosus* agg.), cock's-foot (*Dactylis glomerata*), false oat-grass (*Arrhenatherum elatius*), cleavers (*Galium aparine*), creeping bent (*Agrostis stolonifera*), common hogweed, creeping buttercup, meadow buttercup, creeping thistle, daisy, herb-Robert (*Geranium robertianum*), white clover, red clover (*Trifolium pratense*), Yorkshire fog, dandelion, perennial rye grass, ribwort plantain (*Plantago lanceolata*), sweet vernal grass, and black medick (*Medicago lupulina*). In 2023, Bee orchids (*Ophrys apifera*) were observed on the grassy verge on the south side of the R403 at the eastern edge of the Proposed Scheme. These were not observed during the 2024 surveys, but these surveys occurred before they would be in flower.

GS4 Wet grassland

One grassland area south of the River Liffey was a matrix of GS2 and GS4. This habitat differed from the other patches of GS2 by the presence of hard rush (*Juncus inflexus*).

Woodland and Scrub

WL1 Hedgerows

Hedgerows were the dominant field boundary within the agricultural areas. Most hedgerows were well-maintained, typically with widths of approximately 2 m and heights of approximately 2 m to 4 m. The hedgerows that intersect with the Proposed Scheme typically contained various abundances of ash, hawthorn, bramble, blackthorn (*Prunus spinosa*), elder and ivy. In fewer circumstances, various abundances of hazel (*Corylus avellana*), pedunculate oak (*Quercus robur*), nettles (*Urtica dioica*), dog rose (*Rosa canina*), sycamore (*Acer pseudoplatanus*) and cleavers were also present. Other herbaceous species which typically appeared in low abundances were herb-Robert, bush vetch (*Vicia sepium*), germander speedwell (*Veronica chamaedrys*), meadowsweet (*Filipendula ulmaria*), meadow vetchling (*Lathyrus pratensis*) and bindweed (*Convolvulus* sp.). Some hedgerows contained various abundances of taller trees typically with heights of 10 m to 15 m. Ash was the most common tree, with some containing pedunculate oak.

There were unmanaged hedgerows at the northern end of the Proposed Scheme, around the grounds of St. John of Gods. The most abundant species in these hedgerows were ash, sycamore and brambles. These contained a high variety of species, many of which were ornamental or introduced species, such as New Zealand flax (*Phormium tenax*), Chinese privet (*Ligustrum sinense*), butterfly bush and cherry laurel (*Prunus laurocerasus*).

WL2 Treelines

Several treelines intersect with the Proposed Scheme. South-east of the Liffey, these were all dominated by non-native species of cypress (*Cupressus* sp.), spruce (*Picea* sp.) or poplar (*Populus* sp.). The treeline along the east of the R405 had a wide variety of species, including cypress, ash, hawthorn, sycamore, poplar, blackthorn, alder (*Alnus glutinosa*), and elder. North of the Liffey the Proposed Scheme intersects one treeline of 12 m to 14 m ash trees. Along the R403 there were young, 6 m tall treelines of London planes (*Platanus acerifolia*) with wild cherry.

WS1 Scrub

The Proposed Scheme crosses an area of scrub just south of the R403. This area was predominantly populated by bramble, nettle, honeysuckle (*Lonicera periclymenum*), elder, Chinese privet and butterfly bush. Another small area of scrub was observed on the south-east boundary of St John of Gods in a matrix with very small areas of GS1 dry calcareous and neutral grassland.

WN5 Riparian woodland

There were strips of riparian woodland on both banks of the River Liffey where the Proposed Scheme crosses it. These strips were typically approximately 10 m wide on the northern bank and approximately

20 m wide on the southern bank. Both banks had large proportions of ash and sycamore and occasional or rare occurrences of alder, pedunculate oak, hazel, blackthorn, hawthorn and elder.

WD1 (Mixed) broadleaved woodland

On the south bank of the River Liffey, the Proposed Scheme passes through an area of mixed broadleaved woodland that is uphill from the riparian woodland. This woodland was populated by beech (*Fagus sylvatica*), horse chestnut (*Aesculus hippocastanum*), sycamore, willow (*Salix* sp.) and hawthorn. The understory contained herb-Robert, ivy, cleavers, and lesser celandine (*Ficaria verna*).

WD3 (Mixed) conifer woodland

An approximately 10 m wide strip of mixed conifer woodland lined the western edge of the R405. This was mostly spruce with cypress and ash. It was not well-managed and also had ivy, nettles, brambles and young hawthorn, elder, hazel, sycamore, blackthorn.

Watercourses

FW2 Depositing/lowland rivers

Watercourses within the Proposed Scheme are discussed in Section 9.3.5 of the Environmental Report.

FW4 Drainage ditches

Drainage ditches were typically associated with hedgerows and treelines within the area of the Proposed Scheme. Most ditches were dry. Species within these ditches were typically ivy, brambles and lesser celandine. Some drainage ditches had little vegetation because of the overshadowing hedgerow. A large drainage ditch with stagnant water was observed running along the western edge of the R405. This had a similar mix of species to the other drainage ditches, with the addition of hart's tongue fern (*Asplenium scolopendrium*). The bottom of this ditch was unvegetated.

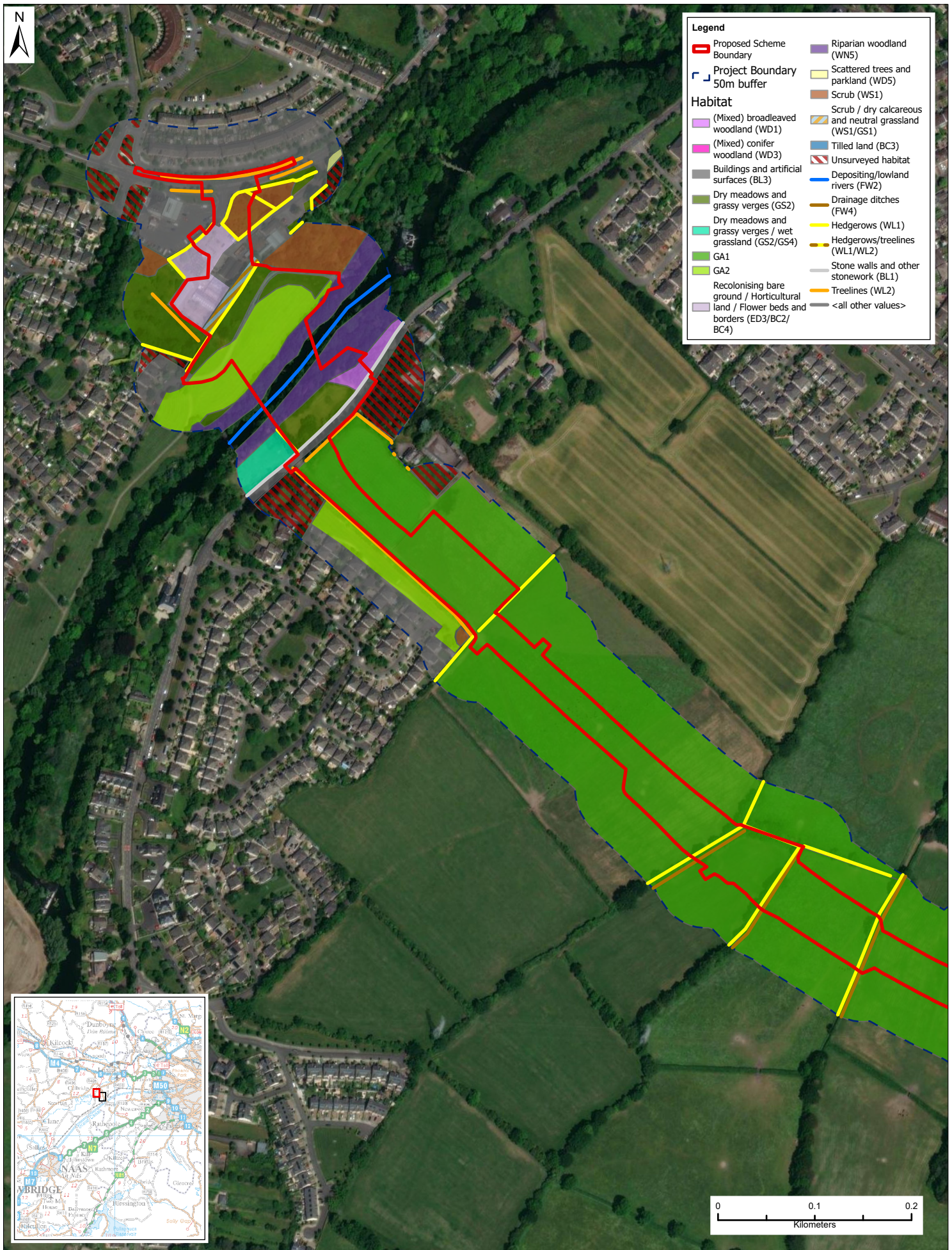


Figure 9-2: Habitats within the vicinity of the Proposed Scheme

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Issue Details

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Approved By: LG	Projection: ITM	

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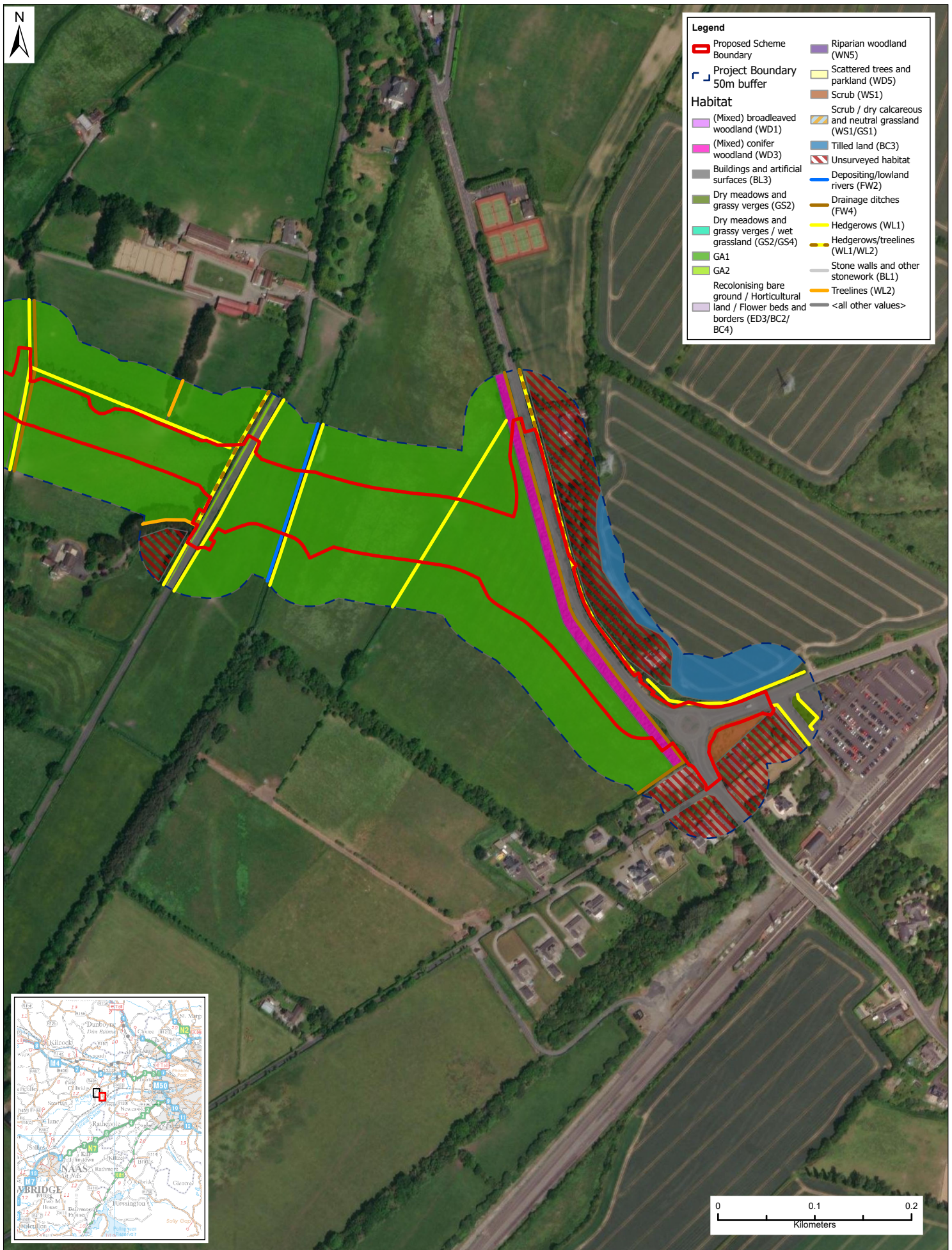


Figure 9-2: Habitats within the vicinity of the Proposed Scheme

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APPENDIX 9.1E RESULTS – INVASIVE ALIEN PLANT SPECIES

The control of invasive alien species in Ireland is regulated through the European Communities (EC) (Birds and Natural Habitats) Regulations 2011 (SI 477 of 2011), (as amended), and also through the European Union (EU) (Invasive Alien Species) Regulations 2024 (SI 374 of 2024). Both of these pieces of legislation state that it is an offence to introduce or spread certain invasive alien species or their propagules. These species are listed under the Third Schedule of SI 477 of 2011, as amended and under the First Schedule of SI 374 of 2024. The species listed on both of these schedules are the same and will be referred to as “Scheduled Species” and have considered in this report owing to the legislative requirement to prevent their spread.

Four ‘Scheduled’ Invasive Alien Plant Species (IAPS) were returned from the NBDC data search: Nuttall's waterweed (*Elodea nuttallii*), Himalayan balsam (*Impatiens glandulifera*), Japanese knotweed (*Reynoutria Japonica*) and three-cornered garlic (*Allium triquetrum*).

The ‘Scheduled’ species observed during field surveys were Himalayan balsam, Japanese knotweed, Spanish bluebell (*Hyacinthoides hispanica*) and waterweed (*Elodea* sp.). All observations were either within 50 m of the River Liffey or to the north of the Liffey.

Stands of Himalayan balsam were observed on both banks of the Liffey both upstream and downstream of the proposed bridge and within the ground of Cellbridge Abbey. The closest observation was approximately 20 m from the Proposed Scheme.

Eight individual Japanese knotweed plants were observed within the Proposed Scheme in the area of scrub south of the R403. Large stands of Japanese knotweed were also observed downstream of the proposed bridge on islands in the Liffey and south of the Liffey.

Spanish bluebell was observed within the Proposed Scheme between the Liffey and the nursery. It was also observed along the Liffey upstream and downstream of the Proposed Scheme. Waterweed was observed within the Liffey during the 2023 aquatic surveys.

IAPS recorded during field surveys are detailed in **Table 9.2** and **Figure 9-3**.

Table 9.2: Invasive Alien Plant Species

Species	ITM x	ITM y	Notes
Himalayan balsam (<i>Impatiens glandulifera</i>)	696752	732291	4×4 m patch of approx. 15 plants.
	696653	732226	2×3 m patch of approx. 40 plants on the north-west bank of the Liffey.
	696861	732520	4×13 m patch of several hundred plants.
	696880	732475	Three plants 4 m from the river.
	696878	732509	5×4 m patch of approx. 25 plants dotted throughout a creeping buttercup patch.
	696883	732504	5×10 m patch of approx. 100 plants on both banks of the stream.
	696705	732239	A single plant on the south-east bank of the Liffey observed in 2023 but not during the 2024 surveys.
	696907	732456	A stand of plants on the south-east bank of the Liffey observed in 2023 but not during the 2024 surveys.
Japanese knotweed (<i>Reynoutria Japonica</i>)	696895	732447	10×10 m stand on island.
	696937	732485	Covering a 5×20 m island.
	696976	732502	5×5 m stand. Old growth potentially treated, but a lot of new growth at base.
	696743	732515	Small stand of 7 plants within scrubby bramble. Signs of new growth.
	696740	732517	One plant.
Spanish bluebell (<i>Hyacinthoides hispanica</i>)	696715	732393	Small patch several plants within compost heap.
	696706	732224	Small patch of four plants within woodland clearing.
	696716	732230	Small patch of approx. 10 plants.
	696762	732454	Small patch of approx. 25 plants.
	696756	732323	Two plants.
	696933	732482	Two plants on island covered in Japanese knotweed.

Section 177AE Appendices to the Environmental Report

Species	ITM x	ITM y	Notes
Waterweed (<i>Elodea</i> sp.)			Waterweed was observed within the Liffey during 2023 aquatic surveys, but not in the 2024 update surveys.

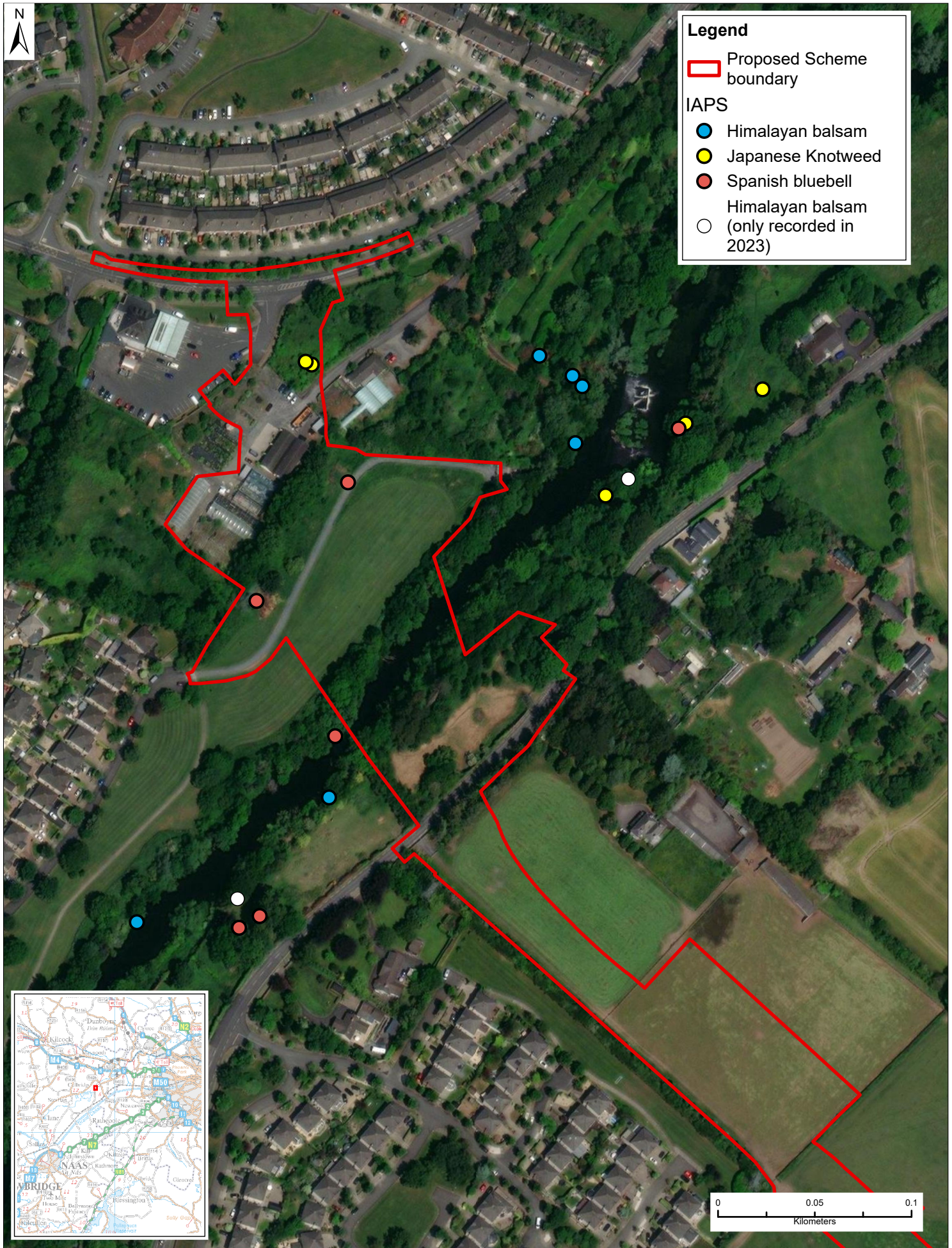


Figure 9-3: Invasive Alien Plant Species in the vicinity of the Proposed Scheme

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APPENDIX 9.1F NDBC DESK STUDY RESULTS

Table 9.3: NDBC results

Species name	Record count	Date of last record	SCI / QI species	BoCCI status	Annex species	Wildlife Acts	Invasive species*
Birds (Red or amber listed and/or Annex I species)							
Barn Owl (<i>Tyto alba</i>)	2	01/09/2021	No	Red	No	Yes	No
Barn Swallow (<i>Hirundo rustica</i>)	13	28/03/2023	No	Amber	No	Yes	No
Black-headed Gull (<i>Larus ridibundus</i>)	5	25/11/2020	Yes	Amber	No	Yes	No
Black-tailed Godwit (<i>Limosa limosa</i>)	2	19/08/2022	Yes	Red	No	Yes	No
Common Coot (<i>Fulica atra</i>)	8	29/12/2022	Yes	Amber	No	Yes	No
Common Goldeneye (<i>Bucephala clangula</i>)	1	23/10/2022	Yes	Red	No	Yes	No
Common Greenshank (<i>Tringa nebularia</i>)	1	24/08/2022	Yes	Green	No	Yes	No
Common Kestrel (<i>Falco tinnunculus</i>)	1	14/03/2023	No	Red	No	Yes	No
Common Kingfisher (<i>Alcedo atthis</i>)	3	10/04/2023	Yes	Amber	Yes	Yes	No
Common Pheasant (<i>Phasianus colchicus</i>)	11	12/05/2023	No	N/A	No	Yes	No
Common Pochard (<i>Aythya ferina</i>)	3	23/03/2023	Yes	Red	No	Yes	No
Common Sandpiper (<i>Actitis hypoleucos</i>)	1	12/07/2022	No	Amber	No	Yes	No

Section 177AE Appendices to the Environmental Report

Species name	Record count	Date of last record	SCI / QI species	BoCCI status	Annex species	Wildlife Acts	Invasive species*
Common Snipe (<i>Gallinago gallinago</i>)	1	29/12/2022	No	Red	No	Yes	No
Common Starling (<i>Sturnus vulgaris</i>)	17	13/05/2022	No	Amber	No	Yes	No
Common Swift (<i>Apus apus</i>)	9	08/07/2023	No	Red	No	Yes	No
Eurasian Oystercatcher (<i>Haematopus ostralegus</i>)	1	10/07/2022	Yes	Red	No	Yes	No
Eurasian Wigeon (<i>Anas penelope</i>)	1	11/09/2022	Yes	Amber	No	Yes	No
Garganey (<i>Anas querquedula</i>)	1	11/09/2022	No	Amber	No	Yes	No
Great Cormorant (<i>Phalacrocorax carbo</i>)	2	21/04/2023	Yes	Amber	No	Yes	No
Great Crested Grebe (<i>Podiceps cristatus</i>)	4	16/04/2023	Yes	Amber	No	Yes	No
Greater Scaup (<i>Aythya marila</i>)	2	02/12/2022	Yes	Red	No	Yes	No
Grey Heron (<i>Ardea cinerea</i>)	13	19/04/2023	Yes	Green	No	Yes	No
House Martin (<i>Delichon urbicum</i>)	7	01/05/2018	No	Amber	No	Yes	No
House Sparrow (<i>Passer domesticus</i>)	13	09/12/2022	No	Amber	No	Yes	No
Little Egret (<i>Egretta garzetta</i>)	1	25/11/2020	No	Green	Yes	Yes	No
Little Grebe (<i>Tachybaptus ruficollis</i>)	7	13/04/2023	Yes	Green	No	Yes	No
Mallard (<i>Anas platyrhynchos</i>)	14	13/04/2023	Yes	Green	No	Yes	No

Section 177AE Appendices to the Environmental Report

Species name	Record count	Date of last record	SCI / QI species	BoCCI status	Annex species	Wildlife Acts	Invasive species*
Merlin (<i>Falco columbarius</i>)	1	09/03/2014	Yes	Amber	Yes	Yes	No
Mew Gull (<i>Larus canus</i>)	1	16/04/2018	No	N/A	No	Yes	No
Mute Swan (<i>Cygnus olor</i>)	13	02/02/2023	No	Amber	No	Yes	No
Northern Lapwing (<i>Vanellus vanellus</i>)	3	22/04/2023	Yes	Red	No	Yes	No
Northern Pintail (<i>Anas acuta</i>)	1	24/11/2022	Yes	Amber	No	Yes	No
Northern Shoveler (<i>Anas clypeata</i>)	3	28/11/2022	Yes	Red	No	Yes	No
Northern Wheatear (<i>Oenanthe oenanthe</i>)	1	18/04/2019	No	Amber	No	Yes	No
Peregrine Falcon (<i>Falco peregrinus</i>)	2	01/03/2023	Yes	Green	Yes	Yes	No
Red Kite (<i>Milvus milvus</i>)	3	10/03/2023	No	Red	Yes	Yes	No
Ringed Plover (<i>Charadrius hiaticula</i>)	1	05/03/2023	Yes	Amber	No	Yes	No
Sand Martin (<i>Riparia riparia</i>)	2	31/03/2021	No	Amber	No	Yes	No
Sky Lark (<i>Alauda arvensis</i>)	3	24/06/2022	No	Amber	No	Yes	No
Tufted Duck (<i>Aythya fuligula</i>)	4	29/12/2022	Yes	Amber	No	Yes	No
Wood Sandpiper (<i>Tringa glareola</i>)	1	18/07/2022	No	Amber	Yes	Yes	No
Amphibian							

Section 177AE Appendices to the Environmental Report

Species name	Record count	Date of last record	SCI / QI species	BoCCI status	Annex species	Wildlife Acts	Invasive species*
Common Frog (<i>Rana temporaria</i>)	33	05/03/2023	N/A	N/A	Yes	Yes	No
Smooth Newt (<i>Lissotriton vulgaris</i>)	7	05/04/2023	N/A	N/A	No	Yes	No
Invertebrates (threatened or endangered)							
Gooden's Nomad Bee (<i>Nomada goodeniana</i>)	2	21/04/2021	N/A	N/A	No	N/A	N/A
Protected mammals							
Brown Long-eared Bat (<i>Plecotus auritus</i>)	13	26/05/2021	No	N/A	Yes	Yes	No
Daubenton's Bat (<i>Myotis daubentonii</i>)	355	26/08/2021	No	N/A	Yes	Yes	No
Eurasian Badger (<i>Meles meles</i>)	70	26/09/2018	No	N/A	N/A	Yes	No
Eurasian Pygmy Shrew (<i>Sorex minutus</i>)	4	25/03/2019	No	N/A	N/A	Yes	No
Eurasian Red Squirrel (<i>Sciurus vulgaris</i>)	5	22/04/2023	No	N/A	N/A	Yes	No
European Otter (<i>Lutra lutra</i>)	11	28/12/2014	Yes	N/A	Yes	Yes	No
Lesser Noctule (<i>Nyctalus leisleri</i>)	57	02/06/2020	No	N/A	Yes	Yes	No
Natterer's Bat (<i>Myotis nattereri</i>)	8	14/09/2018	No	N/A	Yes	Yes	No
Pine Marten (<i>Martes martes</i>)	12	13/01/2023	No	N/A	Yes	Yes	No
Pipistrelle (<i>Pipistrellus pipistrellus sensu lato</i>)	10	29/07/2022	No	N/A	Yes	Yes	No

Section 177AE Appendices to the Environmental Report

Species name	Record count	Date of last record	SCI / QI species	BoCCI status	Annex species	Wildlife Acts	Invasive species*
Red Deer (<i>Cervus elaphus</i>)	2	29/05/2018	No	N/A	N/A	Yes	No
Soprano Pipistrelle (<i>Pipistrellus pygmaeus</i>)	37	02/06/2020	No	N/A	Yes	Yes	No
West European Hedgehog (<i>Erinaceus europaeus</i>)	91	17/10/2022	No	N/A	N/A	Yes	No
Invasive alien animal species							
Eastern Grey Squirrel (<i>Sciurus carolinensis</i>)	25	13/12/2022	N/A	N/A	No	No	Yes
Harlequin Ladybird (<i>Harmonia axyridis</i>)	5	04/04/2024	N/A	N/A	No	No	No
Jenkins' Spire Snail (<i>Potamopyrgus antipodarum</i>)	9	02/09/2016	N/A	N/A	No	No	No
Red-eared Terrapin (<i>Trachemys scripta</i>)	2	19/05/2021	N/A	N/A	No	No	No
American Mink (<i>Mustela vison</i>)	3	15/04/2019	N/A	N/A	No	No	Yes
Brown Rat (<i>Rattus norvegicus</i>)	2	01/04/2014	N/A	N/A	No	No	No
European Rabbit (<i>Oryctolagus cuniculus</i>)	47	25/04/2023	N/A	N/A	No	No	No
Greater White-toothed Shrew (<i>Crocidura russula</i>)	4	09/06/2020	N/A	N/A	No	No	No
House Mouse (<i>Mus musculus</i>)	1	23/12/2015	N/A	N/A	No	No	No
Plants (threatened or endangered)							
Green Figwort (<i>Scrophularia umbrosa</i>)	3	22/07/2020	N/A	N/A	No	No	No

Section 177AE Appendices to the Environmental Report

Species name	Record count	Date of last record	SCI / QI species	BoCCI status	Annex species	Wildlife Acts	Invasive species*
Hairy St John's-wort (<i>Hypericum hirsutum</i>)	1	22/05/2023	N/A	N/A	No	No	No
Common Gromwell <i>Lithospermum officinale</i>	6	18/07/2020	N/A	N/A	No	No	No
Upright Brome <i>Bromopsis erecta</i>	1	25/08/2012	N/A	N/A	No	No	No
Invasive alien plant species							
Black Currant (<i>Ribes nigrum</i>)	1	16/09/2017	N/A	N/A	No	No	No
Butterfly-bush (<i>Buddleja davidii</i>)	6	02/09/2023	N/A	N/A	No	No	No
Cherry Laurel (<i>Prunus laurocerasus</i>)	5	14/02/2020	N/A	N/A	No	No	No
Common Broomrape (<i>Orobanche minor</i>)	1	17/06/2021	N/A	N/A	No	No	No
Indian Balsam (<i>Impatiens glandulifera</i>)	8	24/08/2022	N/A	N/A	No	No	Yes
Japanese Knotweed (<i>Fallopia japonica</i>)	6	18/06/2022	N/A	N/A	No	No	Yes
Least Duckweed (<i>Lemna minuta</i>)	1	22/07/2020	N/A	N/A	No	No	No
Nuttall's Waterweed (<i>Elodea nuttallii</i>)	2	18/07/2020	N/A	N/A	No	No	Yes
Sycamore (<i>Acer pseudoplatanus</i>)	10	09/07/2022	N/A	N/A	No	No	No
Three-cornered Garlic (<i>Allium triquetrum</i>)	3	12/04/2020	N/A	N/A	No	No	Yes
Wild Parsnip (<i>Pastinaca sativa</i>)	2	29/07/2020	N/A	N/A	No	No	No

Section 177AE Appendices to the Environmental Report

Species name	Record count	Date of last record	SCI / QI species	BoCCI status	Annex species	Wildlife Acts	Invasive species*
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*Third Scheduled species of European Communities (Birds and Natural Habitats) Regulations 2011 (as amended)

Flora**Table 9.4: Protected or red-listed species NBDC results**

Species name	Record count	Date of last record	Designation and Location
Common Gromwell (<i>Lithospermum officinale</i>)	6	18/07/2020	Threatened Species: Near threatened Approximately 1.2 km south-east of Proposed Scheme
Green Figwort (<i>Scrophularia umbrosa</i>)	3	22/07/2020	Threatened Species: Near threatened Approximately 1.5 km north-east of Proposed Scheme
Hairy St John's-wort (<i>Hypericum hirsutum</i>)	1	22/05/2023	Protected Species: S.I. No. 235/2022 - Flora (Protection) Order 2022 Threatened Species: Vulnerable Approximately 4.5 km north-east of Proposed Scheme
Upright Brome (<i>Bromopsis erecta</i>)	1	25/08/2012	Threatened Species: Near threatened Approximately 6 km north-east of Proposed Scheme

Fauna

The Suitability of the Study Area for Bat Species (based on NBDC data) is presented in Table 9.5.

Table 9.5: Suitability of the Study Area for Bat Species (based on NBDC data)

Common Name	Scientific Name	Suitability Index	
		West	East
All bats	-	33	29.78
Soprano pipistrelle	<i>Pipistrellus pygmaeus</i>	41	37
Brown long-eared bat	<i>Plecotus auritus</i>	46	44
Common pipistrelle	<i>Pipistrellus pipistrellus</i>	51	47
Lesser-horseshoe bat	<i>Rhinolophus hipposideros</i>	0	0
Leisler's bat	<i>Nyctalus leisleri</i>	47	44
Whiskered bat	<i>Myotis mystacinus</i>	23	23
Daubenton's bat	<i>Myotis daubentonii</i>	33	29
Nathusius' pipistrelle	<i>Pipistrellus nathusii</i>	13	5
Natterer's bat	<i>Myotis nattereri</i>	43	39

The NBDC records of bat species within 5 km of the Proposed Scheme are detailed in Table 9.6.

Table 9.6: NBDC Bat Species Results

Species name	Record count	Date of last record
Brown Long-eared Bat (<i>Plecotus auritus</i>)	13	26/05/2021
Daubenton's bat (<i>Myotis daubentonii</i>)	355	26/08/2021
Lesser noctule (<i>Nyctalus leisleri</i>)	57	02/06/2020
Natterer's bat (<i>Myotis nattereri</i>)	8	14/09/2018
Pipistrelle (<i>Pipistrellus pipistrellus sensu lato</i>)	10	29/07/2022
Soprano pipistrelle (<i>Pipistrellus pygmaeus</i>)	37	02/06/2020
Whiskered bat (<i>Myotis mystacinus</i>)	1	22/07/2008

Table 9.7: NDBC Protected Mammal Species Results

Species name	Record count	Date of last record	Designation
Eurasian pygmy shrew (<i>Sorex minutus</i>)	4	25/03/2019	Protected Species: Wildlife Acts
Eurasian red squirrel (<i>Sciurus vulgaris</i>)	5	22/04/2023	Protected Species: Wildlife Acts
Pine marten (<i>Martes martes</i>)	12	13/01/2023	Protected Species: • EU Habitats Directive: Annex V • Wildlife Acts
Red deer (<i>Cervus elaphus</i>)	2	29/05/2018	Protected Species: Wildlife Acts
West European hedgehog (<i>Erinaceus europaeus</i>)	91	17/10/2022	Protected Species: Wildlife Acts

Table 9.8: NDBC Terrestrial Invertebrate Species Results

Species name	Record count	Date of last record	Designation
Small Heath (<i>Coenonympha pamphilus</i>)	1	01/08/2019	Red list: Near threatened
<i>Andrena (Melandrena) nigroaenea</i>	2	31/03/2021	Red list: Vulnerable
Field Cuckoo Bee (<i>Bombus (Psithyrus) campestris</i>)	1	20/07/2018	Red list: Vulnerable
Gooden's Nomad Bee (<i>Nomada goodeniana</i>)	2	21/04/2021	Red list: Endangered
Large Red Tailed Bumble Bee (<i>Bombus (Melanobombus) lapidarius</i>)	86	21/08/2023	Red list: Near threatened
<i>Megachile (Megachile) centuncularis</i>	1	29/05/2020	Red list: Near threatened
Moss Carder-bee (<i>Bombus (Thoracombus) muscorum</i>)	2	24/08/2022	Red list: Near threatened
Desmoulin's Whorl Snail (<i>Vertigo (Vertigo) moulinsiana</i>)	5	04/11/2006	Protected Species: • EU Habitats Directive: Annex II • Wildlife Acts Red list: Endangered
Narrow-mouthed Whorl Snail (<i>Vertigo (Vertilla) angustior</i>)	4	04/11/2006	Protected Species: • EU Habitats Directive: Annex II • Wildlife Acts Red list: Vulnerable

Table 9.9: NDBC Invasive Alien Animal Species results

Species name	Record count	Date of last record	Designation
Harlequin ladybird (<i>Harmonia axyridis</i>)	5	04/04/2024	• High Impact Invasive Species • Regulation S.I. 477 (Ireland)
Red-eared terrapin (<i>Trachemys scripta</i>)	2	19/05/2021	• Medium Impact Invasive Species • EU Regulation No. 1143/2014
American mink (<i>Mustela vison</i>)	3	15/04/2019	• High Impact Invasive Species • Regulation S.I. 477 (Ireland)
Brown rat (<i>Rattus norvegicus</i>)	2	01/04/2014	• High Impact Invasive Species • Regulation S.I. 477 (Ireland)
Eastern grey squirrel (<i>Sciurus carolinensis</i>)	25	13/12/2022	• High Impact Invasive Species • EU Regulation No. 1143/2014 • Regulation S.I. 477 (Ireland)

APPENDIX 9.1G RESULTS – FAUNA

1.1 Bats

The results of the Bat Activity Transect Surveys (2022), Bat Activity Static Detector Surveys (2022 and 2025), surveys for structures and trees are presented in this section. The location of the surveys are illustrated in **Figure 9-4**.

Bat Activity Transect Surveys

Bat activity transects were walked in May 2022, June 2022 and September 2022 (see **Figure 9-4**). The dates, timing, and weather conditions for the three surveys are detailed in **Table 10**.

Table 9.10: Dates, timings and weather conditions for bat activity transect surveys

Date	Sunset/ Sunrise Time	Start Time of Survey	End Time of Survey	Cloud Cover (100%)	Precipitation	Wind (0-7)	Temperature (°C)
17/05/2022	21:23	21:23	23:23	50	None	1	12
08/06/2022	21:48	21:48	23:48	10	None	2	16
29/09/2022	07:26	05:26	07:26	100	Moderate, consistent	2-4	9-12

Data from the bat activity transects indicate that the site offers a foraging and commuting resource for soprano pipistrelle (34.1% of passes), Leisler's bat (31.2% of passes) and common pipistrelles (25.0% of passes), with relatively few records of *Myotis* (three passes) and brown long-eared bat (two passes) (**Table 9.11**).

Table 9.11: Bat Activity Transect Results including Incidental Records

Species	Number of Passes	% of Passes
Soprano pipistrelle (<i>Pipistrellus pygmaeus</i>)	154	34.1
Leisler's bat (<i>Nyctalus leisleri</i>)	141	31.2
Common pipistrelle (<i>Pipistrellus pipistrellus</i>)	113	25.0
Pipistrelle species (<i>Pipistrellus</i> sp.)	39	8.6
<i>Myotis</i> species (<i>Myotis</i> sp.)	3	0.7
Brown long-eared bat (<i>Plecotus auritus</i>)	2	0.4
Total	452	100

Bat Activity Static Detector Surveys 2022

The static detector survey nights per month and per location are detailed in **Table 9.12**. Static detector locations are illustrated in **Figure 9-4**.

Table 9.12: Static Detector Deployment 2022 Nights per Month

Location (ITM)	May	June	July	August	September	Total
Location 1 North bank (696691, 732296)	15	25	30	3	8	81
Location 2 South bank (696792, 732347)	5	23	28	3	11	70

A total of four bat species (Leisler's bat, Nathusius' pipistrelle, common pipistrelle and soprano pipistrelle) were identified foraging and/or commuting in the vicinity of the static detector deployment locations. In addition, unidentified *Myotis* species and *Pipistrellus* species were also recorded (**Table 9.13**).

Table 9.13: Bat Activity Static Detector Results 2022

Species	Number of Passes	% of Passes
Soprano pipistrelle (<i>Pipistrellus pygmaeus</i>)	8990	39.1
Leisler's bat (<i>Nyctalus leisleri</i>)	5610	24.4
Common pipistrelle (<i>Pipistrellus pipistrellus</i>)	4387	19.1
Pipistrelle species (<i>Pipistrellus</i> sp.)	3138	13.7
Myotis species (<i>Myotis</i> sp.)	833	3.6
Nathusius' pipistrelle (<i>Pipistrellus nathusii</i>)	26	0.1
Total	22984	100

Bat Activity Static Detector Surveys 2025

The static detector survey nights per month and per location are detailed in **Table 9.14**. Static detector locations are illustrated in **Figure 9-4**. Two bat detectors were deployed and were rotated on a fortnightly basis across 4 survey locations for the static bat detector survey period in 2025 (April to August 2025). Static bat detector surveys were carried out in 2025 at a single location on each bank of the Liffey as per the 2022 surveys. Two additional locations were also monitored along the Scheme.

Table 9.14: Static Detector Deployment 2025 Nights per Month

Location (ITM)	April	May	June	July	August	Total
Location 1 North bank (696822, 732430)	2	12	10	15	-	39
Location 2 South bank (696790, 732335)	2	12	Note 1	Note 1	Note 1	14
Location 3 Simmonstown Stud lands (697658, 731688)	15	16	18	-	17	66
Location 4 near Loughlinstown Road Roundabout (698161, 731368)	15	16	-	15	-	46

“ – ” indicates no data collection

Note 1: Static Bat detector was stolen and monitoring of this location was discontinued.

A total of five bat species (Leisler's bat, Nathusius' pipistrelle, common pipistrelle, soprano pipistrelle and Brown long-eared bat) were identified foraging and/or commuting in the vicinity of the static detector deployment locations. In addition, unidentified Myotis species and Pipistrellus species were also recorded (**Table 9.15A**).

Table 9.15A: Bat Activity Static Detector Results 2025

Species	Number of Passes	% of Passes
Soprano pipistrelle (<i>Pipistrellus pygmaeus</i>)	1342	8.5
Leisler's bat (<i>Nyctalus leisleri</i>)	7211	45.5
Common pipistrelle (<i>Pipistrellus pipistrellus</i>)	6897	43.5
Pipistrelle species (<i>Pipistrellus</i> sp.)	184	1.2
Myotis species (<i>Myotis</i> sp.)	185	1.2
Nathusius' pipistrelle (<i>Pipistrellus nathusii</i>)	36	0.2
Total	15855	100

The static detector results for the survey locations on each bank of the Liffey (Location 1 and Location 2) are presented in the table below.

Table 9.15B: Bat Activity Static Detector Results (Banks of River Liffey)

Species	Number of Passes		% of Passes	
	2022	2025	2022	2025
Soprano pipistrelle (<i>Pipistrellus pygmaeus</i>)	8990	434	39.1	16.7
Leisler's bat (<i>Nyctalus leisleri</i>)	5610	1215	24.4	46.9
Common pipistrelle (<i>Pipistrellus pipistrellus</i>)	4387	741	19.1	28.6
Pipistrelle species (<i>Pipistrellus</i> sp.)	3138	163	13.7	6.3
Myotis species (<i>Myotis</i> sp.)	833	39	3.6	1.5
Nathusius' pipistrelle (<i>Pipistrellus nathusii</i>)	26	1	0.1	0.0
Total	22984	2593	100	100



Figure 9-4: Bat activity surveys and PRFs

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Figure 9-4: Bat activity surveys and PRFs

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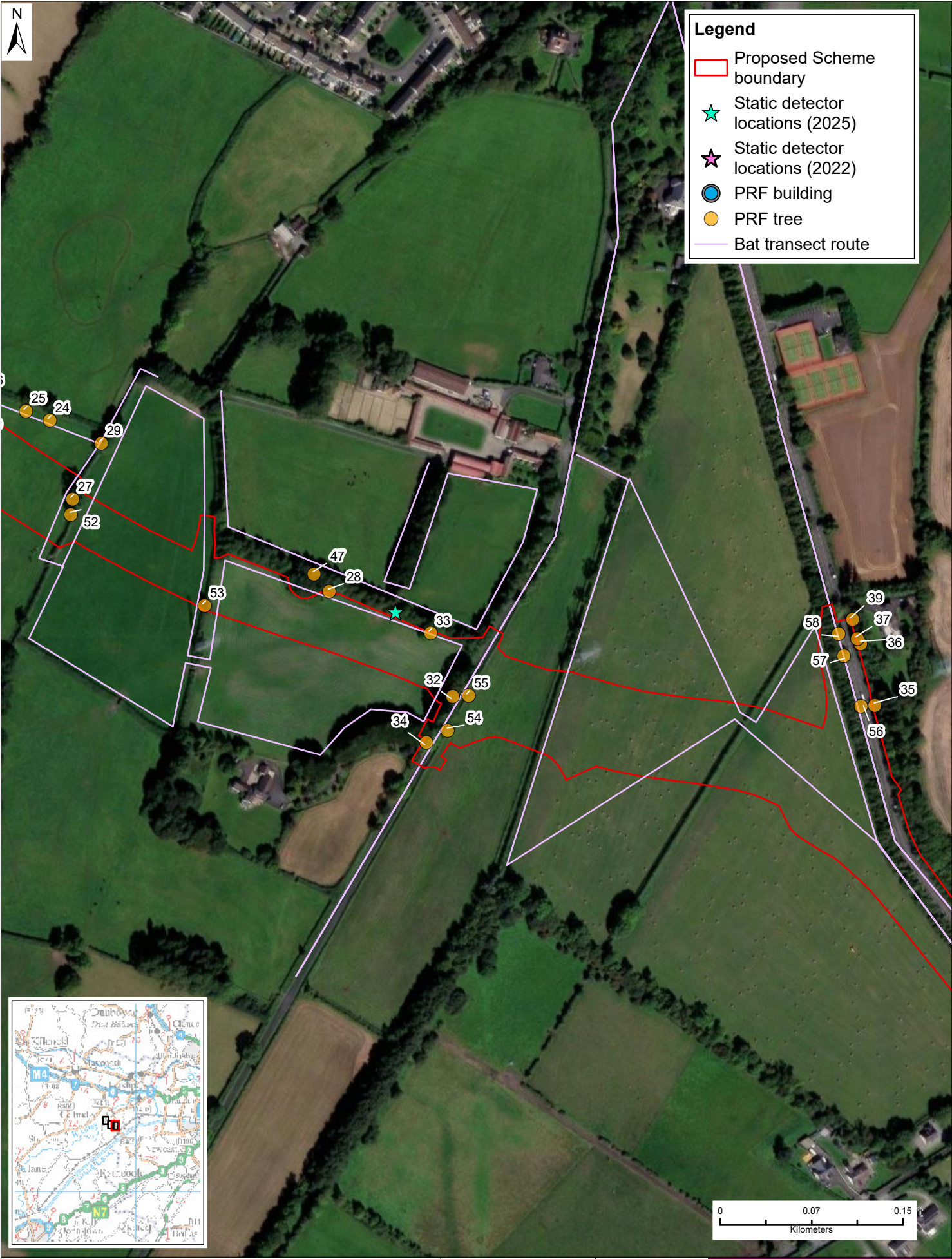


Figure 9-4: Bat activity surveys and PRFs

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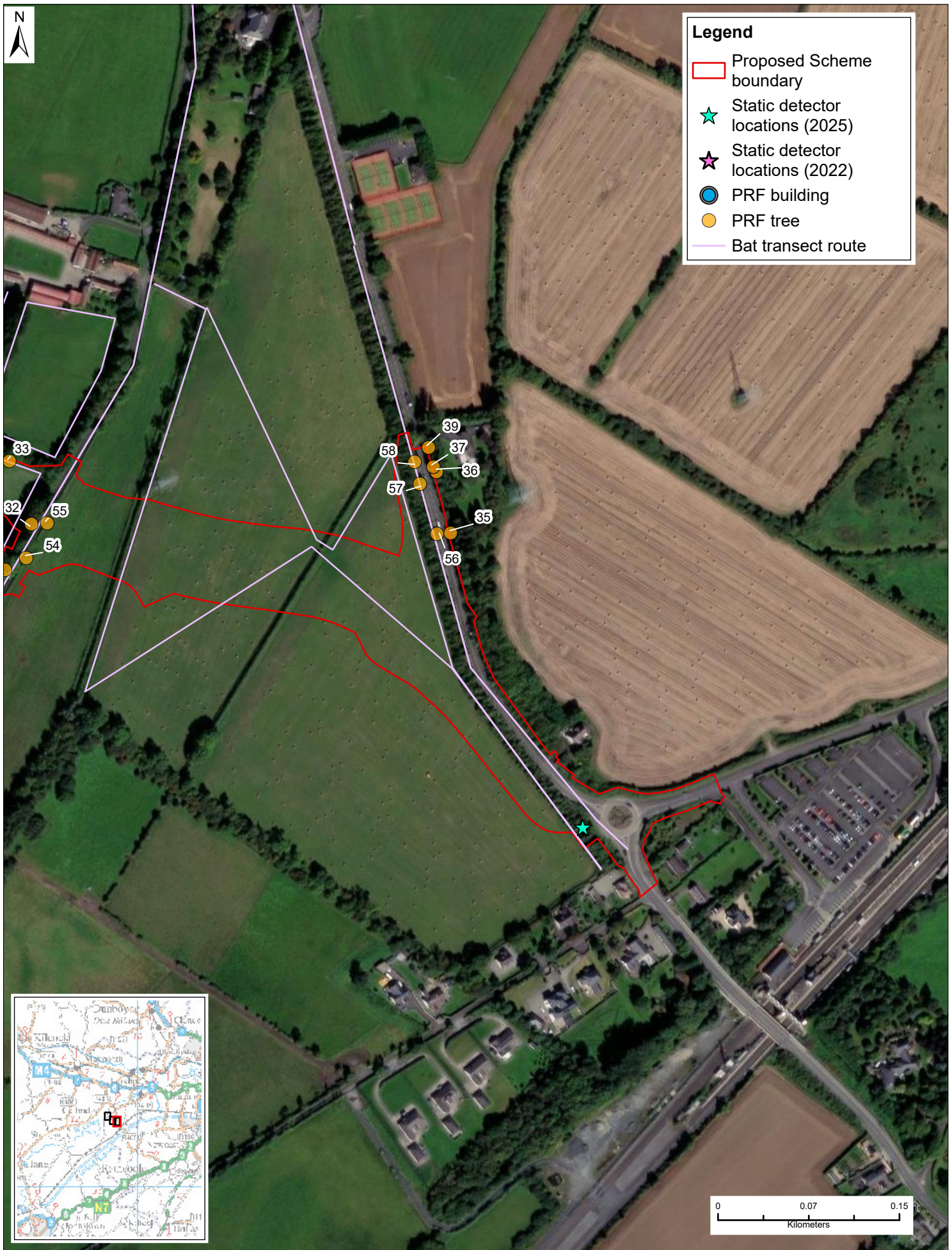


Figure 9-4: Bat activity surveys and PRFs

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Structures – Preliminary Roost Assessment

Of the structures proposed for removal, one was determined to have moderate suitability for roosting bats (ITM 696730, 732467). The features observed on this building are detailed in **Table 9.16**. The location of the building is illustrated in **Figure 9-4**.

Table 9.16: Results of the Building Preliminary Roost Assessment

Feature	Description	Suitability
Feature 1	Small opening where plaster meets soffit at the north-east corner of the building.	Low
		
Feature 2	Gap between fascia and wall at the north corner of the building.	Low
		
Feature 3	Gap between fascia and roof at the north-east of the building.	Low
Feature 4	Gap between fascia and roof at the south-west end of the building.	Low
		

Internal Building Inspection

An internal building inspection of the single building which was determined to have roosting potential was carried out on 08 July 2024. Droppings were identified in the attic space of the building, but at least some of

these were confirmed to be of mouse origin, so they were likely to all be of mouse origin. Probable rat droppings were also identified.

From within the attic, natural light entered the building through openings at both the northern and southern perimeters. There were cavities between the concrete block end walls and the soffit. The endoscope was used to access these cavities, concentrating on the corners at which potential entrances were identified. The potential entrances were not observed with the endoscope, but time constraints limited the survey effort. No bat evidence was identified in the endoscope footage. Near the centre of the attic space, there was a gap in the lining of the roof that exposed a cavity. The endoscope was used to inspect this, and no bat evidence was identified.

From the outside of the building, the endoscope was used to inspect the northern potential entrances. Due to time restrictions, the potential entrance at the southern section could not be assessed. No evidence of roosting bats was recorded in the features. Feature 1 provided an opening with direct access to the wider attic space. In Features 1 and 3, apparent dead plant material may indicate previous use by nesting birds. The presence of cobwebs at these potential entrance points may also indicate lack of use by roosting bats.

Likely suitable entrances were identified, and the attic space offers suitable areas for roosting bats. It is also likely that suitable roosting features and entrances exist in the areas which could not be surveyed.

There was no definitive evidence observed to indicate use of this building by roosting bats. The likely entrances and roosting areas did not appear to be in use. As a result of the survey, a **moderate** potential roosting suitability was determined due to the low disturbance, suitable access points, and presence of roosting features. In line with guidance and with cognisance of the limitations of this preliminary roost assessment, emergence surveys were recommended.

Emergence Surveys

The dates, timing, and weather conditions for the emergence surveys are detailed in **Table 9.17**. No emergence was observed during these surveys and an extremely low level of bat activity was observed in the vicinity of the building.

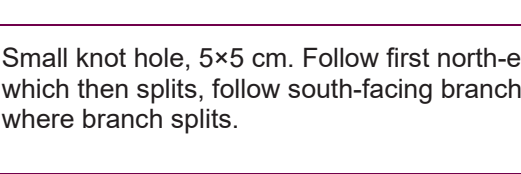
Table 9.17: Dates, Timings and Weather Conditions for Building Emergence Surveys

Date	Sunset/ Sunrise Time	Start Time of Survey	End Time of Survey	Cloud Cover (100%)	Precipitation	Wind (0-7)	Temperature (°C)
28/08/2024	20:23	20:08	22:23	10	None	2	16
03/10/2024	18:55	18:40	20:55	65	None	3	-

Ground Level Tree Assessment

Table 9.18: Results of the Ground Level Tree Assessment

Map Code	Tree Species	Grid Reference (ITM)	Feature Location and Description	Suitability
BT01	Ash	696776 732527	Partially detached ivy with stem diameter in excess of 50 mm.	PRF-I

Map Code	Tree Species	Grid Reference (ITM)	Feature Location and Description	Suitability
				
BT02	Ash	696772 732530	Partially detached ivy with stem diameter in excess of 50 mm. 	PRF-I
BT03	Ash	696640 732397	A crack in a branch. Facing north-east, 3 m from the ground. 	PRF-I
BT04	Ash	696651 732395	Small knot hole, 5×5 cm. Follow first north-east facing branch which then splits, follow south-facing branch, feature is 30 cm from where branch splits. 	PRF-I

Map Code	Tree Species	Grid Reference (ITM)	Feature Location and Description	Suitability
				
BT05	Ash	696712 732422	Partially detached ivy with stem diameter in excess of 50 mm. 	PRF-I
BT06	Ash	696704 732418	Partially detached ivy with stem diameter in excess of 50 mm. 	PRF-I
BT07	Ash	696728 732442	Partially detached ivy with stem diameter in excess of 50 mm.	PRF-I

Section 177AE Appendices to the Environmental Report

Map Code	Tree Species	Grid Reference (ITM)	Feature Location and Description	Suitability
				
BT08	Ash	696732 732452	Partially detached ivy with stem diameter in excess of 50 mm. 	PRF-I
BT09	Ash	696743 732470	Partially detached ivy with stem diameter in excess of 50 mm. 	PRF-I
BT10	Ash	696693	Multi-stemmed ash with dead ivy.	PRF-I

Map Code	Tree Species	Grid Reference (ITM)	Feature Location and Description	Suitability
		732359	Transverse snap PRF (broken limb) – suitable for an individual bat in fair weather (PRF-I) Pre-fell inspection recommended.	
				
BT11	Ash	696697	Partially detached ivy with stem diameter in excess of 50 mm.	PRF-M
		732363		

Section 177AE Appendices to the Environmental Report

Map Code	Tree Species	Grid Reference (ITM)	Feature Location and Description	Suitability
BT12	Ash	696699 732381	Partially detached ivy with stem diameter in excess of 50 mm. 	PRF-I
BT13	Ash	696705 732282	Partially detached ivy with stem diameter in excess of 50 mm. 	PRF-I
BT14	Oak	696723 732316	Partially detached ivy with stem diameter in excess of 50 mm.	PRF-I

Map Code	Tree Species	Grid Reference (ITM)	Feature Location and Description	Suitability
				
BT15	Ash	696774 732358	Partially detached ivy with stem diameter in excess of 50 mm.  	PRF-I
BT16	Ash	696777 732376	Ivy growth.	PRF-I

Map Code	Tree Species	Grid Reference (ITM)	Feature Location and Description	Suitability
				
BT17	Ash	696778 732320	Partially detached ivy with stem diameter in excess of 50 mm. Mature ivy and very thick.	PRF-M
				
BT18	Spruce sp. treeline	696831 732289	Treeline collectively classed as PRF-I due ivy coverage and possibility of features below this.	PRF-I
				

Section 177AE Appendices to the Environmental Report

Map Code	Tree Species	Grid Reference (ITM)	Feature Location and Description	Suitability
BT19	Pedunculate oak	697216 731866	Partially detached ivy with stem diameter in excess of 50 mm. Thick ivy branches creating crevices. Low potential in some areas but most is quite detached from bark.	PRF-I
				
BT20	Pedunculate oak	697270 731927	Partially detached ivy with stem diameter in excess of 50 mm. Ivy thicker in part around main trunk/branches, low potential.	PRF-I
				
BT21	Ash	697259 731883	Partially detached ivy with stem diameter in excess of 50 mm. Mature ash, thick ivy toward crown of tree.	PRF-I

Map Code	Tree Species	Grid Reference (ITM)	Feature Location and Description	Suitability
				
BT22	Pedunculate oak	697285 731881	Partially detached ivy with stem diameter in excess of 50 mm. Low PRF-I potential detached Ivy, thicker in parts.	
				
BT23	Ash (x2)	697292 731835	Partially detached ivy with stem diameter in excess of 50 mm. Ivy thick in parts on both trees, low potential.	PRF-I
				

Map Code	Tree Species	Grid Reference (ITM)	Feature Location and Description	Suitability
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BT24	Ash	697374 731846	Partially detached ivy with stem diameter in excess of 50 mm. Ivy covering trunk up to 6 cm wide with some cavities visible with low roost potential. Possible other cavities not visible.	PRF-M
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3 cm knothole. Close to base of branch and unlikely to have large cavity. On south branch, facing south, 4-5 m high.

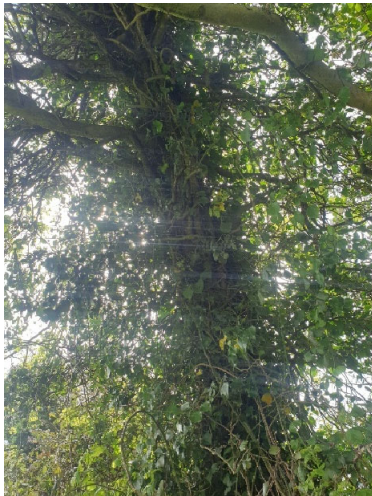
Map Code	Tree Species	Grid Reference (ITM)	Feature Location and Description	Suitability
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Large 6 cm opening from broken branch. unlikely to be deep and quite exposed. On the same branch as the above feature.



Section 177AE Appendices to the Environmental Report

Map Code	Tree Species	Grid Reference (ITM)	Feature Location and Description	Suitability
BT25	Ash	697352 731853	Partially detached ivy with stem diameter in excess of 50 mm. Thick ivy covering. Thick ivy covering, possibly creating crevices. 	PRF-I
BT26	Hawthorn	697320 731868	Partially detached ivy with stem diameter in excess of 50 mm. 	PRF-I
BT27	Ash	697382 731786	Partially detached ivy with stem diameter in excess of 50 mm.	PRF-M

Map Code	Tree Species	Grid Reference (ITM)	Feature Location and Description	Suitability
----------	--------------	----------------------	----------------------------------	-------------



Feature is facing north, on first north-north-east facing branch, 6 m from ground, crack at the base of this branch.



Feature is south-west facing, knot hole 10×10 cm, on first south-west branch, 5 m from ground. More growth could cover this as is close to main trunk.

Map Code	Tree Species	Grid Reference (ITM)	Feature Location and Description	Suitability
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Same description as above feature, located at the opposite end of the feature, facing east and downward, making good shelter.



BT28	Ash	697608	Partially detached ivy with stem diameter in excess of 50 mm.	PRF-I
		731713	Lots of knot holes but all surface based, they don't go anywhere.	

Section 177AE Appendices to the Environmental Report

Map Code	Tree Species	Grid Reference (ITM)	Feature Location and Description	Suitability
				
BT29	Ash	697416 731827	Partially detached ivy with stem diameter in excess of 50 mm covering most of trunk.	PRF-M
				
BT30	Hawthorn	697311 731851	Partially detached ivy with stem diameter in excess of 50 mm.	PRF-I
BT31	Ash	697292 731819	2 cm wide knothole, cannot see if it opens up into a cavity, but any cavity is unlikely to be large. North-east side of trunk 5 m high	PRF-I

Map Code	Tree Species	Grid Reference (ITM)	Feature Location and Description	Suitability
				
BT32	Poplar (×6) & ash (×2)	697705 731619	Tree line collectively classed as PRF-I due to ivy coverage and possibility of features below this.	PRF-I
				
BT33	Ash	697687 731671	Partially detached ivy with stem diameter in excess of 50 mm.	PRF-I
				
			4 cm wide knothole appears shallow.	

Section 177AE Appendices to the Environmental Report

Map Code	Tree Species	Grid Reference (ITM)	Feature Location and Description	Suitability
				
BT34	Ash	697683 731581	3 cm knothole appears unlikely to open up into cavity, but cannot see for certain. On a south-south-east branch 4 m high over driveway entrance, facing south-south-east.	PRF-I
				
BT35	Unknown	698052 731611	Limited potential for roosts as tree and branch are narrow and ivy is not very thick, but because of a lack of visibility, precautionary PRF-I assigned.	PRF-I

Map Code	Tree Species	Grid Reference (ITM)	Feature Location and Description	Suitability
				
BT36	Unknown	698040 731662	2-3 cm knothole with potential for small cavity. On a north-north-east-facing branch, 6 m high, facing west and slightly upward. 	PRF-I
BT37	Unknown	698037 731666	Tree covered in ivy and far side cannot be viewed, so precautionary PRF-I assigned.	PRF-I

Map Code	Tree Species	Grid Reference (ITM)	Feature Location and Description	Suitability
				
BT38	Pedunculate oak	697141 731812	Partially detached ivy with stem diameter in excess of 50 mm. Thick (~10cm) ivy partially detached at points and also forming crevices with overlapping branches. Particularly suitable on the east side of the trunk.	PRF-I
				

Section 177AE Appendices to the Environmental Report

Map Code	Tree Species	Grid Reference (ITM)	Feature Location and Description	Suitability
BT39	Unknown	698033 731682	Knot hole 6 m high on central branch facing towards road. knot forms an umbrella type cover but cannot see cavity. 	PRF-I
BT40	Pedunculate oak	697293 731873	Thick ivy, especially on the south-western branch, but it is generally tight to tree and does not form many suitable crevices. 	PRF-I
BT41	Hawthorn (×3)	697247 731875	This set of trees is collectively classed as PRF-I due ivy coverage and possibility of features below this.	PRF-I

Map Code	Tree Species	Grid Reference (ITM)	Feature Location and Description	Suitability
				
BT42	Ash	697267 731917	Partially detached ivy with stem diameter in excess of 50 mm. 	PRF-I

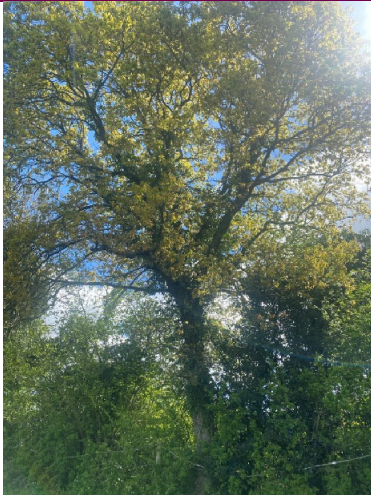
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Map Code	Tree Species	Grid Reference (ITM)	Feature Location and Description	Suitability
BT43	Pedunculate oak	697174 731839	Partially detached ivy with stem diameter in excess of 50 mm. 	PRF-I
BT44	Ash (×3)	696748 732546	Partially detached ivy with stem diameter in excess of 50 mm. Ivy growth on all trees with some small nooks available for individual roosting bats.	PRF-I
BT45	Austrian pine	696808 732340	Partially detached ivy with stem diameter in excess of 50 mm.	PRF-I
BT46	Pedunculate oak	697136 731819	Partially detached ivy with stem diameter in excess of 50 mm. Facing south-east. Ivy stems surrounding main trunk and branches on the south-east side. Some low potential for bats to use. 	PRF-I
BT47	Treeline (mainly conifers - Scot's pine,	697591 731719	Partially detached ivy with stem diameter in excess of 50 mm. Most trees are ivy is covered. Low potential but thicker in parts. Can't	PRF-I

Map Code	Tree Species	Grid Reference (ITM)	Feature Location and Description	Suitability
	with ash & sycamore.		see other features, but precautionary PRF-I assigned. 	
BT48	Pedunculate oak & ash	697282 731809	Partially detached ivy with stem diameter in excess of 50 mm. Most in this treeline have detached Ivy on branches/trunks with some crevices, low potential.  	PRF-I
BT49	Beech	697279 731880	Multiple small splits in the trunk with low potential. Approx. 3 m high on trunk, facing south-east.	PRF-I

Map Code	Tree Species	Grid Reference (ITM)	Feature Location and Description	Suitability
				
BT50	Ash	697232 731871	Partially detached ivy with stem diameter in excess of 50 mm. Covering most of tree trunk/branches, thicker in parts.	PRF-I
				
BT51	Pedunculate oak	697264 731917	Partially detached ivy with stem diameter in excess of 50 mm. Ivy sparse but some low potential in parts.	PRF-I

Section 177AE Appendices to the Environmental Report

Map Code	Tree Species	Grid Reference (ITM)	Feature Location and Description	Suitability
				
BT52	Ash	697391 731768	Partially detached ivy with stem diameter in excess of 50 mm. Tree PRF-I covered in Ivy, thicker in parts, low potential for bats beneath some areas.	
				
BT53	Ash	697501 731693	Partially detached ivy with stem diameter in excess of 50 mm. Ivy is dense around the main trunk and there could be hidden features	PRF-I

Map Code	Tree Species	Grid Reference (ITM)	Feature Location and Description	Suitability
			underneath so precautionary PRF-I assigned.	
				
BT54	Ash	697701 731591	Partially detached ivy with stem diameter in excess of 50 mm. Covering most of trunk. Precautionary PRF-I assigned. 	PRF-I

Section 177AE Appendices to the Environmental Report

Map Code	Tree Species	Grid Reference (ITM)	Feature Location and Description	Suitability
BT55	Ash	697718 731620	Partially detached ivy with stem diameter in excess of 50 mm. Covering most of trunk. Precautionary PRF-I assigned. 	PRF-I
BT56	Pedunculate oak	698040 731611	Partially detached ivy with stem diameter in excess of 50 mm. Covers most of trunk/main branches, potentially dense enough in parts to support individual bats. 	PRF-I
BT57	Pedunculate oak	698026 731652	Partially detached ivy with stem diameter in excess of 50 mm. Covers most of trunk/main branches, potentially dense enough in parts to support individual bats.	PRF-I

Map Code	Tree Species	Grid Reference (ITM)	Feature Location and Description	Suitability
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BT58	Beech	698022 731670	Partially detached ivy with stem diameter in excess of 50 mm. Covers most of trunk. Is denser in parts with potential for crevices beneath for individual bats.	PRF-M
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Multiple knotholes on south branches facing south-east. One looks to go deeper, potential for multiple bats.

Map Code	Tree Species	Grid Reference (ITM)	Feature Location and Description	Suitability
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Multiple vertical splits in the bark with potential for small crevices underneath. On northern side of tree, facing north.



Two knot holes look like they could be deep enough for multiple bats. North-east side of tree facing the road.

Map Code	Tree Species	Grid Reference (ITM)	Feature Location and Description	Suitability
				
BT59	Ash (×2)	697270 731885	Partially detached ivy with stem diameter in excess of 50 mm. Covering most of trunk/branches on both trees. Thicker in parts, Low potential.	PRF-I
				

Emergence and re-entry Surveys (Trees)

Emergence and re-entry surveys were carried out on BT17, BT27 and BT29 in 2022. The dates, timing, and weather conditions for the emergence and re-entry surveys are detailed in **Table 9.19**.

Table 9.19: Dates, Timings and Weather Conditions for Tree Emergence and re-entry Surveys

Date	Tree	Sunset/ Sunrise Time	Start Time of Survey	End Time of Survey	Cloud Cover (100%)	Precipitation	Wind (0-7)	Temperature (°C)
02/08/2022	BT17	21:19	21:04	23:19	40	None	1	22
04/08/2022	BT27, BT29	21:16	21:01	23:16	70	None	3	15
16/08/2022	BT17	06:09	04:09	06:26	90	None	2	15
18/08/2022	BT27, BT29	06:12	04:12	06:27	60	None	5	15

One common pipistrelle was observed emerging from BT27 on 18 August 2022. Approximately 20 common pipistrelles were incidentally seen emerging from BT29 during a transect survey on 8 June 2022. These surveys confirmed the presence of roosting bats in BT17, BT27 and BT29.

During the emergence and re-entry surveys, incidental bat activity was recorded (see **Table 9.20**).

Table 9.20: Incidental Bat Activity Records from Emergence and re-entry Surveys

Species	Number of Passes	% of Passes
Common pipistrelle (<i>Pipistrellus pipistrellus</i>)	603	45.6
Soprano pipistrelle (<i>Pipistrellus pygmaeus</i>)	397	30.0
Leisler's bat (<i>Nyctalus leisleri</i>)	270	20.4
Pipistrelle species (<i>Pipistrellus</i> sp.)	36	2.7
Myotis species (<i>Myotis</i> sp.)	13	1.0
Brown long-eared bat (<i>Plecotus auritus</i>)	3	0.2
Nathusius' pipistrelle (<i>Pipistrellus nathusii</i>)	1	0.1
Total	452	100

Tree Climbing Assessment

With the updated bat guidance advising aerial checks of all trees classified as PRF-M, six trees were identified to be climbed. The results of the aerial tree survey are presented in **Table 9.21**.

Table 9.21: Results of aerial tree survey

Tree	Description	Suitability
BT11	- Transverse snap PRF is suitable for an individual bat in fair weather (PRF-I). - Dense living ivy lacks suitable cavities/structure to support roosting bats, however it may have potential to conceal cavities on the tree. - Pre-fell inspection recommended.	PRF-I
BT17	- Partially detached ivy is present around most aspects of the tree. There is a small cavity between the tree stem and a single clump of partially detached ivy approximately 2.5 m high on the south-eastern aspect. This cavity is travels for approximately 15 cm upwards, however it is partially exposed to wind and water ingress. This feature has potential to support an individual bat or small number of bats during fair weather. - All other areas of ivy which appear to have potential cavities form level are superficial dark shadows and do not provide sufficient cavities for roosting bats.	PRF-I
BT24	- Knothole located at the end of a limb has a small cavity which has roosting suitability for an individual bat in fair weather. - Other knotholes were too small or were superficial. - Pre-fell inspection recommended.	PRF-I

Tree	Description	Suitability
BT27	• Lower knothole (4 m high) on the end of a limb on the tree's southern aspect has a cavity which is of suitable size and characteristics to support multiple bats (PRF-M). • Transverse snap PRF (4.5 m high) has a small partially exposed cavity which has potential to support individual bats in fair weather (PRF-I). • Rot hole/decay cavity is of suitable size and has characteristics to support multiple bats (PRF-M).	PRF-M
BT29	• Dense living ivy may have potential to conceal cavities on the tree.	PRF-I
BT58	• All features are superficial and are not suitable to support roosting bats.	NONE

1.2 Badger

Several signs of badger were noted within approximately 200 m of the Proposed Scheme during an April 2022 site survey. These included badger trails, snuffle holes, latrines, scats, and one potential disused sett. Trails were found on either side of the Proposed Scheme in the vicinity of this potential sett. Badger trails and snuffle holes were identified at the western perimeter of the northwest section of the Proposed Scheme with another potential badger trail on the opposite side of the proposed road. Trails and a latrine with numerous pits and evidence of recent use were also found on the perimeter of the central section of the Proposed Scheme. Badger evidence was identified on both banks of the Liffey during aquatic surveys in June 2023 and a recent badger latrine and footprint were identified on the northwestern bank of the Liffey approximately 10 m southwest of the Proposed Scheme.

An abundance of badger evidence was identified during the 2024 surveys. This included trails, snuffle holes, latrines, footprints and potential setts. Evidence was found throughout the length of the Proposed Scheme on both sides of the River Liffey with evidence concentrated in similar areas to those in the 2022. Several more potential setts were identified in 2024. The potential setts did not appear to be new, so it is probable that they were present in 2022, but not identified due to vegetation cover. The badger evidence identified is mapped in **Figure 9-5** and the potential setts are described in **Table 9.22**.

A notable limitation in the badger surveys relates to the area of scrub between the St John of Gods land and the River Liffey immediately north of the Proposed Scheme. Because of dense vegetation, this area could not be fully surveyed, but there was circumstantial evidence of a possible breeding sett in the area in 2024. It appeared that straw may have been pulled from the grassland to the south towards the scrub. This behaviour would be indicative of breeding badgers.

Camera Trapping

Sett 1 was the single identified likely active badger sett. Patriot (model BTC-Patriot-FHD) camera traps were deployed at the most active-looking potential sett entrances. A camera was deployed at one entrance for a period of 69 days from July to September 2024 and another adjacent entrance for a period of 39 days from August to October 2024.

As potential setts 1, 2, 3 and 4 were all within the same linear habitat, the cameras were placed to also capture any potential commuting badgers within the linear habitat. The results indicated that these potential sett entrances were used by rabbits and not by badgers. The cameras captured a badger commuting and foraging in the linear habitat on four nights, which is a low level of activity, considering a total of 73 nights were captured on camera. In the context of these results, and the sparse evidence of badger activity in the immediate vicinity, the other identified potential setts in the linear habitat were determined to not be active setts. All of the seven potential setts identified during field surveys were determined to not be currently used by badger.

Table 9.22: Badger Settle Evidence

Sett ID	Distance from Proposed Scheme	Notes
1	~1 m	Five-entrance potential sett within a linear habitat. Two well used entrances, two partially used entrances, and one disused entrance. A trail camera was placed outside the most well-used entrance from 23 rd July to 30 th September 2024 (69 days). A second camera was placed outside the second most well used entrance from 26 th August to 4 October 2024 (39 days). The cameras confirmed that the entrances were only used by rabbits. These cameras were also likely to capture any commuting badgers that may use setts 2, 3 or 4.
2	~1 m	One apparently well used entrance, but no well used trail connecting to it. This was initially considered a potential sett entrance because of its proximity to an apparent sett (Sett 1). Given the abundance of rabbit activity and sparsity of badger activity in the linear habitat, this is likely used by rabbit.
3	~1 m	Four entrances to the potential sett were found. These entrances were covered by heavy vegetation trimmings, hindering the view of the entrances and limiting the assessment of the likelihood of badger use. They were either disused or partially used. While assessment of entrances could not be fully carried out, this was initially considered a potential sett as a precaution because of its proximity to an apparent sett (Sett 1). Given the abundance of rabbit activity and sparsity of badger activity in the linear habitat, this is likely used by rabbit.
4	~1 m	One potential sett entrance also covered in trimmings, hindering the view of the entrance and limiting the assessment of the likelihood of badger use. A well-used trail leads to the entrance. While assessment of the entrance could not be fully carried out, this was initially considered a potential sett as a precaution because of its proximity to an apparent sett (Sett 1). Given the abundance of rabbit activity and sparsity of badger activity in the linear habitat, this is likely used by rabbit.
5	90 m	One disused entrance along a hedgerow in a GA1 field observed in 2022 and 2024.
6	0 m	Two partially used entrances could be a badger sett or could be rabbit. There is a lot of nearby rabbit activity and there were some potential rabbit hairs at the entrance. Given the abundance of rabbit activity, this is likely used by rabbit.
7	0 m	Four entrances, but only one showing signs of use. However, the partially used entrance is narrow and is partially blocked so that badgers could not use it. There is a fresh latrine nearby. Given the abundance of rabbit activity, this is likely used by rabbit.

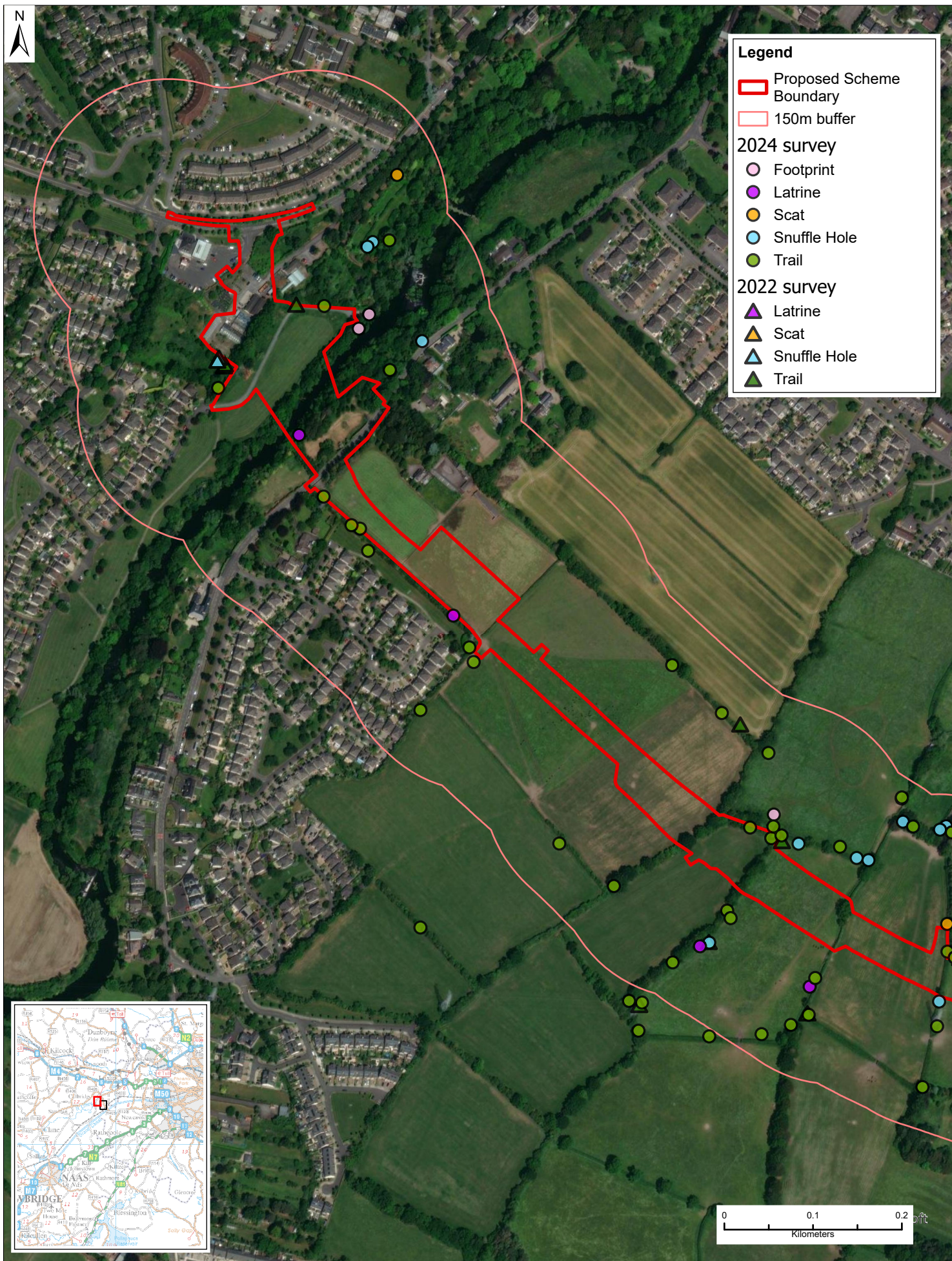


Figure 9-5: Badger evidence within 150 m of the Proposed Scheme

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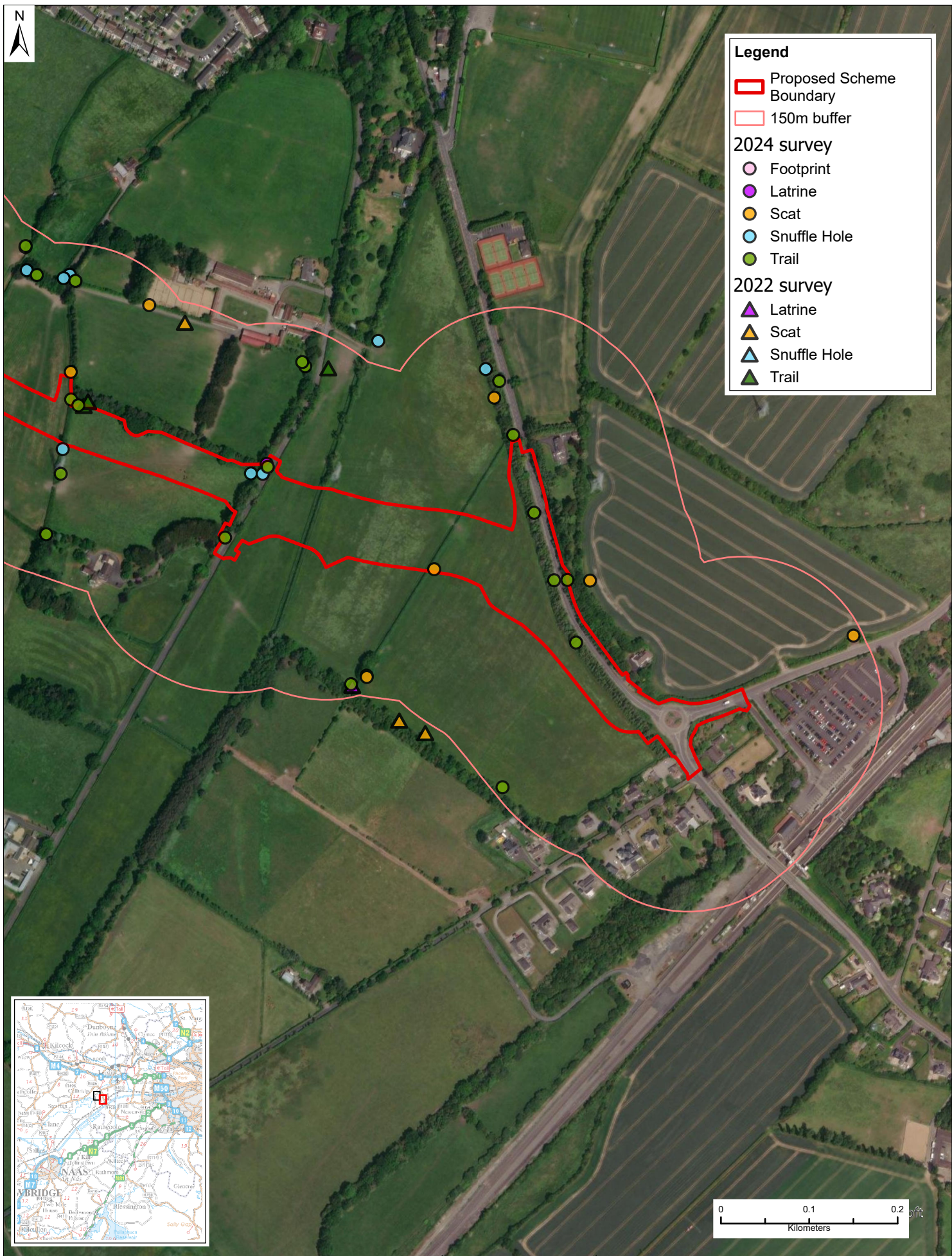


Figure 9-5: Badger evidence within 150 m of the Proposed Scheme

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1.3 Otter

The NBDC desk study data search identified the presence of otter throughout the Study Area of the Proposed Scheme with 11 records of otter within 5 km of the Proposed Scheme.

One 2011 roadkill record on Loughlinstown Road outside the Hazelhatch and Celbridge Station Carpark is at the eastern tip of the Proposed Scheme. This record is approximately 200 to 300 m from both the wet drainage ditch that runs along the R405 and the 'Castletown (Dublin-Kildare) 10' stream. There are numerous records of otter on the Grand Canal. At its closest point, the Proposed Scheme is 730 m north-west of the Grand Canal and the closest otter record to this point is approximately 2 km upstream. The closest otter record in proximity to a waterbody hydrologically upstream of the proposed River Liffey bridge is approximately 11.6 km upstream. Aside from a 1980 record approximately 5.8 km downstream, the closest record downstream on the Liffey is approximately 15 km downstream.

The April 2022 survey found several signs of otter along the banks of an unnamed stream that runs through the southwestern part of the to the Proposed Scheme. These were north and south of the Proposed Scheme. A potential otter couch was identified beside the stream 75 m north of the Proposed Scheme. A potential otter holt was noted on the banks of the same stream 155 m south of the Proposed Scheme, with a trail leading to a potential otter slide beside this. None of these were identified during the April/May 2024 update survey, but potential couches were found on the stream, 50 m and 90 m south of the Proposed Scheme and one potential otter footprint was found within the Proposed Scheme.

Potential otter evidence was identified at the River Liffey during aquatic surveys in June 2023. A potential holt not currently in use was identified on recently cleared land on the southeast bank approximately 50 m west and 70 m upstream of the Proposed Scheme. This remained disused during the 2024 update survey. An otter couch was identified on the northwest bank, approximately 15 m from another holt and 125 m west of the Proposed Scheme. The potential holt was approximately 140 m from the Proposed Scheme. Neither of these features were identified during the 2024 update survey. In 2024 a potential slide was identified on the southern bank approximately 55 m downstream of the Proposed Scheme.

Otter are a widespread species and are presumed to forage and/or commute within the surface water bodies within the Zol of the Proposed Scheme. Otter evidence from the 2022, 2023 and 2024 field surveys is mapped in **Figure 9-6**.

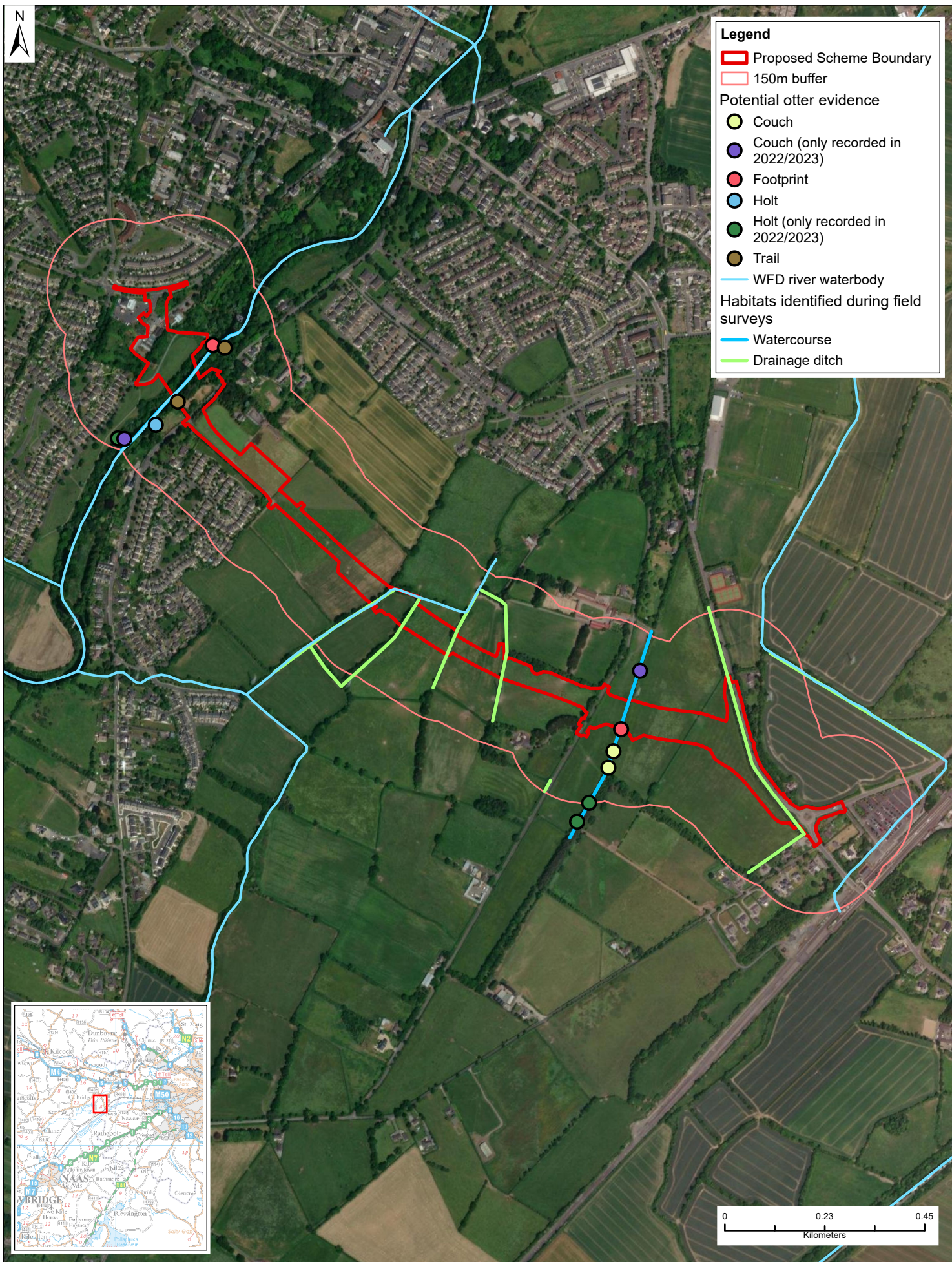


Figure 9-6: Otter evidence within 150 m of the Proposed Scheme

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1.4 Breeding Birds

The results of the bird survey are shown in **Table 9.23**. All survey visits were undertaken in suitable conditions, with no visits made during inclement weather that would limit the activity of birds during the surveys.

Table 9.23: Bird species recorded during the three breeding bird surveys and their status within the site

Species	April 2024	May 2024	June 2024	Status within Site	Estimated number of breeding pairs	BoCCI ¹⁰ and other designations
Blackbird	Singing	Singing	Singing	Probable breeding	4 - 11	Green listed
Blackcap	Singing	Singing	Singing	Possible breeding	11 - 16	Green listed
Blue tit	Present	Nesting	With young	Confirmed breeding	1 - 7	Green listed
Bullfinch	Present	Present	Singing	Probable breeding	1 - 2	Green listed
Chaffinch	Singing	Singing	Singing	Probable breeding	6 - 12	Green listed
Chiffchaff	Singing	Singing	Singing	Possible breeding	5 - 7	Green listed
Coal tit	Present			Possible breeding	0 - 1	Green listed
Collared dove	Present	Present	Fly over	Possible breeding	0 - 1	Green listed
Cormorant	Present			Non-breeding		Amber listed. SCI (nearest SPA: Ireland's Eye, approximately 31 km away).
Dunnock	Singing	Singing	Singing	Possible breeding	1 - 3	Green listed
Goldcrest	Singing	Singing	Singing	Possible breeding	5 - 7	Amber listed
Goldfinch	Singing	Singing	Singing	Probable breeding	3 - 8	Green listed
Great tit	Singing	Singing	Present	Probable breeding	1 - 2	Green listed
Greenfinch	Singing	Singing		Possible breeding	1 - 4	Amber listed
Grey heron		Fly over		Non-breeding		Green listed. SCI (nearest SPA: Wexford Harbour and Slobbs, approximately 92 km away).
Herring gull	Fly over	Present	Fly over	Non-breeding		Amber listed. SCI (nearest SPA is Ireland's Eye, approximately 31 km away).
Hooded crow	Perching	Present	Present	Possible breeding	1 - 3	Green listed
House martin	Fly over	Singing	Fly over	Non-breeding		Amber listed
House sparrow	Present	Singing	Singing	Possible breeding	2 - 6	Amber listed
Jackdaw	Present	Present	Present	Possible breeding	1 - 3	Green listed
Jay		Present		Possible breeding	0 - 1	Green listed
Lesser black-backed gull	Fly over	Fly over	Present	Non-breeding		Amber listed. SCI (nearest SPA: Poulaphouca Reservoir, approximately 15.7 km away). EU Birds Directive: Annex II, Section I; Annex III, Section I.

¹⁰ Gilbert, G., Stanbury, A. and Lewis, L. (2021) Birds of conservation concern in Ireland 4: 2020–2026. Irish Birds, 43, pp.1-22.

Species	April 2024	May 2024	June 2024	Status within Site	Estimated number of breeding pairs	BoCCI ¹⁰ and other designations
Linnet	Singing	Present	Present	Possible breeding	2 - 3	Amber listed
Long-tailed tit	Present	Singing		Probable breeding	1 - 6	Green listed
Magpie	Singing	Present	Singing	Possible breeding	1 - 3	Green listed
Mallard	Present			Non-breeding		Amber listed. SCI species (nearest SPA: Dundalk Bay, approximately 62 km away). EU Birds Directive: Annex II, Section I; Annex III, Section I.
Meadow pipit	Singing		Present	Possible breeding	1 - 2	Red listed
Mistle thrush	Present	Singing	Present	Probable breeding	1 - 2	Green listed
Pied wagtail		Present	Present	Possible breeding	0 - 1	Green listed
Pheasant	Singing			Possible breeding	0 - 1	Green listed. EU Birds Directive: Annex II, Section I; Annex III, Section I.
Robin	Singing	Singing	Singing	Possible breeding	9 - 15	Green listed
Rook	Present	Present	Present	Confirmed breeding	35+	Green listed
Sand martin			Fly over	Non-breeding		Amber listed
Song thrush	Singing	Singing	Present	Possible breeding	4 - 9	Green listed
Spotted flycatcher		Singing		Possible breeding	1 - 2	Amber listed
Starling	Present	Present	Fly over	Possible breeding	65+	Amber listed
Stock dove			Present	Possible breeding	0 - 1	Red listed
Swallow	Fly over	Fly over	Fly over	Non-breeding		Amber listed
Swift		Fly over	Fly over	Non-breeding		Red listed
Treecreeper			Present	Possible breeding	0 - 2	Green listed
Willow warbler	Singing	Singing	Singing	Possible breeding	1 - 2	Amber listed
Woodpigeon	Present	Singing	Present	Probable breeding	1 - 5	Green listed. EU Birds Directive: Annex II, Section I; Annex III, Section I.
Wren	Singing	Singing	Singing	Possible breeding	21 - 25	Green listed
Yellowhammer	Singing	Singing	Carrying food	Confirmed breeding	3 - 4	Red listed

1.4.1 Kingfisher

Survey dates and weather conditions of the kingfisher surveys are summarised in **Table 9.24**.

Table 9.24: Kingfisher Survey Summary

Survey no.	Date	Location	Weather conditions
1	29/04/2024	River Liffey walkover	Dry, calm, great visibility
2	30/04/2024	Vantage Point 1	Dry, calm, great visibility
3	30/04/2024	Vantage Point 2	Dry, calm, great visibility
4	28/05/2024	Vantage Point 1	Dry, calm, great visibility
5	28/05/2024	Vantage Point 2	Dry, calm, great visibility
6	20/06/2024	Vantage Point 1	Dry, calm, great visibility
7	20/06/2024	Vantage Point 2	Dry, calm, great visibility
8	08/07/2024	Vantage Point 1	Dry, calm, great visibility

Survey no.	Date	Location	Weather conditions
9	08/07/2024	Vantage Point 2	Dry, calm, great visibility

No signs of suitable kingfisher nesting habitat were observed. However, one kingfisher was observed commuting up the Liffey on 8 July 2024.

During the vantage point survey on 28 May 2024, one dipper (*Cinclus cinclus*) was observed commuting down the River Liffey and two grey wagtails (*Motacilla cinerea*) were seen commuting up the river. On 20 June 2024, one grey wagtail was observed commuting up the Liffey. This individual remained on the right bank of the river for 31 minutes before commuting downstream. During the survey completed on 8 July 2024, one dipper was observed commuting down and up the Liffey. Two mute swans (*Cygnus olor*) with two cygnets were also observed commuting downstream during this survey. The designations of bird species observed during the kingfisher surveys are in **Table 9.25**.

Table 9.25: Designations of Bird Species observed during Kingfisher Surveys

Species	BoCCI and other designations
Dipper (<i>Cinclus cinclus</i>)	Green listed
Grey wagtail (<i>Motacilla cinerea</i>)	Red listed
Mute swan (<i>Cygnus olor</i>)	Amber listed.
Kingfisher (<i>Alcedo atthis</i>)	Amber listed. EU Birds Directive; Annex I. SCI (nearest SPA: River Boyne and River Blackwater, approximately 27 km away).

1.5 Aquatic Ecology

Surface water features and their WFD statuses downstream of the Proposed Scheme are mapped in Figure 9-7.

The WFD waterbodies, waterbodies observed during field surveys, and aquatic survey locations are mapped in Figure 9-8.

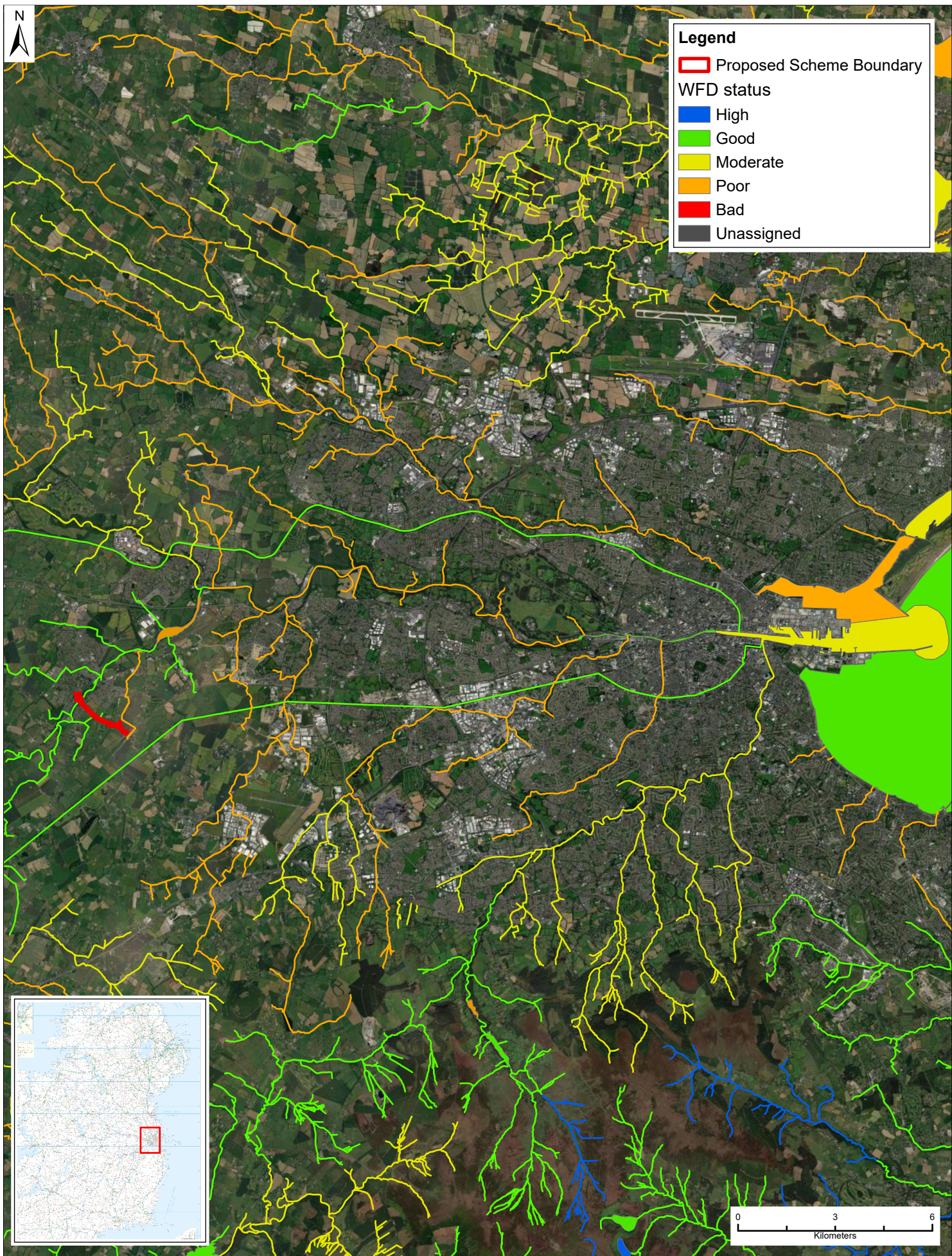


Figure 9-7: WFD status of waterbodies in the Study Area

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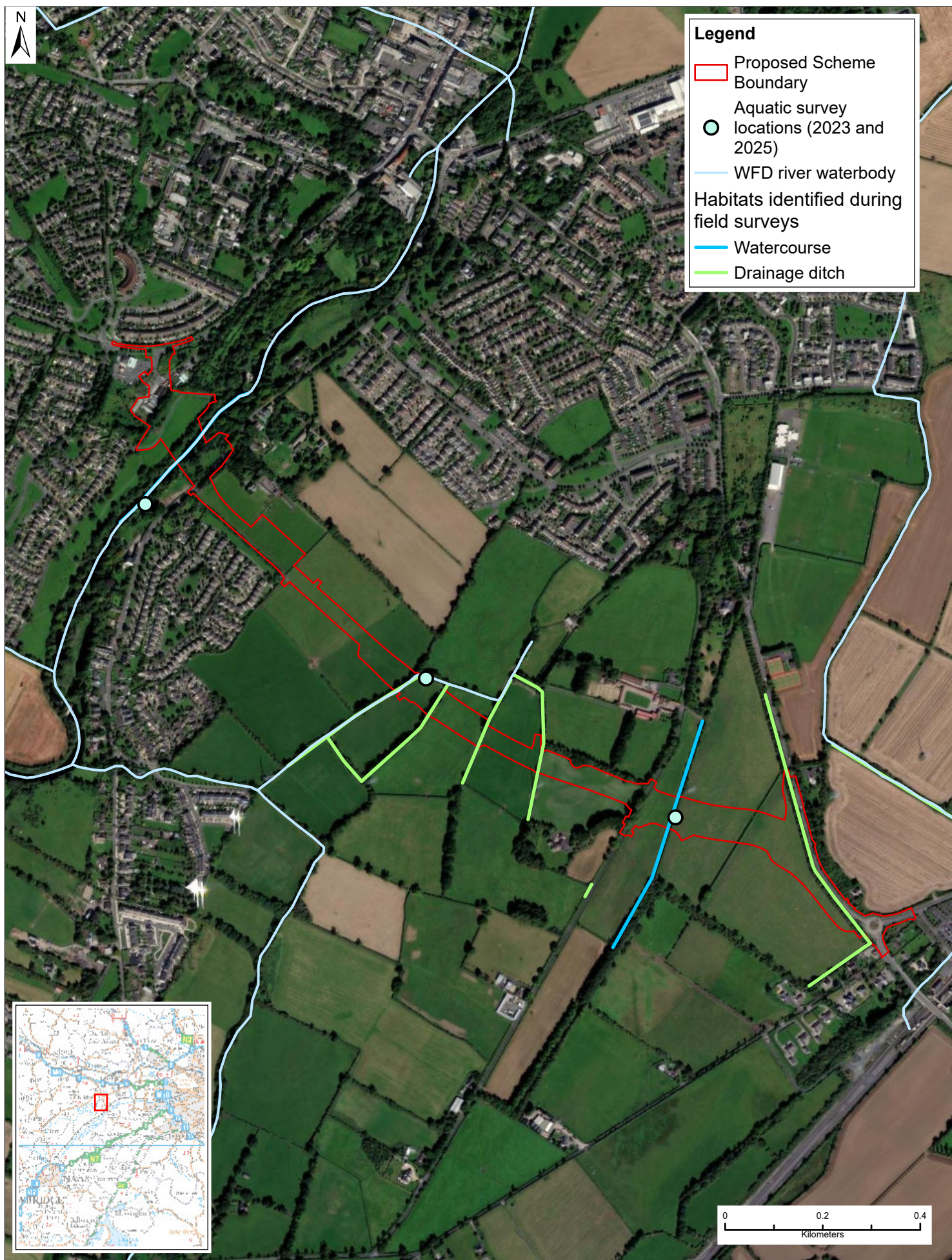


Figure 9-8: Aquatic Ecology

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1.5.1 Aquatic Ecological Surveys 2023

Aquatic Survey Site 1 (River Liffey)

The land use of the area surrounding the river was dominated by suburban development, improved pasture and tillage. The bank height was 0.2 m, the bank width was 16 m, the water depth was greater than 1 m, and there were no channel or bank modifications. No bank erosion or cattle access was evident along the surveyed section of the river. The river was impounded with a weir upstream. The area surveyed consisted of 70% riffle and 30% pool. The substrate consisted of bedrock and silt, but due to inaccessibility, the proportions were not determined. Siltation was high, with the depth of silt over the bedrock approximately 1.2 m. The river had a normal flow discharge, low velocity, low turbidity, low colour, and moderate shading. The percentage dissolved oxygen was 91.8%, with a concentration of 8.56 mg/l. The water temperature was 18.7 °C and conductivity was 440 µS/c.

Bankside vegetation consisted mostly of elm (*Ulmus* sp.), ash, willow (*Salix* sp.), yellow flag (*Iris pseudacorus*), sycamore, pendulous sedge (*Carex pendula*), wood dock (*Rumex sanguineus*), ground elder (*Aegopodium podagraria*), Scots pine (*Pinus sylvestris*) and beech. Low visibility and inaccessibility did not allow for identification of aquatic vegetation. The riparian buffer around the survey area was wooded with mature trees.

The macroinvertebrate survey identified 24 taxa, but conditions did not allow for Q-value scoring. The habitat sampled was 100% pool and the sampling method used was a 2.5-minute sweep sample along the river margin at each bank. Three-spined stickleback (*Gasterosteus aculeatus*) and lamprey ammocoetes were also identified within the river.

Salmonid spawning and adults – There was no suitable habitat for spawning, but good habitat for adult salmonids. The gradient of the stretch was low (<3%). Due to the dominant substrate being silt and bedrock there were no identified spawning gravels within the stretch. There were suitable habitats for adults, with holding pool and glides present and fallen trees providing cover. However, these habitats were not common within the reach and weirs present barriers to passage.

Juvenile salmonids – Habitat suitability for juvenile salmonids was considered 'none – poor'. The deep, slow flowing river is not suited to juveniles, but some cover is provided by vegetation and fallen trees in the margins.

Lamprey spawning – Due to the dominance of silt and bedrock substrate there was no suitable spawning habitat.

Lamprey nursery habitat – The suitability for lamprey nursery habitat was considered very good due to the presence of areas of slow flow with silty bed material and organic matter and suitable water depths (10-50 cm).

Adult lamprey – Habitat suitability for adult lamprey was considered fair. The lack dredging/channelisation and presence of hiding places improve suitability, but there were evident barriers to migration.

Crayfish – Habitat suitability for crayfish was considered very good due to the bankside vegetation, soft banks, aquatic vegetation and submerged tree roots, and suitable water depths (0.75-1.25 m). Numerous juvenile crayfish were also present in the sweep sample.

Aquatic Survey Site 2 (Unnamed Simmonstown Stud stream)

The land use of the area surrounding the stream was dominated by pasture. The bank width was 2.2 m, the wet width was 1.8 m, the stream depth was 0.3 m and the channel and banks had been channelised and straightened. No bank erosion or cattle access was evident along the surveyed section of the stream. The stream was 100% pool and the substrate was 100% silt. The stream had a low flow discharge and was stagnant, but the water was very clear and shading was moderate. The percentage dissolved oxygen was 58.7%, with a concentration of 5.49 mg/l. The water temperature was 18.1 °C and conductivity was 512 µS/c.

Aquatic vegetation included *Phalaris* sp., lesser water-parsnip (*Berula erecta*), duckweed (*Lemna minor*) and

Apium sp.. Bankside vegetation consisted mostly of water mint (*Mentha aquatica*), *Phalaris* sp., lesser waterparsnip,

willowherb (*Epilobium hirsutum*). A hedgerow lined the left bank and a fence lined the right bank. The macroinvertebrate survey identified 16 taxa, but conditions did not allow for Q-value scoring. The habitat sampled was 100% pool and the sampling method used was a 2-minute sweep sample. Stickleback was also present.

Salmonid – There was no suitable habitat for any salmonid life stages.

Lamprey– There was no suitable habitat for lamprey spawning or adult lamprey. There was suitable nursery habitat, but because of the lack of suitable spawning habitat, this is unlikely to occur.

Crayfish – Habitat suitability was good for crayfish. There was overhanging bank vegetation, aquatic vegetation, submerged tree roots and soft banks suitable for burrowing. However, there was no suitable boulder and cobble habitat and no crayfish in the sweep sample.

Aquatic Survey Site 3 (Loughlinstown stream)

The stream had been channelised and straightened. No other physical or physiochemical characteristics could be determined about this stream as it was dry. The land use surrounding the stream was pasture and there was heavy shading from the trees on the channel banks, which consisted mostly of hazel, nettle, elder, ash, oak sp., hawthorn, blackthorn, hearts tongue fern, fool's watercress (*Apium nodiflorum*), and bramble.

1.5.2 Aquatic Ecological Surveys 2025

Aquatic Survey Site 1 (River Liffey)

Site 1 is located southwest of Celbridge town centre on the River Liffey. The land use of the area surrounding the river is dominated by suburban development and parkland. The bank width was ~16 m, and the water depth was measured at >1 m – due to safety concerns regarding water depth and current, the surveyors were unsafe to characterise depths and substrate conditions accurately across the channel. No channel or bank modification was observed, and no bank erosion or cattle access was evident along the survey reach. Flow discharge appeared normal, with moderate velocity. The survey reach was entirely glide habitat.

In terms of physico-chemical conditions, pH was 8.2, water temperature was 17.5°C, and conductivity was 392 µS/cm. Dissolved oxygen concentration (9.02 mg/l) and percent saturation (95.4%,) were both good. Turbidity and colour were both low.

Bankside vegetation consisted of bur-reed (*Sparganium*), *Phalaris*, willow (*Salix*), pendulous sedge (*Carex pendula*), willowherb (*Epilobium* sp.), dogrose (*Rosa canina*), horsetail (*Equisetum*), hogweed (*Heracleum sphondylium*), nettle (*Urtica dioica*), vetch (*Vicia*), water mint (*Mentha aquatica*), speedwell (*Veronica*), ragwort (*Jacobaea*), ivy (*Hedera*), and lords and ladies (*Arum maculatum*). Winter heliotrope (*Petasites pyrenaicus*) was also present on the true right bank. Channel shading was moderate.

Unsafe wading conditions hindered a full assessment of instream aquatic vegetation throughout the survey reach. However, starwort (*Callitriche* sp.), duckweed (*Lemna* sp.), bur-reed (*Sparganium* sp.), and yellow water-lily (*Nuphar lutea*) were noted. There was some filamentous algae present along the river margins (<5%). Of note, sewage fungus was noted on the true left bank (associated with a piped discharge), approximately 5 meters upstream of the rocky outcrop (access point) on that bank.

Overall, the riparian zones of both banks had good structure and had complex vegetative communities, and there was no modification to the bank vegetation. A potential otter track was noted on the true left bank, upstream of the rocky outcrop (access point) on that bank.

Aquatic macroinvertebrates were sampled using a 3-minute multihabitat sweep of all available mesohabitats present that could be safely accessed. Habitat conditions were unsuitable for Q-value assessments. This macroinvertebrate survey identified 21 taxa. Additional observations included three-spined stickleback (*Gasterosteus aculeatus*), cormorant (*Phalacrocorax carbo*), mallard duck and ducklings (*Anas platyrhynchos*), two mute swans and four cygnets (*Cygnus olor*), and a kingfisher (*Alcedo atthis*) also flew downstream carrying insects.

The habitat for salmonid spawning was rated 'none', as the river was too deep, and the observed substrate was unsuitable. However, the habitat for adult salmonids was rated 'good', as there was suitable water depth and refugia. The habitat for juvenile salmonids was rated 'none-poor', as the river was lacking riffle areas for feeding and water was deemed too deep. Similar to salmonids, there was no lamprey spawning potential due to unsuitable substrate. In contrast, the reach was rated to have 'very good' lamprey nursing habitat, as there was plenty bankside areas with fine sediments and organic matter (depositional areas). The habitat suitability for adult lamprey was rated 'fair' due to the adequate cover and refugia; however, substrate is likely to be suboptimal. The habitat suitability for crayfish was rated 'very good', due to the soft banks for burrowing, the overhanging and instream vegetation, leaf litter and suitable refugia. Similarly, eel habitat suitability was rated 'good' considering the substrate heterogeneity, abundant cover like woody debris, riparian vegetation, and unimpeded connectivity for migration.

Aquatic Survey Site 2 (Unnamed Simmonstown Stud stream)

Site 2 is located on Simmonstown Stud, and the site's surrounding land use was dominated by rough pasture. The bank height on the true left was 0.7 m and the true right was 0.9 m. The wetted width was 1.4 m, and the water depth was 0.35 m. The banks were steep, and the channel was straightened. A hedgerow lined the true left bank, and the true right bank is fenced ~2 m back from the water's edge. No bank erosion or cattle access was evident along the surveyed section of the stream. The survey reach was 100% slow glide, and the substrate was 100% silt. The stream had a normal flow discharge, slow velocity, low turbidity, no colour and heavy shading.

In terms of physico-chemical conditions, pH was 7.9, water temperature was 16.0°C, and conductivity was 512 µS/cm. Dissolved oxygen concentration (5.78 mg/l), and percent saturation (59.3%) were both low. Turbidity and colour were both low.

Bankside vegetation consisted of meadowsweet (*Filipendula ulmaria*), water mint (*Mentha aquatica*) flag iris (*Iris pseudacorus*), nettle (*Urtica dioica*), bramble (*Rubus*), nightshade (*Solanum*), whitethorn (*Crataegus monogyna*), and birch (*Betula*). The channel itself was choked with instream vegetation (100% macrophyte coverage): fool's watercress (*Helosciadium nodiflorum*) and lesser water-parsnip (*Berula erecta*) were dominant.

Aquatic macroinvertebrates were sampled using a 3-minute multihabitat sweep of all available mesohabitats. Habitat conditions were unsuitable for Q-value assessments. This macroinvertebrate survey identified 12 taxa. Additional observations included three-spined stickleback (*Gasterosteus aculeatus*).

The habitat was unsuitable for all salmonid life stages, lamprey spawning and adult habitat, and crayfish and eel habitat. Although there was sufficient fine sediment and organic material available as juvenile lamprey habitat, there was no suitable lamprey spawning habitat noted. Also, while the macrophytes prevent refugia for crayfish, the excessive growth and coverage is likely to yield unsuitable water quality conditions for this species (low dissolved oxygen concentrations).

Aquatic Survey Site 3 (Loughlinstown stream)

Site 3 is also located on Simmonstown Stud, and the site's surrounding land use was dominated by rough pasture. The stream has been channelised and straightened and is ephemeral in nature. No physico-chemical or instream habitat characteristics could be determined as the stream was dry at the time of survey. There was heavy shading from bankside trees on both banks, which consisted mostly of hazel (*Corylus*), nettle (*Urtica*), elder (*Sambucus*), ash (*Fraxinus excelsior*), oak (*Quercus* sp.), hawthorn (*Crataegus*), blackthorn (*Prunus spinosa*), Hart's-tongue fern (*Asplenium scolopendrium*), fool's watercress (*Helosciadium nodiflorum*), and bramble (*Rubus*). Due to the stream being dry, the aquatic macroinvertebrate sampling, and fish/crayfish habitat suitability assessments were unable to take place.

APPENDIX 9.1H IMPORTANT ECOLOGICAL FEATURES

A summary evaluation of ecological features within the Study Area is detailed in **Table 9.26**.

Table 9.26: Summary of Valuation of Ecological Features within the Study Area

Ecological features	Highest ecological valuation & rationale	Potentially affected by the Proposed Scheme	IEF (scoped into impact assessment)
Designated sites for nature conservation - international			
South Dublin Bay SAC (000210); North Dublin Bay SAC (000206); Rockabill to Dalkey Island SAC (003000); South Dublin Bay and River Tolka Estuary SPA (004024); North Bull Island SPA (004006); North-West Irish Sea SPA (004236); Howth Head Coast SPA (004113); Dalkey Islands SPA (004172)	International Internationally designated sites.	Yes. Potential direct and indirect effects on this feature have been identified from: • Construction phase; ○ Pollution to water, air and/or soil.	Yes. To be assessed collectively as sites of Dublin Bay.
Rye Water Valley/Carlton SAC (001398)	International Internationally designated site.	No. No potential pathway for impact as the site is 4.7 km from the Proposed Scheme with no hydrological or hydrogeological connectivity.	No
Glenasmole Valley SAC (001209)	International Internationally designated site.	No. No potential pathway for impact as the site is 12.5 km from the Proposed Scheme with no hydrological or hydrogeological connectivity.	No
Wicklow Mountains SAC (002122)	International Internationally designated site.	No. No potential pathway for impact as the site is 13.7 km from the Proposed Scheme with no hydrological or hydrogeological connectivity.	No
Red Bog, Kildare SAC (000397)	International Internationally designated site.	No. No potential pathway for impact as the site is 13.7 km from the Proposed Scheme with no hydrological or hydrogeological connectivity.	No
Poulaphouca Reservoir SPA (004063)	International Internationally designated site.	No. No potential pathway for impact as the site is 15.7 km from the Proposed Scheme with no hydrological or hydrogeological connectivity.	No

Ecological features	Highest ecological valuation & rationale	Potentially affected by the Proposed Scheme	IEF (scoped into impact assessment)
Wicklow Mountains SPA (004040)	International Internationally designated site.	No. No potential pathway for impact as the site is 17.1 km from the Proposed Scheme with no hydrological or hydrogeological connectivity.	No
Mouds Bog SAC (002331)	International Internationally designated site.	No. No potential pathway for impact as the site is 20.4 km from the Proposed Scheme with no hydrological or hydrogeological connectivity.	No
Baldoyle Bay SPA (004016)	International Internationally designated site.	No. No potential pathway for impact as the site is 27.5 km from the Proposed Scheme with no hydrological or hydrogeological connectivity.	No
Baldoyle Bay SAC (000199)	International Internationally designated site.	No. No potential pathway for impact as the site is 27.1 km from the Proposed Scheme with no hydrological or hydrogeological connectivity.	No
Malahide Estuary SAC (000205)	International Internationally designated site.	No. No potential pathway for impact as the site is 26.4 km from the Proposed Scheme with no hydrological or hydrogeological connectivity.	No
Malahide Estuary SPA (004025)	International Internationally designated site.	No. No potential pathway for impact as the site is 26.5 km from the Proposed Scheme with no hydrological or hydrogeological connectivity.	No
Howth Head SAC (000202)	International Internationally designated site.	No. No potential pathway for impact as the site is 29.0 km from the Proposed Scheme with no hydrological or hydrogeological connectivity.	No
North Bull Island Ramsar site	International Internationally designated sites.	Yes. Potential direct and indirect effects on this feature have been identified from: - Construction phase; - Pollution to water, air and/or soil.	Yes. To be assessed collectively as sites of Dublin Bay.
Sandymount Strand/ Tolka Estuary Ramsar site			
Broadmeadow Estuary Ramsar site	International Internationally designated site.	No. No potential pathway for impact as the site is 26.5 km from the Proposed Scheme with no hydrological or hydrogeological connectivity.	No
Baldoyle Bay Ramsar site	International Internationally designated site.	No. No potential pathway for impact as the site is 27.5 km from the Proposed Scheme with no hydrological or hydrogeological connectivity.	No
Designated sites for nature conservation - National			
Wicklow National Park (002122)	National Nationally designated site	No. No potential pathway for impact as the site is approximately 15.1 km from the Proposed Scheme with no hydrological or hydrogeological connectivity.	No

Ecological features	Highest ecological valuation & rationale	Potentially affected by the Proposed Scheme	IEF (scoped into impact assessment)
Grand Canal pNHA (002104)	National Nationally designated site	Yes. Potential indirect effects on this feature have been identified from: - Construction phase; - Biodiversity loss, fragmentation and alteration; - Operational phase; - Biodiversity loss, fragmentation and alteration.	No
Royal Canal pNHA (002103)	National Nationally designated site	No. No potential pathway for impact as the site is approximately 4.3 km from the Proposed Scheme with no hydrological or hydrogeological connectivity.	No
Rye Water Valley/Cartron pNHA (001398)	National Nationally designated site	No. No potential pathway for impact as the site is approximately 4.7 km from the Proposed Scheme with no hydrological or hydrogeological connectivity.	No
Liffey Valley pNHA (000128)	National Nationally designated site	Yes. Potential direct and indirect effects on this feature have been identified from: - Construction phase; - Pollution to water, air and/or soil.	Yes
Slade Of Saggart And Crooksling Glen pNHA (000211)	National Nationally designated site	No. No potential pathway for impact as it is 8.3 km from the Proposed Scheme with no hydrological or hydrogeological connectivity.	No
Kilteel Wood pNHA (001394)	National Nationally designated site	No. No potential pathway for impact as it is 9.5 km from the Proposed Scheme with no hydrological or hydrogeological connectivity.	No
Lugmore Glen pNHA (001212)	National Nationally designated site	No. No potential pathway for impact as it is 9.8 km from the Proposed Scheme with no hydrological or hydrogeological connectivity.	No
Donadea Wood pNHA (001391)	National Nationally designated site	No. No potential pathway for impact on the woodland flora and fungi receptors for which this site is designated, as the site is 11.6 km from the Proposed Scheme and is not downstream of it.	No
Dodder Valley pNHA (000991)	National Nationally designated site	No. No potential pathway for impact as it is 12.4 km from the Proposed Scheme with no hydrological or hydrogeological connectivity.	No
Glenasmole Valley pNHA (001209)	National Nationally designated site	No. No potential pathway for impact as the site is approximately 12.5 km from the Proposed Scheme with no hydrological or hydrogeological connectivity.	No
Red Bog, Kildare pNHA (000397)	National Nationally designated site	No. No potential pathway for impact as the site is approximately 13.7 km from the Proposed Scheme with no hydrological or hydrogeological connectivity.	No

Section 177AE Appendices to the Environmental Report

Ecological features	Highest ecological valuation & rationale	Potentially affected by the Proposed Scheme	IEF (scoped into impact assessment)
Liffey At Osberstown pNHA (001395)	National Nationally designated site	No. No potential pathway for impact on the riparian woodland flora receptors for which this site is designated, as the site is approximately 23.4 km upstream of the Proposed Scheme.	No
Poulaphouca Reservoir pNHA (000731)	National Nationally designated site	No. No potential pathway for impact as the site is approximately 15.6 km from the Proposed Scheme and approximately 63 km upstream of the Proposed Scheme with no hydrological or hydrogeological connectivity.	No
North Dublin Bay pNHA (000206); South Dublin Bay pNHA (000210); Dolphins, Dublin Docks pNHA (000201); Booterstown Marsh pNHA (001205); Dalkey Coastal Zone And Killiney Hill pNHA (001206); North Bull Wildfowl Sanctuary; North Bull Island Nature Reserve	National Nationally designated site	Yes. Potential direct and indirect effects on this feature have been identified from: - Construction phase; - Pollution to water, air and/or soil.	Yes. To be assessed collectively as sites of Dublin Bay.
Santry Demesne pNHA (000178)	National Nationally designated site	No. No potential pathway for impact as it is 19.9 km from the Proposed Scheme with no hydrological or hydrogeological connectivity.	No
Fitzsimon's Wood pNHA (001753)	National Nationally designated site	No. No potential pathway for impact as it is 20.1 km from the Proposed Scheme with no hydrological or hydrogeological connectivity.	No
Mouds Bog pNHA (002331)	National Nationally designated site	No. No potential pathway for impact as it is 20.4 km from the Proposed Scheme with no hydrological or hydrogeological connectivity.	No
Liffey Valley Meander Belt pNHA (000393)	National Nationally designated site	No. No potential pathway for impact on the ash woodland and marshy flora or chironomid receptors for which this site is designated, as the site is approximately 57.3 km upstream of the Proposed Scheme.	No
Liffey Bank Above Athgarvan pNHA (001396)	National Nationally designated site	No. No potential pathway for impact on the flora receptors for which this site is designated, as the site is approximately 42.7 km upstream of the Proposed Scheme.	No

Section 177AE Appendices to the Environmental Report

Ecological features	Highest ecological valuation & rationale	Potentially affected by the Proposed Scheme	IEF (scoped into impact assessment)
Feltrim Hill pNHA (001208)	National Nationally designated site	No. No potential pathway for impact as it is 25.1 km from the Proposed Scheme with no hydrological or hydrogeological connectivity.	No
Newtown Marshes pNHA (001759)	National Nationally designated site	No. No potential pathway for impact on the marsh habitat and breeding bird receptors for which this site is designated, as the site is approximately 61.7 km upstream of the Proposed Scheme and 25.2 km distant from the Proposed Scheme.	No
Curragh (Kildare) pNHA (000392)	National Nationally designated site	No. No potential pathway for impact as it is 26.0 km from the Proposed Scheme with no hydrological or hydrogeological connectivity.	No
Malahide Estuary pNHA (000205)	National Nationally designated site	No. No potential pathway for impact as the site is 26.4 km from the Proposed Scheme with no hydrological or hydrogeological connectivity.	No
Sluice River Marsh pNHA (001763)	National Nationally designated site	No. No potential pathway for impact as it is 27.1 km from the Proposed Scheme with no hydrological or hydrogeological connectivity.	No
Baldoyle Bay pNHA (000199)	National Nationally designated site	No. No potential pathway for impact as it is 27.1 km from the Proposed Scheme with no hydrological or hydrogeological connectivity.	No
Hollywood Glen pNHA (002053)	National Nationally designated site	No. No potential pathway for impact on the flora and breeding peregrine falcon and kestrel receptors for which this site is designated, as the site is approximately 65 km upstream of the Proposed Scheme and 28.6 km distant from the Proposed Scheme.	No
Howth Head pNHA (000202)	National Nationally designated site	No. No potential pathway for impact as the site is 28.7 km from the Proposed Scheme with no hydrological or hydrogeological connectivity.	No
Ballinagee Wood pNHA (001751)	National Nationally designated site	No. No potential pathway for impact on the woodland flora receptors for which this site is designated, as the site is approximately 92 km upstream of the Proposed Scheme, upstream of Poulaphouca Reservoir and 29.6 km from the Proposed Scheme.	No
Baldoyle Estuary Nature Reserve	National Nationally designated site	No. No potential pathway for impact as it is approximately 28 km from the Proposed Scheme with no hydrological or hydrogeological connectivity.	No
Brittas Ponds Wildfowl Sanctuary	National Nationally designated site	No. No potential pathway for impact as it is approximately 10 km from the Proposed Scheme with no hydrological or hydrogeological connectivity.	No

Section 177AE Appendices to the Environmental Report

Ecological features	Highest ecological valuation & rationale	Potentially affected by the Proposed Scheme	IEF (scoped into impact assessment)
Poulaphuca Wildfowl Sanctuary	National Nationally designated site	No. No potential pathway for impact as the site is approximately 15 km from the Proposed Scheme and approximately 63 km upstream of the Proposed Scheme with no hydrological or hydrogeological connectivity.	No
Liffey – Kings <i>Margaritifera</i> Sensitive Area	National Catchment of extant populations of freshwater pearl mussel not associated with an SAC.	No. Juvenile salmonids are the host species of FWPM during its larval phase. Therefore, impacts on migrating salmonids can impact the FWPM catchment. However, this catchment is approximately 82 km upstream of the Proposed Scheme and is upstream of Poulaphuca Dam, which is impassable to migrating salmon (Delanty <i>et al.</i> , 2022). Therefore, any potential impact on downstream salmonids does not have a pathway to impact this site.	No
• Habitats & flora			
Horticultural land (BC2)	Local (lower value) This habitat is of low biodiversity value in a local context.	No. Any effect will not be significant due to a lack of ecological importance.	No
Tilled land (BC3)	Local (lower value) This habitat is of low biodiversity value in a local context.	No. Any effect will not be significant due to a lack of ecological importance.	No
Stone walls and other stonework (BL1)	Local (lower value) This area of habitat (115 m) is likely to be of some local importance for wildlife but lacks the diversity and other characteristics of a more valuable habitat of this type.	No. Any effect will not be significant due to a lack of ecological importance.	No
Buildings and artificial surfaces (BL3)	Local (lower value) This habitat is of low biodiversity value in a local context.	No. Any effect will not be significant due to a lack of ecological importance.	No
Recolonising bare ground (ED3)	Local (lower value) This habitat is of low biodiversity value in a local context.	No. Any effect will not be significant due to a lack of ecological importance.	No

Ecological features	Highest ecological valuation & rationale	Potentially affected by the Proposed Scheme	IEF (scoped into impact assessment)
Improved agricultural grassland (GA1)	Local (Lower value) This area is likely to be of some local importance for wildlife but lacks the diversity and other characteristics of a more valuable site.	No. Any effect will not be significant due to a lack of ecological importance.	No
Amenity grassland (improved) (GA2)	Local (lower value) This small area is likely to be of some local importance for wildlife but lacks the diversity and other characteristics of a more valuable habitat of this type.	No. Any effect will not be significant due to a lack of ecological importance.	No
Dry meadows and grassy verges (GS2)	Local (lower value) Provides some local importance for wildlife e.g. for invertebrate, mammal and bird species.	No. Limited removal proposed	No
Wet grassland (GS4)	Local (higher value) Semi-natural habitat type with high biodiversity in a local context and it provides habitat for many species including plants and invertebrates.	No. None within proposed works area.	No
Hedgerows (WL1)	Local (higher value) Semi-natural habitat type with high biodiversity in a local context and they provide habitat for many species incl. birds, mammals and invertebrates.	Yes. Potential direct and indirect effects on this feature have been identified from: - Construction phase; - Biodiversity loss, fragmentation and alteration.	Yes

Section 177AE Appendices to the Environmental Report

Ecological features	Highest ecological valuation & rationale	Potentially affected by the Proposed Scheme	IEF (scoped into impact assessment)
Treelines (WL2)	Local (lower value) Typically has a higher proportion of alien species than WL1, but they provide habitat for many species incl. birds, mammals and invertebrates.	No. Limited removal proposed	No
Scrub (WS1)	Local (higher value) Semi-natural habitat type with high biodiversity in a local context and it provides habitat for many species incl. birds, mammals and invertebrates.	No. Limited removal proposed	No
Riparian woodland (WN5)	Local (higher value) Semi-natural habitat type with high biodiversity in a local context and it provides habitat for many species incl. birds, mammals and invertebrates.	Yes. Potential direct and indirect effects on this feature have been identified from: - Construction phase; - Biodiversity loss, fragmentation and alteration.	Yes
(Mixed) broadleaved woodland (WD1)	Local (higher value) Semi-natural habitat type with high biodiversity in a local context and it provides habitat for many species incl. birds, mammals and invertebrates.	No. Limited removal proposed	
(Mixed) conifer woodland (WD3)	Local (lower value) One narrow strip of Sitka spruce which had a high diversity of other species relative to typical Sitka spruce plantations, but of low ecological value in the local context.	No. Any effect will not be significant due to a lack of ecological importance.	No

Ecological features	Highest ecological valuation & rationale	Potentially affected by the Proposed Scheme	IEF (scoped into impact assessment)
Depositing/lowland rivers (FW2)	National This habitat forms part of Liffey Valley pNHA downstream of the Proposed Scheme. The habitat that has suffered a decline in quality on a national level.	Yes. Potential direct and indirect effects on this feature have been identified from: - Construction phase; - Biodiversity loss, fragmentation and alteration; - Pollution to water, air and/or soil; - Operational phase; - Pollution to water, air and/or soil.	Yes
Drainage ditches (FW4)	Local (lower value) Generally dry at time of survey and relatively species poor due to low light within hedgerows.	No. Any effect will not be significant due to a lack of ecological importance. Certain stretches of FW4 are assessed in the context of impacts on connected FW2 habitat.	No
Hairy St John's-wort	National FPO species. There are records of the species along the River Liffey downstream of the Proposed Scheme.	No. Any effect will not be significant due to a lack of ecological importance.	No
Green figwort	National Near threatened species with NBDC records on only one other stretch of river in Ireland. There are records of the species along the River Liffey downstream and north east of the Proposed Scheme.	No. Any effect will not be significant due to a lack of ecological importance.	No
Other protected flora/ species of conservation concern	Local (lower value) No protected plant species recorded during the field surveys.	No. Any effect will not be significant due to a lack of ecological importance.	No

Fauna

Ecological features	Highest ecological valuation & rationale	Potentially affected by the Proposed Scheme	IEF (scoped into impact assessment)
Bats (commuting and foraging)	Local (higher value) Protected under the Habitats Directive (Annex IV) and the Wildlife Acts. However, the observed bat assemblage is common and widespread. Bat foraging and commuting activity has been recorded throughout the site.	Yes. Potential direct and indirect effects on this feature have been identified from: - Construction phase; - Biodiversity loss, fragmentation and alteration; - Disturbance from noise, vibration, lighting and human presence; - Operational phase; - Disturbance from noise, vibration, lighting and human presence.	Yes
Bats (roosting)	Local (lower value) Protected under the Habitats Directive (Annex IV) and the Wildlife Acts. However, the observed bat assemblage is common and widespread. Multiple trees proposed to be removed have potential for roosting bats and bats have been seen emerging from multiple trees.	Yes. Potential direct and indirect effects on this feature have been identified from: - Construction phase; - Biodiversity loss, fragmentation and alteration; - Disturbance from noise, vibration, lighting and human presence; - Operational phase; - Disturbance from noise, vibration, lighting and human presence .	No
Badger	Local (higher value) Protected under the Wildlife Acts. An abundance of badger evidence, including setts, were identified in the study area. However, badgers are common and widespread.	No. Any effect will not be significant due to a lack of ecological importance.	No

Ecological features	Highest ecological valuation & rationale	Potentially affected by the Proposed Scheme	IEF (scoped into impact assessment)
Otter	Local (higher) Otters are associated with Grand Canal pNHA. Protected under the Habitats Directive (Annexes II and IV) and the Wildlife Acts. Potential otter holts and couches were identified in the study area, but they appeared disused during the 2024 surveys. Other activity evidence was also identified in 2024.	Yes. Potential direct and indirect effects on this feature have been identified from: - Construction phase; - Biodiversity loss, fragmentation and alteration; - Disturbance from noise, vibration, lighting and human presence; - Pollution to water, air, and/or soil; and - Operational phase; - Disturbance from noise, vibration, lighting and human presence.	Yes.
Other protected mammals	Local (lower value) Although these protected mammals have the potential to occur in the study area, the population potentially impacted is considered to be much less than 1% of the local population as described in the NRA (2009b) guidance.	No. Any effect will not be significant due to a lack of ecological importance.	No
Common Kingfisher (commuting and foraging)	Local (higher value) Protected under the Birds Directive (Annex I) and amber listed. It is only classified as 'possibly' breeding in the vicinity. While no suitable nesting habitat was identified during field surveys, a commuting kingfisher was identified. Therefore, kingfisher commute and forage in the vicinity of the Proposed Scheme.	Yes. Potential direct and indirect effects on this feature have been identified from: - Construction phase; - Biodiversity loss, fragmentation and alteration; - Disturbance from noise, vibration, lighting and human presence; - Pollution to water, air, and/or soil; and - Operational phase; - Disturbance from noise, vibration, lighting and human presence.	Yes

Ecological features	Highest ecological valuation & rationale	Potentially affected by the Proposed Scheme	IEF (scoped into impact assessment)
Common Kingfisher (breeding)	Local (lower value) Protected under the Birds Directive (Annex I) and amber listed. It is only classified as 'possibly' breeding in the vicinity. While no suitable nesting habitat was identified during field surveys, a commuting kingfisher was identified. Therefore, kingfisher commute and forage in the vicinity of the Proposed Scheme.	No. No evidence of breeding within the zone of effect of the Proposed scheme.	No
Barn Owl	Local (lower value) Red listed species. No evidence of barn owl was identified during field surveys, but anecdotal accounts of barn owl were given by landowners. Therefore, barn owl may commute and forage in the vicinity of the Proposed Scheme.	No. No evidence of breeding or recordings during survey. Mitigation will be applied as a precautionary measure.	No
Birds (breeding)	Local (higher value) Recorded birds included green, amber and red list species, but these species are considered relatively common and widespread in the broader landscape.	- Construction phase; - Biodiversity loss, fragmentation and alteration; - Disturbance from noise, vibration, lighting and human presence; - Operational phase; - Disturbance from noise, vibration, lighting and human presence.	Yes

Section 177AE Appendices to the Environmental Report

Ecological features	Highest ecological valuation & rationale	Potentially affected by the Proposed Scheme	IEF (scoped into impact assessment)
Birds (wintering)	Local (lower value) Recorded birds included green, amber and red list species, but these species are considered relatively common and widespread in the broader landscape.	No. Any effect will not be significant due to an abundance of equivalent habitat in the locality.	no
White-clawed crayfish	National Protected under the Habitats Directive (Annexes II and V) and the Wildlife Acts. The recent severe decline in this species nationwide due to the spread of crayfish plague.	Yes. Potential direct and indirect effects on this feature have been identified from: - Construction phase; - Pollution to water, air, and/or soil	Yes
Fish	Local (higher value) Salmon are noted in the Liffey Valley pNHA Site Synopsis. Salmon and lamprey are protected under the EU Habitats Directive and European eel is critically endangered in Ireland.	Yes. Potential direct and indirect effects on this feature have been identified from: - Construction phase; - Pollution to water, air, and/or soil	Yes

Ecological features	Highest ecological valuation & rationale	Potentially affected by the Proposed Scheme	IEF (scoped into impact assessment)
Amphibians, reptiles, terrestrial invertebrates	Local (lower value) Although these protected species have the potential to occur in the study area, the population potentially impacted is considered to be much less than 1% of the local population as described in the NRA (2009b) guidance. Therefore, the effect of the loss of habitat supporting commuting and foraging protected species is considered negligible.	No. Any effect will not be significant due to a lack of ecological importance.	No

The ecological valuation concluded that the following ecological features were deemed to be IEFs and should be assessed for the listed impact categories during construction and/or operational phases of the Proposed Scheme:

- **Designated sites for nature conservation**
 - Sites of Dublin Bay
 - Construction phase: pollution to water, air and/or soil
 - Grand Canal pNHA (otter)
 - Construction phase: biodiversity loss, fragmentation and alteration
 - Operational phase: biodiversity loss, fragmentation and alteration
 - Liffey Valley pNHA
 - Construction phase: pollution to water, air and/or soil
- **Habitats and flora**
 - Hedgerows
 - Construction phase: biodiversity loss, fragmentation and alteration
 - Riparian woodland
 - Construction phase: biodiversity loss, fragmentation and alteration; and, spread of invasive alien species
 - Operational phase: spread of invasive alien species
 - Depositing lowland rivers
 - Construction phase: biodiversity loss, fragmentation and alteration; and, pollution to water, air and/or soil
 - Operational phase: pollution to water, air and/or soil

- **Fauna**

- Bats (commuting and foraging)
 - Construction phase: biodiversity loss, fragmentation and alteration; and, disturbance from noise, vibration, lighting and human presence
 - Operational phase: disturbance from noise, vibration, lighting and human presence
- Otter
 - Construction phase: biodiversity loss, fragmentation and alteration; disturbance from noise, vibration, lighting and human presence; and, pollution to water, air, and/or soil
 - Operational phase: disturbance from noise, vibration, lighting and human presence
- Common kingfisher (commuting and foraging)
 - Construction phase: biodiversity loss, fragmentation and alteration; disturbance from noise, vibration, lighting and human presence; and, pollution to water, air, and/or soil
 - Operational phase: disturbance from noise, vibration, lighting and human presence
- Birds (breeding)
 - Construction phase: biodiversity loss, fragmentation and alteration; and disturbance from noise, vibration, lighting and human presence
 - Operational phase: disturbance from noise, vibration, lighting and human presence
- White-clawed crayfish (Pollution to water)
 - Construction phase: pollution to water, air and/or soil
- Fish (Pollution to water)
 - Construction phase: pollution to water, air and/or soil

APPENDIX 9.1I ASSESSMENT OF EFFECTS

1.6 Construction Phase – Assessment of Impacts

1.6.1 Designated sites for nature conservation

1.6.1.1 Sites of Dublin Bay

Pollution to water, air and/or soil

For the IEF sites of Dublin Bay, the impact of water pollution during the construction phase of the Proposed Scheme has been assessed. Water pollution during construction may result from surface water run-off carrying suspended silt or contaminants into local watercourses (the River Liffey and its tributaries), which are connected via hydrological pathway (River Liffey) to the IEFs.

The extent of the effect is the Liffey estuary transitional waterbodies and the Dublin Bay Coastal waterbody. The magnitude of the effect is unmeasurable; however, is likely to be a degradation of water quality with potential cascading effects on biodiversity features. Therefore, the precautionary principle has been applied. The duration of the effect will be linked with the construction timeframe associated with works within the vicinity of the River Liffey and its tributaries and is considered to be short-term. The timing of the construction works may influence the magnitude (i.e. works during high rainfall events are more likely to result in water pollution). This effect is considered to be reversible after construction works are completed. Due to the unmeasurable magnitude of the effect, the effect of water pollution during the construction phase of the Proposed Scheme is predicted to potentially result in a **significant, short-term, and reversible adverse effect at an international geographic scale** on this IEF. Measures, as set out in **Section 9.5.3 of the Environmental Report**, will be required to mitigate this effect.

1.6.1.2 Grand Canal pNHA

Biodiversity loss, fragmentation and alteration – otter

For the IEF Grand Canal pNHA, the impact on otter associated with the pNHA during the construction phase of the Proposed Scheme has been assessed. Grand Canal pNHA is approximately 680 m from the Proposed Scheme and there is no pathway for direct impacts on *in situ* receptors. However, suitable potential otter habitat will be impacted by the construction phase of the Proposed Scheme. Therefore, there is potential to impact *ex situ* habitat which could be used by otters associated with the Grand Canal pNHA.

Potential otter evidence was identified along the unnamed Simmonstown Stud stream approximately 1.1 km from Grand Canal pNHA and watercourses and drainage ditches connected to this stream flow within approximately 750 m of Grand Canal pNHA. Because of the proximity to the pNHA, it is possible that the unnamed Simmonstown Stream is utilised by otters associated with the pNHA. Construction phase impacts on otter are discussed in **Section 1.6.3.3**. There is potential for significant effects on otter caused by biodiversity loss, fragmentation and alteration, disturbance from noise, vibration, lighting and human presence, and pollution to water, air, and/or soil. There is potential for these effects at the unnamed Simmonstown Stud stream, and therefore, there is potential for these effects on otter associated with Grand Canal pNHA.

The extent of the effect is the unnamed Simmonstown Stud stream upstream. The magnitude of the effect is the fragmentation and alteration of suitable resources (i.e. the unnamed watercourse with evidence of otter use) from the pNHA. The potential for this impact will last for the duration of the construction phase. The effects of fragmentation and alteration are short-term and reversible. Therefore, in the absence of mitigation, construction phase effects on the pNHA is predicted to result in a **not significant**, short-term, and reversible effect on the Grand Canal pNHA.

1.6.1.3 Liffey Valley pNHA

Pollution to water, air and/or soil

Liffey Valley pNHA is 5.8 km downstream of the Proposed Scheme. It spans an approximately 12 km long stretch of the River Liffey, adjacent riparian habitats, and other surrounding habitats. The Liffey Valley site synopsis includes the River Liffey itself and salmon. The construction phase of the Proposed Scheme can

potentially adversely affect downstream aquatic habitats. Therefore, the conservation status of the aquatic habitats and species for which Liffey Valley pNHA is designated could experience adverse effects caused by upstream impacts on aquatic habitats.

Construction phase impacts on depositing/lowland rivers and fish, are assessed in **Sections 1.6.2.3 and 1.6.3.7**, respectively. There is potential for significant effects on both of these IEFs caused by pollution to water, air, and/or soil. These effects are similarly likely on Liffey Valley pNHA's aquatic receptors because it is downstream of the Proposed Scheme. The extent of the effect is the area of the River Liffey within Liffey Valley pNHA and the magnitude of the effect is the degradation of aquatic habitat. Such an effect would be reversible and the duration of the effect would be dependent on the severity of the release of pollutants, but would likely be short-term. The timing of the construction works may influence the magnitude (i.e. works during high rainfall events are more likely to result in the release of pollutants in runoff). Because of the nature, scale and location of the Proposed Scheme, there is potential for significant pollution events. Therefore, in the absence of mitigation, the release of pollutants into watercourses may result in a potential **significant, short-term, and reversible adverse effect at the national geographic scale** on Liffey Valley pNHA. Measures, as set out in **Section 9.5.3 of the Environmental Report**, will be required to mitigate this effect.

1.6.2 Habitats and flora

1.6.2.1 Hedgerows

Biodiversity loss, fragmentation and alteration

There is approximately 845 m of hedgerows and 100 m of hedgerow/treeline within the Proposed Scheme boundary. The majority of hedgerow is composed of native species and provide important habitat and corridors for wildlife, including terrestrial mammals, bats and birds. Almost all of the hedgerow within the Proposed Scheme boundary will be removed to accommodate the Proposed Scheme. The proposed landscape plan includes planting of standard trees (i.e. trees free of side branches to a specified height), native hedgerow and/or woodland mix along most of the length of the Proposed Scheme.

The magnitude and extent of the effect caused by disturbance and removal of hedgerow is the length of hedgerow which will be removed or disturbed (i.e. approximately 945 m). The effect will commence during site clearance and is considered largely medium-term and reversible as the proposed planting of native hedgerow and woodland mix along the length of the Proposed Scheme matures. Although the extent of hedgerow clearance is a small proportion of the hedgerow habitat in the local area and the proposed landscape plan will partially reverse the effect, the fragmentation of these ecological corridors increases the significance of the effect. Despite this, due of its reversible and medium-term nature, the impact of biodiversity loss, fragmentation and alteration is predicted to result in a **not significant**, medium-term, and reversible adverse effect on hedgerows.

The impacts of the severance of these ecological corridors on IEF fauna species are assessed in **Section 1.6.3**.

1.6.2.2 Riparian woodland

Biodiversity loss, fragmentation and alteration

There is approximately 0.36 ha of riparian woodland within the Proposed Scheme boundary, but approximately half of this is to be retained. This is comprised of an area on each bank of the River Liffey which both extend upstream and downstream of the Proposed Scheme. Given the nature and location of the proposed works, a large portion of the 0.36 ha of riparian woodland within the Proposed Scheme boundary will be directly disturbed and/or removed to facilitate construction. The riparian woodland within the Proposed Scheme boundary is likely to be of local importance for wildlife, forming part of the important wildlife corridor of the river and riparian woodlands. The proposed landscape plan includes areas of native woodland and standard trees in the vicinity of the Liffey.

The magnitude and extent of the effect of removal and disturbance of riparian woodland is the area of riparian woodland which will be removed or disturbed, including at least 39 trees identified for removal. The effect will commence during site clearance during the construction phase and is considered partially permanent and irreversible, as a large proportion of the area will be replaced by the bridge. However, as the proposed standard trees and native woodland mix mature, the effect will be largely reversed over the long

term. Although the extent of riparian woodland clearance is a relatively small proportion of the riparian woodland in the local area, the splitting of this ecological corridor greatly increases the significance of the effect. Due to the scale of works at the Liffey crossing, there is an increased likelihood of accidental or unintentional incursion of construction personnel or machinery into areas of woodland to be retained. Therefore, in the absence of mitigation, biodiversity loss, fragmentation and alteration is predicted to result in a **significant, long-term, and partially irreversible adverse effect at the county geographic scale** on riparian woodland. Measures, as set out in **Section 9.5.3 of the Environmental Report**, will be required to mitigate this effect.

The impacts of the splitting of this ecological corridor on other IEFs are assessed in **Section 1.6.3**.

1.6.2.3 Depositing lowland rivers

The Loughlinstown Stream and drainage ditch along the R405 were classified as drainage ditches (FW4) during field surveys, as they were often dry, highly modified, and shared more characteristics with FW4 than with other habitats. They are not of high ecological value in their own right. However, for the purposes of the impact assessment, they will be considered in the assessment of depositing/lowland rivers (FW2) because of their connectivity to depositing/lowland rivers and other aquatic IEFs.

Biodiversity loss, fragmentation and alteration

No instream works are proposed at the River Liffey crossing. Therefore, the only direct modification of this area of aquatic habitat will be through the shading resulting from the proposed bridge which, due to the small area, is not anticipated to significantly impact the habitat.

The proposed channel modifications are the installation of a culvert at each stream crossing and the realignment of the ditch along the R405. Channel modifications will result in the direct removal of the existing stream/drainage ditch habitats within the footprint of the Proposed Scheme. The proposed channel modifications are:

- Loughlinstown stream – a 35.1 m culvert;
- Unnamed Simmonstown Stud stream – a 37.4 m culvert; and
- R405 drainage ditch – approximately 380 m realigned and a 31.2 m culvert.

The area of the FW2 habitat that will be culverted is a small proportion of the equivalent habitat in the locality, but the fragmentation of the linear habitat caused by culverting increases the significance of the habitat loss. Approximately 380 m of the R405 ditch will be realigned, but this watercourse is of low ecological value. Once realigned, the ditch will be slightly greater in length and, with the proposed landscaping resulting in less shading, will likely be of greater ecological value. Instream works during this construction activity also have the potential to directly degrade the stream habitat in close proximity to the Proposed Scheme through construction personnel, vehicles or plant trampling vegetation or damaging the banks or bed of the stream.

The extent and magnitude of the effect of biodiversity loss, fragmentation and alteration is the length of channels that will be culverted or realigned. The effect of culvert installation is permanent and irreversible, but the effect of the realigned R405 drainage ditch is short-term and reversible. Because of its small magnitude, biodiversity loss, fragmentation and alteration is predicted to result in a **not significant**, partially long-term and partially irreversible adverse effect on depositing/lowland rivers.

Pollution to water, air and/or soil

The Proposed Scheme crosses multiple watercourses: the River Liffey, Loughlinstown Stream (dry during all site visits), an unnamed stream in Simmonstown Stud and a drainage ditch along the R405 which connects to the unnamed stream. All of these channels flow into the Liffey. Construction activities in the vicinity of watercourses can potentially impact the watercourses, primarily through the accidental release of pollutants. The primary pollutants of concern are:

- **Suspended sediment** – Suspended sediment can be generated by a variety of construction activities, including: ground investigations, earthworks, soil stockpiles, culvert installation, pumping water from excavations and vehicle movement. Increased sediment in watercourses impacts the habitat quality as suspended sediment increases turbidity and deposited sediment alters the substrate. Sediment entering watercourses can cause the smothering of plants, macroinvertebrates and salmonid spawning and nursery grounds. Increased deposited sediment in salmonid spawning and nursery grounds can increase egg and fry mortality, reducing recruitment of young fish. Increased suspended sediment

concentrations can impact salmonid physiology, respiration, migration and damage gills. Increased sediment concentrations can impact macroinvertebrate physiology and behaviour, such as respiration and drift responses. Sediment deposition can degrade lamprey spawning grounds, but only very high increases in sediment would adversely impact lamprey nursery grounds, as juveniles utilise silty substrate;

- **Concrete** – Concrete will be used along the length of the proposed road, creating the risk of cement-laden water running off into nearby watercourses. Cement is alkaline and is toxic to fish and aquatic macroinvertebrate. If cement reaches a watercourse, it can result in mortality of fish and macroinvertebrates;
- **Hydrocarbons** – Construction works pose a risk of hydrocarbon spill through improperly stored fuel, refuelling spills and vehicle and plant leaks. These hydrocarbons can then run off into watercourses where they can adversely impact the aquatic fauna community (e.g. reduced macroinvertebrate populations and species richness and typically sub-lethal adverse physiological impacts on fish); and
- **Sewage** – Construction works at the proposed River Liffey crossing are in close proximity to a foul sewer pipe on each bank of the Liffey. This poses a risk of an accidental leak of sewage into the Liffey. A high influx of nitrates and phosphates in a sewage leak can directly cause fish kills and can cause eutrophication, adversely impacting the water quality, aquatic fauna and the aquatic ecosystem as a whole.

No works within the channel of the River Liffey will be required and there will be a distance of at least 5 m from the top of the river bank to the abutment on each side of the river. However, there is significant potential for the release of pollutants during construction works in the vicinity of the Liffey, which will include the construction of a large attenuation basin on each side of the Liffey as well as the bridge construction. Contaminated water also has the potential to infiltrate into the groundwater, particularly during the construction of the abutments, which will likely flow into the Liffey.

Works in the vicinity of the watercourse crossings include the construction of culverts, connectivity ditches, an attenuation basin, attenuations swales and the realignment of the drainage ditch along the R405. All works in the vicinity of a watercourse have the potential to release suspended solids, cement and/or hydrocarbons into the stream. The Loughlinstown Stream crossing and the drainage ditch along the R405 are not of high ecological value in the vicinity of the Proposed Scheme, as they are periodically dry, highly modified, and heavily shaded. However, they provide connectivity to high value aquatic habitats downstream. Therefore, significant direct effects on the channels are not anticipated, but downstream effects caused by the release of pollutants can occur. The unnamed Simmonstown Stud stream is of ecological value, as suitable crayfish habitat, aquatic flora, macroinvertebrates and stickleback fish were present. Potential evidence of otter activity was also identified in the stream. There was no suitable salmonid habitat in this stream and it is considered unlikely that lamprey utilise the stream.

The extent and magnitude of the potential effect of the release of pollutants into depositing/lowland rivers is the area of depositing/lowland rivers downstream of the Proposed Scheme. Such an effect would be reversible and the duration of the effect would be dependent on the severity of the release of pollutants, but would likely be short-term. The timing of the construction works may influence the magnitude (i.e. works during high rainfall events are more likely to result in the release of pollutants in runoff). Because of the nature, scale and location of the Proposed Scheme, there is potential for significant pollution events. Therefore, in the absence of mitigation, pollution to water, air and/or soil is predicted to result in a **significant, short-term, and reversible adverse effect at the national geographic scale** on depositing/lowland rivers. Measures, as set out in **Section 9.5.3 of the Environmental Report**, will be required to mitigate this effect.

1.6.3 Fauna

1.6.3.1 Bats (commuting and foraging)

Biodiversity loss, fragmentation and alteration

Construction of the Proposed Scheme will result in the loss, fragmentation and degradation of habitat currently used by bat populations for foraging and commuting. The River Liffey and its riparian woodland and surrounding habitats is a particularly high quality habitat for bat activity. The agricultural lands also provide suitable habitat for bat activity, as hedgerows and treelines provide corridors for commuting and foraging bats. Approximately 0.9 km of hedgerows and treelines are proposed to be removed. The proposed bridge

will involve removal of riparian woodland. This loss of habitat will also result in the fragmentation of the wider landscape for foraging and commuting bats. The River Liffey and its riparian zone and vegetated field boundaries act as corridors for bats. The Proposed Scheme will intersect these corridors and may act as a barrier to bat activity. However, the proposed landscape plan includes standard trees, native hedgerow and/or woodland mix along most of the length of the Proposed Scheme and areas of native woodland and standard trees in the vicinity of the Liffey.

The extent of the effect of the removal, fragmentation, degradation and alteration of commuting/foraging habitat is the area of the Proposed Scheme. The magnitude of the effect is the reduced foraging success of bats of a range of species. The effect will commence during site clearance and is considered largely medium-term and reversible as the proposed native hedgerows, shrub and woodland mixes and standard trees mature. However, although the proposed landscape plan will reverse the area of habitat lost, the splitting of ecological corridors (i.e. hedgerows, treelines and watercourses) is irreversible. As the effect will largely be reversed in the medium term, biodiversity loss, fragmentation and alteration is predicted to result in a **not significant**, medium-term, and partially irreversible adverse effect on commuting and foraging bats.

Disturbance from noise, vibration, lighting and human presence

Lighting has the potential to indirectly impact on foraging and/or commuting bat species due to the potential increase in the existing light levels during construction within and adjacent to the Proposed Scheme. Most construction activities will be carried out during regular daylight hours, therefore disturbance is not anticipated to significantly impact commuting and foraging bats, which are nocturnal.

The extent of the effect is the illuminated area in the immediate vicinity of the Proposed Scheme. The magnitude of the effect is the displacement of bats of a range of species. The effect is infrequent, as most construction activities will be carried out during regular daylight hours. The effect is short term and reversible upon completion of the construction phase. The timing of the construction works may influence the magnitude (i.e. the greatest potential magnitude is during the summer months of May to September when bat foraging and commuting activity is highest). Because of its infrequent occurrence, disturbance from noise, vibration, lighting and human presence is predicted to result in a **not significant**, short-term, and reversible adverse effect on commuting and foraging bats.

1.6.3.2 Bats (roosting)

Biodiversity loss, fragmentation and alteration

With cognisance of all of the roost assessment surveys carried out, the structures and trees potentially impacted by the Proposed Scheme include one structure (low roost potential) and 58 trees or tree groups (three confirmed roosts and 55 PRF-I) with potential to support roosting bats. Surveys in 2022 confirmed roosts at BT17 (two soprano pipistrelles observed re-entering), BT27 (one common pipistrelle observed emerging) and BT29 (approximately 20 common pipistrelles observed emerging). BT29 will not be directly impacted by the Proposed Scheme. Trees will be felled and structures demolished to accommodate construction of the Proposed Scheme, causing biodiversity loss, fragmentation and alteration for roosting bats.

The extent of the effect is the area of the trees and the structure that are to be removed. The magnitude of the effect is the loss of confirmed roosting features (BT17 and BT 27). The effect will commence during site clearance and will be long-term and reversible. Therefore, in the absence of mitigation, biodiversity loss, fragmentation and alteration is predicted to result in a **significant, long-term, and partially reversible adverse effect at the local (higher) geographic scale** on roosting bats. Measures, as set out in **Section 9.5.3 of the Environmental Report**, will be required to mitigate this effect.

Disturbance from noise, vibration, lighting and human presence

For those trees in the vicinity of the Proposed Scheme that are to be retained (e.g. BT29), any existing roosts have the potential to be disturbed by the noise and vibration of construction activities.

The extent of the effect of construction phase disturbance on roosting bats is the area in the immediate vicinity of the Proposed Scheme. The magnitude of effect is the reduced quality of roosts and the potential displacement of bats from roosts in the immediate vicinity of the Proposed Scheme. The effect is short-term over the 24-month construction phase and reversible. Because of its short-term and reversible nature, disturbance from noise, vibration, lighting and human presence is predicted to result in a **not significant**, short-term, and reversible adverse effect on roosting bats.

1.6.3.3 Otter

Biodiversity loss, fragmentation and alteration – mortality and injury

Construction activities could potentially result in mortality of otters. No holts were identified within the footprint of the Proposed Scheme. Therefore, accidental destruction of a holt is not anticipated. Otters could also be killed or injured by falling into excavations within the Proposed Scheme.

The extent of the effect is the area of the Proposed Scheme in the vicinity of watercourses and the magnitude is the number of otters killed or injured. The potential for this impact will last for the duration of the construction phase and is long-term and irreversible. Given the lack of holts in the area of the Proposed Scheme and the sparsity of evidence of current otter activity, the killing or injuring of otter is considered unlikely. Therefore, the impact of killing or injuring otter is predicted to result in a **not significant** effect on otter.

Biodiversity loss, fragmentation and alteration – habitat fragmentation

There was potential evidence of commuting and foraging otter along the River Liffey and the unnamed Simmonstown Stud stream. Therefore, the construction of the Proposed Scheme will potentially result in habitat loss, fragmentation, degradation and alteration for commuting and foraging otter. Construction at the watercourse crossings will limit and alter the corridor in which otter can commute upstream and downstream, potentially acting as a barrier to movement and fragmenting their habitat. The River Liffey crossing will be set back from the river by at least 5 m and, therefore, this is not anticipated to be a significant barrier to movement. Ledges are incorporated into the design of the culvert at the unnamed Simmonstown Stud stream. Therefore, construction of this culvert will not result in a long-term barrier to movement.

The extent of the effect is the area of the Proposed Scheme in the vicinity of the unnamed Simmonstown Stud stream. The magnitude of the effect is the reduced commuting and foraging habitat for otters. The effect will commence at the beginning of the construction phase and will be short-term and reversible after completion of the construction phase. Because of the short-term and reversible nature of the impact, habitat loss, fragmentation and alteration during the construction phase of the Proposed Scheme is predicted to result in a **not significant**, short-term, and reversible adverse effect on commuting and foraging otter.

Disturbance from noise, vibration, lighting and human presence – commuting and foraging otter

Disturbance from noise, vibration, lighting and human presence associated with construction works could occur, resulting in displacement of commuting and foraging otter. However, otter is generally nocturnal in habit and most construction activities will be carried out during regular daylight hours. Additionally, otters are somewhat tolerant to some human disturbance and otters have a large foraging range, so disturbance from construction activities is not likely to significantly reduce foraging range. Therefore, disturbance is not anticipated to significantly impact commuting and foraging otter.

The extent of the effect is the area of the Proposed Scheme in the vicinity of watercourses. The magnitude of the effect is the reduced foraging range. The effect will commence at the start of the construction phase and will last for the duration of the construction phase. The effect is short-term and reversible. Therefore, disturbance from noise, vibration, lighting and human presence is predicted to result in a **not significant**, short-term, and reversible adverse effect on commuting and foraging otter.

Disturbance from noise, vibration, lighting and human presence – breeding/resting otter

Multiple potential holts were identified within 150 m of the Proposed Scheme. However, these were considered highly unlikely to be currently used by otter. Multiple potential holts identified in 2022 and 2023 were no longer visible in 2024, indicating that they are not currently in use. However, it is recognised that otters are a mobile species and a holt may be occupied by an otter in the future. Construction works within 150 m of a holt can impact the otter, and the effect is of greater significance if the holt is occupied by a breeding female or cubs. Therefore, the construction works have the potential to result in disturbance, leading to displacement from holts.

The extent of the effect is the area within 150 m of the Proposed Scheme in the vicinity of a watercourse. The magnitude is displacement from breeding or resting sites. The effect will be short-term, for the 24-month construction period, and reversible. However, there is potential for a long-term and irreversible effect if a breeding holt is disturbed. Given the lack of active holts within 150 m of the Proposed Scheme and the sparsity of evidence of current otter activity, disturbance of breeding or resting otter is considered unlikely. Therefore, the impact of disturbance of breeding or resting otter is predicted to result in a **not significant** effect on otter.

Pollution to water, air, and/or soil

There was potential evidence of commuting and foraging otter along the River Liffey and the unnamed Simmonstown Stud stream. Therefore, the release of pollutants into watercourses could result in degradation of aquatic habitat which otter utilise.

The extent of the effect is the area of aquatic habitat within the Proposed Scheme and downstream of the Proposed Scheme. The magnitude of the effect is the degraded commuting and foraging habitat for otters. The effect will commence at the beginning of the construction phase and will be short-term and reversible. Because of the potential scale of pollution, in the absence of mitigation, pollution to water, air, and/or soil during the construction phase of the Proposed Scheme may result in a **significant, short-term, and reversible adverse effect at the national geographic scale** on commuting and foraging otter. Measures, as set out in **Section 9.5.3 of the Environmental Report**, will be required to mitigate this effect.

1.6.3.4 Common kingfisher (commuting and foraging)

Biodiversity loss, fragmentation and alteration

Construction at the Liffey crossing will result in direct habitat alteration in the footprint of the proposed works.

The extent of the effect is the area of the proposed works at the river crossing. The magnitude of the effect is the reduced quality of foraging and commuting habitat at the proposed bridge. However, habitat degradation is limited by the lack of proposed instream works and distance from the abutments to the riverbanks. The duration of the effect is long-term, as the bridge will be in place for the duration of the operational phase of the Proposed Scheme. Given the presence of multiple existing downstream bridges within 1 km of the proposed bridge, it is not anticipated that the proposed bridge will contribute to any new significant effect on kingfisher. It is considered that kingfisher are already habituated to the presence of man-made structures at this location and throughout the River Liffey. Because of the small area of degraded habitat at the proposed bridge in comparison to the abundance of alternative habitat along the river, the impact of habitat loss, fragmentation and alteration is predicted to result in a **not significant**, long-term, and irreversible adverse effect on commuting and foraging kingfisher.

While this habitat loss is an insignificant proportion of the suitable kingfisher foraging and commuting habitat in the locality, it encroaches on the corridor in which kingfisher can commute upstream and downstream. This encroachment on the commuting corridor may act cumulatively with construction phase disturbance from noise, vibration, lighting and human presence, causing a barrier effect. The impact of this barrier effect is assessed below.

Disturbance from noise, vibration, lighting and human presence

Disturbance from noise, vibration, lighting and human presence associated with construction works at the Liffey crossing can result in displacement of commuting and foraging kingfisher. This disturbance, in combination with physical habitat alteration, can also cause a barrier effect, hindering the commuting of kingfisher along the Liffey corridor. The barrier effect can significantly increase the impact of disturbance, as kingfisher could potentially be displaced from all habitat on the far side of the Liffey crossing. However, given the current land use surrounding the River Liffey in the environs of Celbridge, kingfisher in the area are considered to already be habituated to anthropogenic noise, vibration, lighting and human presence within the environment. There are also three existing bridges within 1 km downstream of the proposed bridge, with significant vehicle traffic on one bridge.

The extent of the effect is the area in the vicinity of the Liffey crossing. The magnitude of the effect is the reduced foraging range of kingfisher. The effect will commence at the start of the construction phase and is considered short-term and reversible. Because of existing bridges and levels of disturbance in the local area, and the short-term nature of the impacts, disturbance from noise, vibration, lighting and human presence is predicted to result in a **not significant**, short-term, and reversible adverse effect on commuting and foraging kingfisher.

Pollution to water, air, and/or soil

The release of pollutants into watercourses could result in degradation of aquatic habitat in which kingfisher forage, reducing foraging success.

The extent of the effect is the River Liffey in the vicinity and downstream of the Proposed Scheme. The magnitude of the effect is the reduced foraging success of kingfisher. This potential for this impact will commence at the beginning of the construction phase and is short-term and reversible after construction is

complete. Because of its potential extent and magnitude, in the absence of mitigation, pollution to water, air, and/or soil may result in a **significant, short-term, and reversible adverse effect at the county geographic scale** on commuting and foraging kingfisher. Measures, as set out in **Section 9.5.3 of the Environmental Report**, will be required to mitigate this effect.

1.6.3.5 Birds (breeding)

Breeding birds – nesting

Biodiversity loss, fragmentation and alteration – nesting habitat

Construction will result in removal of trees and vegetation with suitability for nesting birds within the area of the Proposed Scheme.

The extent of the effect is the suitable nesting habitat/vegetation (e.g. hedgerows, scrub and trees) proposed to be removed within the Proposed Scheme. The magnitude of the effect is the displacement of breeding birds of a range of species. The effect is considering largely medium-term and reversible after the construction phase as the new landscaping matures, providing new suitable nesting habitat. There is an abundance of equivalent suitable nesting habitat in the locality. Therefore, the impact of nesting habitat loss, fragmentation, and alteration is predicted to result in a **not significant**, medium-term, and reversible adverse effect on breeding birds.

Biodiversity loss, fragmentation and alteration – mortality through the destruction of nests

Vegetation removal during construction may result in mortality of eggs and chicks of the breeding birds onsite via the destruction of nests.

The extent of the effect is the suitable nesting habitat/vegetation (e.g. hedgerows, scrub and trees) proposed to be removed within the Proposed Scheme. The magnitude of the effect is the mortality of the eggs/chicks of breeding birds of a range of species. The effect is long-term and irreversible. The timing of the construction works influences the magnitude (i.e. vegetation removal between 1st March and 31st August, inclusive, are more likely to affect breeding birds). Therefore, in the absence of mitigations, the potential for mortality of chicks/eggs is predicted to result in a **significant, long-term, and irreversible adverse effect at the local (higher) geographic scale** on breeding birds. Measures, as set out in **Section 9.5.3 of the Environmental Report**, will be required to mitigate this effect.

Disturbance from noise, vibration, lighting and human presence – nesting habitat

The construction phase will result in disturbance to breeding birds from noise, vibration, lighting and human presence associated with construction works.

The extent of the effect is the suitable nesting habitat/vegetation (e.g. hedgerows, scrub and trees) in the immediate vicinity of the Proposed Scheme. The magnitude of the effect is the increased mortality rates of the eggs/chicks of breeding birds of a range of species. The effect is short-term and reversible. The timing of the construction works influences the magnitude (i.e. construction works between 1st March and 31st August, inclusive, are more likely to affect breeding birds). Because of its small extent, magnitude, and short-term nature, disturbance at nesting habitats is predicted to result in a **not significant**, short-term, and reversible adverse effect on breeding birds.

Breeding birds – commuting and foraging

Biodiversity loss, fragmentation and alteration – commuting and foraging habitat

Construction will result in removal of habitats with suitability for foraging birds within the area of the Proposed Scheme.

The extent of the effect is the suitable foraging habitat/vegetation proposed to be removed within the Proposed Scheme. The magnitude of the effect is the displacement of foraging birds of a range of species. The effect is largely medium-term and reversible after the construction phase as the new landscaping matures, providing new suitable foraging habitat. There is an abundance of equivalent suitable foraging habitat in the locality. Therefore, commuting and foraging habitat loss, fragmentation and alteration is predicted to result in a **not significant**, medium-term, and reversible adverse effect on breeding birds.

Disturbance from noise, vibration, lighting and human presence – commuting and foraging habitat

The construction phase will result in disturbance to foraging birds from noise, vibration, lighting and human presence associated with construction works.

The extent of the effect is the area within the vicinity of the Proposed Scheme. The magnitude of the effect is the displacement of foraging birds of a range of species. The effect is short-term and reversible after construction works are completed. There is an abundance of equivalent suitable foraging habitat in the locality. Therefore, disturbance at commuting and foraging habitat is predicted to result in a **not significant**, short-term, and reversible adverse effect on breeding birds.

1.6.3.6 White-clawed crayfish

Pollution to water, air and/or soil

As discussed in **Section 1.6.2.3**, the release of pollutants into watercourses can adversely impact aquatic habitats, indirectly impacting white-clawed crayfish. Pollutants can have direct effects on white-clawed crayfish. Cement is alkaline and is toxic to aquatic macroinvertebrates. If cement reaches a watercourse, it can result in mortality of white-clawed crayfish. A high influx of nitrates and phosphates in a sewage leak can cause eutrophication, adversely impacting the water quality, aquatic fauna and the aquatic ecosystem as a whole.

The extent of the effect is the freshwater habitat downstream of the Proposed Scheme. As the release of pollutants can have numerous interacting effects on the aquatic ecosystem, the magnitude of the potential effect of the release of pollutants into watercourses can be described as the severity and extent of white-clawed crayfish habitat degradation. The effect is reversible and the duration is dependent on the severity of the release of pollutants, ranging from short to long-term. Because of the nature, scale and location of the Proposed Scheme, there is potential for significant pollution events. Therefore, in the absence of mitigation, pollution to water, air and/or soil is predicted to result in a **significant, short to long-term, and reversible adverse effect at the county geographic scale** on white-clawed crayfish. Measures, as set out in **Section 9.5.3 of the Environmental Report**, will be required to mitigate this effect.

1.6.3.7 Fish

Pollution to water, air and/or soil

As discussed in **Section 1.6.2.3**, the release of pollutants into watercourses can adversely impact aquatic habitats, indirectly impacting the fish community. Pollutants can also have numerous direct effects on fish. Sediment entering watercourses can cause the smothering of salmonid spawning and nursery grounds. Increased deposited sediment in salmonid spawning and nursery grounds can increase egg and fry mortality, reducing recruitment of young fish. Increased suspended sediment concentrations can impact salmonid physiology and gills, respiration and migration. Sediment deposition can degrade lamprey spawning grounds. Cement is alkaline and toxic to fish. If cement reaches a watercourse, it can result in mortality of fish. Hydrocarbons can cause adverse physiological effects on fish, but these are typically sublethal effects. A high influx of nitrates and phosphates in a sewage leak can directly cause fish kills and can cause eutrophication, adversely impacting the water quality, aquatic fauna and the aquatic ecosystem as a whole.

The extent of the effect of pollution to water, air and/or soil is the freshwater habitat downstream of the Proposed Scheme. As the release of pollutants can have numerous interacting effects on the aquatic ecosystem, the magnitude of the potential effect of the release of pollutants into watercourses is described as the altered population structures of the assemblage of fish species. Such an effect is reversible and the duration is dependent on the severity of the release of pollutants, ranging from short to long-term. Because of the nature, scale and location of the Proposed Scheme, there is potential for significant pollution events. Therefore, in the absence of mitigation, pollution to water, air and/or soil is predicted to result in a **significant, short to long-term, and reversible adverse effect at the national geographic scale** on fish. Measures, as set out in **Section 9.5.3 of the Environmental Report**, will be required to mitigate this effect.

1.7 Operational Phase – Assessment of Impacts

1.7.1 Designated sites for nature conservation

1.7.1.1 Grand Canal pNHA

Biodiversity loss, fragmentation and alteration – otter

Grand Canal pNHA is approximately 680 m from the Proposed Scheme and there is no pathway for direct impacts on *in situ* receptors. However, suitable potential otter habitat may be impacted by the operational phase of the Proposed Scheme. Therefore, there is potential to impact *ex situ* habitat which could be used by otters associated with the Grand Canal pNHA.

Operational phase impacts on otter, not necessarily associated with Grand Canal pNHA, are discussed in **Section 1.7.3.2**. A not significant adverse effect on otter, caused by disturbance, is anticipated during the operational phase. Therefore, a **not significant** adverse effect on otter associated with Grand Canal pNHA is anticipated.

1.7.2 Habitats and flora

1.7.2.1 Depositing lowland rivers

Pollution to water, air and/or soil

Vehicle traffic on roads produce many different pollutants (e.g. sediment, heavy metals, volatile organic compounds, polycyclic aromatic hydrocarbons and nutrients) which can run off into watercourses. The proposed drainage will reduce the quantity of pollutants which settle on the proposed road from entering watercourses. All water draining from the proposed road into a watercourse will first pass through an attenuation basin or attenuation swale, which helps to settle out suspended pollutants, and then through a hydrocarbon interceptor, which helps to separate out hydrocarbons. Drainage will only be directed to bioretention trenches, where the water can infiltrate into the surrounding soil, in areas where groundwater is not vulnerable. With these measures designed into the Proposed Scheme, the quantity of pollutants that may enter aquatic habitats is considered ecologically insignificant.

The extent of the effect is the depositing/lowland river habitat downstream of the Proposed Scheme. The magnitude of the effect is the negligible degradation in depositing/lowland river habitat. The duration of the effect is long-term, for the operational phase of the Proposed Scheme, and reversible. Because of the ecologically insignificant quantities of pollutants that may be released into watercourses, pollution to water, air and/or soil is predicted to result in a **not significant**, long-term, and reversible adverse effect on depositing/lowland river habitat.

1.7.3 Fauna

1.7.3.1 Bats (commuting and foraging)

Disturbance from noise, vibration, lighting and human presence

There will be street lighting along the length of the Proposed Scheme. Traffic on the road will also produce noise and light. This operational light and noise can disturb bats and displace them from foraging and commuting habitat. Traffic noise can have a significant negative effect on bat activity at least 20 m from the noise source (Finch *et al.*, 2020). Light disturbance can also have a significant negative effect on bat activity as high light levels can cause disorientation. Lighting can attract some bat species and deter others (BCT and the Institute of Lighting Professionals (ILP), 2018), altering their fitness. Continuous lighting along the road can create a barrier which some bat species may not easily cross.

The extent of the effect of disturbance on foraging and commuting bats is predicted to be at least 20 m from the proposed road, as traffic noise can affect foraging bats at this distance (Finch *et al.*, 2020). However, light-spill could potentially impact bats' foraging and commuting behaviour at greater distances. However, the design of the Proposed Scheme includes for lighting columns to be at the minimum required height and for lights to be fully cut-off type, which will minimise light spill to the surrounding foraging and commuting habitat. The magnitude of effect is the reduced foraging success of bats. The effect is long-term, for the operational

phase of the Proposed Scheme, and reversible. Due to the measures incorporated in the design of the Proposed Scheme, disturbance from noise, vibration, lighting and human presence is predicted to result in a **not significant**, long-term, and reversible adverse effect on commuting and foraging bats.

1.7.3.2 Otter

Disturbance from noise, vibration, lighting and human presence

During the operational phase of the Proposed Scheme, noise and light generated by traffic and street lighting, as well as human presence, can potentially disturb breeding/resting and commuting/foraging otter. No active holts were identified in the vicinity of the Proposed Scheme, and if any will be established before the construction phase, these will be safely destroyed before construction works commence. Therefore, no significant operational phase effects on holts are anticipated. The area of commuting and foraging habitat that will be subjected to disturbance is very small in comparison to the range of otters.

The extent of the effect is the suitable commuting and foraging habitat in close proximity to the proposed road and the magnitude is the displacement of commuting and foraging otter. The effect is long-term, for the operational phase of the Proposed Scheme, and reversible. Because holts are not likely to be subjected to disturbance and the area of commuting and foraging habitat from which otter may be displaced is relatively small, disturbance from noise, vibration, lighting and human presence is predicted to result in a **not significant**, long-term, and reversible adverse effect on otter.

1.7.3.3 Common kingfisher (commuting and foraging)

Disturbance from noise, vibration, lighting and human presence

Given the existing land use surrounding the River Liffey in the environs of Celbridge, commuting and foraging kingfisher in the area are considered to already be habituated to human presence and anthropogenic noise, vibration and light within the environment.

The extent of the effect of operational phase disturbance from noise, vibration, lighting and human presence is the area in the vicinity of the proposed bridge crossing. The magnitude of the effect is the potential displacement of commuting and foraging kingfisher. The effect will last for the entire operational phase of the Proposed Scheme and is considered long-term and reversible. Due to the local kingfisher population's likely habituation to disturbance and the low magnitude of the effect, disturbance from noise, vibration, lighting and human presence is predicted to result in a **not significant**, long-term, and reversible adverse effect on kingfisher.

1.7.3.4 Birds (breeding)

Breeding birds – nesting

Disturbance from noise, vibration, lighting, and human presence

During the operational phase of the Proposed Scheme, noise and light generated by traffic and street lighting, as well as human presence, can potentially disturb nesting birds. However, this impact will be confined to the immediate vicinity of the proposed road, which will be a small proportion of the potential nesting habitat/vegetation within the locality.

The extent of the effect of operational phase disturbance from noise, vibration, lighting and human presence is the suitable nesting habitat/vegetation in immediate vicinity of the Proposed Scheme. The magnitude of the effect is the displacement of nesting birds. The duration of the effect is long-term, for the operational phase of the Proposed Scheme, and is reversible. Because of the small extent and magnitude of the effect, disturbance of nesting birds is predicted to result in a **not significant**, long-term, and reversible adverse effect on breeding birds.

Breeding birds – commuting and foraging

Disturbance from noise, vibration, lighting, and human presence

During the operational phase of the Proposed Scheme noise and light generated by traffic and street lighting, as well as human presence, can potentially disturb commuting and foraging birds. However, this impact will

be confined to the immediate vicinity of the proposed road, which will be a small proportion of the potential commuting and foraging habitat within the locality.

The extent of the effect of operational phase disturbance from noise, vibration, lighting and human presence is the suitable commuting and foraging habitat in immediate vicinity of the Proposed Scheme. The magnitude of the effect is the displacement of commuting and foraging birds. The duration of the effect is long-term, for the operational phase of the Proposed Scheme, and will be reversible. Because of the small extent and magnitude of the effect, disturbance of commuting and foraging birds is predicted to result in a **not significant**, long-term, and reversible adverse effect on breeding birds.

APPENDIX 9.1J APPLICATION FOR DEROGATION



NPWS

An tSeirbhís Páirceanna
Náisiúnta agus Fiadhúlra
National Parks and Wildlife
Service

Application for Derogation

Under Regulation 54 & 54A of the European Communities (Birds and Natural Habitats) Regulations 2011, as amended

Revision 2.0 – July 2025

- This form can be used by any individual or Company applying for a derogation under Regulation 54 of the European Communities (Birds and Natural Habitats) Regulations 2011 (“the Regulations”) or any individual applying on behalf of the Minister for Housing, Local Government and Heritage under Regulation 54(A) of the Regulations.
- Note this application form is not for Domestic Dwelling Derogations (bats within private homes) which can be found here > ([3D Application Form](#))
- Please ensure that you answer questions fully in order to avoid delays and/or your application being rejected on the basis that it does not contain sufficient information and detail for the application to be considered further.
- Please read and familiarise yourself with the [NPWS Guidance on Applications for Regulation 54 Derogations for Annex IV species: Guidance for Applicants](#)
- Please read and familiarise yourself with the [European Commission's Guidance document on the strict protection of animal species of Community interest under the Habitats Directive](#)
- Please also note that the responses to these questions are supplementary to the documentation required for the NPWS to be in a position to consider your application. A complete application should include both the application form and an associated report. Failure to supply either will result in your application being returned and/or refused.
- In circumstances in which a derogation is given on foot of this application, the Applicant is responsible for ensuring compliance with the conditions of any such derogation, even though they may employ another person to act on their behalf. To carry out any activity without, or not in accordance with, a derogation granted under regulation 54 or 54A of the Regulations constitutes a criminal offence, subject to prosecution.
- If you experience any problems filling in this form, please contact the Wildlife Licensing Unit: reg54derogations@npws.gov.ie
- Please note – applications, associated reports and derogations will be published on the NPWS website and/or the Department’s Open Data website.
- Where any applicant is applying for a derogation to carry out surveys, please ensure to list all qualified ecologists and trainees under their supervision. See section 1(c) of Part A.

Part A: The Applicant - Personal Details

These questions relate to the person responsible for any proposed works and who will be the **Applicant**.
If this application is being submitted on behalf of a third party, please also complete Part B below.

1. (a) Name of Applicant

Title (Mr/Mrs/Miss/Ms/Dr)	Forename(s)	Surname
Mr	Kevin	Kane
(b) Company Name, if applicable	Kildare County Council	
(c) Address Line 1	Roads Transportation & Public Safety Department	
Address Line 2	Aras Chill Dara, Devoy Park	
Town	Naas	
County	Kildare	
Eircode	W91 X77F	
(d) Contact number	045 980 200	
(e) Email address	kkane@kildarecoco.ie	
(f) Address where works are to be carried out if different from (b) above.		
Address Line 1	Simmonstown	
Address Line 2		
Town	Celbridge	
County	Kildare	
Eircode		

Details of Person Submitting Application on Behalf of Applicant/Derogation Holder

Information relating to the person (e.g. ecologist) responsible for submitting the application on behalf of the applicant should be entered below:

1. (b) Name of Person/Ecologist

Title (Mr/Mrs/Miss/Ms/Dr)	Forename(s)	Surname
Dr	Miles	Newman
(b) Company Name	RPS (a Tetra Tech Company)	
Address Line 1	RPS (a Tetra Tech Company)	
Address Line 2	West Pier Business Campus	
Town	Dun Laoghaire	
County	Dublin	
Eircode	A96 N6T7	
(c) Contact number	+353 1 488 2900	
(d) Email address	Miles.newman@rps.tetrattech.com	
(e) Relationship to Applicant	Consultant	

For Survey Derogations Only

**1. (c) Please Indicate the Names to Appear on the Derogation Along with the Position Held
e.g. Supervisor/Trainee**

Forename(s)	Surname	Supervisor or Trainee
Miles	Newman	Supervisor

Part B: Species covered by the Derogation

1. **Species of Animal:** Please indicate which species is/are the subject of the application:

- Bat ☒
- Otter ☐
- Kerry Slug ☐
- Natterjack Toad ☐
- Dolphin ☐
- Whale ☐
- Turtle ☐
- Porpoise ☐

2. Please detail the exact species (scientific name): Soprano pipistrelles (*Pipistrellus pygmaeus*) and common pipistrelle (*Pipistrellus pipistrellus*)

3. Please provide the maximum number of individuals affected* Two soprano pipistrelles and one common pipistrelle

4. Please provide the maximum number of breeding or resting sites affected* 2

5. Please provide the maximum number of eggs to be taken* n/a

6. Please provide the maximum number of eggs to be destroyed* n/a

*If no figures can be provided for the maximum number of individuals, breeding sites, resting places and eggs to be covered by the derogation please provide reasons why.

n/a

7. **Species of Plant:** Please indicate which species is/are the subject of the application:

- Killarney Fern ☐
- Slender Naiad ☐
- Marsh Saxifrage ☐

8. If you previously received a derogation for any species of animal or plant, please state derogation number and confirm that you have made a return to NPWS on the numbers actually affected by that derogation.

Licences held by ecologist include:

Bats

DER-BAT-2025-297 (Survey Derogation); 8/9/2025-31/12/2025

DER/BAT 2023-116 (survey licence) (Amended); 18/01/2024-31/12/2024);

DER/BAT 2023-116 (survey licence);12/10/2023-31/12/2023;

DER-BAT-2020-44 (survey licence); 22/5/2020-22/05/2021

DER/BAT 2019-25 (survey licence); 28/03/2019-28/3/2020

DER/BAT 2017-144 (amended); 27/04/2017-10/11/2018 ats

Other

Licence No. 185/2022 (Section 9 and 23 (6) (B) – Licence to photograph /Film Wild Animals) – Marine Species. Expires 31/12/2022

Licence No. 69/2021 (Section 9 and 23 (6) (B) – Licence to photograph /Film Wild Animals). Expired 31/12/2021

Licence No. 01/2020 (Section 9 and 23 (6) (B) – Licence to photograph /Film Wild Animals). Expired 31/12/2020

Licence 55/2019 (Section 9 and 23 (6) (B) – Licence to photograph /Film Wild Animals. (Badger and Otter). Expired 31st December 2019.

Licence No. 061/2018 Amended 2 – Sections 9 and 22 (6)(c) (expired 31 August 2018).

Permission: 326/2018 Amended 2 – Section 42 (expired 31 August 2018).

'Letter on non-opposition' with regards to Badger Sett exclusion of 6 entrances for consented Data Centre in Clonee, Co. Meath (WLU letter dated 21/08/2018)

'Letter on non-opposition' with regards to Otter holt/Badger Sett exclusion of 4 entrances for consented M7 road scheme (Sallins bypass), Co. Kildare (WLU letter dated 2018)

'Letter on non-opposition' with regards to Otter holt/Badger Sett exclusion of 3 entrances for consented M7 road scheme (Sallins link road), Co. Kildare (WLU letter dated 2018).

- 9. Proposed Dates for Activities:** Please indicate the timeframe that you propose to carry out the activities. Dates set by NPWS may differ from dates proposed here. *A derogation will only be issued with a start and end date within a calendar year.*

Start Date:	01/01/2026
End Date:	31/12/2026

Part C: Nature of the Derogation.

1. Please tick which prohibition(s) the application for a derogation relates to:

Regulation 51	
Deliberately capture or kill any specimen of the relevant species in the wild	☐
Deliberately disturb these species particularly during the period of breeding, rearing, hibernation and migration	☐
Deliberately take or destroy eggs of the relevant species in the wild	☐
Damage or destroy a breeding or resting place of such an animal, or	☒
Keep, transport, sell, exchange, offer for sale or offer for exchange any specimen of the relevant species taken in the wild, other than those taken legally as referred to in Article 12(2) of the Habitats Directive.	☐
Regulation 52	

Deliberately pick, collect, cut, uproot or destroy any specimen of these species in the wild, or	☐
Keep, transport, sell, exchange, offer for sale or offer for exchange any specimen of these species taken in the wild, other than those taken legally as referred to in Article 13(1)(b) of the Habitats Directive.	☐

Further information should be provided in the format set out in Part E: Template for Supporting Information

Part D: Derogation Tests

Note: The following summary information must be provided by the applicant in all cases, and will be used to determine if a derogation can be provided. Further information must be provided in the format set out in Part E: Template for Supporting Information

Test 1: Reason for the Derogation

1. Please tick which reason(s) below explains how this application qualifies under Regulation 54(2)(a-e) or Regulation 54A(2)(a-e) of the European Communities (Birds and Natural Habitats) Regulations: Please provide a summary of how the application meets the 3 conditions required to provide a derogation. Note that in all cases additional information must be provided (see Part E).

a.	In the interests of protecting wild flora and fauna and conserving natural habitats (proceed to 2a)	☐
b.	To prevent serious damage, in particular to crops, livestock, forests, fisheries and water and other types of property (proceed to 2b)	☐
c.	In the interests of public health and public safety, or for other imperative reasons of overriding public interest, including those of a social or economic nature and beneficial consequences of primary importance for the environment (proceed to 2c)	☒
d.	For the purpose of research and education, of re-populating and re-introducing these species and for the breeding operations necessary for these purposes, including artificial propagation of plants (proceed to 2d)	☐
e.	To allow, under strictly supervised conditions, on a selective basis and to a limited extent, the taking or keeping of certain specimens of the species to the extent specified therein, which are referred to in the First Schedule (proceed to 2e)	☐

2a. In the interests of protecting wild flora and fauna and conserving natural habitats:

- i) Please state the wild flora, fauna or habitats that require protection and /or conservation.

n/a	
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- ii) Please summarise how the interests of protection and conservation of the species/habitat concerned justify affecting another species under strict protection.

n/a	
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2b) To prevent serious damage, in particular to crops, livestock, forests, fisheries and water and other types of property:

- i) Please summarise the nature of the potential damage, why it is considered “serious” and how this outweighs the conservation interest of the species under strict protection.

n/a	
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2c) In the interests of public health and public safety, or for other imperative reasons of overriding public interest, including those of a social or economic nature and beneficial consequences of primary importance for the environment:

- i) Where the reason is for public health and public safety, summarise the evidence provided to support this reason (e.g. documentary evidence of the risk from a chartered structural engineer, tree surgeon, Garda Síochána, qualified health professional etc.)

n/a	
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- ii) Where the reason is for “other imperative reasons of overriding public interest, including those of a social or economic nature and beneficial consequences of primary importance for the environment”, summarise the nature of the public interest and how this outweighs the conservation interest of the species under strict protection.

The project addresses the objective of improving the strategic transport network in Celbridge. Provision of a second river crossing will facilitate future reduction in traffic congestion and improve the road safety performance of Celbridge.

The project addresses the objective to improve multi-modal transport integration by reducing car journey times between Celbridge town centre and Hazelhatch Train Station. It encourages a transport modal shift by providing a high-quality pedestrian and cycle link to the train station as well as reduce social exclusion by enhancing accessibility to rail services for non-car-owners. The project improves options for active travel within the study area by improving journey ambience for pedestrian and cycle journeys.

As per Article 16 of the Habitats Directive which is transposed into Irish law by Regulation 54(2) (b) of the EC (Birds and Natural Habitats) Regulations 2011, this derogation licence is being sought "In the interests of public health and public safety," for the following reasons:

- Improving connectivity to Hazelhatch train station
- Improved safety for pedestrians and cyclists
- Reduced traffic congestion in Celbridge town
- Shorter and safer journeys to Hazelhatch train station

Additional information is provided in Section 5.2.1 of the Supporting Information for Derogation Application.

2d) For the purpose of research and education, of re-populating and re-introducing these species and for the breeding operations necessary for these purposes, including artificial propagation of plants:

- i) Please summarise the objective(s) of the proposed activities making reference to those listed above and how the the purpose of such activities overrides the interests of strict protection of the species. ¹

n/a	
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2e) To allow, under strictly supervised conditions, on a selective basis and to a limited extent, the taking or keeping of certain specimens of the species to the extent specified therein, which are referred to in the First Schedule

- i) Please clearly state the objective of the activity and verify that this reason is being chosen as the objective of the activity does not match reasons a-d listed above.

n/a	
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- ii) Please summarise how the activity will result in the taking or keeping of limited numbers of specimens of the species, how it will be applied on a selective basis and to a limited extent, and how it will be done under strictly supervised conditions.

n/a	
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¹ Note that this reason may be appropriate for when research involves surveys that may cause disturbance of species under strict protection. But the sole purpose of the surveys should be for research and education or the other reasons listed above under 1d.

Test 2: Absence of Alternative solutions

2. Please summarise the alternative solutions that have been considered and why these solutions are deemed unsatisfactory. This must include the option of the “do-nothing” alternative and evidence should be objective and robust. Note that in all cases further information must be provided in the format set out in Part E: Template for Supporting Information.

Alternative Solution	Reasons for “Unsatisfactory”
Do-Nothing	The Do-Nothing option represents the retention of the existing road network without improvement. This option comprises the existing road network infrastructure (i.e. existing single carriageways) in the study area and this networks ability to meet future demands for traffic and road safety without any upgrade or junction improvement works, other than routine maintenance. The implementation of a Do-Nothing option does not meet the various national, regional and local policies. Given the overall deficiencies described above, the ‘Do-Nothing’ is not considered a viable alternative in providing a ‘safe’ and ‘efficient’ local road network. Additional information is provided in Section 5.2.1 of the Supporting Information for Derogation Application.
Do-minimum and traffic management alternatives	In the case of the Proposed Scheme, the Do Minimum scenario involves maintaining the existing road network as it currently is. The Do-Minimum alternative is equal to the Do-Nothing alternative. Taking account of the project objectives, particularly those relating to improving road safety conditions and improve multi-modal transport integration between Celbridge Town and Hazelhatch Train Station and facilitate the development of Key Development Areas southeast of the River Liffey, it is clear the Do Minimum scenario does nothing to resolve the problems. It is proposed that this option be discarded from further consideration.
Alternatives considered	At Stage 1, a total of ten do-something route options were considered, along with do-nothing, do-minimum and traffic management alternatives. It was determined that a do-something option was required for the project.

	All options were assessed under the criteria of engineering, economy and environment. Five out of the total of ten route corridor options were shortlisted at Stage 1 Preliminary Option Assessment and were brought forward to Stage 2 assessment. These were Options A, A1, B, C and E. The route corridors were presented to the public during a Non-Statutory Public Consultation period (PC 1) which ran from the 12th of February to 11th March 2021. Subsequent to this, a feasible combination route corridor was identified by combining part of Option C with part of Option E (Now referred as Option C-E). These six options were assessed in Stage 2 under the criteria of Economy, Safety, Environment, Accessibility & Social Inclusion, Integration, and Physical Activity. Following the Appraisal process of all the shortlisted options, an Emerging Preferred Option was identified (Option C). This was presented to the public during the second non-statutory public consultation period which ran from 28th March until 6th May 2022 (PC 2). Taking into consideration the feedback received from the members of the public, the presented Route Corridor Option C was subsequently adjusted on the northern end of the route between the service station and the garden centre adjacent to Celbridge Abbey. The adjustment allowed for a greater separation between the proposed road and the existing residential dwellings of the Abbeyfarm housing estate. Adjusted Option C is the Final Preferred Option and preliminary design has been advanced for this option. The alignment in the application for which planning consent is sought represents this Preferred Option and has been informed by the comprehensive consultation process described above.
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* Please insert additional rows above if needed

Test 3: Impact of a Derogation on Conservation Status

3. Please summarise the possible impacts on the population of the species that is subject to this application, taking into account all the mitigation and/or compensation measures that are to be undertaken. Evidence that such mitigation has been successful elsewhere should be provided where relevant. Mitigation measures being relied upon must ensure that the derogation will not be detrimental to the maintenance of the populations of the species to which the Habitats Directive relates at a favourable conservation status in their natural range. Note that in all cases further information must be provided in the format set out in Part E: Template for Supporting Information.

According to “The Status of EU Protected Habitats and Species in Ireland (NPWS, 2019c) the soprano pipistrelle is estimated to have a favourable reference range of one million individuals. This species is concluded to have a Favourable (FV) status in Range; Population; Habitats for the species; Future prospects; and Overall assessment of conservation Status. The overall trend in conservation Status is stated as improving. The common pipistrelle is estimated to have a favourable reference range of over one million individuals. This species is concluded to have a Favourable (FV) status in Range; Population; Habitats for the species; Future prospects; and Overall assessment of conservation Status. The overall trend in conservation Status is stated as improving (NPWS, 2019c). The effect of the Proposed Scheme is the removal of a roosting feature for two soprano pipistrelles and one common pipistrelle, which represents the loss of roosting sites for $\leq 0.0002\%$ of the estimated favourable reference range of either species. Through assessing the roosting site losses in terms of the favourable conservation status of both species, the Proposed Scheme is not deemed to be detrimental to the maintenance of the populations or to have a significant negative effect on the populations.

Part E: Template for Supporting Information

This application form should provide a summary of the evidence that the applicant has provided. In all cases, it is necessary to provide separate supporting information so that the assessment of the application can be undertaken in a robust and comprehensive manner. Applicants should refer to guidance provided by the NPWS and the European Commission whilst preparing this application form and the supporting information.

It is essential that supporting information is prepared in a consistent manner using the template below so that NPWS officials assessing the application can locate the relevant evidence to determine if the three Tests can be met. Failure to provide sufficient evidence will result in the application being refused.

The structure of the Supporting Information should be as follows:

- 1) Table of Contents
- 2) Introduction
 - a. Objective of the proposed works (for example, as part of construction of a national road, repair of roofing, undertaking surveys etc.)
 - b. Name, qualifications and relevant experience of scientific staff, including trainees, (e.g. ecologist) involved in the preparation of the application and those responsible for carrying out the proposed activity.
 - c. If this application is for the carrying out of surveys that may cause disturbance, qualifications of all involved must be provided and trainees must be clearly identified.
- 3) Background to proposed activity including location, ownership, type of and need for the proposed activity, planning history, policy context, zoning in relevant Development plan (or equivalent), etc.
- 4) Full details of proposed activity to be covered by the derogation (including a site plan). The site may be inspected by an NPWS representative, so the details given should clearly reflect the extent of the project. This information will be used to compare site conditions with the Method Statement.
- 5) Ecological Survey and site assessment (Not required for applications to carry out surveys)
 - a. Pre-existing information on species at location and environs.
 - b. Status of the species in the local/regional area (relevant to the consideration of the impact on the population at the relevant geographic scale (Test 3))
 - c. Objective(s) of survey
 - d. Description of Surveys Area
 - e. Survey methodology (including evidence as to how the methodology represents best practice and is appropriate to the Objective). Methodology should include survey maps, details of timing, climate, equipment used and identify any uncertainties or difficulties encountered.
 - f. Survey results including raw data, any processed or aggregated data, and negative results as appropriate. Photographs and maps must be provided where site-specific features are referred.
 - g. Population size class assessment.
- 6) Evidence to support the Derogation Tests
 - a. Test 1 - Reason for Derogation:
 - i. There should be a clear explanation as to why a specific reason(s) has been selected in the application form.

- ii. Applicants are advised to read the guidance published by the NPWS '[Guidance on Applications for Regulation 54 Derogations for Annex IV species: Guidance for Applicants](#)' with specific reference to Section 3.1.
- b. Test 2 - Absence of Alternative Solutions
 - i. Applicants must list the alternatives to the proposed activity that have been considered, including the do-nothing alternatives in a clear and objective manner. A basic requirement is that these alternatives should be compared in terms of their impact on the species subject to strict protection. It should be clear to NPWS officials as to why the chosen approach has been selected.
 - ii. Applicants are advised to read the guidance published by '[Guidance on Applications for Regulation 54 Derogations for Annex IV species: Guidance for Applicants](#)' with specific reference to Section 3.2.
- c. Test 3 - Impact of a derogation on Conservation Status
 - i. Applicants should include details of the population at the appropriate geographic scale and an evaluation of how the proposed activity will affect the conservation status both before and after mitigation measures have been applied.
 - ii. Full and detailed descriptions of proposed mitigation measures that are relevant to the potential impact on the target species. Evidence that such mitigation has been successful elsewhere should be provided, where available.
 - iii. Applicants are advised to read the guidance published '[Guidance on Applications for Regulation 54 Derogations for Annex IV species: Guidance for Applicants](#)' with specific reference to Section 3.3.

7) Monitoring the impacts of the derogations

- a. Applicants must include details of how they propose to verify whether the derogations have been implemented correctly and whether they achieved their objective, using scientifically based evidence, and, if necessary, how the applicant will take corrective measures where required.
- b. Applicants should provide details of proposed reports to be submitted to the NPWS including the results of monitoring.
- c. Applicants are advised to read the guidance published by the European Commission "[Guidance document on the strict protection of animal species of Community interest under the Habitats Directive](#)" with specific reference to Section 3.4.

Part F. Declaration

I declare that all of the foregoing particulars are, to the best of my knowledge and belief, true and correct. I understand that the deliberate killing, injuring, capturing or disturbing of protected species, or damage or destruction of their breeding sites or resting places or the deliberate taking or destroying of eggs is an offence without a derogation and that it is a legal requirement to comply with the conditions of any derogation I may be granted following this application. I understand that NPWS may visit to check compliance with a derogation.

Please note that under Regulation 5 of the European Communities (Birds and Natural Habitats) Regulations 2011-2021 an authorised officer may enter and inspect any land or premises for the purposes of performing any of their functions under these Regulations or for obtaining any information which they may require for such purposes.

Signature of the Applicant

Kevin Kane

Date

23/10/2025

Name in BLOCK LETTERS

KEVIN KANE

PRIVACY STATEMENT

See Privacy Statement at www.npws.ie/licences

npws.ie

Department of Housing, Local Government and Heritage



An Roinn Tithíochta,
Rialtais Áitiúil agus Oidhreachta
Department of Housing,
Local Government and Heritage

CELBRIDGE HAZELHATCH MOBILITY CORRIDOR

Supporting Information for Derogation Application

MDT0902-RPS-00-XX-RP-Z-
0065
October 2025

DEROGATION LICENCE APPLICATION REPORT

Document status

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Approval for issue

SF

October 2025

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Prepared by:

RPS

Prepared for:

Kildare County Council

DEROGATION LICENCE APPLICATION REPORT

Contents

1	INTRODUCTION	1
1.1	Objective of the proposed works	1
1.2	Name, qualifications and relevant experience of scientific staff	1
2	BACKGROUND TO PROPOSED ACTIVITY	2
2.1	Site Location	2
2.2	Description of Route	2
2.3	Lighting	2
2.4	Site Clearance	3
2.5	Fencing	3
2.6	Landscaping	4
3	FULL DETAILS OF PROPOSED ACTIVITY TO BE COVERED BY THE DEROGATION	5
3.1	Ecological Roles	5
3.2	Pre-construction Surveys	5
3.3	Tree Protection	5
3.4	Bats (roosting)	5
3.5	Felling of Trees with confirmed Bat Roosts	6
3.6	Other Bat Specific Mitigation Measures	6
4	ECOLOGICAL SURVEY AND SITE ASSESSMENT	8
4.1	Methodology	8
4.1.1	Desk Study	8
4.1.2	Field Surveys	8
4.1.3	Limitations	9
4.2	Bat Survey Results	10
5	EVIDENCE TO SUPPORT THE DEROGATION TESTS	21
5.1	Test 1 - Reason for Derogation	21
5.2	Test 2 – Absence of Alternative Solutions	22
5.2.1	Need for the Proposed Scheme	22
5.2.2	Alternatives Considered	22
5.3	Test 3 – Impact of a derogation on Conservation Status	23
6	MONITORING THE IMPACTS OF THE DEROGATIONS	24
7	REFERENCES	25

Tables

Table 4-1: Summary of Bat Field Surveys Completed	9
Table 4-2: Suitability of the Study Area for Bat Species (based on NBDC data)	10
Table 4-3: NBDC Bat Species Results	10
Table 4-4: Dates, timings and weather conditions for Bat Activity Transect Surveys	11
Table 4-5: Bat Activity Transect Results including Incidental Records	11
Table 4-6: Static Detector Deployment 2022 Nights per Month	11
Table 4-7: Bat Activity Static Detector Results 2022	11
Table 4-8: Static Detector Deployment 2025 Nights per Month	12
Table 4-9: Bat Activity Static Detector Results 2025	12

DEROGATION LICENCE APPLICATION REPORT

Table 4-10: Results of the Building Preliminary Roost Assessment	17
Table 4-11: Dates, Timings and Weather Conditions for Building Emergence Surveys.....	18
Table 4-12: Incidental Bat Activity Records from Emergence and re-entry Surveys	19
Table 4-13: Dates, Timings and Weather Conditions for Tree Emergence and re-entry Surveys.....	19
Table 4-14: Results of aerial tree survey	19

Figures

Figure 2-1: Site Location.....	2
Figure 4-1: Bat Static Detector Locations, Potential Tree Roosts and Transect Activity Survey Route	16

Appendices

Appendix A Description of the Proposed Scheme	27
Appendix B Ground Level Tree Assessment	28

DEROGATION LICENCE APPLICATION REPORT

1 INTRODUCTION

This derogation licence is being sought to permit works associated with the proposed Celbridge Hazelhatch Mobility Corridor Scheme. In particular, the removal of two ash trees, coded BT17 and BT27, in which bat roost emergence/re-entry surveys confirmed bat roosts of two soprano pipistrelles and one common pipistrelle, respectively.

The document has been prepared by suitably qualified and experienced RPS ecologists.

The document is structured as follows:

- **Section 2: Background to proposed activity**
- **Section 3: Details of proposed activity to be covered by the derogation**
- **Section 4: Ecological survey and site assessment**
- **Section 5: Evidence to support the derogation tests**
- **Section 6: Monitoring the impacts of the derogations**

1.1 Objective of the proposed works

Kildare County Council have contracted RPS for the design and environmental assessment for the “Celbridge Hazelhatch Mobility Corridor” hereafter referred to as the ‘Proposed Scheme’. The Proposed Scheme includes constructing a new road approximately 2 km long, connecting Clane Road to Loughlinstown Road Roundabout near Hazelhatch Train Station. Key components include a new bridge over the River Liffey, road cross-sections with cycle tracks and footpaths, junction improvements, drainage systems, and landscaping.

1.2 Name, qualifications and relevant experience of scientific staff

Dr Miles Newman (Associate Ecologist)

Dr Miles Newman is an Associate terrestrial ecologist with over 17 years of ecology experience. He is a full member of CIEEM (MCIEEM) and a Chartered Environmentalist (CEnv). Miles currently coordinates and leads the bat survey work carried out by RPS in the Republic of Ireland. He is an experienced bat activity surveyor and bat roost assessor (including ground-based assessment, tree climbing, visual aid emergence, and endoscopy). Dr Newman has held the following derogation licences in relation to bat roost disturbance for assessment:

- DER-BAT-2025-297 (Survey Derogation); 8/9/2025-31/12/2025
- DER/BAT 2023-116 (survey licence) (Amended); 18/01/2024-31/12/2024;
- DER/BAT 2023-116 (survey licence); 12/10/2023-31/12/2023;
- DER-BAT-2020-44 (survey licence); 22/5/2020-22/05/2021
- DER/BAT 2019-25 (survey licence); 28/03/2019-28/3/2020
- DER/BAT 2017-144 (amended); 27/04/2017-10/11/2018

DEROGATION LICENCE APPLICATION REPORT

2 BACKGROUND TO PROPOSED ACTIVITY

2.1 Site Location

The project is situated in the south west of Celbridge, County Kildare. Refer to drawing **MDT0902-RPS-01-XX-DR-Z-IX0001** (Location Plan) and **Figure 2-1** below.

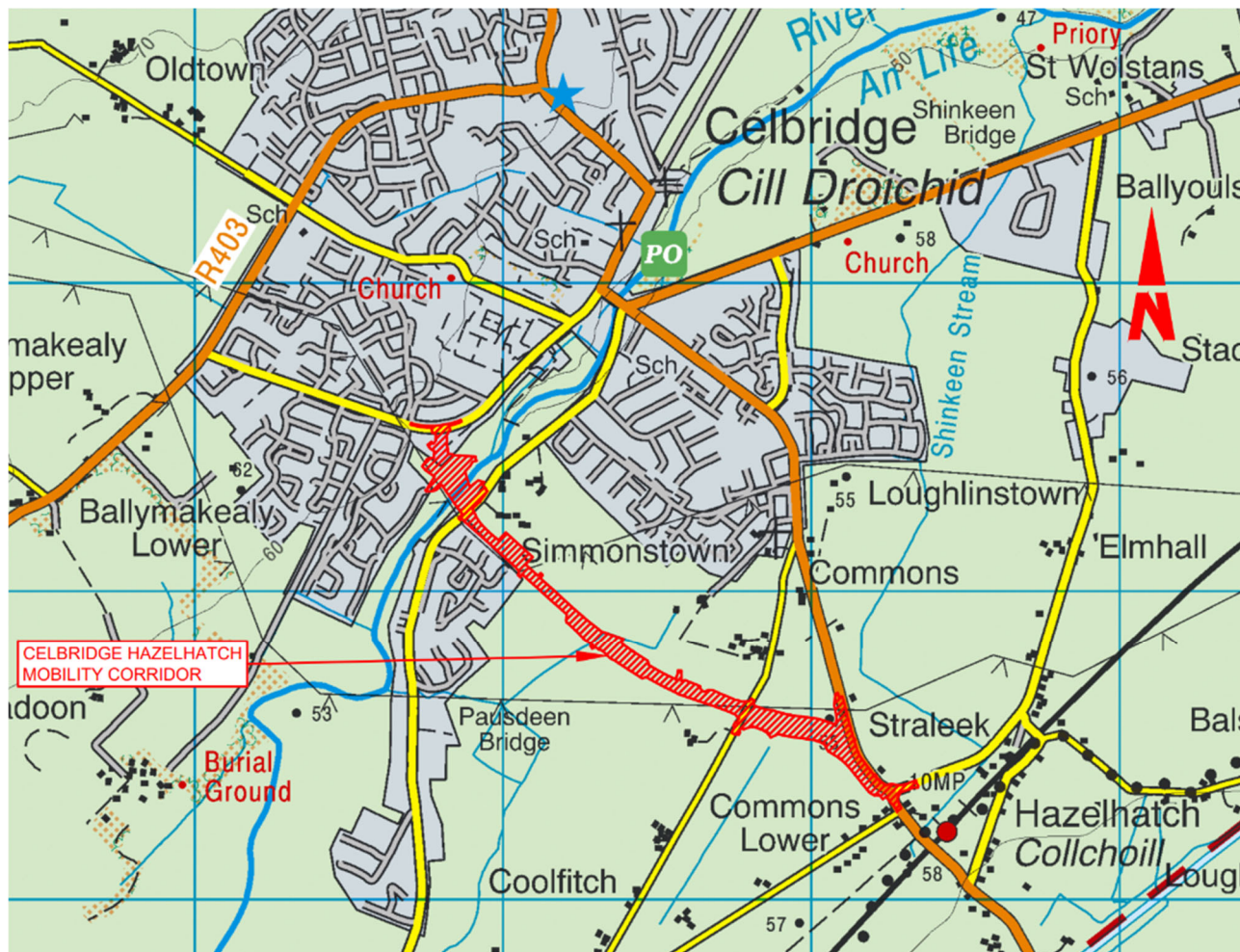


Figure 2-1: Site Location

2.2 Description of Route

The proposed route is approximately 2km long, beginning at a proposed junction with Clane Road and heading in a south easterly direction, predominantly through greenfield lands until it ties into the existing R405 Hazelhatch Road, before terminating at the existing Loughlinstown Road Roundabout near Hazelhatch Train Station. The route also includes proposed junctions with Newtown Road, Simmonstown Manor Road and R405 Hazelhatch Road. A new bridge crossing is required over the River Liffey, located approximately 200m south of the beginning of the route at Clane Road.

2.3 Lighting

New public lighting will be provided for the full extent of the proposed project. The proposed lighting columns are illustrated on drawings **MDT902- RPS-01-XX-DR-Z-GA0001 – GA0015**.

The lighting will be provided by energy efficient light emitting diode (LED) lanterns providing a neutral white output with each mounted on lighting columns that will be designed to the minimum height required. All lanterns will be fully cut-off type to minimise light spill and ensure that light is concentrated on the proposed

DEROGATION LICENCE APPLICATION REPORT

roads, cycleways and footpaths. The lighting will be designed to the appropriate Lighting Class in compliance with BS 5489-1: Code of Practice for the Design of Road Lighting.

All cables for the lighting installation will be ducted underground.

2.4 Site Clearance

The site shall be cleared of any obstructions to the construction of the project.

Existing buildings and polytunnels currently used for horticulture purposes will be demolished between approximately Ch. 0+050 to Ch. 0+150.

The following lengths of existing walls are to be removed:

- Approximately 23m of stone wall to be removed at R403 Clane Road.
- Approximately 92m of stone and blockwork walls to be removed at Newtown Road.

An Arboricultural Survey was carried out in accordance with BS5837:2012 *Trees in Relation to design, demolition and construction* for a study area covering the full extent of the proposed Project. Following completion of the survey, a Tree Constraints Plan and a Tree Schedule were produced identifying the locations of the trees, their assessment category, their crown spreads and their Root Protection Areas (RPAs). A check was carried out to confirm that no trees within the study area were subject to any statutory designations e.g. Tree Protection Orders.

Subsequently an Arboricultural Impact Assessment (AIA) was carried out to evaluate the impact of the proposed project on the trees in the study area and determine required tree removals, required pruning works and recommended measures to mitigate impacts. A Tree Protection and Removal Plan was produced identifying the trees to be removed, trees to be retained and recommended locations of temporary tree protection fencing. A Tree Removal Schedule was also produced listing the trees to be removed.

The AIA has identified the following quantities of trees and hedgerows that require removal:

- Individual Trees: 126 No.
- Groups of Trees: 4,446 m²
- Length of Hedgerow: 445 m
- Scrub: 135 m²

The trees protection and removal plan are illustrated on drawings **MDT0902-RPS-01-XX-DR-Z-LA1000-LA1007**.

No contaminated land was identified during the ground investigation works.

2.5 Fencing

The proposed fencing and environmental barrier design is illustrated on drawings **MDT0902-RPS-01-XX-DR-Z-FE0000-FE0007**.

Mammal-resistant fencing will be required to prevent badgers and otter crossing the new roadway and guide them to the proposed mammal underpasses and mammal ledges in box culverts. The specification for mammal-resistant fencing for badgers and otters is outlined in the NRA “Guidelines for the Treatment of Badgers prior to the construction of National Road Schemes” and “Guidelines for the Treatment of Otters Prior to the Construction of National Road Schemes” respectively.

The mammal resistant fencing will be constructed as per TII standard details [CC-SCD-00319](#) or [CC-SCD-00324](#). At some locations it will be necessary to incorporate mammal-resistant measures into the construction of the proposed noise barriers and security fencing.

Where mammal-resistant measures are not required, boundary fencing for the project will generally be timber post and rails fence as per TII standard details [CC-SCD-00301](#).

Paladin style security fencing is proposed where required to prevent unauthorised access such as around proposed attenuation basins.

DEROGATION LICENCE APPLICATION REPORT

Steel field gates will be provided where required for landowner accesses and maintenance accesses. These gates will be constructed as per TII standard details [CC-SCD-00309](#) (steel single field gate) and [CC-SCD-00310](#) (steel double field gate). Paladin style security gates are proposed where required to prevent unauthorised access. At some locations it will be necessary to incorporate mammal-resistant measures into the construction of the proposed gates.

2.6 Landscaping

A preliminary landscape design has been prepared for the scheme and is illustrated on drawings **MDT0902-RPS-01-XX-DR-Z-LA0000-LA0008**. A detailed Landscape Design Plan will be prepared at the detailed design stage.

The landscape design for the Celbridge to Hazelhatch Mobility Corridor was developed, having regard for the baseline landscape character and to mitigate adverse landscape and visual effects. The scheme features native species woodland and hedgerow planting along with standard trees and was designed to link in with existing retained vegetation. The proposed Scheme as a whole sought to minimise vegetation losses. The landscape scheme details serve to enhance biodiversity and incorporate sustainable drainage features.

Where the drainage bio-retention trenches are proposed, trees will be planted at circa 25m spacing within the grassed verge between the proposed road and cycleways. It is also proposed to provide tree and vegetation planting in other available green spaces, so long as it does not impact on sightlines and safe operation of the scheme, or maintenance requirements.

The proposed planting is as follows:

Standard Trees: 219 No.

Hedge (linear metres): 2,207m

Woodland (square metres): 7,152m²

Woodland (damp conditions, square metres): 4,191m²

Shrub mix near overhead lines (square metres): 1,411m²

DEROGATION LICENCE APPLICATION REPORT

3 FULL DETAILS OF PROPOSED ACTIVITY TO BE COVERED BY THE DEROGATION

The felling of 2no. trees with confirmed bat roosts (BT17 and BT27) is proposed. Mitigation measures have been proposed within Chapter 9 Biodiversity of the Environmental Report submitted as part of the planning consent for the Proposed Scheme.

These mitigation measures are outlined in the following sections.

3.1 Ecological Roles

A Project Ecologist shall be appointed by Kildare County Council before the commencement of works. This suitable qualified and experienced ecologist (hereafter referred to as 'the Project Ecologist') shall be utilised in the implementation of the mitigation measures and survey requirements outlined here.

The ecologist shall be a full member of a relevant institution, such as the Chartered Institute of Ecology and Environmental Management (CIEEM) or similar, have relevant experience in the management of mitigation measures and ecological constraints on construction sites/restoration projects, and hold or have previously held a protected species derogation licence in the Republic of Ireland. It shall be their responsibility to supervise and provide recommendations on the execution of any works which have the potential to give rise to negative or positive effects on biodiversity. The Project Ecologist shall be suitable qualified and experienced and have a minimum of five years' experience completing similar tasks on linear infrastructure projects.

The Contractor shall appoint an Environmental Manager / Clerk of Works (hereafter referred to as the 'ECoW') before the commencement of works. This person shall be responsible for carrying out environmental monitoring of the works and ensuring that the mitigation measures, proposed in this EclA and identified by the Project Ecologist, are adhered to. The ECoW shall be suitable qualified and experienced and have a minimum of five years' experience completing similar tasks on linear infrastructure projects.

3.2 Pre-construction Surveys

At least one month in advance, but no greater than six months in advance, of commencing any enabling or advance works, a pre-construction survey for protected and invasive alien species shall be undertaken (within a suitable season) within the Proposed Scheme area, including areas which could not be accessed during the establishment of the baseline. The surveys shall be undertaken by a suitable qualified and experienced ecologist. The ecologist shall also advise, in writing, on any additional relevant protective measures and/or licensing requirements resulting from the pre-construction survey findings.

3.3 Tree Protection

Prior to construction commencement, Root Protection Areas (RPAs) for retained trees shall be put in place. The purpose of protective barriers is to avoid any harmful construction activity that may damage the retained trees. Tree protection barriers shall be fit for the purposes of excluding construction activities and be durable to withstand an impact. The extent of the RPA shall be an area equivalent to a circle with a radius 12 times the stem diameter (stem diameter measured at 1.5 m above ground level) (NRA, 2006b).

3.4 Bats (roosting)

The following measures are required to lessen or avoid the identified or potential significant effects on roosting bats caused by biodiversity loss, fragmentation and alteration:

- The bat roost potential of any buildings to be demolished and trees to be felled to enable construction will be confirmed through the completion of update surveys by the ECoW (and appropriately qualified personnel, if required). The surveys will be completed with reference to the following guidance (or relevant guidance at time of survey):
 - *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (Collins, 2023)
 - *Bat Mitigation Guidelines for Ireland* (Marnell *et al.*, 2022); and

DEROGATION LICENCE APPLICATION REPORT

- *UK Bat Mitigation Guidelines* (Reason and Wray, 2023).
- The findings of the pre-construction survey will be reviewed with respect to the Proposed Scheme in relation to whether the updated findings trigger a requirement for a species derogation licence from NPWS. Based on the current baseline, derogation licensing is deemed necessary for felling two trees with confirmed roosts (i.e. BT17 and BT27);
- The findings of the pre-construction survey will be reviewed with respect to the Proposed Scheme in relation to whether precautions (e.g. section-felling) are required for trees that have low roost potential, but the absence of bats cannot be confirmed;
- No demolition of buildings or the removal of any trees with bat roost potential (potential to be determined by the ECoW based on findings of pre-construction surveys) will be undertaken unless the ECoW has confirmed that the buildings or trees do not support roosting bats (confirmed via survey) or unless the demolition/removal is completed under the provisions of a derogation licence;
- Following the pre-construction survey, bat roosts located within the CPO boundary will be clearly identified to all personnel working in the vicinity of the roost. Temporary boundary tape fencing (or similar) will be used at the discretion of the ECoW to identify such roosts, subject to such measures themselves not impacting on the use of the roost;
- In the event that roosts are removed or significantly disturbed (wholly or partially), this will be completed in accordance with the necessary derogation licence to be obtained from NPWS and with reference to the *Best Practice Guidelines for the Conservation of Bats in the Planning of National Road Schemes* (NRA, 2006a), *Guidelines for the Treatment of Bats during the Construction of National Road Schemes* (NRA, 2005a) and *Bat Mitigation Guidelines for Ireland* (Marnell *et al.*, 2022). The need for licencing will be determined by the ECoW. The need for additional mitigation for derogation licensing purposes shall be reviewed and determined by the ECoW. Currently, three confirmed roosts are located within the CPO boundary. One of these roosts is not proposed to be disturbed, while the other two will require closure in accordance with a derogation licence;
- In the unlikely event that unknown roosting or stranded bats are encountered on the Proposed Scheme, works shall immediately cease in that area and the local NPWS Conservation Ranger shall be contacted. If present, bats shall only be removed under licence from the NPWS;
- To mitigate to loss of roost features, 4 no. bat boxes will be erected in the vicinity of the identified roosts at suitable locations within the CPO boundary. Suitable locations will be determined by the ECoW based on proximity to artificial lighting and connectivity to foraging and commuting habitats. In the absence of suitable structures to erect the boxes (e.g. retained trees or bridge structures), they will be pole-mounted in suitable locations. The bat boxes will be Schwegler-type (woodcrete) type boxes (or similar) and a range of different type boxes (e.g. 2FN, 3FN, 1FD, 1FF, 3FF, 1FW, 1FE and 1FTH) will be used. These will be provided in addition to any mitigation required with respect to any derogation requirements which may be identified as a result of pre-commencement surveys.

3.5 Felling of Trees with confirmed Bat Roosts

The felling of 2no. trees with confirmed bat roosts (BT17 and BT27) will be completed with reference to the *Best Practice Guidelines for the Conservation of Bats in the Planning of National Road Schemes* (NRA, 2006a), *Guidelines for the Treatment of Bats during the Construction of National Road Schemes* (NRA, 2005a) and *Bat Mitigation Guidelines for Ireland* (Marnell *et al.*, 2022).

Prior to felling, the roost features will be assessed using endoscope to determine the presence of bat with the roost features. Where bats are present prior to felling, bats will either be:

- Removed by hand (by a suitably licenced and experienced bat ecologist) and placed in a suitable vegetation location >1.5m above ground level in the surrounding hedgerows (e.g. on the stable trunk branches of a mature tree), or
- The roost feature will be removed by section from the tree and place in a suitable location, as above.

3.6 Other Bat Specific Mitigation Measures

During the Construction Phase the ECoW will be responsible for ensuring the mitigations prescribed in this document are adhered to. The Contractor's ECoW will liaise directly with the Project Ecologist appointed by

DEROGATION LICENCE APPLICATION REPORT

Kildare County Council to oversee the ecological aspects of the work. A checklist will be filled in on a weekly basis to show how the measures above have been complied with. Any environmental incidents or non-compliance issues will immediately be reported to the project team.

In the Operational phase, Kildare County Council will be responsible for the commission of a suitably experienced ecologist to monitor the effectiveness of Bat boxes.

4 ECOLOGICAL SURVEY AND SITE ASSESSMENT

4.1 Methodology

4.1.1 Desk Study

Relevant information within the biodiversity study area was collected through a detailed desktop review in July 2024, of existing studies and datasets. Sources of information that were used to inform the desk study assessment included:

- Information on ranges of species populations and habitats in Volume 1, 2 and 3 of NPWS' Status of EU Protected Habitats and Species in Ireland (NPWS, 2019 a, b, c);
- Mapping of designated sites for nature conservation for relevant sites in County Dublin, County Kildare, and beyond, as relevant, available online from the NPWS;
- Distribution records for protected species and habitats (including suitability index for bats) held online by the National Biodiversity Data Centre (NBDC)¹, NPWS², Heritage Council³ and Doogue *et al.* (1998);
- Checklists of protected and threatened species in Ireland (Nelson *et al.*, 2019);
- Red lists for rare and threatened Irish species (Curtis and Gough, 1998; Fitzpatrick *et al.*, 2006; Marnell *et al.*, 2009; Regan *et al.*, 2010; King *et al.*, 2011; Clarke *et al.*, 2016; Wyse Jackson *et al.*, 2016; Marnell *et al.*, 2019; Gilbert *et al.*, 2021);

4.1.2 Field Surveys

To inform the assessment, detailed field surveys were undertaken by qualified professional ecologists between 2020 and 2025, as outlined in **Table 4-1**. Detailed surveys were identified following the completion of preliminary ecological site assessment surveys. All field surveys were undertaken using professional interpretation and application of the guidance, systems, and methods referred to in the text describing each survey. Reference was also made to the NRA's Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Developments (NRA, 2009a) in relation to appropriate survey seasons and methods for relevant protected species.

¹ Assessing records up to 10 years old (from date of search), for an area of 5 km from the proposed Project site. Available online at: <https://maps.biodiversityireland.ie/Map>. Accessed 27 June 2024.

² Available online at: <https://dahg.maps.arcgis.com/apps/webappviewer/index.html?id=71f8df33693f48edbb70369d7fb26b7e>. Accessed 1 July 2024.

³ Available online at: <https://www.heritagemaps.ie/WebApps/HeritageMaps/index.html>. Accessed 1 July 2024.

DEROGATION LICENCE APPLICATION REPORT

Table 4-1: Summary of Bat Field Surveys Completed

Field survey focus	Extent of survey	Overview of survey	Surveyors	Survey date(s)
Bats – suitability for roosting, commuting and foraging habitats	Extent of Proposed Scheme and environs	2022 suitability assessments completed with cognisance of the Bat Surveys for Professional Ecologists: Good Practice Guidelines (3 rd edition) (Collins, 2016). 2024 suitability assessments completed with cognisance of the 4 th edition of these guidelines (Collins, 2023).	RPS Ecology	May 2022, April/May 2024
Bats – aerial inspection survey	Trees assessed as Moderate during ground-level assessment.	Tree climbing was carried out by ecologists with cognisance of the 4 th edition of these guidelines (Collins, 2023)	RPS Ecology	August 2024
Bats – internal building inspection	Structure assessed as having moderate suitability for roosting bats	Internal building inspection was carried out by ecologists with cognisance of the 4 th edition of these guidelines (Collins, 2023)	RPS Ecology	July 2024
Bats – emergence/re-entry surveys	2022: trees identified as having moderate or higher roosting suitability. 2024: a building identified as having roosting suitability.	2022 surveys completed with cognisance of the Bat Surveys for Professional Ecologists: Good Practice Guidelines (3 rd edition) (Collins, 2016). 2024 surveys completed with cognisance of the 4 th edition of these guidelines (Collins, 2023).	RPS Ecology	August 2022, August/September 2024
Bats – activity	Bat activity transects covered the extent of Proposed Scheme and environs. Static bat detector surveys were at a single location on each bank of the Liffey in 2022. Updated static bat detector surveys were carried out in 2025 at a single location on each bank of the Liffey and 2 additional locations were monitored along the Scheme.	Activity assessments completed with cognisance of the Bat Surveys for Professional Ecologists: Good Practice Guidelines (Collins, 2016) and the Bat Mitigation Guidelines for Ireland (Marnell <i>et al.</i> , 2022)	RPS Ecology	May to September 2022 April to August 2025

4.1.3 Limitations

Assessment of trees within privately owned gardens east of the R405 was not possible due to accessibility. To reduce any deficiency in the baseline, assessments were carried out using binoculars from the R405. These trees are not proposed for removal but may be within the zone of influence of the Proposed Scheme. As a result, a precautionary approach has been applied to the impact assessment when considering bats in these trees. This limitation is acknowledged and incorporated into the assessment and is deemed to not affect the certainty or predictability of the assessment.

For the internal building inspection on St. John of Gods land, access to the building was restricted to a one-hour timeframe. As a result, the entirety of the building could not be thoroughly internally surveyed. The most likely potential entrances and roosting features were prioritised in the inspection. Access to the lands surrounding the building in St John of Gods property could not be granted for the August emergence survey,

DEROGATION LICENCE APPLICATION REPORT

so vantage points from the neighbouring service station property were used, providing incomplete coverage of the building. Complete coverage of the building was obtained during the September survey. These limitations are accounted for in the preliminary roost assessment. As a result, a precautionary approach has been applied to the impact assessment when considering bats in this structure.

Two bat detectors were deployed and were rotated on a fortnightly basis across 4 survey locations for the static bat detector survey period in 2025 (April to August 2025). During the survey period, one static bat detector was stolen and resulted in a loss of data. Further monitoring of this location was discontinued due to concerns over the security of the equipment. This data loss limitation is acknowledged and incorporated into the assessment and is deemed to not affect the certainty or predictability of the assessment.

4.2 Bat Survey Results

4.2.1.1 Commuting and Foraging

Habitats in the surrounding area were classified as being of high value to commuting and foraging bats. The NBDC maps landscape suitability for bats based on Lundy *et al.* (2011). The map provides a habitat suitability index which ranges from 0 to 100, with 0 being least favourable and 100 most favourable for bats. **Table 4-2** gives the suitability of the study area for each Irish bat species (based on NBDC). The Proposed Scheme is within two areas of assessment and the overall assessment of habitat suitability at the west end was 33 and at the east was 29.78. The riparian and broadleaf woodland habitat around the River Liffey is a particularly favoured habitat. The NBDC records of bat species within 5 km of the Proposed Scheme are detailed in **Table 4-3**.

Table 4-2: Suitability of the Study Area for Bat Species (based on NBDC data)

Common Name	Scientific Name	Suitability Index	
		West	East
All bats	-	33	29.78
Soprano pipistrelle	<i>Pipistrellus pygmaeus</i>	41	37
Brown long-eared bat	<i>Plecotus auritus</i>	46	44
Common pipistrelle	<i>Pipistrellus pipistrellus</i>	51	47
Lesser-horseshoe bat	<i>Rhinolophus hipposideros</i>	0	0
Leisler's bat	<i>Nyctalus leisleri</i>	47	44
Whiskered bat	<i>Myotis mystacinus</i>	23	23
Daubenton's bat	<i>Myotis daubentonii</i>	33	29
Nathusius' pipistrelle	<i>Pipistrellus nathusii</i>	13	5
Natterer's bat	<i>Myotis nattereri</i>	43	39

Table 4-3: NDBC Bat Species Results

Species name	Record count	Date of last record
Brown Long-eared Bat (<i>Plecotus auritus</i>)	13	26/05/2021
Daubenton's bat (<i>Myotis daubentonii</i>)	355	26/08/2021
Lesser noctule (<i>Nyctalus leisleri</i>)	57	02/06/2020
Natterer's bat (<i>Myotis nattereri</i>)	8	14/09/2018
Pipistrelle (<i>Pipistrellus pipistrellus sensu lato</i>)	10	29/07/2022
Soprano pipistrelle (<i>Pipistrellus pygmaeus</i>)	37	02/06/2020
Whiskered bat (<i>Myotis mystacinus</i>)	1	22/07/2008

4.2.1.1.1 Bat Activity Transect Surveys

Bat activity transects were walked in May 2022, June 2022 and September 2022 (see **Figure 4-1**). The dates, timing, and weather conditions for the three surveys are detailed in **Table 4-4**. Data from the bat activity transects indicate that the site offers a foraging and commuting resource for soprano pipistrelle

DEROGATION LICENCE APPLICATION REPORT

(34.1% of passes), Leisler's bat (31.2% of passes) and common pipistrelles (25.0% of passes), with relatively few records of *Myotis* (three passes) and brown long-eared bat (two passes) (**Table 4-5**).

Table 4-4: Dates, timings and weather conditions for Bat Activity Transect Surveys

Date	Sunset/ Sunrise Time	Start Time of Survey	End Time of Survey	Cloud Cover (100%)	Precipitation	Wind (0-7)	Temperature (°C)
17/05/2022	21:23	21:23	23:23	50	None	1	12
08/06/2022	21:48	21:48	23:48	10	None	2	16
29/09/2022	07:26	05:26	07:26	100	Moderate, consistent	2-4	9-12

Table 4-5: Bat Activity Transect Results including Incidental Records

Species	Number of Passes	% of Passes
Soprano pipistrelle (<i>Pipistrellus pygmaeus</i>)	154	34.1
Leisler's bat (<i>Nyctalus leisleri</i>)	141	31.2
Common pipistrelle (<i>Pipistrellus pipistrellus</i>)	113	25.0
Pipistrelle species (<i>Pipistrellus</i> sp.)	39	8.6
Myotis species (<i>Myotis</i> sp.)	3	0.7
Brown long-eared bat (<i>Plecotus auritus</i>)	2	0.4
Total	452	100

4.2.1.1.2 Bat Activity Static Detector Surveys 2022

The static detector survey nights per month and per location are detailed in **Table 4-6**. A total of four bat species (Leisler's bat, Nathusius' pipistrelle, common pipistrelle and soprano pipistrelle) were identified foraging and/or commuting in the vicinity of the static detector deployment locations. In addition, unidentified *Myotis* species and *Pipistrellus* species were also recorded (**Table 4-7**).

Table 4-6: Static Detector Deployment 2022 Nights per Month

Location (ITM)	May	June	July	August	September	Total
North bank (696691, 732296)	15	25	30	3	8	81
South bank (696792, 732347)	5	23	28	3	11	70

Table 4-7: Bat Activity Static Detector Results 2022

Species	Number of Passes	% of Passes
Soprano pipistrelle (<i>Pipistrellus pygmaeus</i>)	8990	39.1
Leisler's bat (<i>Nyctalus leisleri</i>)	5610	24.4
Common pipistrelle (<i>Pipistrellus pipistrellus</i>)	4387	19.1
Pipistrelle species (<i>Pipistrellus</i> sp.)	3138	13.7
Myotis species (<i>Myotis</i> sp.)	833	3.6
Nathusius' pipistrelle (<i>Pipistrellus nathusii</i>)	26	0.1
Total	22984	100

4.2.1.1.3 Bat Activity Static Detector Surveys 2025

The static detector survey nights per month and per location are detailed in **Table 4-8**. Static detector locations are illustrated in **Figure 4-1**. Two bat detectors were deployed and were rotated on a fortnightly basis across 4 survey locations for the static bat detector survey period in 2025 (April to August 2025). Static bat detector surveys were carried out in 2025 at a single location on each bank of the Liffey as per the 2022 surveys. Two additional locations were also monitored along the Scheme.

DEROGATION LICENCE APPLICATION REPORT

Table 4-8: Static Detector Deployment 2025 Nights per Month

Location (ITM)	April	May	June	July	August	Total
Location 1 North bank (696822, 732430)	2	12	10	15	-	39
Location 2 South bank (696790, 732335)	2	12	Note 1	Note 1	Note 1	14
Location 3 Simmonstown Stud lands (697658, 731688)	15	16	18	-	17	66
Location 4 near Loughlinstown Road Roundabout (698161, 731368)	15	16	-	15	-	46

“ – ” indicates no data collection

Note 1: Static Bat detector was stolen and monitoring of this location was discontinued.

A total of five bat species (Leisler's bat, Nathusius' pipistrelle, common pipistrelle, soprano pipistrelle and Brown long-eared bat) were identified foraging and/or commuting in the vicinity of the static detector deployment locations. In addition, unidentified *Myotis* species and *Pipistrellus* species were also recorded (Table 4-9).

Table 4-9: Bat Activity Static Detector Results 2025

Species	Number of Passes	% of Passes
Soprano pipistrelle (<i>Pipistrellus pygmaeus</i>)	1342	8.5
Leisler's bat (<i>Nyctalus leisleri</i>)	7211	45.5
Common pipistrelle (<i>Pipistrellus pipistrellus</i>)	6897	43.5
Pipistrelle species (<i>Pipistrellus</i> sp.)	184	1.2
<i>Myotis</i> species (<i>Myotis</i> sp.)	185	1.2
Nathusius' pipistrelle (<i>Pipistrellus nathusii</i>)	36	0.2
Total	15855	100



Figure 4-1: Bat activity surveys and PRFs

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Figure 4-1: Bat activity surveys and PRFs

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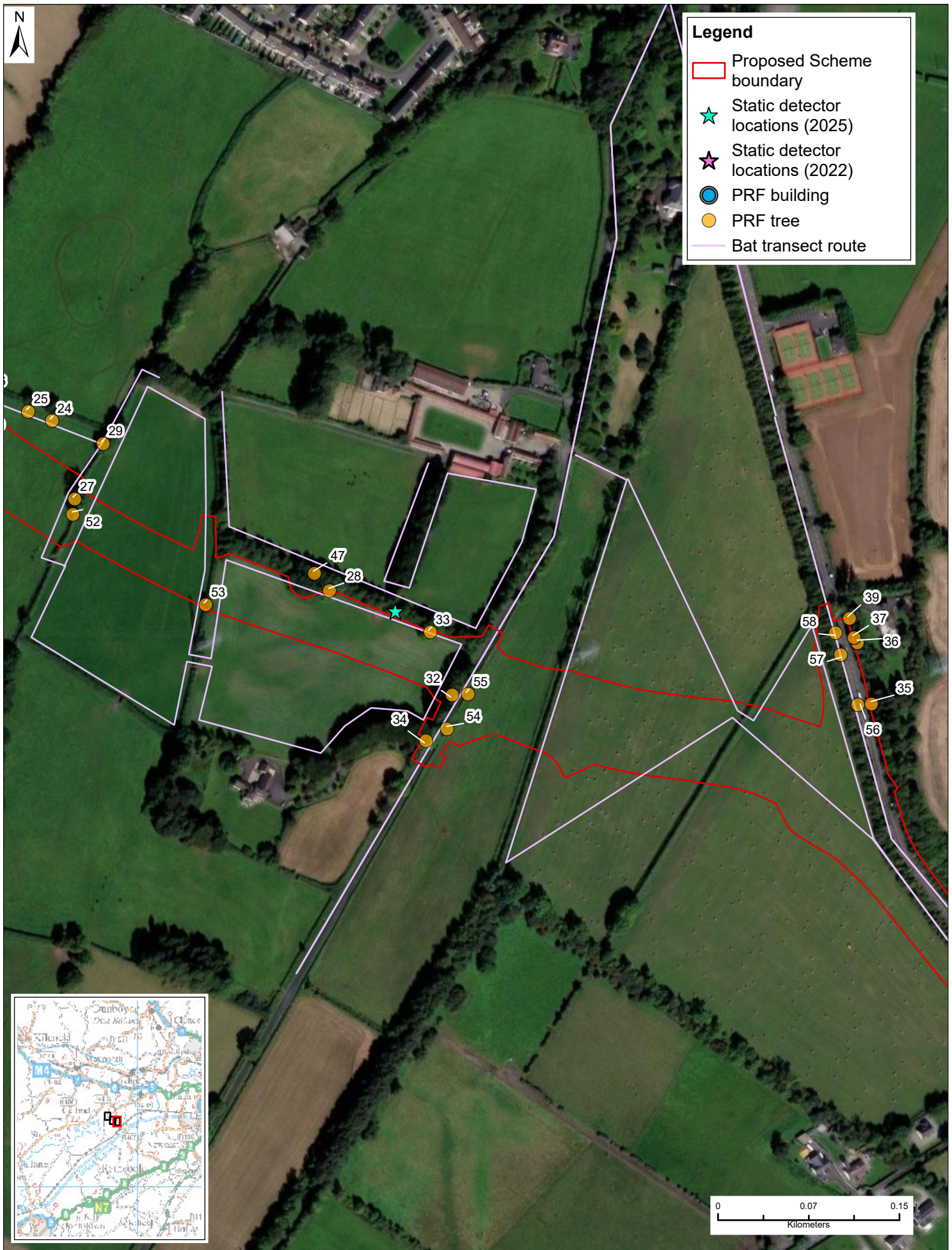


Figure 4-1: Bat activity surveys and PRFs

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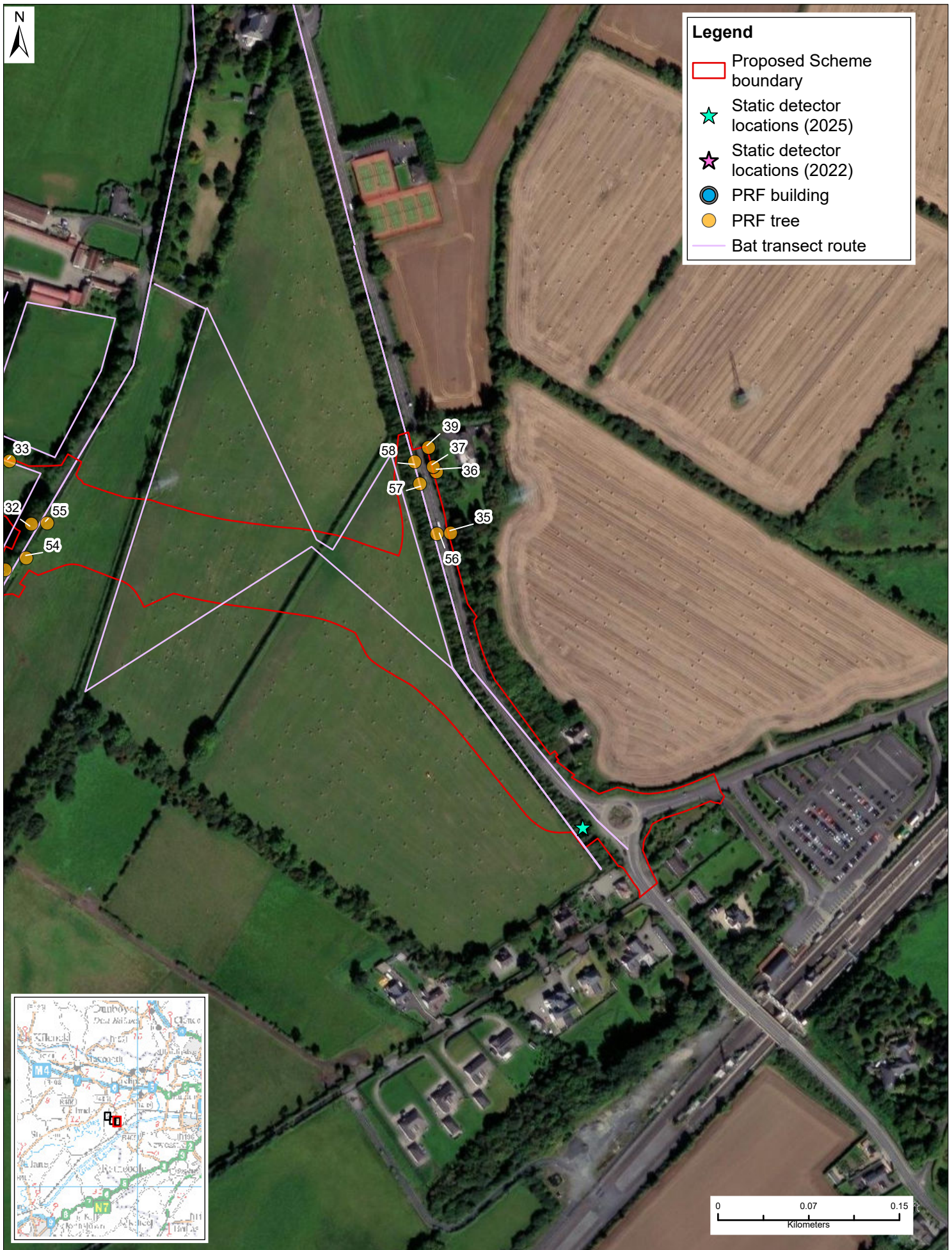


Figure 4-1: Bat activity surveys and PRFs

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4.2.1.2 Roosting

4.2.1.2.1 Structures

4.2.1.2.1.1 Preliminary Roost Assessment

Of the structures proposed for removal, one was determined to have moderate suitability for roosting bats (ITM 696730, 732467). The features observed on this building are detailed in **Table 4-10**. All other structures proposed for removal were determined to have no suitability for roosting bats.

Table 4-10: Results of the Building Preliminary Roost Assessment

Feature	Description	Suitability
Feature 1	Small opening where plaster meets soffit at the north-east corner of the building.	Low
		
Feature 2	Gap between fascia and wall at the north corner of the building.	Low
		
Feature 3	Gap between fascia and roof at the north-east of the building.	Low
Feature 4	Gap between fascia and roof at the south-west end of the building.	Low
		

DEROGATION LICENCE APPLICATION REPORT

4.2.1.2.1.2 Internal Building Inspection

An internal building inspection of the single building which was determined to have roosting potential was carried out on 08 July 2024. Droppings were identified in the attic space of the building, but at least some of these were confirmed to be of mouse origin, so they were likely to all be of mouse origin. Probable rat droppings were also identified.

From within the attic, natural light entered the building through openings at both the northern and southern perimeters. There were cavities between the concrete block end walls and the soffit. The endoscope was used to access these cavities, concentrating on the corners at which potential entrances were identified. The potential entrances were not observed with the endoscope, but time constraints limited the survey effort. No bat evidence was identified in the endoscope footage. Near the centre of the attic space, there was a gap in the lining of the roof that exposed a cavity. The endoscope was used to inspect this, and no bat evidence was identified.

From the outside of the building, the endoscope was used to inspect the northern potential entrances. Due to time restrictions, the potential entrance at the southern section could not be assessed. No evidence of roosting bats was recorded in the features. Feature 1 provided an opening with direct access to the wider attic space. In Features 1 and 3, apparent dead plant material may indicate previous use by nesting birds. The presence of cobwebs at these potential entrance points may also indicate lack of use by roosting bats.

Likely suitable entrances were identified, and the attic space offers suitable areas for roosting bats. It is also likely that suitable roosting features and entrances exist in the areas which could not be surveyed.

There was no definitive evidence observed to indicate use of this building by roosting bats. The likely entrances and roosting areas did not appear to be in use. As a result of the survey, a **moderate** potential roosting suitability was determined due to the low disturbance, suitable access points, and presence of roosting features. In line with guidance and with cognisance of the limitations of this preliminary roost assessment, emergence surveys were recommended.

4.2.1.2.1.3 Emergence Surveys

Emergence surveys of the single building which was determined to have roosting potential were carried out on 28 August and 23 September 2024. As discussed in **Section 4.1.3**, because of access restrictions an incomplete view of the building was achieved during the August survey but a complete view was achieved during the September survey. No emergence was observed during these surveys and an extremely low level of bat activity was observed in the vicinity of the building. The dates, timing, and weather conditions for the emergence surveys are detailed in **Table 4-11**.

Table 4-11: Dates, Timings and Weather Conditions for Building Emergence Surveys

Date	Sunset/ Sunrise Time	Start Time of Survey	End Time of Survey	Cloud Cover (100%)	Precipitation	Wind (0-7)	Temperature (°C)
28/08/2024	20:23	20:08	22:23	10	None	2	16
03/10/2024	18:55	18:40	20:55	65	None	3	-

4.2.1.2.2 Trees

4.2.1.2.2.1 Ground Level Tree Assessment

Of the trees within or immediately adjacent to the Proposed Scheme, six trees were classified as being potential roost features for multiple bats (PRF-M) and 53 trees or tree groups were classified as being potential roost features for individual bats (PRF-I). The results of the ground level tree assessment are detailed in **Appendix B Ground Level Tree Assessment**.

4.2.1.2.2.2 Emergence and re-entry Surveys

Emergence and re-entry surveys were carried out on BT17, BT27 and BT29 in 2022. Two soprano pipistrelles were observed re-entering BT17 on 16 August 2022. One common pipistrelle was observed emerging from BT27 on 18 August 2022. Approximately 20 common pipistrelles were incidentally seen emerging from BT29 during a transect survey on 8 June 2022. These surveys confirmed the presence of

DEROGATION LICENCE APPLICATION REPORT

roosting bats in BT17, BT27 and BT29. During the emergence and re-entry surveys, incidental bat activity was recorded (see **Table 4-12**). The dates, timing, and weather conditions for the emergence and re-entry surveys are detailed in **Table 4-13**.

Table 4-12: Incidental Bat Activity Records from Emergence and re-entry Surveys

Species	Number of Passes	% of Passes
Common pipistrelle (<i>Pipistrellus pipistrellus</i>)	603	45.6
Soprano pipistrelle (<i>Pipistrellus pygmaeus</i>)	397	30.0
Leisler's bat (<i>Nyctalus leisleri</i>)	270	20.4
Pipistrelle species (<i>Pipistrellus</i> sp.)	36	2.7
Myotis species (<i>Myotis</i> sp.)	13	1.0
Brown long-eared bat (<i>Plecotus auritus</i>)	3	0.2
Nathusius' pipistrelle (<i>Pipistrellus nathusii</i>)	1	0.1
Total	452	100

Table 4-13: Dates, Timings and Weather Conditions for Tree Emergence and re-entry Surveys

Date	Tree	Sunset/ Sunrise Time	Start Time of Survey	End Time of Survey	Cloud Cover (100%)	Precipitation	Wind (0-7)	Temperature (°C)
02/08/2022	BT17	21:19	21:04	23:19	40	None	1	22
04/08/2022	BT27, BT29	21:16	21:01	23:16	70	None	3	15
16/08/2022	BT17	06:09	04:09	06:26	90	None	2	15
18/08/2022	BT27, BT29	06:12	04:12	06:27	60	None	5	15

4.2.1.2.2.3 Tree Climbing Assessment

With the updated bat guidance advising aerial checks of all trees classified as PRF-M, six trees were identified to be climbed. Of these trees, one was reassessed as 'NONE', four were reassessed as PRF-I, and one remained PRF-M (**Table 4-14**). However, BT17 and BT27, which were assessed as PRF-I during the aerial survey, were confirmed to have roosting bats in 2022. No evidence of bats was recorded during this survey.

Table 4-14: Results of aerial tree survey

Tree	Description	Suitability
BT11	- Transverse snap PRF is suitable for an individual bat in fair weather (PRF-I). - Dense living ivy lacks suitable cavities/structure to support roosting bats, however it may have potential to conceal cavities on the tree. - Pre-fell inspection recommended.	PRF-I
BT17	- Partially detached ivy is present around most aspects of the tree. There is a small cavity between the tree stem and a single clump of partially detached ivy approximately 2.5 m high on the south-eastern aspect. This cavity travels for approximately 15 cm upwards, however it is partially exposed to wind and water ingress. This feature has potential to support an individual bat or small number of bats during fair weather. - All other areas of ivy which appear to have potential cavities form level are superficial dark shadows and do not provide sufficient cavities for roosting bats.	PRF-I
BT24	- Knothole located at the end of a limb has a small cavity which has roosting suitability for an individual bat in fair weather. - Other knotholes were too small or were superficial. - Pre-fell inspection recommended.	PRF-I

DEROGATION LICENCE APPLICATION REPORT

Tree	Description	Suitability
BT27	- Lower knothole (4 m high) on the end of a limb on the tree's southern aspect has a cavity which is of suitable size and characteristics to support multiple bats (PRF-M). - Transverse snap PRF (4.5 m high) has a small partially exposed cavity which has potential to support individual bats in fair weather (PRF-I). - Rot hole/decay cavity is of suitable size and has characteristics to support multiple bats (PRF-M).	PRF-M
BT29	Dense living ivy may have potential to conceal cavities on the tree.	PRF-I
BT58	All features are superficial and are not suitable to support roosting bats.	NONE

4.2.1.2.3 Combined Assessment

Emergence, re-entry and transect surveys confirmed roosts at BT17, BT27 and BT29. BT29 will be retained, while BT17 and BT27 are proposed for removal as part of the Proposed Scheme. 55 trees or tree groups were assessed as PRF-I in the context of both the ground level and aerial surveys. The building at St. John of Gods was assessed as having moderate roosting suitability in the context of the internal inspection, but in the context of the subsequent emergence surveys, it was not deemed to have roosting bats.

DEROGATION LICENCE APPLICATION REPORT

5 EVIDENCE TO SUPPORT THE DEROGATION TESTS

5.1 Test 1 - Reason for Derogation

As per Article 16 of the Habitats Directive which is transposed into Irish law by Regulation 54(2) (b) of the EC (Birds and Natural Habitats) Regulations 2011, this derogation licence is being sought “*In the interests of public health and public safety,*” for the following reasons:

- Improving connectivity to Hazelhatch train station
- Improved safety for pedestrians and cyclists
- Reduced traffic congestion in Celbridge town
- Shorter and safer journeys to Hazelhatch train station

As part of the design development of the Scheme, a Road Safety Impact Assessment was undertaken. The road safety problems on the existing network identified from the RSA are summarised below:

- **High traffic volumes** – The town centre of Celbridge including Main Street, the River Liffey bridge and the associated junctions to the north and south have limited capacity and experience significant traffic congestion, particularly during peak travel periods. This leads to unreliable journey times, driver frustration and possible erratic or unsafe manoeuvres.
- **Poor pedestrian facilities** - There are limited pedestrian facilities within the study area on English Row (R403), River Liffey bridge, Newtown Road and Hazelhatch Road (R405). The bridge footpath is narrow and of insufficient width to allow two pedestrians to pass or safe access for mobility impaired pedestrians. A pedestrian bridge is located south of the main bridge, but this is not within the desire line of pedestrians traveling from Maynooth Road and Main Street to the south of Celbridge and Hazelhatch train station.
- **Poor cycle facilities** - There are limited cycle facilities within the study area, especially along the south of Maynooth Road, Main Street, River Liffey bridge and the Hazelhatch Road. The absence, narrow or discontinuous nature of cycle facilities may lead to cyclists traveling within the carriageway where they are at an increased risk of being struck by a vehicle.
- **Reduced cross section** – The narrow cross section of the River Liffey bridge, English Row and the south of Maynooth Road presents a road safety challenge where goods vehicles, local traffic, pedestrians and cyclists are concentrated onto narrow sections where numerous private accesses and utility poles are also present.
- **Substandard road alignment** – In a number of locations the road alignment is substandard in terms of junction layout alignment and horizontal and vertical geometry. There are a number of hidden accesses to private dwellings which have obscured visibility to emerging traffic. There is also poor forward visibility on the bridge due to the vertical geometry, especially to the pedestrian crossings at either end of the bridge.

Collision data was obtained from the Road Safety Authority (RSA) database for injury collisions over a 9-year period between 2008 – 2016. The available data was reviewed to gain an understanding of inherent safety issues arising from the layout and alignment of the road network. The nine-year assessment of the Road Safety Authority collision data between 2008 and 2016 revealed there were 87 injury collisions within the study area equating to 9.7 injury collisions per year. Of these, 1 collision was fatal, 8 were serious and 78 were minor injury. Of the 8 serious injury collisions in the study area, 3 of these involved a cyclist.

The principal collision problems identified primarily involved vulnerable road users with 18 collisions involving cyclists, 17 collisions involving pedestrians and 4 collisions involving motorcycles. Collisions involving vulnerable road users accounted for 44.8% of the injury collisions. There were also 15 rear end collisions and 13 single vehicle collisions. Six collision clusters were identified on the River Liffey bridge, Main Street, R403 Clane Road and Maynooth Road. These collision clusters are considered consistent with the lack of vulnerable road user facilities, congestion issues, rural-urban transitions or alignment in these locations.

DEROGATION LICENCE APPLICATION REPORT

Implementation of a second river crossing and link road to Hazelhatch train station will likely reduce the frequency of collisions. The Scheme will also improve multi-modal transport integration by reducing car journey times between Celbridge town centre and Hazelhatch Train Station. It encourages a transport modal shift by providing a high-quality pedestrian and cycle link to the train station as well as reduce social exclusion by enhancing accessibility to rail services for non-car-owners.

5.2 Test 2 – Absence of Alternative Solutions

5.2.1 Need for the Proposed Scheme

The project addresses the objective of improving the strategic transport network in Celbridge. Provision of a second river crossing will facilitate future reduction in traffic congestion and improve the road safety performance of Celbridge. The existing River Liffey Bridge is substandard in terms of cross-sectional width, vertical geometry and junction layout on both the north and south sides. Celbridge's single river crossing point results in a lack of circulation and permeability within the town centre and throughout the general road network in the study area.

The key link roads that lead to and from the existing River Liffey bridge in Celbridge are the R403, R405 and the L1016. These legacy roads are reflecting their origins, era of construction and the staged nature of road improvements over the years. The horizontal geometry is sub-standard at numerous points throughout the existing road network but particularly along R405 Main Street / Maynooth Rd and L1016 Newtown Road. The existing cross sections vary from narrow carriageway lanes bound by kerbed footpaths to wider lanes with hard strips and advisory cycle lanes in places. Pedestrian facilities are also inconsistent in width and finish, often pinch pointed by the historic boundary walls.

The project addresses the objective to improve multi-modal transport integration by reducing car journey times between Celbridge town centre and Hazelhatch Train Station. It encourages a transport modal shift by providing a high-quality pedestrian and cycle link to the train station as well as reduce social exclusion by enhancing accessibility to rail services for non-car-owners. The project improves options for active travel within the study area by improving journey ambience for pedestrian and cycle journeys.

5.2.2 Alternatives Considered

At Stage 1, a total of ten do-something route options were considered, along with do-nothing, do-minimum and traffic management alternatives. It was determined that a do-something option was required for the project. All options were assessed under the criteria of engineering, economy and environment.

Five out of the total of ten route corridor options were shortlisted at Stage 1 Preliminary Option Assessment and were brought forward to Stage 2 assessment. These were Options A, A1, B, C and E. The route corridors were presented to the public during a Non-Statutory Public Consultation period (PC 1) which ran from the 12th of February to 11th March 2021⁴.

Subsequent to this, a feasible combination route corridor was identified by combining part of Option C with part of Option E (Now referred as Option C-E). These six options were assessed in Stage 2 under the criteria of Economy, Safety, Environment, Accessibility & Social Inclusion, Integration, and Physical Activity. Following the Appraisal process of all the shortlisted options, an Emerging Preferred Option was identified (Option C). This was presented to the public during the second non-statutory public consultation period which ran from 28th March until 6th May 2022 (PC 2)⁵.

Taking into consideration the feedback received from the members of the public, the presented Route Corridor Option C was subsequently adjusted on the northern end of the route between the service station and the garden centre adjacent to Celbridge Abbey. The adjustment allowed for a greater separation between the proposed road and the existing residential dwellings of the Abbeyfarm housing estate.

⁴ <https://consult.kildarecoco.ie/en/consultation/celbridge-hazelhatch-link-road-public-consultation-scheme-options>

⁵ <https://consult.kildarecoco.ie/en/consultation/celbridge-hazelhatch-link-road-public-consultation-emerging-preferred-route>

DEROGATION LICENCE APPLICATION REPORT

Adjusted Option C is the Final Preferred Option and preliminary design has been advanced for this option. The alignment in the application for which planning consent is sought represents this Preferred Option and has been informed by the comprehensive consultation process described above.

5.3 Test 3 – Impact of a derogation on Conservation Status

The Proposed Scheme includes constructing a new road approximately 2 km long, connecting Clane Road to Loughlinstown Road Roundabout near Hazelhatch Train Station. The magnitude of the effect is the loss of 1 of two ash trees, coded BT17 and BT27, in which bat roost emergence/re-entry surveys confirmed bat roosts of two soprano pipistrelles and one common pipistrelle, respectively.

According to “The Status of EU Protected Habitats and Species in Ireland (NPWS, 2019c) the soprano pipistrelle is estimated to have a favourable reference range of one million individuals. This species is concluded to have a **Favourable (FV)** status in Range; Population; Habitats for the species; Future prospects; and Overall assessment of conservation Status. The overall trend in conservation Status is stated as **improving**. The common pipistrelle is estimated to have a favourable reference range of over one million individuals. This species is concluded to have a **Favourable (FV)** status in Range; Population; Habitats for the species; Future prospects; and Overall assessment of conservation Status. The overall trend in conservation Status is stated as **improving** (NPWS, 2019c).

The effect of the Proposed Scheme is the removal of a roosting feature for two soprano pipistrelles and one common pipistrelle, which represents the loss of roosting sites for $\leq 0.0002\%$ of the estimated favourable reference range of either species. Through assessing the roosting site losses in terms of the favourable conservation status of both species, the Proposed Scheme is not deemed to be detrimental to the maintenance of the populations or to have a significant negative effect on the populations.

6 MONITORING THE IMPACTS OF THE DEROGATIONS

Monitoring the impact of the derogation will be demonstrated through:

- The implementation of measures detailed in Section 3 of this document;
- Completion of derogation licence return report, as outlined as a condition of the derogation licence; and
- Distribution the results of the monitoring of the effectiveness of bat boxes (Section 3.6) with the wildlife licencing unit.

DEROGATION LICENCE APPLICATION REPORT

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DEROGATION LICENCE APPLICATION REPORT

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Appendix A Description of the Proposed Scheme

2 DESCRIPTION OF THE PROPOSED DEVELOPMENT

2.1 Site Location

The project is situated in the south west of Celbridge, County Kildare. Refer to drawing **MDT0902-RPS-01-XX-DR-Z-IX0001** (Location Plan) and **Figure 2-1** below.

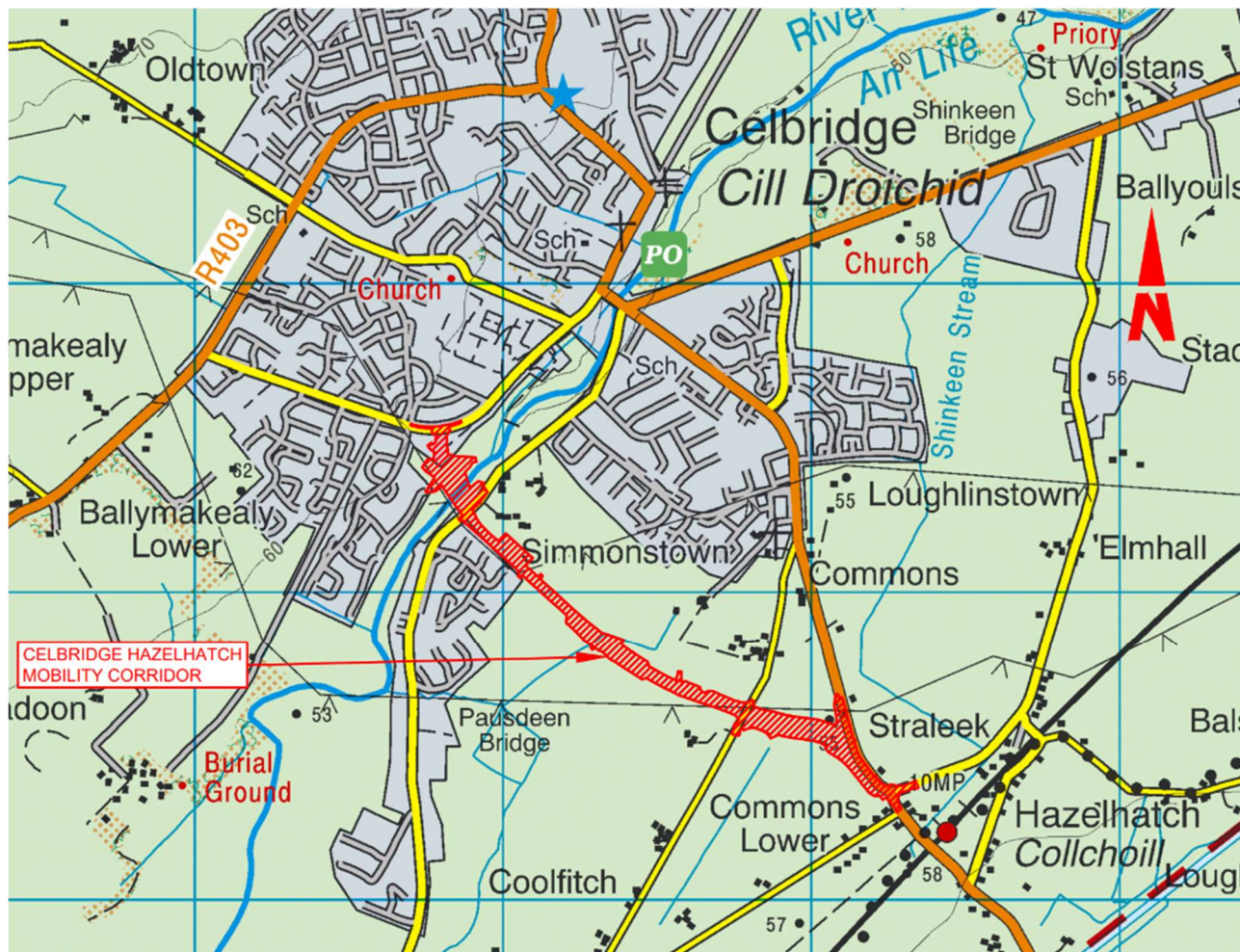


Figure 2-1 Site Location

2.2 Description of Route

The proposed route is approximately 2km long, beginning at a proposed junction with Clane Road and heading in a south easterly direction, predominantly through greenfield lands until it ties into the existing R405 Hazelhatch Road, before terminating at the existing Loughlinstown Road Roundabout near Hazelhatch Train Station. The route also includes proposed junctions with Newtown Road, Simmonstown Manor Road and R405 Hazelhatch Road. A new bridge crossing is required over the River Liffey, located approximately 200m south of the beginning of the route at Clane Road.

2.3 Road Cross-Section

The proposed road cross-section for the project's mainline is a single carriageway with 3.5m wide lanes in each direction for a total pavement width of 7.0m.

The majority of the route includes 2.0m wide one-way cycle tracks and 2.0m wide footpaths on both sides of the road. The portion of the route between Hazelhatch Road Junction and Loughlinstown Road roundabout includes a 2.0m wide footpath and 3.0m wide two-way cycleway on the northbound side of the road only due to space restrictions and desire line requirements.

On both sides of the mainline, it is typically proposed to provide a 2.0m wide grassed verge between the cycle facility and the carriageway, and 1.0m wide grassed verge between the back of the footpath and adjacent earthwork slopes. The exception to this is across the proposed River Liffey Bridge, where no additional verge width is proposed between the cycle tracks and the carriageway or between the footpaths and bridge parapets.

2.4 Design Speed, Speed Limit and Geometry

The design speeds and corresponding posted speed limits proposed for the new road are as follows:

- Ch. 0+000 to Ch. 0+350: 50km/h
- Ch. 0+000 to Ch. 1+1959: 60km/h

The road geometry is designed to the standards contained in the Design Manual for Urban Roads and Streets May 2019.

The proposed geometric design for the new road is illustrated on drawings **MDT0902-RPS-01-XX-DR-Z-GE0000-GE0003**.

2.5 Junctions

Junctions are proposed where the new road interfaces with the following existing roads:

- **Clane Road (R403):** At the start of the route, a 3-arm signalised junction is proposed with the existing regional road.
- **Newtown Road (L1016):** At approximately Ch. 0+285, a 4-arm signalised junction is proposed with the existing local road.
- **Simmonstown Manor Road (L5062):** At approximately Ch. 1+420, a priority junction is proposed with the existing local road on the northbound side of the proposed new road. On the southbound side of the road it is proposed to terminate the existing road with a turning head to be provided at the end of the cul-de-sac.
- **Hazelhatch Road (R405):** At approximately Ch. 1+730, a 3-arm signalised junction is proposed with the existing regional road.
- **Loughlinstown Road (L5061):** At the end of the route, minor improvements are proposed to the existing roundabout junction.

All junctions include facilities for pedestrians and cyclists.

2.6 River Liffey Bridge Crossing

A new bridge crossing over the River Liffey is required between approximately Ch.0+170 to Ch. 0+265.

The location of the proposed bridge is illustrated on drawing **MDT0902-RPS-01-XX-DR-Z-BR0001**. The primary function of the bridge is to carry the Celbridge to Hazelhatch Mobility Corridor over the River Liffey. The design life of the structure shall be 120 years.

The proposed River Liffey Bridge will be an integral Single Span Varying Depth Steel Composite Plate Girder Bridge. Being an integral structure, the superstructure is connected monolithically to the substructure. This design enhances durability and reduces maintenance by eliminating expansion joints and bearings. The substructure consists of cast in-situ reinforced concrete abutments, integral with the steel girders and a bridge deck.

The bridge comprises of a single span arrangement with an overall length of 65.5m. It will span across the CFRAM 0.1% Annual Exceedance Probability (AEP) predicted peak flood level (50.53mOD). The 0.1% AEP flood extents are contained within the river's steep bank slopes in the vicinity of the proposed crossing, and the proposed bridge is designed to span above the top of the riverbanks. Hence the proposed structure will not have any impact on the predicted flooding from the River Liffey.

The superstructure consists of weathering steel plate girders, varying in depth (meaning their height changes across the span of the bridge), that act compositely with an in-situ concrete deck slab. Weathering steel

offers significant advantages in terms of durability and maintenance, as it develops a protective rust layer that prevents further corrosion, reducing the need for repainting and extensive upkeep. Fibre Reinforced Concrete (FRC) permanent formwork will span between the girders to support the deck slab, which will be poured in-situ to form the integral structure. Transverse concrete cantilevers will extend from the deck edges to support the parapet and edge beam.

The clear span between abutments is 63.4m, with an out-to-out width of 16.03m and skew angle of 17.5°. The substructure consists of reinforced concrete abutments on shallow footing foundations, reflecting the underlying geotechnical conditions. The design of the bridge structure includes for sufficient headroom (2.7m) for a future active travel route under the bridge for both pedestrians and cyclists on the northern bank of the river (note – this route is not part of Proposed Scheme).

A 1.4m high bespoke parapet system will be implemented, serving as both a vehicle restraint and pedestrian parapet, with N2 Containment Level and mesh infill. These combined systems will be installed on the precast concrete parapet edge beams at the deck edges.

The River Liffey Bridge has the following cross-sectional dimensions as outlined in **Table 2-1** below.

Table 2-1: Proposed Cross-sectional Dimensions of the River Liffey Bridge Crossing

Location	Width (m)
Parapet Edge beam	0.5
Walkway	2.0
Cycleway	2.0
Carriageway westbound	3.5
Carriageway eastbound	3.5
Cycleway	2.0
Walkway	2.0
Parapet Edge beam	0.5
Total	16.0

As this is a single span structure, no works will be required within the river channel.

The proposed bridge design is illustrated on drawings **MDT0902-RPS-01-XX-DR-Z-BR1010-BR1012**.

2.7 Land Take

The approximate land take required for the scheme is as follows:

- Permanent land take (including roadbed): 12.4ha
- Temporary land take: 0.7ha

Approximately 15 no. landowners are impacted by this land take as illustrated on drawings **MDT0902-RPS-01-XX-DR-Z-LH0001-LH0003**.

2.8 Access Arrangements

Where lands are severed or existing access arrangements are impacted by the project, appropriate measures will be provided to maintain vehicle access. These Include:

- Ch. 0+060: Junction provided on mainline for replacement access to service station.
- Ch. 0+090: Direct access provided to maintain access to foul water pumping station.
- Ch. 0+105: Junction provided on mainline for access to severed commercial lands.

- Ch. 0+550: Field access provided on mainline for access to severed agricultural lands.
- Ch. 0+605: Field access provided on mainline for access to severed agricultural lands.
- Ch. 0+890: Field access provided on maintenance access road for access to severed agricultural lands. The portion of this maintenance access road between the mainline and field access shall be subject to shared use with the landowner and KCC.
- Ch. 1+175: Field access provided on mainline for access to severed agricultural lands.
- Ch. 1+415: Field accesses provided on either side of Simmonstown Manor Road to severed agricultural lands.
- Ch. 1+490: Culvert to be extended and access track provided to maintain access across watercourse.

Where the project interfaces with existing roads, existing accesses will be retained wherever possible. Works will be carried out as necessary to tie in these existing accesses with the new road surface.

Vehicle access for maintenance of drainage attenuation and pollution control facilities are proposed at the following locations:

- Ch. 0+090: Access provided on mainline (shared with foul water pumping station access) for maintenance of Attenuation Basin 1 and associated pollution control facilities.
- Ch. 0+270: Access provided on Newtown Road for maintenance of Attenuation Basin 2 and associated pollution control facilities.
- Ch. 0+890: Access provided on mainline for maintenance of Attenuation Basin 3, Attenuation Swale 4A and associated pollution control facilities.
- Ch. 0+935: Access provided on mainline for maintenance of Attenuation Swale 4B and associated pollution control facilities.
- Ch. 1+415: Access provided at end of Simmonstown Manor Road for maintenance of Attenuation Basin 5 and associated pollution control facilities.
- Ch. 1+425: Access provided at end of Simmonstown Manor Road for maintenance of Attenuation Swale 6A and associated pollution control facilities.
- Ch. 1+835: Access provided on mainline for maintenance of Attenuation Swale 6B and associated pollution control facilities.

2.9 Drainage

The proposed surface water drainage layouts are illustrated on the drawings **MDT0902-RPS-01-XX-DR-C-DR0000 to DR0007**.

2.9.1 Edge Drainage Systems

The proposed road cross section limits the ability to utilise soft SuDS features at the road edge (filter strips, grass channels) as the primary surface water collection method. As the carriageway is kerbed, the surface water will be collected from the carriageway using kerb and gully drainage systems which may include traditional gully systems, or by combined kerb & drainage systems (CKDS). However, once the surface water is collected, various SuDS features (bio-retention trenches, swales, attenuation basins, infiltration trenches) will treat and attenuate the surface water run-off before it discharges to the receiving watercourse at greenfield run-off rates.

On large embankments, once the surface water is collected, it will discharge to a carrier pipe system beneath the verge and/or footpath and cycle track, and continue through the system where it will eventually discharge to attenuation and treatment basins.

In other locations of large embankments where the attenuation feature is a swale at the base of the road earthworks, the kerb and gully drainage system will discharge directly to the swales without connecting to a carrier pipe system first.

In areas of shallow embankment or cut, or areas where the proposed road is at grade, the kerb and gully drainage systems will discharge to a bio-retention trench (BRT) as shown on **MDT0902-RPS-01-XX-DR-C-DR2001**. During average rainfall events, the surface water in the trench will primarily discharge via infiltration as the outlet pipe from the BRT is at a higher level than the trench invert. During intense rainfall events, the water in the trench will fill to the outlet level, and discharge through the pipe ensuring the BRT does not become saturated and/or flooded. The water will also be discharged by evapotranspiration where the surface of the trench is planted with vegetation. The BRT will be located beneath the verge behind the kerb. Any water that does not infiltrate, or that is not absorbed by the vegetation, will discharge to the outlet of the BRT and into the carrier pipe system before discharging to an attenuation feature (basin/swale/infiltration trench). Where a carrier pipe in a large embankment continues to an area where the road is at-grade or in cut, the carrier pipe will discharge to a BRT to allow infiltration and evapotranspiration (subject to minimum separation distances being provided).

In areas where rock is at or near the surface and the minimum separation distances to bedrock or groundwater cannot be achieved, the trench shall be lined with an impermeable liner, meaning evapotranspiration will be the only discharge method for the water before the level reaches the outlet pipe invert. Alternatively in such areas, the BRT may be omitted where the environmental or landscaping risks outweigh the benefits.

Where levels prohibit connections to the mainline drainage the kerb and gully drainage systems will discharge to infiltration trenches.

2.9.2 Attenuation Systems

At the discharge locations it is proposed that, where possible and where required as a condition of the drainage design, attenuation ponds/swales are to be constructed to control the discharge of water to the receiving watercourse. As well as controlling the discharge, these allow sediments to settle from the water prior to the road drainage being discharged to the receiving watercourse. Attenuation ponds/swales have an environmental benefit in that they assist in improving the quality of the water being discharged to the watercourse.

Once the surface water enters the attenuation basin or attenuation swale, it will travel through the system to the outlet where the outfall discharge rate will be limited to the pre-development greenfield runoff rate. The attenuation features are designed to attenuate the runoff during the 100-year rainfall event to the equivalent Q_{bar} greenfield runoff rate.

All attenuation ponds (Ponds 1, 2, 3 & 5) will have a permanent depth of water beneath the outlet invert to aid water treatment prior to discharge. The permanent water depths will be 500mm and an aquatic bench, should be provided just below the permanent water depth to deter unintentional entry.

Subsequently, the attenuated surface water will then pass through a hydrocarbon interceptor prior to discharge to the receiving watercourse. A summary of the outfalls where attenuation systems are required is provided in **Table 2-2** below.

Table 2-2: Proposed Drainage Outfalls

Drainage Network Ref. No	Attenuation System Ref. No	Contributing Catchment Area (ha)	Max Discharge Rate (l/s)	Attenuation System - Volume of Storage (m ³)	Outfall
1	Attenuation Basin 1	0.41	1.10	277.00	River Liffey
2	Attenuation Basin 2	0.66	1.70	455.00	River Liffey
3	Attenuation Basin 3	0.59	1.50	411.00	Loughlinstown Watercourse
4A	Attenuation Swale 4A	0.30	0.80	206.00	Loughlinstown Watercourse
4B	Attenuation Swale 4B	0.30	0.80	203.00	Loughlinstown Watercourse
5	Attenuation Basin 5	0.39	1.00	239.00	Hazelhatch River

Drainage Network Ref. No	Attenuation System Ref. No	Contributing Catchment Area (ha)	Max Discharge Rate (l/s)	Attenuation System - Volume of Storage (m ³)	Outfall
6A	Attenuation Swale 6A	0.34	0.90	245.00	Hazelhatch River
6B	Attenuation Swale 6B	0.35	0.90	252.00	Stream Diversion
7	N/A	N/A	N/A	N/A	3 No. Outfalls to Infiltration Trenches
8	N/A	N/A	N/A	N/A	Stream Diversion
9	N/A	N/A	N/A	N/A	5 No. Outfalls to existing drainage network

The details of the proposed watercourse crossing structures are outlined in **Table 2-3**.

Table 2-3: Proposed Watercourse Crossings

Structure Ref.	Chainage	Location	Watercourse	Type	Span/Length (m)	Size (m)	Embedment (m)
River Liffey Crossing	0+230	Mainline Corridor	River Liffey	Single Span Bridge	65.50	-	-
Cul-01	0+880	Mainline Corridor	Loughlinstown Stream	Pipe	35.11	1.2mØ	0.300
Cul-02	1+490	Mainline Corridor	Hazelhatch River	Box	37.40	4.0m (W) x 2.7m (H)	0.500
Cul-03	1+710	Mainline Corridor	Stream Diversion	Box	31.20	3.5m (W) x 2.6m (H)	0.500

2.10 Project Specific Flood Alleviation Proposals

In accordance with the requirements of “*The Planning System and Flood Risk Management, Guidelines for Planning Authorities*” and associated Technical Appendices (DoEHLG & OPW, 2009), a separate Flood Risk Assessment (FRA) has been carried out.

The Guidelines outline the key principles that should be considered when assessing flood risk to proposed sites. It recommends a staged approach to the assessment of flood risk. The FRA may conclude at any stage if criteria are not met to progress to the next stage. The stages are listed below:

- Stage I Flood Risk Identification – to identify whether there may be any flooding or surface water management issues.
- Stage II Initial Flood Risk Assessment – to confirm sources of flooding that may affect an area or proposed development, to appraise the adequacy of existing information and to scope the extent of the risk of flooding which may involve preparing indicative flood zone maps.
- Stage III Detailed Flood Risk Assessment – to assess flood risk issues in sufficient detail and to provide a quantitative appraisal of potential flood risk to a proposed or existing development or land to be zoned, of its potential impact on flood risk elsewhere and of the effectiveness of any proposed mitigation measures.

The Flooding Risk Assessment is provided under separate cover as part of the planning application and a summary is provided below:

- The desktop study undertaken identified fluvial flooding from the Hazelhatch Rivers as the primary source of flood risk to the proposed CHMC site. Potential fluvial flood risk was also identified for the River Liffey and Loughlinstown River Crossing. Fluvial Flooding caused by insufficient channel and/or hydraulic structures capacity contributing to out-of-bank flooding. Pluvial flooding was identified as a possible risk to the site due to the extent of the hardstanding area proposed for the

development, and also due to GSI Synthetic Aperture Radar (SAR) seasonal flood map showing a low probability of localised pluvial flooding intersecting the proposed CHMC.

- The Stage 2 Initial Flood Risk Assessment concludes the design for the River Liffey and Loughlinstown River Crossings are adequate and does not pose a fluvial flood risk. The proposed CHMC drainage design improves the existing pluvial flood risk and it also caters for the run-off from hardstanding areas and the discharge to receiving watercourses are limited to greenfield runoff rates. The fluvial flood risk from the Hazelhatch Rivers required further assessment and was progressed to Stage 3 Detailed Flood Risk Assessment.
- The Stage 3 Detailed Flood Risk Assessment concluded that mitigation was required to ensure no increase to flood risk adjacent to the Scheme due to flooding from the Hazelhatch Rivers.

The following measures are proposed between Ch. 1+440 to Ch. 1+710, where the proposed road crosses through an area subject to existing flooding, to mitigate potential increases in flood levels upstream of the project:

- Proposed 15 no. 0.9m diameter floodplain culverts (60m length each)
- Proposed 4 no. 1m deep ditches (500m total length)
- The Stage 3 Detailed Flood Risk Assessment concludes that the proposed CHMC with mitigation does not increase flood risk elsewhere. The results of the analysis showed the proposed CHMC provide an improved freeboard for a number of residential dwellings located downstream of the proposed CHMC.

The proposed CHMC is considered an appropriate development of the site in accordance with the requirements of the Justification Test and the Planning Guidelines for Flood Risk Management (DoEHLG & OPW 2009).

2.11 Utilities

Utility providers were contacted and requested to provide all relevant information on any existing utilities located within the study area for the Celbridge to Hazelhatch Mobility Corridor. Responses received indicated that GNI, ESB, Eir, Virgin Media and Uisce Éireann (formerly known as Irish Water) have utilities in the study area. Most of the other utility companies responded confirming that they do not currently own any plant within the study area and have no plans to construct any new plant within the study area in the foreseeable future.

A Utilities Report has been prepared for the scheme (Reference **MDT0902-RPS-00-XX-RP-Z-0032**) which provides a summary of the existing utilities encountered along the scheme and outlines the proposed measures for addressing any conflicts with existing services. A summary of the utility conflicts expected to be encountered and the recommended measures for each conflict are provided in **Table 2-4** below.

The proposed utility works are illustrated on drawings **MDT0902-RPS-01-XX-DR-Z-UT1001-UT1007**.

Table 2-4: Summary of Proposed Measures for Utility Conflicts

Location	Description of Service	Conflict	Proposed Measures
Gas Networks Ireland (GNI)			
Ch. 0	Gas Distribution Pipe	Pipe runs along the R403 Clane Road where the project ties in with the existing road.	Pipeline to be retained and protected in place.
Ch. 50 to Ch. 100	Gas Distribution Pipe	Pipe crosses the proposed road alignment.	Pipeline to be decommissioned.
Ch. 290	Gas Distribution Pipe	Pipe runs along Newtown Road where the project interfaces with the existing road.	Pipeline to be retained and protected in place.
ESB / ESB International (ESBI)			

Location	Description of Service	Conflict	Proposed Measures
Ch. 100	HV 110KV Overhead Line	Overhead powerline crosses over proposed access to severed lands.	Overhead powerline to be retained and protected in place.
Ch. 150	HV 110KV Overhead Line	Overhead powerline crosses over proposed footpath link.	Overhead powerline to be retained and protected in place.
Ch. 290	HV 110KV Overhead Line	Overhead powerline crosses over Newtown Road where the project interfaces with the existing road.	Overhead powerline to be retained and protected in place.
Ch. 540 to Ch. 570	HV 110KV Overhead Line	Overhead powerline crosses over proposed road alignment.	Overhead powerline to be retained and protected in place.
Ch. 1250 to Ch. 1450	HV 220KV Overhead Line	Overhead powerline crosses over proposed road alignment.	Overhead powerline to be retained and protected in place.
Ch. 1700 to Ch. 1750	HV 220KV Overhead Line	Overhead powerline crosses over realignment of R405 Hazelhatch Road.	Overhead powerline to be retained and protected in place.
Ch. 0 to Ch. 75	HV 38KV Underground Cable	Underground power cable crosses the proposed road alignment.	Underground power cable to be retained and protected in place.
Ch 0.	MV/LV Underground Cables	Underground power cables run along the R403 Clane Road where the project ties in with the existing road.	Underground power cables to be retained and protected in place.
Ch. 290	MV/LV Underground Cables	Underground power cables run along Newtown Road where the project interfaces with the existing road.	Underground power cables to be retained and protected in place.
Ch. 360	MV 10KV/20KV Overhead Line	Overhead powerline crosses the proposed road alignment.	Overhead powerline to be retained and protected in place.
Ch. 1960	LV 400V/230V Overhead Line	Overhead powerline located near where the proposed road alignment ties in with the Loughlinstown Road Roundabout at Chainage 1960.	Overhead powerline to be diverted with new overhead line.
Uisce Éireann			
Ch.0	Watermain	Watermain runs along the R403 Clane Road where the project ties in with the existing road.	Watermain to be retained and protected in place.
Ch. 290	Watermain	Watermain runs along Newtown Road where the project interfaces with the existing road.	Watermain to be retained and protected in place.
Ch. 1700 to Ch. 1960	Watermain	Watermain runs along the R405 Hazelhatch Road where the project interfaces with the existing road.	Watermain to be retained and protected in place.

Location	Description of Service	Conflict	Proposed Measures
Ch. 100 to Ch. 150	Foul Sewer	Foul sewer crosses the proposed road alignment between Chainage 100 to 150.	Foul sewer to be retained and protected in place. Manhole covers to be adjusted where required.
Ch. 150 to Ch. 200	Foul Sewer	Foul sewer crosses under the north west side of the proposed River Liffey bridge crossing.	Foul sewer to be retained and protected in place. Manhole covers to be adjusted where required. Additional 300mm diameter pipe to be provided under bridge crossing for potential future use. Manholes to be provided at ends of new pipe to allow future connection.
Ch. 200 to Ch. 250	Foul Sewer	Foul sewer crosses under the south east side of the proposed River Liffey bridge crossing.	Foul sewer to be retained and protected in place. Manhole covers to be adjusted where required. Additional 450mm diameter pipe to be provided under bridge crossing for potential future use. Manholes to be provided at ends of new pipe to allow future connection.
Ch. 0	Eir Underground Cables	Underground cables run along the R403 Clane Road where the project ties in with the existing road.	Underground cables to be retained and protected in place. Chamber covers to be adjusted where required.
Ch. 290	Eir Underground Cable	Underground cable runs along Newtown Road where the project interfaces with the existing road.	Underground cable to be retained and protected in place. Chamber covers to be adjusted where required.
Ch. 1420	Eir Overhead Line and Underground Cable	Overhead line and underground cable run along Simmonstown Manor Road where the project interfaces with the existing road.	Overhead line and underground cable to be diverted underground.
Ch. 1700 to Ch. 1960	Eir Underground Cable	Underground cable runs along the R405 Hazelhatch Road where the project interfaces with the existing road.	Underground cable to be retained and protected in place. Chamber to be relocated so situated in proposed road verge rather than proposed carriageway. Chamber covers to be adjusted where required.
Ch. 1890	Eir Overhead line	Overhead line crosses the proposed road alignment.	Overhead line to be diverted underground.
Ch. 1960	Eir Underground Cable	Underground cable runs along Loughlinstown Road where the project ties in with the existing road.	Underground cable to be retained and protected in place. Chamber covers to be adjusted where required.
Virgin Media			
Ch. 0	Virgin Media Underground Cable	Underground cable runs along the R403 Clane Road where the project ties in with the existing road.	Underground cables to be retained and protected in place. Chamber covers to be adjusted where required.

2.12 Pavement

The following pavement construction is proposed for the new road:

- Surface Course: 40mm SMA 14 surf PMB 65/105-60 DES
- Binder Course: 60mm AC 20 DENSE BIN 40/60 DES
- Base Course: 80mm AC 32 DENSE BASE 40/60 DES
- Subbase: 150mm UGM A

It is generally proposed that 300mm of 6F2 capping is provided beneath the pavement construction.

The pavement design is illustrated on drawings **MDT0902-RPS-01-XX-DR-Z-PV0000-PV0007** and **MDT0902-RPS-01-XX-DR-Z-PV1001**.

2.13 Earthworks

The proposed road is predominantly constructed on embankment. The approximate quantities of earthworks material to be imported are as follows:

- General Fill: 56,000m³
- Capping (Class 6F2): 6,000m³

For road embankment construction in area prone to flooding between Ch. 1+400 to Ch. 1+960, starter layers of Class 6B or Class 6C granular material shall be deposited as the first layers of fill above existing ground level.

Any existing topsoil shall be stripped from ground over the entire footprint of the project. This excavated topsoil shall be appropriately stored for reuse in construction of grassed verges, embankment slopes, and vegetated drainage systems.

Given deep excavations are generally not required for the construction of the road, it is expected that interactions with groundwater bodies shall be minimal for the majority of the works. However, excavations will be required adjacent to the River Liffey for construction of the bridge structure foundations. Groundwater will likely be encountered in these excavations requiring dewatering for construction of the foundations.

The following earthworks quantities have been estimated for the construction of the proposed attenuation basins, attenuation swales, drainage ditches and stream diversions:

- Total Excavation: 10,000m³
- Total Fill: 7,100m³

2.14 Lighting

New public lighting will be provided for the full extent of the proposed project. The proposed lighting columns are illustrated on drawings **MDT902- RPS-01-XX-DR-Z-GA0001 – GA0015**.

The lighting will be provided by energy efficient light emitting diode (LED) lanterns providing a neutral white output with each mounted on lighting columns that will be designed to the minimum height required. All lanterns will be fully cut-off type to minimise light spill and ensure that light is concentrated on the proposed roads, cycleways and footpaths. The lighting will be designed to the appropriate Lighting Class in compliance with BS 5489-1: Code of Practice for the Design of Road Lighting.

All cables for the lighting installation will be ducted underground.

2.15 Site Clearance

The site shall be cleared of any obstructions to the construction of the project.

Existing buildings and polytunnels currently used for horticulture purposes will be demolished between approximately Ch. 0+050 to Ch. 0+150.

The following lengths of existing walls are to be removed:

- Approximately 23m of stone wall to be removed at R403 Clane Road.
- Approximately 92m of stone and blockwork walls to be removed at Newtown Road.

An Arboricultural Survey was carried out in accordance with BS5837:2012 *Trees in Relation to design, demolition and construction* for a study area covering the full extent of the proposed Project. Following completion of the survey, a Tree Constraints Plan and a Tree Schedule were produced identifying the locations of the trees, their assessment category, their crown spreads and their Root Protection Areas (RPAs). A check was carried out to confirm that no trees within the study area were subject to any statutory designations e.g. Tree Protection Orders.

Subsequently an Arboricultural Impact Assessment (AIA) was carried out to evaluate the impact of the proposed project on the trees in the study area and determine required tree removals, required pruning works and recommended measures to mitigate impacts. A Tree Protection and Removal Plan was produced identifying the trees to be removed, trees to be retained and recommended locations of temporary tree protection fencing. A Tree Removal Schedule was also produced listing the trees to be removed.

The AIA has identified the following quantities of trees and hedgerows that require removal:

- Individual Trees: 126 No.
- Groups of Trees: 4,446 m²
- Length of Hedgerow: 445 m
- Scrub: 135 m²

The trees protection and removal plan are illustrated on drawings **MDT0902-RPS-01-XX-DR-Z-LA1000-LA1007**.

No contaminated land was identified during the ground investigation works.

2.16 Fencing

The proposed fencing and environmental barrier design is illustrated on drawings **MDT0902-RPS-01-XX-DR-Z-FE0000-FE0007**.

Mammal-resistant fencing will be required to prevent badgers and otter crossing the new roadway and guide them to the proposed mammal underpasses and mammal ledges in box culverts. The specification for mammal-resistant fencing for badgers and otters is outlined in the NRA “Guidelines for the Treatment of Badgers prior to the construction of National Road Schemes” and “Guidelines for the Treatment of Otters Prior to the Construction of National Road Schemes” respectively.

The mammal resistant fencing will be constructed as per TII standard details [CC-SCD-00319](#) or [CC-SCD-00324](#). At some locations it will be necessary to incorporate mammal-resistant measures into the construction of the proposed noise barriers and security fencing.

Where mammal-resistant measures are not required, boundary fencing for the project will generally be timber post and rails fence as per TII standard details [CC-SCD-00301](#).

Paladin style security fencing is proposed where required to prevent unauthorised access such as around proposed attenuation basins.

Steel field gates will be provided where required for landowner accesses and maintenance accesses. These gates will be constructed as per TII standard details [CC-SCD-00309](#) (steel single field gate) and [CC-SCD-00310](#) (steel double field gate). Paladin style security gates are proposed where required to prevent unauthorised access. At some locations it will be necessary to incorporate mammal-resistant measures into the construction of the proposed gates.

2.17 Landscaping

A preliminary landscape design has been prepared for the scheme and is illustrated on drawings **MDT0902-RPS-01-XX-DR-Z-LA0000-LA0008**. A detailed Landscape Design Plan will be prepared at the detailed design stage.

The landscape design for the Celbridge to Hazelhatch Mobility Corridor was developed, having regard for the baseline landscape character and to mitigate adverse landscape and visual effects. The scheme features native species woodland and hedgerow planting along with standard trees and was designed to link in with existing retained vegetation. The proposed Scheme as a whole sought to minimise vegetation losses. The landscape scheme details serve to enhance biodiversity and incorporate sustainable drainage features.

Where the drainage bio-retention trenches are proposed, trees will be planted at circa 25m spacing within the grassed verge between the proposed road and cycleways. It is also proposed to provide tree and vegetation planting in other available green spaces, so long as it does not impact on sightlines and safe operation of the scheme, or maintenance requirements.

The proposed planting is as follows:

Standard Trees: 219 No.

Hedge (linear metres): 2,207m

Woodland (square metres): 7,152m²

Woodland (damp conditions, square metres): 4,191m²

Shrub mix near overhead lines (square metres): 1,411m²

2.18 Construction of the Proposed Development

2.18.1 Site Access

The site will likely be accessible from each existing road that interfaces with the project.

It is expected that HGV site access, e.g. for import of earthworks material, shall generally be limited to the R403 Clane Road for site access north of the River Liffey, and the R405 Hazelhatch Road for site access south of the river.

2.18.2 Compound

It is proposed that main compound will be located on the south east side of Newtown Road between approximately Ch. 0+425 to Ch. 0+545. This compound will include welfare facilities and vehicle parking for site staff and will allow for the storage of materials. Temporary land take has been included to accommodate this compound and the compound will remain in place for the duration of the works. The compound will have appropriate levels of security. The Contractor will be required to manage parking and deliveries at the compound and other areas in such a manner as to ensure that there is no obstruction to general traffic or sightlines during construction.

It is likely that an additional smaller compound will be required for the site to the north of the River Liffey. Also, localised welfare facilities and vehicle parking for site staff may be provided along the scheme.

Following completion of the proposed scheme, the site compounds will be decommissioned and all materials removed from the site. The temporary land take will be returned back to its original use.

The expected locations of the site compounds are indicated on the drawings **MDT0902-RPS-01-XX-DR-Z-LH0001-LH0003**.

2.18.3 Advance Works

Kildare County Council may decide for some works to be carried out under advance works contracts. These works could include:

- Archaeological test trenching
- Site clearance including demolition of structures and vegetation/ tree removal
- Invasive species management
- Boundary fencing
- Utilities diversions
- Site compound set-up
- Natural catchment drainage including watercourse culverts and flood relief measures
- Landowner access arrangements.

2.18.4 Main Construction

It is expected that the bridge construction will begin early in the programme due to the need for construction space in the area of Attenuation Pond 2. This will include construction of working platforms for operation of cranes. The working platforms will likely be constructed of stone fill and will be located outside the extent of the fluvial flooding from the River Liffey.

The earthworks for the remainder of the project will predominately involve stripping topsoil and subsequent import, laying and compaction of embankment fill. As the earthworks does not include significant cuttings, dewatering of excavations will generally not be required. However, suitable sediment and erosion controls will be implemented for the runoff from the earthworks to ensure that the sediment load in water discharging to the receiving watercourses is kept below permissible levels.

2.18.5 Construction Works in Proximity to River Liffey

Proposed construction works in proximity to the River Liffey include:

- Bridge construction including temporary working platform for crane operation
- Construction of earthworks embankments approaching bridge crossing
- Construction of drainage attenuation basins
- Drainage outfalls construction
- Construction of foul sewer pipes and manholes for potential future use.

The northern bridge abutment has been set back a minimum of 12 metres from the top of northern river bank. The minimum distance between the southern bridge abutment and the top of the southern river bank is approximately 9.5 metres. It is considered that these set back distances are sufficient to allow the bridge foundations and abutments to be constructed without impacting the river banks. There is also sufficient space to construct the proposed foul sewer pipes and manholes without impacting the river banks.

The proposed bridge abutments, bridge foundations, temporary working platform, earthworks embankments, drainage attenuation basins, and foul sewers, are all sited outside the River Liffey's predicted 0.1% AEP flood extents. The drainage outfalls will encroach areas which may be prone to fluvial flooding, however, these works can be timed to take place when the river's water levels are low.

Due to potential ingress of groundwater, excavations for construction of bridge foundations, drainage outfalls, and foul sewers, may require dewatering. The water extracted from the excavations would likely be discharged to the river. Sediment control measures would be implemented to reduce the sediment load in this water prior to discharging to the watercourse. This could include fitting silt bags to outlet pipes. When the water flows through these silt bags, the tightly woven fabric traps sediment particles down to a size of 100 microns (μm). Once the bag is filled with sediment it will be removed and replaced. **Figure 2-2** illustrates an example of a silt bag installed on an outlet pipe.



Figure 2-2 Typical Silt Bag

Sediment control measures will also be implemented to prevent laden surface water runoff from earthworks reaching the river. This could include silt fences which comprise a geotextile filter fabric installed in the path of sheet flow run-off to filter out heavy sediments. Posts support the filter fabric and the fabric itself is buried in the ground to ensure sediment is trapped behind it and doesn't breach the fence. The selection of the type of filter fabric depends on the expected volume of run-off and the characteristics of the sediment. It is sized to retain sediment particles but also have openings large enough to permit water to drain through and avoid clogging. When silt fences are used as sediment control measures, they will be subject to regular rigorous inspections to ensure they remain well constructed and functional. Any silt trapped during rainfall events will be promptly removed and any damage to the fences will be repaired to ensure they continue to function as effective silt barriers. **Figure 2-3** illustrates an example of a silt fence.



Figure 2-3 Typical Silt Fence

2.18.6 Construction Timeline

It is estimated that the overall duration of the construction programme will be approximately 24 months. The exact sequencing of the works will be dictated by the Contractor's methodology and programme.

The sequence of works is expected to be as follows, noting that many of these elements will progress in parallel:

- Establish site compounds
- Site clearance and fencing
- Demolition works
- Bridge Construction
- Drainage culverts construction
- Earthworks
- Drainage and utilities works
- Road pavement construction
- Cycle tracks and footpaths construction
- Landscaping works
- Signage, road markings, lighting and traffic signals works

2.18.7 Hours of Works

Construction activities will be undertaken during daylight hours. It is proposed that the normal permitted working times will be 07.00 to 19.00 hours Monday to Friday and 08.00 to 16.30 hours on Saturdays, with no

working on Sundays and Public Holidays, unless otherwise agreed between the Contractor and the local authority (Kildare County Council).

Works other than the pumping out of excavations, security and emergency works will not be undertaken outside these working hours without the written permission of the local authority. This permission, if granted, can be withdrawn at any time should the working regulations be breached.

There are certain works that may benefit from being undertaken outside of normal working hours e.g. delivery and lifting of bridge beams or any other works that require traffic management on existing roads. The bridge beams will be manufactured off-site but will need to be craned into position. This activity will benefit from being undertaken outside of normal working hours. Temporary lighting will be required for any works outside of daylight hours and details on temporary lighting requirements are provided in **Section 2.18.8** below.

2.18.8 Site Lighting

Site lighting will typically be provided by tower mounted temporary portable construction floodlights. The floodlights will be cowled and angled downwards to minimise light spillage outside of works areas and to surrounding properties. Lighting will be provided with the minimum luminosity sufficient for safety and security purposes and will be shut off at night when not in use or when works cease at the end of the day in order to minimise the effects of light pollution and disturbance to nocturnal species.

2.19 Operational Phase

2.19.1 Maintenance of Bridge Structure

The use of weathering steel for the fabrication of the steel plate girders will ensure that maintenance painting will not be required over the lifetime of the structure. The deck surfacing will need maintenance and replacement after 20 years.

As noted in **Section 2.6**, the integral bridge design does not require expansion joint or bridge bearings, significantly reducing the maintenance requirements for the structure.

2.19.2 Maintenance of Drainage

The vegetated attenuation systems (basins and swales) will need regular inspection as the growth of vegetation will need to be inspected and controlled to ensure the system continues to operate as designed.

Inspections will be carried out at regular intervals and after any significant storm events (greater than a 1-in-1 year event) to check for signs of erosion or flooding, which would indicate whether the system has been affected by the storm. The maintenance regime will ensure that the hydraulic and treatment performance of the ponds is operating as designed.

Any sediment which is not collected upstream of the ponds is likely to settle in the base of the retention pond. This sediment, along with any plant waste, will be removed with care to avoid damage to the pond liner (if part of the pond design) and any vegetation. Information will be provided to operatives on the presence and depth of liners and on the existence of any depth markers. Consideration will be given to the impact that disturbance of the sediment will have on the short-term migration of fines and contaminants from the system and maintenance operations planned accordingly.

Sediment removal will take place at least every ten-years, but this will vary by location and shall be determined by inspection during operation. The removal may need to be phased to protect the existing vegetation. As the ponds are designed to collect and treat contaminants associated with run-off, the area in and around the pond will be considered contaminated and the maintenance regime will take account of this during the disposal of any sediment or plant waste from the ponds, as well as the de-contamination of the pond when it has reached the end of its useful life.

The hydrocarbon interceptors' maintenance will be carried out in accordance with the manufacturer's recommendations and BS EN 858-2:2003 Separator systems for light liquids (e.g. oil and petrol) – Part 2.

It is normally recommended that cleaning of the interceptor takes place every three to six months, but this may vary depending on location and catchment area. Additional cleaning and maintenance will be undertaken after any major events that may have caused additional debris to collect in the system.

The regular maintenance schedule will include, but not be limited to:

- Check the integrity of the interceptor and all its mechanical parts;
- Inspect the filters and repair or replace, where required;
- Assess the volume of contaminants collected in the tank;
- Service all electrical systems, interceptor management systems and alarms etc.;
- Have all silt and contaminants removed and disposed in accordance with environmental regulations;
- Keep logs of any inspections, maintenance, incidents, services and contaminant removal activities; and
- Ensure any contaminants are removed and transported in accordance with relevant legislation.

2.19.3 Maintenance of Road Pavement

The new road pavement will require ongoing inspection, testing and maintenance. This will be carried out in accordance with Kildare County Council's pavement management requirements. Temporary traffic management will be provided where required to facilitate inspection, testing and maintenance.

It is expected that the pavement surface course will require to be replaced every 8 to 10 years.

Appendix B Ground Level Tree Assessment

DEROGATION LICENCE APPLICATION REPORT

Results of the Ground Level Tree Assessment.

Map Code	Tree Species	Grid Reference (ITM)	Feature Location and Description	Suitability
BT01	Ash	696776 732527	Partially detached ivy with stem diameter in excess of 50 mm. 	PRF-I
BT02	Ash	696772 732530	Partially detached ivy with stem diameter in excess of 50 mm. 	PRF-I
BT03	Ash	696640 732397	A crack in a branch. Facing north-east, 3 m from the ground. 	PRF-I
BT04	Ash	696651 732395	Small knot hole, 5×5 cm. Follow first north-east facing branch which then splits, follow south-facing branch, feature is 30 cm from where branch splits. 	PRF-I

DEROGATION LICENCE APPLICATION REPORT

Map Code	Tree Species	Grid Reference (ITM)	Feature Location and Description	Suitability
				
BT05	Ash	696712 732422	Partially detached ivy with stem diameter in excess of 50 mm.	PRF-I
				
BT06	Ash	696704 732418	Partially detached ivy with stem diameter in excess of 50 mm.	PRF-I
				
BT07	Ash	696728 732442	Partially detached ivy with stem diameter in excess of 50 mm.	PRF-I

DEROGATION LICENCE APPLICATION REPORT

Map Code	Tree Species	Grid Reference (ITM)	Feature Location and Description	Suitability
				
BT08	Ash	696732 732452	Partially detached ivy with stem diameter in excess of 50 mm.	PRF-I
				
BT09	Ash	696743 732470	Partially detached ivy with stem diameter in excess of 50 mm.	PRF-I
				
BT10	Ash	696693 732359	Multi-stemmed ash with dead ivy. Transverse snap PRF (broken limb) – suitable for an individual bat in fair weather (PRF-I) Pre-fell inspection recommended.	PRF-I

DEROGATION LICENCE APPLICATION REPORT

Map Code	Tree Species	Grid Reference (ITM)	Feature Location and Description	Suitability
				
BT11	Ash	696697 732363	Partially detached ivy with stem diameter in excess of 50 mm.	PRF-M
				
BT12	Ash	696699 732381	Partially detached ivy with stem diameter in excess of 50 mm.	PRF-I
				
BT13	Ash	696705 732282	Partially detached ivy with stem diameter in excess of 50 mm.	PRF-I

DEROGATION LICENCE APPLICATION REPORT

Map Code	Tree Species	Grid Reference (ITM)	Feature Location and Description	Suitability
				
BT14	Oak	696723 732316	Partially detached ivy with stem diameter in excess of 50 mm.	PRF-I
				
BT15	Ash	696774 732358	Partially detached ivy with stem diameter in excess of 50 mm.	PRF-I
				
BT16	Ash	696777 732376	Ivy growth.	PRF-I

DEROGATION LICENCE APPLICATION REPORT

Map Code	Tree Species	Grid Reference (ITM)	Feature Location and Description	Suitability
				
BT17	Ash	696778 732320	Partially detached ivy with stem diameter in excess of 50 mm. Mature ivy and very thick.	PRF-M
				
BT18	Spruce sp. treeline	696831 732289	Treeline collectively classed as PRF-I due ivy coverage and possibility of features below this.	PRF-I
				
BT19	Pedunculate oak	697216 731866	Partially detached ivy with stem diameter in excess of 50 mm. Thick ivy branches creating crevices. Low potential in some areas but most is quite detached from bark.	PRF-I

DEROGATION LICENCE APPLICATION REPORT

Map Code	Tree Species	Grid Reference (ITM)	Feature Location and Description	Suitability
				
BT20	Pedunculate oak	697270 731927	Partially detached ivy with stem diameter in excess of 50 mm. Ivy thicker in part around main trunk/branches, low potential.	PRF-I
				
BT21	Ash	697259 731883	Partially detached ivy with stem diameter in excess of 50 mm. Mature ash, thick ivy toward crown of tree.	PRF-I
				
BT22	Pedunculate oak	697285 731881	Partially detached ivy with stem diameter in excess of 50 mm. Low potential detached Ivy, thicker in parts.	PRF-I

DEROGATION LICENCE APPLICATION REPORT

Map Code	Tree Species	Grid Reference (ITM)	Feature Location and Description	Suitability
				
BT23	Ash (×2)	697292 731835	Partially detached ivy with stem diameter in excess of 50 mm. Ivy thick in parts on both trees, low potential.	PRF-I
				
BT24	Ash	697374 731846	Partially detached ivy with stem diameter in excess of 50 mm. Ivy covering trunk up to 6 cm wide with some cavities visible with low roost potential. Possible other cavities not visible.	PRF-M

DEROGATION LICENCE APPLICATION REPORT

Map Code	Tree Species	Grid Reference (ITM)	Feature Location and Description	Suitability
				
			3 cm knothole. Close to base of branch and unlikely to have large cavity. On south branch, facing south, 4-5 m high.	
				
			Large 6 cm opening from broken branch. unlikely to be deep and quite exposed. On the same branch as the above feature.	
				

DEROGATION LICENCE APPLICATION REPORT

Map Code	Tree Species	Grid Reference (ITM)	Feature Location and Description	Suitability
BT25	Ash	697352 731853	Partially detached ivy with stem diameter in excess of 50 mm. Thick ivy covering. Thick ivy covering, possibly creating crevices.	PRF-I
				
BT26	Hawthorn	697320 731868	Partially detached ivy with stem diameter in excess of 50 mm.	PRF-I
				
BT27	Ash	697382 731786	Partially detached ivy with stem diameter in excess of 50 mm.	PRF-M
				
			Feature is facing north, on first north-north-east facing branch, 6 m from ground, crack at the base of this branch.	

DEROGATION LICENCE APPLICATION REPORT

Map Code	Tree Species	Grid Reference (ITM)	Feature Location and Description	Suitability
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Feature is south-west facing, knot hole 10×10 cm, on first south-west branch, 5 m from ground. More growth could cover this as is close to main trunk.



Same description as above feature, located at the opposite end of the feature, facing east and downward, making good shelter.



DEROGATION LICENCE APPLICATION REPORT

Map Code	Tree Species	Grid Reference (ITM)	Feature Location and Description	Suitability
BT28	Ash	697608 731713	Partially detached ivy with stem diameter in excess of 50 mm. Lots of knot holes but all surface based, they don't go anywhere. 	PRF-I
BT29	Ash	697416 731827	Partially detached ivy with stem diameter in excess of 50 mm covering most of trunk. 	PRF-M
BT30	Hawthorn	697311 731851	Partially detached ivy with stem diameter in excess of 50 mm.	PRF-I
BT31	Ash	697292 731819	2 cm wide knothole, cannot see if it opens up into a cavity, but any cavity is unlikely to be large. North-east side of trunk 5 m high	PRF-I

DEROGATION LICENCE APPLICATION REPORT

Map Code	Tree Species	Grid Reference (ITM)	Feature Location and Description	Suitability
				
BT32	Poplar (×6) & ash (×2)	697705 731619	Treeline collectively classed as PRF-I due ivy coverage and possibility of features below this. 	PRF-I
BT33	Ash	697687 731671	Partially detached ivy with stem diameter in excess of 50 mm.  4 cm wide knothole appears shallow.	PRF-I

DEROGATION LICENCE APPLICATION REPORT

Map Code	Tree Species	Grid Reference (ITM)	Feature Location and Description	Suitability
				
BT34	Ash	697683 731581	3 cm knot hole appears unlikely to open up into cavity, but cannot see for certain. On a south-south-east branch 4 m high over driveway entrance, facing south-south-east.	PRF-I
			 	
BT35	Unknown	698052 731611	Limited potential for roosts as tree and branch are narrow and ivy is not very thick, but because of a lack of visibility, precautionary PRF-I assigned.	PRF-I
				

DEROGATION LICENCE APPLICATION REPORT

Map Code	Tree Species	Grid Reference (ITM)	Feature Location and Description	Suitability
BT36	Unknown	698040 731662	2-3 cm knothole with potential for small cavity. On a north-north-east-facing branch, 6 m high, facing west and slightly upward. 	PRF-I
BT37	Unknown	698037 731666	Tree covered in ivy and far side cannot be viewed, so precautionary PRF-I assigned. 	PRF-I
BT38	Pedunculate oak	697141 731812	Partially detached ivy with stem diameter in excess of 50 mm. Thick (~10cm) ivy partially detached at points and also forming crevices with overlapping branches. Particularly suitable on the east side of the trunk. 	PRF-I

DEROGATION LICENCE APPLICATION REPORT

Map Code	Tree Species	Grid Reference (ITM)	Feature Location and Description	Suitability
BT39	Unknown	698033 731682	Knot hole 6 m high on central branch facing towards road. knot forms an umbrella type cover but cannot see cavity. 	PRF-I
BT40	Pedunculate oak	697293 731873	Thick ivy, especially on the south-western branch, but it is generally tight to tree and does not form many suitable crevices. 	PRF-I
BT41	Hawthorn (×3)	697247 731875	This set of trees is collectively classed as PRF-I due ivy coverage and possibility of features below this.	PRF-I

DEROGATION LICENCE APPLICATION REPORT

Map Code	Tree Species	Grid Reference (ITM)	Feature Location and Description	Suitability
				
BT42	Ash	697267 731917	Partially detached ivy with stem diameter in excess of 50 mm. 	PRF-I

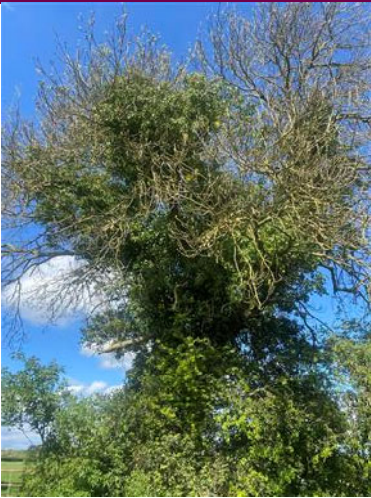
DEROGATION LICENCE APPLICATION REPORT

Map Code	Tree Species	Grid Reference (ITM)	Feature Location and Description	Suitability
BT43	Pedunculate oak	697174 731839	Partially detached ivy with stem diameter in excess of 50 mm. 	PRF-I
BT44	Ash (×3)	696748 732546	Partially detached ivy with stem diameter in excess of 50 mm. Ivy growth on all trees with some small nooks available for individual roosting bats.	PRF-I
BT45	Austrian pine	696808 732340	Partially detached ivy with stem diameter in excess of 50 mm.	PRF-I
BT46	Pedunculate oak	697136 731819	Partially detached ivy with stem diameter in excess of 50 mm. Facing south-east. Ivy stems surrounding main trunk and branches on the south-east side. Some low potential for bats to use. 	PRF-I
BT47	Treeline (mainly conifers - Scot's pine, with ash & sycamore.	697591 731719	Partially detached ivy with stem diameter in excess of 50 mm. Most trees are ivy is covered. Low potential but thicker in parts. Can't see other features, but precautionary PRF-I assigned. 	PRF-I

DEROGATION LICENCE APPLICATION REPORT

Map Code	Tree Species	Grid Reference (ITM)	Feature Location and Description	Suitability
BT48	Pedunculate oak & ash	697282 731809	Partially detached ivy with stem diameter in excess of 50 mm. Most in this treeline have detached Ivy on branches/trunks with some crevices, low potential.	PRF-I
				
BT49	Beech	697279 731880	Multiple small splits in the trunk with low potential. Approx. 3 m high on trunk, facing south-east.	PRF-I
				
BT50	Ash	697232 731871	Partially detached ivy with stem diameter in excess of 50 mm. Covering most of tree trunk/branches, thicker in parts.	PRF-I

DEROGATION LICENCE APPLICATION REPORT

Map Code	Tree Species	Grid Reference (ITM)	Feature Location and Description	Suitability
				
BT51	Pedunculate oak	697264 731917	Partially detached ivy with stem diameter in excess of 50 mm. Ivy sparse but some low potential in parts.	PRF-I
				
BT52	Ash	697391 731768	Partially detached ivy with stem diameter in excess of 50 mm. Tree covered in Ivy, thicker in parts, low potential for bats beneath some areas.	PRF-I
				
BT53	Ash	697501 731693	Partially detached ivy with stem diameter in excess of 50 mm. Ivy is dense around the main trunk and there could be hidden features	PRF-I

DEROGATION LICENCE APPLICATION REPORT

Map Code	Tree Species	Grid Reference (ITM)	Feature Location and Description	Suitability
			underneath so precautionary PRF-I assigned.	
				
BT54	Ash	697701 731591	Partially detached ivy with stem diameter in excess of 50 mm. Covering most of trunk. Precautionary PRF-I assigned.	PRF-I
			 	
BT55	Ash	697718 731620	Partially detached ivy with stem diameter in excess of 50 mm. Covering most of trunk. Precautionary PRF-I assigned.	PRF-I
				
BT56	Pedunculate oak	698040 731611	Partially detached ivy with stem diameter in excess of 50 mm. Covers most of trunk/main branches, potentially dense enough in parts to support individual bats.	PRF-I

DEROGATION LICENCE APPLICATION REPORT

Map Code	Tree Species	Grid Reference (ITM)	Feature Location and Description	Suitability
				
BT57	Pedunculate oak	698026 731652	Partially detached ivy with stem diameter in excess of 50 mm. Covers most of trunk/main branches, potentially dense enough in parts to support individual bats.	PRF-I
				
BT58	Beech	698022 731670	Partially detached ivy with stem diameter in excess of 50 mm. Covers most of trunk. Is denser in parts with potential for crevices beneath for individual bats.	PRF-M
				
			Multiple knotholes on south branches facing south-east. One looks to go deeper, potential for multiple bats.	

DEROGATION LICENCE APPLICATION REPORT

Map Code	Tree Species	Grid Reference (ITM)	Feature Location and Description	Suitability
BT59	Ash (×2)	697270 731885	 Multiple vertical splits in the bark with potential for small crevices underneath. On northern side of tree, facing north.	PRF-I
			 Two knot holes look like they could be deep enough for multiple bats. North-east side of tree facing the road.	
				
BT59	Ash (×2)	697270 731885	Partially detached ivy with stem diameter in excess of 50 mm. Covering most of trunk/branches on both trees. Thicker in parts, Low potential.	PRF-I

DEROGATION LICENCE APPLICATION REPORT

Map Code	Tree Species	Grid Reference (ITM)	Feature Location and Description	Suitability
				

Appendix 10 Cultural Heritage Supporting Information

APPENDIX 10.1A RELEVANT GUIDELINES, POLICY AND LEGISLATION

The key Cultural Heritage legislation and guidance referenced in the preparation of the CHIA is outlined below and has informed the assessment.

Legislation

- The Historic and Archaeological Heritage and Miscellaneous Provisions Act 2023;¹¹
- National Monuments Acts, 1930 to 2014;
- Planning and Development Regulations 2001 (as amended);
- Planning and Development Act 2000, as amended;
- Architectural Heritage (National Inventory) and Historic Monuments (Miscellaneous Provisions) Act, 1999;
- National Cultural Institutions Act 1997;
- Heritage Act, 1995, as amended.

Conventions and Charters

- Council of Europe (1964) International Charter for the Conservation and Restoration of Monuments and Sites (Venice Charter);
- Council of Europe (1969) European Convention on the Protection of the Archaeological Heritage (London Convention);
- UNESCO Convention Concerning the Protection of the World Cultural and Natural Heritage (The World Heritage Convention), 1972;
- ICOMOS Charter on Historic Gardens (Florence Charter), 1982;
- Council of Europe (1985). Convention for the Protection of the Architectural Heritage of Europe (ratified by Ireland 1997), 'Granada Convention';
- ICOMOS Charter for the Conservation of Historic Towns and Urban Areas (Washington Charter), 1987;
- ICOMOS Charter on the Built Vernacular Heritage, 1999;
- Council of Europe (1992). European Convention on the Protection of the Archaeological Heritage (ratified by Ireland 1992), 'Valetta Convention';
- UNESCO Convention on the Protection of the Underwater Cultural Heritage, 2001;
- The European Landscape Convention (ELC), ratified by Ireland 2002 European Landscapes Convention 2010. (The Department of the Environment, Heritage and Local Government 'Landscape and Landscape Assessment Guidelines' have been in draft form since 2000, however the National Landscape Strategy (NLS) was launched in 2015);
- UNESCO Convention for the Safeguarding of the Intangible Cultural Heritage (Paris Convention), 2003;
- ICOMOS Xi'an Declaration on the Conservation of the Setting of Heritage Structures, Sites and Areas, 2005;
- Council of Europe (2005). Framework Convention on the Value of Cultural Heritage for Society, 'Faro Convention';
- Principles for the Conservation of Industrial Heritage Sites, Structures, Areas and Landscapes (The Dublin Principles), 2011;
- The Australia ICOMOS Charter for Places of Cultural Significance (Burra Charter, 2013).

¹¹ The Historic and Archaeological Heritage and Miscellaneous Provisions Act 2023 was enacted in October 2023 and this Act is now law. The Minister for Housing, Local Government and Heritage commenced certain provisions in May 2024 (S.I. No. 252/2024); however, until the Act is fully commenced, the National Monuments Acts have therefore not yet been repealed and remain in force.

Policy

- Project Ireland 2040
- National Development Plan (2018-2027);
- Kildare County Development Plan 2023 – 2029;
- Kildare County Council Heritage Plan 2019 – 2025;
- Celbridge Local Area Plan 2017 – 2023;
- DHLGH (2022) Heritage Ireland 2030;
- DHLGH (2022) National Policy on Architecture;
- DCHG (2019) Built and Archaeological Heritage Climate Change Sectoral Adaptation Plan;
- DRCD (2018) Action Plan for Rural Development;
- DAHG (2015) National Landscape Strategy for Ireland 2015-2025;
- DEHLG (2008) National Policy on Town Defences, 2008;
- DAHGI (now DHLGH) (1999) Framework and Principles for the Protection of the Archaeological Heritage, Department of Arts, Heritage, Gaeltacht and Islands.

Guidance

- Transport Infrastructure Ireland (2024) Guidelines for Cultural Heritage Impact Assessment of TII National Road and Greenway Projects (TII Publication Number PE-ARC-02009)¹²;
- Department of Housing, Local Government and Housing (2023) Archaeology and Flood Relief Schemes Guidelines (2023);
- Historic England (2017) The Setting of Heritage Assets, Historic Environment Good Practice Advice in Planning Note 3 (Second Edition);
- Department of Arts, Heritage and the Gaeltacht (2015) National Landscape Strategy for Ireland 2015-2025, Department of Arts, Heritage and the Gaeltacht;
- The Heritage Council (2013) Historic Landscape Characterisation in Ireland: Best Practice Guidance;
- DAHG (now DCHG) (2011) Architectural Heritage Protection Guidelines for Planning Authorities, Department of Arts, Heritage and the Gaeltacht;
- The Heritage Council (2010) Proposals for Irelands Landscapes;
- Historic Scotland (2010) Managing Change in the Historic Environment;
- NRA (2006) Guidelines for the Testing and Mitigation of the Wetland Archaeological Heritage for National Road Schemes.

¹² These guidelines replace the previous NRA Guidelines for the Assessment of Archaeological Heritage Impacts of National Road Scheme (NRA 2005a) and Guidelines for the Assessment of Architectural Heritage Impacts of National Road Scheme (NRA 2005b).

APPENDIX 10.1B GLOSSARY OF EFFECTS AND ASSESSMENT METHODOLOGY

Types of Effects

Potential effects on the receiving cultural heritage¹³ environment can be described as direct physical effects, indirect physical effects, and effects on setting (i.e. the surroundings in which a cultural heritage asset can be experienced; Historic England 2017).

Direct physical effects are those development activities that directly cause damage to the fabric of a cultural heritage asset. Typically, these activities are related to construction works (e.g. they could include excavation of foundations, earthmoving / site preparation creation of access roads, cycle paths, and the excavation of service trenches).

Indirect physical effects are those processes, triggered by development activity, that lead to the degradation of cultural heritage assets.

Effects on the setting of cultural heritage assets describe how the presence of a development changes the surroundings of an asset in such a way that it affects (positively or negatively) the heritage significance of that asset. Visual effects are most commonly encountered. Such effects may be encountered at all stages in the life cycle of a development, but they are only likely to be considered significant during the prolonged operational life of the development.

Types of effect, as defined by the EPA Guidelines on Information to be Contained in Environmental Impact Assessment Reports (hereafter referred to as the EPA Guidelines) (EPA 2022):

Cumulative Effect – The addition of many minor or insignificant effects, including effects of other projects, to create larger, more significant, effects.

Do Nothing Effect – The environment as it would be in the future should the subject project not be carried out.

Indeterminable Effect – When the full consequences of a change in the environment cannot be described.

Irreversible Effect – When the character, distinctiveness, diversity or reproductive capacity of an environment is permanently lost.

Residual Effect – The degree of environmental change that will occur after the proposed mitigation measures have taken effect.

'Worst case' Effect – The effects arising from a project in the case where mitigation measures substantially fail; and

Indirect or Secondary Effects – Effects on the environment, which are not a direct result of the project, often produced away from the project site or because of a complex pathway.

Quality of Effects

Effects on the cultural heritage environment are assessed in terms of their quality, i.e. positive, negative, neutral:

Negative Effect: A change that will detract from or permanently remove an cultural heritage asset from the landscape;

Neutral Effect: A change that does not affect cultural heritage; and

Positive Effect: A change that improves or enhances the setting of a cultural heritage asset.

Duration of Effects

The duration of an effect can be as follows:

Temporary Effect: Effect lasting for one year or less;

¹³ Cultural Heritage includes archaeology, architectural heritage, and folklore and history

Short-term Effect: Effect lasting one to seven years;
Medium-term Effect: Effect lasting seven to fifteen years;
Long-term Effect: Effect lasting fifteen to sixty years; and
Permanent Effect: Effect lasting over sixty years.

Assessment Methodology

This assessment methodology has regard to the EPA assessment criteria (EPA 2022) and to the National Roads Authority (NRA) Guidelines for the Assessment of Archaeological Heritage Impact of National Road Schemes (hereafter referred to as the NRA Guidelines) (NRA 2005).

Cultural heritage sites are a non-renewable resource, and such assets are generally considered to be location sensitive. In this context, any change to their environment, such as construction activity and ground disturbance works, could adversely affect these sites.

Significance / Sensitivity Criteria

In accordance with EPA Guidelines (EPA 2022), the context, character, significance and sensitivity of each cultural heritage asset requires evaluation and the significance of the effect is then determined by considering the significance / sensitivity of the asset and the predicted magnitude of the effect.

The significance / sensitivity can be ascertained by looking at the following criteria: the existing status (level of protection), condition or preservation, documentation or historical significance, group value, rarity, visibility in the landscape, fragility or vulnerability, and amenity value (Table 1). While these criteria contribute to the significance of a feature they should not be treated as definitive. These criteria are indicators which contribute to a wider judgement based on the individual circumstances of these cultural heritage assets.

Table 1 Explanation of Cultural Heritage Asset Assessment Criteria

Criteria	Explanation
Existing Status	The level of protection associated with a cultural heritage asset is an important consideration.
Condition / Preservation / Integrity	The survival of a cultural heritage asset's archaeological potential both above and below ground is an important consideration and should be assessed in relation to its present condition and surviving features. Well-preserved sites should be highlighted, this assessment can only be based on a field inspection.
Documentation / Data	The significance of a cultural heritage asset may be enhanced by the existence of records of previous investigations or contemporary documentation supported by written evidence or historic maps. Sites with a definite historical association or an example of a notable event or person should be highlighted.
Group Value / Character	The value of a single a cultural heritage asset may be greatly enhanced by its association with related contemporary monuments or with monuments from different periods indicating an extended time presence in any specific area. In some cases it may be preferable to protect the complete group, including associated and adjacent land, rather than to protect isolated monuments within that group.
Rarity / Character	The rarity of some a cultural heritage asset types can be a central factor affecting response strategies for development, whatever the condition of the individual feature. It is important to recognise sites that have a limited distribution.

Criteria	Explanation
Visibility in the landscape/ Character / Integrity	Cultural heritage assets that are highly visible in the landscape have a heightened physical presence. The inter-visibility between monuments may also be explored in this category.
Fragility / Vulnerability / Integrity	It is important to assess the level of threat to a cultural heritage asset from erosion, natural degradation, agricultural activity, land clearance, neglect, careless treatment or development.
Amenity Value / Character	Regard should be taken of the existing and potential amenity value of a cultural heritage asset.

An evaluation of the significance / sensitivity of cultural heritage assets is based on their designation and on the extent to which these assets contribute to the cultural heritage environment, though their individual or group qualities, either directly or potentially. Table 2 presents the scale of significance / sensitivity together with criteria. It has been compiled by Courtney Deery Heritage Consultancy Ltd, based on standard authorities and guidelines as listed at the end of this appendix. Undesignated cultural heritage sites can be assigned a low, medium or high sensitivity value, taking into consideration the criteria cited in Table 1 (e.g. condition, character, integrity or preservation, data, group value, rarity, visibility in the landscape, fragility or vulnerability, and amenity value).

Table 2 Significance / Sensitivity Criteria

Sensitivity / Significance	Criteria
Very high	World Heritage Properties and properties on the Tentative List. Built heritage assets, historic gardens and designed landscapes rated as being of international importance by the National Inventory of Architectural Heritage (NIAH).
High	National Monuments. Protected Structures, built heritage assets, historic gardens and designed landscapes, rated as being of national importance by the NIAH, and structures within an Architectural Conservation Area (ACA). Undesignated cultural heritage sites considered to be of national importance.
Medium	Recorded Monuments (RMP sites, and SMR sites scheduled for inclusion in the next revision of the RMP). Protected Structures / NIAH sites and ACAs. Newly identified archaeological sites, confirmed through archaeological investigation, to be added to the SMR. Undesignated cultural heritage sites considered to be of regional importance.
Low	Assets compromised by poor preservation and/or poor survival of contextual associations. Sites listed in the County or City Industrial Heritage Records, Record of Protected Structures (RPS) and NIAH Building for which there are no upstanding remains. Upstanding sites listed in the County or City Industrial Heritage Records considered to be of local importance.

Sensitivity / Significance	Criteria
	Undisturbed greenfield areas and riverine environs, which have an inherent archaeological potential. Undesignated cultural heritage sites considered to be of local importance.
Negligible	Assets with very little or no surviving cultural heritage interest.
Unknown	The importance of the asset has not yet been ascertained (e.g. a LiDAR feature that may or may not be archaeological). In such cases, the significance of effect will be 'Indeterminable'.

Table 3 Description of Criteria

Criteria	Description
World Heritage Properties	World Heritage Properties as designated by the United Nations Educational, Scientific and Cultural Organization (UNESCO) and properties on the Tentative List.
National Monuments	The National Monuments Act (1930, Section 2) defines a 'National Monument' as 'a monument or the remains of a monument the preservation of which is a matter of national importance by reason of the historical, architectural, traditional, artistic or archaeological interest attaching thereto'. The National Monuments legislation legally protects access to and the visual amenity associated with National Monuments and requires consent from the Minister for invasive works in their vicinity.
Recorded Monuments	The primary source of information for archaeology is the Record of Monuments and Places (RMP) maintained by the Department of Housing, Local Government and Heritage (DHLGH). The RMP documents known upstanding archaeological monuments, their original location (in cases of destroyed monuments) and the position of possible sites in rural areas identified as cropmarks on vertical aerial photographs dating to before 1700 AD (with some later ones also being included). It is based on a comprehensive range of published and publicly available documentary and cartographic sources. For the purpose of the assessment, the Sites and Monument Record (SMR) data and mapping as updated by the Archaeological Survey of Ireland (www.archaeology.ie) was also examined.
Protected Structures	A 'Protected Structure' is a structure that a planning authority considers to be of special interest from an architectural, historical, archaeological, artistic, cultural, scientific, social, or technical point of view and is included in its Record of Protected Structures (RPS). It may be a building or part of a building which is of significance because of its architectural or artistic quality, or its setting, or because of its association with commercial, cultural, economic, industrial, military, political, social, or religious history.
Architectural Conservation Areas	An Architectural Conservation Area (ACA) is a place, area, group of structures or townscapes that is of special interest and that has been afforded statutory protection by the planning authority in accordance with Section 81 of the Planning & Development Act.
NIAH	The National Inventory of Architectural Heritage (NIAH) is a state initiative established on a statutory basis, to identify, record, and evaluate the post-1700 architectural heritage of Ireland, uniformly and consistently as an aid in the protection and conservation of the built heritage. NIAH surveys provide the basis for the recommendations of the Minister for Housing, Local Government and

Criteria	Description
	Heritage to the planning authorities for the inclusion of particular structures in their Record of Protected Structures (RPS).
Undesignated Sites	Newly identified archaeological sites that have been confirmed through archaeological investigation (monitoring, testing, excavation, geophysical survey) are considered to be of medium importance. Such sites are undesignated as they have yet to be added to the SMR.
	Potential or undesignated cultural heritage sites identified through aerial photography, historic mapping, stray finds are considered to be of low sensitivity, as they have yet to be ground-truthed through archaeological investigation. Similarly, undisturbed greenfield areas and riverine environs, which have an inherent but as yet unproven archaeological potential are considered to be of low sensitivity.
	Zones of archaeological potential (ZAP) can be defined as areas within the urban and rural landscape that possess the potential to contain archaeological remains due to the settlement history of a place and or to the presence of topographical features such as rivers, lakes and high, defensible ground
	Sites / features recorded in county / city industrial heritage surveys, where these are not designated assets.

Magnitude of Effect

When assessing the effect magnitude, the following criteria need to be considered:

- Extent – size, scale and spatial distributions of the effect;
- Duration – period of time over which the effect will occur;
- Frequency – how often the effect will occur; and
- Context – how will the extent, duration and frequency contrast with the accepted baseline conditions (see Table 1).

Table 4 Magnitude of Effect Criteria

Effect Magnitude	Criteria
High	These effects arise where a cultural heritage asset is completely and irreversibly destroyed by a proposed development. A change such that the value of the asset is totally altered or destroyed, leading to a complete loss of character, integrity and data about the site.
Medium	An effect which, by its magnitude, duration or intensity alters an important / significant aspect of the environment. An effect like this would be where a cultural heritage asset would be effected upon leading to a significant loss of character, integrity and data about the site. Or an effect which by its magnitude results in the partial loss of a historic structure (including fabric loss or alteration) or grounds including the part removal of buildings or features or part removal of demesne land (e.g. severance, visual intrusion or degradation of setting and amenity). A permanent positive effect that enhances or restores the character and / or setting of an upstanding cultural heritage site in a clearly noticeable manner.

Effect Magnitude	Criteria
Low	A low effect arises where a change to the site is proposed which though noticeable is not such that the cultural heritage character / integrity of the site is significantly compromised, and where there is no significant loss of data about the site. A positive effect that results in partial enhancement of the character and / or setting of an upstanding cultural heritage site in the medium to long-term.
Negligible	An effect which causes very minor changes in the character of the environment and does not directly effect a cultural heritage asset, or affect the appreciation or significance of the asset. There would be very minor changes to the character and integrity of the asset and no loss of data about the site.

Significance of Effect

The EPA Revised Guidelines on the Information to be Contained in Environmental Impact Statements (EIS) (EPA 2017) contained two additional levels of significance of effect: Very Significant and Not Significant (Table 5 and Image 1). These levels have been retained in the current EPA Guidelines (2022).

Table 5 **Significance of Effects (EPA 2022)**

Significance of Effect	Description
Very Significant	An effect which by its character, magnitude, duration or intensity significantly alters the majority of a sensitive aspect of the environment, for example in this case a monument
Not Significant	An effect which causes noticeable changes in the character of the environment but without noticeable consequences.

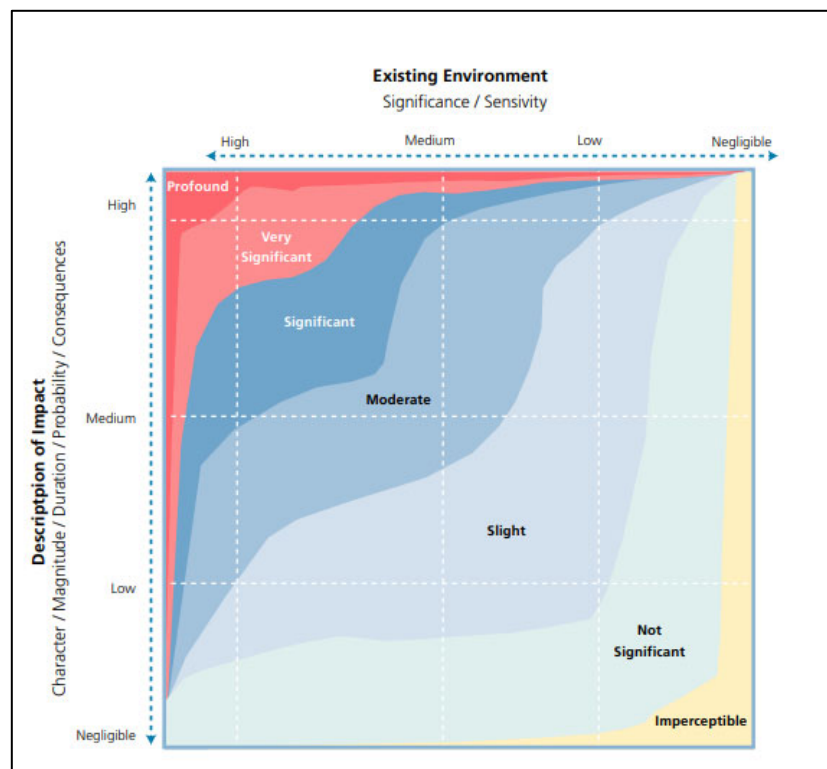


Image 1 Chart Showing Typical Classifications of the Significance of Effects Source Figure 3.4 from the EPA Guidelines on Information to be Contained in EIAR (EPA 2022).

The likely significance of effects is determined by considering the baseline rating or sensitivity value of the asset upon which the effect has an effect and the magnitude of the effect (Image 1). The effect significance is defined as Imperceptible, Not Significant, Slight, Moderate, Significant, Very Significant, or Profound (Table 5).

Table 5 **Defining Significance of Effects**

Effect	Definition
Imperceptible	An effect capable of measurement but without noticeable consequences.
Not Significant	An effect which causes noticeable changes in the character of the environment but without significant consequences.
Slight	An effect which causes minor changes in the character of the environment and does not affect a cultural heritage asset in a moderate or significant manner.
Moderate	A moderate effect arises where a change to the site is proposed which though noticeable, does not lead to a significant loss of character, integrity and data about the cultural heritage asset.
Significant	An effect which, by its magnitude, duration or intensity, alters an important aspect of the environment. An effect like this would be where part or all of a site would be permanently effected upon, leading to a significant loss of character, integrity and data about the cultural heritage asset.
Very Significant	An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment.
Profound	Applies where mitigation would be unlikely to remove adverse effects. Reserved for adverse, negative effects only. These effects arise where a cultural heritage asset is completely and irreversibly destroyed by a proposed development.

APPENDIX 10.1C DETAILED ARCHAEOLOGICAL AND HISTORICAL DEVELOPMENT OF THE STUDY AREA

1.1 Introduction

The proposed route traverses a low-lying landscape in the valley of the River Liffey. The limestone and shale bedrock supports a subsoil of limestone till, with a band of gravels extending parallel to the river's course. Soil cover comprises a combination of grey-brown podzolic, regosols, and complexes.

The *Slighe Mór*, one of the five ancient roads of Ireland, is generally agreed to have travelled through Celbridge (O'Lochlainn 1940; Geissel 2006). This ancient road is associated with the course of the *Eiscir Riada*, although a true esker ridge does not occur in Celbridge. Several ecclesiastical sites are associated with the *Slighe Mór*, including the Early Christian foundation at Celbridge which is associated with the 6th / 7th century St. Mochua.

Land use along the Proposed Scheme route is predominantly agricultural (grazing pasture), occurring on the outskirts of Celbridge town.

1.2 Prehistoric Activity (c.7000 BC – AD 400)

The low-lying lands around the River Liffey would have served as ideal settlement locations during the prehistoric periods. Although no large prehistoric settlement is known from within the study area, the presence of two ring-ditches in Celbridge Abbey townland (KD011-067 and KD011-066) c. 550m west of the proposed development indicate activity belonging to the Bronze/Iron Age burial tradition (c. 2400 BC - AD 400) in the area dating to the Bronze Age. Both sites were indicated on the first edition OS map as irregular shaped enclosures, they comprise low circular-shaped rise of ground or low mound (approx. diam. 16m and 13m) defined by a shallow fosse (both approx. 2m in width).

West of Celbridge town, following a geophysical survey (Licence 08R235) within Donaghcumper Demesne, McQuade (Licence 08E0829, excavations.ie ref. 2008:661) identified the truncated remains of two prehistoric barrows and associated features during archaeological testing. A barrow is an earthen type of burial mound generally associated with the Bronze Age (c. 2,400 BC – 500 BC) and Iron Age (c. 500BC – 400 AD). It is very likely that the riverine location attracted such activity. One barrow was defined by a ditch that was 0.75-0.95m wide, 0.25m deep and 9m in diameter. It had a central inhumation burial. The second barrow was 108m south-west of the first. It had a diameter of 14m and was associated with a pit and a post-hole.

McQuade (Licence 10E0414, excavations.ie ref. 2011:352) again discovered three crouched inhumation burials and four cremation burials within the front lawn of Castletown House, north of the town. The burials were part of a larger cemetery site that extended beyond the limits of the excavation. The remains of a decorated Food Vessel pot were indicative of an Early Bronze Age date. The site is now listed as several recorded monuments (RMP KD011-060 to KD011-060007).

One fulacht fia was excavated within the study area in Elm Hall during works associated with the proposed Kildare Route Rail Project (Hession, Licence 07E0816, excavations.ie ref. 2007:803). Fulachtaí fia are normally characterised by a horseshoe-shaped spread of burnt stones and charcoal that usually seals at least one trough. The troughs can sometimes have a timber base or a clay-lining. They are frequently located near water sources, such as streams, springs and bogs. Fire-heated stones were placed into the water-filled trough of a fulacht as a way of boiling water. The stones often cracked upon contact with the water. Following several uses the troughs would become full of these burnt, cracked stones that needed to be removed. Repeated fillings and removals would lead to the formation of the horseshoe-shaped burnt spread. Fulachtaí are often found in association with stake-holes and hearths (Hawkes 2015).

Evidence for earlier prehistoric activity in the area is more elusive. The discovery of a stone axe head during field walking in Oakley Park (Swan, Licence 96E0186, excavations.ie ref. 1996:180) is the sole find dating to the Neolithic period from within the study area. Likewise, no upstanding monuments or excavation evidence within the study area are dated to the later prehistoric Iron Age.

1.3 Early Medieval period (c.5th – 11th centuries AD)

Christianity first came to Ireland in the early part of the fifth century, and it is believed to have been brought to Celbridge by St Mochua, who founded Clondalkin Abbey. St Mochua ministered in the Celbridge area around the time of St Patrick, who may have ministered in Celbridge himself; some authorities claim St Patrick founded Donaghcumper Church (RMP KD011-013). A well at the entrance to the present community centre in Celbridge was known as St Mochua's Well and was used to baptise people in early Christian times. This well was cemented over, and an inscribed stone tablet placed on the wall in 1783. The parish church in Kildrought, in Tea Lane, was also dedicated to St Mochua (Doohan 1985). Bradley et al. (1986) noted that almost nothing is known about this foundation. The later medieval church (recorded monument RMP KD011-012005) and graveyard (recorded monument RMP KD011-012006) in Oakley Park north of the town may follow the line of an early ecclesiastical enclosure (recorded monument RMP KD011-012004).

The old Irish name for Celbridge was *Kildrought* or *Kildroighid*. This was an anglicised version of the original Gaelic name *Cill Droichid*, the church of the bridge, which was the ancient church of St Mochua. The name was changed to Celbridge following the Williamite conquests.

Test excavations adjacent to the church at Donaghcumper (RMP KD011-013) confirmed the presence of a medieval enclosure that likely defined the monastic precinct (Devine, Licence E004187, excavations.ie ref. 2010:399).

At Killadoon, 1.2km west of the proposed development, the Ordnance Survey Letters recorded that the graveyard (recorded monument RMP KD011-006001) contained, '... *some (remaining) portions of the walls of the (old) Church*' (RMP KD011-006) (Herity 2002). The church was reported '*to be not worth the service of chaplains*' in c.1294, according to Omurethi (the pseudonym of Lord Walter Fitzgerald, writing in 1909-1911; RMP files). The church remains lie to the north of the centre of the graveyard. A rectangular depression measuring 8m x 3.4m and 0.3-0.6m deep, is further defined by sod and ivy-covered stony spreads which are the remains of collapsed walling.

Outside of ecclesiastical settlements, the early medieval period saw the development of a mixed-farming economy managed by kings, nobles and free farmers. There was an increase in settlement (c. AD 500–AD 1200), and the ringfort, otherwise known as the 'rath' or 'fairy fort', is the best-known native monument of this period (Stout 1997). Ringforts are enclosed farmsteads dating to the early medieval period; they are one of the most widespread archaeological sites surviving in the Irish landscape and several likely ringforts have been identified both within and just outside of the study area, five recorded enclosure sites (KD011-063, KD011-029, KD011-030, DU020-024 and DU020-021) which have been identified from cropmarks in aerial photography and may represent ploughed out ringforts.

The majority of the ringfort sites are univallate, surrounded by one ditch and bank, but some are surrounded by two and, to a lesser extent, three enclosing ditches and banks (known as bivallate and trivallate raths respectively). Another morphological variation consists of the platform or raised rath – the former resulting from the construction of the rath on a naturally raised area while the latter's height resulting from prolonged occupation over many centuries. Many raths are circular or oval in shape but they can occur as D-shaped, pear-shaped and sub-rectangular-shaped enclosures. Ringforts were not simple isolated homesteads and should be considered within their contemporary settlement landscape, which would have consisted of unenclosed settlements, farms and fields, routeways and natural resources.

Celbridge was the focus of archaeological work, both as a result of the current building boom and due to the construction of the M4 Celbridge interchange. The work on the interchange concentrated predominantly within the Castletown demesne. A sixteenth century reference to this site referred to it as the Manor of Castletown having a castle with a courtyard together with a mill and millrace. The deer park associated with this demesne was the focus of the majority of archaeological work where a Bronze Age ring barrow dating to c.2000BC was identified. An Early Christian stone-built kiln of circa sixth/ninth century date was also at this location. The results of these excavations and others in the immediate area have extended the period of occupation of Celbridge back into the Bronze Age and confirmed a wider occupation zone for Celbridge in the Early Christian period. (V. J. Keely Ltd on www.nra.ie).

1.4 Medieval Period (late 12th century to early 16th century)

Henry II arrived in Ireland in 1132 and appointed Strongbow as tenant-in-charge in Leinster. He in turn granted land in the Celbridge area which formed part of the 'cantred of Offelan nearest Dublin' to Adam de Hereford c.1176, a Norman knight and conqueror of North Kildare. He set about making the lands he was

granted secure and profitable. As had been the case in the Norman conquests of England and Wales before, many mottes and baileys were erected in the Celbridge area. Mottes were flat-topped mounds on top of which a wooden tower was erected (Duffy and Simpson 2019). None of the wooded towers survive, but as many as 400 mottes survive in Ireland, such as at the recorded monument RMP KD011-020 and possibly at the mound and recorded monument RMP KD011-010, both outside and north-west of the study area.

De Hereford granted land and houses to his tenants. They in turn had to work on the lord's demesne as payment for the lands they received. Thomas de Hereford, brother of Adam, erected the corn and tuck mill of *Kildrought* close to the well of St Mochua early in the thirteenth century. Tenants brought their corn to the mill to be ground and their wool to be woven into material. The growth of the town and community of Celbridge began to develop around the church, castle and mill.

Adam granted Celbridge ('Kildroch') to his brother John, who was in turn succeeded by his son Thomas, on whose death, before 1224, Celbridge passed to his son-in-law Milo de Rochford. The Rochfords held Celbridge until the mid-14th century. Although the earliest evidence for the existence of a borough occurs in 1401, there was clearly a significant settlement there by 1314 when Henry le Waleys was charged with breaking the 'doors of houses in the town of Kildroght' and taking geese, hens, bread, and beer (Wood et al. 1956, 318). Around 1387-9, John Rout and Richard Arblaster, chaplains, were given royal licence to enfeof Maurice FitzThomas, earl of Kildare, with the manor of Kildroght, after which point the first reference to a castle and borough of Kildroght are made. The manor was forfeited after the rebellion of Silken Thomas, and in 1536, it was granted to John Alen, Master of the Rolls. By 1554, it had been restored to the Kildares when the earl requested the Lord Deputy to confirm the manor of Castletown (i.e. the town of the castle of Celbridge) to Gerald Sutton, who was later to forfeit it because of his part in the Baltinglass rebellion of 1580. In 1587, the manor of Castletown-Kildroght was granted to John Dongan, and the Dongan's held it for most of the 17th century. In 1654, the Civil Survey recorded 'one stone house intended for a malt house, a bridge over the Liffey and three mills in Celbridge, while the 1659 census gave the population of Kildroght as 63 and Celbridge as 34. In 1674, Celbridge was granted a weekly market and two-yearly fairs. A burgage plot pattern is evident on 19th century maps, but subsequent building has severely eroded it. There are references to two castles (KD011-023 and KD011-012003), a bridge (KD011-012007) and several mills (KD011-012008), and evidence of a possible early ecclesiastical enclosure (KD011-012004), and a medieval church (KD011-012005) and graveyard (KD011-012006) survives.

The de Hereford castle was built at Castletown (RMP KD011-023) in the vicinity of Castletown House; other castles in the Celbridge area were at Posseckstown, Simmonstown (KD011-019), Templemills and St Wolstan's. By 1314, Kildroght (Celbridge) was termed a town when one Thomas Le Waleys was charged at Naas court with damaging houses there (Costello 1988).

The Zone of Notification (ZoN) site of the castle at Simmonstown (KD011-019), is just under 200m from the proposed development. It was recorded in the Ordnance Survey Letters (Herity 2002, 9) as, '*... a Castle in ruins, of which a great part is remaining.*' The ruins were burnt c. 1980 and subsequently removed, leaving no visible surface trace of the monument (SMR file). Some sub-surface features may, however, survive. The Civil Survey notes that '*There is one little Castle upon the lands of Simonstowne Aforesaid was valued to be worth twenty pounds in the year 1640 butt being since burned is now valued to be worth ten pounds*' (Simington 1952).

The ZoN site of Templemills castle is 138m south of the Proposed Scheme route and is now within a modern housing estate. According to Fitzgerald (1909-11, 520-21), the site marked '*Terrils Ca. (castle) and Mills*' on Taylor's 1783 Map of County Kildare was subsequently occupied by the 'Temple Mills' which are shown on the latest ed. (1938) of the OS 6-inch map. He quotes a description of the mill and its appurtenances from the Civil Survey of 1654; '*Mrs. Mabel Aylmer, Irish Papist, is the owner of "Tyrrells Mill" and two acres of land, which are valued for letting purposes at £16 a year. ... There is one castle upon the aforesaid two acres of land which in the year 1640 was valued to be worth £100, but since being ruined, is now valued at £5.*' Fitzgerald concludes, '*Of Tyrrell's Castle there are now no remains*', but he supplies a drawing of the castle by S. Walker in 1778 which shows a narrow rectangular building with a projecting corner tower. The site of the castle is within a modern housing estate.

Celbridge was granted a weekly market and two-yearly fairs in 1674 and this seems to have boosted the development of the modern village' (Aalen 1970, cited in Bradley et al 1986).

1.5 Post-Medieval Period

The old parish of Kildroght consisted of only four townlands. The townlands of Kildroght and Moortown were very extensive and included the present townland of Celbridge itself. According to the population

survey undertaken in the mid-17th century as part of the Down Survey of 1654–1656 (**Figure 1**), the population of Kildrought parish numbered one hundred and two. Parish land was owned by nine families, most of it in the possession of the Dongans of Castletown, the Walshs of Moortown and the Alens of St Wolstan's.

There were approximately 200 acres of common land in the parish, mainly in the present townlands of Oakley Park and Oldtown, and probably also in the townlands of Commons, Commons Lower and Commons Upper. This common land gave tenants the right to graze cattle, sheep, horses and fowl in the area (right of pasturage) depending upon the size of their holdings (soutm or stinting). During the 17th century, Kildrought had a stone malt house, two corn mills (recorded monuments RMP KD011-037 and KD011-038), one cloth mill and a stone bridge over the Liffey (Doohan 1985; Jordan 2001).



Figure 1 Down survey county map of Kildare

The Civil Survey (1654-6) consisted of the returns of the extent and value of forfeited lands. The Barony of Salt was described as follows, it describes the commonage lands and also the castle in Simmonstown that had been burnt¹⁴.

The soyle of the aforesaid Barrony of Salt is generally moist & especially the meadow grounds pastures and underwoods. The arrable Land in ye sd. Barrony being well manured will yeild good corne. The lands in the study area appear to be Lady Allen of St. Wolstans Irish Papest Newtowne East Simonstowne. There is one stone house upon the lands of Newton East aforesaid wch in the yeare 1640 was valued to be worth twenty pounds Butt being ruined is now valued att Tenn pounds. The said lands of Simonstowne have liberty of Common upon the Comons of Moncronoge. There is one little Castle upon the lands of Simonstowne aforesaid wch was valued to be worth twenty pounds in the yeare 1640 butt beeing since burned is now valued to be worth tenn pounds. There is one Castle upon the River of Rewes aforesaid wch is valued to be worth ffourty pounds.

With the ending of the Williamite Wars in the late seventeenth century, Ireland entered a new era of relative political calm, from 1641 until the Rebellion of 1798 there were few dramatic events and almost a century of peace (Casey and Rowan 1993). Without concern for defence, landowners commenced the building of new mansions, and an era of experimentation of new architectural styles and larger, more comfortable houses became the norm. This is exemplified by the construction of the Castletown House, Ireland's first and largest

¹⁴ The quoted matter has been transcribed or translated exactly as found in the source text, complete with any erroneous, archaic, or otherwise nonstandard spelling, punctuation, or grammar.

Palladian style house which is located within the study area to the northeast. The transformation of the landscape in the 18th century is clear from Taylor's 1783 map of Kildare (**Figure 2**).



Figure 2 Alexander Taylor's map of the County of Kildare, 1783

The River Liffey played a significant part in the development of the designed landscapes surrounding the town, the large estate houses of Castletown, Donaghcumper, St Wolstan's and Celbridge Abbey utilised the riverine setting, together with Killadoon (also spelt Kiladoon in the KCC CDP 2023 - 2029) in the southwest which has extensive riverine outlook.

The large demesnes encompassed complex and elaborate gardens and parkland that were delimited from the rest of the countryside by boundaries and walls and incorporated the river. Demesnes evolved as separate social and economic areas and their distinctive layouts – incorporating farmland, gardens, woods and buildings – were designed to express a particular aesthetic quality. The term landscape is derived from the Dutch landscape paintings and came into common usage during the late 17th century. Landowners were becoming increasingly aware that the countryside around their houses could be 'designed' on a large scale. Although demesnes usually retained their primary function as home farms, the process of landscape ornamentation, initially in the formal and later in the informal styles, dramatically affected their size and layout during the 18th and 19th centuries. This designing of the landscape was emulated to a limited extent by smaller properties.

In the northeastern part of the town is the internationally important estate of Castletown which is located on the northern banks of the Liffey and the estates of St Wolstan's and Donaghcumper on the opposite banks of the river to the south. These adjoining designed landscapes engender demesne landscape character on the eastern side of Celbridge. The demesnes of Castletown, Donaghcumper and St Wolstan's form part of a protected area within the Kildare County Development Plan, which include important views into and out of the demesnes, none of which are in the vicinity of the proposed development.

Celbridge Abbey (RPS B11-24A-C) was built by Bartholomew Van Homrigh, Lord Mayor of Dublin, in 1697 on the banks of the River Liffey. Chief Justice Richard Marla, Bishop of Waterford, bought Celbridge Abbey

in 1723. Celbridge Abbey is considered to be of national significance in the NIAH survey. Built on the site of an earlier house dating to the late 17th century, and possibly incorporating fabric of that house, the building is of some archaeological importance. The present house is associated with Henry Grattan MP (a subsequent occupier, famous orator), and Dean Jonathan Swift and Ester ('Vanessa') Van Homrigh. Now in use as a monastery for the Christian Brothers order, the house retains most of its original form and character. It has extensive landscaped grounds. It is an attractive landmark from the River Liffey to the south, while the rear (north-west) elevation forms an imposing feature on the streetscape of Clane Road (NIAH). The Rock Bridge, situated in the grounds of Celbridge Abbey, is reputed to be the oldest remaining stone bridge that crosses the River Liffey (RPS, B11-110 NIAH), the demesne lands included both sides of the river, it is one of a group of bridges (both footbridges and road bridges) on the section of that river. The proposed new Liffey bridge crossing c.250m is downstream of these bridges.

Oakley Park (B11-22, its former demesne lands is 160m north of the proposed development) was built contemporaneously with Castletown House, it was a country house erected for Reverend Arthur Price (1678/9-1752) to designs attributed to Thomas Burgh (1670-1730) of Dublin (Craig and Desmond 1970, 29) representing an important component of the early 18th-century domestic built heritage of County Kildare. It had historic connections to Colonel George Napier (1751-1804) and Lady Sarah Napier (née Lennox) (1745-1826), sister of Lady Louisa Connolly. It represents the origins of Celbridge as an estate town. It comprises a detached seven-bay three-storey over basement Classical-style house, built 1724. It is set back from the line of the road in its own grounds. It has landscaped lawns to the front (south-east), but this belies the original extent of its former demesne lands which were comprehensively developed during the 20th century expansion of the town.

The Great Southern and Western Railway (GS&WR) became the third main railway to open in the country in the 1940's. In November 1841, the first contracts for the Dublin–Hazelhatch and Hazelhatch–Sallins lines were allotted to contractors William McCormick and William Dargan, respectively. Hazelhatch Station is located on the road from Newcastle to Celbridge (at the southern end of the proposed development).

According to Joyce (1912), an *'uninteresting road leads to Hazlelatch (sic)¹⁵, on the Grand Canal, a station of some importance in former years when the traffic on these waterways was greater than it is at the present time.'* The name of this place appears on the maps of the Down Survey as 'Hazelhurst,' meaning a hurst or wood of hazel trees. Joyce (1912) describes the approach to the railway station via a 'high bridge' and the station itself as 'pretty.'

1.5.1.1 Townlands and Toponymy

The toponymy of an area can be a valuable indicator of the type of cultural heritage within it. Place-names can sometimes be an invaluable source of information not only on the topography, land ownership, and land use within the landscape, but also on the history, archaeological monuments and folklore associated with a place. Townlands are land divisions that form a unique feature in the Irish landscape; their origins can be of great antiquity, and many are of pre-Norman date. They existed well before the establishment of parishes or counties. Townland boundaries can take the form of natural boundaries or routeways as well as artificially constructed earthen banks and ditch divisions. They are predominantly formed of substantial boundaries which are usually distinguishable from standard field division boundaries.

Townland names within the study area comprises a combination of Gaelic Irish names which have been phonetically anglicised, and English names of Anglo-Norman origin (**Table**). The Gaelic Irish names describe the area in the early medieval period, prior to the settlement of Celbridge by the Anglo-Normans. Celbridge derives from 'Kildrought', itself an anglicisation of 'Cill droichead', the church at the bridge. It was first recorded in the early 13th century and village was known as Kildrought until the 18th century. The name "Cill" implies the existence of a pre-Norman church site, but nothing is known of this foundation.

Celbridge is an interesting example of an Anglo-Norman borough which was founded beside an Early Christian site reflected by the curving line of Church Road. The 17th-century re-shaping of the borough has destroyed its original plan, but the Anglo-Norman borough was probably located in the vicinity of St Mochua's church and in the area of the bridge from which the name "Cill Droichead" was derived.

¹⁵ sic meaning "intentionally so written" The quoted matter has been transcribed or translated exactly as found in the source text, complete with any erroneous, archaic, or otherwise nonstandard spelling, punctuation, or grammar.

Section 177AE Appendices to the Environmental Report

The English names relate to the land use and principal landholders of the area in the medieval period. The place name origins and meanings of the townlands in the cultural heritage study area are provided in **Table 1**.

Table 1: Townlands in the Cultural Heritage Study Area

Townland	Parish	Barony	Origin	Meaning
Oakley Park	Kildrought	North Salt	English	Oakley Park
Celbridge Abbey	Donaghcumper	South Salt and South Salt	Irish	Mainistir Chill Droichid – Celbridge Abbey
Newtown	Donaghcumper	South Salt	English	New town
Simmonstown	Donaghcumper	South Salt	English	This townland was mentioned in sources as early as 1540 – it was cited in the Inq. H VIII (Archdall): AL Leathanach: 1,16 Mon. Hib as ‘a certain place planted with [t]rees called the Hoolie stedd, or Hoolie place of Symondeston’
Commons Lower,	Donaghcumper	South Salt	Anglo- Norman	Common land
Commons	Donaghcumper	South Salt	Anglo- Norman	Common land
Dangan	Lyons	South Salt	Irish	From the Irish <i>An Daingean</i> which can mean fortress. The placename appears in written sources since at least 1497
Loughlinstown,	Donaghcumper	Salt South	Irish	In 1540 it was known as <i>Tolysselaghelyn?</i> in the <i>manerium de Lexslype</i> and then most commonly as <i>Loughlinstown</i> or <i>Baile Mhaoileachlainn</i> meaning the townland of McLoughlin
Straleek	Donaghcumper	Salt South	Irish	From the elements <i>Stra</i> meaning deep and <i>leac</i> a flagstone translates to “of the flagstone surface”.
Hazelhatch	Newcastle	Newcastle	English/ Irish	This name has appeared in many sources since 1405. It is from the Irish, ‘Collchoill’, with <i>Coll</i> meaning hazel and <i>choill</i> meaning wood
Ringwood	Newcastle	Newcastle	English/Irish	From the Irish <i>Coill na Chruinn</i> -meaning wood of the ring
-	Kildrought	North Salt	Irish	Cill droichead – church bridge

Section 177AE Appendices to the Environmental Report

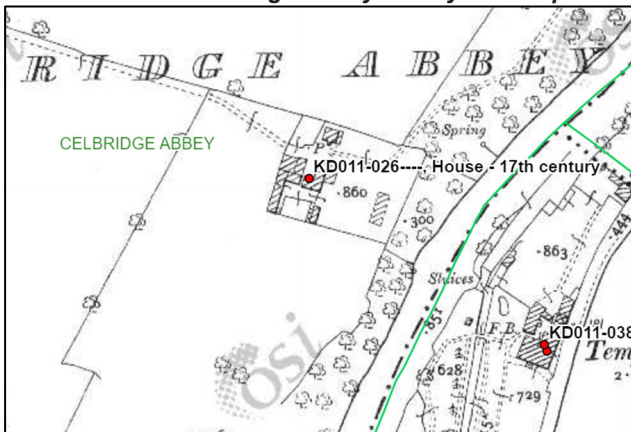
Townland	Parish	Barony	Origin	Meaning
-	Donaghcumper	South Salt	Irish	Domhnach Comair – church / Sunday meeting place
-	Lyons	South Salt	Irish	Possibly from <i>Liatháin</i> – Grey Hills
-	-	North Salt	Anglo- Norman	<i>Saltus salmonis</i> – Salmon Leap. The Latin name for the Old Norse for Leixlip – <i>Lax-hlaup</i>
-	-	South Salt	Anglo- Norman	<i>Saltus salmonis</i> – Salmon Leap. The Latin name for the Old Norse for Leixlip – <i>Lax-hlaup</i>

Townland boundaries can take the form of natural topographical features (such as rivers) or routeways but are predominantly formed by well-built artificially constructed earthen bank and ditch divisions. Boundaries that demarcate the townland are often distinguishable from standard field division boundaries.

The townland boundaries that the proposed development runs through however comprises of public and private roads/lanes and the River Liffey and have no other physical presentation, none are of archaeological interest. The river is a major landscape feature within this area, and it forms the barony boundary between North Salt and South Salt.

APPENDIX 10.1D RECORDED ARCHAEOLOGICAL AND ARCHITECTURAL HERITAGE SITES WITHIN 250M RADIUS OF THE PROPOSED DEVELOPMENT

Archaeological Heritage

Reference No.	KD011-026
Legal Status	RMP
Townland	Celbridge Abbey
Site Type	House – 17 th century
ITM	696544, 732206
Description	A house is depicted at this location on Taylor's map of Kildare (1783). The First Edition 6-inch OS map (1836) depicts it as a simple L-shaped structure, but extensions and ancillary structures were added in the 19 th century, as depicted in the 25-inch OS map (1908). The area was developed in the late 20 th century, with no above-ground trace surviving. There is an error in the description of this site on the Historic Environment Viewer at www.archaeology.ie where it describes Celbridge Abbey (NIAH 11805074). It is possible that the error is in the coordinates and that that recorded monument is, in fact, Celbridge Abbey.
Sources	www.osi.ie , www.archaeology.ie , Killanin and Duignan 1967, 160; Bence-Jones 1978, 81
Images	 Recorded monument and Celbridge Abbey on Taylor's map of Kildare, 1783  House depicted on 25-inch OS map, 1908

	
Distance	c. 165m southwest of the proposed route
Potential effect	No effect

Reference No.	KD011-037
Legal Status	SMR (Scheduled for inclusion in the next revision of the RMP)
Townland	Newtown
Site Type	Mill - unclassified
ITM	696667, 732117
Description	According to Fitzgerald (1909-11, 520-21), the site marked 'Terrils Ca. (KD011-019) and Mills' on Taylor's 1783 Map of County Kildare was subsequently occupied by the 'Temple Mills' which are shown on the first edition 6-inch OS map (1836). He quotes a description of the mill and its appurtenances from the Civil Survey of 1654; 'Mrs. Mabel Aylmer, Irish Papist, is the owner of "Tyrrells Mill" and two acres of land, which are valued for letting purposes at £16 a year. ... There is one Corne Mill and one Cloth Mill (KD011-038) upon the premises, but they are both ruined and waste' . Simington's (1952) publication of the Civil Survey does not show such an entry, but it is clear from cartographic evidence that a mill existed at this location. It is also recorded in the Kildare Industrial Archaeology Heritage Survey (KIAHS ref.: 011-020) which notes that the Temple Mills are probably identical to the cotton mills and power loom described by Lewis (1837). The proximity to Celbridge Abbey may suggest an 18th /early 19th century mill founded at the site of an established former mill / mill-race.
Sources	www.archaeology.ie, www.osi.ie, Taylor 1783, Simington 1952, Fitzgerald 1909-11, Kildare Industrial Archaeology Heritage Survey, Lewis 1837

Images	 <i>Temple Mills on First Edition 6-Inch OS map,</i>
Distance	c. 135m southwest of the proposed development
Potential effect	No effect

Section 177AE Appendices to the Environmental Report

Reference No.	KD011-038
Legal Status	SMR (Scheduled for inclusion in the next revision of the RMP)
Townland	Newtown
Site Type	Mill – unclassified
ITM	696666, 732120
Description	According to Fitzgerald (1909-11, 520-21) the site marked 'Terrils Ca. (KD011-019) and Mills' on Taylor's 1783 Map of County Kildare was subsequently occupied by the 'Temple Mills' which are shown on the first edition 6-inch OS map (1836). He quotes a description of the mill and its appurtenances from the Civil Survey of 1654; 'Mrs. Mabel Aylmer, Irish Papist, is the owner of "Tyrrells Mill" and two acres of land, which are valued for letting purposes at £16 a year. ... There is one Corne Mill (KD011-037) and one Cloth Mill upon the premises, but they are both ruined and waste'. Simington's (1952) publication of the Civil Survey does not show such an entry, but it is clear from cartographic evidence that a mill existed at this location.
Sources	www.archaeology.ie, www.osi.ie, Taylor 1783, Simington 1952, Fitzgerald 1909-11.
Images	See KD011-037 entry
Distance	c. 135m southwest of the proposed development
Potential effect	No effect

Reference No.	KD011-019
Legal Status	RMP
Townland	Newtown
Site Type	Castle – tower house
ITM	696775, 732014
Description	According to Fitzgerald (1909-11, 520-21), the site marked 'Terrils Ca. (castle) and Mills' on Taylor's 1783 Map of County Kildare was subsequently occupied by the 'Temple Mills' which are shown on the first edition 6-inch OS map (1836). He quotes a description of the mill and its appurtenances from the Civil Survey of 1654; 'Mrs. Mabel Aylmer, Irish Papist, is the owner of "Tyrrells Mill" and two acres of land, which are valued for letting purposes at £16 a year. ... There is one castle upon the aforesaid two acres of land which in the year 1640 was valued to be worth £100, but since being ruined, is now valued at £5.' Fitzgerald concludes, 'Of Tyrrell's Castle there are now no remains', but he supplies a drawing of the castle by S. Walker in 1778 which shows a narrow rectangular building with a projecting corner tower (RMP files). In fact, Taylor's map is labelled 'Terrils Ca. & Mills Ca. Rs.', meaning Terrill's Castle and Mills Castle Ruins. The map is therefore indicating two castles, one of which is clearly depicted on Taylor's map, and which corresponds with castle KD011-016 which is depicted on the first edition 6-inch OS map. It is not clear from Taylor's map where the second one was located but the name would suggest it was close to Temple Mill. It would also appear from the Civil Survey that the proprietor was in fact Lady Allen of St. Wolstan's, Irish Papist. The Civil Survey notes that 'There is one little Castle upon the lands of Simonstowne Aforesaid wch was valued to be worth twenty pounds in the yeare 1640 butt being since burned is now valued to be worth ten pounds' (Simington 1952).
Sources	www.archaeology.ie, www.osi.ie, Taylor 1783, Simington 1952, Fitzgerald 1909-11.

Images	
	<i>'Terril's Castle' and 'Mill's Castle' depicted on Taylors map of Kildare, 1783</i>
	Distance c. 135m southwest of the proposed development
Potential effect	No effect
Reference No.	KD011-063
Legal Status	SMR (Scheduled for inclusion in the next revision of the RMP)
Townland	Simmonstown
Site Type	Enclosure
ITM	697288, 732263
Description	Aerial imagery shows an enclosure of c. 50m diameter, possibly with a second external ditch visible on the south-east. A housing estate was constructed across the north-east edge of the monument in c. 2005, but there is no record on the 'Excavations' database of archaeological investigations having taken place on the site. The site is located in a low-lying field under crop at the time of the field inspection. There is no above ground visibility or low relief indications of the subsurface site.
Sources	www.archaeology.ie, www.osi.ie, Google Earth, www.excavations.ie
Images	
	<i>Google Earth image of enclosure, 2018</i>
	Distance c. 165m southwest of the proposed route
Potential effect	No effect

Section 177AE Appendices to the Environmental Report

Reference No.	KD011-029
Legal Status	RMP
Townland	Enclosure
Site Type	Simmonstown
ITM	697410, 732037
Description	Visible on a GSI aerial photograph (W 467-6) as the cropmark of a possible enclosure. On level pasture in a stud farm c. 200m west of a castle (KD011-016) and c. 250m southwest of a possible enclosure (KD011-030). No visible surface traces survive. The site is located in a low-lying field of grazing pasture, the ground was rough underfoot and generally uneven. There is no above ground visibility or low relief indications of the subsurface site.
Sources	www.archaeology.ie, www.osi.ie
Distance	c. 146m northeast of the proposed development
Potential effect	No effect

Reference No.	KD011-016
Legal Status	RMP
Townland	Simmonstown
Site Type	Castle - unclassified
ITM	697561, 732000
Description	Recorded in the Ordnance Survey Letters (Herity 2002, 9) as, '... a Castle in ruins, of which a great part is remaining.' On level pasture. The ruins were burnt c. 1980 and subsequently removed, leaving no visible surface trace of the monument (SMR file). Some sub-surface features may, however, survive. It is depicted on Taylor's map of Kildare (1783) and appears to be one of either Terril's Castle or Mills Castle. The site of the castle is on a northeast to southwest running road of single carriage laneway. The northeastern end of the laneway is overgrown and no longer in use, and the southwestern end provides access to a vernacular structure. The structure is on the western side of the lane. It comprises a single-storey three-bay dwelling with a pitched slate roof, a porch, and replacement windows. The roof is a relatively modern addition; there is a slight slope in its pitch, suggesting that it replaced an earlier thatched roof. The structure's symmetry is disproportionate, with the third bay at a remove from the main door and the chimney line in between. Its unusual configuration may indicate that the house may have reused an earlier structure, such as a castle. However, this is speculation and access to the interior, and further investigation would be required. There is a modern shed built onto the southern end of the dwelling. Across the lane and facing the house is a small single-roomed shed. The pitch of the original roof in the rear wall also suggests a former thatched building. The field surrounding the house is a low-level field of grazing pasture divided into paddocks.
Sources	www.archaeology.ie, www.osi.ie, Herity 2002

Images



'Terril's Castle' and 'Mill's Castle' depicted on Taylors map of Kildare, 1783



Façade of the Vernacular Structure note the disproportion of the bays



View inside the shed with the raised roof

Distance

c. 198m c. 146m northeast of the proposed development

Potential effect

No effect

Architectural Heritage

Reference No.	RPS BH11-126
Legal Status	Protected Structure
Townland	Celbridge Abbey (Celbridge Ed)
Site Type	Folly, Vanessa's Bower
ITM	696859/732459 (See description below regarding incorrect location)
Description	An early 18th century cave-like shelter of limestone construction covered in soil built into an embankment overlooking the River Liffey. The structure was regularly visited by Dean Johnathan Swift and ester Vanhomrigh who Swift affectionately called 'Vanessa'. It has been described as a grotto, that is partly natural and partly artificial rocky seat, hidden in the river bank (J.G.B 1912). The site is located at the southernmost end of Celbridge Abbey Demesne. 'Vanessas's Bower' is labelled on the revised OS on the southern side of the river, The RPS however places it in an incorrect location just outside the demesne lands in the vicinity of a treatment plant at the northeastern end of a greenspace associated with Abbey Park.
Sources	County Development Plan RPS
Distance	40m east (corrected location)
Potential effect	No effect

Reference No.	RPS B11-110, NIAH 11805078
Legal Status	Protected Structure
Townland	Celbridge Abbey (Celbridge Ed)
Site Type	Foot Bridge, Rock Bridge, Clane Road (off),
ITM	696957/ 732574
Description	Four-arch rubble stone footbridge over river, c.1750, with cut-stone triangular cut-waters, rock-faced voussoirs, cut-stone coping and pedestrian gateway to south-east comprising triangular-headed opening with cut-stone voussoirs, rubble stone piers and cut-stone stringcourse over having rubble stone parapet wall. Rubble stone walls. Cut-stone triangular cut-waters. Rubble stone parapet walls. Cut-stone coping. Four segmental arches. Rocked-faced voussoirs. Rubble stone soffits with render over. Sited spanning River Liffey with grass banks to river. Rock Bridge is an attractive and unusual rubble stone footbridge that forms an imposing feature on the River Liffey and is one of a group of bridges (both footbridges and road bridges) on the section of that river that passes through County Kildare – the bridge is reputed to be one of the earliest surviving bridges on the River Liffey. The construction of the arches that have retained their original shape is of technical and engineering merit, while the cut-stone work to the cut-waters and voussoirs attests to the high quality of stone masonry practised in the locality. An unusual feature is the gateway to the south-east, which forms a pictures feature when viewed from the road to south. The bridge is of social and historical significance, having been built as part of the planned Celbridge Abbey estate.  <i>View of the footbridge</i>
Sources	NIAH, County Development Plan RPS
Distance	130m northeast
Potential effect	No effect

Reference No.	RPS B11-111, NIAH 11805079
Legal Status	Protected Structure
Townland	Celbridge Abbey (Celbridge Ed)
Site Type	Foot bridge
ITM	696935/ 732588
Description	Two-arch rubble stone footbridge over canalised section of river, c.1775, with rubble stone pier, rubbles tone voussoirs and cut-stone coping. Random rubble stone walls. Rubble stone rounded pier to south-east. Rubble stone parapet walls. Cut-stone coping. Two elliptical arches. Rubble stone voussoirs. Rubble stone soffits with render over. Sited spanning canalised section of river leading to River Liffey to south-east. Sluice, c.1800, to north-west retaining early sluice gates and original iron mechanisms. This bridge is an attractive rubble stone footbridge that forms an attractive feature on the canalised section of the River Liffey. The construction of the arches that have retained their original shape is of technical and engineering merit. Also of technical interest is the sluice to north-west that retains early sluice gates and most of its original mechanisms. The bridge exhibits good quality masonry to the construction of the walls. The bridge is of social and historical significance, having been built as part of the planned Celbridge Abbey estate.  <i>View of the footbridge (After NIAH)</i>
Sources	NIAH, County Development Plan RPS
Distance	154m northeast
Potential effect	No effect

Reference No.	RPS B11-112, NIAH 11805080
Legal Status	Protected Structure
Townland	Celbridge Abbey (Celbridge Ed)
Site Type	Mill Race - Sluice/Sluice Gate
ITM	696924/ 732566
Description	Sluice, c.1800, retaining early sluice gates and original iron mechanisms. Squared rubble stone retaining walls. This sluice is of considerable technical interest, having built to regulate the flow of the canalised section of the River Liffey into the main section of the River Liffey to south. Many important early or original features and materials remain intact, including sluices gates and the iron mechanisms. The sluice is of some social and historical interest, having been built as part of the planned Celbridge Abbey estate.
Sources	NIAH, County Development Plan RPS
Distance	160m northeast
Potential effect	No effect

Reference No.	RPS SD145, NIAH 11207013
Legal Status	Protected Structure
Townland	Hazelhatch
Site Type	Gates/railings/walls
ITM	698522 /731343
Description	Gateway, extant 1907, on a symmetrical plan comprising pair of rock faced limestone ashlar cylindrical piers on rock faced cut-limestone plinths having margined rock faced cut-limestone shallow domed capping. Road fronted at entrance to grounds of Hazelhatch and Celbridge Railway Station.

Section 177AE Appendices to the Environmental Report

	A gateway making a pleasing, if largely inconspicuous visual statement in a suburban street scene at an entrance on to the grounds of the Hazelhatch and Celbridge Railway Station complex.
Sources	NIAH, County Development Plan RPS
Distance	243m southeast
Potential effect	No effect

Reference No.	RPS SD150, NIAH 11207011
Legal Status	Protected Structure
Townland	Hazelhatch
Site Type	Railway station
ITM	698349 /731246
Description	Detached three-bay single-storey railway station with half-dormer attic, opened 1846, on a T-shaped plan centred on single-bay single-storey gabled advanced breakfront. Occupied, 1901; 1911. Now disused. Pitched slate roof on a T-shaped plan centred on pitched (gabled) slate roof (breakfront), clay ridge tiles, yellow brick Flemish bond central chimney stack on chamfered cushion course on yellow brick Flemish bond base having stringcourse below capping supporting terracotta tapered pots, cut-granite chamfered coping to gables on ogee kneelers including cut-granite chamfered coping to gable (breakfront) on ogee kneelers with abbreviated finial to apex, and replacement uPVC rainwater goods on eaves boards. Repointed yellow brick Flemish bond walls on cut-granite plinth with cut-granite quoins to corners. Tudor-headed central door opening, cut-granite surround having chamfered rebated reveals with fitting now boarded up. Square-headed flanking window openings, cut-granite surrounds having chamfered reveals with hood mouldings framing boarded-up fittings. Square-headed window openings (gables) with cut-granite sills, and concealed dressings having chamfered reveals framing rendered infill. Set in own grounds. A railway station identified as an important component of the mid nineteenth-century built heritage of south County Dublin on account of the connections with the development of the Great Southern and Western Railway (GSWR) line opened (1846) by the Great Southern and Western Railway (GSWR) Company with the architectural value of the composition, one resembling a scaled-down version of the contemporary Carlow Railway Station (1845-6) and thereby attributable to Sir John Benjamin MacNeill (c.1793-1880), confirmed by such attributes as the compact plan form centred on a restrained Tudoresque doorcase; the construction in a honey-coloured yellow brick with granite dressings not only demonstrating good quality workmanship, but also producing a pleasing two-tone palette; and the high pitched roof. NOTE: Occupied (1901) by Thomas Young (----), 'Railway Station Master' (NA 1901; and (1911) by Richard Cousins (----), 'Railway Agent' (NA 1911).
Sources	NIAH, County Development Plan RPS
Distance	142m southeast
Potential effect	No effect

Reference No.	RPS SD151, NIAH11207010
Legal Status	Protected Structure
Townland	Hazelhatch
Site Type	Foot bridge
ITM	698350/ 731216
Description	Single-arch footbridge over railway line, extant 1907. Set in grounds shared with Hazelhatch and Celbridge Railway Station spanning railway line. A footbridge supplied by E. [Edward] Manisty (established 1878) of Dundalk contributing positively to the group and setting values of the Hazelhatch and Celbridge Railway Station complex.
Sources	NIAH, County Development Plan RPS
Distance	144m southeast
Potential effect	No effect

APPENDIX 10.1E WIREFRAMES / HERITAGE PHOTOMONTAGES

APPENDIX D PHOTOMONTAGES

794-NI-P&E-02846 Celbridge to Hazelhatch
Kildare County Council



Project: 02846
November
2025



Existing View



Map image



Tripod location

Camera	Nikon D600	Easting	697126	Title: CH02 Celbridge Abbey Field Existing View	Details	Drawn by:	GMG	Project: Kildare County Council	Client:		 Making Complex Easy
Date	2024.06:26 08:58	Northing	732730		Projection:	IRENET95	Checked:	SA			
View height	1.65 m AGL	Direction	220°		Data Source:	RPS 2024	Job Ref:	02846			
Field of View	100°	Distance	480 m		Status:	For Planning	Date:	November 2025			



Extent View

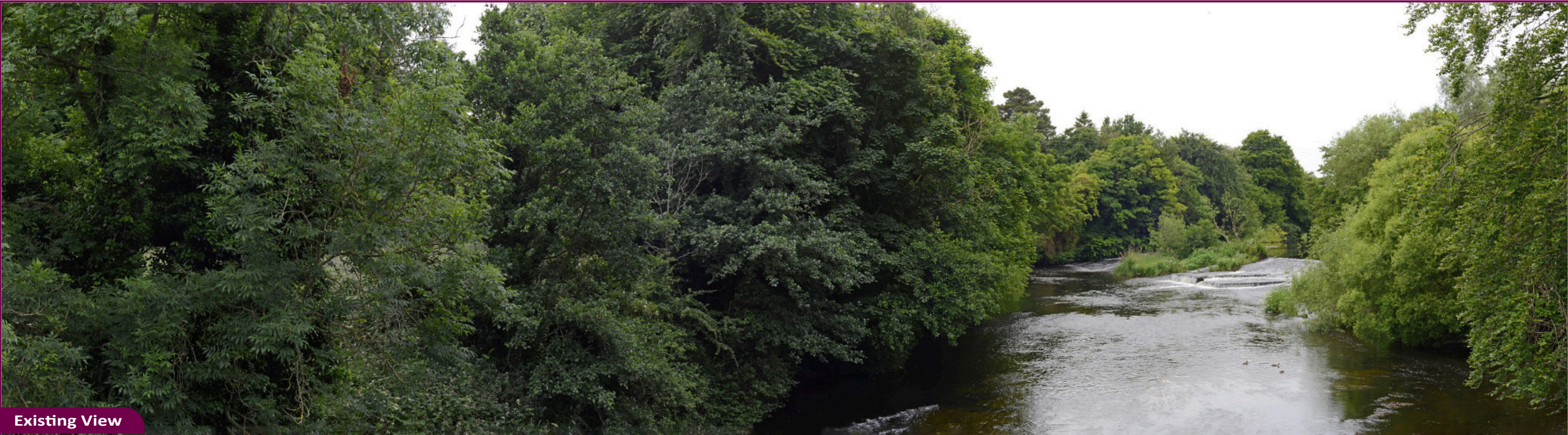


Map image



Tripod location

Camera	Nikon D600	Easting	697126	Title: CH02 Celbridge Abbey Field Extent View	Details	Drawn by:	GMG	Project: Kildare County Council	Client:		 Making Complex Easy Elmwood House, 74 Boucher Road BELFAST, BT12 6RZ 028 9066 7914
Date	2024.06:26 08:58	Northing	732730		Projection:	IRENET95	Checked:	SA			
View height	1.65 m AGL	Direction	220°		Data Source:	RPS 2024	Job Ref:	02846			
Field of View	100°	Distance	480 m		Status:	For Planning	Date:	November 2025			



Existing View



Map image



Tripod location

Camera	Nikon D600	Easting	696964	Title: CH03 Abbey Rock Bridge Existing View	Details	Drawn by:	GMG	Project: Kildare County Council	Client: 	 Making Complex Easy Elmwood House, 74 Boucher Road BELFAST , BT12 6RZ 028 9066 7914
Date	2024.06:26 09:21	Northing	732576		Projection:	IRENET95	Checked:	SA		
View height	1.65 m AGL	Direction	220°		Data Source:	RPS 2024	Job Ref:	02846		
Field of View	100°	Distance	260 m		Status:	For Planning	Date:	November 2025		



Existing View



Map image



Tripod location

Camera	Nikon D600	Easting	696685	Title: CH04 Temple Mills Existing View	Details	Drawn by:	GMG	Project: Kildare County Council	Client: 	 Making Complex Easy Elmwood House, 74 Boucher Road BELFAST, BT12 6RZ 028 9066 7914
Date	2024.06:26 10:30	Northing	732146		Projection:	IRENET95	Checked:	SA		
View height	1.65 m AGL	Direction	50°		Data Source:	RPS 2024	Job Ref:	02846		
Field of View	100°	Distance	170 m		Status:	For Planning	Date:	November 2025		



Map image



Tripod location

Camera	Nikon D600	Easting	696685	Title: CH04 Temple Mills Extent View	Details	Drawn by:	GMG	Project: Kildare County Council	Client:		 Making Complex Easy Elmwood House, 74 Boucher Road BELFAST, BT12 6RZ 028 9066 7914
Date	2024.06:26 10:30	Northing	732146		Projection:	IRENET95	Checked:	SA			
View height	1.65 m AGL	Direction	50°		Data Source:	RPS 2024	Job Ref:	02846			
Field of View	100°	Distance	170 m		Status:	For Planning	Date:	November 2025			

Appendix 11 Material Assets: Agricultural Properties Supporting Information

APPENDIX 11.1A IMPACT MAGNITUDE

Impacts on agricultural properties arising from construction and operation of the proposed Project may include:

- Land-take;
- Farm division;
- Farm enterprise; and
- Effects on Farm Buildings / Farm Facilities.

Land take

The effect of land take on an agricultural property has the potential to have a significant effect. The area of land take together with its location and duration will determine the magnitude of impact. The greater the area of land-take indicates a higher magnitude of impact. The area and location of land take are often interlinked as land take near a farmyard on a single unit farm will generally be of a greater magnitude than a similar area on a fragmented part of the farm holding. The duration of land take can vary from permanent (greater than sixty years) to short term (one year to seven years). The degree of the magnitude of impact decreases with shorter durations.

Farm Division

The effect of farm division is as a direct result of the location of land take on an agricultural property and has the potential to have a significant effect on farm holdings. The effect can often be more significant than that of land take on the farm holding.

The division of lands is largely determined by the land take location which can often result in more significant impacts on farm holdings. Similar to the effect of land take, the area of severed lands, their location relative to remaining lands and the duration of severance will influence the magnitude of impact. The division of a significant area or proportion of available land will indicate a high magnitude of impact. The division of lands adjoining a farmyard, particularly an intensive farm such as a dairy farm, will have a higher magnitude of impact than the severance of an area of land at the external boundary of a farm. The permanent severance of lands will have a greater magnitude of impact than temporary severance.

During the construction period, there may be temporary impacts on access to both severed and remaining lands due to works involved and traffic diversions required for the construction of the Proposed Scheme and the associated junctions. Where farm division occurs, mitigation measures may be necessary to restore access to lands.

Farm Enterprise

The effect of land take and / or farm division on farm holdings will differ according to farm enterprise(s). Some farms enterprises are considered more sensitive to the construction and / or operation effects of a proposed development due to the intensity or type of farming activities on the farm holding.

Dairy farm enterprises typically involve intensive agricultural production and are sensitive to land take and land severance effects. Equine enterprises involving interaction with horses at a moderate to intensive level may be considered sensitive to direct and indirect construction and operation effects of a proposed development. Tillage enterprises typically indicate high quality lands and are more sensitive to land take effects. Pig and Poultry farms are typically highly intensive farming enterprises within a farmyard setting and are considered sensitive to direct impacts. Agribusinesses typically are locations of local employment within the sector and may be considered sensitive to direct impacts.

Effects on Farm Buildings / Farm Facilities

A direct impact on a farmhouse, farm buildings and / or farm facilities has the potential to have a significant effect on farm holdings.

The degree of magnitude will depend on the type and nature of farm buildings that are affected. Where animal housing and animal manure storage or fodder storage facilities are affected the degree of magnitude will be high. Farm buildings such as general-purpose sheds or animal handling facilities are indicative of a medium magnitude of impact. Other facilities such as the loss of natural shelter are indicative of a low to medium magnitude of impact.