

## 21 Schedule of Additional Environmental Commitments (Updated 13 March 2020)

### Note:

The following are new environmental commitments since the publication of the EIAR in October 2018. Those in red which are not highlighted in yellow were submitted at the Oral Hearing to An Bord Pleanála on the 21 February 2020. Those in red and highlighted in yellow are new commitments since the 21 February 2020 to 13 March 2020.

### 21.1 General

Ref No.	Stage	Commitments
1.22	C	A Pest Control Plan (PCP) has been developed to implement pest control measures during construction of the proposed road development and this will be incorporated into the CEMP. A summary of the measures included in the PCP are outlined in the Statement of Evidence – Responses to Engineering, Need for the Project, Alternatives Considered and Material Assets Non-Agriculture Objection/Submissions as read into the record on day one of the oral hearing on 18 February 2020.
1.23	O	A 2m cycle track will be provided from Gort na Bró Roundabout to Gael Scoil Mhic Amhlaigh on both sides as shown on Drawing GCRR-SK-OH-054 included in Appendix A.21.1.
1.24	O	A two-way cycle track will be provided from Gael Scoil Mhic Amhlaigh to Ragoon Road on the eastern verge of Gort Na Bró Road.
1.25	O	Galway County Council propose that plots 583a.209, 583c.201, 583c.202; 583c.203 and 583a.208 are temporary plots, required only for the duration of the construction period for use as a part of the overall construction compound and to enable construction of the proposed road development. A right of way will be provided over Access Road AR 11/01 in favour of McHugh Properties to provide access to these lands.
1.26	O	A 10m wide right of way will be registered by Galway County Council in favour of the landowner in Plot 570 to facilitate access between the northern and southern land parcels under Menlo Viaduct.
1.27	O	Galway County Council propose that plot 717a.201 is removed from the N6 Galway City Ring Road Motorway Order.

## 21.3 Human Beings, Population and Health

Ref No.	Stage	Commitments
18.5	C	Provide for alternative access along the bank of the River Corrib, along with prior advice for walkers, if access restrictions apply due to construction of the overhead bridge crossing.  Safe access across the construction site within NUIG Sporting Campus will be maintained for the duration of the construction contract.
18.15	C	A pedestrian crossing will be installed at the entrance to Lackagh Quarry prior to the commencement of construction works to maintain the greenway. This pedestrian crossing will be maintained by the contractor for the duration of the works.  There will be a speed restriction of 15kph on the access road into the site compound at Lackagh Quarry for the duration of the works.

## 21.4 Material Assets Non-Agriculture

Ref No.	Stage	Commitments
15.5	CO	<del>Alternative pitch facilities will be provided to replace the existing pitches directly impacted by the proposed road development. The facilities include a floodlit 3G GAA pitch and a floodlit 3G training area and associated site infrastructure for the drainage of these pitches and furniture such as ball stop netting.</del> The proposed road development <del>also</del> intercepts the existing sports pavilion resulting in direct impacts to its western end and the building will be modified as follows: <ul style="list-style-type: none"> <li>The existing western plant room, 1 no. changing room, 1 no. storage area, 1 no. weights area and associated access hallways on both ground floor and upper levels will be demolished.</li> <li>The western plant room and its associated plant will be relocated.</li> <li>Construction and reconfiguration of the internal and external walls, roof, windows and door locations.</li> </ul>
15.11	O	The mitigation strategy at the NUIG Sporting Campus has been amended to reflect the following: <ul style="list-style-type: none"> <li>The southern existing grass-based GAA pitch immediately adjacent to River Corrib is no longer required for the mitigation strategy in NUIG</li> <li>The northern existing grass-based GAA pitch immediately adjacent to River Corrib, which is being temporarily acquired by Galway County Council will be reinstated as a grass training area, with appropriate sand base and drainage in line with its current use post construction and returned to NUIG</li> <li>To ensure interconnection for NUIG post completion of the construction, Galway County Council will be providing a right of way for NUIG to use the lands under the proposed viaduct for sporting/athletic purposes by way of a long lease.</li> </ul>
15.13	O	Galway County Council will notify Ob_521_O_517.14_02 of any upcoming day or night time closures near their property.
15.14	C	The existing decorative historic gates at the entrance to the Aughnacurra Estate will be removed, stored and erected at the front entrance upon

Ref No.	Stage	Commitments
		completion, noting that they currently do not close and that they will not close and span the new entrance width.
15.15	C	The existing signage at property 668 on the N83 Tuam Road will be removed, stored and erected at the property upon completion.
15.16	C	The residual lands at property 539 and 540 will be sloped from the rear of the retained exiting estate wall up to the embankment of the proposed road development.
15.17	C	The modifications to the Sports Pavilion at NUIG Sporting Campus will be undertaken as enabling works during the summer period prior to commencement of the construction of the proposed road development.
15.18	C	Welfare facilities at the Sports Pavilion at NUIG Sporting Campus will be maintained throughout the construction works.
15.19	C	There will be no parking permitted at the NUIG Sporting Campus carpark for the personnel employed for the construction works.

## 21.5 Material Assets – Agriculture

Ref No.	Stage	Commitments
14.9	C	Galway County Council will employ an equine expert or veterinary practitioner for the duration of the construction contract

## 21.6 Air Quality and Climate

Ref No.	Stage	Commitments
16.12	C	The Contractor shall use reinforced concrete with an emission factor of no greater than 0.0949 KgCO <sub>2</sub> e/Kg.

## 21.7 Noise and Vibration

Ref No.	Stage	Commitments
17.20	C	The location of potentially vibration sensitive activities have been identified for manufacturing facilities within the Parkmore and Racecourse Business Parks. This location is in proximity to an area where blasting will take place as part of the proposed tunnel at Ballybrit. The most effective form of mitigation for this type of sensitive process is through on-going consultation with the property owners as the design and construction of the proposed road development progresses. This will involve baseline vibration monitoring and the use of trial blasts using an initial low level charge with simultaneously vibration measurements undertaken at the building. This information will be used to determine acceptable vibration levels for the facility relating to the sensitivity of the operating equipment. The results of this trial assessment will then set appropriate agreed limits values at the facility in question which will be monitored during subsequent blasts or other excavation methodologies. Where no safe limit is determined, the timing and scheduling of blasts will be undertaken in consultation with the facility when no sensitive operations are taking place. Given the short time period over which an individual blast takes place (i.e. a number of seconds), this approach is deemed to be feasible.

Ref No.	Stage	Commitments
		M&M Qualtech will be included in the list of property owners to be consulted with as the design and construction of the proposed road development progresses, in particular in respect of the dates of rock breaking and blasting and the detailed traffic management plan for their area. Vibration monitoring will be undertaken at their property in Parkmore.
17.23	O	Noise barrier NB12/05 will be extended west to Chainage 12+550 to reduce noise levels at assessment location R188 below the TII design goal taking account of the RFI sensitivity analysis.
17.24	C	The residents in the Menlo-Coolough-Ballinfoile-Ballindooley area will be informed of any proposed blasting in advance of blasting been undertaken, as set out in Section 13.1 of the CEMP in Appendix A.7.5 of the EIAR and Appendix C of the NIS.
17.25	C	A property condition survey will be carried out at the thatched cottage in Coolough Village, Menlough and at M&M Qualtech, Parkmore Business Park.

## 21.8 Landscape and Visual

Ref No.	Stage	Commitments
12.40	O	It is proposed to extend the proposed of 3m wide mixed screen planting belt along the property side of the proposed road development west from Ch. 1+760 back to Ch. 1+580 as indicated on Figure 12.1.14 of EIAR, as amended
12.41	C	A grass verge with birch tree planting will be established to either side of the new entrance avenue into Aughnacurra Estate to match the character of the existing entrance.
12.42	C	Unless where the existing wall is retained, a new stone wall will be constructed to the front of properties 539 and 540 (west of proposed road development) along the side of the existing / realigned avenue within Aughnacurra Estate to match the character of existing stone walls within the estate.
12.43	C	Ground levels within the residual lands at properties 539 and 540 will be raised back towards the proposed road development and planted with 1000 no. trees of between 1.0 and 2.0m in height in accordance with the details set out on Figure GCRR-SK-OH-652 in Appendix A.21.2. The soil grading and planting shall not interfere with the proposed Bat Roost Structure in property 540

## 21.10 Archaeology, Architectural and Cultural Heritage

Ref No.	Stage	Commitments
13.12	C	The Cultural Heritage Specialist and Project Archaeologist will meet with the representative of the Menlo-Coolough-Ballinfoile-Ballindooley residents to inspect unrecorded features of possible cultural heritage interest associated with the old village of Coolough, Menlo. A report on the site inspection will be made available to residents and uploaded to a dedicated project website.



## 21.11 Soils and Geology

Ref No.	Stage	Commitments																																										
9.3	C	<p>A construction earthworks programme will be implemented as part of the CEMP included in <b>Appendix A.7.5 of the EIAR</b>, which will be finalised by the Contractor, for the proposed road development which categorises the source of material for each fill section. During the finalisation of this programme, the fill limitations outlined below will be incorporated.</p> <p>To prevent impact to the local peatland habitats, <b>the following</b> fill limitations will be incorporated at the locations identified in <b>the table below. Table 9.18 of Chapter 9, Soils and Geology.</b></p> <ul style="list-style-type: none"> <li>Only pavement and capping layers protected from surface water runoff and groundwater movements are permitted to be derived from non-native material</li> <li>All other acceptable fill material will be derived from native material or other pH compatible material</li> </ul> <p><b>Note: This table below replaces Table 9.18 in Section 9.6.2.1 of Chapter 9 of the EIAR (page 788).</b></p> <p><b>Table 21.1: Fill Limitation Areas</b></p> <table border="1"> <thead> <tr> <th rowspan="2">Location</th> <th rowspan="2">Annex I Habitat / Fossitt (2000) ID Codes*</th> <th colspan="2">Fill Limitation Chainage area</th> </tr> <tr> <th>From</th> <th>To</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>4030 mosaic</td> <td>0+620</td> <td>0+775</td> </tr> <tr> <td>2</td> <td>*7130/4010 mosaic, 4010 and PF2</td> <td>1+150</td> <td>1+475</td> </tr> <tr> <td>3</td> <td>4010</td> <td>1+830</td> <td>2+050</td> </tr> <tr> <td>4</td> <td>4010</td> <td>2+200</td> <td>2+325</td> </tr> <tr> <td>5</td> <td>4010 and PF2</td> <td>2+875</td> <td>3+175</td> </tr> <tr> <td>6</td> <td>4010</td> <td>3+450</td> <td>3+550</td> </tr> <tr> <td>7</td> <td>4030/4010 and 4010</td> <td>3+595</td> <td>3+890</td> </tr> <tr> <td>8</td> <td>4030 mosaic and 4010</td> <td>4+650</td> <td>5+150</td> </tr> <tr> <td>9</td> <td>4010 and PF2</td> <td>7+750</td> <td>7+900</td> </tr> </tbody> </table>	Location	Annex I Habitat / Fossitt (2000) ID Codes*	Fill Limitation Chainage area		From	To	1	4030 mosaic	0+620	0+775	2	*7130/4010 mosaic, 4010 and PF2	1+150	1+475	3	4010	1+830	2+050	4	4010	2+200	2+325	5	4010 and PF2	2+875	3+175	6	4010	3+450	3+550	7	4030/4010 and 4010	3+595	3+890	8	4030 mosaic and 4010	4+650	5+150	9	4010 and PF2	7+750	7+900
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9.20	C	<p>Where the design, including environmental mitigation measures, safety requirements and engineering constraints, permit significant bedrock cuttings will be designed to remain visible. Where this cannot be provided digital photographic records of significant new excavations will be recorded or visits from Geological Survey Ireland will be facilitated.</p>																																										
9.21	C	<p>Where the design environmental mitigation measures, safety requirements and engineering constraints permit, significant bedrock cuttings will be designed to remain visible.</p> <p>Where this cannot be done, then digital photographic records of significant new excavations will be recorded by the Contractor and/or visits from Geological Survey Ireland will be facilitated by the Contractor.</p> <p>The Contractor shall notify the Geological Survey Ireland of bedrock cuttings to facilitate a site visit prior to any backfilling.</p>																																										
9.22	C	<p>Where an area of habitat planting has a requirement for a free draining layer beneath the surface and it corresponds with a proposed Material Deposition Area where peat may be placed, a free draining layer will be placed by the Contractor between the peat placement layer and the habitat to be created layer. The free drainage material will be contained within a filter separator</p>																																										

Ref No.	Stage	Commitments
		layer (e.g. geotextile), above and below to prevent the migration of fines sediment therefore ensuring the functionality of the layer. For material deposition areas within Lackagh Quarry, where calcareous grassland is required, a contained drainage layer with a minimum depth of 350mm depth will be provided to ensure free drainage of surface water from the calcareous grassland. This layer will be provided between the calcareous grassland and the material deposition area.
9.23	C	Construction will adhere to all requirements outlined in Lackagh Quarry: Material Deposition Assessment Report (GCRR-4.0-03-4.23), in particular Section 6.4 Particular Commitments. This report is available in <b>Appendix 1.11 of Volume 2 of the RFI Response Report.</b>
9.24	C	Construction will adhere to all requirements outlined in Material Deposition Areas – Baseline Report (GCOB-4.03.4.2.1_001). This report is available in <b>Appendix 1.11 of Volume 2 of the RFI Response Report.</b>
9.25	C	The composition of the mixed peat in material deposition areas with calcareous grassland will ensure that the magnitude of immediate, primary and secondary consolidation will not exceed 250mm.

## 21.12 Hydrogeology

Ref No.	Stage	Commitments
10.10	C	Nine <del>Five</del> wells (W50-10, W50-12, W50-13, W50-14 and W50-15, <b>W50-16, W50-19, W50-17, W50-18</b> ) will be lost during the construction of the proposed road development. These will each be mitigated by providing a replacement well, connecting to mains supply where available or by financial compensation. Where wells have to be abandoned as part of the proposed road development they will be sealed and abandoned in general accordance with Well Drilling Guidelines produced by the Institute of Geologists of Ireland (IGI 2007).
10.20	C	In the unlikely event of significant flow paths (fault or fracture zones) being encountered in the Galway Granite Batholith during construction, measures set out in the Karst Protocol included in the CEMP in <b>Appendix A.7.5 of the EIAR and Appendix C of the NIS</b> will be implemented.

## 21.13 Hydrology

Ref No.	Stage	Commitments
11.1	C	The CEMP included in <b>Appendix A.7.5</b> will be finalised by the Contractor in advance of the commencement of construction and the following will be implemented as part this plan: <ul style="list-style-type: none"> <li>An Incident Response Plan detailing the procedures to be undertaken in the event of spillage of chemical, fuel or other hazardous wastes, logging of non-compliance incidents and any such risks that could lead to a pollution incident, including flood risks.</li> <li>A Sediment Erosion and Pollution Control Plan (Refer to Section 8 of the CEMP in <b>Appendix A.7.5</b>). This shall include water quality monitoring and method statements to ensure compliance with environmental quality standards specified in the relevant legislation.</li> </ul>

Ref No.	Stage	Commitments
		<ul style="list-style-type: none"> <li>• All necessary permits and licenses for instream construction works associated with the provision of culverts, bridges and outfalls. OPW Section 50 consent has been received for all culverts and bridges proposed in the EIAR. Changes to these structures as part of the detailed design and construction stage will require new Section 50 consent to be obtained.</li> <li>• Inform and consult with OPW Western Arterial Drainage Section who have responsibility for the Corrib-Mask Arterial Drainage scheme and the ongoing control of river and lake levels at the Salmon Weir Barrage in Galway City.</li> <li>• Continue to inform and consult with Inland Fisheries Ireland (IFI).</li> <li>• Continue to inform and consult with National Parks and Wildlife Service (NPWS).</li> <li>• All construction works will be carried out in accordance with best practice construction guidance and as such will eliminate the risk of spillage to the River Corrib.</li> <li>• All works will also be carried out in accordance with Irish Water Standards and Specifications, in line with standard processes and procedures for obtaining connection consent and build over agreements with the utility provider.</li> <li>• Future proofing sleeves in the vicinity of Ardaun can be easily accommodated and their location will be agreed with Irish Water prior to commencement of construction.</li> <li>• Irish Water (IW) will be consulted in the updating of the CEMP and specifically the and the incident response plan (IRP) for construction and operation stages</li> <li>• Provision will be made for Irish Water Staff to visit the construction site if deemed necessary by Irish Water</li> <li>• Ongoing liaison with Irish Water will be provided at construction stage and procedures for regular project dates will be established during the construction stage in a timely manner so as to enable Irish Water to assess potential increased risk to the water quality of their potable water supply source</li> </ul>
11.10	C/O	Throughout the project construction and operation phases Galway County Council will continue to consult and inform with Irish Water in respect to water quality and pollution risk to their potable water supply source

## 21.14 Biodiversity

Ref No.	Stage	Commitments
General		
8.69	C/O	Galway County Council (GCoC) will ensure that the results of monitoring will be used to inform the long-term ecological mitigation programme and any necessary timely corrective action. During construction, monitoring and any required corrective action, will be Galway County Council's responsibility. During operation, GCoC will engage the services of a suitable contractor to monitor the ecological mitigation measures for the lifetime of the project. All the relevant requirements set out below, in relation to monitoring and maintenance of the ecological mitigation measures over the lifetime of the project, will be included as conditions in the contract(s) entered into with the appointed contractor. GCoC shall ensure that provision is made, in the contract(s) entered into with the appointed contractor, for corrective action to be undertaken if any aspects of the implementation of the ecological mitigation measures and monitoring commitments proposals are not effective. These provisions shall include a requirement for a suitably qualified ecologist/biodiversity expert to review the efficacy of any corrective actions required.
8.70	C/O	<ul style="list-style-type: none"> <li>• A GIS mapping system will be developed, to allow the Project Ecologist to track the progress, completion and monitoring of the ecological mitigation measures</li> <li>• At the end of each month, any mapping relating to ecological mitigation measures, including results of pre-construction surveys (e.g. locations of badger setts) or design changes for mitigation measures (e.g. change in location of artificial Badger sett), will be uploaded to the dedicated project website. In addition, at the end of each month any ecological monitoring reports will be uploaded to a dedicated project website</li> <li>• Notwithstanding the point above ecological monitoring reports will be submitted to the Planning Authority and copied to the NPWS</li> <li>• The Project Ecologist in conjunction with 'permits to work' will sign off the correct completion and functioning of the measures, where works are in ecologically sensitive locations and/or are ecologically sensitive activities, which are likely to include, but may not be limited to, the following: <ul style="list-style-type: none"> <li>○ works involving vegetation removal/site clearance</li> <li>○ works involving installation of site fencing</li> <li>○ works in or adjacent to the Lough Corrib cSAC,</li> <li>○ works in or adjacent to any watercourses</li> <li>○ works in or adjacent to any known breeding, resting or hibernating locations of any species protected under either the Birds and Habitats Regulations 2011 or Wildlife Act, in particular bats and otter</li> <li>○ works in areas where mitigation measures (including either habitat creation/mitigation or provision of nest and bat boxes) are proposed</li> <li>○ works in or adjacent to donor and receptor sites identified for the creation of habitats, until such time as any donor material required for the receptor sites has been transported</li> </ul> </li> </ul>

Ref No.	Stage	Commitments
		<ul style="list-style-type: none"> <li>Once ecological mitigation measures have been implemented and installed, GIS mapping files of their final as-built locations will be sent to the Project Ecologist to be uploaded into the Local Authority's GIS and planning systems</li> <li>Interactive or real-time/live mapping systems would be onerous to provide and manage. It is not deemed either necessary or appropriate to provide such systems given the above proposals which together will achieve the same function, purpose and results as a real-time/live mapping system</li> </ul>
8.71	C	Excavated blocks of limestone pavement will be retained for reuse for general wildlife and habitat creation within those lands along the east bank of the River Corrib in Menlough which are proposed for habitat retention, enhancement and creation.
Designated Areas for Nature Conservation		
8.3	C/O	<p>The environmental commitments that are required to ensure that the proposed road development will not significantly affect Moycullen Bogs NHA are as follows:</p> <ul style="list-style-type: none"> <li>Avoid/reduce the disturbance/displacement effects of blasting on wintering birds using Ballindooley Lough (Refer to wintering birds section below).</li> <li>Measures to control dust emissions during construction to prevent impacts to vegetation/habitats within Moycullen Bogs NHA at Tonabrocky – see Air Quality and Climate section below. These include control measures such as spraying of exposed earthwork activities and site haul roads during dry weather, wheel washes, control of site vehicle speeds, road sweeping and dust screens.</li> <li>Measures to avoid the introduction or spread of non-native invasive species to Moycullen Bogs NHA during construction or operation. These are detailed in the Non-Native Invasive Species Management Plan which forms part of the CEMP in <b>Appendix A.7.5</b>.</li> <li>Measures to control surface water runoff from the construction site to prevent an accidental pollution event affecting peatland habitats within Moycullen Bogs NHA at Tonabrocky – see Hydrology section below.</li> <li>In the unlikely event of significant flow paths (fault or fracture zones) being encountered in the Galway Granite Batholith during construction, measures set out in the Karst Protocol included in the CEMP in Appendix A.7.5 of the EIAR and Appendix C of the NIS will be implemented.</li> </ul>
Habitats		
8.198	C/O	Areas of compensatory habitat will be created, managed and monitored as set out in the Compensatory Habitat Management Plan in <b>Appendix A.8.26</b> with locations of donor and receptors sites shown on Figures 1-9 in Appendix A.21.3 to this Schedule of Additional Environmental Commitments (these figures are the final updated figures, updated from the figures included in A.8.26 of the EIAR and those in Appendix B to the Biodiversity EIA Statement of Evidence of Aebhín Cawley).
8.19	C	Given the changing baseline environment, the Compensatory Habitat Management Plans (CHMPs) set out in A.8.26 of the EIAR are live

Ref No.	Stage	Commitments
		<p>documents which will need to be updated by the appointed contractor by way of pre-construction surveys.</p> <p>Ecology Site Management Plans for compensatory habitats will be prepared by the contractor prior to the commencement of works, in accordance with the principles set out in Appendix A.8.26 of the EIAR.</p> <p>In addition, the specific measures below will be incorporated into the Ecology Site Management Plans:</p> <ul style="list-style-type: none"> <li>• Soils and plant material (including turves) from all 4030 donor sites will be the primary method used for dry heath habitat translocation and creation. The locations of all 4030 donor and receptor sites are presented in the appendix to this Schedule of Environmental Commitments.</li> <li>• Monitoring immediately after the turves are placed in the receptor sites will be undertaken every three weeks and after a heavy rainfall event until such time as the Dry heath is established, with an adaptive corrective plan put in place if evidence shows that it is not successful.</li> <li>• A minimum 100m translocated soils/turve depth will be provided at each 4030 receptor site.</li> <li>• The pH of the top 400mm layer of material in MDAs, where it directly underlies areas proposed for dry heath habitat creation, will be below 6.5.</li> <li>• The preferred method of habitat translocation is for direct translocation of turves and soil/peat from donor to receptor sites. However, the construction phasing may not facilitate this in every instance. Where direct translocation of turves to receptor sites is not possible, they will be handled and stored based on documented best practice and proven case studies for peatland turve translocation which include: <ul style="list-style-type: none"> <li>○ Ensuring turves are as large in size and depth as possible</li> <li>○ If necessary, use of specially designed digger buckets suitable for the purpose</li> <li>○ Use of low ground pressure vehicles for turve removal, especially for wetter donor sites such as the 4010 and *7130 donor sites, and if necessary operating on bog mats</li> <li>○ Storage of turves for the minimum time possible and placement at receptor sites at the earliest possible opportunity</li> <li>○ Storage of turves in a single layer to avoid crushing and to maintain their integrity</li> <li>○ Storage of turves on a flat surface placed on top of either a geotextile membrane, on bog mats or similar</li> <li>○ Regular watering (with rainwater) and monitoring of the turves for the duration of the storage time</li> </ul> </li> </ul>

Ref No.	Stage	Commitments
		<ul style="list-style-type: none"> <li>○ Storing turves end to end (i.e. with no gaps) to avoid edges drying out and if necessary using silt fencing or geotextile membranes along any vertical exposed edges of turves</li> <li>• In the case of some of the dry heath receptor sites the nature of the ericaceous vegetation, shallow soils and outcropping granite, may make intact turve removal difficult. In these situations, trimming the ericaceous vegetation (and retaining this cut material for use as brash and a source of seed to assist in vegetation regeneration at the receptor sites) may assist in extracting intact turves. Where turves cannot be extracted intact in these areas then the scraw (mixture of soils, root stock, seed bank etc) will still be valuable for use as soils to be translocated to the receptor sites</li> <li>• Similarly, where direct translocation of soil/peat to receptor sites is not possible, it will be handled and stored in the following manner to ensure it is protected: <ul style="list-style-type: none"> <li>○ Use of low ground pressure vehicles for soil removal, especially for wetter donor sites such as the 4010 and *7130 donor sites, and if necessary operating on bog mats</li> <li>○ All wet peaty soils (e.g. this will be likely from the 4010 and *7130 donor sites) will be transported in sealed trucks to avoid loss of wet peat in transit</li> <li>○ Storage of soil/peat for the minimum time possible and placement at receptor sites at the earliest possible opportunity</li> <li>○ Storage of soils/peat from donor sites in dedicated area(s) within construction compounds for the proposed road development west of the River Corrib, on top of a geotextile layer, no higher than 1.5m to avoid compaction</li> <li>○ Turves from donor sites will be 'thatched' on top of the stored soil/peat areas to seal and protect it for the duration of the storage period</li> </ul> </li> <li>• Turves will be placed end to end with no gaps. Where necessary receptor sites will be protected from erosion, and vegetation regeneration will be encouraged through the following means: <ul style="list-style-type: none"> <li>○ Use of geocoir (on flat surface) or geojute (on sloped areas) on areas of bare soil, pinned down with 0.5m steel pegs or similar</li> <li>○ Spreading heather clippings which have been harvested from donor sites on bare soil</li> <li>○ Re-seeding, preferably with seeds collected from donor sites prior to turves/soil being removed, or if necessary with additional dry heath native seed material from a reputable supplier such as <a href="http://www.wildflowers.ie/">http://www.wildflowers.ie/</a>. Where seeds are collected from donor sites prior to turves/soil being removed, they will be collected a minimum of one summer/autumn season prior to construction works</li> </ul> </li> </ul>

Ref No.	Stage	Commitments
		<p>commencing, during warm, dry conditions. Until such time as they are required to be planted at the receptor sites, seeds will be stored in suitable conditions to ensure their survival. These will be used for inclusion in the seed mix for planting later at the appropriate time of year at dry heath receptor sites.</p> <ul style="list-style-type: none"> <li>○ Minimising risks of erosion or escape of translocated soil/peat by: <ul style="list-style-type: none"> <li>○ Undertaking all translocation works and handling of turves and soils/peats during dry weather conditions</li> <li>○ Undertaking these activities during dry conditions at the start of the vegetation growing season (i.e. spring) to encourage rapid establishment of plant growth prior to the winter season</li> <li>○ Implement the measures set out in the Sediment, Erosion and Pollution Control Plan (SEPCP) which summarises the procedures and technical practices for implementing effective sediment, erosion and pollution control through a variety of delivery methods for the construction phase of the proposed road development is presented in Section 8 of the CEMP in Appendix A.7.5 of the EIAR and Appendix C of the NIS</li> <li>○ All wet peaty soils (e.g. this will be likely from the 4010 and *7130 donor sites) will be transported in sealed trucks to avoid loss of wet peat in transit</li> </ul> </li> <li>● The following measures will be implemented as part of the habitat translocation and creation measures to ensure that <i>Daboecia cantabrica</i> becomes established at the dry heath receptor sites: <ul style="list-style-type: none"> <li>○ Seeds from mature plants of <i>Daboecia cantabrica</i> will be collected from the sites within the proposed development boundary where it has been recorded, from August/September onwards (in a year prior to construction works commencing), during warm, dry conditions. Seeds will be stored in suitable conditions to ensure their survival. These will be used for inclusion in the seed mix for planting later at the appropriate time of year at dry heath receptor sites</li> <li>○ Where it is possible to translocate turves from dry heath donor sites containing <i>Daboecia cantabrica</i>, all specimens <i>Daboecia cantabrica</i> will be located in the centre of turves to ensure their successful translocation</li> <li>○ All existing soils/peat at dry heath donor sites will be translocated for placement as the substrate at the dry heath receptor sites, thereby retaining the seedbank, including for <i>Daboecia cantabrica</i>, to allow natural regeneration of the species at the receptor site</li> <li>○ Heather clippings will be harvested at all dry heath donor sites and this material will include clippings from <i>Daboecia cantabrica</i> specimens.</li> </ul> </li> </ul>



Ref No.	Stage	Commitments
Otters		
8.21	O	<p>Otter passage facilities will be provided at all watercourses used by Otter (e.g. raised ledges within structures, or separate dry 600mm pipes installed adjacent to culverts). Mammal underpasses will be constructed in accordance with the <i>Guidelines for the Treatment of Otters prior to the Construction of National Road Schemes</i> (National Roads Authority, 2008). The locations where Otter passage facilities will be provided are listed in <b>Table 8.36 of Chapter 8, Biodiversity</b> and shown on <b>Figures 8.23.1 to 8.23.14</b>.</p> <p>The Otter passage facilities at structures C04/01 and C04/02, will comprise of a raised mammal ledge, sited above flood water levels, incorporated into the structure.</p>
8.72	C	<p>Otter passage facilities will be checked prior to the operation of the proposed road development to ensure they are constructed in accordance with the <i>Guidelines for the Treatment of Otters prior to the Construction of National Road Schemes</i> (National Roads Authority, 2008).</p>
Bats		
8.27	O	<p>The proposed planting design associated with the Castlegar Wildlife Overpass comprises of a central narrow grass path bounded on either side by a double hedgerow in the middle section of the overpass (to mimic a 4m wide bóithrín). Each of the hedgerows will then diverge out to create a "mouth" at the entrance to the overpass on both sides of the proposed road development to funnel bats in to the centre of the overpass. Planting to tie-in to proposed planting leading east and west on upper slopes of cuttings on both sides of the proposed road development. <b>Plate 8.32, of Chapter 8, Biodiversity</b>, shows the schematic design and location of the proposed overpass.</p>
8.73 (depicted as 8.31 on 21 February 2020 Version)	C	<p>The structures provided for the passage of bats will be checked prior to the operation of the proposed road development to ensure they are constructed in accordance with the design requirements set out in Section 8.6.7.2 and Section 8.9.2 of the EIAR.</p>
Badgers		
8.74 (depicted as 8.42 on 21 February 2020 Version)	C	<p>Badger passage facilities will be checked prior to the operation of the proposed road development to ensure they are constructed in accordance with the <i>Guidelines for the Treatment of Badgers during the Construction of National Road Schemes</i> (National Roads Authority, 2006).</p>
Invertebrates		
8.41	C	<p>To avoid the destruction of Marsh fritillary eggs or the mortality of Marsh fritillary caterpillars, the following mitigation strategy will be implemented in relation to the site clearance works:</p> <ul style="list-style-type: none"> <li>All areas within the proposed development boundary, which have been identified as suitable habitat to support the Marsh fritillary butterfly, will be subject to a pre-construction larval web survey. This will be undertaken during the mid-August to the end of September window immediately preceding site clearance works.</li> <li>If larval webs are present, they will be translocated to another area of suitable habitat; either outside of the proposed</li> </ul>

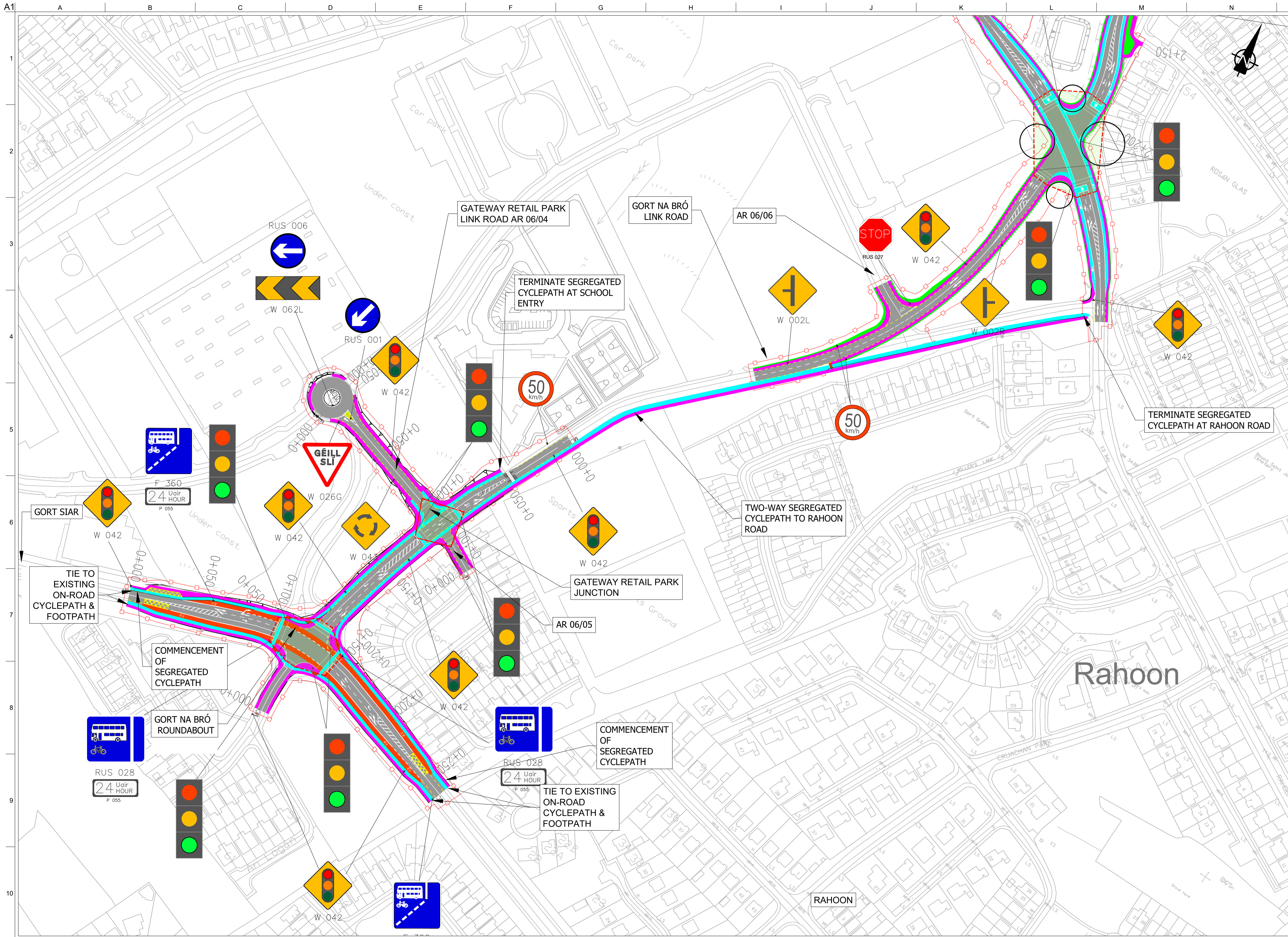
Ref No.	Stage	Commitments
		<p>development boundary or, if within, to an area of suitable habitat that will remain unaffected by construction works for the duration.</p> <ul style="list-style-type: none"> <li>• The larval webs will be moved by translocating vegetation turves which contain the host plant species (<i>Succisa pratensis</i>) with larval webs present.</li> <li>• The vegetation turves will be moved to the receptor site(s) immediately following excavation to ensure they do not dry out. The translocated turves will be set into existing vegetation immediately adjacent to the area of <i>Molinia</i> meadow and/or Wet heath habitat being retained (locations described below) and will be fenced off to prevent any accidental damage from construction works. Care will be taken to ensure that any specimens of <i>Succisa pratensis</i> with larval webs present will be at the centre of the turves. Turves will be fully bedded in at the receptor site(s) to ensure there are no exposed edges vulnerable to drying out.</li> <li>• The first location is at Ch. 0+900, an area of wet grassland (GS4)/Annex I <i>Molinia</i> meadow [6410] habitat that is being retained within the proposed development boundary (Figure 8.23.1 of the EIAR). The second location is at Ch. 3+000, a mosaic of Annex I Wet heath [4010], wet grassland (GS4) and Annex I Dry heath [4030] habitat that is being retained within the proposed development boundary (Figure 8.23.3 of the EIAR).</li> </ul> <p>Once all larval webs have been removed from the affected areas, or if no larval webs were recorded, the vegetation will be immediately cleared or cut to ground level to render the area unsuitable for the species to recolonise. The vegetation shall be maintained in this state until such time as the topsoil is removed.</p>
Birds		
8.49	O	<p>An unmanaged grass margin (at least 1m in width) will be retained along all field boundaries in the area of habitat to be retained that lies to the north west of the proposed road carriageway at Menlo Castle. (Note: depicted as commitment 8.52 on 21 February 2020 Version)</p> <p>To establish and maintain rough grassland habitat for barn owl, lands to the west of the proposed road development at Menlo Castle (see Figure 1 in Appendix A.21.4 of this Schedule of Environmental Commitments) will be grazed annually by cattle for a three month period between July and October at a stocking rate of 0.35 livestock units/ha.</p> <p>Annual monitoring of the grassland habitat will be undertaken for a period of 5 years post-implementation with the objective of recording the establishment of suitable rough grassland habitat and adjustment of the stocking density, if required.</p>
8.54	C	<p>The former Peregrine falcon nest sites in the north east corner of Lackagh Quarry will be retained. The precise locations have not been divulged in the EIAR due to the risk of persecution to the species. Galway County Council and/or BirdWatch will need to be consulted to ascertain their precise locations to ensure their retention and protection from works.</p> <p>To minimise the potential for construction works near Lackagh Quarry to disturb the Peregrine falcon nest site, works from the</p>

Ref No.	Stage	Commitments
		<p>Lackagh Tunnel to the N84 Headford Road Junction will commence prior to mid-February. The installation of rock bolts on the cliff faces in the vicinity of the nest site will be undertaken in a sensitive manner (as advised by a suitably experienced ecologist) so as to minimise any potential disturbance to the nest site during the breeding season, particularly if the nest site is occupied.</p> <p>Rock-bolts will not be installed in the immediate vicinity of an active peregrine falcon nest site during the breeding bird season (1<sup>st</sup> March to 31<sup>st</sup> August).</p> <p>An alternative nest site for Peregrine falcon will be provided on Galway City Council owned lands to the south-east of Lackagh Quarry as indicated on drawing GRR-SK-PP-067 (Appendix A.21.5 of this Schedule of Environmental Commitments A to Aebhín Cawley's statement of evidence at the oral hearing). This artificial nest site will be in place prior to the commencement of works which have the potential to disturb or displace breeding Peregrine falcon in Lackagh Quarry. The alternative nest site will be provided in accordance with the design requirements set out in the report prepared by BirdWatch Ireland contained in Appendix C to Aebhín Cawley's statement of evidence at the oral hearing in Appendix A.21.6 of this Schedule of Environmental Commitments.</p> <p>An artificial peregrine falcon nest box will be installed at each of the two former nest sites in Lackagh Quarry. Remediation works will be carried out at the two ledges to create a level and stable substrate for the nest boxes. The artificial nest boxes will be securely anchored to the cliff face at each location and will be provided in accordance with the design requirements set out in the report prepared by BirdWatch Ireland, the relevant extract from which is contained in Appendix A.21.6 to this Schedule of Environmental Commitments.</p> <p>Monitoring of Peregrine falcon breeding activity at both Lackagh Quarry and the proposed alternative nest site will be undertaken throughout each breeding season over the entire construction period to ascertain any nest success/failure of the local breeding pair and if blasting is affecting numbers of common Peregrine falcon prey species. Use of the artificial nest sites will also be monitored during operation of the proposed road development for a period of three years.</p>
8.58	O	Nest boxes will be monitored annually by an ecologist, and the results reported to Galway County Council, to record their usage by breeding birds for a period of three years post-construction.

## **Appendix A.21.1**

**Pedestrian and Cycling Facilities  
from Gort na Bró Roundabout to  
Scoil Mhic Amhlaigh**





**FOR INFORMATION**

- Legend:
- Proposed Development Boundary
  - Proposed Road Development
  - Proposed Carriageway Pavement
  - Proposed Grass Verge
  - Proposed Cycleway
  - Proposed Footpath
  - Proposed Shared Footpath/Cycleway
  - Proposed Bus Lane
  - Proposed Traffic Island
  - Proposed Visibility Splay

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**N6 Galway City Ring Road**

Scale  
1:2500 @ A3

Date  
March 2020

Issue	Date	By	Chkd	Appd
I1	13/03/2020	AM	MH	EMC

Drawing Title  
Proposed Pedestrian and Cycle Facilities at Gort na Bró Roundabout to Gael Scoil Mhich Amhlaiht

Sheet 1 of 1

Drawing Status  
**For Information**

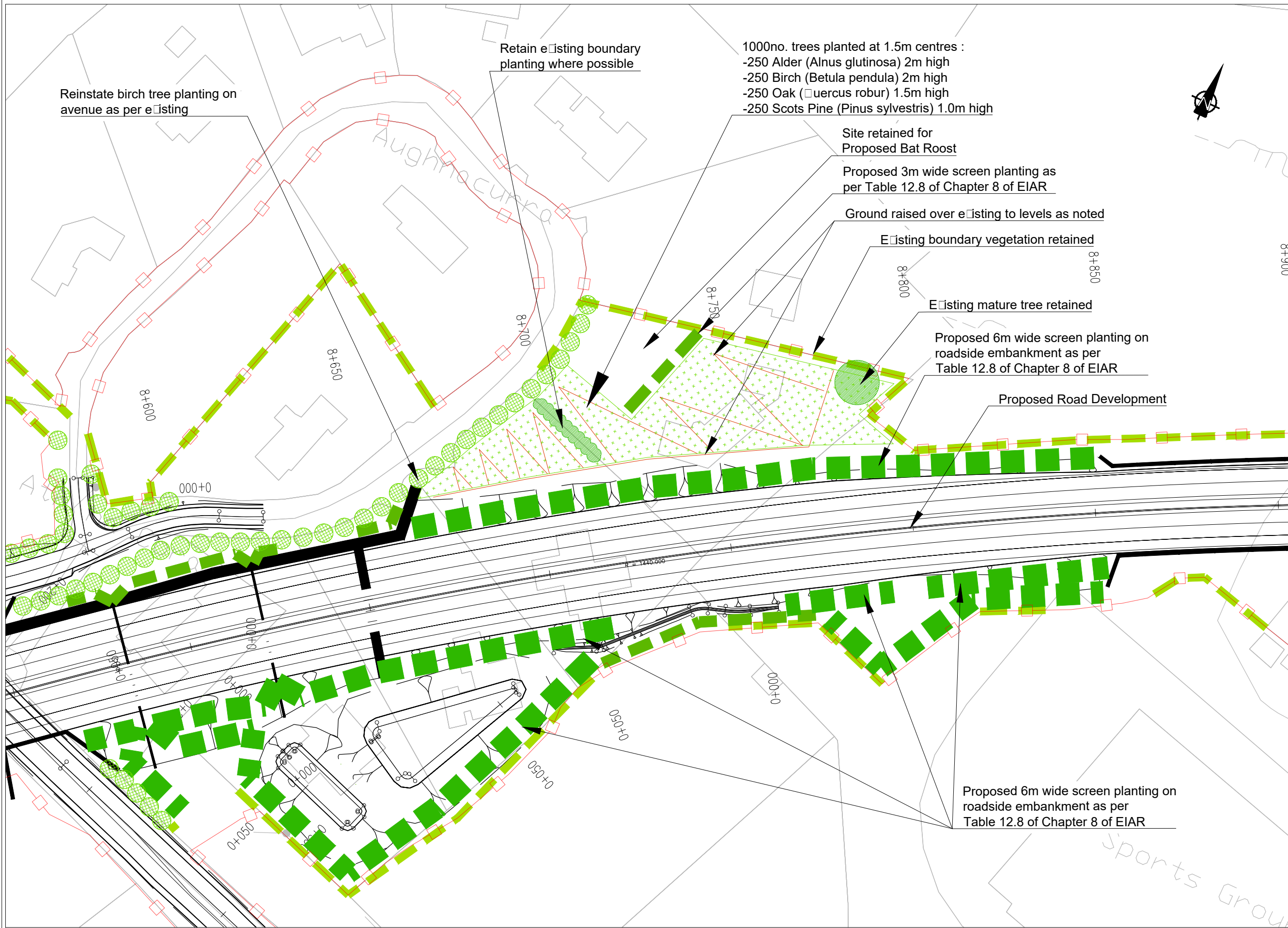
Job No	Drawing No	Issue
<b>233985</b>	<b>GCRR-SK-OH-054</b>	<b>11</b>



## Appendix A.21.2

### Planting Plan at Aughnacurra Estate

FOR INFORMATION



Legend:

- Proposed Development Boundary
- Proposed Road Development

MITIGATION MEASURES (Refer to Chapter 12 of EIAR)

- Screen Planting Min. 3.0m wide
- Screen Planting Min. 6.0m wide
- Retaining Boundary, Hedgerow and/or edge of Retained Vegetation
- Proposed Street Tree Planting
- Proposed Planting

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An Roinn Iompair, Tarsáireacht agus Spóirt  
 Department of Transport, Tourism and Sport

Project Ireland 2040  
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Galway City Transport Project

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Scale  
 1:1000 @ A3

Date  
 March 2020

Issue	Date	By	Chkd	Appd
I1	11/03/2020	KJ	MH	EMC

Drawing Title  
 Planting Plan at Aughnacurra

Sheet 1 of 1

Drawing Status  
**For Information**

Job No	Drawing No	Issue
233985-00	GCRR-SK-OH-052	I1

## **Appendix A.21.3**

### **Habitat Donor and Receptor Sites**



Figure 1

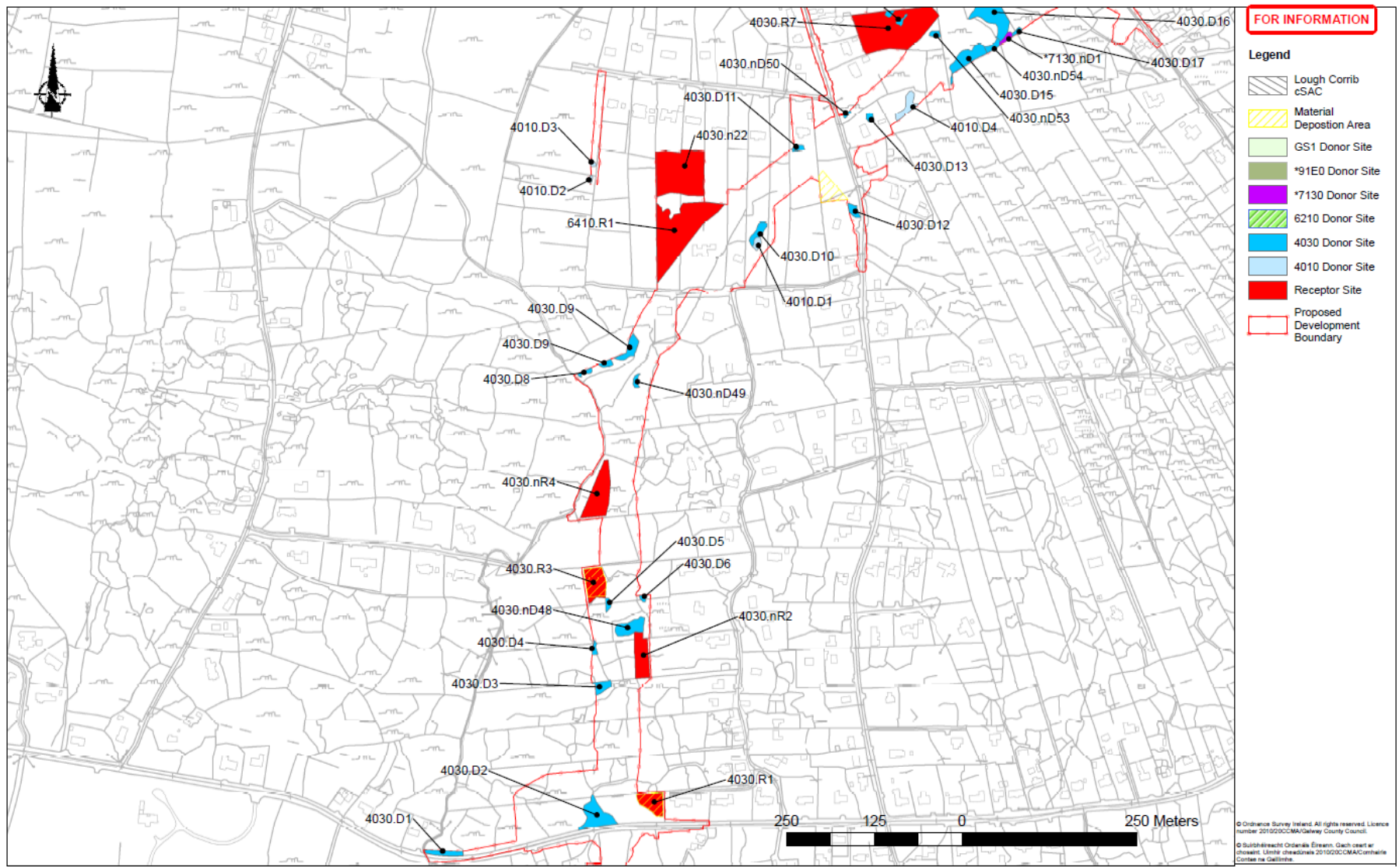


Figure 2

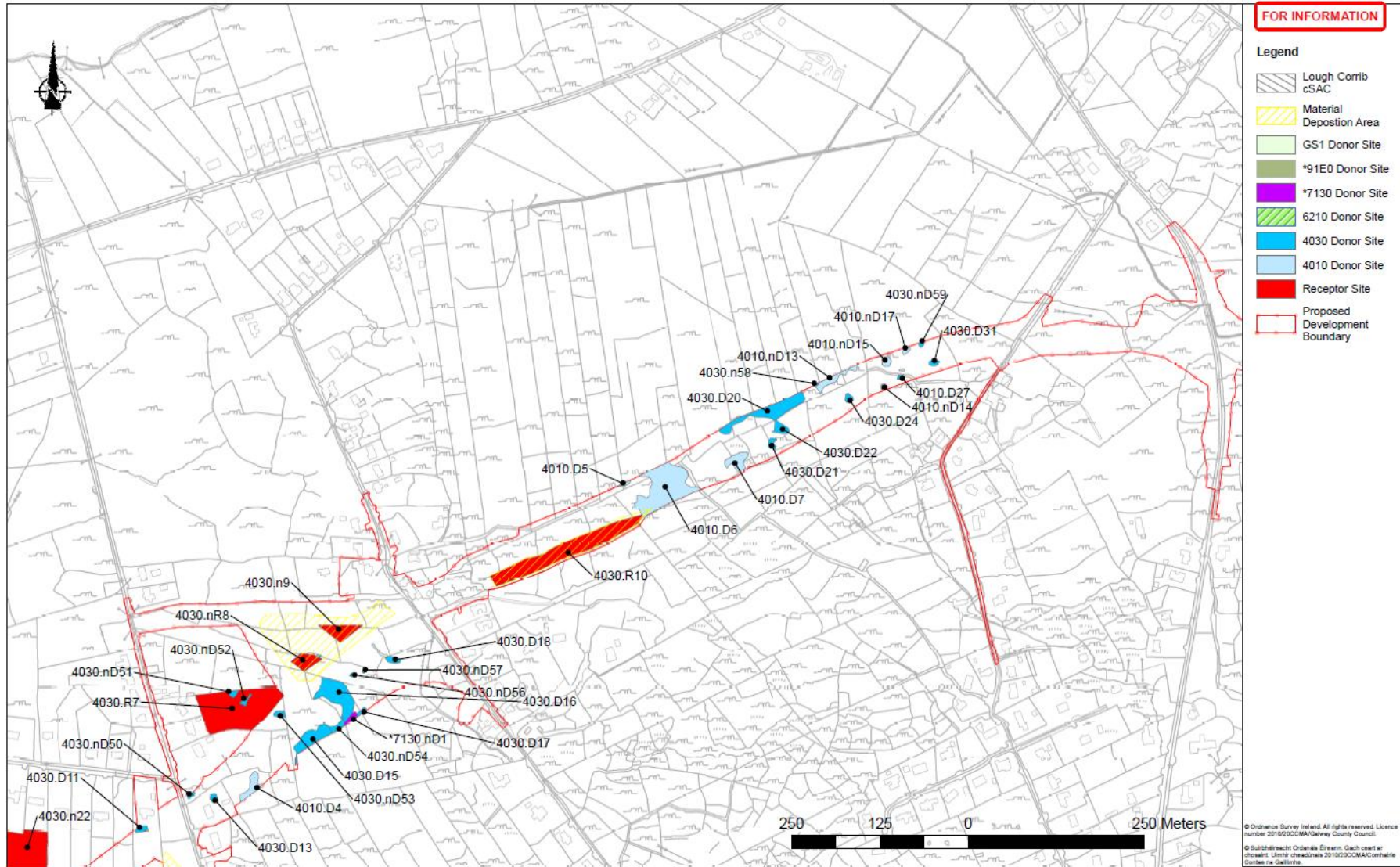




Figure 3

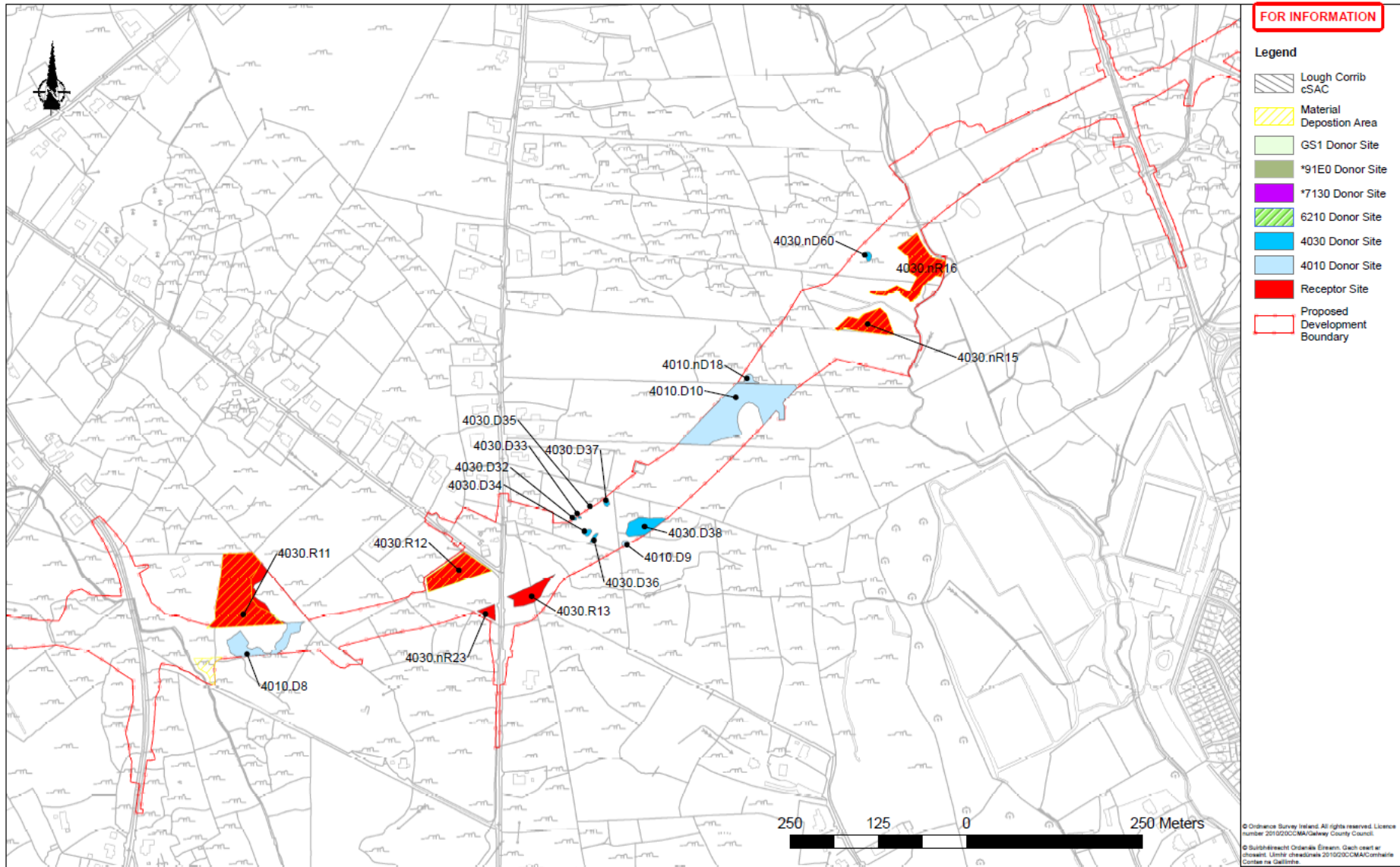


Figure 4

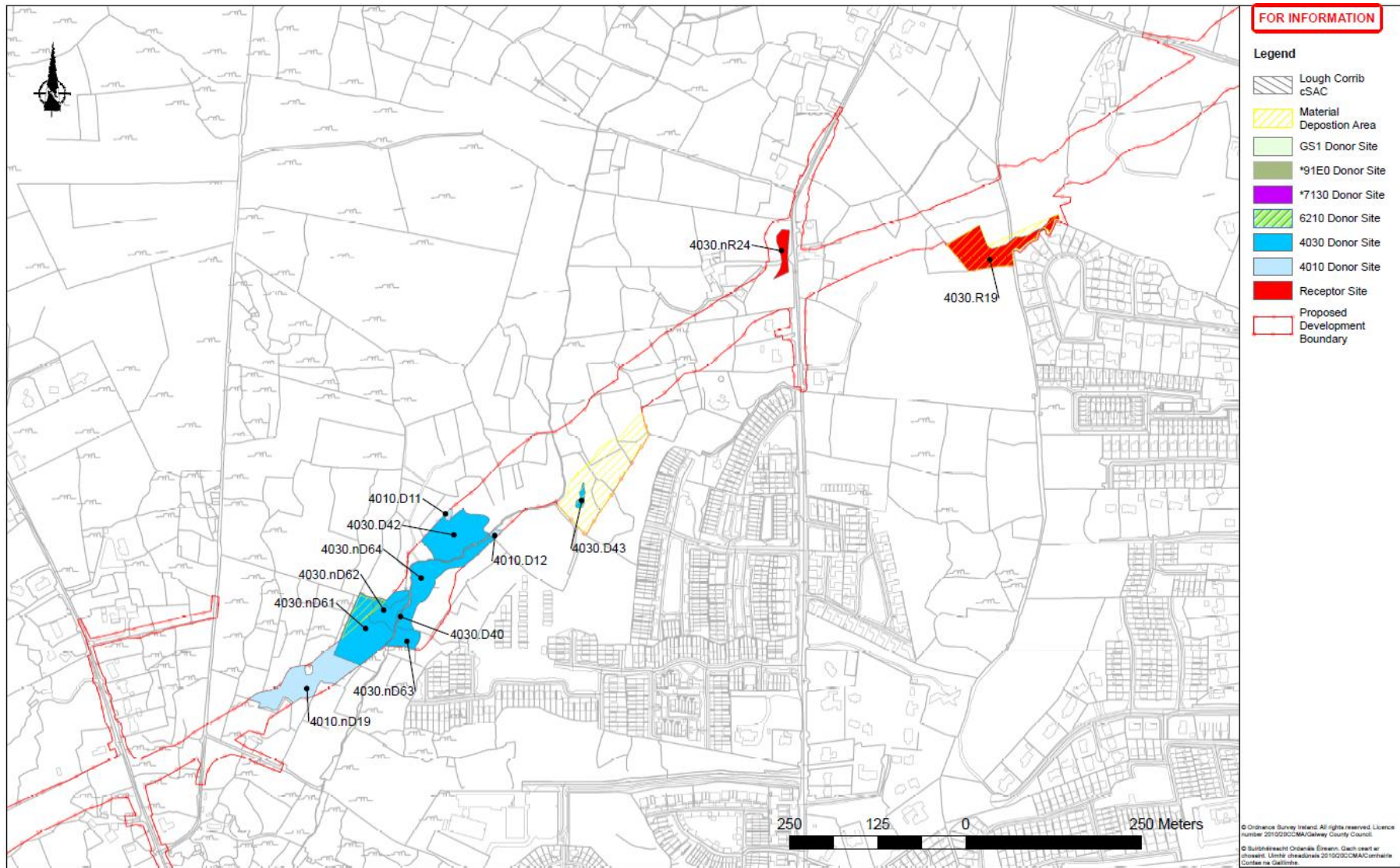




Figure 5

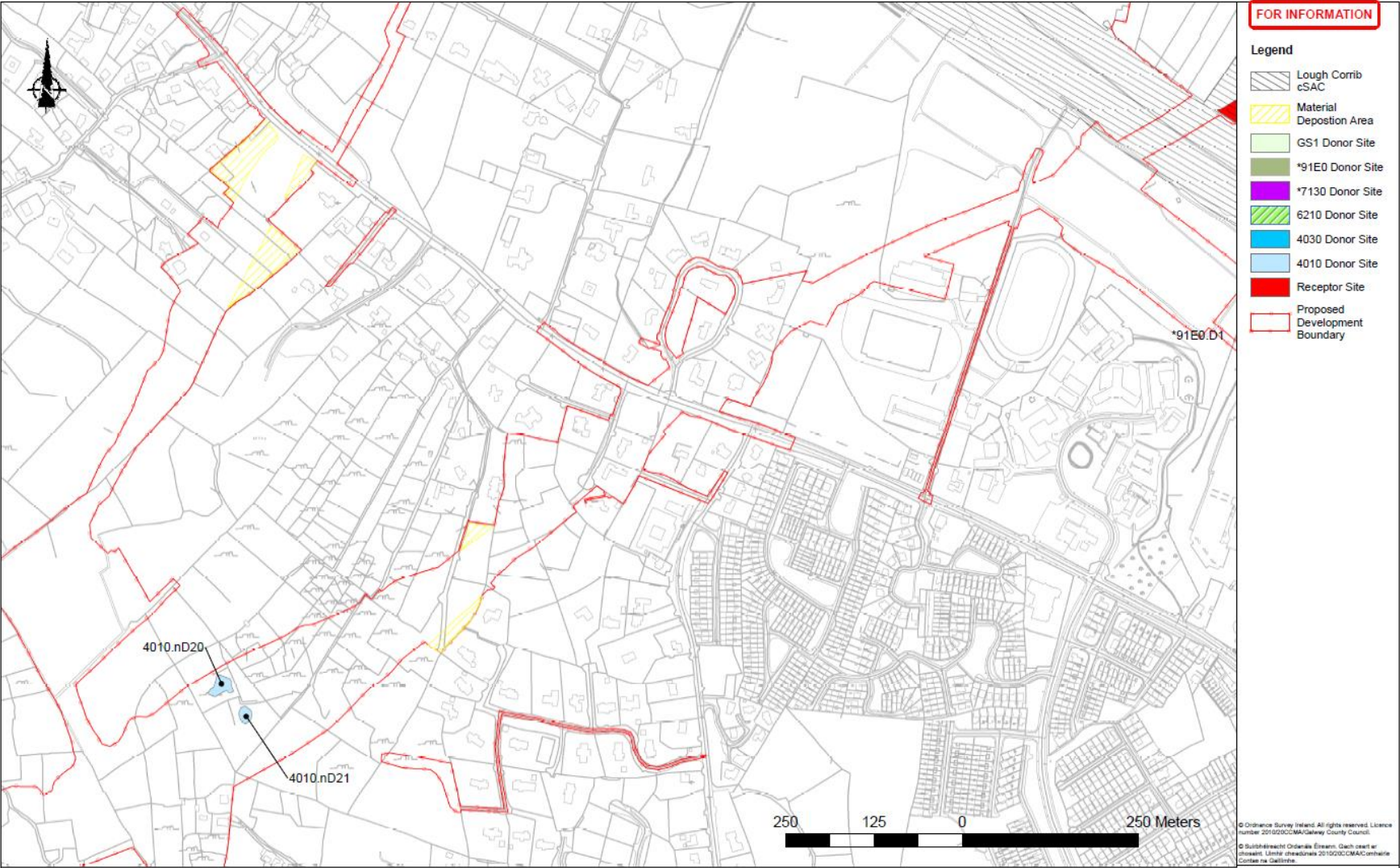


Figure 6





Figure 7



Figure 8

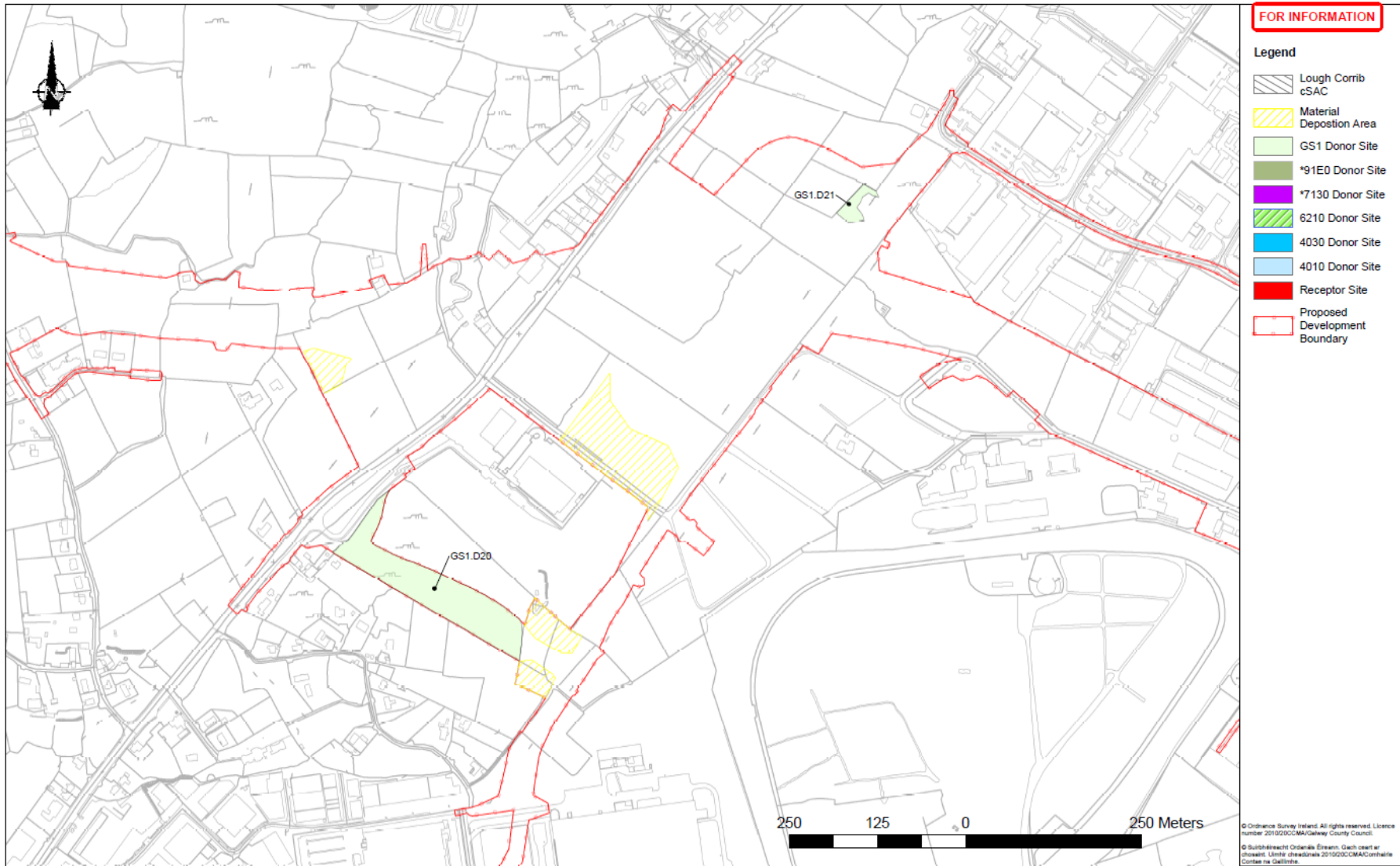
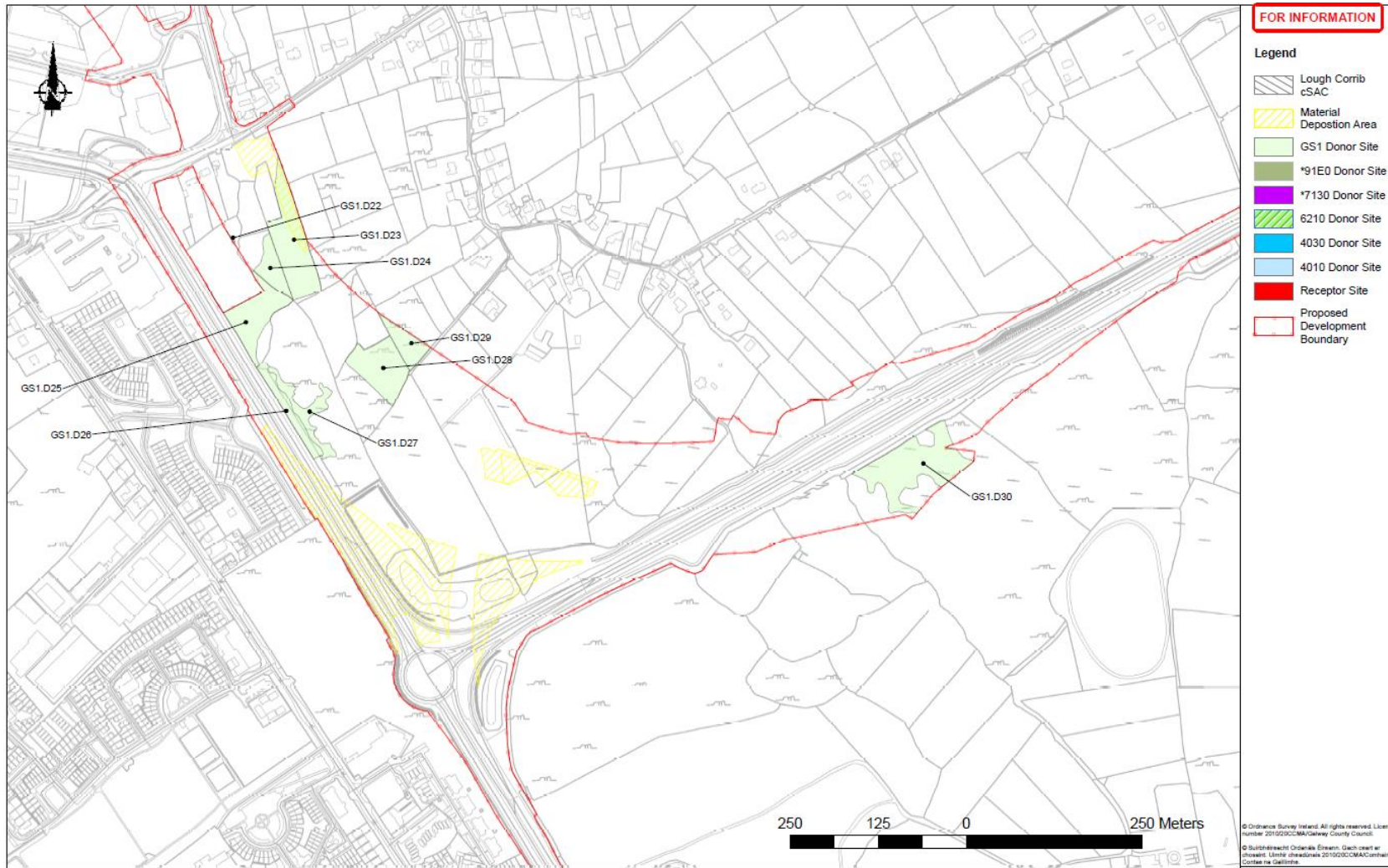




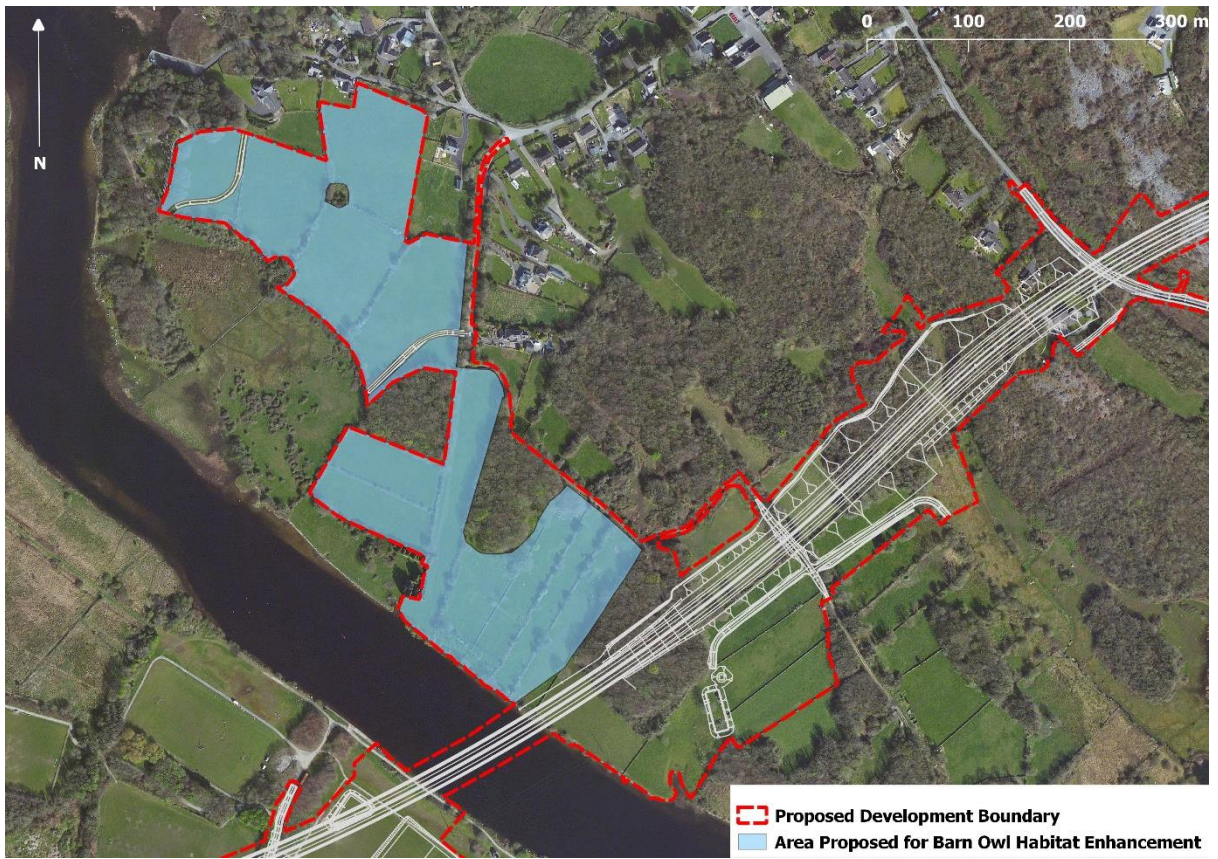
Figure 9



## **Appendix A.21.4**

### **Barn Owl habitat enhancement**

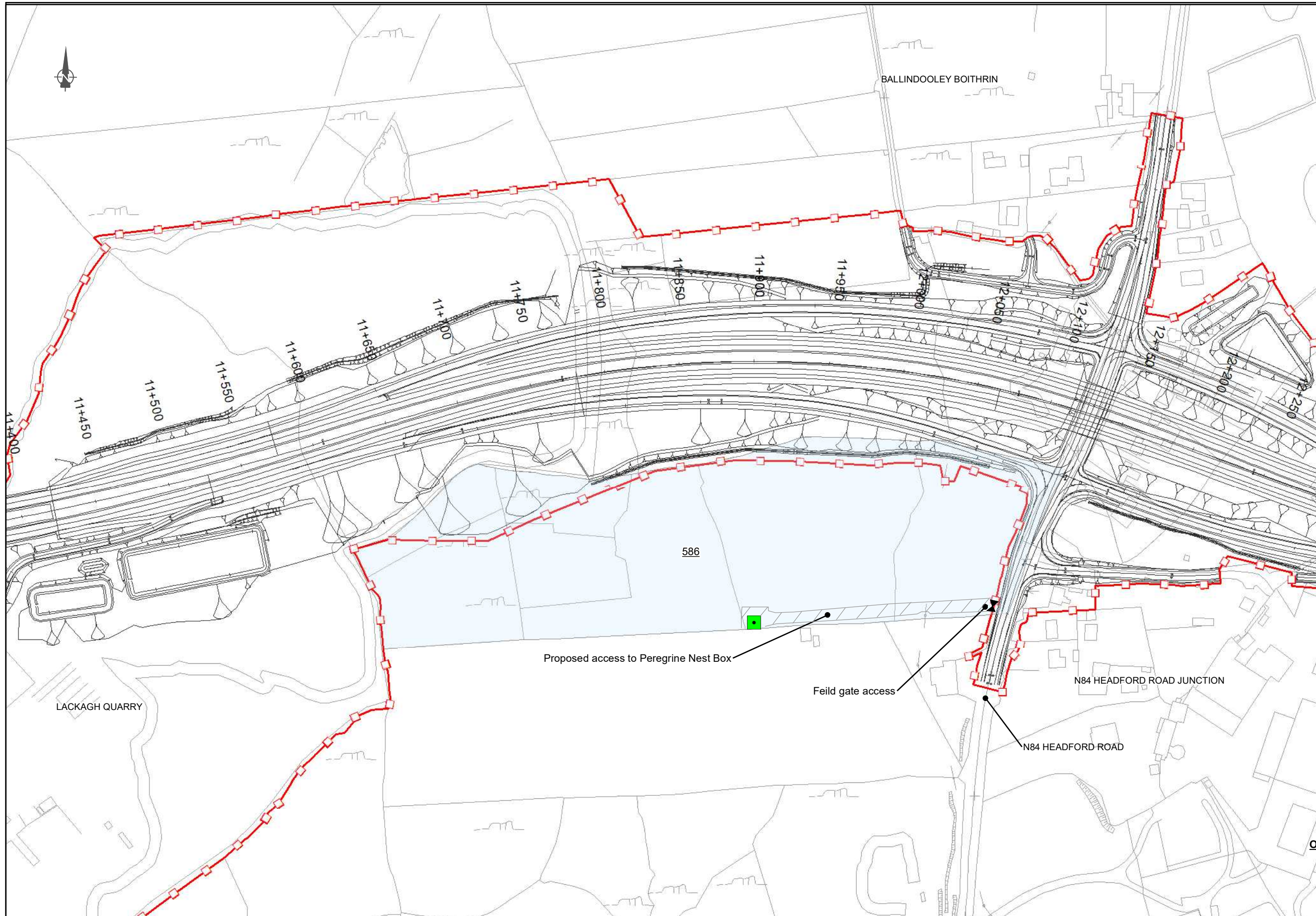
**Figure 1: Area proposed for Barn Owl Habitat Enhancement**



## **Appendix A.21.5**

Peregrine Nest Box location





FOR INFORMATION

**Legend**

- ■ ■ ■ City Boundary
- Proposed Development Boundary
- ▨ Proposed Road Development
- Galway City Council Lands
- Proposed Peregrine Nest Box Location (10m x 10m)
- ▨ 4m wide access for Construction & Maintenance

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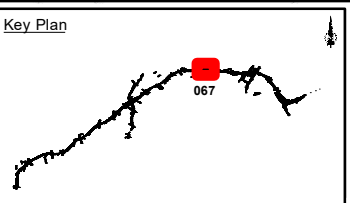
**Clients**

Comhairle Chontae na Gaillimhe  
Galway County Council

AN6  
Galway City Transport Project

GA  
An Roinn Iompair  
Turasoireachta agus Spóirt  
Department of Transport, Tourism and Sport

TII  
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**Job Title**

**N6 Galway City Ring Road**

**Scale: 1:2,500**

**Date: February 2020**

Issue	Date	By	Chkd	Appd
D1	29/01/2020	AG	MH	EMC

**Drawing Title**

**Proposed location of Peregrine Nest Box**

**FOR INFORMATION**

Job No	Drawing No	Issue
233985-00	GCRR-SK-PP-067	D1

## **Appendix A.21.6**

### **Bird Watch Ireland Peregrine Report**





# Recommendations for mitigation to minimise the impacts of the proposed N6 Galway City Ring Road on breeding Peregrine Falcon (*Falco peregrinus*) in Lackagh Quarry



Prepared for Scott Cawley

By  
John Lusby

BirdWatch Ireland

## SUMMARY

The Peregrine Falcon *Falco peregrinus* is an Annex I species listed on the EU Birds Directive (2009/147/EEC) and is protected nationally under the Wildlife Act 1976 and Amendment Act 2000. Lackagh Quarry, on the outskirts of Galway City is a traditional nesting site for Peregrine and the results of the ecological surveys undertaken for the N6 Galway City Ring Road (GCRR) identify that a breeding pair has occupied the site in each year between 2016 to 2019. The route for the proposed N6 GCRR traverses Lackagh Quarry and is therefore likely to reduce the suitability of the site for breeding Peregrine due to the existing nesting ledges becoming unsuitable and/or direct disturbance associated with construction or operation of the proposed road development. To minimise the potential impacts of the proposed road development of the N6 GCRR on breeding Peregrine in Lackagh Quarry, mitigation measures are included in the Environmental Impact Assessment Report (EIAR) for the N6 GCRR to reduce disturbance to breeding Peregrine during the nesting cycle. A seasonal constraint on construction works near Lackagh Quarry will be implemented, whereby works from the Lackagh Tunnel to the N84 Headford Road Junction will commence prior to mid-February. This will ensure that if its magnitude displaces Peregrine from the quarry, any construction related disturbance will be initiated prior to nesting and can influence nest site selection, which is targeted to reduce the likelihood of nest desertion and will not impact upon an incubating female in the nest. The installation of rock bolts on the cliff faces in the vicinity of the nest site will be undertaken in a sensitive manner (as advised by a suitably experienced ecologist) so as to minimise any potential disturbance to the nest site during the breeding season. The mitigation strategy also includes for the retention of one of the two ledges previously used by breeding Peregrine (in 2016 and 2017) in Lackagh Quarry. However, there remains a risk that breeding Peregrine will be temporarily or permanently displaced from Lackagh Quarry as a result of the proximity of the road carriageway to the existing nest ledge which will be retained and due to the lack of suitable alternative ledges in the quarry post-construction as identified in the EIAR. The displacement of breeding Peregrine from Lackagh Quarry would likely result in a reduction in the breeding population of Peregrine in the survey area for the N6 GCRR, as there are no other suitable nesting opportunities available in this area which are not already occupied by breeding Peregrine. The loss of Lackagh Quarry as a breeding site for Peregrine has the potential to have long-term effects on the local population and is significant at the county geographic scale.

As identified in the EIAR for the N6 GCRR, the proposed road development will result in a significant residual impact on Peregrine falcon. In response to the submission made by the Department of Culture, Heritage and the Gaeltacht to An Bord Pleanála on the 21 December 2018 (see Appendix 1) and in an effort to reduce this residual impact, it is proposed to implement additional mitigation in the form of the provision of an alternative nest site for Peregrine at a suitable location in close proximity to Lackagh Quarry. The objective of this mitigation is to ensure that Peregrines, if displaced from the previously used nesting ledges in the quarry, can remain and breed in the area. An artificial nest site will be provided in a suitable location and will be in place prior to the commencement of works which have the potential to disturb or displace breeding Peregrine. Three locations which are suitable for the placement of an artificial nest site for Peregrine are identified. Although it is not possible to guarantee uptake of this artificial nest site, the provision of this site will increase the likelihood of the continued occupation of breeding Peregrine in Lackagh Quarry and its surrounds which would mitigate the significant negative residual effect on Peregrine at the local and county geographic scale as a result of the construction of the proposed N6 GCRR.



## 1. INTRODUCTION

The Peregrine Falcon *Falco peregrinus* is an Annex I species listed on the EU Birds Directive (2009/147/EEC) and is protected nationally under the Wildlife Act 1976 and Amendment Act 2000. The conservation status of the Peregrine in Ireland is currently considered to be favourable and as such they are green-listed on the Birds of Conservation Concern in Ireland (Colhoun & Cummins 2013).

The breeding population of Peregrine in Ireland is continuing to recover after a period of extensive declines during the 1950s and 1960s, which was primarily due to secondary poisoning by organochlorine pesticides that resulted in reduced breeding productivity and adult mortality (Ratcliffe 1993, Crick & Ratcliffe 1995). In 1970, only fourteen breeding pairs of Peregrine were recorded in Ireland (Temple-Lang 1970), with similar population declines documented in the UK, where direct persecution to reduce the threat posed by Peregrines to homing Pigeons during the war also contributed to the population declines (Ratcliffe 1993). After restrictions on the use of organochlorine pesticides, the Peregrine population has slowly recovered with an expansion in range and increase in numbers since the early 1970s. The Breeding Bird Atlases of 2007–11 (Balmer *et al.* 2013) shows a marked range expansion over this period, with 'confirmed' or 'probable' breeding for Peregrine recorded in 217 10km squares in Ireland in 2007-11 (Balmer *et al.* 2013), which represents an increase of 343% since 1968-1972 (Sharrock 1976). The breeding population of Peregrine in Ireland has been surveyed at intervals of approximately ten years or more since 1981, which shows a gradual increase in the population size over this period. The first national survey of Peregrine in the Republic of Ireland in 1981 recorded a total of 225 occupied territories (based on approximately 50% coverage of the breeding range in 15 representative areas) (Norriss *et al.* 1983). The third national survey of breeding Peregrine in the Republic of Ireland in 2002 estimated 390 occupied breeding territories (Madden *et al.* 2009). The fourth and most recent survey of Peregrine in the Republic of Ireland in 2017 shows a further increase to an estimated minimum population estimate of 425 occupied territories (IRSG, unpublished data).

### DISTRIBUTION AND NEST SITE SELECTION

Peregrines have traditionally used a range of natural nest sites including coastal cliffs, rock faces and rocky outcrops which provide suitable ledges for nesting (Ratcliffe 1993, Norriss *et al.* 1983, Hardey *et al.* 2009). Alongside the increase in range and numbers in recent decades in Ireland (Balmer *et al.* 2013) there has been a documented increase in the use of quarries and man-made structures for nesting. The national survey of Peregrines in the Republic of Ireland in 2002 demonstrated that the number of occupied territories on natural cliff sites remained virtually stable over the previous ten years, however the number of pairs nesting in quarries increased over the same period with almost one quarter of the recorded occupied breeding territories in quarries in 2002 (Madden *et al.* 2009). Recent evidence indicates that use of buildings and other man-made structures by Peregrine in Ireland has also increased, with associated increases in Peregrine numbers in lowland areas away from the more traditional coastal and upland areas, which has included nesting within urban areas in cities and towns (J. Lusby *pers comm.*). The 2002 national survey recorded breeding pairs on 11 buildings (Madden *et al.* 2009), however the number of breeding sites on man-made structures is now substantially higher (J. Lusby *pers comm.*, NPWS 2013). A similar trend has been recorded in the UK, in 2014 the breeding population of Peregrines in the UK, Isle of Man and Channel Islands was estimated at 1,769 pairs. This is 22% larger than the population estimate from the previous survey in 2002 (Wilson *et al.* 2017). Most of this increase is accounted for by increases in lowland England, whereas populations in some upland areas declined. Peregrines now breed in many towns and cities throughout the UK, using buildings, such as churches, warehouses, tall chimneys, and tower blocks; on industrial plants such as power stations, chemical processing plants and cooling towers; and in open country on pylons, radio masts, viaducts and bridges (Dixon & Shawyer, Drewitt 2014, Wilson *et al.* 2017). In North America, Peregrine populations have also increased in urban areas which has been attributed to an increase in the availability

of potential nest sites compared to those in natural and historical cliff habitats (Venu 2018). In the Eastern United States, the carrying capacity of Peregrine populations increased with an increase in urban nest sites (Gahbauer *et al.* 2015). In the Mid-west the Peregrine population is now predominantly concentrated in urban areas (Wakamiya & Roy 2009) constituting about 80% of nests on anthropogenic sites (Redig & Tordoff 1997).

### PROVISION OF ARTIFICIAL NEST SITES

The provision of artificial nesting sites has also aided the population recovery of Peregrines and their colonisation of urban areas. Natural nest sites are typically located on cliffs, rocky outcrops or crags with ledges or cavities where the eggs are laid on a flat surface containing enough gravel or soil substrate for the birds to make a scrape or depression, while in the urban setting, artificial nest sites with gravel substrates located on structures serve the same purpose (Venu 2018). Artificial nesting sites are particularly beneficial in situations where traditional or existing nest sites are no longer suitable or where birds are present but where there are no suitable nesting sites (Dixon & Shawyer). The provision of artificial nest sites has facilitated a population increase and improved breeding for Peregrines in urban areas such as Cape Town, South Africa (Altwegg *et al.* 2014) and in the San Francisco Bay Area in the United States (Venu 2018). Several studies have recorded higher breeding productivity of Peregrines using artificial nest sites compared to natural sites, for example, Gahbauer *et al.* (2015) showed that nests with overhead cover had higher productivity than those without, as did nests in trays or boxes compared to sites without any human-provided nesting aids.

The most common artificial nest sites for Peregrine are large, open-fronted nest boxes made of wood or metal which are fitted to the exterior of buildings and other man-made structures including bridges, pylons and road infrastructures. There are several designs of nest boxes and the type of nest box and dimensions can be tailored to the specific requirements of the site, provided the nest box is sufficiently large, sheltered and protected from disturbance, with a suitable substrate for nesting and safe space or ledge for juveniles to move prior to fledging. In situations where there are no existing or suitable structures available, purpose-built towers fitted with a nest box can be erected. For example, a disused four-sided tower crane fitted with a nest box was installed at Battersea in the UK to provide a nest site for Peregrines which had previously nested on an adjacent building and resulted in the successful relocation of the pair (Nick Dixon *pers comm*). In addition to nest boxes, open trays can also be used where there is an existing sheltered ledge or within a structure which is protected from the elements (Dixon & Shawyer). The modification of existing ledges within quarries can also provide new or improved nesting opportunities for Peregrine. Such enhancement works have been carried out at quarries in the United States to improve sites for breeding Peregrine, including adding substrate and removing sharp objects from existing ledges. Explosives were used to increase the size and nesting potential of a traditional Peregrine eyrie in northern California, which was subsequently successfully used by breeding Peregrine (Pagel 1989). Specific cliff features to encourage nesting Peregrine have been incorporated within a quarry re-habilitation project in Hong Kong (CSI Quarry Rehabilitation Guidelines).

## 2. BREEDING PEREGRINE AND THE PROPOSED N6 GALWAY CITY RING ROAD

The distribution and breeding status of Peregrine Falcon in Galway City was assessed in the years between 2016 and 2018 to inform the Environmental Impact Assessment Report (EIAR) for the N6 Galway City Ring Road (GRCC). Potentially suitable nesting sites for Peregrine were identified within a 5km radius of the proposed N6 GCRR. These sites were monitored between May to July 2016 to determine the presence of Peregrine. Breeding Peregrine were confirmed at three sites within the survey area, all of which were quarries (Lusby 2017). The three quarries,

namely Angliham, Twomileditch and Lackagh were confirmed to be traditional nesting sites for Peregrine based on records of occupation in previous years, in addition to the confirmation of the presence of breeding Peregrine in these sites between 2016 to 2019 (Lusby 2018, Aonghus O'Donaill, *Pers comm*).

Of the three breeding sites confirmed within the survey area for the N6 GCRR, the Peregrine occupying Lackagh Quarry are considered to be at risk of impact from the proposed road development. The route for the proposed N6 GCRR traverses through Lackagh Quarry and is likely to reduce the suitability of the site for breeding Peregrine due to the existing nesting ledges becoming unsuitable and/or direct disturbance associated with construction or operation of the proposed road development.

#### **BREEDING PEREGRINE IN LACKAGH QUARRY**

In 2017 and 2018 additional monitoring was undertaken in Lackagh Quarry to determine the breeding status and nest location, and to assess the nest site availability to inform the impact assessments of the proposed road development on breeding Peregrine and the mitigation measures required to minimise the predicted adverse impacts.

In 2017, the Peregrine nested on a ledge close to the north corner of the east wall of Lackagh Quarry (Lusby 2017). This nest location is located less than 40m from the proposed road development. In 2018, the Peregrine nested on a ledge, over 100m to the west of the previous nest site, close to the top of the northern quarry wall (Lusby 2018). This nest site was also used in 2019 (J Lusby *pers comm.*) and is approximately 50m from the proposed road development.

Assessment of the available nesting opportunities for Peregrine in Lackagh Quarry indicated a limited availability of alternative suitable nesting ledges. The limited availability of nesting sites is also highlighted by the fact both of the ledges which have been used by breeding Peregrine in Lackagh Quarry are regarded as poor quality nest sites. The nest ledge used in 2016 and 2017 is prone to flooding (Aonghus O'Donaill *pers comm*), and the nest site used in 2018 and 2019 is situated less than one meter below the top of the quarry wall, which is not a typical nesting location for Peregrines (Ruddock & Whitfield 2007) and is considered vulnerable to human disturbance and predation (J. Lusby *pers comm*).

#### **POTENTIAL IMPACTS OF THE N6 GALWAY CITY RING ROAD ON BREEDING PEREGRINE IN LACKAGH QUARRY**

The legislative framework under the Wildlife (Amendment) Act, 2000 provides for the protection of all wild birds and their nests, eggs and young ([www.npws.ie/legislation](http://www.npws.ie/legislation)). It is an offence to intentionally cause disturbance at a nest site or to breeding Peregrine.

Peregrines are sensitive to a range of activities and can desert their nests in response to disturbances (Newton 1979), however the response to disturbance can vary between individuals and in relation to the nature, extent and timing of disturbance activities. Birds which are frequently exposed to human activities may become more accustomed and tolerant of such disturbances compared to those which do not regularly encounter human activities (Newton 1979). Peregrines nest in densely populated urban areas throughout their range (Wilson *et al.* 2014, Drewitt 2014, Venu 2018), in close proximity to human activities in active quarries (Moore *et al.* 1997, Lusby 2017) and on major road infrastructures (Venu 2018). In a survey of Peregrines in quarries in nine eastern counties in the Republic of Ireland, Moore *et al.* (1997) showed that Peregrines were equally likely to nest in active or disused quarries, and Ratcliffe (1993) observed quarry nesting Peregrines which ignored frequent rock blasting. One of the three breeding pairs of Peregrine within the survey area for the N6 GCRR nest in an active quarry (Lusby 2017). Peregrines have also been recorded nesting in close proximity to major roads in Ireland, including an active quarry which held a breeding pair located approximately 300m from the M6 motorway in 2016 (Lusby 2017). There are many examples of

Peregrines using artificial nest sites fitted to major road infrastructures such as bridges throughout their breeding range (e.g. <https://www.newnybridge.com/peregrine-falcons/>).

Although Peregrines can tolerate and successfully nest in proximity to human activity and associated disturbances, certain types of disturbances are tolerated over others. The impact of disturbance will vary according to many factors including the level and type of disturbance, the tolerance of an individual or pair, the stage of breeding cycle in which the disturbance occurs and the proximity of the disturbance to the nest. Breeding Peregrines are more likely to be disturbed by activities taking place above their nest (Herbert & Herbert 1969). Ratcliffe (1972) suggested Peregrines could tolerate any number of people in the nesting haunt, provided the eyrie was safe and inaccessible. The stage of the breeding cycle in which the disturbance occurs is also likely to be important, for example a pair may become accustomed to regular disturbance events over time (Ratcliffe 1993), whereas sporadic disturbance or disturbance which is initiated during a sensitive stage of the breeding cycle (e.g. laying, incubation) may be detrimental and cause desertion of the nest. Displacement to alternative nest sites can occur due to disturbance although this may be temporary depending on the disturbance source, or birds may become reconciled to the disturbance and return to the disturbed nest site (Ratcliffe 1962).

It is not possible to determine the specific response of breeding Peregrine in Lackagh Quarry to the construction and operation of the proposed N6 GCRR, however, based on the proximity of the proposed road development to the previously used nesting ledges, the level of disturbance during the construction and operation, the fact that similar disturbance events have not recently occurred in Lackagh Quarry, and the lack of suitable alternative ledges in the quarry post-construction, it is likely that Peregrines will be temporarily or permanently displaced from Lackagh Quarry and its surrounds. To minimise the potential impacts of the proposed road development of the N6 GCRR on breeding Peregrine in Lackagh Quarry, mitigation measures are included in the EIAR for the N6 GCRR to reduce disturbance to breeding Peregrine during the nesting cycle. A seasonal constraint on construction works near Lackagh Quarry will be implemented, whereby works from the Lackagh Tunnel to the N84 Headford Road Junction will commence prior to mid-February. The seasonal constraint on construction works near Lackagh Quarry will ensure that any construction related disturbance will be initiated prior to nesting and can influence nest site selection, which is targeted to reduce the likelihood of nest desertion and impacts on an incubating female in the nest. The installation of rock bolts on the cliff faces in the vicinity of the nest site will be undertaken in a sensitive manner (as advised by a suitably experienced ecologist) so as to minimise any potential disturbance to the nest site during the breeding season. The mitigation strategy also includes for the retention of one of the two ledges previously used by breeding Peregrine (in 2016 and 2017) in Lackagh Quarry. However, there remains a risk that breeding Peregrine will be temporarily or permanently displaced from Lackagh Quarry as a result of the proximity of the road carriageway to the existing nest ledge which will be retained and due to the lack of suitable alternative ledges in the quarry post-construction as identified in the EIAR. The displacement of breeding Peregrine from Lackagh Quarry would likely result in a reduction in the breeding population of Peregrine in the survey area for the N6 GCRR, as there are no other suitable nesting opportunities available in this area which are not already occupied by breeding Peregrine. The loss of Lackagh Quarry as a breeding site for Peregrine has the potential to have long-term effects on the local population and is significant at the county geographic scale.

### 3. RECOMMENDATIONS

As identified in the EIAR for the N6 GCRR, the proposed road development will result in a significant residual impact on Peregrine Falcon. In response to the submission made by the



Department of Culture, Heritage and the Gaeltacht to An Bord Pleanála on the 21 December 2018 (see Appendix 1) and in an effort to reduce this residual impact, it is proposed to implement additional mitigation in the form of the provision of an alternative nest site for Peregrine at a suitable location in close proximity to Lackagh Quarry. The provision of a suitable, alternative nest site, alongside the mitigation measures outlined in the EIAR, namely the seasonal constraint on the commencement of construction works at Lackagh Quarry and retention of one of previously used nest ledges, would reduce the risk of construction related disturbance effects to breeding Peregrine in the short-term (during the construction period) and reduce the risk of displacement of breeding Peregrine from Lackagh Quarry and surrounds in the long-term (during the operation of the proposed road development). Furthermore, given that the previously used nest ledges in Lackagh Quarry are deemed to be of poor quality, the provision of a suitable and safe nesting site could help to secure the future of Peregrine in this area. An artificial nest site of appropriate design will be in place prior to the commencement of works which have the potential to disturb or displace breeding Peregrine. Although it is not possible to guarantee uptake of this artificial nest site, the provision of this site will increase the likelihood of the continued occupation of breeding Peregrine in Lackagh Quarry and its surrounds which would mitigate the significant negative residual effect on Peregrine at the local and county geographic scale as a result of the construction of the proposed N6 GCRR. Should the artificial nest site be taken up by the resident pair of Peregrine (as confirmed by monitoring as outlined below) then the seasonal constraint on the commencement of construction works at Lackagh Quarry should be lifted, as this would not result in effects to breeding Peregrine.

#### **Provision of an alternative nest site for Peregrine**

It is recommended that an alternative nest site, consisting of a nest box fitted to a suitable structure is provided in close proximity to Lackagh Quarry (<1km) prior to the commencement of works which have the potential to disturb or displace breeding Peregrine. The objective of this mitigation recommendation is to ensure that Peregrines, if displaced from the previously used nesting ledges in the quarry, can remain and breed in the area. Three options are outlined as suitable locations for the installation of the artificial nest site as detailed, one of which is fitting a nest box to an existing structure and two are installing a purpose-built structure to accommodate a nest box. The nest box should be open-fronted with a sheltered cavity, containing a substrate (a mix of gravel or pea shingle and compost or woodchips) and sufficient space to allow the young to exercise in safety as they develop (Dixon & Shawyer). The nest box should be fitted with a raised edge to help retain the substrate and the juveniles as they become more active. The nest box should not be placed in locations facing full sun throughout the day (Ratcliffe 1995). The design and specifications of a nest box for Peregrine is detailed here: [http://www.schwegler-natur.de/portfolio\\_1408366639/schwegler-wanderfalkennistkasten/?lang=en](http://www.schwegler-natur.de/portfolio_1408366639/schwegler-wanderfalkennistkasten/?lang=en) and included in Appendix 2 to this report. Two possible locations for this nest site are discussed below.

#### **1: Communications tower**

The communications tower (ITM 530660 728015) located approximately 500m to the south of the previously used nest ledges in Lackagh Quarry, and approximately 450m to the south of the proposed road development provides a suitable location and is the preference site for the provision of a nest box for Peregrine. The tower is located within sight and sufficiently close to Lackagh Quarry to increase the potential of uptake by breeding Peregrine if displaced from the quarry, while also located at a sufficient distance from the proposed road development to avoid disturbance associated with the construction and operation of the proposed road development. The nest box should be fitted close to the top of the tower (the top third of the tower) and should be in place prior to the initiation of works in Lackagh Quarry.

There are several aspects which need to be considered prior to the installation of a nest box on the communications mast. Firstly, as it is an offence to cause intentional disturbance to breeding Peregrine or their nest, this may impose a restriction on maintenance work (e.g. repairs) or other activities in close proximity to the nest site (a distance which could cause disturbance) during the nesting season, should the nest site be occupied. Secondly, it is typical for the ground level surrounding an active nest to be littered with feathers and bones of prey consumed by Peregrine.

If it is not possible to install a nest box to the existing structure, a purpose-built tower (as detailed below) could be installed in close proximity.

The location of the communications tower in relation to Lackagh Quarry is shown below in Figure 1.

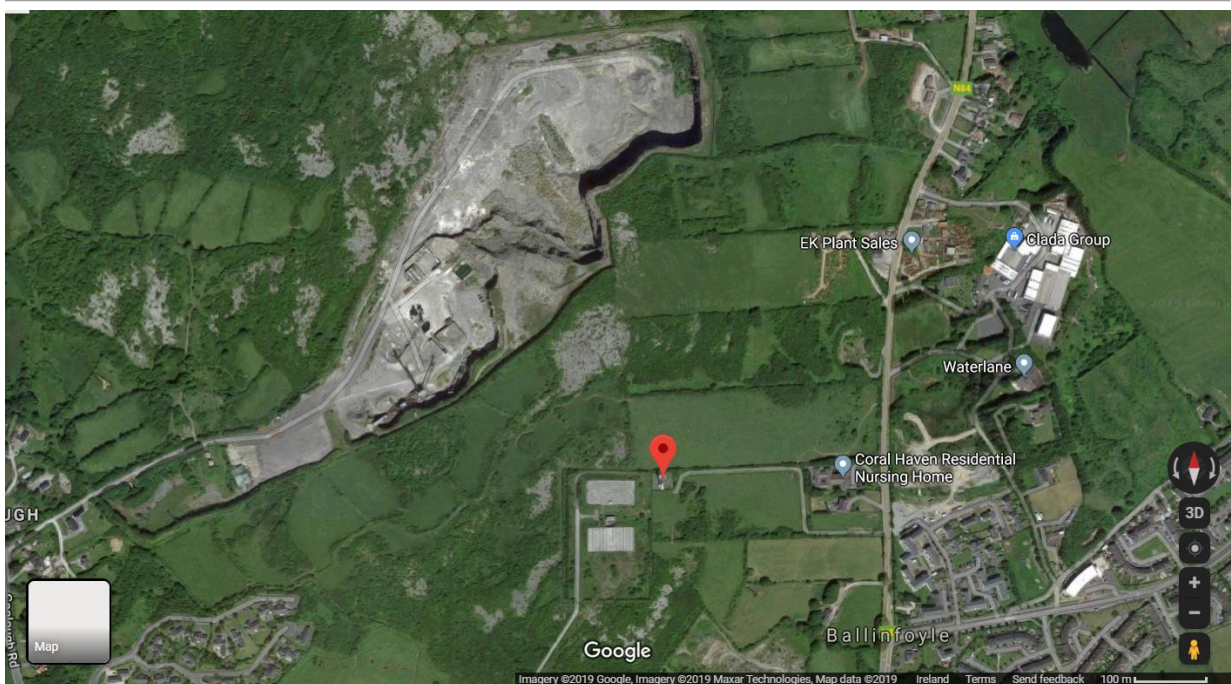


Figure 1: The location of the communications tower (ITM 530660 728015) which would be suitable for the placement of a nest box for Peregrine (shown by the red pin).

## 2: Purpose-built tower

A purpose-built tower fitted with a nest box can be installed at either of the two locations proposed below. The purpose-built tower and nest box should be in place prior to construction activities in the quarry. The tower can be constructed from suitable materials provided it is safe, secure and long-lasting to accommodate a nest box of approximately 260kg (empty nest box). The tower can be of similar design to a pylon or tower crane, with four supporting bases, narrow four-sided tower with supporting girders. The nest box will be positioned at a minimum height of 25m above ground level. The nest box should be accessible to licensed professionals to allow maintenance and monitoring of the nest as required. A perimeter fence should be installed around the base of the tower to restrict access to the general public and to and reduce the potential for disturbance.

One example of a purpose-built tower for Peregrine which has been used to inform the design of the proposed tower at Lackagh Quarry is a disused four-sided crane tower with a nest box installed at Battersea in the UK to provide a suitable nest for Peregrine to encourage their relocation from nesting on a nearby building. The nest box in this situation was installed at 30m above ground level which was a similar height to the existing nest site on the building (Nick Dixon *pers comm.*) Images of this structure can be viewed here:

<http://parliamentperegrinediary.blogspot.com/>, other examples of purpose built towers for Peregrine are included in Appendix 3.

*Location 1 for purpose-built tower:*

The Galway City Council owned lands to the south of the N6 GCRR and south east of Lackagh Quarry would provide a suitable location for an artificial nest site for Peregrine. The purpose-built tower should be sited at a minimum distance of 100m from the proposed road development, in the south west corner of the plot 586d.403 at approximately ITM 530736 728267 as shown in Figure 2 below.



*Figure 2: The proposed location for a purpose-built tower to accommodate a nest box for Peregrine (ITM 530736 728267 (shown by the red pin)).*

*Location 2 for purpose-built tower:*

The area within the proposed development boundary for the proposed road development to the north of the nest site used in 2016/2017, in the north east corner of the quarry would provide a suitable location for the purpose-built tower, as shown in Figure 3 below.





Figure 3: The proposed location for a purpose-built tower to accommodate a nest box for Peregrine (shown by the red pin).

**Mitigation recommendation:**

**Provide alternative nest sites for Peregrine**

**Objective:**

Minimise the potential that Peregrine are temporarily or permanently displaced from Lackagh Quarry and surrounds as a result of the construction of the N6 Galway City Ring Road

**Mitigation measures** (step by step approach):

- An artificial nest sites of appropriate design for Peregrine to be provided in close proximity to Lackagh Quarry (<1km)
- Examples of appropriate designs of nest boxes for Peregrine are detailed here: [http://www.schwegler-natur.de/portfolio\\_1408366639/schwegler-wanderfalkennistkasten/?lang=en](http://www.schwegler-natur.de/portfolio_1408366639/schwegler-wanderfalkennistkasten/?lang=en)
- The nest box should be open-fronted with a sheltered cavity, containing a substrate (a mix of gravel or pea shingle and compost or woodchips) and sufficient space to allow the young to exercise in safety as they develop (Dixon & Shawyer). The nest box should also be fitted with a raised edge to help retain the substrate and the juveniles as they become more active.
- The nest box should not be placed in locations facing full sun throughout the day (Ratcliffe 1995)
- The first option is for the nest box to be fitted to the communications tower (ITM 530660 728015). The nest box should be in place prior to the initiation of works which have the potential to cause disturbance to Peregrine in Lackagh Quarry. The nest box should be



secured close to the top of the tower (the top third of the tower) in a suitable location which provides a clear flight line to the nest box.

- Should it not be possible to install a nest box on the communications tower, a purpose-built tower should be installed: 1) to the south of the N6 GCRR on Galway City Council owned lands to the south-east of Lackagh Quarry, or 2) within the proposed development boundary for the proposed road development to the north of the nest site used in 2016/2017 in the north-east corner of the quarry. The purpose-built tower should be sited at a minimum height of 25m above ground level and should be in place prior to construction activities in the quarry.

### Monitoring

Monitoring should be undertaken by a suitably qualified ecologist to determine the response of Peregrine to the disturbances associated with the construction of the proposed road development and to the mitigation measures implemented to determine their success. Monitoring should be carried out during March to July over a minimum of three visits as per the methods outlined in Lusby (2018) and Hardey *et al.* (2009) to identify the nest location and outcome of breeding including determining use of the artificial nest site, during the construction phase and for a period of three years once the proposed road development is in operation.

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## **APPENDIX 1.**

### **Submission by the Department of Culture, Heritage and the Gaeltacht to An Bord Pleanála**

*In the EIAR, there is a degree of uncertainty as to whether Lackagh Quarry will remain a suitable breeding site for Peregrine during and post-construction. No alternative breeding site for the Peregrine pair associated with this nest site is known locally. To counterbalance the potential loss of this breeding resource, a suitable alternative nest site(s) needs to be created, noting that the most recent National Peregrine Survey did not record any urban nesting pairs from Galway City. There may be opportunities to install artificial nesting platforms or boxes on other suitable features or buildings. Failing that, a bespoke nesting structure in an appropriate area should be constructed.*

*The EIAR could benefit from more clarity as to the efficacy of the mitigation measure to temporarily dissuade active breeding of Peregrine at Lackagh Quarry by commencing works from the Lackagh Tunnel to the N84 Headford Road Junction prior to mid-February. The appropriateness of potentially working in the vicinity of, and disturbing an active nest site to install rock bolts on the cliff face may be challenging. If an alternative suitable Peregrine nesting resource was created prior to any road development works being undertaken then the possibility of temporarily rendering the nesting ledges at Lackagh Quarry unavailable for Peregrine during the construction period as a mitigation measure to avoid the disruption of a breeding attempt could be considered.*



## APPENDIX 2.

### Peregrine Falcon Nest Box

(extracted from [http://www.schwegler-natur.de/portfolio\\_1408366639/schwegler-wanderfalkennistkasten/?lang=en](http://www.schwegler-natur.de/portfolio_1408366639/schwegler-wanderfalkennistkasten/?lang=en))

**Installation height:** Generally, in heights above 25 – 30 m. North- or east-facing sites have proved to be most effective. The “balcony” with its perch should be placed so that there is a clear area directly below. The box can be attached directly to a building using screws (e.g. on flat roof sections) or, by means of a mounting rack and wall plugs, onto an outside wall.

**Recommended litter/ bedding:** Place some gravel or other loose material in the box.

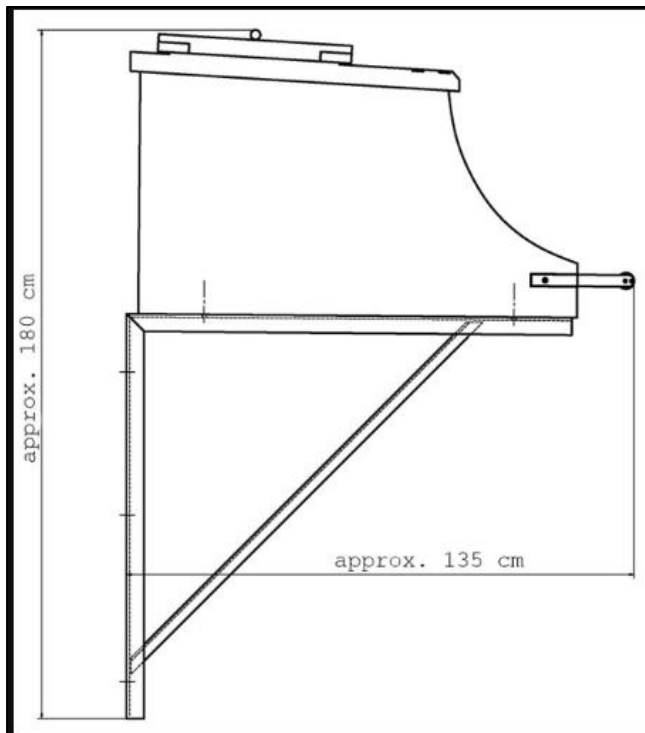
Peregrines do not construct nests, instead the female scrapes a hollow in which to hatch the eggs. The breeding period starts any time between mid-March and the beginning of April.

**Material:** Special, high-strength, reinforced lightweight concrete. This ensures that the box is very long-lasting (decades) and allows a proper and structurally correct manner of installation. The naturally grey, smooth concrete can be painted individually during installation to match the building, if required.

**External dimensions:** W 80 x H 73 x D 130 cm.

**Nesting chamber:** W 67 x H 54 x D 72 cm.

**Weight:** approx. 260 kg (empty box).



### **APPENDIX 3.**

Examples of purpose-built towers which have been fitted with a nest box for Peregrines are shown below:

<http://parliamentperegrinediary.blogspot.com/>

<http://www.friendsofcamas.org/projects/peregrine-tower-webcam-project>

<https://images.app.goo.gl/FsmGBHSdBwjNW1a86>

<https://www.gettyimages.de/detail/nachrichtenfoto/the-newly-erected-nesting-tower-designed-to-house-a-nachrichtenfoto/828929510>

<http://www.conservewildlifenj.org/blog/2018/02/09/photo-from-the-field-new-falcon-tower-on-bonnet-island-lbi/>