

The background is a vibrant yellow. It is decorated with several abstract shapes in shades of blue and teal. These shapes include circles, teardrop-like forms, and elongated rounded rectangles, some of which contain white circles. The shapes are scattered across the page, creating a modern, geometric aesthetic.

Chapter 22

Summary of Mitigation & Monitoring Measures

Contents

22. Summary of Mitigation & Monitoring Measures.....	1
22.1 Introduction.....	1
22.2 Mitigation and Monitoring Schedules	1
22.3 General Mitigation Requirements	2
22.4 Traffic and Transport	3
22.5 Air Quality	3
22.6 Climate.....	4
22.7 Noise and Vibration	5
22.8 Population.....	8
22.9 Human Health.....	8
22.10 Biodiversity	9
22.11 Water	17
22.12 Land, Soils, Geology and Hydrogeology	18
22.13 Archaeological and Cultural Heritage.....	20
22.14 Architectural Heritage	23
22.15 Landscape (Townscape) and Visual	26
22.16 Waste and Resources	27
22.17 Material Assets	29
22.18 Major Accidents and Disasters.....	30
22.19 Cumulative Impacts & Environmental Interactions.....	31
22.20 References	32

22. Summary of Mitigation & Monitoring Measures

22.1 Introduction

The purpose of this Chapter is to collate the mitigation and monitoring measures identified in the Environmental Impact Assessment Report (EIAR) that are considered necessary to protect the environment, prior to the commencement of, and throughout the duration of the Construction and / or Operational Phases of the Clongriffin to City Centre Core Bus Corridor Scheme (hereafter referred to as the Proposed Scheme).

The design of the Proposed Scheme has evolved through comprehensive design iteration, with particular emphasis on minimising the potential for environmental impacts, where practicable, whilst ensuring the objectives of the Proposed Scheme are attained. In addition, feedback received from the comprehensive consultation programme undertaken throughout the option selection and design development process has been incorporated, where appropriate.

As described throughout this EIAR, the design of the Proposed Scheme has been progressed taking account of environmental constraints and considerations that have been identified in assessments. This has enabled the avoidance of potential environmental impacts, wherever possible.

22.2 Mitigation and Monitoring Schedules

Mitigation and monitoring measures have been identified as environmental commitments and overarching requirements which shall avoid, reduce or offset potential impacts.

Mitigation and monitoring measures specified within the EIAR technical assessments are also provided in Chapter 6 to Chapter 21 of this EIAR.

The timing and implementation of the mitigation and monitoring measures are indicated within this Chapter as either during the:

- Pre-Construction Phase: Activities such as investigative surveys (e.g. bat surveys) that need to be undertaken in advance of the construction works;
- Construction Phase: The undertaking of physical works to construct elements of the Proposed Scheme, as outlined in Chapter 4 (Proposed Scheme Description); and
- Operational Phase: When the Proposed Scheme comes into operation (i.e. any mitigation associated with planned maintenance).

The following tables summarise the Construction and Operational phase mitigation outlined in the relevant EIAR technical assessments, but should be read in conjunction with the mitigation outlined in the specific chapter and also with the Construction Environmental Management Plan (CEMP) in Volume 4 of this EIAR (note that the CEMP summarises the Construction Phase mitigation only). Where appropriate, the location to which the mitigation relates to is identified and where the mitigation measure is scheme wide the location is given as 'throughout (as required)'. Note that in certain instances, a mitigation measure may be relevant to more than one environmental aspect (e.g. Mitigation Number WT1 is also a mitigation measure used in relation to Biodiversity).

22.3 General Mitigation Requirements

Table 22.1: General Mitigation Measures

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
GEN1	Section 5.10	Throughout (as required)	The mitigation measures appropriate to the construction contract summarised in this chapter have been included in the Construction Environmental Management Plan (CEMP) and its associated management plans (provided in Appendix A5.1 in Volume 4 of this EIAR).	Construction

22.4 Traffic and Transport

Table 22.2: Traffic and Transport Mitigation Measures

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
TT1	6.5.1	Throughout (as required)	<p>A Construction Environmental Management Plan (CEMP) has been prepared (included as Appendix A5.1 in Volume 4 of this EIAR) and will be implemented (and developed further as required) by the appointed contractor.</p> <p>A detailed Construction Traffic Management Plan will be prepared (and included in the CEMP) and implemented by the appointed contractor.</p> <p>The appointed contractor will also prepare (and include in the CEMP) and implement a Construction Stage Mobility Management Plan (CSMMP) to actively encourage personnel to travel to site by sustainable means.</p>	Construction

22.5 Air Quality

Table 22.3: Air Quality Mitigation Measures

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
AQ1	7.5.1	Construction Compound and throughout (as required)	<p>A series of mitigation measures will be implemented by the appointed contractor to minimise dust nuisance impacts:</p> <ul style="list-style-type: none"> Public roads affected by the Proposed Scheme works will be regularly inspected for soiling associated with the construction activities and cleaned as necessary; Material handling systems and stockpiling of materials will be designed and laid out to minimise exposure to wind. Water misting or sprays (or similar dust suppression methods) will be used as required if particularly dusty activities associated with the construction contract are necessary during dry or windy periods; During movement of dust generating materials both on and off-site, trucks will be covered with tarpaulin, and before entrance onto public roads, trucks will be checked to ensure the tarpaulins are properly in place; and The appointed contractor will provide a site hoarding of 2.4m height along noise sensitive boundaries, at a minimum, at the Construction Compound, which will assist in minimising the potential for dust impacts off-site. 	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
			The appointed contractor will keep the effectiveness of the mitigation measures under review and revise them as necessary. In the event of dust nuisance associated with the Proposed Scheme occurring outside the works boundary, movements of materials likely to raise dust will be curtailed and satisfactory procedures implemented to rectify the problem.	

22.6 Climate

Table 22.4: Climate Mitigation Measures

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
CL1	8.7.1	Throughout (as required)	<p>A series of mitigation measures have been incorporated into the Proposed Scheme with the goal of reducing the embodied carbon associated with the Construction Phase. These mitigation measures include:</p> <ul style="list-style-type: none"> • The replacement, where feasible, of concrete containing Portland cement with concrete containing ground granulated blast furnace slag (GGBFS); • Where practicable, materials will be reused within the extent of the Proposed Scheme; and • Where practicable, materials will be sourced locally to reduce the embodied emissions associated with transport. 	Construction

22.7 Noise and Vibration

Table 22.5: Noise and Vibration Mitigation Measures

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
NV1	9.5.1.1	Throughout (as required)	<p>The appointed contractor will be required to take specific noise abatement measures to the extent required and comply with the recommendations of BS 5228–1 (BSI 2014a) and European Communities Noise Emissions by Equipment for Use Outdoors (Amendment) Regulations 2006 (S.I. No 241/2006). The mitigation measures outlined below for the Construction Phase have also been included in the Construction and Environmental Management Plan (Appendix A5.1 in Volume 4 of this EIAR).</p> <p>These measures will ensure that:</p> <ul style="list-style-type: none"> • During the Construction Phase, the appointed contractor will be required to manage the works to comply with the limits detailed in Section 9.2.4.1 in Chapter 9 of this EIAR using methods outlined in BS 5228–1 (BSI 2014a). • The best means practicable, including proper maintenance of plant and equipment, will be employed to minimise the noise produced by on site operations. 	Construction
NV2	9.5.1.1	Throughout (as required)	<p>The appointed contractor will put in place the most appropriate noise control measures depending on the level of noise reduction required at individual working areas i.e., based on the construction threshold values for noise and vibration set out in Tables 9.7 and 9.10 in Chapter 9 of this EIAR. Reference to Table 9.37 in Chapter 9 of this EIAR indicates that intrusive works occurring within 25m to 45m of Noise Sensitive Locations (NSLs) will need specific noise control measures to reduce impacts depending on the time period over which they will occur, i.e. daytime or evening.</p>	Construction
NV3	9.5.1.1.1	Throughout (as required)	<p>The potential for any item of plant or equipment to result in exceedance of construction noise thresholds (Tables 9.7 and 9.10 in Chapter 9 of this EIAR) will be assessed prior to the item being brought onto the site. The least noisy item of plant or equipment will be selected wherever practicable (e.g., plant or equipment items with sound attenuation incorporated). Should a particular item of plant or equipment already on the site be found to exceed the construction noise thresholds, the first action will be to identify whether the item can be replaced with a quieter alternative.</p>	Construction
NV4	9.5.1.1.2	Construction Compound and throughout (as required)	<p>The following measures will be implemented by the appointed contractor to control noise levels at source in order to remain below the threshold values for noise set out in Table 9.7 in Chapter 9 of this EIAR, which relate to specific site considerations:</p> <ul style="list-style-type: none"> • For mobile plant items such as dump trucks, planers, excavators and loaders, the installation of an acoustic exhaust, utilising an acoustic canopy to replace the normal engine cover and/or maintaining enclosure panels closed during operation can reduce noise levels by up to 10 dB; 	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
			<ul style="list-style-type: none"> For percussive tools such as pneumatic concrete breakers and tools a number of noise control measures include fitting muffler or sound reducing equipment to the breaker 'tool' and ensuring any leaks in the air lines are sealed; The Construction Compound is in close proximity to NSLs (refer to Table 9.32 in Chapter 9 of this EIAR). Noisy items of plant or equipment (e.g., crushing plant) will be sited away from noise sensitive boundaries; Where compressors, generators and pumps are located in proximity to NSLs and have potential to exceed the construction noise thresholds, these will be surrounded by acoustic lagging or enclosed within acoustic enclosures providing air ventilation; and Resonance effects in panel work or cover plates can be reduced through stiffening or application of damping compounds, while other noise nuisance can be controlled by fixing resilient materials in between the surfaces in contact. 	
NV5	9.5.1.1.3	Throughout (as required)	Erection of localised demountable enclosures or screens will be used by the appointed contractor around breakers or drill bits, as required, when in operation in proximity to NSLs boundaries with the potential to exceed the construction noise thresholds. Annex B of BS 5228-1 (BSI 2014a) (Figures B1, B2 and B3) provide typical details for temporary and mobile acoustic screens, sheds and enclosures that can be constructed on site from standard materials.	Construction
NV6	9.5.1.1.3	Construction Compound	The appointed contractor will provide a site hoarding of 2.4m height along noise sensitive boundaries, at a minimum, at the Construction Compound.	Construction
NV7	9.5.1.1.3	Construction Compound	Careful planning of the Construction Compound including the placement of site buildings and stores between the site and NSLs will also be considered by the appointed contractor.	Construction
NV8	9.5.1.1.4	Throughout (as required)	Construction activities will be scheduled in a manner that reflects the location of the site and the nature of neighbouring properties. Construction activities / plant or equipment items will be considered with respect to their potential to exceed construction noise thresholds at NSLs and will be scheduled according to their noise level, proximity to sensitive locations and possible options for noise control. In situations where an activity with potential for exceedance of construction noise thresholds is scheduled (e.g. road widening and utility diversions or activities with similar noise levels identified in Table 9.22 in Chapter 9 of this EIAR). Other construction activities associated with the Proposed Scheme will be scheduled to avoid significant cumulative noise levels.	Construction
NV9	9.5.1.1.5	Throughout (as required)	The NTA will establish clear forms of communication that will involve the appointed contractor and NSLs in proximity to the works so that residents or building occupants are aware of the likely duration of activities likely to generate noise or vibration that are potentially significant as set out in Tables 9.7 and 9.10 in Chapter 9 of this EIAR.	Construction
NV10	9.5.1.1.6	Throughout (as required)	During the Construction Phase the appointed contractor will carry out noise monitoring at representative NSLs to evaluate and inform the requirement and/ or implementation of noise management measures. Noise monitoring will be conducted in accordance with ISO 1996-1 (ISO 2016) and ISO 1996-2 (ISO 2017). The selection of monitoring locations will be based on the nearest representative NSLs to the working area which will progress along the length of the Proposed Scheme.	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
NV11	9.5.1.2	Throughout (as required)	During the Construction Phase the appointed contractor will carry out vibration monitoring at buildings and structures where proposed works have the potential to be at or exceed the vibration limit values in Table 9.10 in Chapter 9 of this EIAR. Vibration from construction activities will be limited to the values set out in Table 9.10 in Chapter 9 of this EIAR to avoid any form of potential cosmetic damage to buildings and structures.	Construction
NV12	9.5.1.2	Throughout (as required)	<p>The appointed contractor will implement the following mitigation measures during the Construction Phase:</p> <ul style="list-style-type: none"> • A clear communication programme will be established by NTA to inform adjacent building occupants in advance of any potential intrusive works which may give rise to vibration levels likely to result in significant effects as per Table 9.11 in Chapter 9 of his EIAR.; • Activities capable of generating significant vibration effects with respect to human response as per Table 9.11 will be restricted to daytime hours only, as far as practicable; and • Appropriate vibration isolation (such as resilient mounts to pumps and generators) will be applied to plant and equipment, where required and where feasible. 	Construction

22.8 Population

Table 22.6: Population Mitigation Measures

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
n/a	n/a	n/a	No additional mitigation or monitoring measures are considered necessary beyond those already identified in other environmental assessments.	n/a

22.9 Human Health

Table 22.7: Human Health Mitigation Measures

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
HH1	11.5.1	Throughout (as required)	Mitigation for adverse psychosocial responses to the Construction Phase will include providing the public with sufficient information to enable people to plan their days, journeys and activities around the construction works and take control of their options to some extent. The appointed contractor will put in place a Communications Plan in accordance with the NTA requirements. The Plan will provide a mechanism for members of the public to communicate with the NTA and the appointed contractor, and for the NTA and the appointed contractor to communicate important information on various aspects of the Proposed Scheme to the public. This will include timely communication to the local community on the planned works activities, timings and traffic management. These requirements are set out in the CEMP (Appendix A5.1 in Volume 4 of this EIAR).	Construction

22.10 Biodiversity

Table 22.8: Biodiversity Mitigation Measures

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
BD1	12.5.1.2	Throughout (as required)	<p>Habitat Loss / Fragmentation</p> <p>Where practicable, areas of vegetation, including habitats of Local Importance (Higher Value), (i.e., scattered trees and parkland, treeline and hedgerow habitat types), which lie within the footprint, or along the boundary of the Proposed Scheme, will be retained.</p> <p>The areas of vegetation to be retained are shown on the Landscaping General Arrangement Drawings (BCIDA-ACM-ENV_LA-0001_XX_00-DR-LL-9001) in Volume 3 of this EIAR. These areas will be protected by the appointed contractor for the duration of construction works and fenced off at an appropriate distance.</p>	Construction
Refer to WT1 in Table 22.9	-	Construction Compound and throughout (as required)	<p><u>Habitat Degradation – Surface Water Quality</u></p> <p>In terms of mitigation, a Surface Water Management Plan (SWMP) has been prepared (provided in the CEMP, Appendix A5.1 in Volume 4 of this EIAR), which details control and management measures for avoiding, preventing, or reducing any significant adverse impacts on the surface water environment during the Construction Phase of the Proposed Scheme.</p> <p>It will be a condition of the Employer's Requirements that the successful contractor, immediately following appointment, must detail in the SWMP how it is intended to effectively implement all the applicable measures identified in this EIAR and any additional measures required pursuant to conditions imposed by An Bord Pleanála to any grant of approval.</p> <p>At a minimum, all the control and management measures set out in the SWMP will be implemented by the appointed contractor. This includes measures relating to:</p> <ul style="list-style-type: none"> • Construction Compound management including the storage of fuels and materials; • Control of Sediment; • Use of Concrete; • Management of vehicles and plant including refueling and wheel wash facilities (if necessary); and • Monitoring. 	Construction
Refer AQ1 in Table 22.3	-	Construction Compound and throughout (as required)	<p><u>Habitat Degradation – Air Quality</u></p> <p>The mitigation measures to control dust emissions during the Construction Phase are outlined in Table 22.3 of this Chapter of the EIAR.</p>	

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
BD2	12.5.1.2	Throughout (as required)	<p>To mitigate loss of habitat, proposed planting incorporated into the Proposed Scheme will be implemented by the appointed contractor listed below and displayed on the Landscaping General Arrangement Drawings (BCIDA-ACM-ENV_LA-0001_XX_00-DR-LL-9001) in Volume 3 of this EIAR:</p> <ul style="list-style-type: none"> • 545 street trees planted; • 2995m² of proposed hedgerow; • 56141m² of proposed species rich grassland; • 204m² of proposed ornamental planting; and • 8372m² of proposed amenity grassland planting. 	Construction
BD3	12.5.1.2	Throughout (as required)	<p><u>Habitat Degradation – Invasive Species</u></p> <p>The NTA will ensure that a confirmatory pre-construction invasive species survey will be undertaken by a suitably qualified specialist to confirm the absence and/or extent of all Third Schedule invasive species within the footprint of the Proposed Scheme.</p> <p>Where an infestation is confirmed/identified within the footprint of the Proposed Scheme, this will require the implementation of a Non-Native Invasive Species Management Plan (refer to the Plan contained in the CEMP in Appendix 5.1 of Volume 4 of this EIAR). Following the confirmatory pre-construction survey, mitigation measures outlined in BD4 and BD5 will be implemented, as required.</p>	<p>Pre-Construction</p> <p>Construction</p>
BD4	12.5.1.2	Throughout (as required)	<p><u>Habitat Degradation – Invasive Species</u></p> <p>Where a pre-construction invasive species re-survey identifies newly established non-native invasive species within the footprint of the Proposed Scheme, the non-native Invasive Species Management Plan (ISMP) produced will provide a detailed description of the infestations (e.g. approximate area of the respective colonies (m²), where feasible; approximate total number of stems, pattern of growth and information on other vegetation present), and where necessary, include calculations of volumes of infested soils to be excavated.</p> <p>The ISMP will be finalised following the pre-construction survey as advised by a suitably qualified specialist, with regard to the Management of Invasive Alien Plant Species on National Roads - Technical Guidance (TII 2020a) and Standard (TII 2020b) and other species-specific guidance documents including those listed in the non-native ISMP, as necessary.</p>	Pre-Construction / Construction
BD5	12.5.1.2	Throughout (as required)	<p><u>Habitat Degradation – Invasive Species</u></p> <p>The NTA will ensure that all control measures specified in the Proposed Scheme non-native ISMP shall be implemented by a suitably qualified and licenced specialist prior to the construction of the Proposed Scheme to control the spread of newly established non-native invasive species within the footprint of the Proposed Scheme. Furthermore, the appointed contractor will adhere to control measures specified within the Non-Native ISMP throughout the Construction Phase of the Proposed Scheme.</p>	Pre-Construction / Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
			The site will be monitored by the appointed contractor after control measures have been implemented. Any re-growth, will be subsequently treated as detailed in the Proposed Scheme non-native ISMP.	
BD6	12.5.1.2	Throughout (as required)	<p><u>Habitat Degradation – Invasive Species</u></p> <p>Once the Proposed Scheme is in operation, the Local Authority will implement a maintenance and management regime subject to their management procedures, where any introduction of non-native invasive plant species will be managed. No additional mitigation is required.</p>	Operation
BD7	12.5.1.4.1	(CBC0001PRF001; CBC0001PRF002, CBC0001PRF003, CBC0001PRF004, CBC0001PRF005) Provided in Figure 12.6.2 in Chapter 12 of this EIAR.	<p><u>Bats</u></p> <p><u>Protection of Bats during Vegetation Clearance</u></p> <p>A total of five potential roost features (PRFs) were identified in trees within the footprint of the Proposed Scheme during the multidisciplinary surveys. The following mitigation measures will be implemented by the appointed contractor to protect the PRFs:</p> <ul style="list-style-type: none"> Retained trees with PRFs will be fenced off at the outset of works and for the duration of construction to avoid structural damage to the trunk, branches, or root system of the tree which could disturb roosting bats. Temporary fencing will be erected at a sufficient distance from the tree so as to enclose the Root Protection Area (RPA) of the tree. The RPA will be defined based upon the recommendation of a qualified arborist; Where fencing is not feasible due to insufficient space, protection for the tree will be afforded by wrapping hessian sacking (or suitable equivalent) around the trunk of the tree and strapping stout buffer timbers around it; The area within the RPA will not be used for vehicle parking or the storage of materials (including soils, oils and chemicals). The storage of hazardous materials (e.g. hydrocarbons) or concrete washout areas will not be undertaken within 10m of any retained trees, hedgerows and treelines; A qualified arborist shall assess the condition of, and advise on any repair works necessary to, any trees which are to be retained or that lie outside of the Proposed Scheme footprint but whose RPA is impacted by the works. Any remedial works required will be carried out by a qualified arborist; A buffer zone of at least 5m will be maintained between construction works and the identified trees to ensure that the root protection areas are not damaged; and There will be no additional lighting within 5m of the PRF during the Construction Phase of the Proposed Scheme to avoid disturbance to roosting bats. 	Construction
BD8	12.5.1.4.1	Throughout (as required)	<p><u>Bats</u></p> <p><u>Habitat Loss and Fragmentation</u></p> <p>Planting of treeline, hedgerow and grassland habitats within the Proposed Scheme footprint will be carried out by the appointed contractor, as detailed in the landscape drawings which will provide suitable compensatory habitat for the bat species recorded within the study area (Refer to the Landscaping General Arrangement Drawings (BCIDA-ACM-ENV_LA-0001_XX_00-DR-LL-9001) in Volume 3 of this EIAR for locations.</p>	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
BD9	12.5.1.4.2	Throughout (as required)	<p><u>Badgers</u></p> <p><u>Disturbance / Displacement</u></p> <p>The NTA will ensure that a confirmatory pre-construction check of all suitable badger habitat will be completed within the 12 month period prior to any construction works commencing.</p> <p>The presence of any new setts or significant badger activity will be treated and/or protected in accordance with the Guidelines for the Treatment of Badgers during the Construction of National Road Schemes (NRA, 2006a).</p>	Pre-Construction
BD10	12.5.1.4.2	Throughout (as required)	<p><u>Protection of Badgers from Accidental Harm During Construction (Excavations)</u></p> <p>To protect badgers from indirect harm during construction, where practicable open excavations will be covered when not in use, and backfilled as soon as practicable by the appointed contractor.</p> <p>Excavations will also be covered at night, where practicable, and any deep excavations which must be left open will have appropriate egress ramps in place to allow mammals to safely exit should they fall in.</p>	Construction
Refer to WT1 in Table 22.9	-	Construction Compound and throughout (as required)	<p><u>Otter – Habitat Degradation / Reduced Prey Availability – Water Quality</u></p> <p>In terms of mitigation, a Surface Water Management Plan (SWMP) has been prepared (provided in the CEMP, Appendix A5.1 in Volume 4 of this EIAR), which details control and management measures for avoiding, preventing, or reducing any significant adverse impacts on the surface water environment during the Construction Phase of the Proposed Scheme.</p> <p>It will be a condition of the Employer's Requirements that the successful contractor, immediately following appointment, must detail in the SWMP how it is intended to effectively implement all the applicable measures identified in this EIAR and any additional measures required pursuant to conditions imposed by An Bord Pleanála to any grant of approval.</p> <p>At a minimum, all the control and management measures set out in the SWMP will be implemented by the appointed contractor. This includes measures relating to:</p> <ul style="list-style-type: none"> • Construction Compound management including the storage of fuels and materials; • Control of Sediment; • Use of Concrete; • Management of vehicles and plant including refueling and wheel wash facilities (if necessary); and • Monitoring. 	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
BD11	12.5.1.4.3	Vicinity of Coolock Bridge over the Santry River (upstream and downstream of the bridge)	<p><u>Otter</u> <u>Loss of Breeding/ Resting Sites</u></p> <p>The NTA will ensure that a confirmatory pre-construction check of all suitable otter habitat will be completed within the 12 month period prior to any constructions works commencing.</p> <p>The presence of any new holt/couch sites will be treated and/or protected in accordance with the Guidelines for the Treatment of Otters prior to the Construction of National Road Schemes (NRA, 2008c).</p>	Pre-Construction
Refer to WT1 in Table 22.9	-	Throughout (as required where vegetation is present)	<p><u>Marine Mammals – Habitat & Food Resource Degradation – Water Quality</u></p> <p>In terms of mitigation, a Surface Water Management Plan (SWMP) has been prepared (provided in the CEMP, Appendix A5.1 in Volume 4 of this EIAR), which details control and management measures for avoiding, preventing, or reducing any significant adverse impacts on the surface water environment during the Construction Phase of the Proposed Scheme.</p> <p>It will be a condition of the Employer's Requirements that the successful contractor, immediately following appointment, must detail in the SWMP how it is intended to effectively implement all the applicable measures identified in this EIAR and any additional measures required pursuant to conditions imposed by An Bord Pleanála to any grant of approval.</p> <p>At a minimum, all the control and management measures set out in the SWMP will be implemented by the appointed contractor. This includes measures relating to:</p> <ul style="list-style-type: none"> • Construction Compound management including the storage of fuels and materials; • Control of Sediment; • Use of Concrete; • Management of vehicles and plant including refueling and wheel wash facilities (if necessary); and • Monitoring. 	Construction
BD12	12.5.2.4.1	Throughout (as required)	<p><u>Breeding Birds</u> <u>Habitat Loss and Loss of Breeding / Resting Sites</u></p> <p>Planting of treeline, hedgerow and grassland habitats within the Proposed Scheme footprint will be carried out by the appointed contractor, as detailed in the landscape drawings which will provide suitable compensatory habitat for the breeding bird species recorded within the study area (Refer to the Landscaping General Arrangement Drawings (BCIDA-ACM-ENV_LA-0001_XX_00-DR-LL-9001) in Volume 3 of this EIAR for locations.</p>	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
BD13	12.5.1.5.1	Throughout (as required)	<p>Breeding Birds Mortality Risk</p> <p>Where feasible, vegetation (e.g., hedgerows, trees, scrub, bankside vegetation and grassland) will not be removed, between the 1st March and the 31st August, to avoid direct impacts on nesting birds.</p> <p>Where the construction programme does not allow this seasonal restriction to be observed, then these areas will be inspected by a suitably qualified ecologist as engaged by the appointed contractor, for the presence of breeding birds prior to clearance.</p> <p>Areas found not to contain nests will be cleared within 3 days of the nest survey, otherwise repeat surveys will be required. Vegetation clearance will not commence where nests are present, works will resume when birds have fledged and nests are no longer in use, or an agreement is reached with NPWS.</p>	Construction
Refer to WT1 in Table 22.9		Throughout (as required)	<p>Breeding Birds/Wintering Birds – Water Quality</p> <p>In terms of mitigation, a Surface Water Management Plan (SWMP) has been prepared (provided in the CEMP, Appendix A5.1 in Volume 4 of this EIAR), which details control and management measures for avoiding, preventing, or reducing any significant adverse impacts on the surface water environment during the Construction Phase of the Proposed Scheme.</p> <p>It will be a condition of the Employer's Requirements that the successful contractor, immediately following appointment, must detail in the SWMP how it is intended to effectively implement all the applicable measures identified in this EIAR and any additional measures required pursuant to conditions imposed by An Bord Pleanála to any grant of approval.</p> <p>At a minimum, all the control and management measures set out in the SWMP will be implemented by the appointed contractor. This includes measures relating to:</p> <ul style="list-style-type: none"> • Construction Compound management including the storage of fuels and materials; • Control of Sediment; • Use of Concrete; • Management of vehicles and plant including refueling and wheel wash facilities (if necessary); and • Monitoring. 	Construction
BD14	12.5.1.7	Vicinity of Coolock Bridge over the Santry River (immediately upstream and downstream of the bridge)	<p>Amphibians Habitat Loss, Disturbance & Mortality Risk</p> <p>If vegetation clearance works by the appointed contractor are to begin during the season where frogspawn or tadpoles may be present (i.e., February to mid-summer), or where breeding adult newts, their eggs or larvae may be present (i.e. mid-March to September), a pre-construction</p>	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
			survey of suitable habitat will be undertaken by a suitably qualified ecologist engaged by the appointed contractor to determine whether breeding amphibians are present. Where amphibians are present, mitigation measures outlined in BD15, BD16, and BD17 will be completed before works recommence.	
BD15	12.5.1.7	Vicinity of Coolock Bridge over the Santry River (immediately upstream and downstream of the bridge)	In the case of common frog, any frog spawn, tadpoles, juvenile or adult frogs present will be captured, under licence from NPWS, and removed from affected habitat by hand net and translocated to the nearest area of available suitable habitat, beyond the Zone of Influence (Zoi) of the Proposed Scheme.	Construction
BD16	12.5.1.7	Vicinity of Coolock Bridge over the Santry River (immediately upstream and downstream of the bridge)	In the case of smooth newt, individuals will be captured, under licence from NPWS, and removed from affected habitat either by hand net or by trapping and translocated to the nearest area of available suitable habitat, beyond the Zoi of the Proposed Scheme. If used, the type and design of traps shall be approved by the NPWS. This is a standard and proven method of catching and translocating smooth newts.	Construction
BD17	12.5.1.7	Vicinity of Coolock Bridge over the Santry River (immediately upstream and downstream of the bridge)	If the size or depth of the habitat feature is such that it cannot be determined by visual survey whether all amphibians have been captured, the suitably qualified ecologist engaged by the appointed contractor will advise on the appropriate course of action to confirm that no amphibian species remain. If drainage of the habitat feature is deemed to be the appropriate course of action, any mechanical pumps used will have a screen fitted, and be sited, such that no amphibian species can be sucked into the pump mechanism. Any capture and translocation works shall be undertaken immediately in advance of site clearance/construction works commencing.	Construction
Refer to WT1 in Table 22.9		Construction Compound and throughout (as required)	<u>Fish – Habitat Degradation – Surface Water Quality</u> In terms of mitigation, a Surface Water Management Plan (SWMP) has been prepared (provided in the CEMP, Appendix A5.1 in Volume 4 of this EIAR), which details control and management measures for avoiding, preventing, or reducing any significant adverse impacts on the surface water environment during the Construction Phase of the Proposed Scheme. It will be a condition of the Employer's Requirements that the successful contractor, immediately following appointment, must detail in the SWMP how it is intended to effectively implement all the applicable measures identified in this EIAR and any additional measures required pursuant to conditions imposed by An Bord Pleanála to any grant of approval. At a minimum, all the control and management measures set out in the SWMP will be implemented by the appointed contractor. This includes measures relating to: <ul style="list-style-type: none"> • Construction Compound management including the storage of fuels and materials; • Control of Sediment; 	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
			<ul style="list-style-type: none"> • Use of Concrete; • Management of vehicles and plant including refueling and wheel wash facilities (if necessary); and • Monitoring. 	
BD18	12.5.2.2	Throughout (as required)	<p><u>Habitat Degradation – Surface Water Quality (for the protection of flora and fauna during the Operational Phase)</u></p> <p>The surface water run-off from the increase in impermeable area will be managed by the appointed contractor through a combination of bioretention areas and filtration drains. This drainage infrastructure will be installed by the appointed contractor, as shown in Surface Water Drainage Works drawings BCIDA-ACM-DNG_RD-0001_XX_OO-DR-CD-9001 in Volume 3 of this EIAR. Where no new paved areas are proposed, the existing drainage network will be retained and utilised.</p>	Construction
BD19	12.5.1.2	Throughout (as required)	<p><u>Habitat Degradation – Groundwater</u></p> <p>In the unlikely event that groundwater is encountered during the proposed works and temporary localised pumping is required, an appropriate dewatering system and groundwater management system specific to the site conditions will be designed and implemented by the appointed contractor. These will include measures to minimize any surface water inflow into the excavation. Qualitative and quantitative monitoring will be adopted to ensure that the water is of sufficient quality to discharge. The use of silt traps will be adopted if the monitoring indicates the requirement for same, with no silt or contaminated water permitted to discharge to the receiving water environment.</p> <p>The mitigation measures to protect groundwater quantity and quality during the Construction Phase are also outlined in Table 22.10 of this Chapter of the EIAR, and also in Chapter 14 (Land, Soils Geology & Hydrogeology) and Appendix A5.1 in Volume 4 of this EIAR. This includes control measures for the excavation of potentially contaminated ground and the pollution of soil and groundwater.</p>	Construction
BD20	12.5.2.2	Throughout (as required)	<p>In the Operational Phase the infrastructure (including the maintenance regime for SUDS and the management of non-native invasive species) will be carried out by the local authority and will be subject to their management procedures. No additional mitigation is required.</p>	Operational
BD21	12.5.2.3.1	Maypark and St. David's Wood	<p><u>Bats</u></p> <p><u>Indirect Disturbance of Flight Patterns Due to Operational Lighting</u></p> <p>A total of two areas were identified within the footprint of the Proposed Scheme where the installation of additional lighting in previously dark / poor lighting areas in Maypark and St. David's Wood is required. The lighting design in these locations will be installed by the appointed contractor, which will ensure that light spill will be kept beneath three lux on the surrounding treelines as shown on the Street Lighting drawings (BCIDA-ACM-LHT_RL-0001_XX_OO-DR-EO-9001) in Volume 3 of this EIAR.</p>	Construction

22.11 Water

Table 22.9: Water Mitigation Measures

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
WT1	13.5.2.1	Construction Compound and throughout as required	<p>In terms of mitigation, a Surface Water Management Plan (SWMP) has been prepared (provided in the CEMP, Appendix A5.1 in Volume 4 of this EIAR), which details control and management measures for avoiding, preventing, or reducing any significant adverse impacts on the surface water environment during the Construction Phase of the Proposed Scheme.</p> <p>It will be a condition of the Employer's Requirements that the successful contractor, immediately following appointment, must detail in the SWMP how it is intended to effectively implement all the applicable measures identified in this EIAR and any additional measures required pursuant to conditions imposed by An Bord Pleanála to any grant of approval.</p> <p>At a minimum, all the control and management measures set out in the SWMP will be implemented by the appointed contractor. This includes measures relating to:</p> <ul style="list-style-type: none"> • Construction Compound management including the storage of fuels and materials; • Control of Sediment; • Use of Concrete; • Management of vehicles and plant including refueling and wheel wash facilities (if necessary); and • Monitoring. 	Construction
WT2	13.5.3	Throughout (as required)	In the Operational Phase the infrastructure (including the maintenance regime for SUDS) will be carried out by the local authority and will be subject to their management procedures.	Operational

22.12 Land, Soils, Geology and Hydrogeology

Table 22.10: Land, Soils, Geology and Hydrogeology Mitigation Measures

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
LSGH1	14.5.1	Throughout (as required)	<p><u>Loss or Damage of Topsoil</u> Excavated topsoils will be stockpiled by the appointed contractor using appropriate methods to minimise the effects of weathering. Care will be taken in reworking this material to minimise dust generation, groundwater infiltration and generation of runoff.</p>	Construction
LSGH2	14.5.1	Throughout (as required)	<p><u>Loss or Damage of Topsoil</u> All topsoil or subsoil shall be assessed for re-use within the Proposed Scheme by the appointed contractor ensuring the appropriate handling, processing and segregation of the material. Where practical the removal of topsoil from the Proposed Scheme will be avoided. All earthworks will be undertaken in accordance with TII Specification for Road Works (SPW) Series 600 Earthworks (TII 2013) and project specific earthworks specifications ensuring that all excavated material and imported material is classified using the same methodology so as to allow maximum opportunity for the reuse of materials on site.</p>	Construction
LSGH3	14.5.1.2	Throughout (as required)	<p><u>Loss or Damage of Topsoil</u> The appointed contractor will ensure that excavations will be kept to a minimum, using shoring or trench boxes where appropriate. For more extensive excavations, a temporary works designer shall be appointed by the appointed contractor to design excavation support measures in accordance with all relevant guidelines that minimises the excavation of contaminated ground.</p>	Construction
LSGH4	14.5.1.2	Throughout (as required)	<p><u>Loss or Damage of Topsoil</u> The appointed contractor will be responsible for regular testing of excavated soils to monitor the suitability of the soil for reuse.</p>	Construction
LSGH5	14.5.1.2	Throughout (as required)	<p><u>Loss or Damage of Topsoil</u> Samples of ground suspected of contamination will be tested for contamination by the appointed contractor during the ground investigation and ground excavated from these areas will be disposed of to a suitably licensed or permitted site in accordance with the current Irish waste management legislation.</p>	Construction
LSGH6	14.5.1.2	Throughout (as required)	<p><u>Loss or Damage of Topsoil</u> Any dewatering in areas of contaminated ground will be designed by the appointed contractor to minimise the mobilisation of contaminants into the surrounding environment.</p>	Construction
LSGH7	14.5.1.3	Throughout (as required)	<p><u>Pollution of Soil and Groundwater</u> Good construction management practices, as outlined in the CIRIA guidance, Control of Water Pollution from Construction Sites – Guidance for consultants and contractors (Masters-Williams <i>et al.</i>, 2001), will</p>	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
			be employed by the appointed contractor to minimise the risk of transmission of hazardous materials as well as pollution of adjacent watercourses and groundwater.	
LSGH8	14.5.1.3	Throughout (as required)	<p><u>Pollution of Soil and Groundwater</u></p> <p>The construction management of the site by the appointed contractor will take account of the recommendations of the CIRIA guidance Control of Water Pollution from Construction Sites – Guidance for consultants and contractors (Masters-Williams <i>et al.</i>, 2001) to minimise as far as possible the risk of soil, groundwater and surface water contamination.</p>	Construction
LSGH9	14.5.1.3	Construction Compound and throughout (as required)	<p><u>Pollution of Soil and Groundwater</u></p> <p>Measures to be implemented by the appointed contractor to minimise the risk of spills and contamination of soils and waters include:</p> <ul style="list-style-type: none"> • Employing only competent and experienced workforce, and site-specific training of site managers, foremen and workforce, including all sub-contractors, in pollution risks and preventative measures; • Ensure that all areas where liquids (including fuel) are stored, or cleaning is carried out, are in designated impermeable areas that are isolated from the surrounding area and within a secondary containment system, e.g. by a roll-over bund, raised kerb, ramps or stepped access; • The location of any fuel storage facilities shall be considered in the design of the Construction Compound. These are to be designed in accordance with relevant guidelines and codes of best practice and will be fully bunded; • Good housekeeping at the site (daily site clean-ups, use of disposal bins, etc.) during the entire Construction Phase; • All concrete mixing and batching activities will be located in areas away from watercourses and drains; • Potential pollutants to be adequately secured against vandalism; • Provision of proper containment of potential pollutants according to codes of best practice; • Thorough control during the entire Construction Phase to ensure that any spillage is identified at early stage and subsequently effectively contained and managed; and • Spill kit to be provided and to be kept close to the storage area. Staff to be trained on how to use spill kits correctly. 	Construction
LSGH10	14.5.1.3	Throughout (as required)	<p>An Environmental Incident Response Plan, as described in the CEMP (Appendix A5.1 in Volume 4 of this EIAR), will be implemented by the appointed contractor, which will identify the actions to be taken in the event of a pollution incident.</p> <p>It will address containment measures, emergency discharge routes, a list of appropriate equipment and clean-up materials and notification procedures to inform the relevant environmental protection authority.</p>	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
LSGH11	14.5.1.3	Throughout (as required)	Sediment control methods are outlined in the Surface Water Management Plan within the CEMP (Appendix A5.1 in Volume 4 of this EIAR) and these will be implemented by the appointed contractor.	Construction

22.13 Archaeological and Cultural Heritage

Table 22.11: Archaeological and Cultural Heritage Mitigation Measures

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
ACH1		Throughout (as required)	The NTA will procure the services of a suitably-qualified archaeologist as part of its Employer's Representative team administering and monitoring the works.	Pre-Construction
ACH2	15.5.1.1	Throughout (as required)	The appointed contractor will make provision for archaeological monitoring to be carried out under licence to the Department of Housing, Local Government and Heritage (DHLGH) and the National Museum of Ireland (NMI), and will ensure the full recognition of, and the proper excavation and recording of, all archaeological soils, features, finds and deposits which may be disturbed below the ground surface. All archaeological issues will be resolved to the satisfaction of the DHLGH and the NMI.	Construction
ACH3	15.5.1.1	Throughout (as required)	The appointed contractor will ensure that the archaeologist as described in ACH5 will have the authority to inspect all excavation to formation level for the proposed works and to temporarily halt the excavation work, if, and as, necessary, having conferred with the NTA. They will be given the authority to ensure the temporary protection of any features of archaeological importance identified having conferred with the NTA. The archaeologist will be afforded sufficient time and resources to record and remove any such features identified in accordance with licensing requirements agreed.	Construction
ACH4	15.5.1.1	Throughout (as required)	The appointed contractor will make provision to allow for, the necessary archaeological monitoring, inspection and excavation works that may arise on the site during the Construction Phase.	Construction
ACH5	15.5.1.1.1	Throughout (as required)	An experienced and competent licence-eligible archaeologist will be employed by the appointed contractor to advise on archaeological and cultural heritage matters during construction to communicate all findings in a timely manner to the NTA and statutory authorities, to acquire any licenses / consents required to conduct the work, and to supervise and direct the archaeological measures associated with the Proposed Scheme.	Construction
ACH6	15.5.1.1.1	Throughout (as required)	Licence applications are made by the licence-eligible archaeologist to the National Monuments Service at the DHLGH.	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
			In addition to a detailed method statement, the applications must include a letter from the NTA that confirms the availability of adequate funding. There is a prescribed format for the letter that must be followed.	
ACH7	15.5.1.1.1	Throughout	The archaeologist will be provided with information on where and when the various elements and ground disturbance will take place.	Construction
ACH8	15.5.1.1.1	Throughout (as required)	Once the presence of archaeologically significant material is established, full archaeological recording of such material is recommended in accordance with the licensing requirements. If it is not possible for the construction works to avoid the material, full excavation of the archaeologically significant material will be recommended. The extent and duration of excavation will be advised by the archaeologist and will be a matter for discussion between the NTA and the licensing authorities.	Construction
ACH9	15.5.1.1.1	Throughout (as required)	Secure storage for artefacts recovered during the course of the monitoring and related work will be provided by the appointed contractor.	Construction
ACH10	15.5.1.1.1	Throughout (as required)	During construction all construction traffic and the management of materials will be restricted where practicable by the appointed contractor so as to avoid any newly revealed archaeological or cultural heritage sites and their environs, to ensure no damage to a site of archaeological interest.	Construction
ACH11	15.5.1.2	Throughout (as required)	Features of cultural heritage interest that are required to be removed on a temporary basis or for a short-term period, will be removed under archaeological supervision and in accordance with a method statement in consultation with the NTA and the relevant statutory authorities.	Construction
ACH12	15.5.1.3.1	Mayne River Avenue to Gracefield Road – Malahide Road Section (RMP DU015-074, DCIHR 15-13-009, CBC0001AH001)	The appointed contractor will ensure that archaeological monitoring under licence will take place: <ul style="list-style-type: none"> At the site of a house depicted on the 1843 OS map (CBC0001AH001), south of the Newtown Road / R107 Malahide Road Junction (Figure 15.1 Sheet 3 of 9 in Volume 3 of this EIAR); At the site of the proposed pocket park on Bothar Mhullach Ide / Brookville Park, outside the Cadbury's Factory which is adjacent the Record of Monuments and Places (RMP) zone of archaeological potential (ZAP) for a recorded mound (RMP DU015-074) (Figure 15.1 Sheet 4 of 9 in Volume 3 of this EIAR); and At the site of Coolock Bridge (DCIHR 15-13-009) outside the Cadbury's Factory on the Old Malahide Road / R107 Malahide Road (Figure 15.1 Sheet 4 of 9 in Volume 3 of this EIAR). It is in these areas that there is a possibility to disturb intact archaeological layers and material. Licensed archaeological excavation, in full or in part, of any identified archaeological remains (preservation by record) or preservation in situ will be undertaken.	Construction
ACH13	15.5.1.4.1	Gracefield Road and Clontarf Road-Malahide Road Section (RMP DU018-006, RMP DU018-067)	The appointed contractor will ensure that archaeological monitoring under licence will take place: <ul style="list-style-type: none"> At the recorded bridge site (RMP DU018-006) on the R107 Malahide Road (Figure 15.1 Sheet 7 of 9 in Volume 3 of this EIAR); and Within the ZAP for burial site RMP DU018-067 on the R107 Malahide Road / Marino Mart (Figure 15.1 Sheet 9 of 9 in Volume 3 of this EIAR). 	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
			It is in these areas that there is a possibility to disturb intact archaeological layers and material. Licensed archaeological excavation, in full or in part, of any identified archaeological remains (preservation by record) or preservation in situ will be undertaken.	

22.14 Architectural Heritage

Table 22.12: Architectural Heritage Mitigation Measures

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
AH1	16.5.1.1	Throughout as required, and specifically (DCC RPS 4855, DCC RPS 4893, DCC RPS 2735)	Three Protected Structures were identified in the study area which front onto or have boundaries along the Proposed Scheme. Mitigation will be the recording, protection and monitoring of sensitive fabric prior to, and for the duration of the Construction Phase in accordance with the methodology provided in Appendix A16.3 in Volume 4 of this EIAR. Recording, overseeing of protective measures and monitoring is to be undertaken by a suitably qualified architectural heritage specialist engaged by the appointed contractor.	Construction
AH2	16.5.1.1	62 and 64 Malahide Road (DCC RPS 4852-3)	The Proposed Scheme will directly impact on the boundary of a group of Protected Structures during the Construction Phase. The following mitigation measures will be implemented - recording the existing boundaries in position prior to the works, labelling the affected railings, gates, gate posts, capping stones and historic masonry, prior to their careful removal to safe storage, and their reinstatement on new lines, which reinstating the existing details, and the relationships between the entrances and the historic buildings. Recording is to be undertaken by an appropriate architectural heritage specialist engaged by the appointed contractor. The architectural heritage specialist will oversee the labelling, taking-down and reinstatement of the affected gates, railings, piers and masonry. Works to historic fabric will be carried out in accordance with the methodology provided in Appendix A16.3 in Volume 4 of this EIAR.	Construction
AH3	16.5.1.2	(NIAH 501302221, NIAH 501302252, NIAH 50120063, NIAH 50120090, NIAH 50120122, NIAH 50120123, NIAH 50120088)	Seven NIAH Structures were identified in the study area (refer to Table 16.9 in Chapter 16 of this EIAR) which front onto or have boundaries along the Proposed Scheme. Mitigation is as per AH1.	Construction
AH4	16.5.1.3	Mount Dillon Cottages (CBC0001BTH010), Rosemount, Malahide Road (CBC0001BTH015), Alley Cottages (CBC0001BTH017), 133 – 139 Malahide Road (CBC0001BTH018), 127 – 131 Malahide Road (CBC0001BTH019), 70 – 72 Malahide Road (CBC0001BTH022)	Other Architectural Heritage Structures (refer to Table 16.12 in Chapter 16 of this EIAR), which front onto or have boundaries along the Proposed Scheme. Mitigation is as per AH1.	Construction
AH5	16.5.1.3	1-12 Artane Cottages Upper (CBC0001BTH012, CBC0001BTH013)	At 1-12 Artane Cottages Upper there is a proposed land-take affecting the front boundaries. The front boundary wall, brick piers and cobbled surface to Number 2 appear historic. The neighbouring boundaries have been previously replaced. The following mitigation measures will be implemented - recording the existing boundary to Number 2 in position prior to the works and labelling the surviving historic fabric prior to the careful removal to safe storage. Recording is to be undertaken by a suitably	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
			qualified architectural heritage specialist engaged by the appointed contractor. The architectural heritage specialist will oversee the labelling, taking-down and reinstatement of the affected historic fabric. The design of the new boundary treatments to number's 1 to 12 will be agreed in consultation with affected householders and the NTA. Works to historic fabric will be carried out in accordance with the methodology provided in Appendix A16.3 in Volume 4 of this EIAR.	
AH6	16.5.1.3	1-2 Maypark (CBC0001BTH016)	At 1-2 Maypark (CBC0001BTH014) there is a proposed land-take affecting the front boundaries. The front boundaries comprise decorative railings on rendered plinths with matching piers and gates. They are original to the houses. Mitigation is as per AH2.	Construction
AH7	16.5.1.3	Charlemont Terrace, 38-60 Malahide Road (CBC0001BTH023)	At Charlemont Terrace, 38-60 Malahide Road (CBC0001BTH023) there is a proposed land-take affecting the front boundaries of numbers 38, 48, 50, 52, 54, 5, 58 and 60. The boundaries to the front of many of the houses have been previously altered to accommodate vehicular entrances, though all, except numbers 58 and 60, retain some original decorative iron railings. Mitigation is as per AH5. The surviving historic railings, gates and plinths will be reinstated on the new line. The design of the new boundary treatments will be based on the material and detail of the surviving boundary at Number 38-60 Malahide Road.	Construction
AH8	16.5.1.3	Casino Terrace, 30-36 Malahide Road (CBC0001BTH024)	At Casino Terrace, 30-36 Malahide Road (CBC0001BTH024) there is a proposed land-take affecting the front boundaries. Mitigation is as per AH5. The surviving historic railings, gates and plinths will be reinstated on the new line. The design of the new boundaries will be agreed in consultation with affected householders and the NTA.	Construction
AH9	16.5.1.3	Marino Terrace, 24, 26 and 28 Malahide Road (CBC0001BTH025)	At Marino Terrace, 24, 26 and 28 Malahide Road (CBC0001BTH025) there is a proposed land-take affecting the front boundaries. Mitigation is as per AH5. The surviving historic railings, gates and plinths will be reinstated on the new line. The design of the reinstated boundary to No. 28 will be agreed in consultation with the affected householder and the NTA.	Construction
AH10	16.5.1.3	Alpha Cottages, 20 and 22 Malahide Road (CBC0001BTH026)	At Alpha Cottages, 20 and 22 Malahide Road (CBC0001BTH026) there is a proposed land-take affecting the front boundaries. Mitigation is as per AH2.	Construction
AH11	16.5.1.4.1	Post box at 17 Maypark (CBC0001PB002)	The following mitigation measures will be implemented - recording of the post box in position prior to the works, the labelling of the affected fabric prior to its careful removal to safe storage, and their reinstatement in new position in close proximity (within 20m) of their existing positions. Recording is to be undertaken by a suitably qualified architectural heritage specialist engaged by the appointed contractor. The architectural heritage specialist will oversee the labelling, taking-down and reinstatement. The works to the historic fabric will be carried out in accordance with the methodology provided in Appendix A16.3 in Volume 4 of this EIAR.	Construction
AH12	16.5.1.4.1	Post boxes at 25 Malahide Road, 117 Malahide Road and 78 Malahide Road (CBC0001PB001, CBC0001PB003, CBC0001PB004)	The following mitigation measures will be implemented - recording, protection and monitoring of the post boxes prior to and during the Construction Phase. Recording is to be undertaken by a suitably qualified architectural heritage specialist engaged by the appointed contractor and in accordance with the methodology provided in Appendix A16.3 in Volume 4 of this EIAR. The architectural heritage specialist will oversee the labelling, taking-down and reinstatement.	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
AH13	16.5.1.4.2	Belcamp Road, St. David's Wood, Marino Health Centre (CBC0001MS001, CBC0001MS002, CBC0001MS003)	The following mitigation measures will be implemented - recording, protection and monitoring of the milestones prior to and during the Construction Phase. As per AH12, recording is to be undertaken by a suitably qualified architectural heritage specialist engaged by the appointed contractor and in accordance with the methodology provided in Appendix A16.3 in Volume 4 of this EIAR. The architectural heritage specialist will oversee the labelling, taking-down and reinstatement.	Construction
AH14	16.5.1.4.2	Belcamp Road (CBC0001MS001)	Vegetation overgrowing the milestone at Belcamp Road (CBC0001MS001), will be cut back, and a gravel perimeter of 450mm will be instated around the back and sides of the milestone to discourage re-growth which will improve visibility and awareness of the structure. The removal of vegetation is to be monitored by a suitably qualified architectural heritage specialist engaged by the appointed contractor.	Construction
AH15	16.5.1.4.2	St. David's Wood (CBC0001MS002)	The high wall behind the milestone at St. David's Wood (CBC0001MS002) is to be taken down to match the surrounding retaining wall. The wall may retain historic fabric associated with the former designed landscape at Artaine Castle (NIAH 2433). The masonry will be recorded prior to and during its removal. Recording is to be undertaken a suitably qualified architectural heritage specialist engaged by the appointed contractor. The architectural heritage specialist will oversee the taking-down of the relevant sections of wall. The works to the historic fabric will be carried out in accordance with the methodology provided in Appendix A16.3 in Volume 4 of this EIAR.	Construction

22.15 Landscape (Townscape) and Visual

Table 22.13: Landscape (Townscape) and Visual Mitigation Measures

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
LV1	17.5.1	Throughout (as required)	<p>Mitigation and management measures are proposed to avoid, reduce or remediate, wherever practicable significant negative landscape (townscape) and visual effects of the Construction Phase of the Proposed Scheme. These measures (LV1-LV5) will be carried out by the appointed contractor and are to be applied across the Proposed Scheme wherever necessary to avoid disturbance of landscape features or characteristics to be retained.</p> <p>Trees and vegetation to be retained within and adjoining the Proposed Scheme will be protected in accordance with the British Standard Institution (BSI) British Standard (BS) 5837:2012 'Trees in relation to design, demolition and construction – Recommendations' (BSI 2012). Works required within the root protection area (RPA) of trees to be retained will follow a project specific arboricultural methodology for such works, prepared by a professional qualified arborist. For details of trees to be retained refer to Tree Protection Plans (BCIDA-ACM-ENV_ZZ-0001_XX_00-DR-LL-0001 - 0021 in the Arboricultural Impact Assessment (Appendix A17.1 in Volume 4 of this EIAR)).</p>	Construction
LV2	17.5.1	Throughout (as required)	<p>Wherever practicable trees and vegetation will be retained within the Proposed Scheme. Trees and vegetation identified for removal will be removed in accordance with BS 3998:2010 'Tree Work – Recommendations' (BSI 2010) and best arboricultural practices as detailed and monitored by a professional qualified arborist engaged by the appointed contractor. For details of trees and vegetation to be removed refer to Tree Protection Plans (BCIDA-ACM-ENV_ZZ-0001_XX_00-DR-LL-0001 to 0021 in the Arboricultural Impact Assessment (Appendix A17.1 in Volume 4 of this EIAR)) and Landscape General Arrangements (BCIDA-ACM-UBR_ZZ-0001_XX_00-DR-LL-9001 in Volume 3 of this EIAR).</p>	Construction
LV3	17.5.1	Throughout (as required)	<p>The Arboricultural Impact Assessment prepared for the Proposed Scheme will be fully updated at the end of the Construction Phase by the appointed contractor and made available, with any recommendations for on-going monitoring of retained trees during the Operational Phase.</p>	Construction
LV4	17.5.1	Throughout (as required)	<p>Where properties are subject to permanent and / or temporary acquisition, an inventory of boundary details and accesses, planting, paving, and other features that may be disturbed or removed will be prepared by the appointed contractor prior to commencement of construction works.</p>	Construction
LV5	17.5.1	Throughout (as required)	<p>Where properties are subject to permanent and / or temporary acquisition, appropriate measures will be put in place by the appointed contractor to provide for protection of features, trees and vegetation to be retained, for continued access during construction and for adequate security and screening of construction works. All temporary acquisition areas will be fully decommissioned and reinstated at the end of the Construction Phase, or at the earliest time after the reinstatement works are completed to the satisfaction of the NTA.</p>	Construction

22.16 Waste and Resources

Table 22.14: Waste and Resources Mitigation Measures

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
WR1	18.5.1	Throughout (as required)	A Construction and Demolition Resource and Waste Management Plan (CDRWMP) has been prepared and this will be implemented (and updated as necessary) by the appointed contractor - refer to Appendix A5.1 in Volume 4 of this EIAR.	Construction
WR2	18.5.1	Throughout (as required)	The following measures will be implemented during construction, where practicable, by the appointed contractor, to ensure the maximum quantity of material is reused on the Proposed Scheme and to contribute to achieving the objectives set out in the Waste Action Plan for a Circular Economy (DCCAE 2020) as follows: <ul style="list-style-type: none"> Stockpiling of existing sub-base, capping layer and topsoil material generated on-site for direct reuse in the Proposed Scheme where practicable (subject to material quality testing to ensure it is suitable for its proposed end use); Recycled aggregates and reclaimed asphalt will be specified in the Proposed Scheme, where practicable. 	Construction
WR3	18.5.1	Throughout (as required)	The following management measures will be implemented by the appointed contractor insofar as is reasonably practicable: <ul style="list-style-type: none"> Where waste generation cannot be avoided, waste disposal will be minimised; Opportunities for reuse of materials, by-products and wastes will be sought throughout the Construction Phase of the Proposed Scheme; Possibilities for reuse of clean non-hazardous excavation material as fill on the site or in landscaping works will be considered following appropriate testing to ensure material is suitable for its proposed end use; Where excavated material cannot be reused within the Proposed Scheme works, material will be sent for recovery or recycling; Source segregation: Metal, timber, glass and other recyclable material will be segregated (and waste stream colour-coding will be used) during construction works and removed off site to a permitted / licensed facility for recycling; Material management: 'Just-in-time' delivery, where practicable, will be used to minimise material wastage; and General construction waste and by-products will be reused within the Proposed Scheme, where practicable, or appropriately reused (in accordance with Article 27 of the Waste Directive Regulations), recovered, recycled or disposed of off-site, as arranged by the appointed contractor. <p>Any hazardous waste arising will be managed by the appointed contractor in accordance with the applicable legislation.</p>	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
			<p>Waste Auditing: The quantity and types of waste and materials leaving site during the Construction Phase will be recorded by the appointed contractor. The name, address and authorisation details of all facilities and locations to which waste and materials are delivered will be recorded along with the quantity to each facility. Records will show material which is recovered, which is recycled and which is disposed of.</p> <p>Where Article 27 notifications are required in relation to the proposed development, the appointed contractor will complete and submit these Article 27 notifications to the EPA for by-product reuse.</p> <p>Any off-site interim storage or waste management facilities for excavated material will have the appropriate EPA licence, Waste facility permit or Certificate of Registration, as appropriate, in place.</p> <p>The relevant appropriate waste authorisation will be in place for all facilities that wastes are delivered to (i.e., EPA Licence, Waste Facility Permit or Certificate of Registration).</p>	

22.17 Material Assets

Table 22.15: Material Assets Mitigation Measures

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
MA1	19.5.1.1	Throughout (as required)	Where there are interfaces with existing utility infrastructure, the appointed contractor will ensure that protection in place or diversion as necessary will be carried out to prevent long-term interruption to the provision of the affected services.	Construction
MA2	19.5.1.1	Throughout (as required)	All possible precautions will be taken by the appointed contractor to avoid unplanned interruptions to any services during the Construction Phase of the Proposed Scheme. This will include appropriate investigation by the appointed contractor to identify the precise location of all utility infrastructure within the working areas prior to the commencement of excavation works. Where works are required in and around utility infrastructure, precautions will be implemented by the appointed contractor to protect the infrastructure from damage, in accordance with best practice methodologies and the requirements of the utility companies where practicable. Protection measures during construction will include warning signs and markings indicating the location of utility infrastructure, safe digging techniques in the vicinity of known utilities, and in certain circumstances where possible, isolation of the section of infrastructure during works in the immediate vicinity.	Construction
MA3	19.5.1.1	Throughout (as required)	All utility companies for which diversions are proposed will continue to be consulted with NTA oversight when designing any diversions to ensure that proposed diversions conform to the utility provider's requirements, where practicable and acceptable to the NTA, and to ensure that service interruptions are kept to a minimum.	Construction
MA4	19.5.1.1	Throughout (as required)	Where diversions or modifications are required to utility infrastructure, service interruptions and disturbance to the surrounding residential, commercial and/or community property may be unavoidable. Where this is the case, it will be planned in advance by the appointed contractor. Required service interruptions will generally only occur for a set period of time per day (a set number of hours not exceeding eight hours where reasonably practicable) and will generally not be continuous for full days at a time. Prior notification will be given to all impacted properties. This notification will include information on when interruptions and works are scheduled to occur and the duration of such interruption. Any required works will be carefully planned by the appointed contractor to ensure that the duration of interruptions is minimised in so far as is practicable.	Construction
MA5	19.5.1.2	Throughout (as required)	Consideration will be given by the appointed contractor to the sustainability of material being sourced for the construction of the Proposed Scheme. In so far as is reasonably practicable, materials required for the construction of the Proposed Scheme will be sourced locally in order to reduce the amount of travelling required to get the material to the site. Key issues to be considered when sourcing materials for the Construction Phase will include the source, the material specification, production and transport costs, and the availability of the material. For quarried material sourced within the State, only quarries which are included in local authority quarry registers will be used by the appointed contractor to source any quarried material.	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
MA6	19.5.1.2	Throughout (as required)	Construction materials will be managed on-site by the appointed contractor in such a way as to prevent over-ordering and waste. Materials will be stored in appropriate storage areas or receptacles to reduce the potential for damage requiring replacement. 'Just In Time' ordering principles will be implemented by the appointed contractor where practicable in order to reduce the potential for over-ordering.	Construction

22.18 Major Accidents and Disasters

Table 22.16: Population Mitigation Measures

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
n/a	n/a	n/a	No additional mitigation or monitoring measures are considered necessary beyond those already identified in other environmental assessments and the CEMP (Appendix A5.1 in Volume 4 of this EIAR).	n/a

22.19 Cumulative Impacts & Environmental Interactions

Table 22.17: Cumulative Impacts & Environmental Interactions Mitigation Measures

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
CI&EI1	21.4.2.1	Throughout (as required)	Other major infrastructure projects could directly interface with the construction of the Proposed Scheme. Interface liaison will take place on a case-by-case basis through the NTA, as will be set out in the Construction Contract, to ensure that there is coordination between projects, that construction access locations remain unobstructed by the Proposed Scheme works and that any additional construction traffic mitigation measures required to deal with cumulative impacts are managed appropriately.	Pre-Construction / Construction

22.20 References

British Standards Institution (BSI) (2010). BS 3998:2010 'Tree Work – Recommendations'

British Standards Institution (BSI) (2012). BS 5837:2012 'Trees in relation to in relation to design, demolition and construction. Recommendations'

British Standards Institution (BSI) (2014). BS 5228-1:2009 +A1:2014 Code of Practice for noise and vibration control of construction and open sites - Part 1: Noise

CIRIA (2001). CIRIA C532: Control of Water Pollution from Construction Sites – Guidance for consultants and contractors.

EPA (2021). Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects [Online] Available from https://www.epa.ie/publications/circular-economy/resources/C_and_D_Guidelines-.pdf

European Commission (2018). EU Construction and Demolition Waste Protocol and Guidelines.

ISO (2016). ISO 1996-1:2016 Acoustics - Description, measurement and assessment of environmental noise. Part 1: Basic quantities and assessment procedures.

ISO (2017). ISO 1996-2:2017 - Description, measurement and assessment of environmental noise - Part 2: Determination of sound pressure levels.

TII (2013) Specification for Road Works Series 600 - Earthworks (including Erratum No. 1, dated June 2013) CC-SPW-00600

TII (2020a). The Management of Invasive Alien Plant Species on National Roads – Technical Guidance

TII (2020b). The Management of Invasive Alien Plant Species on National Roads – Standard

Directives and Legislation

S.I. No. 126/2011 - European Communities (Waste Directive) Regulations 2011 as amended

Waste Management Act 1996, as amended

S.I. No. 241/2006 – European Communities (Noise Emission by Equipment for Use Outdoors) (Amendment) Regulations 2006

S.I. No. 419/2007 - Waste Management (Shipments of Waste) Regulations 2007, as amended

S.I. No. 820/2007 - Waste Management (Collection Permit) Regulations 2007, as amended.

S.I. No. 549/2018 – European Communities (Environmental Noise) Regulations 2018