

The background is a vibrant yellow. It is decorated with several abstract geometric shapes in shades of blue, teal, and white. These include circles, semi-circles, and rounded rectangular shapes, some of which are layered or overlapping. The shapes are scattered across the page, with a concentration in the top right and bottom left corners.

Chapter 22

Summary of Mitigation & Monitoring Measures

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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 Kimmage 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 have 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 occurring 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 the 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 within 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 measures 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 Phase
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 (CTMP) will be prepared (and included in the CEMP) and will be 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 Phase
AQ1	7.5.1	Construction Compounds 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 construction activities and cleaned, as necessary; Material handling systems and site 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 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 tarpaulins are properly in place; The appointed contractor will provide a site hoarding of 2.4m height along noise sensitive boundaries, at a minimum, at the Construction Compounds, which will assist in minimising the potential for dust impacts off site; and 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. 	Construction

22.6 Climate

Table 22.4: Climate Mitigation Measures

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Phase
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 practicable, 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 Phase
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 the BS 5228-1 (BSI 2014) and European Communities Noise Emissions by Equipment for Use Outdoors (Amendments) Regulations (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 (CEMP) in 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 (Noise & Vibration) of the EIAR using methods outlined in BS 5228–1 (BSI 2014a); and • 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 Table 9.8 and Table 9.11 in Chapter 9 (Noise & Vibration) of this EIAR). Reference to Table 9.43 in Chapter 9 (Noise & Vibration) indicates that intrusive works occurring within 75m of Noise Sensitive Receptors (NSLs) will need specific noise control measures to reduce impacts depending on 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 (Table 9.8 in Chapter 9 (Noise & Vibration) of this EIAR) will be assessed prior to the item being brought onto the site. The least noisy item of plant will be selected wherever practicable (e.g. plant 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 Compounds 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 9.8 in Chapter 9 (Noise & Vibration) 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; • For percussive tools such as pneumatic concrete breakers and tools a number of noise control measures include fitting a muffler or sound reducing equipment to the breaker 'tool' and ensuring any leaks in the air lines are sealed; • The Construction Compounds are in close proximity to NSLs (refer to Table 9.40 in Chapter 9 (Noise & Vibration) in this EIAR) and a strict noise control policy relating to materials handling will be applied. Noisy items of plant will be sited away from noise sensitive boundaries; • Where compressors, generators and pumps are located in proximity to NSLs and have the potential to exceed the construction noise thresholds, these will be surrounded by acoustic lagging or enclosed within acoustic enclosures providing air ventilation; and 	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Phase
			<ul style="list-style-type: none"> Resonance effects in panel work or cover plates can be reduced through stiffening or the 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 around breakers or drill bits, as required, when in operation in proximity to NSL boundaries with the potential to exceed the construction noise thresholds. Annex B of BS 5228-1 (BSI 2014) (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 Compounds	The appointed contractor will provide a site hoarding of 2.4m height along noise sensitive boundaries, at a minimum, at the Construction Compounds.	Construction
NV7	9.5.1.1.3	Construction Compounds and throughout (as required)	Careful planning of the Construction Compounds 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 9.43 in Chapter 9 (Noise & Vibration) in this EIAR). Other construction activities will be scheduled to not result in 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 Table 9.8 and Table 9.11 in Chapter 9 (Noise & Vibration) 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
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 9.11 in Chapter 9 (Noise & Vibration) of this EIAR). Vibration from construction activities will be limited to the values set out in Table 9.11 in Chapter 9 (Noise and vibration) 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 the 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 9.12 in Chapter 9 (Noise & Vibration) of this EIAR. The nature and duration of the works will be clearly set out in all communication circulars as necessary; Activities capable of generating significant vibration effects with respect to human response (as per Table 9.12 in Chapter 9 (Noise & Vibration) of this EIAR) will be restricted to daytime hours only, as far as practicable; and 	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Phase
			<ul style="list-style-type: none"> Appropriate vibration isolation shall be applied to plant (such as resilient mounts to pumps and generators), where required and where feasible. 	

22.8 Population

Table 22.6: Population Mitigation Measures

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Phase
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 Phase
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.	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 Phase
BD1	12.5.1	Throughout (as required)	Where deemed necessary a suitably experienced and qualified ecologist will be employed by the appointed contractor. The ecologist will advise the appointed contractor on ecological matters during construction, communicate all findings in a timely manner to the NTA and statutory authorities, acquire any licences / consents required to conduct the work, and supervise and direct ecological measures associated with the Proposed Scheme.	Construction
BD2	12.5.1.2.1	Throughout (as required)	Habitat Loss / Fragmentation Where practicable, areas of vegetation including habitats of Local Importance (Higher Value), (i.e. mixed broadleaved woodland, scattered trees and parkland, treelines and hedgerow habitat types), which lie within the footprint, or along the boundary of the Proposed Scheme, will be retained. Proposed planting incorporated into the Proposed Scheme to be implemented by the appointed contractor is shown as design mitigation and is listed below and displayed on the Landscaping General Arrangement drawings [BCIDD-ROT-ENV_LA-0011_XX_00-DR-LL-9001] in Volume 3 of this EIAR. These areas will be protected for the duration of construction works and fenced off at an appropriate distance.	Construction
BD3	12.5.1.2.1	Throughout (as required)	Habitat Loss / Fragmentation To mitigate the loss of habitat, proposed planting incorporated into the Proposed Scheme will be implemented by the appointed contractor, as listed below and displayed on the Landscaping General Arrangement [BCIDD-ROT-ENV_LA-0011_XX_00-DR-LL-9001] in Volume 3 of this EIAR: <ul style="list-style-type: none"> • 134 street trees planted; • 165m of proposed hedge; • 590m² of proposed ornamental planting; and • 768m² of proposed amenity grassland planting. 	Construction
Refer to WT1, WT2 and WT3 in Table 22.9	12.5.1.2.2	Throughout (as required) and Construction Compound K1 and Construction Compound K2	Habitat Degradation – Surface Water Quality In terms of mitigation, a Surface Water Management Plan (SWMP) has been prepared (provided in the CEMP in 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 within 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; • In-stream working and water body crossings; • Control of sediment; • Use of concrete; • Management of vehicles and plant including refuelling and wheel wash facilities (if necessary); and • Monitoring. 	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Phase
			Specific mitigation measures which the appointed contractor will implement in relation to surface water quality at the proposed boardwalk over the Stoneboat / Poddle_10 at Mount Argus View as well as the new cycle / footbridges across the Grand Canal to either side of the existing Robert Emmet Bridge are outlined in WT1, WT2 and WT3.	
Refer LSGH8 and LSGH9 in Table 22.10	12.5.1.2.3	Throughout (as required)	<p><u>Habitat Degradation – Groundwater Quality</u></p> <p>The following mitigation measures will be implemented with regard to pollution of soil and groundwater:</p> <ul style="list-style-type: none"> • The construction management of the site to be implemented by the appointed contractor will take account of the recommendations of the CIRIA Control of Water Pollution from Construction Sites – Guidance for consultants and contractors (Masters-Williams et al. 2001) to minimise, as far as possible, the risk of soil, groundwater and surface water contamination; and • Measures to be implemented by the appointed contractor to minimise the risk of spills and contamination of soils and waters will include: <ul style="list-style-type: none"> ○ Employing only a competent and experienced workforce, and site-specific training of site managers, foremen and workforce, including all subcontractors, 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 will be considered in the design of the Construction Compounds. 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 will be adequately secured against vandalism; ○ Provision of proper containment of potential pollutants according to the codes of best practice; ○ Thorough control during the entire Construction Phase to ensure that any spillage is identified at an early stage and subsequently effectively contained and managed; and ○ Spill kits will be provided and will be kept close to the storage area. Staff will be trained on how to use spill kits correctly. 	Construction
Refer AQ1 in Table 22.3	12.5.1.2.4	Throughout (as required)	<p><u>Habitat Degradation – Air Quality</u></p> <p>The mitigation measures which will be applied by the appointed contractor to control dust emissions during the Construction Phase are outlined in Table 22.3 of this Chapter of the EIAR.</p>	Construction
BD4	12.5.1.2.5	Throughout (as required)	<p><u>Habitat Degradation – Non-Native Invasive Plant 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. Where an infestation is confirmed / identified, this will require the implementation of a non-native Invasive Species Management Plan (ISMP) (refer to the ISMP contained in the CEMP in Appendix 5.1 of Volume 4 of this EIAR). Following the confirmatory pre-construction survey, mitigation measures outlined in BD5 and BD6 will be implemented, as required.</p>	Pre-Construction / Construction
BD5	12.5.1.2.5	Throughout (as required)	<p><u>Habitat Degradation – Non-Native Invasive Plant Species</u></p> <p>Where a pre-construction invasive species re-survey has confirmed the presence of previously identified Third Schedule non-native invasive species, or identifies newly established non-native invasive species within the footprint of the Proposed Scheme, the ISMP</p>	Pre-Construction / Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Phase
			<p>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, will 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 guidance on The Management of Invasive Alien Plant Species on National Roads (Technical Guidance) (TII 2020a; 2020b) and other species-specific guidance documents including those listed in the ISMP, as necessary</p>	
BD6	12.5.1.2.5	Throughout (as required)	<p><u>Habitat Degradation – Non-Native Invasive Plant Species</u></p> <p>The NTA will ensure that all control measures specified in the ISMP shall be implemented by a suitably qualified and licensed specialist prior to the construction of the Proposed Scheme to control the spread of non-native invasive species within the footprint of the Proposed Scheme. Furthermore, the appointed contractor will adhere to control measures specified within the ISMP throughout the Construction Phase of the Proposed Scheme</p>	Pre-Construction / Construction
Refer to WT1, WT2 and WT3 in Table 22.9	12.5.1.3.1	Throughout (as required)	<p><u>Rare and Protected Plant Species</u> <u>Habitat Degradation – Surface Water Quality</u></p> <p>In terms of mitigation, a SWMP has been prepared (provided in the CEMP in 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>Specific mitigation measures which the appointed contractor will implement in relation to Surface Water quality at the proposed boardwalk over the Stoneboat / Poddle_10 at Mount Argus View as well as the new cycle / footbridges across the Grand Canal to either side of the existing Robert Emmet Bridge are outlined in WT1, WT2 and WT3.</p>	Construction
BD7	12.5.1.4.1.1	Throughout (as required)	<p><u>Bats - Protection of Bats During Vegetation Clearance</u></p> <p>One tree was identified within the multidisciplinary surveys to contain PRFs (see Figure 12.6.2 in Volume 3 of this EIAR). This tree (CBC0011PRF001), which is along the boundary of Construction Compound K2 will not be removed during the Construction Phase of the Proposed Scheme, and the following mitigation measures will be implemented by the appointed contractor:</p> <ul style="list-style-type: none"> • Where works are required within the RPA (including the tree identified to contain PRFs), the mitigation measures as set out in the method statement within the Arboricultural Impact Assessment (refer to Appendix A17.1 in Volume 4 of this EIAR) and which follow the requirements of the British Standard Institution (BSI) British Standard (BS) 5837:2012 Trees in relation to design, demolition, construction – Recommendations (BSI 2012) will be implemented; and • The PRF containing tree will, in advance of any works commencing in the area, be protected by the appointed contractor for the duration of construction works associated with the Proposed Scheme. <p>In addition to the above, the following bat specific mitigation measures (in relation to vegetation clearance) will be implemented by the appointed contractor:</p> <ul style="list-style-type: none"> • Where the qualified arborist engaged by the appointed contractor is required to assess the condition of, and advise on any repair works necessary to, any trees which are to be retained (including PRF-containing trees or category U trees), these will be notified to the appointed ecologist to be surveyed to confirm if these trees are PRFs (as done for the pre-constructions surveys outlined in Section 12.5.1.4.1.2 of Chapter 12 (Biodiversity) in Volume 2 of the EIAR). Where these previously identified or new PRF(s) require works including removal for example due to poor condition, they will be subject to mitigation as described in Section 12.5.1.4.1.2 of Chapter 12 (Biodiversity) in Volume 2 of the EIAR; and • There will be no additional lighting within 5m of any PRF during the Construction Phase of the Proposed Scheme to avoid potential disturbance to roosting bats. 	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Phase
BD8	12.5.1.4.1.2	Throughout (as required)	<p><u>Bats - Roost Loss</u></p> <p><u>Potential Roost Feature Re-Appraisal (First Step of Pre-Construction Survey)</u></p> <p>The NTA will ensure that a confirmatory pre-construction survey of all trees identified as containing PRFs or not to be removed within the boundary of the Proposed Scheme shall be rechecked for PRFs by an experienced bat specialist engaged by the NTA as part of the pre-construction surveys. The survey will:</p> <ul style="list-style-type: none"> • Confirm that previously identified PRFs which are to be retained are still standing; and • Identify whether new PRF (if any) may have developed owing to damage or management change to trees in the intervening period between the original surveys and grant of planning. <p><u>Pre-Construction Survey</u></p> <p>In the unlikely event that PRFs are detected during the pre-construction survey, it is recommended that:</p> <ul style="list-style-type: none"> • In advance of any clearance, all trees deemed to contain PRFs, which are subject to felling / clearance will be checked for the presence of bats by a suitably qualified / licenced bat specialist (using an endoscope under a separate licence held by that individual); • In the unlikely event that bats are encountered during construction works, such as vegetation clearance, works will immediately cease in that area and the local NPWS Conservation Ranger will be contacted; • An application will then be made to the NPWS for a derogation licence to permit actions affecting bats or their roosts that would normally be prohibited by law; • After licence approval from the NPWS (which may include the necessity for additional mitigation measures to those recommended here), bats may be removed by a bat specialist licensed to handle bats and released in the area in the evening following capture; and • Only then will trees containing PRFs be felled and this should be undertaken 'in sections' where the section can be handled to avoid sudden movements or jarring of the sections. <p><u>Installation of Bat Boxes</u></p> <p>In addition to mitigation proposals that may arise as result of the pre-construction survey (e.g. emergence surveys and confirmation of roost), it is proposed to install generalist / self-cleaning bat boxes for each tree containing PRFs that is confirmed to be removed:</p> <ul style="list-style-type: none"> • Standard Schwegler 1FFH (2 number) and 3FF boxes (1 number) for all PRF trees to be removed; • The boxes will be installed three months in advance of felling of any PRF and in public spaces managed by the local authority, as close as possible to areas of the PRF to be felled and which overlap with areas of bat activity confirmed during activity surveys undertaken as part of the EIAR; • The boxes will be installed on the tree at a height of 3m to 5m and firmly fixed to the tree trunk; • Where practicable, the bat boxes will be installed in an east, south and west orientation and protected from undue disturbance by selective placement away from light spill and at a height >3.5m; • There will be a 1m clearance (e.g. no overhanging branches or ivy encroachment near the installed box) around each bat box opening; and • Installed bat boxes will be labelled and data (reference number, GPS location and photographic record) will be supplied to Bat Conservation Ireland (BCI), the Local Authority Biodiversity Officer and the NPWS. 	Pre-Construction / Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Phase
BD9	12.5.1.4.1.3	Throughout (as required)	<p><u>Bats</u> <u>Habitat Loss and Fragmentation</u></p> <p>Where possible, habitats of importance to bats such as scattered trees and parkland, treeline and Where possible, habitats of importance to bats such as scattered trees and parkland, treeline and hedgerow habitat types, which lie within the footprint, or along the boundary of the Proposed Scheme, that are not directly impacted by the Proposed Scheme, will be retained. These areas will be protected for the duration of construction works and fenced off at an appropriate distance. Vegetation to be retained is shown on the Landscaping General Arrangement drawings (BCIDD-ROT-ENV_LA-00011_XX_00-DR-LL-9001) in Volume 3 of this EIAR.</p> <p>To minimise the loss of habitat associated with the Proposed Scheme, there are also areas within the Proposed Scheme footprint which are included for mitigation planting where general construction works will not be undertaken. Proposed planting incorporated into the Proposed Scheme that will be implemented, shown as design mitigation, is listed below and displayed on the Landscape General Arrangement drawings (BCIDD-ROT-ENV-LA-0011_XX_00-DR-LL-9001) in Volume 3 of this EIAR.</p>	Construction
BD10	12.5.1.4.1.4	Throughout (as required)	<p><u>Bats</u> <u>Disturbance of Flight Patterns / Foraging Routes as a Result of Lighting Impacts</u></p> <p>The appointed contractor, in liaison with the suitably qualified licensed ecologist(s), will ensure that lighting at the Construction Compounds, and active work areas in proximity to known bat activity, will be designed to minimise light spill and be cognisant of light-spill onto these areas.</p> <p>Where deemed necessary, a suitably qualified licensed ecologist(s), engaged by the appointed contractor, will ensure that lighting at the Construction Compounds and in active work areas, which are in close proximity to watercourses with known bat activity, will be designed to minimise light spill and be cognisant of downward light-spill onto watercourses.</p> <p>Mitigation measures to reduce light spill will include the following:</p> <ul style="list-style-type: none"> • The use of sensor / timer triggered lighting; • LED luminaires to be used where possible due to their sharp cut-off, lower intensity, good colour rendition and dimming capability; • Column heights to be considered to minimise light spill; and • Accessories such as baffles, hoods or louvres can be used to reduce light spill and direct it only where needed. • Where night-time works are required, the appointed contractor will liaise with the engaged suitably experienced and qualified ecologist(s) and implement measures to mitigate the impact of such works (especially works carried out adjacent to watercourses with known bat activity). 	Construction
BD11	12.5.1.4.2.1	Throughout (as required)	<p><u>Badgers</u> <u>Disturbance / Displacement</u></p> <p>Although there were no signs of badger recorded during field surveys, badger could potentially establish new territory within the Zol of the Proposed Scheme. Therefore, the NTA will ensure that a confirmatory pre-construction check of all suitable badger habitat will be completed within 12 months 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 Guideline for the Treatment of Badgers Prior to the Construction of National Road Schemes (NRA 2005a).</p>	Pre-Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Phase
BD12	12.5.1.4.2.2	Throughout (as required)	<p><u>Badgers</u> <u>Protection of Badgers from Accidental Harm During Construction (Excavations)</u> 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. 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
BD13	12.5.1.4.2.3	Throughout (as required)	<p><u>Badgers</u> <u>Lighting</u> See BD10 which relates to lighting mitigation measures.</p>	Construction
BD14	12.5.1.4.3.1	Throughout (as required)	<p><u>Otter</u> <u>Loss of Breeding / Resting Sites</u> The NTA will ensure that a confirmatory pre-construction check of all suitable otter habitat will be completed by a suitably qualified ecologist within the 12-month period prior to any construction works commencing. 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 2005b).</p>	Construction
BD15	12.5.1.4.3.2	Throughout (as required)	<p><u>Otter</u> <u>Measures to Prevent Injury/ Mortality Impacts</u> The appointed contractor will engage the services of a suitably qualified ecologist to conduct a pre-construction otter survey of the Proposed Scheme, in accordance with the Guidelines for the Treatment of Otters Prior to the Construction of National Road Schemes (NRA 2006c), and to oversee and advise works at watercourse crossings:</p> <ul style="list-style-type: none"> • Where a new or reactivated holt is encountered, within 150m (up and downstream) of the watercourse crossing, the qualified ecologist(s) will consult with the NPWS in conjunction with the NTA and appointed contractor; • The qualified ecologist will review method statements; oversee works; provide advice to the appointed contractor(s), deliver toolbox talks and temporarily halt works, if, and as, necessary, having conferred with the NTA; • To protect otters 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; • 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; and • Fencing requirements as per the Guidelines for the Treatment of Otters Prior to the Construction of National Road Schemes (NRA 2006c) will be erected around the Construction Compounds (particularly Construction Compound K1) and other working areas which are in close proximity to significant watercourses and have suitable roaming territory for otter. 	Construction
BD16	12.5.1.4.3.3	Throughout (as required)	<p><u>Otter</u> <u>Measures to Prevent Disturbance / Displacement</u> Where night-time works are required, the appointed contractor will liaise with the engaged suitably experienced and qualified ecologist(s) and implement measures to mitigate the impact of such works (especially works carried out adjacent to watercourses with known otter activity). Site set up near watercourse crossings shall be undertaken in a timely manner to reduce impacts to otter. The works area will be delineated from the watercourse with hoarding by the appointed contractor to obscure the site from otter and prevent access. The</p>	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Phase
			<p>construction works will commence following confirmation from the suitably qualified ecologist that no otter holt is located within 200m of either of the proposed cycle / pedestrian bridges over the Grand Canal or the proposed Stone Boat Boardwalk along the River Poddle. Should an otter holt be found to be present, the suitably qualified ecologist will advise, in discussion with the NTA and the appointed contractor on the appropriate actions to be taken.</p> <p>Where night-working adjacent to watercourses known to support otter is required, owing to practical considerations of traffic restrictions etc., the advice of a suitably qualified ecologist must be sought by the appointed contractor and a derogation licence, if necessary, may be sought from the NPWS permitting such works in close proximity to a new holt.</p>	
BD17	12.5.1.4.3.4	Throughout (as required)	<p><u>Otter</u> <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 in 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>Specific mitigation measures which the appointed contractor will implement in relation to Surface Water quality at the proposed boardwalk over the Stoneboat / Poddle_10 at Mount Argus View as well as the new cycle / footbridges across the Grand Canal to either side of the existing Robert Emmet Bridge are outlined in WT1, WT2 and WT3.</p>	Construction
BD18	12.5.1.4.3.5	Throughout (as required)	<p><u>Otter</u> <u>Lighting</u></p> <p>See BD10 which relates to lighting mitigation measures.</p>	Construction
Refer to WT1, WT2 and WT3 in Table 22.9	12.5.1.4.4.1	Throughout (as required)	<p><u>Marine Mammals</u> <u>Habitat and Food Resource Degradation – Surface Water Quality</u></p> <p>In terms of mitigation, a SWMP has been prepared (provided in the CEMP in 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>Specific mitigation measures which the appointed contractor will implement in relation to Surface Water quality at the proposed boardwalk over the Stoneboat / Poddle_10 at Mount Argus View as well as the new cycle / footbridges across the Grand Canal to either side of the existing Robert Emmet Bridge are outlined in WT1, WT2 and WT3.</p>	Construction
BD19	12.5.1.5.1.1	Throughout (as required)	<p><u>Breeding Birds</u> <u>Habitat Loss and Fragmentation</u></p> <p>Where possible, habitats of importance to breeding birds such as scattered trees and parkland, treeline and hedgerow habitat types, which lie within the footprint, or along the boundary of the Proposed Scheme, that are not directly impacted, will be retained. These areas will be protected for the duration of construction works and fenced off at an appropriate distance. Vegetation to be retained is shown on the Landscaping General Arrangement drawings (BCIDD-ROT-ENV_LA-0011_XX_00-DR-LL-9001) in Volume 3 of this EIAR.</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 (refer to the Landscaping General Arrangement drawings (BCIDD-ROT-ENV_LA-0011_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 Phase
BD20	12.5.1.5.1.2	Throughout (as required)	<p>Breeding Birds <u>Mortality Risk</u></p> <p>Where practical, vegetation (e.g. hedgerows, trees, scrub, bankside vegetation and grassland) will not be removed, between 1 March and the 31 August, to avoid direct impacts on nesting birds.</p> <p>Where the construction programme does not allow this seasonal restriction to be observed, 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 three days of the nest survey, otherwise repeat surveys will be required. Vegetation clearance will not commence where nests are present, and works will resume when birds have fledged and nests are no longer in use, or an agreement is reached with the NPWS.</p>	Construction
BD21	12.5.1.5.1.4	Throughout (as required)	<p>Breeding Birds <u>Disturbance / Displacement</u></p> <p>The appointed contractor will implement the noise mitigation measures described in NV4, NV6 and NV7 in Table 22.5 in this Chapter.</p>	Construction
Refer to WT1, WT2 and WT3 in Table 22.9	12.5.1.5.1.3	Throughout (as required)	<p>Breeding Birds <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 in 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>Specific mitigation measures which the appointed contractor will implement in relation to Surface Water quality at the proposed boardwalk over the Stoneboat / Puddle_10 at Mount Argus View as well as the new cycle / footbridges across the Grand Canal to either side of the existing Robert Emmet Bridge are outlined in WT1, WT2 and WT3.</p>	Construction
Refer to WT1, WT2 and WT3 in Table 22.9	12.5.1.5.2.1	Throughout (as required)	<p>Wintering Birds <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 in 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>Specific mitigation measures which the appointed contractor will implement in relation to Surface Water quality at the proposed boardwalk over the Stoneboat / Puddle_10 at Mount Argus View as well as the new cycle / footbridges across the Grand Canal to either side of the existing Robert Emmet Bridge are outlined in WT1, WT2 and WT3.</p>	Construction
BD22	12.5.1.7.1	Throughout (as required)	<p>Amphibians <u>Habitat Loss, Disturbance and Mortality Risk</u></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 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 below will be completed before works recommence.</p> <ul style="list-style-type: none"> In the case of common frog, any frog spawn, tadpoles, juvenile or adult frogs present will be captured, under a licence from the NPWS and removed from affected habitat by hand net and translocated to the nearest area of available suitable habitat, beyond the Zol of the Proposed Scheme; 	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Phase
			<ul style="list-style-type: none"> In the case of smooth newt, individuals will be captured, under a 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 newt; If the size or depth of the habitat feature is such that it cannot be determined by a 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 will be sited, such that no amphibian species can be sucked into the pump mechanism; and Any capture and translocation works shall be undertaken immediately in advance of site clearance / construction works commencing. 	
Refer to WT1, WT2 and WT3 in Table 22.9	12.5.1.7.2	Throughout (as required)	<p><u>Amphibians</u> <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 in 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>Specific mitigation measures which the appointed contractor will implement in relation to Surface Water quality at the proposed boardwalk over the Stoneboat / Poddle_10 at Mount Argus View as well as the new cycle / footbridges across the Grand Canal to either side of the existing Robert Emmet Bridge are outlined in WT1, WT2 and WT3.</p>	Construction
Refer to WT1, WT2 and WT3 in Table 22.9	12.5.1.8.1	Throughout (as required)	<p><u>Fish</u> <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 in 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>Specific mitigation measures which the appointed contractor will implement in relation to Surface Water quality at the proposed boardwalk over the Stoneboat / Poddle_10 at Mount Argus View as well as the new cycle / footbridges across the Grand Canal to either side of the existing Robert Emmet Bridge are outlined in WT1, WT2 and WT3.</p>	Construction
Refer to WT1, WT2 and WT3 in Table 22.9	12.5.1.9.1	Throughout (as required)	<p><u>Invertebrates</u> <u>Habitat and 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 in 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>Specific mitigation measures which the appointed contractor will implement in relation to Surface Water quality at the proposed boardwalk over the Stoneboat / Poddle_10 at Mount Argus View as well as the new cycle / footbridges across the Grand Canal to either side of the existing Robert Emmet Bridge are outlined in WT1, WT2 and WT3.</p>	Construction
BD23	12.5.2.2.1	Throughout (as required)	<p><u>National Sites</u> <u>Habitat Degradation – Surface Water Quality</u></p> <p>The proposed SuDS drainage system, as shown in Proposed Surface Water Drainage Works drawings (BCIDD-ROT-DNG_RD-0011_XX_00-DR-CD-9001 in Volume 3 of this EIAR), will be installed by the appointed contractor during the Construction Phase.</p>	Operational

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Phase
			Once the Proposed Scheme is in operation, the Local Authorities will be required to implement a maintenance and inspection regime for SuDS which will be subject to their management procedures. No additional mitigation is required.	
BD24	12.5.2.2.2	Throughout (as required)	<p><u>National Sites</u> <u>Habitat Degradation – Non-Native Invasive Plant Species</u></p> <p>Once the Proposed Scheme is in operation, the local authorities 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>	Operational
BD25	12.5.2.4.3.1; 12.5.2.4.4.1	Throughout (as required)	<p><u>Breeding Birds / Wintering Birds / Amphibians / Otter / Marine Mammals / Fish</u> <u>Habitat Degradation / Reduced Prey Availability – Surface Water Quality</u></p> <p>The proposed SuDS drainage system, as shown in Proposed Surface Water Drainage Works drawings (BCIDD-ROT-DNG_RD-0011_XX_00-DR-CD-9001 in Volume 3 of this EIAR), will be installed by the appointed contractor during the Construction Phase.</p> <p>Once the Proposed Scheme is in operation, the Local Authorities will be required to implement a maintenance and inspection regime for SuDS which will be subject to their management procedures. No additional mitigation is required.</p>	Operational

22.11 Water

Table 22.9: Water Mitigation Measures

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Phase
WT1	13.5.2.1	Construction Compounds and throughout (as required)	<p>A SWMP has been prepared (provided in the CEMP in 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 within 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; and • Monitoring. 	Construction
WT2	13.5.2.2	Stoneboat / Poddle_010 and the Grand Canal (at Robert Emmet Bridge)	<p>Considering the works to the lands directly adjacent to the banks of the Poddle_010 and the Grand Canal, the following mitigation measures, which are in line with Inland Fisheries Ireland (IFI) Guidelines on Protection of Fisheries During Construction Works Adjacent to Waters (IFI 2016) will be implemented by the appointed contractor to minimise and avoid impacts:</p> <ul style="list-style-type: none"> • All necessary consents will be obtained from the relevant regulator (such as IFI, OPW or the local authority), as appropriate; • Bank stabilization and erosion protection, if required, will be designed in consultation with the IFI and NPWS; • The area of disturbance of the bank will be the absolute minimum required; • Works within and adjacent to the Poddle_010 will be conducted during forecast low flow periods, where possible; • Operation of machinery in-stream will not be permitted. All construction machinery operating near the water body will be mechanically sound to avoid leaks of oils, hydraulic fluid, etc.; • A suitable bund will be installed by the appointed contractor along the bank downhill of any piling in the banks (Poddle_010 and Grand Canal), for example, silt fence, sandbags or straw bales to direct silty water runoff away from water body. Any silty water will be collected and treated through the use of a silt-buster tank or similar, to be decided upon by the appointed contractor; • Any dewatering flows will be directed to the construction drainage system and to the settlement pond (or other) treatment system; • Reinstatement of any banks affected during construction works near a watercourse will be reinstated back to pre-development conditions; and 	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Phase
			<ul style="list-style-type: none"> • Any bank-side clearance in the immediate area of a crossing / works should be kept to a minimum and adequate measures will be put in place to control or minimise the risk of siltation. This may include such measures as: <ul style="list-style-type: none"> ○ Bunding and diversion of site runoff to settlement ponds / tanks; ○ Stripping of topsoil will be in accordance with the soils requirements outlined in A Guide to Landscape Treatments for National Road Schemes in Ireland (NRA 2005c), and where necessary, the site will be surfaced with granular material; and ○ Covering of temporary stockpiles. 	
WT3	13.5.2.2	Grand Canal (at Robert Emmet Bridge)	The appointed contractor, in consultation with the NTA, will engage with ESB Networks to locate their oil-filled cable that crosses the Grand Canal in proximity to Robert Emmet Bridge. A ground investigation, where construction works are to take place near to the ESB oil-filled cable, will be carried out prior to construction commencing, and following this, an appropriate suite of mitigation measures will be confirmed and deployed.	Construction
WT4	13.5.3	Throughout (as required)	In the Operational Phase, the infrastructure (including the maintenance regime for Sustainable Drainage Systems (SUDS)) will be carried out by the local authorities 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 Phase
LSGH1	14.5.1.1	Throughout (as required)	<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.	Construction
LSGH2	14.5.1.1	Throughout (as required)	<u>Loss or Damage of Topsoil</u> All topsoil or subsoil shall be assessed for reuse 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 to allow maximum opportunity for the reuse of materials on-site.	Construction
LSGH3	14.5.1.2	Throughout (as required)	<u>Excavation of Potentially Contaminated Ground</u> The appointed contractor will ensure that excavations shall 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.	Construction
LSGH4	14.5.1.2	Throughout (as required)	<u>Excavation of Potentially Contaminated Ground</u> The appointed contractor will be responsible for regular testing of excavated soils to monitor the suitability of the soil for reuse.	Construction
LSGH5	14.5.1.2	Throughout (as required)	<u>Excavation of Potentially Contaminated Ground</u> Samples of ground suspected of contamination will be tested for contamination by the appointed contractor during the detailed ground investigation and ground excavated from these areas will be disposed of, to suitably licensed or permitted sites, in accordance with the current Irish waste management legislation.	Construction
LSGH6	14.5.1.2	Throughout (as required)	<u>Excavation of Potentially Contaminated Ground</u> Any dewatering in areas of contaminated ground shall be designed by the appointed contractor to minimise the mobilisation of contaminants into the surrounding environment.	Construction
LSGH7	14.5.1.3	Throughout (as required)	<u>Loss or Damage of Proportion of Geological Heritage Area</u> The appoint contractor, in consultation with the NTA, will provide the Geological Survey of Ireland (GSI) with relevant construction information to supplement their existing CGS Report should the subsurface of the River Poddle be encountered during any of the works related to the Proposed Scheme.	Construction
LSGH8	14.5.1.4	Throughout (as required)	<u>Pollution of Soils and Groundwater</u> Good construction management practices, as outlined in the Construction Industry Research and Information Association (CIRIA) guidance Control of Water Pollution from Construction Sites – Guidance for consultants and contractors (Masters-Williams <i>et al.</i> 2001) will be employed by the appointed contractor to minimise the risk of transmission of hazardous materials, as well as pollution	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Phase
			of adjacent watercourses and groundwater. The construction management of the site will take account of these recommendations to minimise, as far as possible, the risk of soil, groundwater and surface water contamination.	
LSGH9	14.5.1.4	Throughout (as required)	<p><u>Pollution of Soils and Groundwater</u></p> <p>Measures to be implemented to minimise the risk of spills and contamination of soils and waters shall include:</p> <ul style="list-style-type: none"> • Employing only a 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 all Construction Compounds. These are to be designed in accordance with relevant guidelines and codes of best practice at the time of construction and will be fully bunded; • Good housekeeping on-site (daily site clean-ups, use of disposal bins, etc.) will be applied during the entire Construction Phase; • Potential pollutants will be adequately secured against vandalism in containers in a dedicated secured area; • Provision of proper containment of potential pollutants according to codes of best practice; • Thorough control will be implemented during the entire Construction Phase to ensure that any spillage is identified at an early stage and subsequently effectively contained and managed; and • Spill kits will be provided and will be kept close to the storage area and staff will be trained on how to use spill kits correctly. 	Construction
LSGH10	14.5.1.4	Throughout (as required)	<p><u>Pollution of Soils and Groundwater</u></p> <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. 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 (refer to Appendix A5.1 CEMP in Volume 4 of this EIAR).</p>	Construction
LSGH11	14.5.1.4	Throughout (as required)	<p><u>Pollution of Soils and Groundwater</u></p> <p>Sediment control methods are outlined in the Surface Water Management Plan in Appendix A5.1 CEMP in Volume 4 of this EIAR, and these will be implemented by the appointed contractor.</p>	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 Phase
ACH1	15.5.1.1	Throughout (as required)	The NTA will procure the services of a suitably qualified archaeologist as part of its Employer's Representative team administrating 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 ACH6 will have the authority to inspect all excavation to the 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 the 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	Throughout (as required)	In the case of cellars, coal cellars and / or basements, the appointed contractor in consultation with the archaeologist engaged by them will make provision for a geodetic survey and recording of each individual structure which will be subject to impact. This survey and recording will be carried out in advance of any construction works on cellars, coal cellars and / or basements.	Construction
ACH6	15.5.1.2	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 licences / consents required to conduct the work, and to supervise and direct the archaeological measures associated with the Proposed Scheme.	Construction
ACH7	15.5.1.2	Throughout (as required)	Licence applications will be made by the licence-eligible archaeologist on behalf of the client to the National Monument Service at the DHLGH. 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.	Construction
ACH8	15.5.1.2	Throughout (as required)	The archaeologist will be provided, with information on where and when the various elements and ground disturbance will take place.	Construction
ACH9	15.5.1.2	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 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
ACH10	15.5.1.2	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

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Phase
ACH11	15.5.1.2	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
ACH12	15.5.1.3	Throughout (as required)	Features of a 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 statutory authorities.	Construction
ACH13	15.5.1.4.1.2; 15.5.1.4.1.3	Lower Kimmage Road from Kimmage Cross Roads to Junction with Harold's Cross Road	The appointed contractor will ensure that archaeological monitoring under licence will take place, where any preparatory ground breaking or ground reduction works are required at the following locations: <ul style="list-style-type: none"> • Within the designated ZAP for the Historic Dublin City Watercourse (RMP DU022-003001/002 and RMP DU018-043004), which includes the recorded millrace site (RMP DU022-00302) and mill and mill pond (RMP DU022-077001/002) (Figure 15.1 Sheets 1 and 3 - 7 and 9 – 10 of 13 in Volume 3 of this EIAR); • At Mount Argus Way, the site of a weir (RMP DU018-043003) (Figure 15.1 Sheets 5 and 6), known locally as the 'Tongue' or the 'Stone Boat'. The design intent is to avoid any impact to the weir (RMP DU018-043003). As a mitigation measure, all piling arisings and any ground breaking works will be archaeologically monitored in order to identify any associated below ground archaeological features or finds; and • At the location of the quarries along Lower Kimmage Road (DCIHR 22-02-005), should any ground breaking works be required, archaeological monitoring will take place. 	Construction
ACH14	15.5.1.5.1.2; 15.5.1.5.1.3.	Harold's Cross Road from Harold's Cross Park to the Grand Canal	The appointed contractor will ensure that archaeological monitoring under licence will take place, where any preparatory ground breaking or ground reduction works are required at the following locations: <ul style="list-style-type: none"> • Within the ZAP for the historic settlement at Harold's Cross (RMP DU018-050) to include the full extent of land take for the Proposed Scheme. The monitoring of topsoil-stripping and excavation works across this whole area will be carried out as an archaeological exercise; • On Harold's Cross Road where the former line of a tramway has been identified (DCIHR 18-15-030); and • At Robert Emmet Bridge (or Harold's Cross Bridge) (NIAH 50080983 and DCHIR 18-15-009) and the Grand Canal where excavation will occur to accommodate the new design proposals. Excavation in the area may result in revealing features of an industrial heritage interest associated with the canal and bridge. Any resultant archaeological or industrial heritage features will be identified and recorded. 	Construction
ACH15	15.5.1.5.1.3	Harold's Cross Road from Harold's Cross Park to the Grand Canal	Should any subsurface archaeological stratigraphy be encountered as a result of monitoring undertaken (see ACH14), the appointed contractor will implement an appropriate ameliorative strategy. This will entail licensed archaeological excavation, in full or in part, of any identified archaeological remains (preservation by record) or preservation in situ.	Construction
ACH16	15.5.1.5.2	Harold's Cross Road from Harold's Cross Park to the Grand Canal	The memorial cross will be appropriately protected in accordance with the mitigation measures set out in Chapter 16 (Architectural Heritage) (i.e. AH3).	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Phase
ACH17	15.5.1.6.1.1	Clanbrassil Street Upper and Lower and New Street South from the Grand Canal to Patrick Street Junction	<p>The appointed contractor will ensure that archaeological monitoring under licence will take place, where any preparatory ground breaking or ground reduction works are required at the following locations:</p> <ul style="list-style-type: none"> • Towards the southern extent of the ZAP for the Historic City of Dublin (DU018-020) at the junction between New Street Lower and Malpas Street and Long Lane as this coincides with the location of possible medieval city defences (DU018-020001; though the precise location of the gate is unknown; • Within the designated ZAP for the Historic City of Dublin (DU018-020) on the original route of the Slige Chualann; and • At the following RMP sites which lie within the Proposed Scheme: the sites of a house (18th/19th century) (DU018-020360), and a mill (DU018-020399); • Along Clanbrassil Street Upper to the South Circular Road where former tramway lines are recorded (DCIHR 18-15-030) (monitoring will also occur on Harold's Cross Road as outlined above); • At the site of a weaving mill (St Kevin's Hall) (DCIHR 18-11-100) on Clanbrassil Street Lower. 	Construction
ACH18	15.5.1.7.1	Construction Compound K1 and K2	Archaeological monitoring under licence will take place at the early stages of construction where any preparatory ground-breaking or ground reduction works are required at Construction Compound K1 and K2. This will be undertaken in order to establish the presence or absence, as well as the nature and extent, of any archaeological deposits, features or sites that may be present in these areas.	Construction
ACH19	15.5.2	Proposed Stoneboat Boardwalk	The appointed contractor, in discussion with the NTA will install interpretative signage at either end of the proposed pedestrian boardwalk over the Stoneboat. These interpretative signage will comprise of information panels that will detail the story of the Dublin City Historic Watercourse, the River Poddle and the River Dodder and how important they were to industry from medieval times onwards.	Operation

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 Phase
AH1	16.5.1.1	<u>Protected Structure:</u> Our Lady's Hospice, Greenmount House, Harold's Cross (DCC RPS 3581)	The following mitigation measures will be implemented: <ul style="list-style-type: none"> Recording the north pier and the affected sections of the curtain wall in position prior to the works. Labelling the component granite masonry blocks prior to their careful removal to safe storage; and Reinstatement of the pier and curtain wall on the new alignment, as per the detailed survey. Recording will 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 pier and curtain wall. Works to historic fabric will be carried out in accordance with the methodology provided in Appendix A16.3 Methodology for Works Affecting Sensitive and Historic Fabric in Volume 4 of this EIAR.	Construction
AH2	16.5.1.1	<u>Protected Structure:</u> Tongue / Stoneboat (RMP DU018-043003)	The architectural heritage specialist engaged by the appointed contractor will record, protect and monitor the sensitive fabric of the feature prior to and for the duration of the Construction Phase in accordance with the methodology provided in Appendix A16.3 Methodology for Works Affecting Sensitive and Historic Fabric in Volume 4 of this EIAR.	Construction
AH3	16.5.1.1	<u>All Other Proposed Structures:</u> (as listed in Appendix A16.2 in Volume 4 of this EIAR)	The architectural heritage specialist will record, protect and monitor the boundaries (as relevant) prior to, and for the duration of the Construction Phase. Recording, overseeing of protective measures and monitoring will be undertaken by an appropriate architectural heritage specialist engaged by the appointed contractor in accordance with the methodology provided in Appendix A16.3 Methodology for Works Affecting Sensitive and Historic Fabric in Volume 4 of this EIAR.	Construction
AH4	16.5.1.2	<u>Grand Canal Conservation Area</u>	The architectural heritage specialist will record, protect and monitor the bridge during the construction works in accordance with Appendix A16.3 Methodology for Works Affecting Sensitive and Historic Fabric in Volume 4 of this EIAR. The proposed piling on the tow paths of the Grand Canal will also to be monitored by the appointed contractor to ensure that no damage occurs to the Grand Canal, its tow path or the harbour to the west. The end walls of the bridge will be recorded in detail by the architectural heritage specialist before being carefully taken down. The materials will be retained for reuse and reinstated in place of the sections of the galvanised railings to the east and west of the bridge. Recording will 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 end walls, all undertaken in accordance with the methodology provided in Appendix A16.3 Methodology for Works Affecting Sensitive and Historic Fabric in Volume 4 of this EIAR.	Construction
AH5	16.5.1.2	<u>Kerbs at 1 to 15 Harold's Cross Road</u> (CBC0011BTH167)	Mitigation in respect to these features includes the retention of the kerbs in-situ, and their integration into the proposed new paving design where paths are widened. Where paths are to be narrowed, kerbs will need to be repositioned. Further mitigation includes the recording of the kerbs in position prior to the works, labelling the affected fabric prior to their removal to safe storage, and the reinstatement of the kerbs on the new line. Recording will be undertaken by an	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Phase
		<u>and on Robert Emmet Bridge (CBC0011BTH135, CBC0011BTH136)</u>	appropriate architectural heritage specialist engaged by the appointed contractor. The works to the historic fabric will be carried out in accordance with the methodology provided in Appendix A16.3 Methodology for Works Affecting Sensitive and Historic Fabric in Volume 4 of this EIAR.	
AH6	16.5.1.2	<u>NIAH Structures:</u> Two Limestone Retaining Walls along Clanbrassil Street Upper (NIAH 50080982)	Mitigation in regard to these feature includes the careful recording of both of the walls located on the western side of R137 Clanbrassil Street Upper. The component masonry will be labelled before any removal or deconstruction occurs. The parapet and coping to the wall which fronts directly on the west side of R137 Clanbrassil Street Upper and is a continuation of the bridge, will be taken down. The remaining portion of the wall fronting directly on to the R137 Clanbrassil Street Upper below the level of road will be retained in its present location and buried within the widened road. The steps and the wall directly to the west of it are also to be taken down . The materials will be retained for reuse and stored in a secure location for the duration of the works. A new retaining wall of similar construction will be constructed in the existing laneway that provides access to Gordon's Fuels. The parapet will be rebuilt using the limestone masonry and granite coping from the original 1790s walls. The steps will be reused in the proposed landscaping and urban realm works, thus ensuring that the historic fabric of the walls and steps is retained and reused on the new alignment. Recording will 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 walls. Works to historic fabric will be carried out in accordance with the methodology provided in Appendix A16.3 Methodology for Works Affecting Sensitive and Historic Fabric in Volume 4 of this EIAR.	Construction
AH7	16.5.1.2	<u>Patrick Street Conservation Area</u>	The architectural heritage specialist engaged by the appointed contractor will record, protect and monitor the sensitive fabric of the area prior to and for the duration of the Construction Phase in accordance with the methodology provided in Appendix A16.3 Methodology for Works Affecting Sensitive and Historic Fabric in Volume 4 of this EIAR.	Construction
AH8	16.5.1.3	<u>NIAH Structures:</u> 66 Harold's Cross Road (NIAH 50081060)	The architectural heritage specialist engaged by the appointed contractor will record, protect and monitor prior to and for the duration of the Construction Phase in accordance with the methodology provided in Appendix A16.3 Methodology for Works Affecting Sensitive and Historic Fabric in Volume 4 of this EIAR.	Construction
AH9	16.5.1.3	<u>NIAH Structures:</u> 75 and 77 Harold's Cross Road (NIAH 50081052), 92 Harold's Cross Road (NIAH 50081055), 72 and 74 Harold's Cross Road (NIAH 50081059), 66 to 70 Harold's Cross Road (NIAH 50081060, even numbers only), Robert Emmet	The architectural heritage specialist engaged by the appointed contractor will record, protect and monitor prior to and for the duration of the Construction Phase in accordance with the methodology provided in Appendix A16.3 Methodology for Works Affecting Sensitive and Historic Fabric in Volume 4 of this EIAR.	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Phase
		Bridge (NIAH 50080983), the limestone wall on R137 Clanbrassil Street Upper (NIAH 50080982), 65 and 66 Clanbrassil Street Upper (NIAH 50080943), and Leonard's Corner Post Office, 68 Clanbrassil Street Upper (NIAH 50080945)		
AH10	16.5.1.4	<u>Designated Landscapes:</u> Public Park on the Village Green (i.e. Harold's Cross Park) (RMP DU018-050) Our Lady's Hospice, Greenmount House (DCC RPS 3581)	Mitigation in respect to this feature includes the recording, protection and monitoring of the boundaries prior to, and for the duration of the Construction Phase by an appropriate architectural heritage specialist engaged by the appointed contractor, and in accordance with the methodology provided in Appendix A16.3 Methodology for Works Affecting Sensitive and Historic Fabric in Volume 4 of this EIAR.	Construction
AH11	16.5.1.5	<u>Other Structures of Architectural Heritage Interest:</u> No. 33 to 61 Harold's Cross Road (CBC0011BTH040)	The architectural heritage specialist engaged by the appointed contractor will record the boundary walls and gates including the dimensions of the walls, decorative panels and piers. Samples of the concrete render will be taken. The gates and hinges will be labelled before being carefully taken down and stored in a secure location. Concrete walls and piers will be rebuilt as per the detailed survey. A render based on the samples taken will be used and the gates and piers will be reinstated. This will ensure that much of the character associated with the boundary walls to the houses and their contribution to the character of R137 Harold's Cross Road will be retained. The architectural heritage specialist will oversee the labelling, taking-down and reinstatement of the boundary walls and gates. Works to historic fabric will be carried out in accordance with the methodology provided in Appendix A16.3 Methodology for Works Affecting Sensitive and Historic Fabric in Volume 4 of this EIAR.	Construction
AH12	16.5.1.5	<u>All Other Structures of Architectural Heritage Interest:</u> (as listed in Appendix A16.2 in	Mitigation in respect to these features include the recording, protection and monitoring of the boundaries which are located in close proximity to the proposed works prior to, and for the duration of the Construction Phase by an appropriate architectural heritage specialist engaged by the appointed contractor, and in accordance with the methodology provided in Appendix A16.3 Methodology for Works Affecting Sensitive and Historic Fabric in Volume 4 of this EIAR.	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Phase
		Volume 4 of this EIAR)		
AH13	16.5.1.6.1	<u>Street Furniture:</u> 7 Post boxes CBC0011PB001; CBC0011PB002; CBC0011PB003; CBC1012PB005; NIAH 50080944; CBC0011PB005; and NIAH 50080638	The architectural heritage specialist engaged by the appointed contractor will record, protect and monitor these features prior to and for the duration of the Construction Phase in accordance with the methodology provided in Appendix A16.3 Methodology for Works Affecting Sensitive and Historic Fabric in Volume 4 of this EIAR.	Construction
AH14	16.5.1.6.2	<u>Street Furniture:</u> Lamp Posts CBC0011LP040; CBC0011LP004, CBC0011LP006, CBC0011LP007, CBC0011LP008, CBC0011LP009, CBC0011LP010, CBC0011LP011, CBC0011LP012, CBC0011LP013, CBC0011LP014, CBC0011LP015, CBC0011LP016, CBC0011LP017, CBC0011LP018 CBC0011LP020, CBC0011LP021, CBC0011LP022, CBC0011LP023, CBC0011LP024, CBC0011LP025, CBC0011LP027, CBC0011LP028,	Mitigation consists of the recording of the lamp posts 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 positions in close proximity (within 2m) of their existing positions. Recording will 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 lamp posts. Works to historic fabric will be carried out in accordance with the methodology provided in Appendix A16.3 Methodology for Works Affecting Sensitive and Historic Fabric in Volume 4 of this EIAR.	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Phase
		and CBC0011LP032		
AH15	16.5.1.6.2	<u>Street Furniture:</u> Lamp Posts CBC1012LP026, CBC1012LP118, CBC1012LP029, CBC1012LP028, CBC1012LP027, CBC0011LP001, CBC0011LP002, CBC0011LP003, CBC0011LP005, CBC0011LP019, CBC0011LP026, CBC0011LP029 to CBC0011LP031, and CBC0809LP031	Mitigation consists of recording, protection and monitoring prior to and during the Construction Phase by an appropriate architectural heritage specialist engaged by the appointed contractor, and in accordance with the methodology provided in Appendix A16.3 Methodology for Works Affecting Sensitive and Historic Fabric in Volume 4 of this EIAR.	Construction
AH16	16.5.1.6.3	<u>Street Furniture:</u> Statutory and Street Furniture Vent pipes (CBC0011BTH121, CBC0011BTH122, and CBC0011BTH118), A Township Marker at 225a Kimmage Road Lower (CBC0011MS001), The War Memorial Cross (CBC0011BTH205) and The public art instillation on R137 New Street South (CBC0011BTH132)	The architectural heritage specialist engaged by the appointed contractor will record, protect and monitor these features prior to and for the duration of the Construction Phase in accordance with the methodology provided in Appendix A16.3 Methodology for Works Affecting Sensitive and Historic Fabric in Volume 4 of this EIAR.	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Phase
AH17	16.5.1.7.1	<u>Paving and Surface Treatments:</u> Kerb Stones CBC0011BTH119 and CBC0011BTH128	Mitigation in respect to these features is to record the kerbs in position prior to the works, labelling the affected fabric prior to their removal to safe storage, and the reinstatement of the kerbs on the new line. The works to the historic fabric will be carried out by an appropriate architectural heritage specialist engaged by the appointed contractor, and in accordance with the methodology provided in Appendix A16.3 Methodology for Works Affecting Sensitive and Historic Fabric in Volume 4 of this EIAR.	Construction
AH18	16.5.1.7.1	<u>Paving and Surface Treatments:</u> Cobbled surface and narrow granite kerbs at Clanbrassil Street Upper CBC0011BTH204	The architectural heritage specialist engaged by the appointed contractor will record the cobbled surface. The cobbles will be carefully taken up. The removed cobbles will be stored in a secure location for reuse before being reinstated in the original location in front of 30 Clanbrassil Street Upper and as per the detailed survey. The architectural heritage specialist will oversee the labelling, taking-down and reinstatement of the cobbles. Works to historic fabric will be carried out in accordance with the methodology provided in Appendix A16.3 Methodology for Works Affecting Sensitive and Historic Fabric 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 Phase
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 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 works area will be protected in accordance with the British Standard Institution (BSI) British Standard (BS) 5837:2012 Trees in relation to 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, which will be prepared / approved by a professional qualified arborist. For details of trees to be retained, refer to the Tree Protection Plans which are contained within Appendix A17.1 Arboricultural Impact Assessment 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, this is of particular note where mature trees are a prominent and valuable asset within the urban realm or generally along roads and within medians. 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. For details of trees and vegetation to be removed, refer to the Tree Protection Plans within Appendix A17.1 Arboricultural Impact Assessment in Volume 4 of this EIAR and the Landscape General Arrangements (BCIDD-ROT-ENV_LA-0011_XX_00-DR-LL-9001 in Volume 3 of this EIAR).</p>	Construction
LV3	17.5.1	Throughout (as required)	<p>The Arboricultural Assessment prepared for the Proposed Scheme will be fully updated by the appointed contractor at the end of the Construction Phase 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) (particularly 29 properties – a shared forecourt at No. 14 to 26 Harold's Cross Road; No. 33 to 61 (odd numbers) Harold's Cross Road; and No. 32A Clanbrassil Street Upper (i.e. residential dwelling adjacent to Gordon's Fuels)	<p>Where properties are subject to permanent and / or temporary acquisition (particularly a shared forecourt at No. 14 to 26 Harold's Cross Road; No. 33 to 61 (odd numbers) Harold's Cross Road; and No. 32A Clanbrassil Street Upper (i.e. residential dwelling adjacent to Gordon's Fuels) 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) (particularly 29 properties – a shared forecourt at No. 14 to 26 Harold's Cross Road; No. 33 to	<p>Where properties are subject to permanent and / or temporary acquisition (particularly a shared forecourt at No. 14 to 26 Harold's Cross Road; No. 33 to 61 (odd numbers) Harold's Cross Road; and No. 32A Clanbrassil Street Upper (i.e. residential dwelling adjacent to Gordon's Fuels) appropriate measures will be put in place by the appointed contractor to provide for protection of features, trees and</p>	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Phase
		61 (odd numbers) Harold's Cross Road; and No. 32A Clanbrassil Street Upper (i.e. residential dwelling adjacent to Gordon's Fuels)	vegetation to be retained, and 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. Where boundary features, gates, railings, archways of heritage importance (and which contribute to landscape value) are to be affected by the works, mitigation measures should follow those outlined in Chapter 16 (Architectural Heritage).	
LV6	17.5.1	Throughout (as required)	Appropriate access to amenities and public open spaces shall be maintained by the appointed contractor, where possible	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 Phase
WR1	18.6.1	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 the CDRWMP within Appendix A5.1 CEMP in Volume 4 of this EIAR).	Construction
WR2	18.6.1	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 National Waste Action Plan for a Circular Economy, as follows: <ul style="list-style-type: none"> • Stockpiling of existing subbase, 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); and • Recycled aggregates and reclaimed bituminous mixtures will be specified in the Proposed Scheme, where practicable. 	Construction
WR3	18.6.1	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; • 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; • Any hazardous waste arising will be managed by the appointed contractor in accordance with the applicable legislation; and 	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Phase
			<ul style="list-style-type: none"> 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 will be 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>Where Article 27 notifications are required in relation to the Proposed Scheme, 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 Phase
MA1	19.5.1.1	Proposed pedestrian / cycle bridges at Robert Emmet Bridge over the Grand Canal	The proposed pedestrian and cycle bridges at Robert Emmet Bridge over the Grand Canal have been designed to minimise the impact on the Grand Canal itself, as far as possible. Any disruption to the waterway will be planned by the appointed contractor in consultation with Waterways Ireland, and all Waterways Ireland requirements will be adhered to during the construction of these structures. Where works are to take place in, adjacent to and above the canal, precautions will be implemented to protect Robert Emmet Bridge, canal banks and the waterway from damage.	Construction
MA2	19.5.1.1	Throughout (as required)	Where there are interfaces with existing utility infrastructure, the appointed contractor will ensure that protection is in place or diversion as necessary will be carried out to prevent long-term interruption to the provision of the affected services.	Construction
MA3	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 excavations. Where works are required in and around known 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
MA4	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
MA5	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 shall be planned in advance by the appointed contractor. Required service interruptions will generally only be permitted 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 interruptions. 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 possible.	Construction
MA6	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	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Phase
			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.	
MA7	19.5.1.2	Throughout (as required)	<p>Construction materials will be managed on-site by the appointed contractor in such a way as to prevent over-ordering and waste.</p> <p>Materials will be stored in appropriate storage areas or receptacles to reduce the potential for damage requiring replacement.</p> <p>'Just-In-Time' ordering principles will be implemented by the appointed contractor, where practicable, to reduce the potential for over-ordering.</p>	Construction

22.18 Risk of Major Accidents and Disasters

Table 22.16: Major Accidents Mitigation Measures

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Phase
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

Table 22.17: Cumulative Impacts Mitigation Measures

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Phase
CI&E1	21.5.1	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

BSI (2010). BS 3998:2010 Tree Work – Recommendations

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

BSI (2014). BS5228-1:2009 +A1 2014 Code of Practice for noise and vibration control of construction and open sites - Part 1: Noise)

IFI (2016). Guidelines on Protection of Fisheries During Construction Works Adjacent to Waters

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

Masters-Williams et al. (2001). Control of Water Pollution from Construction Sites – Guidance for consultants and contractors

NRA (2005a). Guidelines for the Treatment of Badgers prior to the Construction of National Road Schemes

NRA (2005b). Guidelines for the Treatment of Otters prior to the Construction of National Road Schemes

NRA (2005c). A Guide to Landscape Treatments for National Road Schemes in Ireland

TII (2013). Specification for Road Works (SPW) Series 600 Earthworks

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

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

Directives and Legislation

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

Wildlife Acts, as amended