

The background is a vibrant yellow. It is decorated with several abstract geometric shapes in shades of blue, teal, and white. These shapes include circles, semi-circles, and rounded rectangles, some of which are partially cut off by the edges of the page. The overall aesthetic is modern and clean.

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 Swords to City Centre Core Bus Corridor Scheme (hereafter referred to as the Proposed Scheme).

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

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

22.2 Mitigation and Monitoring Schedules

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

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

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

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

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

22.3 General Mitigation Requirements

Table 22.1: General Mitigation Measures

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

22.4 Traffic and Transport

Table 22.2: Traffic and Transport Mitigation Measures

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
TT1	6.5.1	Throughout (as required)	<p>A Construction Environmental Management Plan (CEMP) has been prepared (included as Appendix A5.1 in Volume 4 of this EIAR) and will be implemented (and developed further as required) by the appointed contractor.</p> <p>A detailed Construction Traffic Management Plan (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 Stage
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 will be regularly inspected for soiling associated with the 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 associated with the construction contract are necessary during dry or windy periods; During movement of dust-generating materials both on and off-site, trucks will be covered with tarpaulin and before entrance onto public roads, trucks will be checked to ensure the tarpaulins are properly in place; and The appointed contractor will provide a site hoarding of 2.4m height along noise sensitive boundaries, at a minimum, at the Construction Compounds which will assist in minimising the potential for dust impacts off-site. The appointed contractor will keep the effectiveness of the mitigation measures under review and revise them as necessary. In the event of dust nuisance occurring outside the works boundary associated with the Proposed Scheme, 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 Stage
CL1	8.7.1	Throughout (as required)	<p>A series of mitigation measures have been incorporated into the Proposed Scheme with the goal of reducing the embodied carbon associated with the Construction Phase. These mitigation measures include:</p> <ul style="list-style-type: none"> The replacement, where 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 Stage
NV1	9.5.1.1	Throughout (as required)	<p>The appointed contractor will be required to take specific noise abatement measures to the extent required and comply with the recommendations of BS 5228–1 (BSI 2014a) and European Communities Noise Emissions by Equipment for Use Outdoors (Amendment) Regulations 2006 (S.I. No 241/2006). The mitigation measures outlined below for the Construction Phase have also been included in the Construction and Environmental Management Plan (Appendix A5.1 in Volume 4 of this EIAR).</p> <p>These measures will ensure that:</p> <ul style="list-style-type: none"> • During the Construction Phase, the appointed contractor will be required to manage the works to comply with the limits detailed in Section 9.2.4.1 in Chapter 9 (Noise and Vibration) of this 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 9.10 and Table 9.13 in Chapter 9 (Noise and Vibration) of this EIAR). Reference to Table 9.44 in Chapter 9 (Noise and Vibration) of this EIAR indicates that intrusive works occurring within 75m of NSLs with a direct line of sight to work 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 to result in exceedance of construction noise thresholds (Table 9.10 and 9.11 in Chapter 9 (Noise and 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 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, if required, by the appointed contractor to control noise at source in order to remain below the threshold values for noise set out in Table 9.10 in Chapter 9 (Noise and 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 (Table 9.34 in Chapter 9 of this EIAR). 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 • 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. 	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
NV5	9.5.1.1.3	Construction Compounds	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 (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	Careful planning of the Construction Compounds including the placement of site buildings and stores between the site and noise sensitive locations 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 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 9.44 in Chapter 9 of this EIAR), other construction activities will be scheduled to avoid significant cumulative noise levels.	Construction
NV9	9.5.1.1.5	Throughout (as required)	The NTA will establish clear forms of communication that will involve the 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 9.10 and Table 9.13 in Chapter 9 of this EIAR.	Construction
NV10	9.5.1.1.6	Throughout (as required)	During the Construction Phase the appointed contractor will carry out noise monitoring at representative NSLs to evaluate and inform the requirement and/or implementation of noise management measures. Noise monitoring will be conducted in accordance with ISO 1996–1 (ISO 2016) and ISO 1996–2 (ISO 2017). The selection of monitoring locations will be based on the nearest representative NSLs to the working area which will progress along the length of the Proposed Scheme.	Construction
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 9.13 in Chapter 9 of this EIAR. Vibration from construction activities will be limited to the values set out in Table 9.13 in Chapter 9 of this EIAR to avoid any form of potential cosmetic damage to buildings and structures.	Construction
NV12	9.5.1.2	Throughout (as required)	The appointed contractor will implement the following mitigation measures during the Construction Phase: <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 9.14.; • Activities capable of generating significant vibration effects with respect to human response (as per Table 9.14 in Chapter 9 of this EIAR) will be restricted to daytime hours only, as far as practicable; and • Appropriate vibration isolation shall be applied to plant (such as resilient mounts to pumps and generators), where required and where feasible. 	Construction

22.8 Population

Table 22.6: Population Mitigation Measures

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

22.9 Human Health

Table 22.7: Human Health Mitigation Measures

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
HH1	11.5.1	Vicinities of Mater Misericordiae Hospital, Mater Private Hospital, Rotunda Hospital and CHI Temple Street Hospital	Access to the Mater Misericordiae Hospital, Mater Private Hospital, Rotunda Hospital and CHI Temple Street Hospital will be maintained during the Construction phase of the Proposed Scheme. In advance of construction works in the vicinity of the hospitals, the appointed contractor will liaise with the hospitals to inform them of the proposed construction traffic management arrangements. The CTMP (in Appendix A5.1, CEMP, in Volume 4 of the EIAR), provides further detail with regard to maintaining access to properties during the Construction Phase.	Construction
HH2	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 Stage
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 licenses / consents required to conduct the work, and supervise and direct the ecological measures associated with the Proposed Scheme.	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
BD2	12.5.1.2.1	Throughout (as required)	<p><u>Habitat Loss / Fragmentation</u></p> <p>Where practicable, areas of vegetation, including habitats of Local Importance (Higher Value), such as mixed broadleaved woodland, mixed broadleaved conifer woodland, scattered trees and parkland, immature woodland, treeline and hedgerow habitat types) which lie within the footprint, or along the boundary of the Proposed Scheme, will be retained. The areas of vegetation to be retained are shown on the Landscaping General Arrangement drawings (BCIDB-JAC-ENV-LA-0002_XX-DR-LL-9001.pdf) in Volume 3 of this EIAR.</p> <p>These areas will be protected by the appointed contractor for the duration of construction works and fenced off at an appropriate distance.</p>	Construction
BD3	12.5.1.2.1	Throughout (as required)	<p><u>Habitat Loss / Fragmentation</u></p> <p>To mitigate the loss of habitat, proposed planting incorporated into the Proposed Scheme will be implemented by the appointed contractor. This planting is listed below and displayed on the Landscaping General Arrangement (BCIDB-JAC-ENV_LA-0002_XX_00-DR-LL-9001) in Volume 3 of this EIAR.</p> <ul style="list-style-type: none"> • 91 street trees will be planted; • 1160m² woodland trees will be planted; • 758 m of proposed hedgerow; • 14479 m² of proposed species rich grassland; • 1789 m² of proposed ornamental planting; • 1159 m² of Proposed native Planting; and, • 31,460m² of Proposed amenity grass planting. <p>The partial loss of a local authority pollinator-rich strip within a GA2-dominated verge at the intersection of Coolock lane and the R132 Swords Road will be reinstated with species rich grassland in the area not being constructed as a Bus terminus.</p>	Construction
Refer to WT1 – WT12 in Table 22.9	12.5.1.2.2	Construction Compounds and throughout (as required)	<p><u>Habitat Degradation – Surface Water Quality</u></p> <p>The proposed SuDS drainage system, as shown in the Proposed Surface Water Drainage Works drawings (BCIDB-JAC-DNG_RD-02_XX_00-DR-CD-9001 in Volume 3 of this EIAR), will be installed by the appointed contractor during the Construction Phase.</p> <p>The mitigation measures which will be applied by the appointed contractor for surface water quality during the Construction Phase are outlined in WT1 – WT12 in Table 22.10 in this Chapter of the EIAR.</p>	Construction
BD4	12.5.1.2.3	Construction Compounds and throughout (as required)	<p><u>Habitat Degradation – Hydrological Regime</u></p> <p>The mitigation measures which will be applied by the appointed contractor to control pollution of soil and groundwater during the Construction Phase are outlined in Table 22.10 in this Chapter of the EIAR.</p>	Construction
Refer to LSGH1-9 in Table 22.10	12.5.1.2.4	Throughout (as required)	<p><u>Habitat Degradation – Groundwater</u></p> <p>The mitigation measures which will be applied by the appointed contractor to control pollution of soil and groundwater during the Construction Phase are outlined in LSGH6, LSGH7, LSGH8 and LSGH9 in Table 22.10 in this Chapter of the EIAR.</p>	Construction
Refer to AQ1 in Table 22.3	12.5.1.2.5	Construction Compounds and 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 22.5 of this Chapter of the EIAR.</p>	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
BD5	12.5.1.2.6	Throughout (as required)	<p><u>Habitat Degradation – Invasive Species</u></p> <p>The NTA will ensure that a confirmatory pre-construction invasive species survey will be undertaken by a suitably qualified specialist to confirm the absence and/or extent of all Third Schedule invasive species within the footprint of the Proposed Scheme.</p> <p>Where an infestation is confirmed / identified within the footprint of the Proposed Scheme, this will require the implementation of a Non-Native Invasive Species Management Plan (ISMP) (refer to the Plan contained in the CEMP in Appendix A5.1 of Volume 4 of this EIAR). Following the confirmatory pre-construction survey, mitigation measures outlined in BD6 and BD7 will be implemented, as required.</p>	Pre-Construction / Construction
BD6	12.5.1.2.6	Throughout (as required)	<p><u>Habitat Degradation – Invasive 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 produced will provide a detailed description of the infestations (e.g. approximate area of the respective colonies (m²), where feasible; approximate total number of stems, pattern of growth and information on other vegetation present), and where necessary, include calculations of volumes of infested soils to be excavated.</p> <p>The ISMP will be finalised following the pre-construction survey as advised by a suitably qualified specialist, with regard to The Management of Invasive Alien Plant Species on National Roads – Technical Guidance (TII 2020a) and Standard (TII 2020b) and other species-specific guidance documents including those listed in the ISMP, as necessary.</p>	Pre-Construction / Construction
BD7	12.5.1.2.6	Throughout (as required)	<p><u>Habitat Degradation – Invasive 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> <p>The site will be monitored by the appointed contractor after control measures have been implemented. Any re-growth will be subsequently treated as detailed in the Proposed Scheme ISMP.</p>	Pre-Construction / Construction
BD8	12.5.1.3	Throughout (as required)	<p><u>Rare and Protected Plant Species</u></p> <p>As a precautionary measure in respect of opposite-leaved pondweed known to be present in the Royal Canal, the mitigation measures relating to the protection of water quality in receiving watercourses during construction will be applied by the appointed contractor. These measures are detailed in outlined in WT1 – WT12 in Table 22.10 in this Chapter of the EIAR.</p>	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
BD9	12.5.1.4.1.1	Throughout (as required)	<p>Bats <u>Protection of Bats During Vegetation Clearance</u></p> <p>While no active roosts were identified during the multidisciplinary surveys within the footprint of the Proposed Scheme there were 12 no. trees identified within the multidisciplinary surveys from within the Proposed Scheme footprint (permanent and temporary landtake) with potential roost features (PRFs) (see Figure 12.8.2. in Volume 3 of this EIAR). These trees will 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"> Retained trees with PRFs will be fenced off at the outset of works and for the duration of construction to avoid structural damage to the trunk, branches, or root system of the tree which could disturb roosting bats. Temporary fencing will be erected at a sufficient distance from the tree so as to enclose the Root Protection Area (RPA) of the tree. The RPA will be defined based upon the recommendation of a qualified arborist; Where fencing is not feasible due to insufficient space, protection for the tree will be afforded by wrapping hessian sacking (or suitable equivalent) around the trunk of the tree and strapping stout buffer timbers around it; The area within the RPA will not be used for vehicle parking or the storage of materials (including soils, oils and chemicals). The storage of hazardous materials (e.g. hydrocarbons) or concrete washout areas will not be undertaken within 10m of any retained trees, hedgerows and treelines; A qualified arborist engaged by the appointed contractor will assess the condition of, and advise on any repair works necessary to, any trees which are to be retained or that lie outside of the Proposed Scheme footprint but whose RPA is impacted by the works; Where works are required within the RPA, 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) will be implemented; and There will be no additional lighting within 5m of the PRF during the Construction Phase of the Proposed Scheme to avoid potential disturbance to roosting bats. 	Construction
BD10	12.5.1.4.1.2	Throughout (as required)	<p>Bats <u>Potential Roost Feature Re-appraisal (first step of Preconstruction 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 Potential Roost Features (PRFs) by a suitably qualified ecologist engaged by the NTA as part of the preconstruction surveys. The survey will:</p> <ul style="list-style-type: none"> Confirm that previously identified PRF's which are to be retained are still standing; and Identify whether new PRF features (if any) may have developed owing to damage or management change to PRF in the intervening period between the original surveys and grant of planning. 	Pre-Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
BD11	12.5.1.4.1.2	Throughout (as required)	<p>Bats <u>Preconstruction Survey</u> In the unlikely event that PRF's 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 be PRF 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 found on the proposed development site 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 National Parks and Wildlife Service 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 licenced to handle bats and released in the area in the evening following capture; and • Only then will PRF trees be felled and this should be undertaken 'in sections' where the section can be handled to avoid sudden movements or jarring of the sections. 	Pre-Construction/Construction
BD12	12.5.1.4.1.2	Throughout (as required)	<p>Bats <u>Installation of Bat Boxes</u> 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 PRF 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 3 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 3-5 and firmly fixed to 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 1m clearance (e.g. no overhanging branches or ivy encroachment near 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), Local Authority Biodiversity Officer and NPWS. 	Pre-Construction / Construction
BD13	12.5.1.4.1.3	Collinstown Industrial Buildings and RCSI Cottages	<p>Bats – Protection of Bats during Demolition of Collinstown Industrial Buildings and cottages at RCSI Sport Grounds Bats could occupy suitable roosting features at any time prior to the commencement of works. Therefore, there is an inherent risk that bats could be affected by the proposed demolition works. The following mitigation procedures will be followed:</p> <ul style="list-style-type: none"> • Collinstown Industrial Buildings and the two cottages at the roadside boundary of the RCSI Sports Grounds will be re-surveyed prior to demolition to ensure there are no roosting bats present. The appointed contractor will ensure a suitably qualified and experienced ecologist will carry out internal and external inspections of the building as well as a minimum of one bat emergence survey and one bat re-entry survey during the active bat season (generally taken as mid-April to mid-September inclusive); and • Where a bat roost is encountered in the cottage or industrial buildings, all works on the structure and in the immediate vicinity of the roost will cease and an application for a derogation licence must be submitted by the suitably qualified / licenced bat specialist to the NPWS to seek permission for the removal of the roost. 	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
BD14	12.5.1.4.1.4	Throughout (as required)	<p>Bats <u>Habitat Loss and Fragmentation</u> Where practicable, 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, will be retained. These areas will be protected for the duration of the construction works and fenced off at an appropriate distance. Vegetation to be retained is shown on Landscaping General Arrangement drawings (BCIDB-JAC-ENV_LA-0002_XX_00-DR-LL-9001) in Volume 3 of this EIAR. Proposed planting incorporated into the Proposed Scheme will be implemented as listed below and displayed on the Landscaping General Arrangement Drawings [BCIDB-JAC-ENV_LA-0002_XX_00-DR-LL-9001] in Volume 3 of this EIAR:</p> <ul style="list-style-type: none"> • 91 street trees planted; and • 758m of proposed hedgerow. 	Construction
BD15	12.5.1.4.1.5	Construction Compounds and active works areas	<p>Bats <u>Disturbance of Flight Patterns / Foraging Routes as a Result of Lighting During Construction</u> 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. 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 practicable; • 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. <p>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 adjacent to watercourses with known bat activity).</p>	Construction
BD16	12.5.1.4.2.1	Throughout (as required)	<p>Badgers <u>Disturbance / Displacement</u> The NTA will ensure that a confirmatory pre-construction check of all suitable badger habitat will be completed within the 12 months prior to any construction works commencing. The presence of any new setts or significant badger activity will be treated and / or protected in accordance with the Guidelines for the Treatment of Badgers during the Construction of National Road Schemes (NRA 2005b).</p>	Pre-Construction
BD17	12.5.1.4.2.2	Throughout (as required)	<p>Badgers <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

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
BD18	12.5.1.4.3	Throughout (as required) especially in relation to working areas in proximity to the River Tolka, Royal Canal and Construction Compounds	<p>Otter</p> <ul style="list-style-type: none"> The appointed contractor will engage a suitably qualified and/or licensed ecologist(s) to oversee and advise works at watercourse crossings; Where a new or reactivated holt is encountered, within 150 metres (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, 2008) will be erected around the Construction Compound and other working areas which are in close proximity to significant watercourses and have suitable roaming territory for otter. Where mammal-proof fencing cannot for practical reasons be installed to delineates the works area from the riparian zone, the use of physical hoarding 2.4m tall (as specified in the Appendix A5.1 CEMP in Volume 3 of the EIAR) is acceptable given the proposed working time and duration of the works. 	Construction
BD19	12.5.1.4.3.1	Throughout (as required)	<p>Otter</p> <p><u>Loss of Breeding / Resting Sites</u></p> <p>The NTA will ensure that a confirmatory pre-construction check of all suitable otter habitat will be completed within the 12-month period prior to any construction works commencing.</p> <p>The presence of any new holt / couch sites will be treated and/or protected in accordance with the Guidelines for the Treatment of Otters prior to the Construction of National Road Schemes (NRA 2008c).</p>	Pre-Construction
BD20	12.5.1.4.3.2	Throughout (as required)	<p>Otter</p> <p><u>Measures to Prevent Injury / Mortality Impacts</u></p> <p>See Mitigation number BD18</p>	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
BD21	12.5.1.4.3.3	Construction Compounds and 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 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 construction works will commence following confirmation from the suitably qualified ecologist that no otter holt is located within 150m of Frank Flood Bridge and the area for the proposed pedestrian/cycle bridge. 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. The appointed contractor will provide site hoarding of 2.4m height between the construction site and the watercourse to mitigate potential impacts associated with protected species (Otter and Kingfisher). The hoarding will be installed to retain as far as is practical, a narrow riparian corridor for use by otter. In respect of the scaffold structure, the working platform will be above water level with only a limited number of supporting anchor posts into river bed. The scaffold structure and floating pontoon will be in place for a period during July to September. These will be removed before the closure on instream works as required by IFI and reinstated as necessary in year two of the Construction as necessary. The appointed contractor will ensure that the partial damming of the watercourse to enable the emplacement of scour protection should not represent a significant impediment to otter commuting. Works to install the scour protection will be undertaken in daylight hours.</p>	Construction
BD22	12.5.1.5.1.1	Throughout (as required)	<p><u>Breeding Birds</u> <u>Habitat Loss and Fragmentation</u> Where practicable, habitats of importance to breeding birds such as scattered trees and parkland, treeline and hedgerow and scrub - 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 to be retained is shown on the Landscaping General Arrangement Drawings (BCIDB-JAC-ENV_LA-0002_XX_00-DR-LL-001) in Volume 3 of this EIAR. 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 (BCIDB-JAC-ENV_LA-0002_XX_00-DR-LL-001)) in Volume 3 of this EIAR for locations.</p>	Construction
BD23	12.5.1.5.1.2	Throughout (as required)	<p><u>Breeding Birds</u> <u>Mortality Risk</u> Where practicable, vegetation (e.g., hedgerows, trees, scrub, bankside vegetation and grassland) will not be removed, between the 01 March and the 31 August, to avoid direct impacts on nesting birds. Where the construction programme does not allow this seasonal restriction to be observed, then these areas will be inspected by a suitably qualified ecologist as engaged by the appointed contractor, for the presence of breeding birds prior to clearance. 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, works will resume when birds have fledged and nests are no longer in use, or an agreement is reached with NPWS.</p>	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
BD24	12.5.1.5.1.3	Throughout (as required)	<p>Breeding Birds <u>Disturbance / Displacement</u> The appointed contractor will implement the noise mitigation measures described in NV5, NV7 and NV9 in Table 22.5 in this Chapter. This will include the use of 2.4 metre hoarding around the Construction Compound SW5 at Frank Flood Bridge and areas delineating the working area from the River Tolka.</p>	Construction
BD25	12.5.1.5.2.1	Throughout (as required)	<p>Wintering Birds <u>Measures to Reduce Mortality and Disturbance / Displacement Impacts to SCI birds due to Vegetation Loss during Construction</u> Where practicable, the removal of screening or overhanging vegetation (e.g., hedgerows, trees, scrub, bankside vegetation and grassland) from will be undertaken outside of the breeding bird season (01 March to the 31 August) and before the arrival of the wintering birds. Therefore, clearance works if required at Plunkett College along the Swords Road will commence in September and be concluded before the start of October. However, where the construction programme does not allow these seasonal restrictions to be observed, then these areas will be inspected by a suitably qualified ecologist as engaged by the appointed contractor, for the presence of wintering birds prior to clearance. Where wintering birds are observed the suitably qualified ecologist will, in discussion with the appointed the contractor, advise how works will be appropriately undertaken.</p>	Construction
BD26	12.5.1.5.2.2	Construction Compound SW5	<p>Wintering Birds <u>Measures to Prevent Disturbance and Displacement Impacts during Construction</u> The following mitigation measures will be put in place at Construction Compound SW5 adjacent Frank Flood Bridge by the appointed contractor to minimise disturbance to SCI bird species:</p> <ul style="list-style-type: none"> ▪ The appointed contractor will undertake the establishment of the Construction Compound outside of the wintering bird season (October to March), where practicable. However, where the construction programme does not allow this seasonal restriction to be observed, then the construction compound will be inspected by a suitably qualified ecologist as engaged by the appointed contractor, for the presence of wintering birds prior to establishment. Where wintering birds are observed the suitably qualified ecologist will, in discussion with the appointed contractor, advise how works will be appropriately undertaken; ▪ Hoarding of the Construction Compound will be in place prior to the arrival of wintering birds and will be retained on all sides of the compound for the duration of the works; ▪ The design of the lighting will ensure that light-spill will not occur over the River Tolka (as a far as is practical). The use of lighting where required shall be such that it is not excessively tall thus providing an obstacle to low-flying birds potentially moving between feeding sites. Furthermore, and where security lighting is not required, lighting should not be continuously on when compound is closed. Sensor-operated lighting timers as necessary should be installed; and, ▪ In addition to lighting at the Construction Compound aligning with Section 12.5.1.4.1.5 the lighting column heights will be considered by the appointed contractor, so as not to act as an obstacle to birds. 	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
BD27	12.5.1.7.1	Throughout (as required)	<p><u>Amphibians</u> <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 in 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 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; ▪ 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 Zol 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 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. 	Construction
BD28	12.5.1.8.1	Construction Compounds and throughout (as required)	<p><u>Fish</u> <u>Habitat Loss and Fragmentation</u></p> <p>A scaffold platform will be put in place to enable the appointed contractor to undertake finishing works to the underside of the newly constructed Frank Flood Bridge structure. Although there may be temporary disturbance in terms of a wholly unimpeded fish passage due to the scaffold poles extending down to ground level in the River Tolka, there will be no loss of aquatic habitat nor alteration of potential spawning grounds as a result of its use.</p> <p>Instream works (floating pontoon, erection of Scaffold or Installation of scour protection) cannot occur between October and June. As per IFI agreement through consultation, instream works will occur in July, August and September. This will decrease disturbance impacts on fisheries but also otter and kingfisher etc. There is a requirement for the floating pontoon and temporary scaffold to be uninstalled before the end of the permitted instream working seas. It will be reinstated in a similar manner in year two of the construction programme to enable the finalisation of the proposed Pedestrian / Cycle Bridge to be completed.</p> <p>The appointed contractor will be cognizant of the IFI guidance (Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters, IFI 2016) in the design and placement of the scaffold platform. The appointed contractor will liaise with a suitably qualified ecologist and the NTA (after which the consultation with the IFI may be undertaken regarding the placement.</p>	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
BD29	12.5.2.9	Throughout (as required)	<p><u>Invertebrates</u></p> <p>While no rare or protected invertebrate species were recorded to be within the Zol of the Proposed Scheme, a Surface Water Management Plan (SWMP) has been prepared (provided in the CEMP, Appendix A5.1 in Volume 4 of this EIAR), which details control and management measures for avoiding, preventing, or reducing any significant adverse impacts on the surface water environment in respect of aquatic invertebrates 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 are outlined in Table 22.11 of this Chapter.</p>	Construction
BD30	12.5.2.1.2.3	Throughout (as required)	<p><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>	Operation
BD31	12.5.2.4.1.1	Throughout (as required)	<p><u>Bats</u></p> <p><u>Habitat Loss and Loss of Breeding / Resting Sites</u></p> <ul style="list-style-type: none"> Mitigation has been proposed as part of the bat mitigation strategy and may be implemented dependant on the outcome of survey and / or licenced compensatory requirements and will continue into Operational Phase of the Proposed Scheme for some time. Replanting will occur as detailed in BD3. In line with the maintenance contract the appointed contractor will carry out annual post construction monitoring, over a two-year period to ensure the successful re-establishment of vegetation within the Proposed Scheme. 	Operation
BD32	12.5.2.4.1.4	Throughout (as required)	<p><u>Bats</u></p> <p><u>Monitoring of Bat Boxes</u></p> <ul style="list-style-type: none"> Where bat boxes are installed as part of the Construction Phase of the Proposed Scheme, monitoring is required under best practice guidance (e.g. Marnell et al. 2022 (Bat mitigation guidelines for Ireland). The level of post-installation monitoring will be dependent on the roost type and the number of bats present. A precautionary approach will be assumed on the basis that bats using these PRFs reflect species that were typically noted during the activity surveys and are occasionally identified from urban transport corridors. The NTA will ensure that annual inspections of installed bat boxes will be undertaken for 2 years or as advised by a suitably qualified ecologist, to confirm occupancy. Where no occupancy is noted in year 1, the boxes will be relocated to another mature tree and details communicated with the BCI, Local Authority Biodiversity Officer and NPWS. 	Operation
BD33	12.5.2.4.2	Collinstown Industrial Buildings and two RCSI cottages.	<p><u>Bats</u></p> <p><u>Monitoring of Confirmed Roosts</u></p> <p>Were the RCSI cottage structures and the Collinstown industrial buildings are confirmed to have a roost between the interim of the bat surveys and commencement of construction (See Section 12.5.1.4.1.3), a mitigation strategy devised by the appointed ecologist and submitted in support of a Derogation issued by the NPWS would be applicable. All measures listed therein would be applicable including the need to monitor any mitigation/compensatory roosts for a specified number of years post construction.</p>	

22.11 Water

Table 22.9: Water Mitigation Measures

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
WT1	13.5.2	Construction Compounds and throughout (as required)	<p>A Surface Water Management Plan (SWMP) has been prepared (provided in the CEMP, Appendix A5.1 in Volume 4 of this EIAR), which details control and management measures for avoiding, preventing, or reducing any significant adverse impacts on the surface water environment during the Construction Phase of the Proposed Scheme.</p> <p>It will be a condition within the Employer’s Requirements that the successful contractor(s), 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"> • A requirement for a Pollution Incident Response Plan; • Construction Compounds management including the storage of fuels and materials; • Control of Sediment; • Use of Concrete; • Management of vehicles and plant including refuelling and wheel wash facilities; and • Monitoring. <p>Specific mitigation measures in relation to Surface Water quality at the Construction Compounds are outlined in WT2, WT3 and WT4.</p>	Construction
WT2	13.5.2.2.1	Construction compounds SW1, 2 and 3	The appointed contractor will install a silt fence at the perimeter of the site to prevent over land flows. Surface water drains at access points will be covered by the appointed contractor.	Construction
WT3	13.5.2.2.1	Construction compound SW4	The appointed contractor will ensure that the surface water drain on Collins Avenue at the entrance to Construction Compound SW4 will be covered.	Construction
WT4	13.5.2.2.1	Construction compound SW5	Construction compound SW5 is on the south bank of the Tolka_050 and has direct and short connection to the water body over land. The existing short retaining wall will be kept in situ in so far as is reasonably practicable. Where it is removed, mitigation measures as described for the Frank Flood bridge (WT5-WT12) will be used to help control pollution pathways from the Construction Compound. Fuel will be stored as far from the water body as is reasonably practicable within the site and be on an impervious base. Where any spillages of oil onto permeable ground occur, the appointed contractor will ensure that any contaminated ground will be removed and disposed of off-site by a licensed carrier.	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
WT5	13.5.2.2.2	Frank Flood Bridge	<p>A temporary platform / pontoon will be erected within the river channel to facilitate construction. The platform / pontoon will be located immediately upstream of the existing bridge. To ensure no increase in flood risk, the following mitigation measures will be put in place:</p> <ul style="list-style-type: none"> • Works will be undertaken 1st July to 30th September when flows are expected to be at their lowest. This restriction also aligns with ecological restrictions on the works due to Salmon, otter and Kingfisher habitats; and • The platform/pontoon (which will be required for two seasons between 1st July and 30th September) will be designed so that it can be removed from the channel at short notice in the event of anticipated increase in river water levels, prolonged heavy rainfall or a flood warning. 	Construction
WT6	13.5.2.2.2	Frank Flood Bridge	<p>Historical records from the existing gauging station at Drumcondra (ref 9019) will be reviewed to identify potential rate of change of flows in the river to inform the design of the Pontoon and the methods required to remove it in the event of a flood.</p>	Construction
WT7	13.5.2.2.2	Frank Flood Bridge	<p>Bridge abutments will be installed from the north and south banks of the water body and from the pontoon. Specific measures to protect the water body will be implemented by the appointed contractor as follows:</p> <ul style="list-style-type: none"> • Diversion away from working areas using sandbags (or similar) of flow into the middle and northern or southern channel of the existing bridge (depending on which bank is being worked on), allowing a dry space within which works can be carried out on the embankment. • Install a silt fence across the northern or southern channel to ensure no silty water runoff downstream in the event of rain. 	Construction
WT8	13.5.2.2.2	Frank Flood Bridge	<p>In-channel and river bank working general principles will also apply as follows:</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 stabilisation and erosion protection will be designed in consultation with the Inland Fisheries Ireland (IFI), Office of Public Works and National Parks & Wildlife Service (NPWS); • All construction machinery operating within proximity to any water body will be mechanically sound to avoid leaks of oils, hydraulic fluid, etc. Machinery will be cleaned and checked prior to commencement of works; • The area of disturbance of the watercourse bed and bank will be the absolute minimum required for the installation of the structure; • While dewatering is not anticipated, any dewatering flows will be directed to a settlement pond (or other) treatment system; • Any banks affected during construction works near a watercourse will be reinstated back to pre-development conditions as far as practicable, recognizing the re-profiling of the banks in this location; • Any bank-side clearance in the immediate area of the crossing will be kept to a minimum and adequate measures will be put in place to control or minimize 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 (or other) treatment system, ○ stripping of topsoil. See Soils in A Guide to Landscape Treatments for National Road Schemes in Ireland (National Roads Authority, 2005), and where necessary, surfacing of site with granular material; and, ○ covering of temporary stockpiles. 	Construction
WT9	13.5.2.2.2	Frank Flood Bridge	<p>Concrete Piling</p> <ul style="list-style-type: none"> • Monitoring of the alkalinity of water downstream by testing the PH levels will be implemented by the appointed contractor concurrently to the works to check for impacts of concrete 'washout' or spills. 	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
WT10	13.5.2.2.2	Frank Flood Bridge	<p>For the Horizontal Directional Drilling (HDD) under the Tolka_060 to install three ducts for the diversion of services:</p> <ul style="list-style-type: none"> A drilling Slurry Management Plan will be developed and implemented by the appointed contractor and all additives proposed will be biodegradable, chemically inert and non-hazardous to aquatic life; A slurry recirculation unit will be utilised, and careful monitoring and management of such a unit can determine if any loss of slurry volume is experienced during the works; and The Slurry Management Plan will include an Incident Response Plan to be implemented in the event of a loss of drilling fluids. 	Construction
WT11	13.5.2.2.2	Frank Flood Bridge	<p><u>For the diversion of Electricity Supply Board (ESB) oil-filled cables:</u></p> <ul style="list-style-type: none"> The section of existing oil filled cables along the length of the proposed HDD duct installation will be cut at each end, capped and left as redundant cables in situ by ESB following commissioning of the replacement cables (in consultation with the NTA and Appointed Contractor). New electrical cables will be installed in the new ducts beneath the river between two joint bays and transition joints used to join the oil filled cables to the new electrical cables. A new standalone oil line will be installed in the duct with the new electrical cables to allow the oil to continue to perform its function in cooling the remaining existing oil filled cables at either side of the new river crossing. The ducting installed by HDD will be continuous welded HDPE which provides protection to the water body should any leak arise. 	Construction
WT12	13.5.2.2.2	Frank Flood Bridge	<p><u>For the diversion of ESB oil-filled cables:</u></p> <ul style="list-style-type: none"> For the existing cables either side of the water body, 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 following this appropriate mitigation measures will be confirmed and deployed, which could for example result in the removal of all contaminated material from site as outlined in Chapter 14 (Land, Soils, Geology & Hydrogeology) in Volume 2 of this EIAR. Any hazardous material to be removed from site will be removed in accordance with measures outlined in Chapter 18 (Waste & Resources) in Volume 2 of this EIAR. 	Construction

22.12 Land, Soils, Geology and Hydrogeology

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

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
LSGH1	14.5.1	Throughout (as required)	<p>Loss or Damage of Topsoil</p> <p>Excavated topsoils will be stockpiled by the appointed contractor using appropriate methods to minimise the effects of weathering.</p> <p>Care will be taken in reworking this material to minimise dust generation, groundwater infiltration and generation of runoff.</p>	

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
LSGH2	14.5.1.1	Throughout (as required)	<p><u>Loss or Damage of Topsoil</u></p> <p>All topsoil or subsoil shall be assessed for re-use within the Proposed Scheme by the appointed contractor ensuring the appropriate handling, processing and segregation of the material.</p> <p>Where practical the removal of topsoil from the Proposed Scheme will be avoided.</p> <p>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.</p>	Construction
LSGH3	14.5.1.2	Throughout (as required)	<p><u>Excavation of Potentially Contaminated Ground</u></p> <p>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.</p>	Construction
LSGH4	14.5.1.2	Throughout (as required)	<p><u>Excavation of Potentially Contaminated Ground</u></p> <p>The appointed contractor will be responsible for regular testing of excavated soils to monitor the suitability of the soil for reuse.</p>	Construction
LSGH5	14.5.1.2	Throughout (as required)	<p><u>Excavation of Potentially Contaminated Ground</u></p> <p>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 a suitably licensed or permitted site in accordance with the current Irish waste management legislation.</p>	Construction
LSGH6	14.5.1.2	Throughout (as required)	<p><u>Excavation of Potentially Contaminated Ground</u></p> <p>Any dewatering in areas of contaminated ground shall be designed by the appointed contractor to minimise the mobilisation of contaminants into the surrounding environment.</p>	Construction
LSGH7	14.5.1.3	Throughout (as required)	<p><u>Pollution of Soil and Groundwater</u></p> <p>Good construction management practices as outlined in the CIRIA guidance Control of Water Pollution from Construction Sites – Guidance for consultants and contractors (Masters-Williams et al. 2001) will be employed by the appointed contractor to minimise the risk of transmission of hazardous materials as well as pollution 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.</p>	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
LSGH8	14.5.1.3	Throughout (as required)	<p><u>Pollution of Soil and Groundwater</u> Measures to be implemented to minimise the risk of spills and contamination of soils and waters include:</p> <ul style="list-style-type: none"> • Employing only competent and experienced workforce, and site-specific training of site managers, foremen and workforce, including all 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 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 and will be fully bunded; • Good housekeeping at the site (daily site clean-ups, use of disposal bins, etc.) during the entire Construction Phase; • All concrete mixing and batching activities will be located in areas away from watercourses and drains; • Potential pollutants to be adequately secured against vandalism; • Provision of proper containment of potential pollutants according to codes of best practice; • Thorough control during the entire Construction Phase to ensure that any spillage is identified at early stage and subsequently effectively contained and managed; and • Spill kits to be provided and to be kept close to the storage area. Staff to be trained on how to use spill kits correctly. 	Construction
LSGH9	14.5.1.3	Throughout (as required)	<p><u>Pollution of Soil and Groundwater</u> An Environmental Incident Response Plan, as described in the CEMP (Appendix A5.1 CEMP 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 such aspects as containment measures, emergency discharge routes, a list of appropriate equipment and clean-up materials and notification procedures to inform the relevant environmental protection authority.</p>	Construction
LSGH10	14.5.1.3	Throughout (as required)	<p><u>Pollution of Soil and Groundwater</u> Sediment control methods are outlined in the Surface Water Management Plan within the CEMP (Appendix A5.1 in Volume 4 of this EIAR), and these will be implemented by the appointed contractor.</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 Stage
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 administering and monitoring the works.	Pre-Construction
ACH2	15.5.1.1	Throughout (as required)	The appointed contractor will make provision for archaeological monitoring to be carried out under licence to the Department of Housing, Local Government and Heritage (DHLGH) and the National Museum of Ireland (NMI), and will ensure the full recognition of, and the proper excavation and recording of, all archaeological soils, features, finds and deposits which may be disturbed below the ground surface. All archaeological issues will be resolved to the satisfaction of the DHLGH and the NMI.	Construction
ACH3	15.5.1.1	Throughout (as required)	The appointed contractor will ensure that the archaeologist as described in ACH5 will have the authority to inspect all excavation to formation level for the proposed works and to temporarily halt the excavation work, if, and as necessary, having conferred with the NTA. They will be given the authority to ensure the temporary protection of any features of archaeological importance identified, having conferred with the NTA. The archaeologist will be afforded sufficient time and resources to record and remove any such features identified in accordance with the licensing requirements agreed.	Construction
ACH4	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 (including at 62, 63, 65, 66 Dorset St Upper where cellars will be infilled). This survey and recording will be carried out in advance of any construction works on the cellar, coal cellar and/or basement.	Construction
ACH4	15.5.1.1	Throughout (as required)	The appointed contractor will make provision to allow for the necessary archaeological monitoring, inspection and excavation works that may arise on the site during the Construction Phase.	Construction
ACH5	15.5.1.1.1	Throughout (as required)	An experienced and competent licence-eligible archaeologist will be employed by the appointed contractor to advise on archaeological and cultural heritage matters during construction, to communicate all findings in a timely manner to the NTA and statutory authorities, to acquire any licenses / consents required to conduct the work, and to supervise and direct the archaeological measures associated with the Proposed Scheme.	Construction
ACH6	15.5.1.1.1	Throughout (as required)	Licence applications are made by the licence-eligible archaeologist to the National Monuments Service at the DHLGH. 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
ACH7	15.5.1.1.1	Throughout (as required)	The archaeologist will be provided with information on where and when the various elements and ground disturbance will take place.	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
ACH8	15.5.1.1.1	Throughout (as required)	Once the presence of archaeologically significant material is established, full archaeological recording of such material is recommended in accordance with the licensing requirements. If it is not possible for the construction works to avoid the material, full excavation of the archaeologically significant material will be recommended. The extent and duration of excavation will be advised by the client's archaeologist and will be a matter for discussion between the NTA and the licensing authorities.	Construction
ACH9	15.5.1.1.1	Throughout (as required)	Secure storage for artefacts recovered during the course of the monitoring and related work will be provided by the appointed contractor.	Construction
ACH10	15.5.1.1.1	Throughout (as required)	During construction all construction traffic and the management of materials will be restricted where practicable by the appointed contractor so as to avoid any newly revealed archaeological or cultural heritage sites and their environs to ensure no damage to a site of archaeological interest.	Construction
ACH11	15.5.1.2	Throughout (as required)	Features of 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 relevant statutory authorities.	Construction
ACH12	15.5.1.3	Pinnock Hill to Airside Junction	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 of the site of a structure in Miltonsfields (SMR DU011-154); and • At the site of houses (CBC0002AH001) in Fosterstown North and Nevinstown West identified from historic mapping; <p>It is in these areas that there is a possibility to disturb intact archaeological layers and material. Licensed archaeological excavation, in full or in part, of any identified archaeological remains (preservation by record) or preservation in situ will be undertaken.</p>	Construction
ACH13	15.5.1.3	Pinnock Hill to Airside Junction	The sculpture (CBC0002CH001) will be protected from any adverse impacts during construction works and if necessary, for its protection, it will be removed under archaeological supervision by the appointed contractor. This will be undertaken in accordance with a method statement in consultation with the NTA and the statutory authorities. It will be returned to its current setting and as close as possible to its current location following completion of the works.	Construction
ACH14	15.5.1.3	Airside Junction to Northwood Avenue	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"> • In the area of archaeological potential (CBC0002AH003) identified in Fosterstown South; and • At the undesignated archaeological heritage sites identified from historic mapping (CBC0002AH002 and CBC0002AH004 to CBC0002AH012), listed in Table 15.10. <p>It is in these areas that there is a possibility to disturb intact archaeological layers and material. Licensed archaeological excavation, in full or in part, of any identified archaeological remains (preservation by record) or preservation in situ will be undertaken.</p>	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
ACH15	15.5.1.4	Airside Junction to Northwood Avenue	The roadside memorial (CBC0002CH007) will be protected from any adverse impacts during construction works and if necessary, for its protection, will be removed under archaeological supervision by the appointed contractor. This will be undertaken in accordance with a method statement in consultation with the NTA and the statutory authorities. It will be returned to its current setting and as close as possible to its current location following completion of the works.	Construction
ACH16	15.5.1.5	Northwood Avenue to Shantalla 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"> At the undesignated archaeological heritage sites identified from historic mapping (CBC0002AH013 to CBC0002AH015), as listed in Table 15.11. It is in these areas that there is a possibility to disturb intact archaeological layers and material. Licensed archaeological excavation, in full or in part, of any identified archaeological remains (preservation by record) or preservation in situ will be undertaken.	Construction
ACH17	15.5.1.5	Northwood Avenue to Shantalla Road	The cable markers (CBC0002CH009 to CBC0002CH012) will be protected from any adverse impacts during construction works and if necessary for their protection, they will be removed under archaeological supervision by the appointed contractor. This will be undertaken in accordance with a method statement in consultation with the NTA and the statutory authorities. They will be returned to their current settings and as close as possible to their current locations following completion of the works.	Construction
ACH18		Shantalla Road to Botanic Avenue	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"> In the area of archaeological potential associated with the River Tolka (CBC0002AH020); and At the undesignated archaeological heritage sites identified from historic mapping (CBC0002AH016 to CBC0002AH019) and the DCIHR (DCC 2003-2009; DCIHR 18-03-034 and -039). It is in these areas that there is a possibility to disturb intact archaeological layers and material. Licensed archaeological excavation, in full or in part, of any identified archaeological remains (preservation by record) or preservation in situ will be undertaken.	Construction
ACH19	15.5.1.6	Shantalla Road to Botanic Avenue	The Marian Statue at Our Lady's Park in Drumcondra (CBC0002CH022) will be protected from any adverse impacts during construction works and if necessary for its protection, it will be removed under archaeological supervision by the appointed contractor. This will be undertaken in accordance with a method statement in consultation with the NTA and the statutory authorities. It will be returned to its current setting and as close as possible to its current location following completion of the works.	Construction
ACH20	15.5.1.7	Botanic Avenue to Granby Row	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 RMP ZAP for the Historic City of Dublin (DU018-020), which incorporates the recorded area of archaeological potential of a Viking burial ground (RMP DU018-020495); Within the designated RMP ZAP of the house site (RMP DU018-023) on Dorset Street Lower; In the vicinity of the recorded well site (RMP DU018-024) on Hardwicke Lane; At a turnpike site (CBC0002AH021) identified from historic mapping; and Along the route of the former tramline along Drumcondra Road to Dorset Street Upper and along Parnell Square East (DCIHR 18-07-027). It is in these areas that there is a possibility to disturb intact archaeological layers and material. Licensed archaeological excavation, in full or in part, of any identified archaeological remains (preservation by record) or preservation in situ will be undertaken.	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
ACH21	15.5.1.7	Botanic Avenue to Granby Row	Although no impact is predicted on the Parnell Monument (SMR DU018-425, national monument), Ministerial Consent will be required for any groundworks within 30m of the monument. The appointed contractor will ensure this consent is obtained in consultation with the suitably qualified archaeologist and the NTA.	Construction
ACH22	15.5.1.7	Botanic Avenue to Granby Row	All coalhole covers on Parnell Square West (CBC0002CH021) be recorded in relation to the associated property and coal cellar. The surrounding granite setting will be recorded, noting the presence and characteristics of any channel which has been carved into the setting. If works are required in these areas, the coalhole covers will be removed and subsequently reinstated at the same location at the completion of works by the appointed contractor.	Construction
ACH23	15.5.1.8	Proposed Construction Compounds	The appointed contractor will ensure that archaeological monitoring (as defined in section 15.5.1.1) under licence will take place, where any preparatory ground-breaking or ground reduction works are required (as defined in section 15.4.1), at the following locations: <ul style="list-style-type: none"> At all undesignated archaeological heritage sites identified in Section 15.4.3.6.3 at proposed construction compounds SW1, SW3, SW5. 	Construction

22.14 Architectural Heritage

Table 22.12: Architectural Heritage Mitigation Measures

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
AH1	16.5.1.1	Protected Structures: Thatched cottage in Collinstown, Swords Road (FCC RPS 604) where a proposed land-take will impact on the front boundary.	The proposed mitigation is the recording the existing boundaries in position prior to the commencement of construction works. The affected masonry, railings, gates, gate posts and capping stones are to be labelled prior to their careful removal to safe storage and their reinstatement on new lines, reinstating the existing details, and the relationships between the entrances and the historic buildings. 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 affected gates, railings, piers and masonry. 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	Protected Structures throughout (as required): Protected Structures which are within, front onto, or have boundaries along the Proposed Scheme (as listed in Appendix A16.2 Inventory or Architectural Heritage Sites in Volume 4 of this EIAR). There is potential for damage to these features during construction.	The proposed mitigation to offset the risk of damage is the recording, protection and monitoring of the adjoining structures or boundaries prior to, and for the duration of the Construction Phase. Recording, overseeing of protective measures and monitoring is to 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

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
AH3	16.5.1.2	<p>Architectural Conservation Areas: O'Connell Street and Environs ACA</p> <ul style="list-style-type: none"> 3 Protected Structures 2 areas of historic street surfaces <p>As listed in Appendix A16.2 Inventory or Architectural Heritage Sites in Volume 4 of this EIAR.</p>	<p>The proposed mitigation to offset the risk of damage is the recording, protection and monitoring of the adjoining structures or boundaries prior to, and for the duration of the Construction Phase.</p> <p>Recording, overseeing of protective measures and monitoring is to 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.</p>	Construction
AH4	16.5.1.3.1	<p>Conservation Areas: River Tolka CA.</p> <ul style="list-style-type: none"> Frank Flood Bridge (NIAH 50120266), Statue of Our Lady (NIAH 50130158) <p>As listed in Appendix A16.2 Inventory or Architectural Heritage Sites in Volume 4 of this EIAR,</p>	<p>The proposed mitigation offset the risk of damage is the recording, protection and monitoring of the boundaries prior to, and for the duration of the Construction Phase.</p> <p>Recording, overseeing of protective measures and monitoring is to 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.</p> <p>See also AH7 and AH8.</p>	Construction
AH5	16.5.1.3.2	<p>Conservation Areas: Parnell Square CA- Historic paving and one historic lamp post. Wide granite kerbs on Frederick Street North (CBC0002BTH096) and at the base of the Parnell Monument. Parnell Square East (CBC0002BTH099) and Parnell Square West (CBC0002BTH101).</p>	<p>Mitigation with regard to the protection of the one historic lamp-post which is to be retained in position in the Parnell Square CA is outlined in AH15.</p> <p>Mitigation with regard to the protection of the historic paving in Parnell Square CA is outlined in AH20 and AH21.</p>	Construction
AH6	16.5.1.3.2	<p>Conservation Areas: Parnell Square CA. Protected Structures in Parnell Square CA or groups of Protected Structures, one post box, and three groups of lamp posts (as listed in Appendix A16.2 Inventory or Architectural Heritage Sites in Volume 4 of this EIAR). None of these features will be directly impacted by the Proposed Scheme, but there is potential for damage during construction.</p>	<p>The proposed mitigation to offset the risk of damage is the recording, protection and monitoring of the boundaries prior to, and for the duration of the Construction Phase.</p> <p>Recording, overseeing of protective measures and monitoring is to 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.</p>	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
AH7	16.5.1.4	NIAH Structures: Frank Flood Bridge (NIAH 50120266)	<p>The proposed mitigation is the recording the existing boundaries in position prior to the commencement of construction works. The affected masonry, balusters, capping stones and lamps will be labelled prior to their careful removal to safe storage and their reinstatement in the new position.</p> <p>Recording is to be undertaken by an appropriate architectural heritage specialist engaged by the appointed contractor. The architectural heritage specialist will oversee the labelling, taking-down and reinstatement of the affected historic fabric.</p> <p>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.</p>	Construction
AH8	16.5.1.4	NIAH Structures: Statue of Our Lady (NIAH 50130158)	<p>The Statue of Our Lady (NIAH 50130158) will be temporarily removed to storage during the construction of the new bridge, for its protection by the appointed contractor.</p> <p>The proposed mitigation is the recording the affected fabric in position prior to its careful dismantling and removal to safe storage, and reinstatement in the new position.</p> <p>Recording is to be undertaken by an appropriate architectural heritage specialist engaged by the appointed contractor. The architectural heritage specialist will oversee the labelling, taking-down and reinstatement of the affected historic fabric.</p> <p>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.</p>	Construction
AH9	16.5.1.4	NIAH Structures throughout (as required): NIAH structures identified in the study area which are within, front onto, or have boundaries along the Proposed Scheme (as listed in Appendix A16.2 Inventory or Architectural Heritage Sites in Volume 4 of this EIAR).	<p>Mitigation to offset the risk of damage will include recording, protection and monitoring of the structures or boundaries (as relevant) prior to, and for the duration of the Construction Phase.</p> <p>Recording, overseeing of protective measures and monitoring is to 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.</p>	Construction
AH10	16.5.1.5	Designed Landscapes: Santry Demesne (DU014-030) – gate posts, demesne wall and capping stones.	<p>The proposed mitigation is the recording the affected demesne wall fabric in position prior to the commencement of construction works. The affected gate posts, brick capping stones and historic masonry are to be labelled prior to their careful removal to safe storage and their reinstatement on new lines, reinstating the existing details.</p> <p>Recording is to be undertaken by an appropriate architectural heritage specialist engaged by the appointed contractor. The architectural heritage specialist will oversee the labelling, taking-down and reinstatement of the affected historic fabric.</p> <p>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.</p>	

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
AH11	16.5.1.5	Designed Landscapes: Highpark Convent (NIAH 3238)	<p>The affected railings, gates, gate posts, capping stones and historic masonry are to be labelled prior to their careful removal to safe storage and their reinstatement on new lines, reinstating the existing details and the relationships between the entrances and the historic buildings.</p> <p>Recording is to be undertaken by an appropriate architectural heritage specialist engaged by the appointed contractor. The architectural heritage specialist will oversee the labelling, taking-down and reinstatement of the affected historic fabric.</p> <p>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.</p>	Construction
AH12	16.5.1.6.1	Post Boxes: Pillar post box at 243 Swords Road (CBC0002PB002) to be repositioned	<p>The proposed mitigation is the recording of the post box in position prior to the works, the labelling of the affected fabric prior to its careful removal to safe storage, and its reinstatement in a new position in close proximity (within 20m) of its existing position.</p> <p>Recording is to be undertaken by an appropriate architectural heritage specialist engaged by the appointed contractor. The architectural heritage specialist will oversee the labelling, taking-down and reinstatement.</p> <p>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.</p>	Construction
AH13	16.5.1.6.1	Post Boxes (as listed in Appendix A16.2 Inventory or Architectural Heritage Sites in Volume 4 of this EIAR).	<p>Mitigation consists of the recording, protection and monitoring prior to and during the Construction Phase.</p> <p>Recording, overseeing of protective measures and monitoring is to be undertaken by an appropriate architectural heritage specialist engaged by the appointed contractor and in accordance with the methodology provided in Appendix A.16.3 Methodology for Works Affecting Sensitive and Historic Fabric in Volume 4 of the EIAR.</p>	Construction
AH14	16.5.1.6.2	Lamp Posts: Historic lamp-posts lining Drumcondra Road Lower, Dublin 9 (CBC0002LP003)	<p>The proposed mitigation is 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 of their existing positions.</p> <p>Recording is to be undertaken by an appropriate architectural heritage specialist engaged by the appointed contractor. The architectural heritage specialist will oversee the labelling, taking-down and reinstatement.</p> <p>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.</p>	Construction
AH15	16.5.1.6.2	Lamp Posts: Lamp posts to be retained in position. (as listed in Appendix A16.2 Inventory or Architectural Heritage Sites in Volume 4 of this EIAR).	<p>The proposed mitigation is the recording, protection and monitoring prior to and during the Construction Phase.</p> <p>Recording, overseeing of protective measures and monitoring is to be undertaken by an appropriate architectural heritage specialist engaged by the appointed contractor and in accordance with the methodology provided in Appendix A.16.3 Methodology for Works Affecting Sensitive and Historic Fabric in Volume 4 of the EIAR.</p>	Construction
AH16	16.5.1.6.3	Statuary and Street Furniture: Milestone at Pinnock Hill (CBC0002MS001).	<p>The proposed mitigation is the recording, protection and monitoring prior to and during the Construction Phase. The milestone has been painted over, and the paint will be removed, if practicable.</p> <p>Recording, overseeing of protective measures and monitoring is to be undertaken by an appropriate architectural heritage specialist engaged by the appointed contractor and in accordance with the methodology provided in Appendix A.16.3 Methodology for Works Affecting Sensitive and Historic Fabric in Volume 4 of the EIAR.</p>	Construction

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
AH17	16.5.1.6.3	Statuary and Street Furniture: Bicycle sculptures at the boundary of DCU St. Patrick's Campus (CBC0002BTH102)	Mitigation consists of recording of the sculptures in position prior to the works, labelling the affected fabric prior to its careful dismantling and removal to safe storage, and the reinstatement of the sculptures in their existing positions. Recording is to be undertaken by an 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 in Volume 4 of the EIAR.	Construction
AH18	16.5.1.6.4	Paving and Surface Treatments: Junction of Botanic Road and Drumcondra Road Lower (CBC0002BTH051)	Mitigation consists of recording the setts prior to the laying of the cycle track, protecting them and retaining them in-situ under the proposed new road surface. Recording, overseeing of protective measures and monitoring is to be undertaken by an appropriate architectural heritage specialist engaged by the appointed contractor and in accordance with the methodology provided in Appendix A.16.3 in Volume 4 of the EIAR.	Construction
AH19	16.5.1.6.4	Paving and Surface Treatments: Frederick Street North (CBC0002BTH096)	Mitigation consists of the recording, protection and monitoring prior to and during the Construction Phase. Recording, overseeing of protective measures and monitoring is to be undertaken by an appropriate architectural heritage specialist engaged by the appointed contractor and in accordance with the methodology provided in Appendix A.16.3 in Volume 4 of the EIAR.	Construction
AH20	16.5.1.6.4	Paving and Surface Treatments: Parnell Square East (CBC0002BTH099)	Mitigation consists of 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, overseeing of protective measures and monitoring is to be undertaken by an appropriate architectural heritage specialist engaged by the appointed contractor and in accordance with the methodology provided in Appendix A.16.3 in Volume 4 of the EIAR. The proposed mitigation reduces the magnitude to Low.	Construction
AH21	16.5.1.6.4	Paving and Surface Treatments: Areas of paving or surface treatment of architectural interest. See Chapter 16 Appendix A16.1 Section 2.7.4. (as listed in Appendix A16.2 Inventory or Architectural Heritage Sites in Volume 4 of this EIAR).	Mitigation consists of recording, protection and monitoring prior to and during the Construction Phase. Recording, overseeing of protective measures and monitoring is to be undertaken by an appropriate architectural heritage specialist engaged by the appointed contractor and in accordance with the methodology provided in Appendix A.16.3 in Volume 4 of the EIAR.	Construction

22.15 Landscape (Townscape) and Visual

Table 22.13: Landscape (Townscape) and Visual Mitigation Measures

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
LV1	17.5.1	Throughout (as required)	<p>Mitigation and management measures are proposed to avoid, reduce or remediate, wherever practicable significant negative landscape (townscape) and visual effects of the Construction Phase of the Proposed Scheme. These measures will be carried out by the appointed contractor and are to be applied across the Proposed Scheme wherever necessary to avoid disturbance of landscape features or characteristics to be retained.</p> <p>Trees and vegetation to be retained within and adjoining the works area will be protected in accordance with the British Standard Institution (BSI) British Standard (BS) 5837:2012 'Trees in relation to design, demolition and construction - Recommendations' (BSI 2012). Works required within the root protection area (RPA) of trees to be retained will follow a project-specific arboricultural methodology for such works, which will be prepared by a professional qualified arborist. For details of trees to be retained refer to Tree Protection Plans in the Arboricultural Impact Assessment (Appendix A17.1 in Volume 4 of this EIAR).</p>	Construction
LV2	17.5.1	Throughout (as required)	Wherever practicable, trees and vegetation will be retained within the Proposed Scheme. Trees and vegetation identified for removal will be removed in accordance with 'BS 3998:2010 Tree Work – Recommendations' (BSI 2010) and best arboricultural practices as detailed and monitored by a professional qualified arborist. For details of trees and vegetation to be removed refer to Tree Protection Plans ((BCIDB-JAC-ENV_LA-0006_XX_00-DR-ES-0001 to BCIDB-JAC-ENV_LA-0006_XX_00-DR-ES-0030 in the Arboricultural Impact Assessment (Appendix A17.1 in Volume 4 of this EIAR) and Landscape General Arrangements (BCIDB-JAC-ENV_LA-0002_XX_00-DR-LL-9001 Volume 3 of this EIAR).	Construction
LV3	17.5.1	Throughout (as required)	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.	Construction
LV4	17.5.1	Throughout (as required)	Where properties are subject to permanent and / or temporary acquisition (as listed in Section 17.4.3.2.8 and Section 17.4.4.3.8), 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.	Construction
LV5	17.5.1	Throughout (as required)	Where properties are subject to permanent and / or temporary acquisition (as listed in Section 17.4.3.2.8 and Section 17.4.4.3.8), appropriate measures will be put in place by the appointed contractor to provide for protection of features, trees and 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).	Construction
LV6	17.5.1	Throughout (as required)	Appropriate access to amenities and public open spaces will be maintained by the appointed contractor.	Construction

22.16 Waste and Resources

Table 22.14: Waste and Resources Mitigation Measures

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
WR1	18.6.1	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 Construction and Environmental Management Plan (CEMP) in Volume 4 of this EIAR. The appointed contractor will update the CDRWMP in advance of construction commencing.	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 as follows: <ul style="list-style-type: none"> • Stockpiling of existing sub-base, capping layer and topsoil material generated on-site for direct reuse in the Proposed Scheme where practicable in the proposed Construction Compounds (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 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 ; and • Any hazardous waste arising will be managed by the appointed contractor in accordance with the applicable legislation. • 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. • 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. • 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. • 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). 	Construction

22.17 Material Assets

Table 22.15: Material Assets Mitigation Measures

Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment	Implementation Stage
MA1	19.5.1.1	Throughout (as required)	Where there are interfaces with existing utility infrastructure, the appointed contractor will ensure that protection in place or diversion as necessary will be carried out to prevent long-term interruption to the provision of the affected services.	Construction
MA2	19.5.1.1	Throughout (as required)	All possible precautions will be taken by the appointed contractor to avoid unplanned interruptions to any services during the Construction Phase of the Proposed Scheme. This will include appropriate investigation by the appointed contractor to identify the precise location of all utility infrastructure within the working areas prior to the commencement of excavation works. Where works are required in and around 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
MA3	19.5.1.1	Throughout (as required)	All utility companies for which diversions are proposed will continue to be consulted with NTA oversight when designing any diversions to ensure that proposed diversions conform to the utility provider's requirements, where practicable and acceptable to the NTA, and to ensure that service interruptions are kept to a minimum.	Construction
MA4	19.5.1.1	Throughout (as required)	Where diversions, or modifications, are required to utility infrastructure, service interruptions and disturbance to the surrounding residential, commercial and/or community property may be unavoidable. Where this is the case, it will be planned in advance by the appointed contractor. Required service interruptions will generally only occur for a set period of time per day (a set number of hours not exceeding eight hours where reasonably practicable) and will generally not be continuous for full days at a time. Prior notification will be given to all impacted properties. This notification will include information on when interruptions and works are scheduled to occur and the duration of such interruption. Any required works will be carefully planned by the appointed contractor to ensure that the duration of interruptions is minimised in so far as is practicable.	Construction
MA5	19.5.1.2	Throughout (as required)	Consideration will be given by the appointed contractor to the sustainability of material being sourced for the construction of the Proposed Scheme. In so far as is reasonably practicable, materials required for the construction of the Proposed Scheme will be sourced locally to reduce the amount of travelling required to get the material to the site. Key issues to be considered when sourcing materials for the Construction Phase will include the source, the material specification, production and transport costs, and the availability of the material. For quarried material sourced within the State, only quarries which are included in local authority quarry registers will be used by the appointed contractor to source any quarried material.	Construction
MA6	19.5.1.2	Throughout (as required)	Construction materials will be managed on-site by the appointed contractor in such a way as to prevent over-ordering and waste. Materials will be stored in appropriate storage areas or receptacles to reduce the potential for damage requiring replacement. 'Just-In-Time' ordering principles will be implemented by the appointed contractor where practicable to reduce the potential for over-ordering.	Construction

22.18 Risk of Major Accidents and / or Disasters

Table 22.16: Major Accidents Mitigation Measures

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

22.19 Cumulative Impacts

Table 22.17: Cumulative Mitigation Measures

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

22.20 References

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

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

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

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

Department of Transport, Tourism and Sport (2019). Traffic Signs Manual

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

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

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

Masters-Williams H, Heap H, Kitts H, Greenshaw L, Davis S, Fisher P, Hendrie M and Owens D (2001) Control of water pollution from construction sites. Guidance for consultants and contractors (C532D), CIRIA, London

National Roads Authority (2005b). Guidelines for the Treatment of Badgers During the Construction of National Road Schemes

National Roads Authority (2008c). Guidelines for the Treatment of Otters prior to the Construction of National Road Schemes

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

Transport Infrastructure Ireland (2020). The Management of Invasive Alien Plant Species on National Roads – Technical Guidance (GE-ENV-01105)

Directives and Legislation

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

National Monuments (Amendment) Act 2004 (No. 22 of 2004)

Regulation (EC) no 1013/2006 of the European Parliament and of the Council of 14 June 2006 on shipments of waste

Waste Management Act 1996 (S.I No. 10 of 1996) as amended

Waste Management (Collection Permit) Regulations 2007 (S.I. No. 820 of 2007)

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