APPENDIX 4: SCHEME DESCRIPTION

Environmental Management Plan

URS

York Street Interchange

Environmental Management Plan

December 2014

47037827

Prepared for:
Transport NI

UNITED KINGDOM & IRELAND

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URS Project Number

URS project number (up to 31 May 2011): S105296

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1. INTRODUCTION

1.1 Background

This document defines the Environmental Management procedures, work practices and management responsibilities relating to the construction of the Proposed Scheme.

1.2 URS Environmental Management Systems

URS holds accreditation to BS EN ISO 14001 for its Environmental Management System, a component of which is the preparation and maintenance of this Environmental Management Plan (EMP) for the scheme.

This EMP has been developed to reflect the relevant requirements of ISO 14001 and in particular, the guidance offered by Interim Advice Note 183/14 of the Highways Agency, which is expected to form part of Transport NI policy prior to start of the construction of the scheme.

The preparation and implementation of an EMP is widely considered to be best practice (by statutory and non-statutory bodies) to manage the environmental effects of their projects and to demonstrate compliance with environmental legislation. DMRB Volume 11, Section 2, Part 5 outlines the reason why mitigation needs to be managed throughout the various stages and DMRB Volume 11, Section 2, Part 6 recommends that an Environmental Management Plan is prepared and is part of any environmental assessment, whether statutory or non-statutory.

The EMP provides the framework for recording environmental risks, commitments and other environmental constraints, and clearly identifies the structures and processes that will be used to manage and control these aspects. The EMP also seeks to ensure compliance with relevant environmental legislation, government policy objectives and scheme-specific environmental objectives. It also provides the mechanism for monitoring, reviewing and auditing environmental performance and compliance.

In accordance with IAN 183/14, this outline EMP shall be further refined and expanded by the appointed Contractor into a Construction Environmental Management Plan (CEMP) as more information becomes available and there is more certainty in terms of the proposed layout, construction methods, programme and the likely environmental effects.

Towards the end of the construction phase, the CEMP shall be further refined by the appointed Contractor into a Handover Environmental Management Plan (HEMP) which shall contain essential environmental information needed by the bodies responsible for the future maintenance and operation of the asset.

With this purpose in mind, it therefore follows that this EMP should be treated as a “live” document throughout the project lifecycle, requiring regular review and update as necessary.

1.3 Objectives

The objectives of this EMP are to:

- act as a continuous link and main reference document for environmental issues between the design, construction and the maintenance and operation stages of a project;
- demonstrate how construction activities and supporting design shall properly integrate the requirements of environmental legislation, policy, good practice. and those of the environmental regulatory authorities and third parties;

- record environmental risks and identify how they will be managed during the construction period;
- record the objectives, commitments and mitigation measures to be implemented together with programme and date of achievement;
- identify the key staff structures and responsibilities associated with the delivery of the project and environmental control and communication and training requirements as necessary;
- describe the contractor's proposals for ensuring that the requirements of the environmental design are achieved, or are in the process of being achieved, during the Contract Period;
- act as a vehicle for transferring key environmental information at handover to the body responsible for operational management. This shall include details of the asset, short and long term management requirements and any monitoring or other environmental commitments; and
- provide a review, monitoring and audit mechanism to determine effectiveness of, and compliance with, environmental control measures and how any necessary corrective action shall take place.

1.4 CEEQUAL Award

Transport NI is committed to sustainable development and is aware of the economic, environmental and social impacts of its decisions. Construction projects are to be designed within the context of value for money and functionality, to maximise the efficiency of energy, water and waste management, minimise and where possible avoid negative but enhance positive impacts on biodiversity and take account of the likely impact on staff, transport systems and local communities.

The specification and design of construction projects undertaken for central government departments and their agencies shall take due account of the contribution the project can make to achieving the departmental targets and framework strategies.

The Scheme is registered for a Civil Engineering Environmental Quality Assessment and Awards Scheme (CEEQUAL) assessment for a Whole Project Award with an Interim Client & Design Award. The Interim Award stage will be completed by Transport NI in advance of the construction contract, with a "Very Good" minimum score targeted. The Contractor shall collate evidence throughout the construction stage in order to address the CEEQUAL assessment requirements for the Whole Project Award. The CEEQUAL Assessor is in post and contact details will be provided as required. The Contractor shall target a minimum CEEQUAL score of "Very Good" for the Whole Project Award. Details of the CEEQUAL scheme can be downloaded from www.ceequal.com.

1.5 Scope

This EMP considers the following subject areas as appropriate for this scheme;

- Environmental Management Procedures;
- Working Hours;
- Water;

- Air Quality;
- Noise and Vibration;
- Materials;
- Geology and Soils;
- Landscape;
- Nature Conservation;
- Cultural Heritage;
- Waste; and
- People and Communities.

Specific requirements for the scheme are detailed for each of these subject areas in **Chapter 3** of this EMP.

The appointed Contractor shall be required to develop their CEMP to take account of the proposed control measures identified within Chapter 3.

1.6 Legislation

Relevant legislation and construction good practice constantly alter and change. The guidance and legislation contained within this outline EMP are of relevance at the time of writing.

The Contractor shall be responsible for complying with legal requirements applicable to their scope of works to design and construct the scheme. The Contractor is also responsible for identifying any other applicable requirements, including any requirements under Health and Safety.

1.7 Relevant Guidance

Guidance outlined within Construction Industry Research and Information Association (CIRIA) best practice guidance and the relevant NIEA Pollution Prevention Guidelines (PPGs) should be complied with during the construction phase. The Contractor is also responsible for ensuring that any developments or changes to regulation and environmental legislation are complied with, even if they are not noted within this outline EMP.

Any references to guidance documents used in the development of this outline EMP and relevant to construction activities are provided within **Appendix A**.

2. ENVIRONMENTAL MANAGEMENT SYSTEMS AND PLANS

2.1 Environmental Management Systems

It shall be a requirement of the competition process that the appointed Contractor holds an Environmental Management System accredited to BS EN ISO 14001.

Furthermore, it shall be a requirement of the competition that each tenderer prepares an Outline CEMP, including an associated Outline Site Waste Management Plan, to be included as part of their respective tenders.

2.2 Roles and Responsibilities

The CEMP shall place the following responsibilities on the key roles within the project as set out in Table 2.1.1.

Table 2.1.1 Construction Team CEMP Key Roles and Responsibilities

Role	Responsibilities
Project Director	Assign specific environmental duties to competent members of the Project Team. Identify the environmental training needs of personnel under their control and arrange appropriate training programmes and ensure records are being maintained. Ensure that significant environmental aspects identified for the project are managed. Promote the continual improvement of environmental performance.
Environmental Manager	Develop, maintain and audit the CEMP (and supporting documents) to ensure all aspects, impacts, statutory requirements and Environmental Statement commitments are reflected in the plan. Develop and implement a programme of regular project environmental inspections, monitoring, recording and reporting by the Environmental Site Representative in accordance with procedures set out in the CEMP. Ensure that the works are constructed in line with the CEMP, in liaison with the Project Manager and Site Manager. Attend regular construction meetings to ensure environmental issues are discussed and addressed by the project team. Liaise with the other environmental advisors, statutory bodies and the local community as required. Comply with duties under relevant legislation and company procedures in relation to environmental incident investigation and reporting. Provide support and training to the workforce with regard to understanding environmental aspects, impacts, regulatory requirements, best practice, constraints and methods of working. Nominate the Environmental Site Representative(s). Appoint environmental specialists as required. Ensure identified environmental specialists are in attendance on site as required by the CEMP. Review non-conformance reports provided by the Environmental Site Representative(s) to identify any underlying issues or patterns to identify suitable ameliorative measures. Develop the HEMP (and supporting documents) for handover to Transport NI

Role	Responsibilities
	upon completion of the construction contract.
Environmental Site Representative(s)	Provide an “on-call” 24 hr resource as a first point of call for environmental issues/incidents. Complete programme of regular project environmental inspections, monitoring, recording and reporting in accordance with the CEMP. Provide direction on corrective action to be taken by the Site Manager in response to identified non-conformances. Report all identified non-conformances separately to the Project Manager and Environmental Manager. Ensure that corrective actions are completed fully by the Site Manager. Maintain daily records of environmental issues, events and consultations with third parties. Ensure identified environmental specialists are in attendance on site as required by the CEMP. Maintain records of environmental awareness training/inductions delivered to site staff.
Project Manager	Ensure that the Construction Environmental Management Plan is produced, maintained and implemented on the project and distributed to all relevant parties. Monitor the completion of corrective actions by the Site Manager and take action as required to expedite completion. Provide regular reports to Transport NI on environmental performance, including details of any identified incidents or non-conformances and corrective actions. Ensure that all personnel for whom they are responsible are aware of the Construction Environmental Management Plan and implement the relevant requirements. Identify the competence of all subcontractors and suppliers and ensure that they are made aware of, and comply with the CEMP and associated procedures. Establish a consultation and communication system with all relevant interested parties associated with the project, including employees, partners, contractors, clients, designers and third parties, etc., where relevant .
Site Manager	Ensure that all personnel undergo suitable and sufficient environmental induction before starting work on the project, and periodic refresher training throughout the construction phase of the project. Ensure that staff attend the appropriate environmental courses that are organised by the Environmental Manager. Ensure the Environmental Manager is maintaining records of training delivered to site staff. Monitor the performance of personnel and activities under their control and ensure that arrangements are in place so that all personnel can work in a manner which minimises risks to themselves and to the environment. Undertake a programme of regular project environmental inspections in liaison with the Environmental Site Representative(s). Complete any corrective actions identified by the Environmental Site Representative(s) and provide status reports as required to the Project Manager. Assist and support the Environmental Manager and statutory bodies in the investigation of any incidents. Notify the Environmental Site Representative of all environmental issues or

Role	Responsibilities
	incidents arising over the course of operations.
Design Manager (Designer)	Co-ordinate and manage all environmental aspects of the design and construction of the scheme. Ensure that all members of the design team are aware of relevant environmental aspects, constraints or commitments with reference to the published Environmental Statement and CEMP. Ensure that members of the design team receive sufficient training in relation to relevant environmental aspects. Liaise with statutory bodies with responsibility for environmental issues as required in the development of the design. Supervise and witness the works to ensure that works are being carried out to agreed method statements and environmental mitigation measures. Liaise with the Environmental Manager in the development of the CEMP and the HEMP and in the completion of their duties.
Ecological Clerk of Works	Attend site as required to monitor the protection of wildlife in accordance with the requirements of relevant legislation, the construction contract and the CEMP. Identify potential risks to wildlife and develop suitable control measures. Provide status reports and updates to the Environmental Site Representative(s) in the completion of their activities. Liaise with the Environmental Site Representative(s) as required to provide specific training to site staff.
Archaeological Clerk of Works	Attend site as required to monitor the protection of archaeological finds in accordance with the requirements of relevant legislation, the construction contract and the CEMP. Provide status reports and updates to the Environmental Site Representative(s) in the completion of their activities. Liaise with the Environmental Site Representative(s) as required to provide specific training to site staff.

2.3 Qualifications of Environmental Manager and Environmental Site Representative(s)

The Environmental Manager must be a member of the Institute of Ecology and Environment Management (IEEM), the Institute of Environmental Management and Assessment (IEMA) or hold an equivalent qualification in the ecological and environmental field.

Whilst the Environmental Manager may have specialist experience in one particular field, he/she shall also be experienced generally, in the wider aspects of ecology and environmental management.

The Environmental Site Representative(s) shall not be required to be as widely experienced as the Environmental Manager but should be equally well qualified and competent in the discharge of their duties. It shall be a requirement of the construction contract that the details of the Environmental Site Representative are submitted to Transport NI for approval at the onset of the construction contract.

2.4 Environmental Management Plans

2.4.1 *Construction Environmental Management Plan (CEMP)*

The construction contract shall require the appointed Contractor to comply with the requirements of Interim Advice Note IAN 183/14 (or equivalent successor DMRB Advice Note or Standard) in relation to the preparation of Environmental Management Plans.

It shall be a requirement of the contract that the developed CEMP fully addresses the particular requirements of the Environmental Statement, the Specification Appendices and the Employer's Requirements.

The CEMP shall be developed as necessary during the course of the design and construction and will be reviewed on a regular basis with the Project Manager. As an absolute minimum requirement the CEMP shall be reviewed every three months and revised where necessary and submitted to the Project Manager together with any supporting information and an appropriate design certificate in accordance with the certification procedure that shall be set out in the Employer's Requirements.

Notwithstanding the above requirements the CEMP shall be reviewed at least 2 weeks prior to the construction stages listed below and revised where necessary and submitted to the Project Manager together with any supporting information and an appropriate design certificate in accordance with the design and certificate procedure of the Employer's Requirements:

- setting up the site compound(s);
- start of works;
- start of each succeeding stage of the works as agreed with the Project Manager;
- start of any site activity which is likely to have an effect on wildlife or the environment;
- start of the landscaping works; and
- start of each succeeding stage of the landscaping works as agreed with the Project Manager.

2.4.2 *Handover Environmental Management Plan (HEMP)*

The Contractor shall prepare a Handover Environmental Management Plan (HEMP) setting out a proposed strategy for the future maintenance and management of all areas in which landscape and ecology works are located (including landscape and ecological areas) for a 20-year period commencing at the issue of the defects date.

The HEMP will be implemented by Transport NI (and their appointed maintenance agents) for the 20-year period following the issue of the Defects Certificate for Planting. Transport NI will modify the Contractor's HEMP as appropriate.

The HEMP shall:

- describe how the environmental management proposals within the areas in which environmental works are located will be achieved, within the 20 year period of the HEMP; and
- include a record of the previous maintenance operations and management systems undertaken during the 3 year period following the defects date, together with any problems encountered and recommendations for remediation.

The HEMP shall include, but shall not be limited to, the following:

- strategies for the regular maintenance of all areas in which landscape and ecology works are located;
- a timetable for the implementation of each regular maintenance operation during a typical 12 month period, together with an overall 20 year timetable showing any variation to the regular maintenance tasks during the period of the HEMP;
- a timetable showing the anticipated date at which the Environmental Function attributed to each area/areas in which landscape and ecology works are located will be achieved during the 20 year period of the HEMP;
- a timetable showing the regular monitoring requirements for each area/areas in which landscape and ecology works are located, including those in relation to protected species and/or water quality, as agreed with the relevant statutory and non-statutory bodies, i.e. NIEA; and
- any supporting information as considered appropriate by the Contractor including details of agreements made with third parties.

The HEMP shall form part of a package of information that will be transferred to Transport NI. This shall include, but shall not be limited to, the following:

- CEMP (or relevant sections);
- Environmental Statement; and
- Baseline studies as appropriate.

2.4.3 *Site Waste Management Plan*

Transport NI is seeking to minimise the amount of waste generated during the project. The Contractor shall formulate a Site Waste Management Plan (SWMP) in accordance with the principles established in the Code of Practice entitled Site Waste Management Plans; Guidance for Construction Contractors and Clients, dated February 2006, (amended September 2010) or any subsequent revision prior to the start of works. The SWMP shall be based on the Outline Site Waste Management Plan which will be submitted with tenders during the competition process.

The SWMP is required to set targets for waste reduction and recovery based on an assessment of the likely composition and quantity of waste arisings and identification of the most significant cost-effective options for improvements (Quick Wins). This should be supplemented by information on how the targets will be achieved during construction activities and how the actual levels of waste reduction and recovery will be monitored for comparison with the targets set. The SWMP shall include details of the provisions put in place by the Contractor to fulfil these requirements.

The Contractor shall submit Site Waste Management Plan data sheets in the form prescribed in Annex B of the “Site Waste Management Plans – Code of Practice” to Transport NI prior to the start works.

2.4.4 *Pollution Control and Contingency Plan*

The Contractor shall prepare a Pollution Control and Contingency Plan as part of the CEMP. The plan shall include, without limitation, the following:

- identification and categorisation of surface waters vulnerable to site works and an assessment of the earthworks that are likely to give rise to silty run-off, the routes this is likely to take and the methods to prevent silt entering any watercourses;
- fuel handling (including oil) precautions during the works, in particular, near rivers, streams and watercourses;
- incident notification procedures involving both the Project Manager and relevant third parties;
- procedures for notifying local residents of works which may cause a nuisance;
- procedures for investigating environmental incidents and devising ideas to improve environmental performance;
- requirements for pollution control equipment;
- how mud and dust will be controlled and the frequency for road cleaning and dust suppression required at different times of the year;
- how any water supply boreholes and wells will be protected;
- the measures to be taken to protect watercourses and associated wildlife from, for example, chemical spillages or the introduction of sediment-laden run-off; and
- performance standards for site run-off.

Belfast Lough Special Protection Area (SPA), Ramsar Site and Area of Special Scientific Interest (ASSI) is a particularly sensitive area that must be protected from pollution.

2.4.5 *Landscape and Ecology Aftercare Plan*

The Contractor shall prepare a Landscape and Ecology Aftercare Plan to be implemented by the Contractor for 3 full growing seasons after planting or 3 years after the completion of the works whichever is the longer. The plan shall include, without limitation, the following:

- tree surgery;
- protection, management and maintenance of existing retained vegetation; and
- protection, management and maintenance of new planting, seeding and habitat creation areas.

The Contractor shall be required to carry out ongoing monitoring and review of the landscape and ecological design and protection measures. The data collected shall be recorded and analysed on a systematic basis in order to:

- monitor the performance in respect of achieving the environmental functions and the corresponding landscape and environmental element attributed to each area in which the landscape and ecology works are located; and
- assist in the forward planning of maintenance work in respect of each area in which the landscape and ecology works are located.

The results of all monitoring shall, without limitation, be set out on drawings and schedules sufficient to show clearly:

- the condition, height and species composition of the plants and vegetation within each area in which the landscape and ecology works are located;
- the presence of any species and habitats within each area in which the landscape and ecology works are located that are protected by Law; and
- any special circumstances which may affect the management and maintenance of each area in which the landscape and ecology works are located (including, without limitation, highway maintenance operations, ground condition, aspect and slope).

2.4.6 *Japanese Knotweed Management Plan*

A Japanese Knotweed Management Plan shall be prepared by the Contractor, with reference to the GB Environment Agency knotweed code of practice (entitled 'Managing Japanese knotweed on development sites: the knotweed code of practice').

The Management Plan shall include methods to control Japanese knotweed including application of herbicide, cutting, digging and pulling. It is not possible to eradicate an established stand of Japanese knotweed with a single herbicide application and repeated control measures are required over more than one growing season. Chemical control usually takes a minimum of three years to totally eradicate Japanese knotweed from the site. Given the small amount of Japanese knotweed present on the site, a combined treatment of digging and spraying is likely to be the most effective method of control.

NIEA must, however, agree with the method statement submitted to them by the Contractor to ensure the most effective control and disposal of Japanese Knotweed material.

2.4.7 *Green Travel Plan*

The Contractor shall produce a Green Travel Plan which shall set out objectives and targets for minimising journeys to and from the site by the workforce, sub-contractors, suppliers and anyone else who is likely to visit the site regularly.

The Green Travel Plan shall address the following issues:

- minimising journeys of all kinds to and from the site;
- safety of journeys made to and from the site;
- use of sustainable modes of transport;
- use of public transport;
- encouraging cycling;
- travel incentives;
- the health and wellbeing of the workforce;
- minimising the amount of car parking required;
- measures aimed at avoiding disruption and inconvenience to local residents and businesses; and
- safety of local children.

The plan shall be implemented from the date of the start of the works and shall be monitored on a regular basis to ensure that it is being adhered to and targets are being met.

Advice on the preparation of Green Travel Plans can be found in 'The Essential Guide to Travel Planning' published by DfT.

3. ENVIRONMENTAL CONTROL MEASURES AND PROPOSALS

3.1 Working Hours

- The working day can vary between seasons, with the working day extended to take advantage of extended daylight hours during the period from April to October. Typically, these hours are 7am to 7pm in the summer months and 7.30am to 5.30pm in the winter. Operations such as earthworks are seasonal and weather dependent, and most likely take place between April and October.
- To minimise disruption to road users, and therefore mitigate the effects of traffic congestions, the Contractor shall be incentivised to complete operations during off-peak periods, outside normal working hours. Where this is anticipated, work should be undertaken in the following order of preference:
  - Evening periods;
  - During the daytime over the weekend; and
  - Night working.
- During night working, the Contractor shall not undertake operations likely to result in significant disturbance at nearby sensitive receptors and residential properties, including, but not limited to, the following locations:
  - Stella Maris and residential properties directly opposite on Corporation Street;
  - Little George's Street;
  - Great George's Street;
  - Molyneaux Street;
  - McGurks Way;
  - North Queen Street; and
  - the future Apex Housing development on the site of the former North Queen Street police station.
- The Contractor shall notify Belfast City Council when unforeseen circumstances result in works over-running and extend beyond normal hours, regarding the nature, time, location and reasons for the over-run as soon as possible. Records shall be kept of such events by the Contractor.
- Works that do not result in significant disturbance at nearby receptors may be considered to be undertaken during extended working hours, subject to agreement with Belfast City Council.
- Locations of works that are anticipated to be outside normal working hours shall be defined and confirmed by the Contractor in the CEMP.

3.2 Air Quality

3.2.1 *Introduction*

- Negative air quality impacts can come from many sources during construction, and as such there are a number of ways in which air quality effects can be minimised by the Contractor to avoid creating nuisance.
- Works should be planned to take into account the location of sensitive receptors, local topography, wind direction, and any potential sources of pollution.

3.2.2 *Vehicle and Plant Emissions*

- Emissions to the atmosphere in terms of gaseous and particulate pollutants from vehicles and plant used on the site should be controlled and limited, as far as reasonably practicable, using measures and appropriate control techniques as listed below:
  - the engines of all vehicles and plant on site should not be left running unnecessarily (i.e. idling) to prevent exhaust emissions (and noise);
  - vehicles and plant should be low emission, and fitted with catalysts, diesel particulate filters or similar devices. Ultra low sulphur fuels should be used in plant and vehicles;
  - plant, equipment and emission control apparatus shall be selected to minimise the engine exhaust emissions, taking into consideration economic constraints and practicability;
  - vehicles and plant should be well maintained, with servicing completed in line with manufacturers recommendations. Records of servicing should be maintained and visual checks to be carried out to ensure that black smoke is not emitted at times other than at ignition;
  - all project vehicles should be in receipt of current MOT certificates or equivalent (as required subject to age), to ensure compliance with relevant exhaust emission regulations;
  - plant should be situated and operated away from potential receptors;
  - the use of diesel or petrol powered generators should be minimised where possible, with mains electricity of battery powered equipment used as alternative;
  - movement of vehicles and plant should be minimised around the site;
  - vehicle / plant exhausts should be directed away from the ground to minimise risk of re-suspension of ground dust, where reasonably practicable;
  - construction site traffic should be managed on the public road network, so as to prevent queuing or parking of vehicles outside of the site compounds;
  - movements of site traffic in and out of site should be noted within a log book;
  - maximising energy efficiency (this may include using alternative modes of transport, maximising vehicle utilisation by ensuring full loading and efficient routing); and
  - the excavation of any contaminated materials with the potential to release odour shall be subject to specific measures to minimise odour release. Odour nuisance shall be

managed with odour causing waste being removed from site on a regular basis to avoid excessive accumulation.

- The Contractor shall prepare a Green Travel Plan as outlined in **Sub-Section 2.4.7**.

3.2.3 *Control of Dust*

3.2.3.1 *Generation of Dust*

- Dust is generated in many ways during a construction project. The Contractor should take all necessary measures to minimise disturbance caused by dust, during both construction and demolition works. Excavation and earthworks can be a potential source of dust if they are not properly controlled, especially in dry and windy weather. If possible, such activities should be avoided on exceptionally dry or windy days.

- Activities which have the potential to generate dust should be subject to a risk assessment, taking into account their proximity to sensitive receptors and duration. This allows appropriate mitigation and management techniques to be engaged.

- Visual inspections should be undertaken regularly when dust raising activities are occurring. Inspections should take into account prevailing meteorological conditions, and results shall be recorded and maintained. These inspections should take place at least daily, and should determine the effectiveness of the applied mitigation and management techniques.

3.2.3.2 *Vehicle and Plant Dust*

- The Contractor shall impose maximum speed limits of 15mph within compounds and working areas to avoid excessive dust emissions.

- Care shall be taken to ensure that machinery or dust causing activities should be sited away from sensitive receptors.

- The production of dust should be taken into account when selecting plant and equipment, with apparatus with emission controls being chosen, as far as economically practical.

- Vehicles shall not be overloaded, and all loads entering and leaving the construction site and carrying waste and other dusty materials shall be adequately sheeted to prevent the spillage of material during transport.

- Any cutting and grinding operations to be carried out should use equipment and techniques which incorporate dust suppression measures and reduce emissions.

- Facilities for vehicle washing/wheel washing should be provided at all site exits as well as procedures for effective cleaning and inspection of vehicles, to keep dust and mud off the public road network.

3.2.3.3 *Earthwork Dust*

- Exposed earthworks should be kept damp at all times, to prevent airborne dust emissions. Should this not be possible, windbreaks should be used to minimise the potential for dust generated by wind erosion;

- Dust generation should be minimised from earthworks by sealing or seeding of surfaces to stabilise them as soon as possible.

3.2.3.4 *Site Fires*

- No site fires are permitted.

3.2.3.5 *Dust arising from Compounds and Works Areas*

- Hard standing surfaces used within construction site should be regularly maintained and kept clean.
- An approved mechanical road cleaner shall be employed to clean the site hard standing and the public highway in the vicinity of the site, to prevent an accumulation of dust and dirt.
- Wheel washing facilities shall be provided and used by all vehicles leaving the site.

3.2.3.6 *Dust arising from Materials Handling and Storage*

- Materials stockpiles on site should be avoided where possible, however, if unavoidable, the stockpiles should be designed so as to minimise dust generation by wind erosion (i.e. no steep sided stockpiles or mounds or those that have sharp changes in shape), covered securely, or damped down or suitably treated to prevent the emission of dust.
- Stockpiles and mounds shall be created away from the site boundary, sensitive receptors, watercourses and surface drains and sited to take into account the predominant wind direction.
- Stockpiles shall be maintained at suitable heights as agreed with Transport NI.
- Double handling of material should be avoided wherever reasonably practicable.
- Drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment should be minimised, with fine water sprays used on such equipment wherever appropriate.
- Fences of similar height and size to stockpiles shall be erected by the Contractor to act as wind barriers and these shall be kept clean using wet methods. Porous fences or hedges often make the most suitable shelter.
- Where drop heights are greater than 2 metres suitable dust suppression measures shall be utilised to control dust emissions.
- Stockpiled materials which are likely to remain undisturbed for a significant duration shall be sprayed with an appropriate chemical dust suppressant, or vegetated; in the case of long-term stockpiles, they can be seeded, re-vegetated or turfed to stabilise surfaces. Alternatively surface binding agents, approved by NIEA, can be used.
- Any construction materials that are stored within the construction site should be located away from the site boundary and downwind of sensitive receptors unless used for the purposes of screening.
- Fine or powdery material (under 3 mm in size) shall be stored inside buildings or enclosures.
- The site should be regularly inspected by the Contractor for spillages of dusty or potentially dusty materials who shall have procedures in place for prompt clearance of any such spillage.

- The frequency of site inspections should be increased when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.

3.2.3.7 *Concrete Work*

- Mixing of concrete shall be carried out in enclosed/shielded areas where necessary to prevent the escape of dust.
- Before concrete pours, the pour structure shall be cleaned and fine non-ferrous debris should be sucked out from the pour area.

3.2.3.8 *Dust caused by Demolition and Crushing*

- Where used, crushing equipment should be fitted with water suppression to minimise the amount of dust created. Water suppression should be fitted at crushing and transfer points.

3.3 Cultural Heritage

3.3.1 *Proposed Measures*

- The Contractor must properly assess and plan for the archaeological implications of the scheme where development may affect land with archaeological significance or potential. The Contractor shall ensure that the destruction of archaeological remains will be avoided wherever possible and should never take place without prior archaeological excavation and record.
- Cultural heritage resources shall be protected from damage by construction activities, using detailed archaeological testing methodologies.
- Appropriate screening around historic buildings, features or archaeological resources within or adjacent the working site, will be erected compatible with the type of site works being undertaken to provide protection during construction.
- For cultural heritage resources which are remaining in-situ, vibration limits should be calculated from condition surveys to protect from damage by vibration as a result of construction works.

3.3.2 *Monitoring and Reporting*

- Where unexpected archaeological remains are found during construction works, work should cease until advice is sought from an archaeologist. Further archaeological works or design measures may be required to mitigate the impact of development on those remains. Procedures will be put in place to protect and preserve archaeological remains encountered unexpectedly during construction works.
- Archaeological finds must be reported to NIEA-HMU, with details provided of when, where and how the object was found. The archive of finds and records from the excavation and analysis would be accessioned into a suitable museum or approved archive store.
- A cultural heritage watching brief will be developed and implemented for the duration of relevant construction works (i.e. excavations, earthworks). This brief will be either ‘General’ or ‘Targeted’, and would be undertaken by a qualified archaeologist and would require prior approval by the NIEA.

3.3.3 *Awareness and Training*

- Best practice information relating to wildlife should be given to workers through 'toolbox talks' by the nominated Archaeological Clerk of Works.

3.3.4 *Site Investigation Works*

- Archaeological mitigation measures as outlined in Chapter 9 of the ES and detailed within a Construction Environmental Management Plan shall be submitted to and approved by NIEA, and are to be complied with during construction.

3.4 Ecology and Nature Conservation

3.4.1 *Proposed Measures*

3.4.1.1 *General*

- The Contractor shall consult and comply with the requirements of the Northern Ireland Environment Agency (NIEA), with respect to any sites or species protected by law, which are likely to be affected by the construction, establishment and maintenance of the works.
- The Contractor shall undertake all works affecting protected species following best practice mitigation techniques in accordance with requirements of The Conservation (Nature Habitats, etc.) Regulations (Northern Ireland) 1995, as amended, and the Wildlife (Northern Ireland) Order 1985, as amended.
- An ecologist, acting as the Ecological Clerk of Works (ECoW) will be retained during construction work to deal with any protected species or other ecological issues that may arise.
- The ECoW shall be consulted on all issues that have the potential to cause impacts upon the Belfast Lough Special Protection Area (SPA) / Ramsar site and Area Special Scientific Interest (ASSI), and notified features of interest.
- The ECoW will liaise with relevant specialists and NIEA, undertake pre-construction surveys to inform and supervise implementation of mitigation as necessary. NIEA may require detailed surveys of protected flora or fauna which may be directly or indirectly affected by the works. In such a case, the Contractor shall undertake these surveys by employing specialists holding appropriate experience and licences approved by NIEA and Transport NI. Any additional mitigation measures identified during the course of additional surveys shall be agreed with NIEA and Transport NI.
- All site workers will be briefed by the ECoW on the ecological sensitivities of the site through 'toolbox talks' and will be provided with clear information about protected species and restricted areas and activities. Toolbox talks provide a convenient and effective method of communicating and reinforcing the safety and environment messages throughout the workforce on a regular basis.
- The Contractor shall take due account in the design, construction, completion and maintenance of the works with respect to the seasonal use of habitats by bats and birds (and other protected species as necessary).
- NIEA Pollution Prevention Guidelines (PPG) shall be applied to the scheme, e.g. PPG 5, Works and Maintenance In or Near Water, PPG 6 Working at Construction and Demolition Sites, and PPG 2 Above Ground Oil Storage Tanks.

- Working areas shall be fenced off in order to prevent access to the watercourse channel and bank vegetation.
- Waste management schemes shall be implemented in accordance with **Sub-Section 3.9**.
- Stockpiles of earthworks material shall not be kept near stream channels.
- Where possible, earth stockpiles should be covered to prevent run-off of sediment-laden water into watercourses.
- The storage and construction compounds must be located within the areas agreed with the Scheme ecologist or ECoW and clearly marked and fenced if necessary, to avoid incursion into ecologically sensitive habitats and be secured to avoid malicious damage. The Contractor shall implement NIEA Guidelines PPG2, PPG5, and PPG6 during the construction period, to safeguard the aquatic ecology interest of the watercourses.
- On-site storage of chemical, fuel or construction materials shall be limited to those needed for immediate construction. All surplus materials shall be removed from the works site as soon as their immediate purpose has been concluded.
- Any fuel or chemical stores shall be secure from vandalism and appropriately bunded to at least 110% capacity. These stores should be kept at a safe distance (refer to relevant guidance at time of construction) away from Belfast Lough SPA and watercourses.
- All potentially polluting liquids and solids associated with vehicles, equipment and machinery shall be identified to site staff so that spillages and wash water can be prevented from entering watercourses or the sewerage network.
- Pollution contingency plans shall be developed and approved with the relevant agency. These should include designated members of staff to deal with emergencies if they arise.
- The Contractor shall not wash tools and equipment in any watercourse.
- Wash water shall not be discharged into any watercourses or into road drains or disposed of in any way that could result in a discharge to controlled water.
- Mobile bunding or material for bund construction shall be available should an emergency barrier need to be constructed to prevent material leakage from a works site into a watercourse.
- Quantities of absorbent substrate shall be available to soak up spillages or leaks.

3.4.1.2 *Fencing/Buffer Zones*

- Buffer zones around ecologically sensitive features which are to remain shall be marked and fenced as appropriate, prior to site clearance.
- Retained trees shall be protected with tree protective fencing as outlined in BS 5837: 2005 - "Guide for trees in relation to construction" and BS1722 British Standard for Fencing. These standards shall be applied to fencing installed around trees and shrubs to safeguard the root zone to protect from accidental damage. Site personnel should be made aware of the need to avoid damage.

3.4.1.3 *Noise Control*

- The layout of the construction site should be such as to avoid to siting particularly noisy (for example generators) or busy (for example stores) works areas near to sensitive ecological receptors.

3.4.1.4 *Dust Control*

- Dust abatement measures should be implemented (damping etc.) to prevent deposition on vegetation communities in the vicinity of the works, particularly close to designated sites.

3.4.1.5 *Excavations*

- In line with Health & Safety procedures, any open excavations shall be fenced at night. To prevent mammals being trapped in excavations, a sloping plank or similar should be placed within it.

3.4.1.6 *Awareness and Training*

- Best practice information relating to wildlife should be given to workers through 'toolbox talks' by the nominated ECoW.

3.4.1.7 *Water Pollution*

- Pollution to surface or coastal waters shall be prevented by adhering to PPGs and other controls as agreed with NIEA prior to construction.

3.4.1.8 *Stockpiled Materials*

- Any soil removed for re-use in ecological mitigation shall be carefully sorted and stored into subsoil and topsoil stockpiles to avoid mixing and/or compaction.

3.4.1.9 *Lighting*

- Position and direction of lighting should be designed to minimise intrusion and disturbance to river corridors and other areas of nature conservation value.

3.4.1.10 *Monitoring*

- NIEA (and other relevant bodies) should agree on ecological monitoring programme prior to the commencement of construction activities. This ecological monitoring will be undertaken by suitably experienced and competent ecologist during the construction period.

- Ecologically sensitive areas shall be subject to a watching brief at critical construction times. The watching brief shall be undertaken by an suitably qualified ecologist to ensure opportunities for minimising effects on features of ecological importance are taken wherever possible, including obtaining and implementing the terms and conditions of any licences for protected species where required, and searches for protected species in affected areas of habitat that are considered suitable.

- Vegetation clearance shall also be subject to watching brief to ensure that protected species are not adversely affected. Measures to be undertaken in the event of the unforeseen discovery of a protected species shall be agreed with the relevant statutory bodies.

- As it is an offence to disturb a protected species, works in an area found to contain such shall stop, and the advice of a suitably experienced ecologist sought. Works can only

resume following this advice. For some protected species, there may be a requirement to apply for a licence for works that may disturb them.

3.4.2 *Protection of Birds*

- Any necessary clearance of trees, scrub and tall herbaceous vegetation should occur outside the bird-breeding/nesting season (i.e. works to be carried out between October and February). If works cannot be avoided during the nesting season, a survey shall be undertaken by a suitably qualified ecologist prior to clearance, to ensure the area does not contain active nests. If discovered, trees containing nesting birds should be 'buffered' by an area of existing vegetation, following further consultation with a suitably qualified ecologist, before works can proceed.

3.4.3 *Protection of Mammals*

3.4.3.1 *Bats*

- All trees/buildings to be removed during construction shall be subject to pre-construction checks, to ensure that no bats are roosting within the trees or structure. A licence is required from NIEA before removal and construction can commence if bats are found to be present.
- As bats are active mainly at dusk and dawn, construction activities (such as earthworks, surfacing etc) would be restricted to daylight hours in areas in close proximity to the M2 motorway in order to limit disturbance to these protected species.
- NIEA are required to provide a license to approve destruction of a roost. The destruction must not occur whilst the roost is inhabited. Mitigation measures must be in place (in the form of alternative roosts) prior to destruction of existing roost.
- Bat flight lines should be maintained by use of temporary measures such as poles with tape/ribbon along lines of maintained crossings and where bat hop-over planting is proposed, immediately following vegetation clearance (as advised by the Environmental Manager).

3.4.4 *Control of Invasive Species*

3.4.4.1 *Japanese Knotweed*

- This species should be treated according to the Environment Agency (EA) UK guidance 'Managing Japanese knotweed on development sites: the knotweed code of practice'.
- A Japanese Knotweed Management Plan shall be prepared by the Contractor in accordance with **Sub-Section 2.4.6**.

3.5 Landscape, Lighting and Fencing

3.5.1 *Proposed Measures*

- The Contractor shall consider the locations of site compounds, heavy plant and material stockpiles which may have a significant landscape and visual effect during the construction phase. The movement and activity of heavy plant, which has a significant visual presence due to size/scale and hazard lighting, would remain a transient issue, irrespective of where the site compound(s) is located.
- The Contractor shall prepare a Landscape and Ecology Aftercare Plan as outlined in S**ub-Section 2.4.5**.

3.5.2 *Lighting*

- Appropriate lighting will be provided at site boundaries with sufficient illumination to ensure safety of the passing public, including precautions taken to avoid shadows cast by site hoarding on surrounding, roads, footpaths and amenity areas;
- Lighting will be positioned and directed so as not to unnecessarily intrude on adjacent buildings and land uses and prevent any unnecessary interference with local residents and passing motorists, particularly for sites where night working is undertaken;
- Guidance should be taken from BS 5489 Parts 1 and 9 (Road Lighting) and Institute of Lighting Engineers guidance notes for reduction of light pollution.

3.5.3 *Fencing*

- Appropriate fencing would be used to secure the site and protect the public from construction activities. If hoardings are to be used by the Contractor, such hoarding shall be maintained in good condition.
- Retained trees shall be protected with tree protective fencing as outlined in BS 5837: 2005 - "Guide for trees in relation to construction" and BS1722 British Standard for Fencing. These standards shall be applied to fencing installed around trees and shrubs to safeguard the root zone to protect from accidental damage. Site personnel should be made aware of the need to avoid damage.
- Other protected areas of nature conservation value should either have permanent construction boundary fencing in place, or have temporary fencing to prevent people, machines or materials entering the area.

3.6 Noise and Vibration

3.6.1 *Proposed Measures*

- Noise and vibration arising from construction activities should be identified in advance and its effects mitigated where possible.
- The appointed Contractor shall program operations and use methods/techniques to minimise noise and vibration at sensitive receptors and residential areas, including, but not limited to:
  - Stella Maris and residential properties directly opposite on Corporation Street;
  - Little George's Street;
  - Great George's Street;
  - Molyneaux Street;
  - McGurk's Way;
  - North Queen Street; and
  - the future Apex Housing development on the site of the former North Queen Street police station.

- The Contractor's proposals for noise management shall reflect the requirements of British Standard BS 5228-1:2009 Code of Practice for Noise Control on Construction and Open sites.
- Construction site traffic should be managed on the public road network, so as to prevent queuing or parking of vehicles outside of the site compounds.
- Programme and route for the transportation of construction materials, spoil and personnel should be selected to minimise noise and vibration at sensitive receptors.
- The Contractor should select only plant conforming to relevant national or international standards, directives and recommendations on noise and vibration emissions.
- Site hoardings and screens should be designed to provide acoustic screening where practicable at the earliest opportunity. Doors and gates should not be located opposite occupied noise-sensitive buildings.
- Plant and equipment liable to create noise or vibration will be located away from sensitive receptors or will be controlled by the use of lined and sealed acoustic covers or enclosures to prevent or reduce risk of disturbance.
- Vehicles and plant should be well-maintained, with servicing completed in line with manufacturers recommendations. Records of servicing should be maintained.
- Plant, machinery and vehicles should be fitted with exhaust silencers.
- Plant and equipment will be shut down when not in use and used where practicable in the mode of operation that minimises noise.
- Vibration predictions will assist the selection of steps to minimise vibration and other activities where it is not practical to do this at source. Operations for which vibration prediction is likely to be required include, but are not limited to:
  - demolition;
  - piling;
  - vibratory compaction;
  - cable percussive testing (for additional ground investigations);
  - dynamic compaction; and
  - impact breakers.
- Vibration levels shall be predicted in accordance with the methods set out in BS 5228: 1992: Part 4. Guidance in BS 6472, BS 5228 and BS 7385 shall be used to establish criteria, controls and working methods unless otherwise agreed with Belfast City Council.
- Control measures shall be agreed with relevant Belfast City Council. BS 5228 provides recommendations for temporary construction noise limits, based on an assessment of the existing ambient noise levels in the vicinity of the works. These limits shall be adhered to.

3.6.2 *Monitoring*

- Monitoring shall be undertaken by the Contractor at specific locations, having been identified with regard for the plant in use and the activities undertaken at each work area, as agreed with Belfast City Council.
- Monitoring shall focus on the early stages of each new construction activity or process and work undertaken during extended, night time and weekend working hours.
- Construction method, working hours, plant inventories and plant operation compliance shall be monitored against related requirements.

3.7 Road Drainage and the Water Environment

3.7.1 *Proposed Measures*

- Works in, near or liable to impact a waterway must gain the consent of NIEA – Water Management Unit (WMU), Pollution Prevention (PP), DOE Marine Team and DARD Rivers Agency, prior to commencement of works;
- The excavation, storage and removal of any water logged materials with the potential to release odour will be subject to specific measures to minimise odour release.

3.7.2 *Consents*

- A licence will be obtained from NIEA and/or Rivers Agency where water is to be abstracted from surface water or groundwater.
- Where discharges are required to controlled waters or sewers, consent will be obtained from the NIEA/Rivers Agency or the statutory sewerage undertaker as applicable. NIEA/Rivers Agency are also liable for permits for dewatering operations; and
- Works in the vicinity of a surface or coastal waters (in, over or under a watercourse, works altering or repairing any structure in, over or under a watercourse) or works within the drainage margin of the watercourse will require consent from the NIEA/Rivers Agency/DOE Marine Team.

3.7.3 *Site Drainage*

- NIEA must approve submitted site drainage plans prior to the commencement of works.

3.7.4 *Protection of Surface Water/Pollution Control*

- All potentially polluting substances will be stored on impermeable surfaces with controlled drainage, away from storm water sewers, grids, channels, watercourses and ditches. Otherwise adequate measures must be taken to protect against pollution.
- All tank discharge pipes, valves and trigger guns will be contained securely within the bund when not in use.
- All water runoff from designated refuelling areas will be channelled to an oil separator or an alternative treatment system prior to discharge.
- The risk of vandalism should be reduced by locking Fuel storage tanks/Bowser when not in use, to prevent unauthorised access.
- Storage of oils and diesel, along with the general maintenance and refuelling of plant, will be restricted to impermeable bunded areas with a minimum 110% storage capacity and

away from surface waters or areas where any spillages could easily reach a surface water.

- All fuel, chemicals and oils will be stored within bunded areas in accordance with PPG2 and PPG26 and be compliant with The Control of Pollution (Oil Storage) Regulations (Northern Ireland) 2010.
- An appropriately licensed waste disposal contractor must be used to dispose of leaking or empty oil drums from the site.
- All hazardous substances on-site will be controlled in accordance with The Control of Substances Hazardous to Health Regulations (Northern Ireland) 2003 (COSHH Regulations). The storage compound shall be fenced off and locked when not in use to prevent theft and vandalism.
- Care should be taken during refuelling of plant and machinery. This should occur at least 10m away from watercourses using a mobile fuel bowser and will be restricted to designated areas on hard standing. Only double bunded fuel bowsers shall be used. Vehicles must not be left unattended during refuelling operations. Fixed plant shall be self-bunded. Mobile plant must be in good working order, kept clean and fitted with drip trays where appropriate. All water runoff from designated refuelling areas shall be channelled to an oil separator or an alternative treatment system prior to discharge.
- Mobile plant and vulnerable locations must be supplied with spill kits and oil absorbent materials to reduce risk of spillages entering the sub-surface or groundwater environment. Considering the nature of the proposed scheme, spill kits shall need to be provided at a number of sites to ensure that they are easily accessible and can be deployed within a very short period of time.
- Care must be taken whilst using shuttering oils when preparing formwork. This requires operatives to be trained in the proper handling of materials, the sensitive nature of the wider drainage system, and the consequences of accidental spillage.
- A Pollution Control and Contingency Plan shall be prepared by the Contractor in accordance with **Sub-Section 2.4.4**.
- Impermeable areas should be designated for concrete mixing, at least 10m away from a watercourse or surface water drain to reduce the risk of runoff entering a watercourse, or the sub-surface, or groundwater environment.
- Equipment, batching and ready mix lorry washing and cleaning should be washed out on site into a designated area that has been designed to contain wet concrete / wash waters (see PPG6).
- Wheel washing will be undertaken in a designated area. Water from wheel washing facilities and wash down areas will be recycled or fully contained and disposed of via tankers or through connection with the foul sewer (in accordance with relevant consent from NI Water).

3.7.5 *Managing Run Off and Silty Water*

- Measures shall be taken to ensure that run off from earthworks does not enter drains, watercourses or ditches.
- The Contractor shall carefully plan the site works so that activities likely to generate silt-laden runoff are carried out during drier months, and erosion of surface soils is controlled.

- Stockpiles should be kept to a minimum, however areas of exposed ground and stockpiles should be minimised to reduce silty runoff and located well away from drains and watercourses to control erosion, (by a minimum distance of 10m where the land is flat, and further if there is a slope to a watercourse), stabilised as soon as possible (e.g. seeded or geotextile mats), and bunded by earth or silt fences (if required) at the toe of the stockpile to intercept silt-laden runoff during rainfall events. Stockpiles shall not be located where there is a steep slope towards a watercourse. Geotextiles will be used as necessary to shield spoil mounds.

- Facilities for vehicle washing/wheel washing should be provided at all site exits as well as procedures for effective cleaning and inspection of vehicles, to keep mud off the public road network. Tools and plant must be washed out and cleaned in designated areas.

- Water, unpolluted other than with fairly coarse particles, and with relatively small flows, may be treated by passing through tanks or skips with a suitable filter such as gravel, geotextiles, straw bales or siltbusters.

- Areas of hard standing and surface roads will be swept regularly to prevent the build-up of material which could be washed into watercourses.

3.7.6 *Monitoring*

- A water quality monitoring programme for the proposed scheme will be implemented, discharges will also be monitored in accordance with the consents held;

- Routine monitoring shall be undertaken at watercourses upstream and downstream of the works, and at all discharge points to measure turbidity, odour and presence of oil film and to ensure they are free from litter and debris;

- Riverbed sediments shall be subject to monitoring pre-scheme, to establish baseline levels of sediments in spawning gravels and nursery areas at selected reference sites in the catchment. This monitoring programme shall also include control sites located upstream of potential silt runoff locations (e.g. watercourse crossings) and outwith within the “drainage corridor” of the proposed scheme.

3.8 Geology and Soils

3.8.1 *General Measures*

- Construction works will be carried out in such a way as to prevent, contain or limit, as far as reasonably practicable, any adverse impacts arising from the presence of contaminated land or material.

- A contamination watching brief will be designed and implemented during construction to ensure that any significant contamination not identified during the investigations is recorded and can be dealt with appropriately.

- Where ground with identified significant levels of contamination (as defined in the ES) is encountered during construction, adverse impacts to human health and the environment working methods and procedures for handling and disposal of material will be employed to minimise risk.

- Any local pockets of potentially contaminated soil encountered during the works should be assessed and if required the material disposed of at a licensed waste facility.

- ‘Clean’ and ‘dirty’ (contaminated) work areas should be divided by internal fencing where contamination is encountered.

- Personal Protective Equipment (PPE) should be worn by ground workers and other staff. Those potentially at risk should be made aware of potential site hazards via site safety induction procedures and appropriate induction procedures.
- Potential hazards identified and appropriate health and safety measures taken to minimise this hazard.
- Standard good housekeeping procedures of materials which have the potential for pollution (i.e. fuels and oils and other liquid chemicals) and which are likely to be used during construction and environmental control measures should be adopted for the management and mitigation of risks.
- Sealed and bunded enclosures should be provided for storage of fuels and other potentially contaminated liquids. All such liquids and soluble solids should be managed with appropriate care. Accidental spills should be contained and absorbed, for example using straw bales and/or spill management kits.
- Leaks and spills should be prevented and control measures used to prevent contaminants entering the sub-surface or groundwater environment.
- Construction work would involve excavation and removal of glacial deposits at most cutting locations along the route and the removal of schist bedrock in some locations. Material removed as part of the construction should be re-used elsewhere in the scheme where practicable and possible.
- Topsoil and subsoil should be separated where removal is required and this should be conserved and stored in a designated area and appropriately protected, ready for re-use as landscape fill for the scheme.
- Contaminated materials should be assessed as solids, liquids, gas and leachate to allow for appropriate management.
- Measures will be implemented to prevent the contamination of ground and surface watercourses and aquifers during the works as detailed in the Road Drainage and the Water Environment chapter.
- Hazardous dusts emissions should be prevented during excavation, or from stockpiles as detailed in the **Sub-Section 3.2**.
- Where contaminated materials are to be removed from the construction site they will be stored separately from clean materials and controls put in place to prevent from leaching into the ground or surface waters, by storing them separately from clean materials and to prevent the spread of contaminated dust.

3.8.2 *Demolition Control Measures*

3.8.2.1 *Proposed Measures*

- Demolition debris should be kept within a controlled area using measures, such as fencing and/or screening, to ensure that the area of ground potentially affected by demolition works is kept to a minimum;
- Surveys should be carried out prior to any demolition for the presence of asbestos;
- Specialist contractors will remove any asbestos and disposed of it in accordance with the relevant legislation.

3.8.3 *Lime/Cement Stabilisation*

3.8.3.1 *Proposed Measures*

- Detailed advance briefings on the hazards and procedures associated with lime and cement stabilisation as well as on methods to prevent hazardous dust emissions will be provided prior to stabilisation taking place.
- Appropriate PPE is essential in areas where lime or cement stabilisation is being undertaken.
- Bulk storage of lime and cement will be in a purpose-built silo. Lime and cement should be stored in a cool dry environment free from draughts, away from water and flammable materials.
- Measures to be taken to minimise dust are detailed in DMRB Volume 4, Section 1, Part 6, HA 74/07 'Treatment of Fill and Capping Materials Using Either Lime or Cement or Both', and apply to the handling of lime and cement.

3.9 Waste Management

3.9.1 *Proposed Measures*

- The Contractor shall develop a SWMP as outlined in **Sub-Section 2.4.3**.
- In addition to the development of a SWMP the Contractor shall be required to:
  - identify key sources of waste prior to submitting all Interim Design and Design Certificates to Transport NI in accordance with the design and certification procedures of the contract, and;
  - propose waste reduction solutions advising upon impacts on performance, cost and quality.
- In order to achieve the above requirements during the design the Contractor shall:
  - include waste as a formal agenda item at design team meetings;
  - identify opportunities to reuse existing materials on-site and provide justification for the non-reuse of materials (where applicable);
  - explore opportunities to simplify and standardise design solutions and provide justification where this is not appropriate; and
  - explore and advise upon the benefits of offsite manufacture of components or elements, commenting upon waste, cost, time and quality.
- In addition, the Contractor shall:
  - work with sub-contractors prior to the start of works to identify areas of waste and agree methods of waste reduction (Note that this may require revisiting the design);
  - request and document within the SWMP accurate forecasts of waste from each subcontractor.(including off-site construction options);

  - develop and implement a logistics plan which addresses both where waste will arise and how it may be reduced. This is to be included within the SWMP and made available to Transport NI upon request.

- This should be done in line with the following requirements:
  - existing materials shall be recycled for re-use in the works unless agreed otherwise with Transport NI.
  - all timber and wood shall be procured from legal and sustainable sources;
  - the Contractor shall register the project with the Considerate Constructor Scheme; and
  - the Contractor shall meet good practice waste minimisation and management standards as set down by WRAP Northern Ireland (www.wrapni.org.uk).

3.10 Register of Environmental Actions and Commitments

As detailed within Interim Advice Note (IAN) 183/14 of the Highways Agency, the identification of Environmental Actions and population of a Register of Environmental Actions and Commitments (REAC) is critical to the success of an EMP and subsequently the environmental performance of a project. Depending on the scale of the project, there may be many sources of information from which Environmental Actions must be identified, such as an ES or Environmental Assessment Report, Ecological Surveys, Heritage or Tree Reports, Contaminated Land or Flood Risk Assessments, Public Inquiry Commitments, or standard requirements such as Statutory Authority consents.

The REAC should be in a tabular format with headings allowing for:

- clear and specific description of the Action;
- the objective of the Action;
- how the Action is to be implemented/achieved;
- the source of the Action, including references for source documentation;
- naming of the person responsible for the Action i.e. Principal Contractor or Environmental Manager;
- achievement criteria and reporting requirements;
- the project stage or date or implementation and/or achievement;
- details of any monitoring required, what should be monitored and how results should be used to effect necessary action; and
- date and signature for completion of Action.

Where it is required that an Action must be monitored to determine success, the details of monitoring, success criteria, reporting requirements and trigger level for remedial works should be clearly defined.

Table 18.6: Register of Environmental Actions and Commitments

Mitigation Item No.	Location	Mitigation Objective and Commitment	Potential Mitigation Measure	Potential Timing of Mitigation Measure	Potential Monitoring Requirements	Potential Additional Consultation Proposed
Air Quality (Chapter 8)						
AQ1	Within & beyond proposed works	To minimise dust blow from site, site traffic, stockpiles and road network	Dust Minimisation Plan to be prepared as part of the CEMP to include dampening of haul roads and stockpiles; keeping roads clean and using covers over construction lorry trailer units; location of stockpiles and dust generating activities away from sensitive receptors (this list is not exhaustive).	In advance of and concurrent with construction	Monitoring of works to ensure compliance with requirements and standards.	Belfast City Council
AQ2	Within & beyond proposed works	To minimise emissions and odour from site	Air Quality Management Plan to be prepared as part of the CEMP, to include (where reasonable) selection of plant and vehicles to minimise exhaust emission levels and be well maintained. Traffic movements to be minimised throughout the site, limiting the use of public roads to essential movements only. Location of construction plant away from site boundaries, which are close to sensitive receptors. Effective waste management to avoid potential odour nuisance (this list is not exhaustive).			
Cultural Heritage (Chapter 9)						
CH1	In vicinity of proposed works	Archaeological trial trench and test pit evaluation of archaeological remains	A sample-based mechanical or hand-excavated trench or test pit based investigation to record the character of archaeological remains within the landtake required for the Proposed Scheme, including within the limits of the vesting boundary. Targeted investigations may also be appropriate where remains have been identified through non-intrusive survey (such as walkover survey) or where there is the potential for archaeological remains to be discovered. The results of these intrusive trenching or test pit works would inform decision making on further mitigation recording that may be appropriate.	In advance of construction	Monitoring of works to ensure compliance with requirements and standards	Consultant Archaeologist, NIEA-Built Heritage

Mitigation Item No.	Location	Mitigation Objective and Commitment	Potential Mitigation Measure	Potential Timing of Mitigation Measure	Potential Monitoring Requirements	Potential Additional Consultation Proposed
CH2	In vicinity of proposed works	Detailed excavation (to include trench mitigation) of archaeological remains	Detailed excavation would be undertaken where significant archaeological remains are either known previously or discovered during the course of the works. This may be targeted at specific area locations, or a sample range of locations (e.g. test pits or specific investigation trenches).	In advance of and concurrent with construction	Monitoring of works to ensure compliance with requirements and standards	Consultant Archaeologist, NIEA-Built Heritage
CH3	In vicinity of proposed works	Geoarchaeological investigation of archaeological remains	A programme of sample recovery and analysis undertaken to investigate palaeo-environmental conditions and soil sediment development that may be relevant to the research of archaeological remains recovered within the vicinity. Achieved through trial pit excavations or other geotechnical soil sample retrieval methods (such as soil cores or boreholes).	In advance of and concurrent with construction	Monitoring of works to ensure compliance with requirements and standards	Consultant Archaeologist, NIEA-Built Heritage
CH4	In vicinity of proposed works	Targeted Watching Brief	A programme of observation, investigation and recording of archaeological remains during or alongside construction earthwork activities, in specific areas where the presence of moderate potential remains has been demonstrated, but where detailed investigation prior to the main construction programme is unjustified, unfeasible due to safety or logistical considerations, or undesirable due to environmental or engineering constraints. Under Targeted Watching Brief, as opposed to General Watching Brief, the contractor's preferred method of working would be controlled as necessary to allow archaeological recording to take place to the required standard.	Concurrent with construction	Monitoring of works to ensure compliance with requirements and standards	Consultant Archaeologist, NIEA-Built Heritage
CH5	In vicinity of proposed works	General Watching Brief	A programme of observation, investigation and recording during construction activities where remains have not been identified by assessment and evaluation studies, but where there remains a residual risk of archaeological discoveries. In this case, the contractor's preferred method of working would not be controlled for archaeological purposes, but access for recording any discovered archaeology would be provided.	Concurrent with construction	Monitoring of works to ensure compliance with requirements and standards.	Consultant Archaeologist, NIEA-Built Heritage

Mitigation Item No.	Location	Mitigation Objective and Commitment	Potential Mitigation Measure	Potential Timing of Mitigation Measure	Potential Monitoring Requirements	Potential Additional Consultation Proposed
Ecology & Nature Conservation (Chapter 10)						
ENC1	In vicinity of proposed works	To monitor and mitigate ecological and nature conservation impacts where required	The Contractor should appoint an Ecological Clerk of Works (ECoW). A Habitat Management Plan should also be prepared as part of the CEMP outlining how natural habitats would be managed through the construction and operation phases of the Proposed Scheme.	In advance of construction	-	Consultant Ecologist, NIEA-Natural Heritage
ENC2	In vicinity of proposed works	Verify presence of, and whether new species and habitats have moved into the site	ECoW should ensure that a suite of pre-construction ecological surveys is undertaken in the appropriate field season immediately prior to scheme construction.	In advance of construction	-	Consultant Ecologist, NIEA-Natural Heritage
ENC3	In vicinity of proposed works	To avoid adverse impacts on bats and birds.	All vegetation clearance works should take place ideally during the winter months (September to February) to avoid key breeding periods. Any vegetation clearance work undertaken between March and August should have the specific approval of the ECoW to ensure that no ecological constraints exist.	Concurrent with construction	Monitoring of works to ensure compliance with requirements and standards	Consultant Ecologist, NIEA-Natural Heritage
ENC4	In vicinity of proposed works	To reduce risk of water pollution and ensure water quality/habitats and species not detrimentally affected.	Construction methods (e.g. using full cut-off diaphragm walls) to prevent lateral movement of groundwater towards Belfast Harbour and prevent any leaching of dissolved contaminants reaching Belfast Lough through newly established pathways. Pollution Incident Response Plan will also need to be put in place.	Concurrent with construction	Monitoring of construction site water management measures	NIEA - WMU, DOE Marine Team and NIEA - Natural Heritage
ENC5	In vicinity of proposed works	To reduce risk of water pollution and ensure water quality/habitats and	A CEMP to be produced by the contractor, which would address likely sources of pollution and sedimentation which could potentially reach Belfast Harbour and onward into Belfast Lough.	In advance of and concurrent with construction	Monitoring of construction site water management	NIEA - WMU, DOE Marine Team and NIEA - Natural

Mitigation Item No.	Location	Mitigation Objective and Commitment	Potential Mitigation Measure	Potential Timing of Mitigation Measure	Potential Monitoring Requirements	Potential Additional Consultation Proposed
		species not detrimentally affected.			measures	Heritage
ENC6	In vicinity of proposed works	Mitigate and compensate for the mosaic of semi-natural and artificial habitats	The overall landscape planting objectives should attempt to mitigate and compensate for the mosaic of semi-natural and artificial habitats to be lost as part of the development (i.e. incorporate existing trees where possible, especially where mature specimens occur; enhance the ecological interest through the creation of natural habitat with new planted areas and screen planting comprising trees and shrubs between link roads; maximise the number of native tree, shrub and plant species in new planted areas; provide food for insects, birds and animals (these would include nectar-rich, berry-bearing and seed-bearing plants), incorporate street trees into design of appropriate streetscapes).	Concurrent with construction	Regular monitoring of landscape planting during construction	Consultant Landscape Architect, Consultant Ecologist, NIEA-Natural Heritage
ENC7	In vicinity of proposed works	Prevent and control the spread of invasive species	The ECoW should undertake further pre-construction surveys to identify locations of any non-native invasive species, ensure that mitigation measures are carried out where required, and an Invasive Species Management Plan is developed. Great care should be taken when working close to the identified area of invasive species to prevent the spread of live plants or viable seeds. To enhance specific areas of the site, invasive species (in this case, Japanese knotweed) should be treated and managed. This would encourage the natural flora to flourish.	In advance of and concurrent with construction	Regular monitoring of site for invasive species	Consultant Ecologist, NIEA-Natural Heritage
ENC8	In vicinity of proposed works	Provision for bats	ECoW should undertake pre-construction surveys on any semi-mature / mature trees to be felled and assess them for the likelihood of bat presence. Bat boxes suitable for roosting pipistrelle bats should be provided at a suitable location around North Queen Street Bridge and the new Dock Street Overbridge.	In advance of and concurrent with construction	To be detailed in Method Statement	Consultant Ecologist, NIEA-Natural Heritage

Mitigation Item No.	Location	Mitigation Objective and Commitment	Potential Mitigation Measure	Potential Timing of Mitigation Measure	Potential Monitoring Requirements	Potential Additional Consultation Proposed
			Planting to encourage insects should be used to create suitable feeding areas for bats throughout the site, especially in planted areas and linear planting features. The Interchange lighting plan will use modern lighting to concentrate brightest light on the road areas and away from vegetation as far as possible. However, safety requirements dictate that the area will stay well lit.			
ENC9	In vicinity of proposed works	Provision for birds	Areas to be landscaped should consider birds in their design, providing plentiful food in the form of seeds and berries. Species in planted areas should be chosen to provide places for birds to roost and nest. A variety of bird boxes should be provided around the site, in any relatively quiet areas. A suitably experienced ecologist should advise on the exact type and positioning of the boxes. Planted areas should be used to replace the large areas of bare ground and brownfield, to provide locations for birds to forage.	Concurrent with construction	Monitoring of works to ensure compliance with requirements and standards	Consultant Ecologist, NIEA-Natural Heritage
ENC10	In vicinity of proposed works	Provision for insects	The Proposed Scheme should incorporate the provision of nectar-rich plants to provide food for bees and other insects. Other insect friendly features should be considered, and incorporated where feasible, such as log piles and insect boxes.	Concurrent with construction	Monitoring of works to ensure compliance with requirements and standards	Consultant Ecologist, NIEA-Natural Heritage
Landscape Effects (Chapter 11)						
LV1	Within footprint of the proposed works	Reduce landscape and visual impact of the Proposed Scheme by use of Planting/Screening	The embankments behind the back gardens of North Queen Street and Little George's Street properties which back onto the Proposed Scheme would be potentially re-planted (where feasible). The small pocket of open space at Molyneaux Street would also be re-planted.	Concurrent with construction	Monitoring of works to ensure compliance with requirements and standards	Consultant Landscape Architect, DOE Planning, Belfast City Council,

Mitigation Item No.	Location	Mitigation Objective and Commitment	Potential Mitigation Measure	Potential Timing of Mitigation Measure	Potential Monitoring Requirements	Potential Additional Consultation Proposed
			Generally, planting would be replaced on the embankments and road edges, creating several new blocks of mixed tree and shrub planting, and acting to partially screen the development; it may also assist wildlife habitat creation and the softscape would offer an informal drainage sink. The potential extent of planting may be limited by required service strips. Corporation Street and Garmoyle Street would be potentially planted with street trees on a grass verge, to the west of the existing pedestrian path. Great George's Street (eastern portion) would be potentially planted with street trees on both sides. The development would narrow the road and widen the southern path to facilitate improved public realm. Appropriate screening would be provided where possible (i.e. where road links would have a visual impact on adjacent properties or views). In selected locations where the visual impact is significant, immediate temporary screening would be required (if feasible).			Affected Landowner
LV2	North Queen Street Bridge	Reduce landscape and visual impact of acoustic barriers	Proposed acoustic barriers along Westlink in the vicinity of North Queen Street Bridge should be sensitively located (if feasible) and designed to limit any potential visual and landscape impact and reduce potential for over-shadowing on residential receptors.	Concurrent with construction	Monitoring of works to ensure compliance with requirements and standards	Landscape Architect, Acoustic Consultant, DOE Planning, Belfast City Council, Affected Party
LV3	Within footprint of the proposed works – Boundary	Reduce landscape and visual impact of boundary treatments	The boundary treatments for the development should be sensitive to the character of the area; this is particularly important in the case of proposed retaining walls.	Concurrent with construction	Monitoring of works to ensure compliance with requirements	Landscape Architect, DOE Planning

Mitigation Item No.	Location	Mitigation Objective and Commitment	Potential Mitigation Measure	Potential Timing of Mitigation Measure	Potential Monitoring Requirements	Potential Additional Consultation Proposed
	Locations				and standards	
LV4	Structure locations	Reduce landscape and visual impact of structures	Integration of parapets into the structure of overbridges and other structures to create the impression of one simple structure. The overbridges should be designed to allow the road corridors and cityscape to flow under the structures, in order to minimise its visual prominence (i.e. consideration should be given in the detailed design to minimise and strategically-locate the bridge piers).	Concurrent with construction	Monitoring of works to ensure compliance with requirements and standards	Landscape Architect, DOE Planning
LV5	Underbridge structures	Enhance landscape and visual impact of structures	Proposed enhancement lighting to the underbridges.	Concurrent with construction	Monitoring of works to ensure compliance with requirements and standards	Landscape Architect, DOE Planning
LV6	Within footprint of the proposed works – Development areas	Enhance landscape and visual impact of potential development areas	The Proposed Scheme would create four main potential future development areas, which could potentially improve the appearance of the cityscape.	Concurrent with construction	Monitoring of works to ensure compliance with requirements and standards	Landscape Architect, DOE Planning
LV7	In vicinity of the proposed works	Potential future landscape and visual enhancement to benefit the appearance and usability of the cityscape around the Proposed Scheme.	The potential future enhancements measures listed below are only potential opportunities and would be subject to further consideration as part of a Strategic Advisory Group. • creation of a feature entrance area, including pedestrian steps and ramp access, to link York Street and Henry Street; • creation of large-scale land art, sculpture and landform around road network; • addition of suitably designed parapets with enhanced aesthetics on York Street overbridges. The proposed bridge may become a	In advance of and concurrent with construction	Monitoring of works to ensure compliance with requirements and standards	Landscape Architect, SAG, DOE Planning, Belfast City Council, Transport NI

Mitigation Item No.	Location	Mitigation Objective and Commitment	Potential Mitigation Measure	Potential Timing of Mitigation Measure	Potential Monitoring Requirements	Potential Additional Consultation Proposed
			positive landmark in the cityscape; • feature boundary treatments and feature decorative finishes to retaining walls and structures; • improved public realm treatments to key streetscapes, such as York Street. This would be ideally designed as a coherent masterplan, considering Belfast City strategic design issues, feature lighting and decoration of underpasses, especially pedestrian underpasses; and • temporary enhancements and feature boundary treatments, to the potential future development areas.			
LV8	Within footprint of the proposed works	Minimise landscape and visual impact during construction	Sensitive location of construction compounds and stockpile locations in relation to adjacent and nearby properties, to reduce the extent of adverse visual impacts. Construction compounds should be fully reinstated and secured with appropriate boundary treatments following completion of the works.	Concurrent with construction	Monitoring of works to ensure compliance with requirements and standards	Landscape Architect
Land Use (Chapter 12)						
LU1	Within footprint of proposed works	Minimise landtake	With a greater understanding of underlying ground conditions at the detailed design stage, landtake from and inconvenience to affected landowners should be minimised as much as feasibly possible.	In advance of and concurrent with construction	-	Affected Party
LU2	Within footprint of proposed works	Alleviate negative landtake impacts	Suitable accommodation works have been considered for each land plot affected by the Proposed Scheme. These are subject to discussions and if possible agreed with the affected landowner. A comprehensive schedule of accommodation works and mitigation	In advance of and concurrent with construction	-	Affected Party

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			measures would be developed through dialogue as necessary.			
LU3	In vicinity of proposed works	Minimise impacts upon surrounding land uses	Construction compounds to be located in areas that would cause the least disturbance to existing land uses, and to be fully reinstated post construction. Any land used for construction works, and outside the area to be developed for the road, is also to be fully reinstated at a minimum.	Concurrent with / post construction	On-site observation and inspection	Adjacent Party
LU4	In vicinity of proposed works	Minimise impacts upon surrounding land uses	Land uses adjacent to the site should be able to continue with minimal disruption and inconvenience. A CEMP shall be prepared in advance of construction to mitigate potential impacts and maintain continued access to and operation of land as necessary.	In advance of and concurrent with construction	On-site observation and inspection	Adjacent Party
LU5	In vicinity of proposed works	Disposal of surplus land	DRD Transport NI to carry out a review of land vested for construction. If this exceeds the minimum required for the performance of DRD's present and future responsibilities, any surplus land may be sold back to the original owner or others at the then market value.	Post construction	-	Previous Landowner or Other Interested Parties
Noise & Vibration (Chapter 13)						
NV1	Interchange links between Westlink, M2 and M3 and the slip roads from these to the local road network	To reduce noise levels generated from road traffic	Thin Surface Course Systems (TSCS), otherwise known as low noise road surfacing to be provided on Interchange links between Westlink, M2 and M3 and the slip roads from these to the local road network.	Concurrent with construction	Additional noise surveys may be required in accordance with the Noise Insulation Regulations (Northern Ireland) 1995 or at the discretion of Transport NI	Belfast City Council
NV2	North and south side of Westlink (either side of North Queen	To provide noise mitigation to groups of properties fronting/backing on	Noise barrier adjacent to northbound carriageway of Westlink: approximate height 1.5m, approximate length 240m; and Noise barrier adjacent to southbound carriageway of Westlink:	Concurrent with construction		Belfast City Council

Mitigation Item No.	Location	Mitigation Objective and Commitment	Potential Mitigation Measure	Potential Timing of Mitigation Measure	Potential Monitoring Requirements	Potential Additional Consultation Proposed
	Street Bridge)	to the Westlink	approximate height 1.5m, approximate length 285m.			
NV3	In vicinity of proposed works	To monitor and mitigate construction noise impacts where required	The Contractor should appoint or delegate a 'responsible person' to be present on site who should be willing to answer and act upon queries from the public.	Concurrent with construction		Belfast City Council, Affected Party
NV4	In vicinity of proposed works	Limiting construction vibration nuisance and potential impact to noise sensitive locations	Several mitigation measures are considered appropriate, and of good working practice for all construction contracts, as detailed in BS5228 (1997 & 2009), '*Noise and Vibration Control on Construction and Open Sites'*. Typical measures would include positioning of static plant as far away from receptors as possible, using well-maintained plant, temporary screening, enclosures, restricting works (where feasible) to daytime and staggering high vibration activities such as piling and jack hammering. These would be defined within a CEMP.	Concurrent with construction	Monitoring to be undertaken Pre & During construction, targeting areas where major earthworks and structures are close to receptors.	Belfast City Council
Pedestrians, Cyclists, Equestrians & Community Effects (Chapter 14)						
COM1	In vicinity of proposed works	Reduce impacts on potential future usage of community facilities	Where necessary, specific mitigation measures to negate adverse impacts upon community facilities are described within sub-section 14.6.1.6. Whilst it would not be possible to eliminate adverse impacts at all community facilities, in the majority of cases, the proposed mitigation measures would significantly reduce impacts.	Concurrent with construction	-	Affected Community Facility
COM2	South-east wingwall of North Queen Street Bridge	Treatment of the McGurk's Bar Memorial	Careful consultation with the local community would be required. In such instances, arrangements would normally be made to carefully remove the memorial and make it available for owners to resite. Although not proposed as part of the scheme, potential relocation of the memorial would be a matter for future consultation with victims' representatives and Transport NI.	In advance of construction	On-site observation and inspection	Affected Owners, Victims' Representatives and Transport NI

Mitigation Item No.	Location	Mitigation Objective and Commitment	Potential Mitigation Measure	Potential Timing of Mitigation Measure	Potential Monitoring Requirements	Potential Additional Consultation Proposed
COM3	Proposed Scheme	Provision of a dedicated bus lane on York Street and replacement of lost bus stops	A new bus lane is proposed between a new signalised junction at Galway House and the junction of York Street and Great Patrick Street. All other existing bus lanes within the scheme would be maintained. In consultation with Translink, any lost serviced bus stops would be appropriately relocated to new routes where feasible.	In advance of and concurrent with construction	-	Translink, Transport NI
COM4	Proposed Scheme	Replace, maintain and/or improve pedestrian/cyclist facilities/access.	Footways are provided on all surface streets, with existing widths maintained and where possible (within the constraints of the site), enhanced. An additional with-flow cycle lane of 1.5m width is proposed for cyclists heading northbound along York Street, with the provision of Advanced Stop Lines at signalised junctions. In the southbound direction on York Street, a 1.5m wide with-flow cycle lane is proposed between signalised junctions at Dock Street and at Galway House. The new bus lane between Galway House and the junction of York Street and Great Patrick Street would be made accessible to cyclists. All other existing bus lanes, accessible by cyclists, within the scheme would be maintained. At all junctions, provision would be made for non-motorised users in accordance with Department for Transport Local Transport Notes and Traffic Advisory Leaflets. Accordingly, dropped kerbs and tactile paving is proposed at all controlled and uncontrolled crossing points, with pedestrian guardrail provided where considered necessary to control movements. At proposed signalised junctions, puffin crossings would be implemented in line with DMRB guidance. The Proposed Scheme layout would also include the provision of a new, modern road lighting system for the safety of motorised and non-motorised road users. The provision, or replacement of existing lighting systems has been considered as part of this process and the provision of additional lighting under proposed bridge structures would continue to be considered as part of future design development.	Concurrent with / post construction	-	DRD Cycling Unit, Strategic Advisory Group, Transport NI

Mitigation Item No.	Location	Mitigation Objective and Commitment	Potential Mitigation Measure	Potential Timing of Mitigation Measure	Potential Monitoring Requirements	Potential Additional Consultation Proposed
COM5	Proposed Works	To minimise disruption and ensure safe passage of pedestrians and cyclists.	Careful traffic management to facilitate safe passage for pedestrians and others. This would typically include barriers defining the footpaths and safety zones to prevent construction vehicles encroaching on pedestrian areas. Where appropriate, segregated pedestrian routes would be provided. Traffic management would be closely monitored on site to ensure safe operation.	Concurrent with construction	Monitoring of works to ensure compliance with requirements and standards	-
COM6	Proposed Works	To minimise disruption to traffic.	Contractor to ensure delays to local and strategic traffic are kept to a minimum and full use is made of the available carriageway and works space. Mitigation measures may include: Advanced publicity outlining the traffic management proposals and duration, and giving advance warning of specific traffic management measures; Reducing lane widths; Efficient phasing of contraflow operations; and adequate advance signing of the works. Contractor required to maintain at least two-way traffic around the junction during weekday am and pm periods of peak traffic flow.	Concurrent with construction	Monitoring of works to ensure compliance with requirements and standards	-
Vehicle Travellers (Chapter 15)						
VT1	Proposed Scheme	Retaining / enhancing views experienced by the vehicle traveller.	Where appropriate, mitigation would include open parapets on overbridges to allow views from the road and to reduce the mass of the structure and planting design which should be sensitive to the interaction between retaining views from the road and screening	Concurrent with construction	-	Landscape Architect
VT2	In vicinity of proposed works	To maintain road safety and reduce driver stress	As part of the Traffic Management Plan, temporary warning and variable message signs would be erected as appropriate to draw attention to particular hazards including site accesses and temporary traffic management measures. Local & wider community should be notified of major works (i.e. road closures, diversions, etc) in advance in the local press, community facilities, radio, internet etc.	During construction	On-site observation	Local & Wider Community Transport NI

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Road Drainage & the Water Environment (Chapter 16)						
RDWE1	Proposed scheme	Quick removal of surface water to improve safety and minimal nuisance. Provide effective sub-surface drainage to maximise longevity of the pavement and its associated earthworks. Minimise impact of runoff on the receiving water environment.	A centrally located storm water pumping station is proposed to collect surface water drainage and convey water to an appropriate outlet. Surface water run-off collection for the Proposed Scheme would be achieved through a combination of road drainage gullies and combined kerb and drainage (CKD) systems, discharging to longitudinal collector pipes. In the outline design, CKD unit chambers would be provided at regular intervals and at locations further downstream on carrier drainage pipes, catch pit chambers would be provided with sump units to collect silt/sediment which would be subject to routine highway maintenance. The pumping station wet well plan dimensions within the outline design are 11.8 x 7m. The 0.6m deep operational depth which the sump would deliver would incorporate significant storage volume, provided beneath the lowest pump operating stop levels. The mixing effect arising from the large storage volume would provide further dilution of dissolved contaminants prior to entry into the pumping system and some settlement within the sump. The pumping infrastructure mechanism proposed would ensure regular discharge of flows (i.e. low flow pumps to be provided, assisted by high flow pumps which would operate during extreme rainfall events). This drainage design option also facilitates 'storm water separation', which would assist in reducing the frequency of flow surcharge experienced in the NIW sewerage network and would also reduce effluent volumes requiring treatment at Duncrue Street Wastewater Treatment Works.	Concurrent with construction	Monitoring of works to ensure compliance with requirements and standards	NI Water / NIEA – WMU / DOE Marine Team
RDWE2	In the vicinity of the quay wall	Avoiding adverse effects upon water	The design flow and flow velocity of storm water drainage discharges on the receiving water environment must be reflective	Concurrent with /	Monitoring of works to ensure	NI Water / NIEA – WMU / DOE

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	outfall point from the abandoned Gamble Street NI Water CSO culvert.	quality as a result of disturbing contaminated bed sediments within Belfast Harbour.	of the hydraulic calculations contained with Table 16.9 in order to minimise the potential for disturbance of contaminants within the bed sediments.	post construction	compliance with requirements and standards	Marine Team
RDWE3	Pumping Station catchment area	Measures to avoid an acute pollution incident occurring within Belfast Harbour in the event of an accidental spillage.	A manual shutdown facility is to be provided as part of the control system for operation of the pumping system. This shutdown system could be operated from a location which is remote from the Proposed Scheme (i.e. at the maintaining authority headquarters) enabling swift action to be taken in the event of a spillage occurring within the extents of the underpasses and pumping station catchment area.	Concurrent with construction	-	-
RDWE4	Proposed Scheme underpasses	Avoid drainage of groundwater and prevent flotation or seepage ingress from groundwater (which could potentially be contaminated)	Underpasses would be designed as sealed structures with sufficient load bearing capacity and flexural strength. This approach to the structural design of the underpasses would mean that within their structural formation between the finished road surface and the top of propping slab level, there would be no requirement to collect and dispose of significant quantities of groundwater.	Concurrent with construction	-	-
RDWE5	In the vicinity of the Proposed Scheme	Avoid ponding or accumulation of standing water within the Proposed Scheme footprint	Further drainage measures including surface water drainage solutions would be required in isolated areas adjacent to the site. These include the central scheme areas which may be landscaped and would, for example, be included in the pumping station catchment area, areas where the adjacent ground slopes towards the scheme, areas of proposed or existing engineered/earthworks slopes, footways or finally, paved areas within the site where storm water could potentially pond or accumulate.	Concurrent with construction	-	-
RDWE6	In the vicinity of the Proposed	Consideration of changes in the	To quantify this issue further, the following additional information is	In advance of	-	-

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	Scheme	local hydrogeological regime, which may potentially affect groundwater flow in the fluvial deposits, leading to changes in the hydraulic gradient and increased hydraulic heads that may be transmitted to overlying deposits.	required as part of the detailed design development: • Further routine groundwater level gauging of boreholes (i.e. weekly monitoring be undertaken over several weeks); • In-situ hydraulic testing of wells installed in the three hydrogeological units (i.e. the bedrock, the fluvial deposits and the estuarine alluvium); and • Numerical groundwater modelling to test the effects of deep foundation structures on the groundwater flow regime and to quantify the potential implications of head changes in the fluvial deposits on groundwater levels in the estuarine alluvium.	construction		
RDWE7	Proposed Scheme	Reduce the risk of coastal flood water ingress to underpasses.	It is proposed that scheme flood retaining walls would be provided and ramp approaches would be sufficiently raised to reduce the risk of coastal flood water ingress to underpasses.	Concurrent with construction	-	Rivers Agency
RDWE8	M3 to Westlink Underpass / Nelson Street	Reduce the risk of flood water ingress to underpasses.	A temporary flood barrier is to be incorporated into the Proposed Scheme to provide protection and remove the potential flood entry point. In addition, as part of the temporary flood barrier proposal, a Flood Risk Management Plan should be developed, the purpose of which would be to outline flood warning procedures, provide a safe work plan for erecting the temporary flood barrier, detail ownership and responsibility for the flood barrier, as well as methods for safe storage, and outline procedures for closing Nelson Street.	Concurrent with construction	-	Rivers Agency
RDWE9	Proposed Scheme	Reduce the risk of flood water ingress to underpasses via drainage infrastructure	New drainage infrastructure would be designed in such a way so as to prevent back flow routes occurring into underpasses during flood events. The storm water pumping station would be designed with resilience measures and protection to reduce risk of failure. To this extent, the drainage design is being progressed on the	In advance of construction / concurrent with construction	-	Rivers Agency

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			basis that the continual operation of the pumping station would be achieved through provision of adequate infrastructure, standby generator with permanent fuel storage and that the base level, of the pump controls and telemetry would be located above the 0.5%AEP flood level plus 600mm.			
RDWE10	Proposed Works	To minimise impact and avoid contamination of watercourses and ensure compliance with the Water Framework Directive	Any works in, near or liable to impact a waterway (including measures to mitigate adverse impacts) 'must' gain the approval of NIEA – WMU Pollution Prevention (PP), DOE Marine Team and DARD Rivers Agency, a minimum of two months prior to commencement of such works. Works require Method Statements to be agreed prior to the commencement to demonstrate how they would be completed with minimum disturbance and would describe the specific procedures to be put in place to control sediment mobilisation and spillages. Measures established through dialogue with the NIEA WMU Major Client Interface Group and stakeholders engaged through the consultation process would be included within the Method Statements (where appropriate and technically feasible). An Environmental Liaison Group also to be set-up to ensure that potential for significant impact upon the water environment is addressed and appropriate measures to mitigate effects are employed for sensitive activities.	In advance of construction / concurrent with construction	Monitoring of works to ensure compliance with requirements and standards	Rivers Agency / NIEA – WMU / DOE Marine Team
RDWE11	Proposed Works	Protection of the water environment in accordance with best practice guidelines	The Contractor shall be required to comply with the Pollution Prevention Guidelines (PPGs) regarding pollution of watercourses and CIRIA manuals C532 ("Control of Water Pollution from Construction Sites"), C648 ("Control of Water Pollution from Linear Construction Projects") and SP156 'Control of water pollution from construction sites – guide to good practice'. An Emergency Response Plan shall be prepared to minimise the risk and potential effects of any spillage incidents.	In advance of construction / concurrent with construction	Monitoring of works to ensure compliance with requirements and standards	NIEA – WMU / DOE Marine Team
RDWE12	Proposed Works	Control sediment	In principle it has been agreed that temporary discharges from the	In advance of	Monitoring of	NIEA – WMU /

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		erosion and contaminated silty runoff	works area (with appropriate settlement and filtration measures to ensure treatment of runoff and settling out of sediments before discharge), would be possible to the existing NI Water sewerage network, subject to consultations and submission of design proposals to NI Water On this basis, the CEMP should include an Erosion Prevention and Sediment Control Plan prior to commencement of any works.	construction / concurrent with construction	works to ensure compliance with requirements and standards	DOE Marine Team
Geology & Soils (Chapter 17)						
GS1	Proposed Works	Minimise adverse effects on the geology and soils	Employment of high standards of soil / deposit handling and management during the construction, and avoiding creation of bare areas of permanently exposed deposits that would be vulnerable to erosion.	During Construction	-	-
GS2	Proposed Works	Remediate any areas of contaminated land which may be encountered	Measures to remediate contaminated land may include additional targeted testing and risk assessments if no existing ground investigation data is available, and then assess whether there is a need for containment or disposal of the material. The re-use of this material would need careful consideration to demonstrate that unacceptable risks are not posed to health or environmental receptors; The Contractor would produce a CEMP, which would provide details of environmental control measures to deal with any contaminated land encountered during the site operations. Management of all materials onto and off the site should be suitably authorised through the Waste Management Regulations (NI) 2006 and/or the Water Order (NI) 1999. This should be demonstrated through a Site Waste Management Plan (SWMP).	During Construction	-	NIEA – Waste Management Unit / Belfast City Council
GS3	Proposed Works	Re-use of road construction	If material cannot be reused elsewhere for approved agricultural improvements or as fill, its disposal would be at suitable licensed	During Construction	-	NIEA – Waste Management

Mitigation Item No.	Location	Mitigation Objective and Commitment	Potential Mitigation Measure	Potential Timing of Mitigation Measure	Potential Monitoring Requirements	Potential Additional Consultation Proposed
		materials, such as surfacing planings for capping materials, should be adopted where possible	tips where it would be subject to landfill tax. There are strict legal controls preventing illegal dumping of surplus fill, including a requirement for a waste disposal license to be obtained and a Duty of Care on the Contractor. The Contractor would be required to make every effort to reuse as much of the material as possible within the area of the construction site. Any material to be reused, which is wet, should be stockpiled to allow it to dry out. Stockpiling should be well away from any sensitive areas of ecological or archaeological interest, or watercourses where pollution could occur. ADEPT and MPA guidance on managing reclaimed road materials (ADEPT and MPA 'Guidance on Managing Reclaimed Asphalt – Highways and Pavements', July 2013) and the NIEA publication on bitumen road planings (NIEA 'Guidance on the production of fully recovered asphalt road planings') should be followed in the identification and management of road planings.			Unit / Belfast City Council

APPENDIX A LIST OF RELEVANT GUIDANCE

List of Relevant Guidance Documents

Area	Publication
Dust Control	• Process Guidance Note PG3/1 (04): Blending, Packing, Loading, Unloading and Use of Bulk Cement (Defra, Welsh Assembly Government and Scottish Ministers, June 2004).
Cultural Heritage	• Department of the Environment (NI) - Planning Service (1999), *PPS 6: Planning Archaeology and The Built Heritage;* • The Historic Monuments and Archaeological Objects (Northern Ireland) Order 1995.
Ecology	• BS 1722:2006 British Standard for Fencing; • BS 5837:2005 Trees in Relation to Construction; • Department of the Environment (NI) - Planning NI (2011), Draft PPS 2 Natural Heritage (Revised). Consultation Version; • Department of the Environment (NI) - Planning Service (1997), PPS 2 - Planning and Nature Conservation. Planning Service, Belfast; • Department of the Environment (NI) – Environment and Heritage Service (2004), Badgers and Development; • Department of the Environment (NI) – Northern Ireland Environment Agency (2007), Bats and Development; • Department of the Environment (NI) – Northern Ireland Environment Agency (undated) Otters and Development. • Environment Agency (undated), Managing Japanese Knotweed on development sites: The knotweed code of practice. Vol 1 – 3. Environment Agency, Bristol; • Grogan A., Philcox C. & Macdonald D. (2001) Nature Conservation and Roads: advice in relation to otters. Wildlife Conservation Research Unit/Highways Agency.
Landscape, Lighting and Fencing	• BS 5489 Parts 1 and 9 Code of Practise for Road Lighting; • Institute of Lighting Engineers guidance notes for the Reduction of Light Pollution, 2000.
Noise and Vibration	• BS 5228-2 2009 Code of practice for noise and vibration control on construction and open sites; • BS 6472 2008 Guide to evaluation of human exposure to vibration in buildings. Vibration sources other than blasting; • BS 7385 Part 2: 1993 "Evaluation and measurement for vibration in buildings".
Road Drainage and the Water Environment	• PPG2 and PPG26 and be compliant with The Control of Pollution (Oil Storage) Regulations (Northern Ireland) 2010; • The Control of Substances Hazardous to Health Regulations (Northern Ireland) 2003 (COSHH Regulations).
Geology and Soils	• DMRB Volume 4, Section 1, Part 6, HA 74/07 ‘Treatment of Fill and Capping Materials Using Either Lime or Cement or Both’