

East Meath - North Dublin Grid Upgrade Construction Environmental Management Plan – Appendix D

Surface Water Management Plan

EirGrid

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Appendix D – Surface Water Management Plan

1. Introduction

This Surface Water Management Plan (hereafter referred to as the SWMP) for the East Meath – North Dublin Grid Upgrade (hereafter referred to as the Proposed Development) details the control and management measures for avoiding, preventing, or reducing any significant adverse impacts on the surface water environment during the Construction Phase.

The control and management measures are best practice approaches that can be used to protect surface water during the Construction Phase of the Proposed Development.

1.1 Objectives

The objectives of the SWMP are to:

- Ensure sediment and pollution control requirements can be built into the design stage, and land take requirements for the Proposed Development, are defined as far as practicable;
- Minimise, and where possible, avoid potential for sediment, silty water, and other contaminants such as oil, fuel, concrete, cement, and other materials to discharge to a watercourse;
- Minimise the area and duration of exposed ground which has the potential to create runoff; and
- Minimise any potential impacts in the event of an accidental spillage or site runoff by providing appropriate control and containment measures on-site and by maintaining sediment and pollution controls throughout the Construction Phase of the Proposed Development.

1.2 Relevant Legislation, Policy and Guidelines

The SWMP and the control and management measures relating to surface water management have been prepared with regard to the following guidance documents, where relevant:

- Construction Industry Research and Information Association (CIRIA) Control of Water Pollution from Construction Sites. Guidance for Consultants and Contractors (C532) (CIRIA 2001);
- CIRIA C648 Control of Water Pollution from Linear Construction Projects: Technical Guide (Murnane et al. 2006a);
- CIRIA C649 Control of Water Pollution from Linear Construction Projects: Site Guide (Murnane et al. 2006b);
- Best Practice Guide BPGCS005 – Oil Storage Guidelines (Enterprise Ireland 2003);
- PUB C692 Environmental Good Practice on Site, 3rd Edition (CIRIA 2010)
- Control of Water Pollution from Linear Construction Projects. Technical Guide (C648) (CIRIA 2006a);
- Control of Water Pollution from Linear Construction Projects. Site Guide (C649) (CIRIA 2006b);
- National Roads Authority (NRA) Guidelines for the Crossing of Watercourses During the Construction of National Road Schemes (NRA 2005);
- Transport Infrastructure Ireland (TII) Design Manual for Roads and Bridges Part 3 DN-DNG-03022 (NRA HD 33/15) (Including Amendment No. 1) (TII 2015a);
- Guidelines for the Creation, Implementation and Maintenance of an Environmental Operating Plan (hereafter referred to as the TII Guidelines) (TII 2007);
- Guidance Note on Storage and Transfer of Materials for Scheduled Activities (Environmental protection Agency 2004);
- Road Drainage and the Water Environment DN-DNG-03065 (TII 2015b); and
- Inland Fisheries Ireland (IFI) Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters (IFI 2016).

The following directive and legislation were also considered:

- Number 10 of 1996 – Waste Management Act 1996 Revised (hereafter referred to as the Waste Management Act 1996 (as amended) (hereafter referred to as the Waste Management Act));
- Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy (hereafter referred to as the Water Framework Directive (WFD));
- S.I. No. 324 of 2011 – European Communities (Shipments of Hazardous Waste exclusively within Ireland) Regulations 2011; and
- S.I. No. 291 of 2013 – Safety, Health and Welfare at Work (Construction) Regulations 2013, as amended by S.I. No. 528/2021 - Safety, Health and Welfare at Work (Construction) (Amendment) Regulations 2021.

1.3 Contents of this Surface Water Management Plan

Table 1.1 provides the contents of the SWMP, and where details can be found in this document.

Table 1.1: SWMP Contents

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1.4 Potential Sources of Water Pollution

The main activities / areas where sediment and surface water runoff and pollution generation have the potential to arise include the following:

- Earthworks – including planing, excavation and processing, transportation of materials (within and outside the Proposed Development), and deposition of materials and temporary stockpiling (if required). The most significant area of concern regarding sediment control for the Proposed Development is when existing low porosity surfaces (existing roads and footpaths) are removed, and the underlying granular layers are disturbed and exposed. Typically, these surfaces are likely to be exposed during the following activities associated with the Proposed Development:
 - The preparatory and site clearance works;
 - Creation of the excavated cable trench, Joint Bays and Passing Bays;
 - Infilling of trenches;
 - Tracking of machinery; and
 - Vegetation clearance.

- Construction vehicles and machinery – erosion of exposed surfaces can result in excessive volumes of eroded material entering surface water features. Access track construction may affect surface runoff patterns, creating alternative flow paths and promote erosion of previously unaffected areas;
- Construction of structures and concreting activities – concrete, grout and other cement-based products which would typically be used in the construction of structures are highly alkaline and can generate very fine, high alkaline silt (11.5 pH) which has the potential to flow as runoff to surface water features;
- Watercourse crossings, in-stream works, and riverbank works – there is a higher likelihood of impacts on surface water quality when construction is taking place over or near surface waters (e.g. silty water can more easily find a pathway either via drains or overland flow to the water body and impact on its baseline water quality); and
- Temporary Construction Compounds (including temporary Horizontal Directional Drilling (HDD) Compounds) and machinery refuelling areas – there is potential for welfare facilities and wastewater to be discharged to surface water bodies which can impact surface water quality.

2. Roles and Responsibilities

The roles and responsibilities of key stakeholders are outlined in Section 1.5 of the Construction Environmental Management Plan (CEMP), to which this SWMP is appended.

The TII Guidelines (TII 2007) identifies the role of an Environmental Manager (EM). The EM, or equivalent, will ensure the successful development, implementation, and maintenance of the SWMP.

A full-time on-site Environmental Clerk of Works (EnvCoW) will be appointed prior to the commencement of works. The role of the EnvCoW will be to monitor and report on compliance with planning consents, environmental permits, legislation and mitigation.

3. Environmental Incident Response Plan

An Environmental Incident Response Plan (EIRP) has been prepared for the Proposed Development (see Appendix A of the CEMP). The EIRP will ensure that in the unlikely event of an incident, response efforts are prompt, efficient, and suitable for the particular circumstances. The EIRP includes measures to address surface water related incidents such as accidental spillages of noxious substances (e.g. oil and significant releases of sediment or concrete washings). The EIRP details are not repeated in this Section of the SWMP. However, it should be read in conjunction with the general measures set out in this SWMP.

4. Control and Management Measures

4.1 General Measures

A number of measures will be implemented in order to manage surface water in and around construction works and to prevent impacts to surface waters as a result of construction activity. The appointed contractor will be required to update and implement this SWMP, which will form part of the overall appointed contractor CEMP. The measures outlined below will be included at a minimum in the updated SWMP.

The CEMP and the Construction Resource Waste Management Plan (CRWMP) (included as Appendix C of the CEMP), outline measures to control and manage activities and waste at the surface to prevent issues such as accidental spillage or increased runoff as a result of hardstanding or precipitation infiltration into stockpiles, exposed soils and silt. The CEMP and CRWMP will be implemented in full.

The appointed EnCoW will monitor and regularly inspect the implementation of all ecological and surface water mitigation contained in the CEMP, Environmental Impact Assessment Report (EIAR), this SWMP and the NIS (which are all included in the planning application pack), and will act as a liaison between the Electricity Supply Board / EirGrid and An Bord Pleanála in the discharge of planning conditions relating to biodiversity and surface waters.

All works will be carried out in accordance with the Guidelines on Protecting Fisheries During Construction Works in and Adjacent to Waters (IFI 2016).

Works method statements will be agreed with IFI for all water body crossings and the Office for Public Works (OPW), where required. The works method statement will include details on monitoring requirements for in-stream concrete pouring works, handheld turbidity monitoring for in-stream works and will include the following:

- Prior to the concrete pour taking place, all mitigation for turbidity and erosion control will be checked to ensure it is fit for purpose;
- Established concrete washout management areas will be designated to control the discharge of concrete washout;
- An emergency response plan will be developed and communicated to site staff prior to the concrete pour being undertaken;
- The EnCoW and on-site personnel will monitor the concrete pour continuously, ensuring that any spills are promptly addressed and mitigated; and
- The EnCoW will conduct a thorough inspection of the site after the concrete pour to identify any environmental impacts and implement clean-up measures if necessary.

An adverse weather stop work plan will be developed to ensure that activities with the potential to cause pollution are stopped under certain weather conditions. Met Éireann (red, amber, yellow) warnings will be monitored daily by the EnCoW by accessing the Met Éireann website (Met Éireann 2024). Works will be stopped where red weather warnings are issued. Where an amber weather warning is issued, works will be monitored by the EnCoW and stopped where deemed appropriate based on the site conditions.

4.1.1 Temporary Construction Compounds and HDD Compounds / Laydown Areas

4.1.1.1 Temporary Construction Compound Establishment

All surface water runoff will be intercepted and directed to appropriate treatment systems / settlement facilities for the removal of pollutants prior to discharge.

4.1.1.2 Security

The Temporary Construction Compounds and HDD Compounds will be fenced off, lit (during working hours) and secured with Closed-Circuit Television (CCTV), to ensure safe storage of all material, plant and equipment, if required, to prevent acts of vandalism that could result in leaks or spills from materials.

4.1.1.3 Welfare Facilities

Temporary Construction Compounds will be engineered with appropriate services as discussed in Chapter 4 (Proposed Development Description) in Volume 2 of the EIAR.

Temporary welfare facilities will need to be used (e.g., portable toilets in the vicinity of works). Welfare facilities will discharge wastewater either to an existing sewer (where available), with the permission of the

utility operator, or to a sealed holding tank to be collected and disposed of in an appropriate manner to a suitably licensed facility off site by a licensed contractor.

4.1.1.4 Fuel Storage

- All hydrocarbons used during the Construction Phase will be appropriately handled, stored, and disposed of in accordance with recognised standards as laid out in the Environmental Protection Agency (EPA) IPC Guidance Note: Guidance Note on Storage and Transfer of Materials for Scheduled Activities (EPA 2004);
- All chemical and fuel filling locations will be contained within signposted, designated bunded areas, a minimum of 20m from any surface water drain or watercourse;
- At the Temporary Construction Compounds, where the site is pervious, an area of hardstanding will be installed in a demarcated area for refuelling, and vehicle / plant cleaning and service areas. This area will be drained to a soak away if possible, or to local surface water drains, with the permission of the asset owner;
- Suitable precautions will be taken to prevent spillages from equipment containing small quantities of hazardous substances (for example, chainsaws and jerry cans) including:
 - Each container or piece of equipment will be stored in its own drip tray made of a material suitable for the substance being handled;
 - Spill kits and drip trays will be provided for all equipment and at locations where any liquids are stored and dispensed, and staff will be trained on the procedures to be followed;
 - Spill kits will be provided at all Temporary Construction Compound locations and will be carried by all crews during underground cable installation and substation upgrade works;
 - Spill kits will be of adequate size for the volume of substances being carried; and
 - Containers and equipment will be stored on a firm, level surface.
- Procedures and contingency plans will be in place at each works area to address the cleaning up of small spillages, as well as dealing with an emergency incident (see Appendix A (EIRP) of the CEMP). A stock of absorbent materials such as sandbags will be kept at each work site, on plant working near water and particularly at refuelling areas and where fuel or oil is stored. Any sandbags deployed in the containment of a spillage will be disposed of appropriately as per guidance on the spillage they were deployed to contain;
- The storage of fuels, other hydrocarbons and other chemicals within the Temporary Construction Compounds will be in accordance with relevant legislation and best practice. In particular:
 - Fuel tanks, drums, and mobile bowsers (and any other equipment that contains oil and other fuels) will be housed within a bund of at least 110% capacity of the fuel tank itself or at least 25% of the total volume of the containers, whichever is greatest. The fuel tank will be double skinned. There will be no passive drainage from the bund, and any water collected within it will be pumped out and removed off site for disposal; and
 - For any designated area(s) for oils, fuels, chemicals, hydraulic fluids etc., storage and refuelling will be set up at least 10m from any surface water drains or watercourses (as per the range of CIRIA Guidance listed in Section 1.2) and the storage location within the Temporary Construction Compounds will be organised, so as to be as far away from surface water drains or watercourses as is practicable, to minimise risks from leaks and spills. Refuelling and storage of fuels will be carried out on impermeable surfaces.
- Storage of fuel and refuelling will be undertaken within bunded areas, with double skinned tanks and carried out on impermeable surfaces. Storage areas will be covered, wherever possible, to prevent rainwater filling the bunded areas. No plant refuelling will take place within 10m of a watercourse.

4.1.1.5 Bentonite Storage

There is a requirement for HDD to take place below major infrastructure that will be crossed by the Proposed Development (crossing of the M1, M2 and M3 Motorways) to prevent disruption to public services. HDD will require the use of bentonite clay. Bentonite is an absorbent aluminium phyllosilicate clay which is mixed with water during the drilling process to form a slurry. The slurry is used as a drilling fluid due to its unique properties which aid it to manage viscosity and fluid control, air in hole cleaning and wellbore stabilisation, lubrication and the cooling of down hole drilling equipment. Bentonite is also used in the grouting and sealing of boreholes as it expands when mixed with water. These attributes make bentonite a good drilling fluid, however, it is harmful to the water environment if not stored and used correctly.

Therefore, the storage of bentonite will include the following measures:

- The storage area will be equipped with containment structures to prevent the spread of bentonite in case of spills or leaks;
- Bentonite will be stored within compound areas on impermeable liners to minimise the risk of groundwater contamination;
- The storage area will be watertight to prevent water leaking in to bentonite pellets causing expansion in runoff;
- Storage areas will be regularly cleaned and inspected to identify and address potential issues promptly;
- Bentonite storage areas will be clearly labelled with appropriate warning signs;
- When bentonite is to be used at a site location outwith the compound area, mixing will take place within a contained and sealed environment to prevent bentonite runoff entering surface water features; and
- The appointed contractor will develop specific method statements for the use of bentonite during HDD works. These will contain methods for monitoring the drilling fluid return to ensure no bentonite is being lost to formation during drilling (i.e., bentonite breakout).

4.1.1.6 Storage of Materials and Waste

Where material is required to be stored:

- A buffer zone of 20m will be maintained between storage and working areas and sensitive water bodies (i.e. those designated under the WFD), taking account of the minimum working area required to facilitate the works;
- Storage areas for solid materials, including waste soils (where applicable), will be designed and managed to prevent deterioration of the materials and their escape (via surface runoff or wind blow);
- Storage areas will be kept secure to prevent acts of vandalism that could result in leaks or spills; and
- All containers of any size will be correctly labelled indicating their contents and any hazard warning signs.

A register of all hazardous substances, which will either be used on-site or expected to be present (in the form of soil and / or groundwater contamination) will be established and maintained. This register will be available at all times and will include as a minimum:

- Valid Material Safety Data Sheets (MSDS);
- Health and safety and environmental controls to be implemented when storing, handling, using and in the event of spillage of materials;
- Emergency response procedures / precautions for each material; and

- The Personal Protective Equipment (PPE) required when using the material.

Waste may be stored at the Temporary Construction Compounds for a limited amount of time to help to limit the number of vehicle movements to and from site as far as possible, in order to minimise effects on the local roads (refer to Appendix C (CRWMP) of the CEMP). Where waste is required to be stored:

- All collected waste will be managed in accordance with the Waste Management Act, and associated Regulations;
- All waste will be stored in secure designated areas, in enclosures or containers to prevent material being dispersed by the wind;
- Designated areas will be sited at least 10m away from surface water drains or watercourses to limit the risk of escape and contamination of watercourses;
- Safe handling of all potentially hazardous materials will be emphasised to all construction personnel employed;
- Waste storage containers will be labelled with their waste type and their List of Waste (LoW) code. Any labelling will be consistent with Industry Best Practice at the time construction commences and reviewed annually;
- Liquid wastes will be stored in containers within bunded zones with secondary containment of at least 110% capacity of the largest container or at least 25% of the total tank capacity inside the bunded zone (whichever is the greatest); and
- Incompatible or hazardous wastes will be stored and handled in accordance S.I. No. 324 of 2011 – European Communities (Shipments of Hazardous Waste exclusively within Ireland) Regulations 2011.

4.2 Control of Sediment

There are a number of sources of sediment or silt-laden water on a construction site, including silty runoff from stripped soils, and the stockpiling of soils. Control measures for each of these will be provided, as follows.

4.2.1 Silty Water Runoff

- Clearing and stripping of topsoil or existing roads and footpaths that expose underlying granular layers at each phase of works will be delayed as long as possible, and will be carried out shortly before construction begins;
- Cut-off ditches, berms or diversion channels will be utilised around working area boundaries, where possible, to limit surface water entering the excavated areas and silty water running off the site into surface water drains or watercourses;
- Silt fences and silt traps will be installed prior to commencement of works and will be inspected daily to inform adaptive management as required. The locations of the same will be determined by the EnCoW. Site restoration, post works, will be carried out in agreement with relevant statutory consultees and with IFI, where relevant to watercourses;
- Silt fences will be inspected regularly by the EnCoW. These inspections will be daily during the proposed construction works, and regularly on completion of the works until bare areas have developed new growth, but particularly after heavy rains and / or strong winds. Any defects will be rectified immediately;
- Silt traps will be located in small drains where flow is low, and silt fences will be located where runoff from large areas needs to be controlled;
- Silt fences will be installed in the working areas and not at the water body;
- Where distances between the works and water body allow, a minimum setback distance of 20m from the water body will be maintained;

- Proposed construction access routes will be delineated, such that an appropriate set back distance from water bodies is maintained;
- Where an appropriate set back distance cannot be maintained, and works are to be undertaken adjacent to water bodies, the setback distance will be delineated and monitored by the EnCoW on-site; and
- Weather conditions will be taken into account by the appointed contractor when planning construction activities to minimise the risk of silty water runoff from the site.

4.2.2 Silt Trap

The purpose of a silt trap is to reduce the level of solids in slow flowing water. The silt trap works by allowing a build-up of water behind it slowing the flow and allowing solids to settle out. The following requirements will apply during the Construction Phase:

- Silt traps will be placed in drains downstream of working areas where the volume of water flow is expected to be low and will be identified on-site by the EnCoW;
- Silt traps will be made of terram, not mesh;
- The silt trap will be staked into the banks of the drain / water body, such that no water can flow around the sides;
- The material will be bedded into the drain bed / water body to prevent water flowing beneath it;
- The height of the trap will be lower than the bank heights. The upper edge will be fixed to a timber cross piece. This will allow water to overtop the silt trap and not burst through or around it;
- Inspections will be carried out daily during the proposed Construction Phase works by the EnCoW, and after heavy rains and / or strong winds; weekly on completion of the works for at least one month, and monthly thereafter until bare areas have developed new growth;
- Any build-up of solids will be carefully removed without removing any vegetation growing on the bottom;
- The silt trap will not be pulled from the ground but cutaway at ground level and posts removed; and
- A record of when it was installed, inspected and removed will be maintained by the EnCoW as part of the site works package.

4.2.3 Silt Fences

The following measures will be implemented in relation to silt fences during the Construction Phase:

- Silt fences will be installed prior to the commencement of works and will be inspected daily by the site team and EnCoW to inform adaptive management, as required. The locations of the same will be determined by the EnCoW;
- Site restoration post-works will be carried out, in agreement with IFI. These works will include riverbank stabilisation, gravel replacements, bank profiling and planting where required. In all cases, the site will be restored post-installation;
- Silt fences will be installed downslope of the area where silt is being generated;
- To be effective, the silt fence will contain the area where silt is generated and will terminate on high ground (i.e., an elevated area not adjacent to any watercourse);
- The base of the silt fence will be bedded at least 15cm to 30 cm into the ground at 2m intervals. The manufacturer's installation instructions will be followed during installation to ensure that the silt fence is appropriately installed;
- Once installed, the silt fence will be inspected regularly by the EnCoW, daily during the proposed Construction Phase works, and regularly on completion of the works until bare areas

have developed new growth, but particularly after heavy rains and / or strong winds. Any defects will be rectified immediately;

- Two lines of silt curtain / fence will be installed, for the receptors listed in Table 12.7 in Chapter 12 (Hydrology) in Volume 2 of the EIAR), unless otherwise agreed by the EnCoW;
- Any build-up of sediment along the fence boundary will be removed daily;
- Silt fences will be maintained until vegetation on the disturbed ground has re-established;
- The silt fencing will be left in place until the works are completed (which includes removal of any temporary ground treatment) and will remain in place until bare areas have developed new growth;
- Silt fences will not be removed during heavy rainfall;
- The silt fence will not be pulled from the ground but cutaway at ground level and posts removed; and
- A record of when it was installed, inspected and removed will be maintained by the EnCoW as part of the site works package.

4.2.4 Stockpiling Material

The following measures will be implemented for the stockpiling of materials. During construction, mobilisation sites will either be cleared in stages to prevent bare earth being exposed to ambient conditions for prolonged periods, or the bare earth will be immediately covered in a gravel / plastic covering to reduce the likelihood of sediment laden runoff following rainfall events. Stripped soil will be stockpiled more than 10m away from the surface interceptor drain and watercourses. Stockpiles will be in a dry zone that is not subject to flooding (i.e. outside the 1:100 flood extent (1% Annual Exceedance Probability)).

The following measures will be put in place by the appointed contractor for stockpiling of material:

- Clearing and stripping of topsoil or existing roads and footpaths that expose underlying granular layers at each phase of works will be delayed as long as possible, and will be carried out shortly before construction begins;
- Topsoil stripping in close proximity to any watercourses will be undertaken in dry weather conditions and all stockpiles will be located at least 10m from a watercourse or removed off site. Stockpiles within 200m of a watercourse will be covered to prevent rainwater leaching in to and mobilising the material.
- There will be designation of appropriate locations set back from watercourses and methods for stockpiling soil, aggregates, chemicals, etc. Where an appropriate set back distance cannot be maintained, and works are to be undertaken adjacent to water bodies, the setback distance will be delineated and monitored by the EnCoW on-site;
- Where an excavation contains a combination of acceptable and non-acceptable material for reuse, the excavation will be conducted so that the acceptable material is excavated and stockpiled separately without contamination by the unacceptable material;
- Temporary stockpiles will be located away from surface water drains or watercourses at a minimum distance of 10m;
- The topsoil, and upper level of subsoil, will be stripped and stockpiled in identified locations;
- For watercourse crossings, stockpiles will not be located anywhere within the crossing working area;
- No stockpiles will be located within a European or National designated site or within a floodplain area; and
- Management of stockpiles to prevent siltation of watercourse systems through runoff during rainstorms will be required with the final measures to be determined by the appointed contractor. The following measures or equivalent measures will be included, at a minimum:

- Allowing the establishment of vegetation on the exposed soil. Where the stockpiles will not be present long enough for vegetation to be established, they will be covered to reduce rain infiltration and runoff;
- Providing silt fences or silt traps at the base of the stockpile to mitigate runoff during rain events;
- Surrounding stockpiles with cut-off ditches to contain runoff;
- Directing any runoff to the site drainage system or filter drains along the construction working width and to the settlement pond (or other) treatment systems; and
- Providing bunds or another form of diversion to keep runoff from entering the stockpile area.

For mitigation relating to the stockpiling of riverine material excavated during the watercourse crossings, refer to the Hydrology Mitigation Measures in Table 6 of the CEMP (as taken from Chapter 12 (Hydrology) in Volume 2 of the EIAR).

4.3 Open Trench Water Crossings

The primary method for the crossing of water bodies will be open cut trenching. This approach will require the provision of a dry working area, which will be determined by the appointed contractor, but is likely to involve fluming / over pumping on smaller watercourses. This crossing method requires water bodies to be protected from the potential impacts outlined in Chapter 12 (Hydrology) in Volume 2 of the EIAR (included in the planning application pack). The following mitigation measures will be implemented along with the mitigation mentioned in Section 4 to minimise the impacts associated with open cut watercourse crossings:

- No works on water bodies will be allowed to commence until the relevant Risk Assessment Method Statements (RAMS) and pertinent Health and Safety documents are received from the specialist appointed contractor and are reviewed and agreed by the Client's representative. The appointed contractor documents will include method statements, open trenching risk assessments and environmental management plans specific to the area where the trenching is to take place. These plans will be submitted by the appointed contractor to the Employer's Representative on-site for review and comment, prior to commencing open trench operations. In addition to this, for the in-channel crossings, the appointed contractor will be required to prepare detailed construction method statements. Such method statements will be provided to IFI for approval;
- All open trenched water body crossings will take place during the June to September period in order to avoid the period of salmon and trout spawning, unless otherwise agreed with IFI. Consultation to-date with IFI indicates that for the crossings of the Tolka_020 (WB06), as a minimum, instream timing restrictions will apply as per the Guidelines on Protecting Fisheries During Construction Works in and Adjacent to Waters (IFI 2016);
- Any natural bed substrate (up to a depth of 30cm) removed from the water bodies will be stored separately to other stockpiled material, and covered with suitable waterproofing to prevent the washout of fines. Where a depth of 30cm is not present, the full depth of the layer will be removed to where the substrate is mainly clay or sand;
- The ground preparation works (such as soil stripping, hardstand formation) adjacent to the water body crossing will be carried out in the same manner as that for other works activities;
- Dewatering of the excavation will be treated on-site, and where necessary, pumps will be used to remove excess water from excavations. De-watering volumes will be treated using settlement tanks before the settled water is returned to the water body. A second tank in series with the first will be used if the first is not sufficient to remove enough solids. Pumped over water will be directed to a splash plate to prevent erosion of the riverbed / bank at the downstream outlet;
- Where technically feasible (i.e., where space and topographic constraints allow), fluming will be used as opposed to over pumping to provide a dry working area for the watercourse crossing. Where sites can be flumed, the diameter of the flume pipe will be chosen to accommodate

flows at the time, with spare capacity to cover that predicted over the period that the works are expected to last. A clay material will be used around the flume pipe to create a seal and prevent leakage and loss of flow volumes;

- Where fluming cannot be achieved, and damming and pumping methods are to be used for open trenching, sandbags will be used with an impermeable barrier. Material excavated from the trench (and an upstream pump sump, if required) will be placed on terram on level ground as far back from the water body edge, as is practicable, and surrounded on its downslope side by a silt fence and / or impermeable berm to prevent material re-entering the water body. This material, if deemed suitable, can be used to partially backfill the trench. However, a significant amount of material will be in excess and will be removed from site by a suitably licensed handler to a suitably licensed facility. All pumps will be monitored on a daily basis, and if failure occurs, pumps will be repaired or replaced as soon as possible;
- The natural bed material removed which was set aside will be used to reinstate the stream bed after the ducts have been installed and the flume pipe has been removed, as well as all the damming materials. The stream bed will be reinstated at the same level and grade as it was prior to the works to ensure that there are no changes in channel bed gradient;
- All bank surfaces will be reinstated using biodegradable stabilising materials (e.g. coir matting), which will be allowed to degrade and revegetate naturally from wind-blown seed. A silt fence will be placed along the riverbank where the works were undertaken to prevent solids washed off during heavy rainfall from entering the stream while the surface re-vegetates. This measure will be particularly important at sites which slope to the edge of the water body;
- Mitigation measures outlined in Section 4.2.1 to Section 4.2.4 will be employed, where appropriate, under the direct supervision of the EnCoW; and
- Visual monitoring, supported by visual turbidity monitoring of receiving waters, will be conducted by appointed contractor's EnCoW for the duration of the works. Post-reinstatement, weekly monitoring will also be undertaken until vegetation is established.

4.4 Use of Concrete

- The use and management of concrete in or close to watercourses will be carefully controlled to avoid spillage. Alternate construction methods are encouraged, for example, the use of pre-cast concrete or permanent formwork will reduce the amount of in-situ concreting required;
- Weather conditions will be taken into account when planning construction activities which require the use of wet concrete, to minimise the risk of the runoff of concrete 'washout' from site;
- Where concrete batching is proposed by the appointed contractor, this activity will be carried out at least 20m from surface water drains or watercourses. Washout from such mixing plant will be carried out only in a designated contained impermeable area;
- Batching and mixing activities and material storage areas will be located at least 10m (as per the CIRIA Guidance listed in Section 1.2) away from surface water drains or watercourses;
- Chute washout will be carried out at designated locations only, at least 10m from surface water drains or watercourses. These locations will be signposted throughout the construction works areas;
- Chute washout locations will be provided with appropriate designated, contained impermeable areas and treatment facilities, including adequately sized settlement tanks;
- The clear water from the settlement tanks will be pH corrected prior to discharge to any surface water drains or watercourses, or alternatively disposed of as waste to a licensed facility;
- Where temporary batching plants are required on-site, these will be located a minimum of 10m from any watercourse or drain (with exception to batching within a seal, dry working area);

- Washout from the batching process will be isolated from watercourses and drains and collected in a lined container. The container will be appropriately sized such that its capacity is at least 110% of the expected washout volume;
- The clear water from the settlement tanks will be pH corrected prior to discharge to any surface water drains or watercourses, or alternatively disposed of as waste to a licensed facility in accordance with the Duty of Care for Waste;
- Placing and/or batching of concrete in or near watercourses will be carried out under the supervision of the EnCoW;
- Wet concrete operations adjacent to and within water bodies will be avoided where possible, with a minimum separation distance of 20m, with the exception of when working within a sealed dry working area (e.g., during a trenched crossing);
- The appointed contractor will ensure that all concrete truck washing / cleaning is undertaken off site, where possible, and remote from water bodies or potential pathways to water bodies;
- There will be no hosing of concrete, cement, grout, or similar material spills into surface water drains or watercourses. Such spills will be contained immediately, and runoff prevented from entering the watercourse. Contained runoff will be collected and treated / disposed of appropriately; and
- Discharge of washout water to wastewater (foul) sewer will only be carried out with the express permission of the sewerage utility operator and will be treated to the standard required, for example, because of its high pH (alkalinity), washout water may need treatment before disposal to the foul sewer.

4.5 Vehicles and Plant

- Vehicles and plant provided for use on the Proposed Development will be in good working order to ensure optimum fuel efficiency, and will be regularly inspected to ensure that they are free from leaks and are promptly repaired when not in good working order;
- Vehicles and plant will not park near or over surface water drains or watercourses, and where practicable, will only use pre-defined construction access routes throughout;
- Refuelling of vehicles and plant will be carried out on bunded hardstanding surfaces, using drip trays to ensure no fuel can contaminate the ground outside of the bunded areas;
- The appointed contractor will provide wheel washing facilities, and any other necessary measures to remove mud and organic material from vehicles at the Temporary Construction Compounds, where necessary. These will be located at least 10m away from any surface water drains or watercourses;
- Activities will be planned in advance and machinery will be managed to ensure that the number of trips is limited to the minimum required at each location;
- A buffer zone of 20m will be maintained between storage and working areas and sensitive (WFD designated) water bodies, taking account of the minimum working area required to facilitate the works;
- Tracking beside streams will be avoided where practicable to avoid damage to the bankside. Where tracking of plant and machinery is necessary, steps will be taken to reduce the impact to channel banks through the provision of track mats or similar to reduce the impacts on the substrate;
- Geotextile or timber matting will be used on soft ground unless the EnCoW advises, before or after monitoring, that use of a wide-tracked machine alone would produce relatively lower siltation risk, than the installation and removal of bog mats;
- Concrete will be brought to site by covered truck. Wet concrete operations adjacent to water bodies will be avoided where possible, with a minimum separation distance of 20m, with exception of in-stream pours which would be undertaken within a sealed dry working area. The

- appointed contractor(s) will ensure that all concrete truck washing / cleaning is undertaken off site where possible and remote from water bodies or potential pathways to water bodies; and
- Refuelling of plant, equipment and vehicles will be carried out on impermeable surfaces.

4.6 Water Body Crossings

There will be a requirement to provide a water body crossing on Dunboyne Stream_010 to facilitate construction access. At this stage it is anticipated that the temporary crossing will become a permanent crossing in this location to facilitate the new permanent access track to Joint Bay 1. The crossing will be subject to an extensive options appraisal during detailed design, which will determine the most appropriate crossing methodology. The following mitigation measures will be implemented during detailed design, along with the mitigation mentioned throughout Section 4, to minimise the potential for impacts associated with water body crossings.

4.6.1 Culvert Crossing

- Implement best practice associated with the design of culvert crossings (SEPA 2010; IFI 2016);
- The culvert will be positioned on the straightest part of the water body and aligned with the water body bed in this location;
- Culvert lengths will be the minimum required to facilitate the crossing;
- Bottomless or clear span culverts will be favoured during the detailed design stage with respect to closed pipe culverts;
- All new proposed culverts and proposed culvert upgrades will be suitably sized for the expected peak flows in the watercourse (and will be agreed with IFI during the detailed design stage);
- Where possible, pre-cast elements for culverts and concrete works will be used;
- Culverts will be installed such that, where practicable, they align with the existing channel gradient and maintain existing channel width. This will help to ensure adequate water depth and velocity for fish passage;
- The natural riverbed level and slope will be maintained, by burying the culvert invert below the natural bed level. The culvert invert will be embedded to a minimum depth of 300mm (millimetres), or as agreed with IFI during the detailed design stage;
- All guidance / mitigation measures proposed by the OPW or the IFI will be incorporated into the detailed design of the proposed culvert;
- A sediment retention system (e.g. baffles) will be installed within culverts, where required, based on channel gradient and likely flow conditions;
- A low flow channel will be considered during the detailed design stage to account for periods of low flow during summer months. The low flow channel will be designed in conjunction with the hydraulics of the culvert with input from an experienced fluvial geomorphologist; and
- Energy dissipation at culvert outlets (where deemed necessary, based on hydraulic analysis during the detailed design stage) will be designed with reference to appropriate guidance and technical standards guidance.

4.6.2 Bridge Crossing

In relation to the proposed crossing on Dunboyne Stream_010, should the detailed design identify a bridge crossing as the preferred option, the detailed design will consider the following:

- Implement best practice associated with the design of culvert crossings (SEPA 2010; IFI 2016);
- Abutments will be set back from the river channel and banks to allow the continuation of the riparian corridor underneath the structure. This will help to minimise or prevent the need for

bed and bank reinforcement, reduce the risk of creating a barrier to fish passage and will allow mammal passage under the bridge structure;

- The distance between the bridge abutments will be designed to be as wide as possible to maintain the bank habitat, maximising the riparian corridor and allowing the water body some space to move;
- The natural channel width will be maintained;
- The foundations (of abutments) will be buried deep enough to minimise or prevent the need for bed or bank reinforcement or bridge weirs or aprons. This will maintain the natural bed material and bed levels, protecting habitat and allowing fish passage;
- The foundations will be buried deep enough to allow for scour during high flows. A suitably qualified engineer or geomorphologist will be consulted to advise on an appropriate depth;
- The structure will be designed to facilitate the passage of woody debris;
- The requirements for bed and bank reinforcement will be considered, only if the risk of erosion cannot reasonably be eliminated through the above measures;
- The length of bed and bank protection will be restricted and green bank protection measures will be implemented, where applicable;
- Bridge piers / abutments will be designed to minimise impacts on morphological processes such that abutments are set back on the floodplain. In-channel structures will not be favoured as part of the detailed design; and
- The crossing location will be identified with input from an experience geomorphologist to identify preferential crossing locations within the Planning Application Boundary in relation to channel alignment.

5. Monitoring of Water Bodies

A detailed CEMP will be established prior to construction by the appointed contractor. This will follow best practice for the storage, handling and disposal of hazardous / non-hazardous materials to prevent chemical pollution. All fuels or chemicals kept on the construction site will be stored in protected containers and all refuelling and maintenance will be carried out in bunded containment areas. Refuelling and maintenance in areas draining directly to water bodies will be avoided, as far as is practicable. Oil interceptors will also be installed in appropriate locations. Equipment will be regularly inspected and maintained. Where inspections show defects, equipment will be repaired immediately or taken out of use using a 'Tag Out Lock Out' until sufficient repairs can be implemented and signed off. Accidental spillages will be contained and cleaned up immediately using methods appropriate to the substance spilled. Remediation measures will be carried out in the unlikely event of pollution of the surface water environment.

The appointed contractor will carry out visual monitoring of surface water control measures (settlement tanks, silt fences, silt traps, fuel storage areas etc.) on a daily basis. In addition, weekly visual inspections of all water bodies crossed by the Proposed Development will be carried out by the appointed contractor. A record of inspections will be maintained.

Indicators that water pollution may have occurred include the following:

- Change in water colour;
- Change in water transparency;
- Increases in the level of silt in the water;
- Oily sheen to water surface; and
- Floating detritus, or scums and foams.

If hydrocarbons are observed or other waste quality parameters are suspected to have been exceeded, as a result of the of an incident but where a visual inspection may not provide sufficient information to conclude,

an investigation will be carried out to determine whether any element of the construction of the Proposed Development could be causing the contamination. If any potential sources of contamination are observed, appropriate actions will be taken (depending on the source and nature) to prevent further contamination and the incident will be recorded and investigated in more detail to prevent a recurrence. If required, the relevant regulatory authorities will be informed.

6. References

CIRIA (2001). Control of Water Pollution from Construction Sites. Guidance for Consultants and Contractors (C532)

CIRIA (2005). PUB C650 Environmental Good Practice on Site, 2nd Edition.

CIRIA (2006a). Control of Water Pollution from Linear Construction Projects. Technical Guide (C648).

CIRIA (2006b). Control of Water Pollution from Linear Construction Projects. Site Guide (C649).

Enterprise Ireland (2003). Best Practice Guidelines BPGCS005 – Oil Storage Guidelines

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

Met Éireann (2024). Weather Forecast. [Online] Available at <https://www.met.ie/>

Murnane et al. (2006a). CIRIA C648 Control of Water Pollution from Linear Construction Projects: Technical Guide

Murnane et al. (2006b). CIRIA C649 Control of Water Pollution from Linear Construction Projects: Site Guide

NRA (2006). Guidelines for the Crossing of Watercourses During the Construction of National Road Schemes.

SEPA (2010). Wat-sg-25 Engineering in the water environment: good practice guide – River Crossings, Second Edition.

TII (2007) Guidelines for the Creation, Implementation and Maintenance of an Environmental Operating Plan.

TII (2015a). Design Manual for Roads and Bridges Part 3 DN-DNG-03022 (NRA HD 33/15) (Including Amendment No. 1).

TII (2015b). Road Drainage and the Water Environment DN-DNG-03065.

Directives and Legislation

Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water

Number 10 of 1996 – Waste Management Act 1996 (Revised)

S.I. No. 324 of 2011 – European Communities (Shipments of Hazardous Waste exclusively within Ireland) Regulations 2011

S.I. No. 291 of 2013 - Safety, Health and Welfare at Work (Construction) Regulations 2013

S.I. No. 528/2021 - Safety, Health and Welfare at Work (Construction) (Amendment) Regulations 2021