MOTT MACDONALD

Shelburne Energy Farm

Water Quality Management Plan

April 2026

This page left intentionally blank for pagination.

Mott MacDonald
South Block
Rockfield
Dundrum
Dublin 16
D16 R6V0
Ireland

T +353 (0)1 2916 700
mottmac.com

Shelburne Energy Farm

Water Quality Management Plan

April 2026

Issue and Revision Record

Document reference: 229101268 | PL2

Contents

Tables

Figures

1 Introduction

1.1 Background

Mott MacDonald Ireland Limited was appointed by Gen7 Renewable Energy Limited (Gen7) to prepare an Environmental Impact Assessment Report (EIAR) to accompany planning applications to the relevant planning authorities for a renewable energy development referred to as Shelburne Energy Farm.

In summary, the development at Shelburne Energy Farm is a solar photovoltaic farm with an accompanying and co-located battery energy storage system. The project description is detailed fully in the EIAR which was submitted to accompany the planning application.

1.2 Purpose

Following submission of the planning application, Wexford County Council (WCC) reviewed the relevant documentation and made several requests for information (RFI) to clarify certain matters. The purpose of this Water Quality Management Plan document is to address WCC's RFI no. 4b which is worded as follows:

"4. The applicant is required to submit the following reports which have been referenced within the NIS, EIAR and other planning particulars, however have not been included within the planning application:

b. Water Quality Management Plan (groundwater and surface water)."

The information set out in this Water Quality Management Plan (WQMP) document compliments proposed measures set out in the Construction and Environmental Management Plan (CEMP). The WQMP will remain a 'live' document and will be reviewed regularly and revised, as necessary, to ensure that the measures implemented are effective for proposed works. The measures will be agreed with the local authority prior to commencement of construction works.

A Sediment, Erosion and Pollution Control Plan (SEPCP) document has been prepared separately and should be read in conjunction with the WQMP document.

The WQMP includes measures to manage and monitor water quality at the site, specifically relating to groundwater and surface water sources, to ensure compliance with environmental quality standards specified in the relevant legislation, during the duration of the proposed works. The measures will be implemented by the contractor at the relevant stages of the proposed works.

2 Background Information

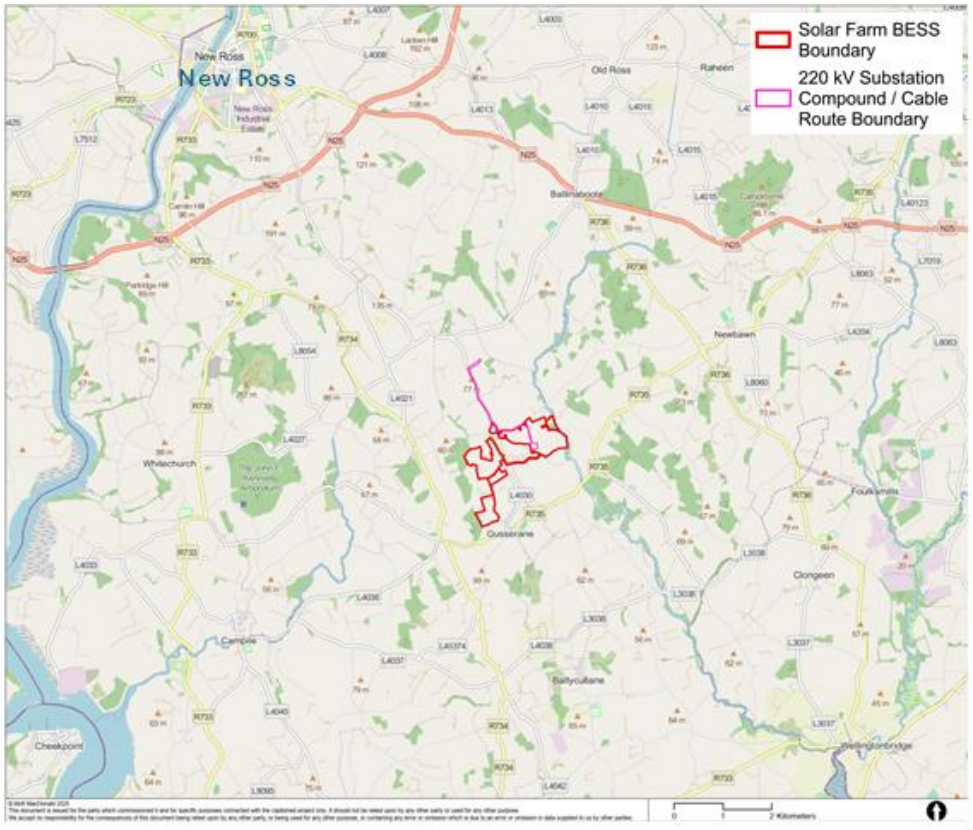
2.1 Project Location

Project location information is detailed fully in Chapter 5 (Development Description) of the EIAR which was submitted to accompany the planning application.

The Proposed Project is located in the townlands of Ballygarvan, Cloonagh and Nash, Gusserane, County Wexford, as illustrated in Figure 2-1.

The closest settlements include the town of New Ross located approximately 6.5km northwest, and the villages of Ballynaboola approximately 4.5km to the north, Newbawn 3.4km to the northeast and Ballycullane 3.5km to the south.

Figure 2-1 Location of Proposed Project



Source: Mott MacDonald Ireland Limited

Figure 2-1 indicates planning application boundaries; the red boundary represents the application boundary in relation to the planning application Wexford County Council, while the pink boundary represents the application boundary for the planning application to An Coimisiún Pleanála.

2.2 Existing Land Use

Existing land use information is detailed fully in Chapter 5 (Development Description) of the EIAR which was submitted to accompany the planning application.

The Proposed Project is predominantly within agricultural lands with field boundaries delineated by mature hedgerows, with some limited areas of semi-natural woodland in the east of the Proposed Project area.

The current land-use within the Proposed Project area comprises existing agricultural lands which are predominately used for tillage production, crop production and livestock grazing.

Land-use in the wider landscape of the Proposed Project is characterised as predominantly rural agricultural lands with low density residential properties occurring throughout the locality.

2.3 Proposed Development

The Proposed Project description is detailed fully in Chapter 5 (Development Description) of the EIAR which was submitted to accompany the planning application.

In summary, the Proposed Project comprises a photovoltaic (PV) solar energy farm and a co-located Battery Energy Storage System (BESS), collectively referred to as Shelburne Energy Farm, and together occupying a total area of approximately 121.5 hectares. A grid connection is required to connect Shelburne Energy Farm to the national electricity grid, with a co-located 220kV substation compound within the energy farm, measuring approximately 0.72 hectares, with an associated underground cable connection which will connect to an existing overhead transmission circuit.

2.4 Topographical Characteristics

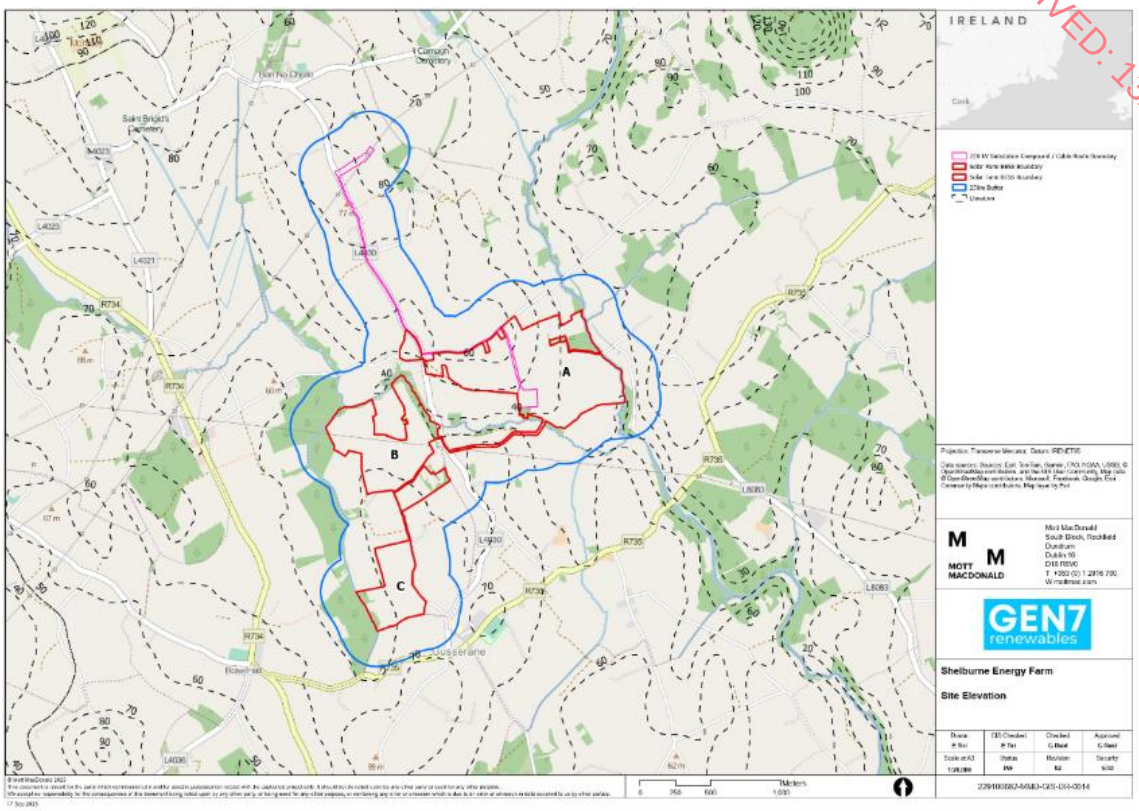
The topographical context for the Proposed Project is fully in Chapter 8 (Land, Soils and Hydrogeology) of the EIAR which was submitted to accompany the planning application.

Topographical data, obtained from Tailte Eireann, indicates the topography varies local to the Proposed Project. The minimum elevation across the site is 29.5m OD and the maximum elevation is 77m OD.

The highest elevation within the solar array is 66.5m OD located within Area A. In Area A the topography typically slopes to the south, with localised variations sloping towards watercourses to the east (Owenduff River) and south (Tellarought River). In Area B, the topography slopes to the southeast. In Areas C the topography slopes towards the west. Elevation rises along the underground cable route towards the north, the elevation rises to a maximum topography of 77m OD.

Topography local to the Proposed Project extents is shown in Figure 2-2.

Figure 2-2 Topography mapping



Source: Mott MacDonald Ireland Limited

2.5 Geological and Hydrogeological Characteristics

The geological and hydrogeological context for the Proposed Project is fully in Chapter 8 (Land, Soils and Hydrogeology) of the EIAR which was submitted to accompany the planning application.

2.5.1 Geology

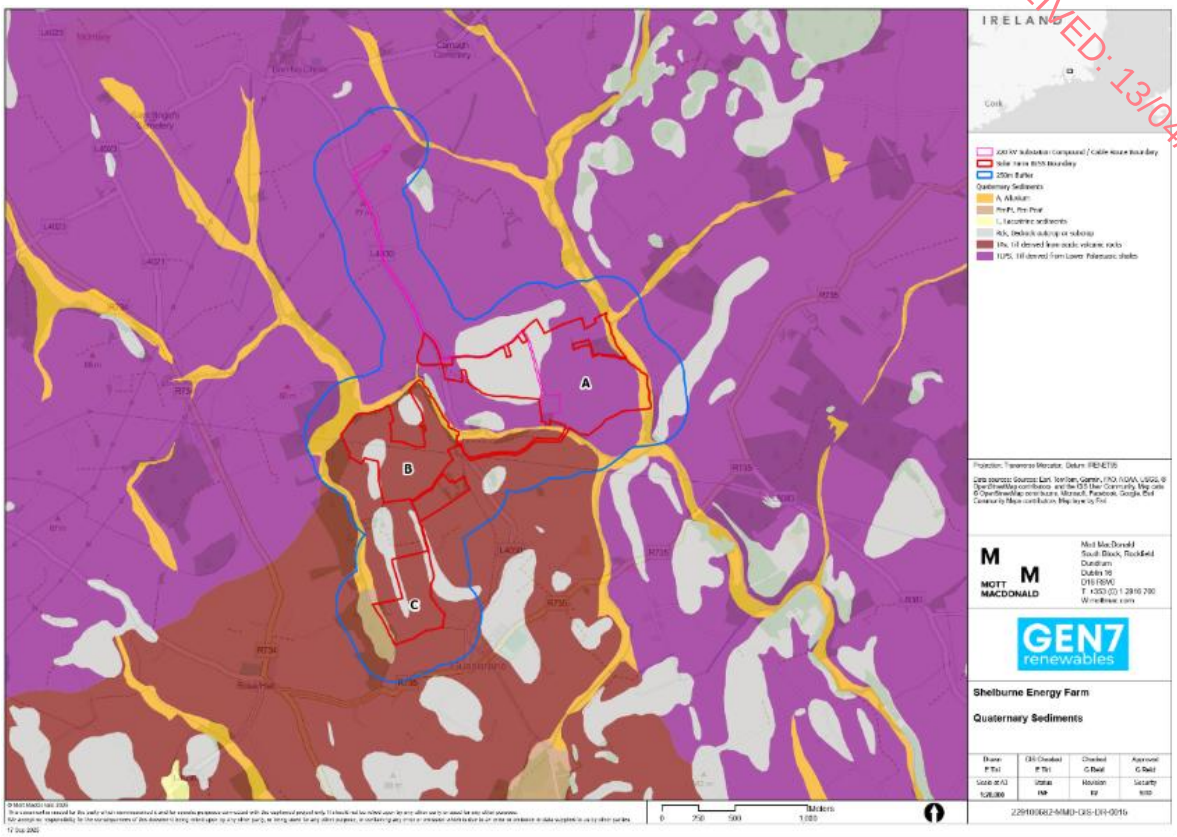
2.5.1.1 Superficial deposits

Geological Survey of Ireland (GSI) Web Map Viewer mapping of superficial deposits indicates that the majority of the Proposed Project area has mapped superficial deposits, with areas of no mapped superficial deposits corresponding with areas of subcrop and bedrock outcrop.

The superficial deposits to the north of the Proposed Project area underlying Area A are mapped as Glacial Till derived from Lower Palaeozoic shales. There are mapped areas of alluvium deposits to the east of Area A as well as west, north and east of Area B which correspond to the watercourses within and/or bounding the Proposed Project area extents. Furthermore, there is a mapped area of Fen Peat adjacent to the Proposed Project area, to the southwest of solar array Area C.

Superficial geology deposits local to the Proposed Project extents is shown in Figure 2-3.

Figure 2-3 Superficial geology mapping



Source: Mott MacDonald Ireland Limited

2.5.1.2 Bedrock geology

GSI Web Map Viewer mapping of bedrock deposits indicates that bedrock geology beneath the Proposed Project area comprises Campile Formation and Slieve Gullion Complex.

The units of the Campile Formation present beneath the Proposed Project area are Rhyolitic volcanics, grey and brown slates, Felsic volcanics and intermediate volcanics of Ordovician age. The Campile Formation has been intruded by Dolerited dykes from the Slieve Gullion Complex of Tertiary age. General mapped dip of the geology in the area is to the northwest dipping between 55 and 70º. Structural features in the area include faulting orientated generally north-south.

Bedrock geology local to the Proposed Project extents is shown in Figure 2-4.

Figure 2-4 Bedrock geology mapping

Source: Mott MacDonald Ireland Limited

2.5.1.3 Radon

The Environmental Protection Agency (EPA) (Ireland) datasets mapping categorises radon risk based on indoor radon measurements and geological information, including bedrock type, quaternary geology, soil permeability and aquifer type.

EPA (Ireland) datasets mapping indicates that the Proposed Project extents are predominantly located in an area where 20% of homes are estimated to be above the reference level of 200 becquerels per cubic metre (Bq/m^3). Radon risk in these areas is considered to be high risk. However, there are areas estimated as having 5 and 10% of homes above the 200Bq/m^3 reference level, which are classified as moderate risk.

2.5.2 Hydrogeology

2.5.2.1 Aquifers

The Campile Formation and Dolerite Dykes which underly the Proposed Project area are classified as regionally important Aquifers associated with the fissured bedrock.

There are no sand and gravel aquifers within the Proposed Project area associated with the superficial deposits.

Groundwater vulnerability within the Proposed Project area, identified using the GSI Groundwater Data Viewer ranges between low to extreme, with some areas classified as ‘rock at or near surface or Karst’. The areas of extreme groundwater vulnerability within the Proposed Project area occur where the fractured bedrock is outcropping or near surface, with the groundwater vulnerability classification decreasing with distance away from the outcrop. In

general, areas of extreme and high groundwater vulnerability are predominant within the Proposed Project area.

2.5.2.2 Well springs and abstractions

GSI Groundwater Data Viewer mapping indicates that no Group Scheme or Public Supply Scheme Source Protection Areas are located within the Proposed Project area.

It is assumed that all residential properties obtain their potable water supply from a private well, due to the absence of water mains identified within the Proposed Project area. The location of private wells is not mapped; however, private wells are required to be located in the overall residential property boundary and not lands private adjacent lands (i.e. private wells are not located within the Proposed Project area). There is a total of 47 residential properties within the Proposed Project area, and therefore it is assumed each property obtains drinking water from their own private well.

GSI Groundwater Data Viewer mapping indicates that no large private groundwater abstractions are located within the Proposed Project area. The closest private groundwater abstractions radius is 400m to the east of the Proposed Project area where two radii are located.

National Monument Service Historic Environment Viewer mapping indicates a well named Saint Colman's Well is within the Project extents, but it should be noted that according to the notes on the feature it could not be found in 1988 and is unlikely to be in use.

National Library of Scotland and Ordnance Survey Ireland historical mapping indicates additional historical springs and wells are located adjacent to the west of the Proposed Project area, but these are not mapped on modern maps and their current status is unknown. These wells are not shown on the GSI Groundwater Data Viewer mapping.

2.5.3 Water quality status (groundwater bodies)

EPA (Ireland) datasets mapping indicates Adamstown Water Framework Directive (WFD) Groundwater Body (European Code: IE_SE_G_001), which is classified as productive fissured bedrock, lies beneath the Proposed Project extents.

The WFD status of the groundwater body is 'Good', and the risk status is currently 'Not at Risk'.

2.6 Hydrological Characteristics

The hydrological context for the Proposed Project is fully in Chapter 9 (Surface Water Resources and Flooding) of the EIAR which was submitted to accompany the planning application.

2.6.1 Surface waterbodies

A review of EPA (Ireland) datasets mapping indicates multiple surface waterbodies near the Proposed Project extents, and suggests there are no lakes. Refer to mapping extract in Figure 2-5.

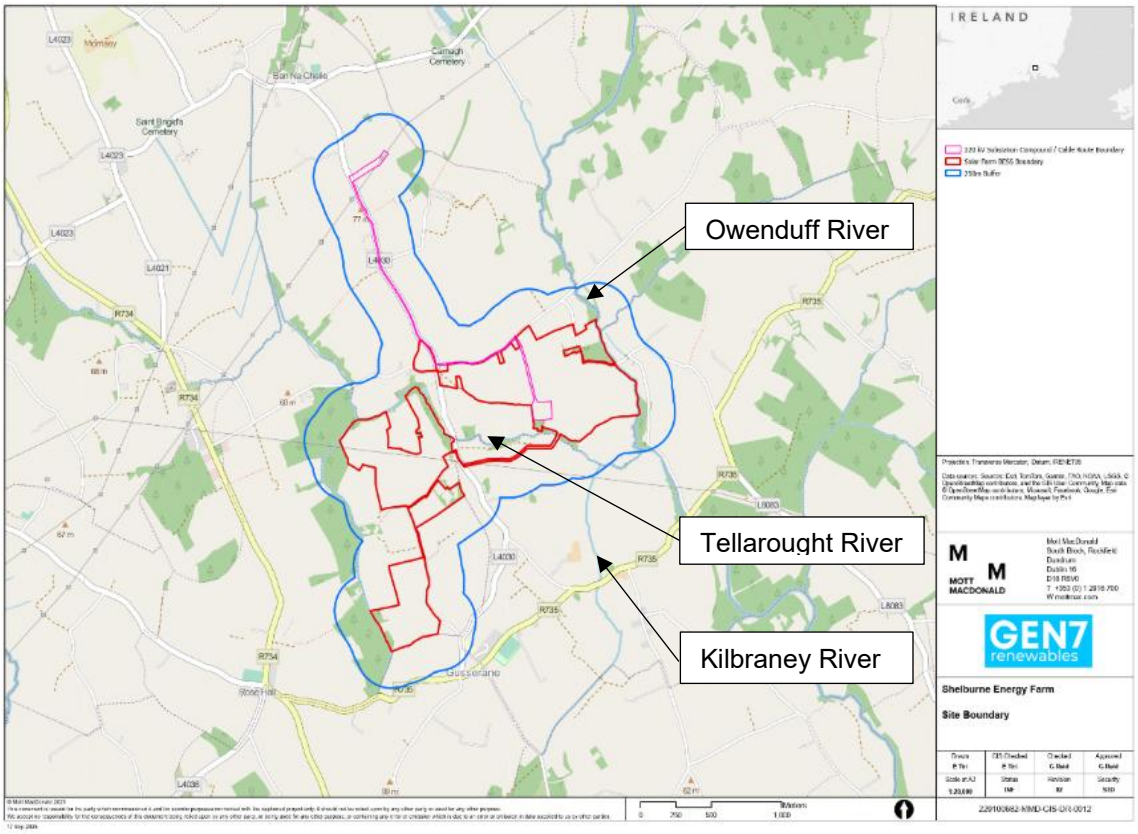
Mapping indicates that the Owenduff River flows in a southerly direction along the eastern edge of the Proposed Project boundary.

Mapping indicates that the Tellarought River, a tributary of the Owenduff River, flows south-east through the Project extents before joining the Owenduff River south-east of the Proposed Project boundary.

Mapping indicates that the Kilbraney River, a tributary of the Owenduff River, flows north before joining the Tellarought River. The confluence is very close to where the Tellarought River joins

the Owenduff River. The Kilbraney River/Stream does not intersect the Proposed Project extents.

Figure 2-5 Watercourse mapping



Source: Mott MacDonald Ireland Limited

2.6.2 Water quality status (surface waterbodies)

EPA (Ireland) datasets mapping indicates that the Owenduff River (Owenduff (Wexford_010)) is a WFD river waterbody (European Code: IE_SE_13O010100).

It is worth noting that under the WFD monitoring programme, all three watercourses identified local to the Proposed Project extents, namely Owenduff River, Tellarought River and Kilbraney River, are collectively named the Owenduff River ((Wexford)_010).

The WFD status of the river waterbody is ‘Moderate’, and the risk status is currently ‘At Risk’.

3 Water Quality Management

3.1 Site management

The following measures will be implemented prior to commencement and throughout the duration of the proposed works.

- A full-time on-site Environmental Clerk of Works (EnCoW) will be appointed prior to commencement of works.
- The Emergency Incident Response Plan and environmental control and mitigation measures described in the CEMP will be agreed prior to construction with the local authority.
- A Sediment, Erosion and Pollution Control Plan (SEPCP) document has been prepared, which compliments the CEMP and WQMP. The SEPCP will remain a 'live' document and will be reviewed regularly and revised, as necessary, to ensure that the measures implemented are effective for all construction works.
- All pollution control measures will be designed, installed, and maintained in accordance with CIRIA guidance for 'Environmental Good Practice on Site' (C741) and 'Control of water pollution from linear construction projects. Technical guidance' (C648).
- A Resource and Waste Management Plan (RWMP) document has been prepared to support the CEMP for this Proposed Project. The RWMP will remain a 'live' document and will be reviewed regularly and revised, as necessary, to ensure that the measures implemented are effective for all construction works. The RWMP will ensure that waste generated during the project will be managed in a way that ensures the relevant provisions of the Waste Management Act 1996 and associated amendments and regulations are met, particularly with regard to the use of appropriately permitted Waste Contractors and destinations for waste materials.

3.2 Groundwater

Water quality monitoring for groundwater bodies will be implemented by the contractor to provide early warning of any potential impacts on groundwater resources during proposed works. Water quality monitoring procedures are discussed further in Section 4 of this document.

The following water quality management measures will be implemented duration the different stages of the proposed works.

3.2.1 Pre-construction

A pre-construction confirmatory survey of wells and groundwater abstractions will be undertaken.

Water quality testing will be undertaken pre-construction for any identified drinking water abstraction sources which may be impacted by construction activities.

A phase of ground investigation prior to construction will include an assessment of shallow groundwater quality within the superficial deposits (if present) and shallow bedrock. This will identify existing contamination and inform any requirement of remediation, as outlined in the CEMP.

3.2.2 Construction

A SEPCP document has been prepared, which compliments both the CEMP and this WQMP. The SEPCP sets out proposed control measures, specially relating to sediment, erosion and pollution, to be implemented to help manage water quality for the duration of the proposed works. This document outlines a range of measures for managing groundwater quality during construction and should be read in conjunction with the WQMP.

Water quality testing will be undertaken during construction for any identified drinking water abstraction sources which may be impacted by construction activities.

Potential impacts resulting from the Proposed Project are reduced due to the programme of works being carried out within the dry season. During the dry season, in the majority of locations, groundwater will not be encountered. However, if groundwater will be encountered, which is likely during maximum recorded groundwater level conditions, the appropriate mitigation measures will be carried out as described above.

A dewatering management plan will be developed by the contractor before construction work commences. All construction activities, including construction traffic, will be managed through the site's CEMP, which will set out key mitigation measures for, and monitoring of, potential impacts from traffic.

If a daily abstraction volume higher than 25 m^3 is required for dewatering activities, a dewatering / discharge permit should be obtained (with specific mitigation measures specified in the permit). If possible, any abstracted water, if of suitable quality, should be discharged back into the same waterbody. There will be regular checks on the treatment system as well as continuous monitoring equipment to measure, but not limited to, pH, temperature, conductivity, Total Suspended Solids and Totals Dissolved Solids.

Radon has been identified within the Proposed Project area. To address risks of exposure to radon, workplace radon tests will be carried out in areas of high risk, as required by S.I. Regulation 66 of S.I. No. 30 of 2019. Radon barriers are also to be installed in areas where a high radon risk have been identified.

If any monitored parameters exceed the established thresholds during construction, additional mitigation measures will be promptly deployed to prevent any adverse effects on groundwater quality.

3.2.3 Post-construction

Water quality testing will be undertaken post-construction for any identified drinking water abstraction sources which may be impacted by construction activities.

3.3 Surface Water

Water quality monitoring for surface water bodies will be implemented by the contractor to provide early warning of any potential impacts on groundwater resources during proposed works. Water quality monitoring procedures are discussed further in Section 4 of this document.

The following water quality management measures will be implemented duration the different stages of the proposed works.

3.3.1 Pre-construction

Prior to commencement of construction, the contractor will prepare method statements for discharge of construction water discharges. Further discussions will take place with the relevant

authority to determine the required permit licence agreements to permit the discharge of water during the construction phase to either sewer or to ground.

3.3.2 Construction

A SEPCP document has been prepared, which compliments both the CEMP and this WQMP. The SEPCP sets out proposed control measures, specially relating to sediment, erosion and pollution, to be implemented to help manage water quality for the duration of the proposed works. This document outlines a range of measures for managing surface water quality during construction and should be read in conjunction with the WQMP.

Under no circumstances will treated water be discharged to a watercourse without the respective water quality meeting the statutory limits as set under the relevant EU environmental objectives for surface water.

No instream works are proposed. Any works in the vicinity of drains (no fisheries importance) or watercourses will be carried out in accordance with the guidelines set out by IFI in ‘Guidelines on Protecting Fisheries During Construction Works in and Adjacent to Waters’ (IFI, 2016). The closest separation distance to the Owenduff River during the construction phase is circa 15m, which relates to the installation of the 38kV polesets to carry the MV cabling across the Tellarought River.

The contractor will carry out visual examinations of local watercourses during the construction phase. In the unlikely event of water quality concerns, the EnCoW will be consulted.

If any monitored parameters exceed the established thresholds during construction, additional mitigation measures will be promptly deployed to prevent any adverse effects on surface water quality.

3.3.3 Operation phase

The surface water drainage pond will be maintained and managed as wetland feature for biodiversity enhancement purposes. The emergency storage pond for possible storage of fire water will be maintained as per manufacturers specification and any effluent will be removed and treated off site in a suitable waste management facility. There will be no discharges to groundwater or surface waters draining the site.

4 Water Quality Monitoring

4.1 Monitoring methods

4.1.1 Approach

Water quality monitoring for groundwater and surface water bodies will be implemented by the contractor to provide early warning of any potential impacts on groundwater and surface water resources during construction phases, as well as to assess conditions following completion of the works.

In the event that water quality declines during the proposed works, the monitoring frequency will increase, and measures will be put in place to improve water quality.

The water quality sampling and analysis regime will consist of physico-chemical sampling techniques.

Water quality monitoring will be carried out at the following stages of the project:

- Pre-construction baseline sampling:
  - Monitoring and sampling to commence 6 months prior to commencement of the construction phase to establish baseline conditions.
  - Continuous monitoring to allow automated data capture in real time.
  - Discrete monitoring to comprise monthly sampling via in-situ measurements and grab samples for lab analysis.
- Construction phase:
  - Continuous monitoring to allow automated data capture in real time.
  - Discrete monitoring to comprise fortnightly sampling via in-situ measurements and grab samples for lab analysis.
- Post-construction/ operational phase:
  - Monitoring and sampling to continue 12 months post-completion of commissioning Proposed Project.
  - Continuous monitoring to allow automated data capture in real time.
  - Discrete monitoring to comprise monthly sampling via in-situ measurements and grab samples for lab analysis.
- Decommissioning phase:
  - Decommissioning phase poses similar risks to construction phase. It is noteworthy that that decommissioning phase requirements will be subject to changes in requirements by the planning authority, environmental regulators or stakeholders.
  - Monitoring and sampling to commence 6 months prior to commencement of decommissioning phase to establish baseline conditions.
  - During decommissioning phase, continuous monitoring to allow automated data capture in real time, and discrete monitoring to comprise fortnightly sampling via in-situ measurements and grab samples for lab analysis.
  - Monitoring and sampling to continue 6 months post-completion of decommissioning phase.

– Post-completion of decommissioning, continuous monitoring to allow automated data capture in real time, and discrete monitoring to comprise monthly sampling via in-situ measurements and grab samples for lab analysis.

Results from water quality sampling will be independently recorded and reported by the appointed EnCow. Reports will be made available to the local authority or related stakeholders if requested.

4.1.2 Monitoring locations

The following details the recommendations with respect to selecting appropriate monitoring locations for groundwater bodies at the Proposed Project site:

- A borehole close to the site boundary, at the topographically higher parts of the site (i.e. up-gradient), to establish the baseline quality of groundwater flowing into the site.
- A borehole between the construction footprint and the nearest receptor (e.g. surface water body) which typically corresponds to with the topographically lower parts of the site (i.e. down-gradient), to compare with relevant water quality parameters.
- Direct monitoring of any identified sensitive receptors, such as private or public wells.
- Daily visual inspections of any open excavations where groundwater is encountered.

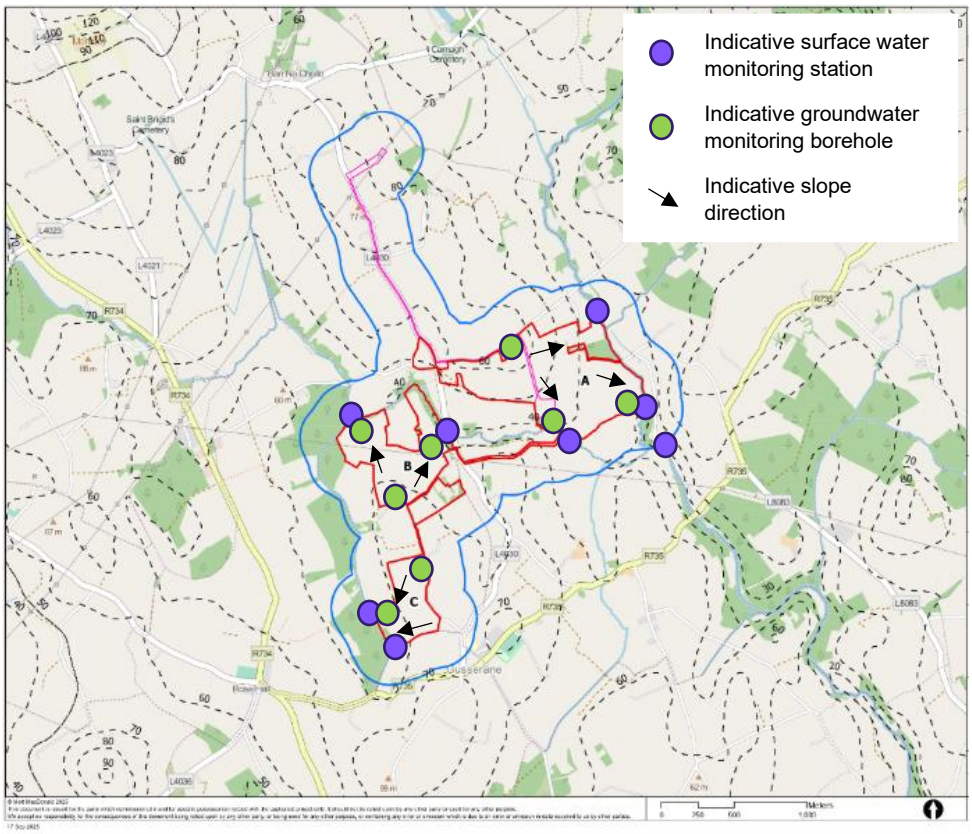
The following details the recommendations with respect to selecting appropriate monitoring locations for surface water bodies at the Proposed Project site:

- A monitoring station located within the upstream section of each relevant surface water body (i.e. river), close to the site boundary extents.
- A monitoring station located within the downstream section of each relevant surface water body (i.e. river), close to the final discharge point/site boundary extents.
- At least one monitoring station located approximately 100 to 200m downstream of the site boundary extents (i.e. mixing zone) to check for recovery.

Indicative water quality monitoring locations for groundwater and surface water bodies are shown in Figure 4-1.

Monitoring locations will be agreed with the local authority prior to commencement of construction works.

Figure 4-1 Indicative monitoring locations



Source: Mott MacDonald Ireland Limited

4.1.3 Monitoring specifications

Surface water monitoring will be carried out using continuous and discrete monitoring (in-situ readings and laboratory analysis) as set out in the following sections.

The water quality sampling and analysis regime will consist of physico-chemical sampling techniques.

4.1.3.1 Continuous monitoring

Continuous monitoring shall comprise the deployment of remote monitoring equipment at strategic locations at the Proposed Project site. It is anticipated that monitoring equipment will be deployed and maintained from baseline through to completion of the construction phase monitoring.

Monitoring equipment should be set to record water quality data at specified intervals (e.g. 15 minutes) and should allow automated data capture in real time at specified agreed intervals. One recommended approach is to use sondes which can upload collated data via telemetry to a centralised data storage system (i.e. cloud storage) that allows real-time access and monitoring.

Monitoring equipment will be calibrated prior to installation, installed and maintained in accordance with manufacturers recommendations, with periodic recalibration, to suit those recommendations.

A warning system will be implemented so that relevant parties, such as the EnCoW, can be notified of exceedance of established trigger threshold during monitoring to allow them to initiate a response plan.

4.1.3.2 Discrete monitoring

Discrete monitoring during all works phases (Section 4.1.1) will utilise hand-held probes to provide immediate in-situ readings for comparison against established trigger thresholds and compare against the continuous monitoring data. The range of parameters suitable for in-situ field analysis is dictated primarily by the availability of suitable monitoring equipment.

The following details the requirements of surface water body sampling methodology used and site practice:

- Hand-held probes are to be immersed in the water until a steady reading is achieved;
- Visual assessments for deposited silt, discoloured water and oily sheens will also be carried out at each sample location; and
- Visual assessments shall be recorded, and results retained.

The following details the requirements of groundwater body sampling methodology used and site practice:

- Borehole should be purged prior to the sample being taken;
- Water sample should be collected from the borehole via bailer or pump;
- Hand-held probes are to be immersed in the water until a steady reading is achieved;
- Visual assessments for deposited silt, discoloured water and oily sheens will also be carried out at each sample location; and
- Visual assessments shall be recorded, and results retained.

The following details the requirements of visual assessments which are to be carried out at the same time as discrete monitoring activities at each location:

- Weather condition observations;
- Status of vegetation, i.e. present or absent, thin or dense etc;
- For surface water bodies, relative water level with respect to channel;
- For surface water bodies, flow rate/ velocity of in-channel flows;
- For groundwater bodies, relative water level with respect to borehole;
- Water clarity, i.e. turbidity; and,
- Visual and/or odour-related signs of hydrocarbons, i.e. present or absent.

The monitoring will comprise samples obtained at periodic site visits for the collection of laboratory samples. The following details the requirements of sampling methodology used and site practice:

- Method statements and risk assessments are to be prepared and submitted by the appointed sampler for inspection by the EnCoW prior to collection of samples;
- All samples will be taken by a suitably trained scientist, engineer, or site staff member, who is familiar with standard sampling techniques for surface water and groundwater sources, such as “ISO 5667-6:2014 Water Quality – Sampling – Guidance in Sampling Rivers and Streams” and “ISO 5667-11:2009 – Water Quality – Sampling – Part 11: Guidance on Sampling of Groundwaters”;
- For surface water body samples, care should be taken to avoid disruption to the riverbed during sampling and samples must be taken facing upstream in order to avoid increased turbidity and suspended solids from disturbance caused by the sampler;
- For groundwater body samples, it is recommended that the borehole is purged prior to the sample being taken to make sure the sample represents the aquifer rather than the stagnant

water inside the well casing. Once this has been undertaken, the sample should be collected via bailer or pump;

- Samples should be kept chilled at or below 4ºC prior to delivery to the laboratory. All samples must reach the laboratory no later than 48 hours after the sample date;
- Visual assessments for deposited silt, discoloured water and oily sheens will also be carried out at each sample location. Visual assessments shall be recorded, and results retained;
- Sampling conducted following EPA (Ireland) -approved protocols ensuring contamination prevention;
- Use of clean, sterilised containers for surface water sampling. Containers should be provided by the laboratory;
- Samples are to be accompanied with laboratory specific Chain of Custody documentation, which will provide details on the sample location. Chain of Custody sheets will be retained for the duration of works; and,
- Laboratory analysis performed by an accredited laboratory (e.g., INAB equivalent).

4.1.3.3 Monitoring parameters

Continuous monitoring (in-situ) parameters for waterbodies are set out in Table 4-1.

Table 4-1 Continuous monitoring (in-situ) parameters

pH	Turbidity (NTU)
Temperature (°C)	Ammonium (mg NH_4/l)
Electrical Conductivity (µS/cm)	Nitrate (mg NO_3/l)
Dissolved oxygen (DO)	Molybdate Reactive Phosphorus (MRP) (mg P/l)

Discrete monitoring (in-situ) parameters for waterbodies are set out in Table 4-2

Table 4-2 Discrete monitoring (in-situ) parameters

pH	Turbidity (NTU)
Temperature (°C)	Ammonium (mg NH_4/l)
Electrical Conductivity (µS/cm)	Nitrate (mg NO_3/l)
Dissolved oxygen (DO)	Total Dissolved Solids (TDS)

Discrete monitoring (laboratory analysis testing) parameters for waterbodies are set out in Table 4-3

Table 4-3 Discrete monitoring (laboratory analysis testing) parameters

pH	Total Ammonia (mg N/l)
Alkalinity (mg $CaCO_3$/l)	Ammoniacal Nitrogen (mg NH_3/l)
Turbidity (NTU)	Ammonium (NH_4) (mg/l)
Total Suspended Solids (TSS) (mg/l)	Nitrate (mg NO_3/l)
Dissolved oxygen (DO)	Nitrite (mg NO_2/l)
Biological Oxygen Demand (BOD) (mg/l)	Total Oxidized Nitrogen (TON) (mg N/l)
Chemical Oxygen Demand (COD) (mg/l)	Total Aluminium (mg Al/l)
Molybdate Reactive Phosphorus (MRP) (mg P/l)	Total Iron (mg Fe/l)
Total Petroleum Hydrocarbons (TPH) (mg/l)	Total Polycyclic Aromatic Hydrocarbons (PAH) (mg/l)

4.2 Trigger thresholds

Trigger thresholds necessitating an adaptive response will be defined based on baseline monitoring conducted before the construction phase begins, and, where appropriate, through comparison with Environmental Quality Standards (EQS) and classifications specified in water quality legislation. Trigger thresholds shall be the EQS target level or the measured antecedent concentration established by the pre-development baseline monitoring assessment, whichever is greater.

In accordance with the European Communities Environmental Objectives (Groundwater) Regulations 2010 (S.I. No. 9 of 2010), as amended (including S.I. No. 366/2016), the relevant groundwater body-related EQS parameters are set out in Table 4-4.

Table 4-4 Groundwater EQS threshold values

Parameter	Units	Threshold Value Range
Inorganic & Metals		
Electrical Conductivity	S/cm @25°C	800 — 1875
Chloride	mg/l Cl	24 — 187.5
Sulphate	mg/l SO4	187.5
Nitrate	mg/l NO3	37.5
Nitrite	µg/l NO2	375
Ammonium	µg/l N	65 — 175
Molybdate Reactive Phosphorus	µg/l P	35
Total Chromium	µg/l Cr	37.5
Chromium VI 4	µg/l Cr	7.5
Arsenic	µg/l As	7.5
Lead	µg/l Pb	7.5
Mercury	µg/l Hg	0.75
Aluminium	µg/l Al	150
Zinc	µg/l Zn	75
Pesticide		
Atrazine	µg/l	0.075
Simazine	µg/l	0.075
MCPA	µg/l	0.075
Diuron	µmg/l	0.075
Cypermethrin	µg/l	0.075
Bentazone	µg/l	0.075
Glyphosate	µg/l	0.075
Mecoprop	µg/l	0.075
Isoproturon	µg/l	0.075
2,4 Dichlorophenoxy-acetic acid	µg/l	0.075
Dichlobenil	µg/l	0.075
2,6 Dichlorobenzamide	µg/l	0.075
Total Pesticides	µg/l	0.375
Organics		
Di (2-ethylhexyl) phthalate	µg/l	6
1,2 Dichloroethane	µg/l	2.25
Vinyl Chloride	µg/l	0.375
1,2 Dichloroethene	µg/l	0.375
Tetrachloroethene	µg/l	7.5
Trichloroethene	µg/l	7.5
Dichloromethane	µg/l	15
Tetrahydrofuran	µg/l	115
Methyl Tertiary Butyl Ether	µg/l	10
Benzene	µg/l	0.75

Toluene	µg/l	525
Total Petroleum Hydrocarbons 5	µg/l	7.5
Benzo(alpha) pyrene	µg/1	0.0075
Total Polycyclic Aromatic Hydrocarbons 6	µg/l	0.075

In accordance with the European Communities Environmental Objectives (Surface Waters) Regulations 2009 (S.I. No 272 of 2009), as amended (including S.I. No. 77 of 2019), the relevant surface water body-related EQS parameters are set out in Table 4-5.

Table 4-5 Surface Water EQS threshold values

Parameter	Units	Threshold Value Range
Water temperature	°C	≤ +1.5°C above ambient temperature outside the mixing zone
Biochemical Oxygen Demand (BOD)	mg O_2/l	High Status < 1.3 (mean) or < 2.2 (95%ile) Good Status < 1.5 (mean) or < 2.6 (95%ile)
Dissolved oxygen	-	Lower limit 95%ile >80% saturation Upper limit 95%ile <120% saturation
pH (individual values)	-	Soft water: 4.5 < pH < 9.0, where soft water is ≤100 mg/1 $CaCO_3$ Hard water: 6.0 < pH < 9.0, where hard water is >100mg/l $CaCO_3$
Total Ammonia	mg N/l	High status < 0.040 (mean) and < 0.090 (95%ile) Good status < 0.065 (mean) and < 0.140 (95%ile)
Molybdate Reactive Phosphorus (MRP)	mg P/l	High status < 0.025 (mean) and < 0.045 (95%ile) Good status < 0.035 (mean) and < 0.075 (95%ile)

4.3 Response plan

Water quality monitoring will be undertaken during all works phases, as set out in Section 4.1.1.

All monitoring data collected data shall be uploaded to the centralised data storage system and screened by the appointed EnCoW, including a sense-check for anomalies. Trends in the concentrations of specified parameters shall be analysed to anticipate and pre-empt any potential exceedance of established trigger thresholds.

During the construction phase, an exceedance event requiring a response will be determined by the EnCoW where:

- in their judgement based on trends indicated on monitored data, a breach of the trigger threshold is likely; or
- where the remote monitoring equipment and telemetry triggers an alarm that a trigger threshold has been exceeded for the specified water quality parameters and where the EnCoW determines that the exceedance is not spurious.

Upon determining that a trigger threshold has been met, the EnCoW will instruct that all works within the drainage catchment to the affected location cease. This instruction may extend to a site-wide shutdown. The EnCoW will investigate the potential cause of the trend or exceedance and implement effective adaptive mitigation measures where a potential source of reduced quality runoff is identified. Works will only recommence when monitoring has determined that specific water quality parameters have returned to acceptable levels determined by the EnCoW.

During the post-construction/operational phase, monitoring shall be undertaken for validation purposes; no actions are anticipated. Monitoring results shall be retained and reported monthly and made available for inspection by the local authority or EPA (Ireland) upon request.

It is anticipated that recommended response plan-related approach for both the construction phase and post-construction/ operational phase, as set out above, will apply to the Proposed Project during the decommissioning phase. However, it is noteworthy that decommissioning phase requirements will be subject to changes in requirements by the planning authority, environmental regulators or stakeholders.

4.4 Data analysis and reporting

4.4.1 Screening data

All monitoring data collected data shall be uploaded to the centralised data storage system and screened by the appointed EnCoW, including a sense-check for anomalies. Trends in the concentrations of specified parameters shall be analysed to anticipate and pre-empt any potential exceedance of established trigger thresholds.

All in-situ and laboratory monitoring data shall be screened and sense-checked for anomalies in accordance with ISO/IEC 17025:2017, EPA (Ireland) requirements, and applicable EU/ISO standards. Screening shall ensure data integrity, traceability and validity, and shall generate an auditable record suitable for regulatory inspection. This will involve:

- Completeness and timeliness checks against the approved monitoring plan; all scheduled measurements/samples, locations and frequencies shall be reconciled and any gaps or late data flagged and investigated;
- Verification of metadata and formats (location IDs, dates/times, sample IDs, matrix/depth, units, detection limits, rounding/significant figures) to maintain consistent technical records and enable traceability;
- Chain-of-custody and sampling reconciliation from field to lab, mapped to ISO 5667-1 sampling guidance and, where automatic samplers are used, EN 16479:2023 performance requirements for water/wastewater samplers; any discrepancies shall be treated as nonconformances;
- Instrument calibration and drift checks for in-situ devices, with full metrological traceability to SI units;
- Laboratory QA/QC review of field/lab controls (field/lab blanks, duplicates, spikes), method performance and detection limits, to be undertaken by INAB-accredited laboratories (ISO/IEC 17025); confirm participation in appropriate proficiency testing, e.g., the EPA (Ireland) Intercalibration Programme recognised by INAB;
- Plausibility screening against baseline/historic ranges and site conditions (seasonality, flows, rainfall, construction activities), and statistical checks (e.g., rolling averages, control charts) to identify outliers, step-changes or drift;
- Ensure estimation and, where relevant, reporting of uncertainty consistent with ISO/IEC 17025 cl. 7.6 and ILAC G17 (GUM-based guidance for testing). Use uncertainty when assessing trends and any statements of conformity to thresholds;
- Apply a documented, risk-appropriate decision rule (e.g., guard-banding) when declaring exceedance or “near-miss” status, in line with ILAC G8 and ISO/IEC 17025 cl. 7.8.6; decision rules shall be pre-agreed and recorded;
- Log data issues as nonconforming work, trigger clarifications/corrections with the field team or laboratory as needed, and document corrective/preventive actions; and,
- Store data in a controlled, centralised, data storage systems repository with version control, access control, backup, and audit logging, consistent with ISO/IEC 17025 cl. 7.11 and cl. 8.4 (records). Where licence conditions require submissions to the EPA (Ireland), report via the EDEN portal and retain records for a minimum of seven years.

4.4.2 Reporting results

After each round of data monitoring and screening, results will be presented in periodic Water Monitoring Reports using tables and graphs. The reports will also relate water quality indicators to natural and human influences like temperature, precipitation, and water levels/ flows. Relationships will also be determined between continuously monitored data for key discretely monitored parameters.

The Water Monitoring Reports will provide a comprehensive assessment of current conditions and serve as a benchmark during construction to evaluate any potential impacts on the water environment resulting from the Proposed Project.

The reports will include an analysis of findings based on previously established EQS/trigger thresholds, taking into account additional data sources that outline typical water quality ranges in comparable environments, as presented in Table 4-6.

Table 4-6 Typical water quality ranges

Parameter	Expected natural range	Notes
Hydrocarbons (e.g. TPH and PAH)	None	Laboratory measurements greater than trace levels, or visible presence of an oily sheen is an indication of leakage/spillage of oil from construction vehicles etc into waterbodies.
Water temperature	≤ +1.5°C above ambient temperature	Higher temperature values may indicate certain activities during construction works result in elevated temperatures which may affect ecological status.
pH	Soft water: 4.5 < pH < 9.0, where soft water is ≤100 mg/1 $CaCO_3$ Hard water: 6.0 < pH < 9.0, where hard water is >100mg/l $CaCO_3$	Elevated pH values may indicate concrete works, and chemical inputs are adversely impacting waterbodies.
Turbidity (NTU)	< 10 to protect fish life (may be higher during rainfall events)	Turbidity is a measure of water clarity; how much the material suspended in water decreases the passage of light through the water. Turbidity can be useful as an indicator of the effects of runoff from construction. Turbidity often increases sharply during a rainfall event and monitoring in combination with rainfall data may be appropriate.
Total Suspended Solids (TSS) (mg/l)	< 25 Typical Conditions <100 Flood Conditions	Elevated TSS may indicate increased levels of silt, fine aggregates, or cementitious material discharging to waterbodies.
Electrical conductivity (µS/cm)	< 800	Conductivity is a measure of the ability of a solution to conduct electricity and is proportional to the concentration of dissolved mineral salts. High conductivity could indicate cement/concrete discharges to waterbodies.
Dissolved oxygen (DO)	> 70% saturation	DO is a key indicator of a waterbody's potential to support aquatic life. Reduced DO levels may be caused by:

		● siltation / suspended solids - Oxygen is more easily dissolved into water with low levels of dissolved or suspended solids. ● improper disposal of foul waste from on-site facilities
Chemical Oxygen Demand (COD) (mg/l)	< 20	COD is commonly used to indirectly measure the amount of organic compounds in water. Most applications of COD determine the amount of organic pollutants found in waterbodies. Causes of raised COD levels would be similar to those for BOD.
Alkalinity (mg/l CaCO3)	20 – 200 mg/l	Alkalinity refers to how much acid that can be neutralised within waterbodies. Alkalinity acts as a buffer protecting the river and habitats from fluctuations in pH. ● UKTAG classifies alkalinity as low (200). ● Levels < 10 mg/l indicate a low buffering potential within waterbodies likely to be susceptible to fluctuations in pH from natural or human sources. ● Levels 100-200 mg/l will provide sufficient buffering to reduce significant changes pH levels. Typical levels in freshwater bodies are 20-200 mg/l.

Results from water quality sampling will be independently recorded and reported by the appointed EnCoW.

Technical records should be made available for inspection by the EPA (Ireland) and/or local authority, in line with EPA (Ireland) compliance and performance reporting guidance, if requested.

5 Conclusion

The purpose of this Water Quality Management Plan (WQMP) document is to address WCC's RFI no. 4b which is worded as follows:

"4. The applicant is required to submit the following reports which have been referenced within the NIS, EIAR and other planning particulars, however have not been included within the planning application:

b. Water Quality Management Plan (groundwater and surface water)."

The information set out in this Water Quality Management Plan (WQMP) document compliments proposed measures set out in the Construction and Environmental Management Plan (CEMP). The WQMP will remain a 'live' document and will be reviewed regularly and revised, as necessary, to ensure that the measures implemented are effective for proposed works. The measures will be agreed with the local authority prior to commencement of construction works.

A Sediment, Erosion and Pollution Control Plan (SEPCP) document has been prepared separately and should be read in conjunction with the WQMP document.

The WQMP includes measures to manage and monitor water quality at the site, specifically relating to groundwater and surface water sources, to ensure compliance with environmental quality standards specified in the relevant legislation, during the duration of the proposed works. The measures will be implemented by the contractor at the relevant stages of the proposed works.

With the implementation of the proposed measures set out in this document, the Proposed Project will not result in a change in status of any WFD quality elements (groundwater or surface waterbody) or directly prevent the future attainment of good water status or indirectly impact measures that may be put in place by the relevant competent authorities to achieve the environmental objectives of the WFD.