9.0 HYDROLOGY AND HYDROGEOLOGY

9.1 INTRODUCTION

This chapter describes the existing hydrological, hydrogeological and water quality characteristics at the site of the proposed power plant in Profile Park. The potential effects on the water environment arising from the power plant and associated infrastructure including the grid connection are assessed. The drainage of the plant is considered which includes proposed mitigation measures to reduce any potential negative effects associated with its construction, operation and decommissioning. Any residual effects are also assessed.

9.1.1 STATEMENT OF AUTHORITY

John Dillon (BSc., MSc., DIC, MCIWM, PGeo) is a hydrogeologist with 18 years' geological/hydrogeological experience on major infrastructure developments. John has authored numerous Hydrology and Hydrogeology chapters for EIARs for a range of projects.

Michelle Wong (BSc., MSc., EurGeol, PGeo) is a hydrogeologist with over 10 years' experience in both the public and private sectors. Michelle has a strong background in groundwater resource assessment and hydrogeological/ hydrological investigations. Michelle has authored numerous Hydrology and Hydrogeology chapters for EIARs for a range of projects.

Cathal Kelly (BE., Civil Engineering, CEng Engineers Ireland), is a TOBIN water resources engineer with 8 years experience who completed the Flood Risk Assessment which is referenced in this chapter and included in Appendix 9.1.

9.2 METHODOLOGY

9.2.1 SCOPE OF ASSESSMENT

The scope of the assessment undertaken is set out as follows:

- Characterise the hydrological and hydrogeological baseline conditions of the existing environment based on a desktop study and site investigation;
- Identify the possible effects of the proposed power plant during construction, operation and decommissioning of the project on the receiving hydrological and hydrogeological environment;
- Develop mitigation measures to reduce or eliminate the identified potential negative effects; and
- Identify any residual effects after mitigation measures are implemented.

9.2.2 LEGISLATIVE / GUIDANCE REVIEW

This chapter of the EIA Report has been prepared with reference to the requirements of the following legislation (where relevant):

- S.I. No. 293 of 1988: European Communities (Quality of Salmonid Waters) Regulations;
- S.I. No. 272/2009 - European Communities Environmental Objectives (Surface Waters) Regulations 2009, as amended;

- S.I. No. 9/2010 - European Communities Environmental Objectives (Groundwater) Regulations 2010, as amended;
- S.I. No. 477/2011 - European Communities (Birds and Natural Habitats) Regulations 2011
- Consolidated EIA Directive 2011/92/EU as amended by Directive 2014/52/EU;
- European Communities (Water Policy) Regulations 2003 [S.I. No. 722/2003];
- Waste Management Act 1996 as amended;
- Water Framework Directive (2000/60/EEC); and
- Groundwater Directives (80/68/EEC) and (2006/118/EC).

This chapter has also been completed in accordance with guidance contained in the following:

- "Advice Notes on Current Practice in the Preparation of Environmental Impact Statements" (EPA, September 2003);
- "Guidelines on the Information to be contained in Environmental Impact Statements" (EPA, 2002);
- "Draft Guidelines on the Information to be contained in Environmental Impact Assessment Reports" (EPA, 2017);
- "Draft Advice Notes on Preparing Environmental Impact Statements" (EPA, September 2015);
- The guidelines and recommendations of the Institute of Geologists of Ireland (IGI) publication 'Geology in Environmental Impact Statements – A Guide' (2002);
- Inland Fisheries Ireland (2016) "Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites"
- IGI Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements (2013);
- Good Practice During Proposed development Construction (Scottish Natural Heritage, 2010);
- PPG2 – Above ground oil storage tanks;
- PPG5 – Works or Maintenance in or near water;
- CIRIA (Construction Industry Research and Information Association) 2006: Guidance on 'Control of Water Pollution from Linear Construction Projects' (CIRIA Report No. C648, 2006);
- CIRIA C697 SuDS Manual; and
- CIRIA 2006: Control of Water Pollution from Construction Sites - Guidance for Consultants and Contractors. CIRIA C532. London, 2006.

9.2.3 STUDY METHODOLOGY

An examination of the existing hydrological/hydrogeological regime was carried out through a combination of consultation with relevant authorities, a desktop review of the hydrological/hydrogeological resource and site-specific fieldwork. These elements are described further below.

The assessment of the water environment consisted of the following:

- A desk study of available information including a review of site investigations, relating to surface water and groundwater, undertaken within or adjacent to the site;
- A walkover of the site and surrounding area;
- Drainage distribution and catchment mapping;
- Interpretation of all data to establish the baseline environment; and
- Assessment of flood risk.

Information retained by the Geological Survey of Ireland (GSI), the Office of Public Works (OPW) and EPA was accessed to provide the hydrological and hydrogeological setting of the site. Relevant documents and datasets used to provide the setting of the site included EPA Water Quality Data, topography maps and GSI Hydrogeological Data.

The relevant sections of the South Dublin County Development Plan 2016 - 2022 were also consulted in the preparation of this report.

The following sources of information were utilised to establish the baseline environment:

- The Geological Survey of Ireland (GSI) groundwater records for the area were inspected, with reference to hydrology and hydrogeology;
- Office of Public Works (OPW) flood mapping;
- Catchment Flood Risk Assessment and Management (CFRAM) and Preliminary Flood Risk Assessment (PFRA) Map data;
- EPA water quality monitoring data for watercourses in the area;
- EPA Water Framework Directive Monitoring Programme;
- Information from the 2nd Cycle River Basin Management Plan, 2018-2021; and
- Site visit of the study area.

TOBIN Consulting Engineers carried out an investigation in February 2021 and May 2021, in order to assess the water environment in the vicinity of the proposed power plant.

Recommendations arising from consultations with both Irish Water and South Dublin County Council (refer to Chapter 1, Introduction) were incorporated into the water impact assessment and mitigation measures.

9.1.1.1 Consultation

Consultation took place with a number of organisations including the following relevant bodies with details of same referenced in Chapter 2 EIA Report Methodology:

- South Dublin County Council;
- Inland Fisheries Ireland;
- Geological Survey of Ireland;
- Department of Arts, Heritage and the Gaeltacht;
- Waterways Ireland;
- Environmental Protection Agency (EPA); and
- The Office of Public Works;

9.3 EXISTING ENVIRONMENT

9.3.1 SITE WALKOVER AND INVESTIGATIONS

Field work involved a walkover survey of the site to identify hydrological features on site, wet ground, drainage patterns and distribution, exposures, drains etc;

Following the field survey, the results were reviewed in ArcGIS software in conjunction with publicly available hydrological and hydrogeological data from the GSI, EPA and OPW. Various maps were produced, representing a graphical interpretation of the field results.

On a regional scale, the site at Profile Park and its environs is located within the Liffey and Dublin Bay Hydrometric Area and Catchment. The delineation of the sub-catchments and general area of confluence is shown in Figure 9-1 'Regional Catchment Delineation Overview'.

The site of the proposed power plant is located within the National River Basin District of the 2nd cycle river basin management plan, formerly the Eastern River Basin District (ERBD) within the 1st cycle river basin management plan. At a local scale, the Baldonnell Stream (EPA Code: 09B09) flows through the site from in a north-south direction. The Baldonnell stream continues to flow northwards, discharging into the Griffeen River which then discharges into the River Liffey at Lucan.

9.3.2 TOPOGRAPHY

The topography of the site of the proposed power plant is mostly flat with elevations from c.73 mAOD to 76 mAOD. Surface water flows generally in a northward's direction towards the River Liffey.

9.3.3 SURFACE WATER HYDROLOGY

The purpose of this section is to describe the surface water environment including the following:

- Catchments;
- Site surface water features and drainage;
- Flood risk assessment;
- Assessment of hydrometric data;
- Surface water abstractions within the catchment of the site; and
- Surface water quality.

9.3.3.1 Catchments

A catchment, also referred to as a drainage basin and watershed, is a topographic area that collects and discharges surface streamflow through one outlet or mouth (Mays, 2012). The catchment boundary is the line dividing land where surface drainage flows toward a given stream from land where it drains into a separate stream.

The regional natural surface water drainage pattern, in the environs of the site is shown on Figure 9-1 'Regional Catchment Delineation Overview'. The site is located within the River Liffey and Dublin Bay catchment, located within the National River Basin District.

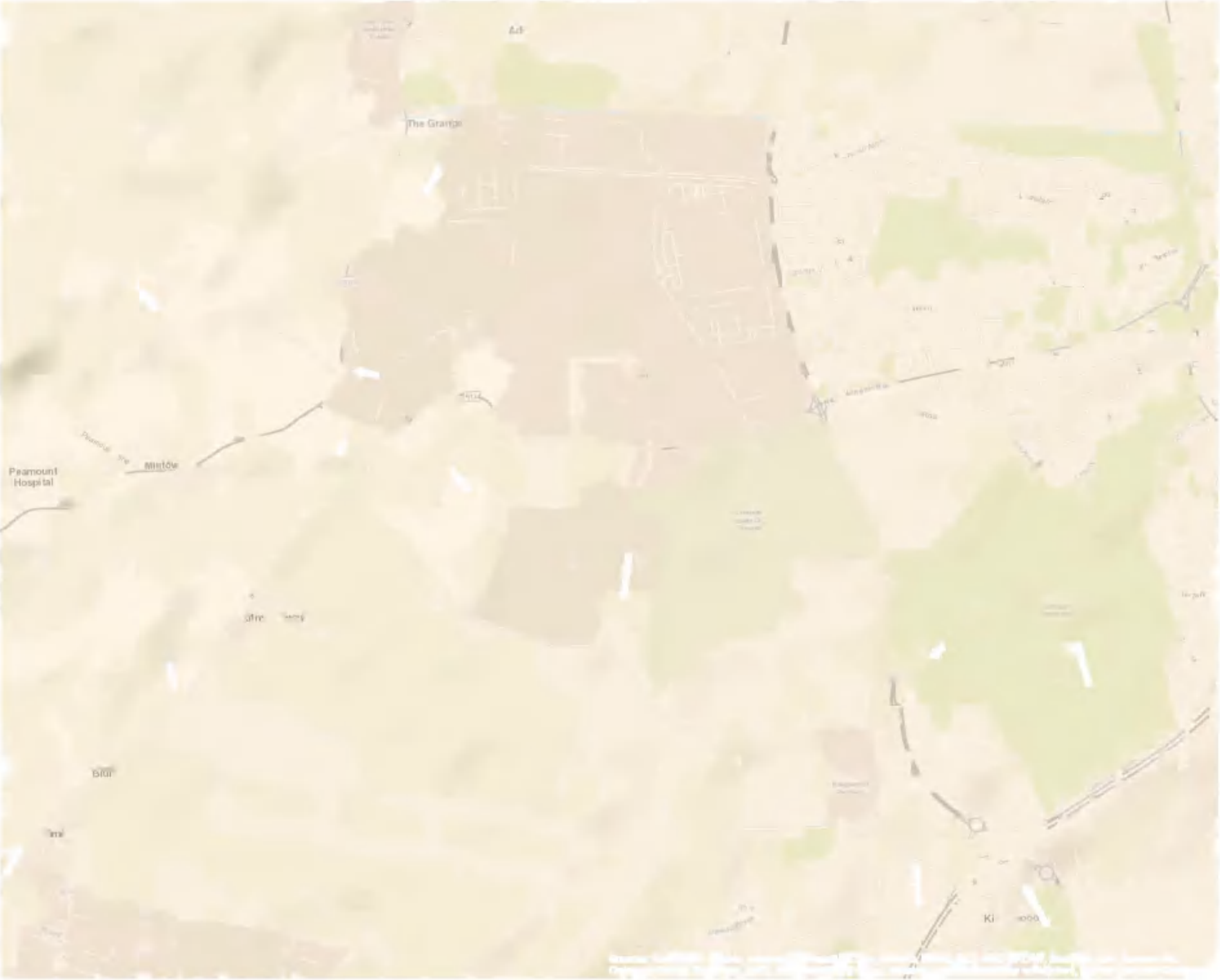

The Grange
Peamount Hospital
Milltow

Table 9-1: Waterbodies (within 2km radius) and the Proposed Power Plant

Catchment (Catchment ID)	WFD Sub-catchment (Sub catchment ID)	River Network EPA Name (Eden Code)	River Waterbody WFD Status 2013 - 2018 (River Name & Code)	River Waterbody WFD Risk (3rd Cycle) 2020-2027
Liffey and Dublin Bay (9)	Liffey_SC_090 (09_15)	Baldonnell Stream (09B09)	Good Liffey_170 (IE_EA_09L012100)	Under Review
		Camac (09C02)	Poor Camac_030 (IE_EA_09C020310)	At Risk

The EIAR study area comprises of approximately 1.9 ha and has a few surface water features in the region of the site. The study area includes the electrical grid and gas connections. The main regional surface water features include the following:

- Griffeen River (located approximately 1km northwest of the development);
- Liffey River (located approximately 4.5km north of the development);

This catchment includes the area drained by the River Liffey and by all streams entering tidal water between Sea Mount and Sorrento Point, Co. Dublin, draining a total area of 1,616km^2. The largest urban centre in the catchment is Dublin City. The other main urban centres are Dun Laoghaire, Lucan, Clonee, Dunboyne, Leixlip, Maynooth, Kilcock, Celbridge, Newcastle, Rathcoole, Clane, Kill, Sallins, Johnstown, Naas, Newbridge, Athgarvan, Kilcullen and Blessington. The total population of the catchment is approximately 1,255,000.

The River Liffey rises on the western slopes of Tonduff in the Wicklow Mountains, from where it flows west, before being joined by the Brittas River from the north and then flowing into the northern end of Pollaphuca Reservoir (created by the ESB in the 1930s). The Liffey flows out of the reservoir through the Pollaphuca generating station and into the lower reservoir and generating station at Golden Falls. The Liffey then flows west though Kilcullen before flowing through Newbridge, then past Sallins and Clane, after which it is joined by the Morell from the south.

The Liffey continues through Celbridge to Leixlip, before which it flows into Leixlip reservoir and generating station. The Liffey then enters a steep-sided valley, through which it flows past Islandbridge, where the river becomes tidal, and through the centre of Dublin City.

9.3.3.2 Surface Water Features & Drainage within the Site Boundary

The Baldonnell Stream (IE_EA_09L012100) is located within the site boundary. The EPA maps show the stream to run through the central portion of the proposed power plant in a north-south orientation. The Baldonnell Stream joins the Griffeen River (IE_EA_09L012100) approximately 1.3km downstream from the proposed power plant The Griffeen River then joins the Liffey River (IE_EA_09L012350) at Lucan, located 4.8km north of and downstream from the proposed power plant.

The neighbouring data centre site has diverted the upstream section of Baldonnell Stream where it has been culverted under their site before it enters a 'V-Shaped' channel within the site of the proposed power plant. The diverted stream enters the site at the south-eastern corner, where it continues to flow northwards along the 'V-shaped' channel which has steep grassy banks up to 3m in height. The Baldonnell Stream follows the development site's eastern boundary before it is culverted beneath the existing road through a concrete circular culvert measuring approximately 1m in diameter. The Baldonnell Stream is 0.3 to 0.6m in width with water depths averaging at 0.2m in the winter period, the flow was mostly gentle, and the substrate varied from clayey cobbles to silt.

Minor surface water ponding occurs on the site. The surface water ponding is considered to be seasonal and mainly associated with periods of heavy, prolonged and intense rainfall. The ponding form as a result of acceptance of drainage from the adjacent site and of natural attenuation of rain. The ponding has minor connectivity with the Baldonnell Stream (EPA name, IE_EA_09L012100) through the small drainage pipe located at the south-eastern corner of the proposed site.

9.3.3.3 Flood Risk Assessment

The Planning System and Flood Risk Management Guidelines (OPW/DoEHLG, 2009) classify electricity generating stations as "essential infrastructure" considered appropriate in Flood Zone C. The proposed power plant has therefore been assessed against a 0.1% AEP MRFS flood (i.e., a 1000-year flood in a likely climate change scenario).

The Flood Risk Assessment is provided in Appendix 9-1 and the initial flood risk assessment is summarised below:

A Stage 2 initial flood risk assessment was carried out in accordance with the Planning System and Flood Risk Management (PSFRM) Guidelines. Based on existing site topography, water arising at the site naturally flows away from the site towards lands at lower elevations. The potential sources of flood risk were reviewed using mapping produced by the Eastern Catchment Flood Risk Assessment and Management (CFRAM) Study. Based on that review it was found that:

- The proposed power plant is located outside of Flood Zone A and B as proposed by Eastern CFRAM mapping;
- The proposed power plant is to be sited outside of Flood Zone A and B as proposed by Eastern CFRAM mapping; and
- Mitigation measures are to be implemented to address flood risk issues for the construction stage and during the design life of the permanent works.

The Geological Survey Ireland (GSI) provides mapping[16] with data related to Ireland's subsurface and groundwater. There are no karst landforms in the vicinity of the site. There is, therefore, no evidence to suggest groundwater is a potential source of flood risk to the proposed power plant site.

9.3.3.4 Assessment of Hydrometric Data

The natural surface water drainage pattern in the environs of the proposed power plant site is shown in Figure 9-1.

It was noted that there were no hydrometric stations located in the immediate environs of the proposed power plant site. Although hydrometric stations do exist on watercourses downstream of the development, they include flows coming from a number of different tributaries. As such, they are not representative of the actual flows occurring at the site.

9.3.3.5 Surface Water Pressures within the Site & Environs

There are currently no known surface water abstractions from the streams adjacent to the site. The EPA has identified no river abstraction pressures upstream or downstream of the site.

The EPA has identified the Baldonnell Stream (Liffey_170, IE_EA_09L012100) to be under significant pressures at risk of not meeting their water quality objectives under the Water Framework Directive, namely from urban run-off and urban wastewater.

Electrical Cable Route

The electrical generator associated with each gas engine will connect to a main transformer where the voltage will be increased to 110 kV. The proposed electrical connection considered in this EIAR is an underground 110 kV cable. Electrical power will be exported from the power plant's main transformers to the existing Castlebaggot 220 / 110 kV Substation which is operated by EirGrid or to a new proposed 110 kV substation in Profile Park. No confirmed details of this potential new substation were available for consideration as part of this EIAR.

There are no drainage/ stream crossings identified from aerial and GSI mapping associated with the potential electrical grid connection to the existing Castlebaggot substation. No instream works are proposed for the cable works. The underground cable connection to the Castlebaggot 220 / 110 kV substation will be along existing private roads in Profile Park. Milltown_09 (EPA Code: 09M28), a tributary of the Liffey River is in proximity (100m to the north) to the grid connection. The management of Milltown Stream within the existing Castlebaggot substation site has been granted consent which has been included as a part of the planning application SD20A/ 0121.

The specification for cables and cable installation will be in accordance with EirGrid requirements and within the parameters assessed in this EIAR.

9.3.3.6 Surface Water Quality

Environmental Protection Agency Records:

---

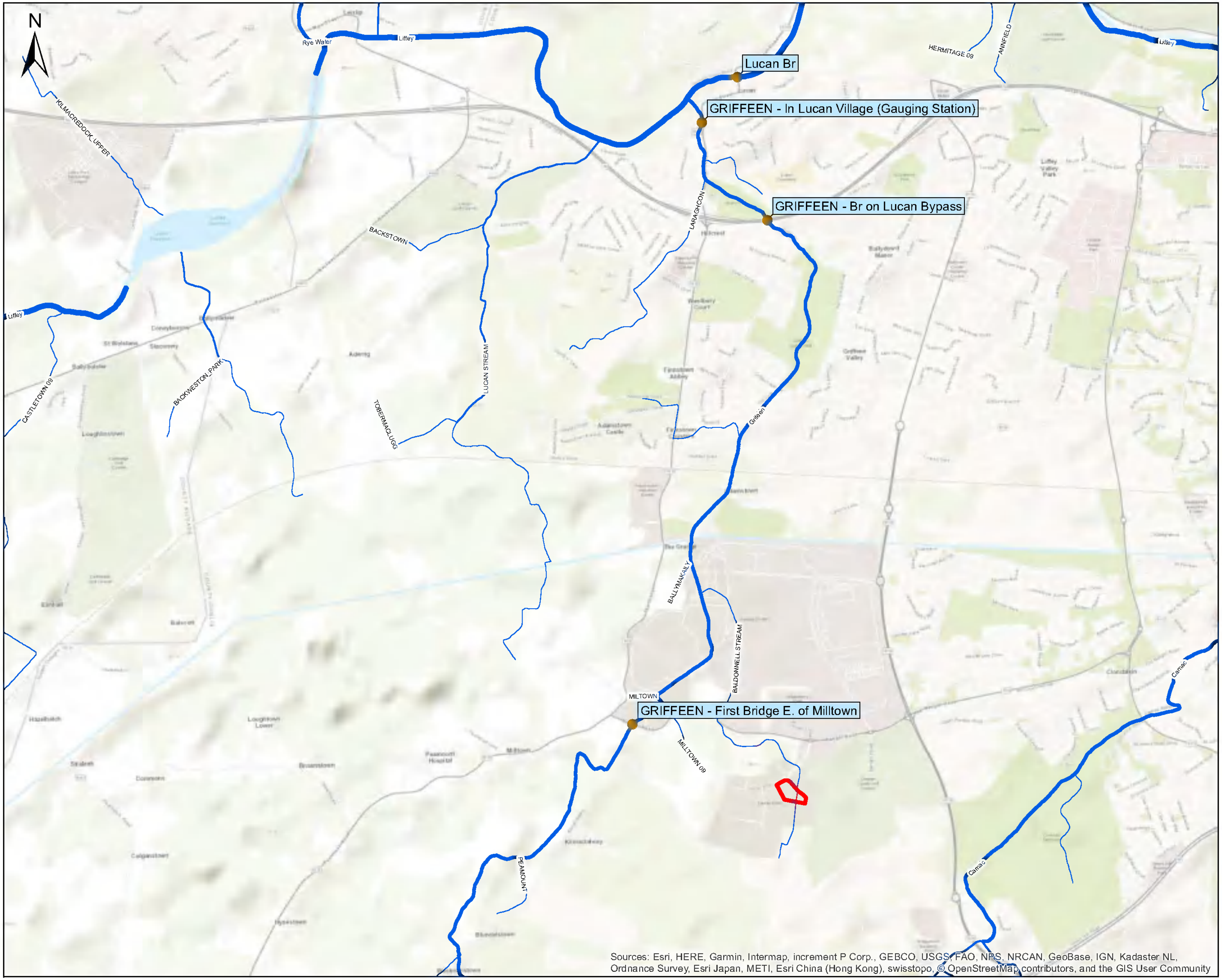
[16] https://www.gsi.ie/en-ie/data-and-maps/Pages/default.aspx

The Environmental Protection Agency (EPA) regularly monitors water bodies in Ireland as part of their remit under the Water Framework Directive (WFD) (2000/60/EC), which requires that rivers are maintained or restored to good/ favourable status. The quality of watercourses is assessed in terms of 4 No. quality classes; 'unpolluted' (Class A), 'slightly polluted' (Class B), 'moderately polluted' (Class C) and 'seriously polluted' (Class D). These water quality classes and the water quality monitoring programme are described in the EPA publication 'Water Quality in Ireland, 2003'. The water quality assessments are largely based on biological surveys. Biological Quality Ratings or Biotic Indices (Q values) ranging from Q1 to Q5 are defined as part of the biological river quality classification system. The relationship of these indices to the water quality classes defined above, are set out in Table 9-2 below.

Table 9-2: Relationship between Biotic Indices and Water Quality Classes

Biotic Index	Quality Status	Quality Class
Q5, 4-5, 4	Unpolluted	Class A
Q3-4	Slightly Polluted	Class B
Q3, 2-3	Moderately Polluted	Class C
Q2, 1-2, 1	Seriously Polluted	Class D

No monitoring locations were recorded on the Baldonnell Stream within or upgradient of the site due to the limited stream size. However, samples were recorded downgradient of the site boundary c. 3.9 km and c. 4.8km on the Griffeen River (RS09G010500 and RS09G010600 respectively) which feeds into the River Liffey (RS09L012100) at Lucan. The locations of the biological quality stations are included in Table 9-3 below and Figure 9-2 'EPA Surface Water Monitoring Locations.



NOTES

1. FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING
2. ALL DRAWINGS TO BE CHECKED BY THE CONTRACTOR ON SITE
3. ENGINEER TO BE INFORMED OF ANY DISCREPANCIES BEFORE ANY WORK COMMENCES
4. ALL LEVELS RELATE TO ORDNANCE SURVEY DATUM AT MALIN HEAD

Issue	Date	Description	By	Chkd.
D01	30/04/2021	Draft Issue	S.P	J.D

Client: Greener Ideas

Project: Profile Park Power Plant

Title: Figure 9.2 Surface Water Features/ Local Catchment Delineation

Scale @ A3: 1:25,000

Prepared by: S. Pezzetta | Checked: J. Dillon | Date: April 2021

Project Director: D. Grehan

TOBIN CONSULTING ENGINEERS
Consulting, Civil and Structural Engineers,
Block 10-4, Blanchardstown Corporate Park,
Dublin 15, Ireland.
tel: +353-(0)1-8030406
fax:+353-(0)1-8030409
e-mail: info@tobin.ie
www.tobin.ie

Drawing No.: Figure 9.2 | Issue: D01

Table 9-3: Relationship between Biotic Indices and Water Quality Classes (Sourced from EPA Maps/ Water, accessed in February 2021)

[illegible]	[illegible] Bridge E. of Milltown	[illegible] Br	[illegible] Village (Gauging Station)	[illegible]
[illegible] site boundary	1.2 km	3.9 km	4.8 km	5.1 km
[illegible] gradient	Upgradient	Downgradient	Downgradient	Downgradient
[illegible] Waterbody Name	Liffey_170	Liffey_170	Liffey_170	Liffey_170
[illegible] Waterbody Code	IE_EA_09L012100	IE_EA_09L012100	IE_EA_09L012100	IE_EA_09L012100
[illegible]	09_1079	09_1120	09_242	09_916
[illegible]	RS09G010200	RS09G010500	RS09G010600	RS09L012100
2019	-	-	Q3, Poor (Operational)	Q3-4, Moderate (Operational)
1991	Q3, Poor (PreWFD)	Q3, Poor (PreWFD)	-	-

The majority of EPA monitoring points indicate that the overall water quality in this area is moderately polluted. The overall status of surface water/rivers in the vicinity of the proposed site is poor status. This classification is based on a medium macroinvertebrate value (Q-Value) according to www.wfdireland.ie.

The EPA has assigned WFD River Waterbody Approved Risks to a number of waterbodies. The WFD Status (2013-2018) of Liffey_0170 is good. The Baldonnell Stream within the site, feeding into River Liffey (_170) is currently 'under review' within the WFD Risk 3rd cycle. River Liffey (_170) was 'at risk' according to (2010-2015) 2nd WFD assessment cycle, significant pressures included urban wastewater and runoff.

9.3.4 HYDROGEOLOGY/GROUNDWATER

The information provided herein relates to the hydrogeology or groundwater environment. It is provided to give context to the groundwater characteristics and flow patterns within and adjacent to the proposed power plant.

9.3.4.1 Existing Groundwater Quality

The study area lies within the following groundwater waterbody (GWB), Dublin (IE_EA_G_008). The Water Framework Directive (www.wfdireland.ie) for the period 2013-2018 describes the groundwater quality status as 'Good' for Dublin GWB. These classifications are based on an assessment of the point and diffuse sources in the area that may affect the groundwater quality.

9.3.4.2 Aquifer Potential and Characteristics

Reference to the National Aquifer Map prepared by the GSI (www.GSI.ie) indicates that there is one type of Bedrock Aquifer underlying the proposed site. The bedrock aquifer is a Locally important aquifer which is moderately productive in local zones (LI).

The subsoil deposits overlying the bedrock are not considered to be of sufficient lateral extent, depth or permeability to represent an aquifer body and are mainly comprised of low permeability limestone till. Summarised below in Table 9-4 are the aquifer characteristics of the underlying aquifer.

Table 9-4: Bedrock Aquifer Classification and Characteristics

Aquifer Classification	Permeability/Flow Mechanism	Bedrock	Karst Features
Locally Important (LI)	Productive only in Local Zones	Dark limestone and shale underlying the entire site	No

No significant dissolution features (i.e. karst) were observed from visual appraisal of the proposed site and no karst features are recorded within the GSI Karst Database of Ireland within a 2km radius of the proposed power plant.

9.3.4.3 Groundwater Vulnerability

Groundwater vulnerability represents the intrinsic geological and hydrogeological characteristics that determine how easily groundwater may be contaminated by activities at the surface. Vulnerability depends on the quantity of contaminants that can reach the groundwater, the time taken by water to infiltrate to the water table and the attenuating capacity of the geological deposits through which the water travels.

These factors are controlled by the types of subsoils that overlie the groundwater, the way in which the contaminants recharge the geological deposits (whether point or diffuse) and the unsaturated thickness of geological deposits from the point of contaminant discharge. The groundwater vulnerability throughout the proposed power plant site is at H (High).

9.3.4.4 Groundwater Usage

According to South Dublin County Council and Irish Water, no public water scheme (PWS) is present within 2km radius of the proposed power plant. No groundwater abstractions were identified within 5km from the site (as shown in Figure 9-1 'Regional Surface Water Features/Catchment Delineation').

According to the GSI database, there are no recorded well within the proposed power plant study area. According to the GSI well data, there are no known water supply wells within1 km of the proposed power plant.

9.3.4.5 Groundwater Flow

On a regional scale, the groundwater flow direction is generally a subdued reflection of surface water drainage. Therefore, on a regional scale, the groundwater flow is considered to be towards the surrounding tributaries which feed into the River Liffey to north of the proposed power plant. Local groundwater flow discharges to the local streams i.e. Baldonnell Stream feeding into River Liffey. Local and regional groundwater flow is generally northwards.

9.4 ASSESSMENT OF SIGNIFICANT EFFECTS

9.4.1 INTRODUCTION

This section addresses the potential effects on the hydrological and hydrogeological environment as a result of the development of the proposed power plant site. The potential effects may comprise direct and indirect effects on the quality of surface waters and groundwater. Thus, the hydrological and hydrogeological assessment identified water sensitive receptors located within and downstream from the site area.

The construction activities and operational infrastructure were reviewed to identify activities likely to impact upon identified water bodies including relevant water courses within and remote from the site. Following the identification of sensitive water receptors and potential effects to the water environment at the development stage, the extent and severity of potential construction, operational, decommissioning and cumulative effects were evaluated, taking into account all proposed control measures included in the project design.

9.4.1.1 Sensitivity of Receptors

The sensitivity of an environmental receptor is based on its ability to absorb an impact without perceptible change. The hydrological environment is considered to be of low sensitivity for receptors draining to the Liffey River via hydrological links. The EPA has found the water quality in the receiving waters to be poor (Q3).

9.4.1.2 Do Nothing Scenario

If the power plant does not proceed, the proposed power plant site and surrounding areas would remain as they currently are (i.e. artificial surfaces made up of industrial, commercial and transport units). The site would fall under the industrial management at Profile Park. This would result in no effect to the existing hydrological and hydrogeological conditions in the area. However given the zoning of the site it is likely that another industrial or commercial development would occur on the site which would result in similar effects as set out in this chapter.

9.4.2 WORST CASE SCENARIO

Localised and short-term contamination of surface water streams could occur during the construction and operational phases, which in turn could affect the ecology and quality of the downstream water bodies of the Liffey River. Also, potentially localised groundwater contamination may occur. However, good environmental practice on site and mitigation measures outlined in Section 9.6 will be put in place to prevent this from happening.

9.4.3 CONSTRUCTION PHASE

9.4.3.1 Hydrology and Hydrogeological Effects

The construction phase of the development will involve the following key activities that could have potential effects on surface water and groundwater conditions:

- Earthworks related to:
  - Construction of temporary and permanent infrastructure on site, including foundations, hardstands, fuel/oil bunds, site access, transformers, construction compounds, and all associated onsite infrastructure;
  - Laying of underground electrical cabling, both within the proposed power plant site, and as part of the route to the off-site electrical substation; and
  - Stockpiling material.
- Handling and storage of hydrocarbons, concrete, urea and other potential water pollutants.

The construction of the temporary site compounds, site access, power plant infrastructure foundations, bunds, hardstands, laying of underground electrical cabling and drainage channels will involve the removal of vegetation, the excavation of mineral subsoil and rock. Exposed and disturbed ground may increase the risk of erosion and subsequent sediment laden surface water runoff. The release of suspended solids is primarily a consequence of the physical disturbance of the ground during the construction phase, if not correctly compacted.

Incorrect site management of earthworks and excavations could, therefore, lead to loss of suspended solids to surface waters as a consequence of the following activities:

- Soil stripping, to construct the site access/ entrance, site compounds, power plant infrastructure foundations, hardstands, fuel bunds within site, laying of underground cabling, etc;
- Run-off and erosion from soil stockpiles (prior to reinstatement/profiling/side casting);
- Dewatering of excavations for infrastructure foundations (where necessary). The result of increased sediment loading to watercourses is to degrade water quality of the receiving waters and change the substrate character.

In the absence of mitigation there is potential for short term and significant negative effects.

9.4.3.2 Earthworks (Removal of Vegetation Cover, Excavations and Stock Piling)

Construction phase activities of the proposed power plant will require earthworks resulting in the removal of vegetation cover and excavation of mineral subsoil). Potential sources of sediment laden water include:

- Drainage and seepage water resulting from infrastructure excavation;
- Stockpiled excavated material providing a point source of exposed sediment;
- Construction of the grid connection cable trench to substation resulting in entrainment of sediment from the excavations during construction; and,

- Erosion of sediment from emplaced site drainage channels.

These activities can result in the release of suspended solids to surface watercourses i.e. Baldonnell Stream and could result in an increase in the suspended sediment load, resulting in increased turbidity which in turn could affect the water quality and fish stocks of downstream water bodies. The pathways identified for construction earthworks are drainage and surface water discharge routes. The main receptors are downgradient rivers (Liffey) and associated dependent ecosystems.

In the absence of mitigation there is potential for short term and significant negative effects.

9.4.3.3 Potential Effects on Groundwater Levels during Excavation Works

Groundwater level impacts are not anticipated to be significant due to the local hydrogeological regime.

9.4.3.4 Electrical Cable and Gas Pipeline Routes

The excavations for electrical cable and gas pipeline trenches may have a direct effect on the exposed soils and rock in the form of increased erosion and sediment release that, without mitigation, could also have additional effects on water quality (due to sedimentation of water courses).

Any excavations will expose bare soil for a temporary period over a short section of the trench.

The trenches will be backfilled immediately following the installation of each section of cabling. While the trenches are open, there will be a potential impact to the adjacent watercourse of an increase in the concentration of suspended solids.

There are no significant watercourse crossings on the proposed electrical grid or gas pipeline routes.

In the absence of mitigation there is potential for brief and slight negative effects however this is unlikely to occur due to the immediate backfilling following cable installation.

9.4.4 OPERATIONAL PHASE

9.4.4.1 Drainage

The proposed power plant footprint will comprise of 1.9 ha. The greenfield runoff rate has been calculated based on the Environment Agency guidance "Rainfall runoff management for developments" , SC030219 (2013), the SuDS Manual C753 (CIRIA, 2015) and the non-statutory standards for SuDS (Defra, 2015). The mean annual maximum flow rate (Qbar) is calculated to be 13.5 l/s/ha for 1 in 100 year events. Based on climate change and an increase in hardstand surfaces, there is a potential increase in runoff. Climate change scenarios suggest fluvial floods in the 2080's increasing by up to 10% (low and medium low scenarios) or by up to 20% (medium high and high scenarios). Present recommendations are to include in the design flow a 20% increase in flood peaks as a result of climate change. The potential for increased runoff is addressed in the SuDs design measures. Mitigation measures are outlined in section 9.6 and include the use of gravel roads instead of tarmac roads in non risk locations, grasscrete parking areas, tree pits, attenuation tank and other SuDs measures.

With regard to water quality effects, the main discharges occur as a result of surface water runoff (storm water) to the surface water environment during the operational phase. Surface water runoff will be generated from all surfaces within the facility that are exposed to rainwater or to which water is applied in order to clean. This includes all hardstanding surfaces, roofs, and other impermeable surfaces. Operational access will be required to the site for testing, maintenance and deliveries, there will be vehicles daily on the site at any given time. This may lead to occasional accidental emissions, in the form of oil, petrol or diesel leaks, which could cause localised contamination of site drainage/ surface water feature i.e. Baldonnell Stream. Due to the frequent nature of visits, the risk of surface water pollution during operation is considered to be likely and permanent.

The presence of operational workforce will lead to the generation of foul sewage from toilets and washing facilities. This foul sewage will be collected and discharged to the foul sewer network.

Due to the operational nature of the proposed site, the handling, containment, use and disposal of chemicals on site will be required at any given time leading to occasional accidental emissions of potentially polluting substances. This could cause localised contamination of site drainage/ surface water feature i.e. Baldonnell Stream.

Firefighting systems will be used during the operational phase of the proposed power plant. Mobile foam units will be used for immediate action against small local fires and the engine hall will be equipped with a number of powder and CO_2 extinguishers. Firefighting pump connected to the fire main will be operated on diesel. The risk to surface water pollution is considered to be likely and permanent.

The pre-mitigation impact is considered as significant, permanent and likely to impact on surface waters.

9.4.4.2 Groundwater

In relation to groundwater quality, the main risk during operation is that there is spill or leakage associated with fuel or chemical storage on site. In the absence of mitigation this could result in a negative a significant effect on groundwater.

9.4.4.3 Flooding

A Flood Risk Assessment was undertaken in accordance with the Planning System and Flood Risk Management Guidelines for Planning Authorities (PSFRM Guidelines) which were published in 2009 by the Office of Public Works (OPW) and Department of the Environment, Heritage and Local Government (DoEHLG). Its aim is to ensure that flood risk is considered in development proposals and the assessment of planning applications.

Pluvial Flooding:

There is some pluvial flooding or surface water ponding at the proposed power plant site. Surface water arising at developed areas of the site will be managed by a dedicated stormwater drainage system designed in accordance with Sustainable Drainage Systems (SuDS) principles, limiting discharge from the site to greenfield runoff rates.

It is estimated that the natural landscaping and topography of the site will provide safe exceedance flow paths and prevent surface water ponding, therefore minimising residual risks associated with an extreme flood event or a scenario where the stormwater drainage system becomes blocked.

On this basis, the proposed power plant is not at risk of pluvial flooding and there will be no cumulative effects on flood risk elsewhere based on the Flood Risk Assessment. The proposed power plant will not significantly alter the drainage regime of the site. Therefore, no cumulative impacts on other projects are anticipated.

Fluvial Flooding:

The subject site is bounded to the east by the Baldonnell Stream, a tributary of the Grifeen River.

Previous flood studies in the area (CFRAM and PFRA) modelled the Grifeen and Camac Rivers, however the Baldonnel Stream was not explicitly modelled. CFRAM modelling of the area shows the site as liable to fluvial flooding, without accounting for the conveyance capacity of the Baldonnell Stream. This modelling was therefore not compete. To quantify the risk of fluvial flooding at the subject site, a site-specific hydraulic model of the Baldonnell Stream was developed.

Based on the results of this model which is informed by detail cross sectional surveys of the Baldonnel Stream to address the technical gaps in the CFRAMS/PFRA mapping, it is demonstrated that the development is not at risk of flooding and will have an imperceptible impact on flood risk upstream/downstream of the subject site. The development therefore satisfies the criteria of the PSFRM's Justification Test.

Groundwater Flooding:

There is no evidence from Geological Survey Ireland mapping to suggest that groundwater is a potential source of flood risk to the proposed power plant site.

Coastal Flooding:

Given the elevated nature of the proposed power plant site (72 mOD), there is no risk of coastal flooding.

9.4.5 DECOMMISSIONING PHASE

The power plant is expected to be operational for at least 25 years. On cessation of activities, the plant will either be redeveloped as a power related facility or the site will be redeveloped in an alternative form.

In the event that the facility is decommissioned, the following programme will be implemented:

- All plant equipment and machinery will be emptied, dismantled, and stored under appropriate conditions until it can be sold. If a buyer cannot be found, the material will be recycled or disposed of through licensed waste contractors and hauliers. If plant and machinery is required to be cleaned on site prior to removal, all necessary measures will be implemented to prevent the release of contaminants;
- All waste will be removed from the facility; and

- The site and all associated buildings will be secured.
- Waste will be recycled wherever possible. Licensed waste contractors will control all waste movement, recycling, and disposal operations.

Decommissioning of the proposed power plant development will involve the disassembly and removal of the power plant equipment and machinery. These impacts have been assessed similar to that of the Construction Phase and, therefore, the mitigation measures for the Construction Phase will also be implemented during decommissioning.

The pre-mitigation impact is considered as significant, long-term and likely to impact on surface waters.

9.4.6 PRE-MITIGATION MAGNITUDE AND SIGNIFICANCE OF IMPACT

The magnitude of an impact includes the timing, scale, size and duration of the potential impact. The magnitude criteria for hydrology/hydrogeology are defined as set out in Table 9-5 and 9-6 below.

Table 9-5: Pre-mitigation Magnitude and Significance of Hydrological/Hydrogeological Criteria – Construction

Criteria	Description	Duration and Frequency of Effects	Significance of Potential Effect
Runoff Regime	Potential localised increase in surface water runoff may be caused by impermeable areas on site. Impermeable areas may give rise to a slight increase in surface water flow locally but will not have a significant impact on the volumetric flow rate of downstream rivers.	Short term and rarely	Significant
Surface Water Quality	Sedimentation of drainage ditches and stream.	Temporary and occasional	Significant
Groundwater Levels	No change in groundwater is expected. No ZOCs or wells within 2km of proposed power plant.	Not applicable	Not significant
Groundwater Quality	Minor leaks or spills during the construction phase.	Short term and occasional	Not significant

Table 9-6: Pre-mitigation Magnitude and Significance of Hydrological/Hydrogeological Criteria – Operational

Criteria	Description	Duration and Frequency of Effects	Significance of Potential Effect
Runoff Regime	Increased surface runoff caused by impermeable areas on site may increase surface water flow locally but will not have	Long term and rarely	Not significant

	a significant potential effect on the volumetric flow rate of downstream rivers. Site to be maintained at greenfield runoff rates.		
Surface Water Quality	Significant loss in water quality is expected in the form potentially polluting substances.	Permanent and likely	Significant, negative
Groundwater Levels	No significant change in groundwater is expected.	Not applicable	Not significant
Groundwater Quality	Minor leaks or spills during the operational phase has the potential to affect groundwater quality if there is a breach in mitigation control measures, i.e. bund integrity.	Long term and unlikely	Significant, negative

Table 9-7: Pre-mitigation Magnitude and Significance of Hydrological/Hydrogeological Criteria – Decommissioning

Criteria	Description	Duration and Frequency of Effects	Significance of Potential Effect
Runoff Regime	Potential localised increase in surface water runoff may be caused by impermeable areas on site. Impermeable areas may give rise to a slight increase in surface water flow locally but will not have a significant impact on the volumetric flow rate of downstream rivers.	Short term and rarely	Significant
Surface Water Quality	Sedimentation of drainage ditches and stream.	Temporary and occasional	Significant
Groundwater Levels	No change in groundwater is expected. No ZOCs or wells within 2km of proposed power plant.	Not applicable	Not significant
Groundwater Quality	Minor leaks or spills during the construction phase.	Short term and occasional	Not significant

9.5 MITIGATION AND MONITORING MEASURES

9.5.1 MITIGATION BY AVOIDANCE

In identifying and avoiding sensitive surface waters, the proposed power plant has implemented 'avoidance of impact' measures. Mitigation by avoidance is viewed as part of the 'Reasonable Alternatives' outlined in Chapter 3. Examples include moving the grid connection route away from Baldonnell Stream, locating fuel storage and construction compounds >50 m from surface water streams.

9.5.2 MITIGATION BY PREVENTION AND REDUCTION

Mitigation measures are outlined below and are considered as in-built to the design of the project. These mitigation measures are a combination of measures to comply with legislation and best practice construction methods to be implemented in order to prevent water (surface water and groundwater) pollution. Examples of these measures are the storage of potentially polluting materials in fully bunded tanks and controlling / reducing runoff from hardstand areas. Bund testing will be undertaken on a regular basis during the operation phase in accordance with BAT guidance.

9.5.3 CONSTRUCTION PHASE

In order to mitigate potential effects during the construction phase, best practice construction methods will be implemented in order to prevent water (surface water and groundwater) pollution. A CEMP was developed for the project to ensure adequate protection of the water environment. All personnel working on the project will be responsible for the environmental control of their work and will perform their duties in accordance with the requirements and procedures of the CEMP.

During the construction phase, all works associated with the construction of the power plant and associate grid connection to the substation will be undertaken in accordance with the guidance contained within CIRIA Document C741 'Environmental Good Practice on Site' (CIRIA, 2015). Any groundwater encountered will be managed and treated in accordance with CIRIA C750, 'Groundwater control: design and practice' (CIRIA, 2016).

All mitigation and management measures outlined hereunder will be incorporated into the CEMP. Mitigation measures are incorporated into the CEMP and will be incorporated into the specification for the Civil Engineering Works contract. The implementation of the CEMP will be overseen by a suitably qualified ecologist/engineer and will be regularly audited throughout the construction phase. The assigned ecologist/engineer will be required to stop works on site if he/she is of the opinion that a mitigation measure or corrective action is not being appropriately or effectively implemented.

Monitoring

Monitoring of the Baldonnell Stream (for water quality and turbidity), will be undertaken pre-construction and during the construction period. A programme of inspection and maintenance will be designed, and dedicated construction personnel assigned to manage this programme. A checklist of the inspection and maintenance control measures will be developed and records kept.

9.5.3.1 Hardstanding

To minimise any impact on the underlying subsurface strata from material spillages, all oils and solvents used during construction will be stored within specially constructed dedicated bunded areas. Refuelling of construction vehicles and the addition of hydraulic oils or lubricants to vehicles will take place in a designated area of the site, away from surface water gullies or drains. Spill kits and hydrocarbon absorbent packs will be stored in this area and operators will be fully trained in the use of this equipment. For certain vehicles which are less mobile, refuelling may need to occur elsewhere on site. A spill kit will be stored with the bowser and the person operating the bowser will be trained in their use. When not in use this will be stored in the designated area of the construction compounds.

All construction waste will be sorted and stored in on-site skips, prior to removal by a licensed waste management contractor.

9.5.3.2 Concrete

Concrete is required for the construction of the power plant infrastructure and tank farm foundations. After concrete is poured at a construction site, the chutes of ready mixed concrete trucks must be washed out to remove the remaining concrete before it hardens. Wash out of the main concrete bottle will not be permitted on site; wash out is restricted only to chute wash out of trucks, mixers and concrete pumps. Wash down and washout of the concrete transporting vehicles will take place at an appropriate facility offsite.

The best management practice objectives for concrete chute washout are to collect and retain all the concrete washout water and solids in leak proof containers or impermeable lined wash out pits, so that the wash material does not reach the soil surface and then migrate to surface waters or into the ground water. The collected concrete washout water and solids will be emptied on a regular basis. Washout will be undertaken at the construction compounds.

9.5.3.3 Fuels and Chemicals

With regards to on-site storage and handling of potentially pollutant materials:

- Fuels and chemicals will be stored within bunded areas as appropriate to guard against potential accidental spills or leakages. The bund area will have a volume of at least 110 % of the volume of such materials stored;
- All on-site refuelling will be carried out by a trained competent operative.
- Mobile measures such as drip trays and fuel absorbent mats kept with all plant and bowsers and will be used as required during all refuelling operations;
- A spill kit will be stored with the bowser and the person operating the bowser will be trained in their use;
- All equipment and machinery will have regular checking for leakages and quality of performance and will carry spill kits;
- Any servicing of vehicles will be confined to designated and suitably protected areas such as construction compounds; and
- Additional drip trays and spill kits will be kept available on site, to ensure that any spills from vehicles are contained and removed off site.

9.5.3.4 Erosion and Sediment Control

No in stream construction work is proposed.

Runoff will be maintained at Greenfield (pre-development) runoff rates. The layout of the development has been designed to collect surface water runoff from hardstanding areas within the development and discharge to associated surface water attenuation adjacent to the proposed infrastructure. It will then be managed by gravity flow at Greenfield runoff rates.

Suspended solid (silt) removal features will be implemented in accordance with CIRIA C697 SuDS Manual, and CIRIA C648 Control of water pollution from linear construction projects.

9.5.3.5 Interceptor Drains

Interceptor drains/diversion ditches will be installed ahead of the main earthworks activities to minimise the effects of collected water on the stripped/exposed soils once earthworks commence. This drainage will integrate into the existing site drainage. These drainage ditches will be installed on the upgradient boundary of the areas affected by the foundation edge earthworks operations and installed ahead of the main foundation construction operations commencing. They will generally follow the natural flow of the ground. The interceptor drains will intercept any storm water surface run-off and collect it to the existing low points in the ground, allowing the clean water flows to be transferred independently through the works without mixing with the construction drainage.

9.5.3.6 Swales

Infrastructure drainage/swales are required to control run-off from the running surface to lower water levels in the subgrade, to control surface water and to carry this flow to outlet points. Swales wills be installed in advance of the main construction phase. Swales will provide additional storage of storm water where located along gradient.

Swales will be re-vegetated by hydro-seeding with indigenous seed mix as soon as is practicable following excavation. This will reduce the flow velocity, treat potential pollutants, increase filtration and silt retention.

All stockpiled material will be side cast, battered back and profiled to reduce rainfall erosion potential. The stockpiling of materials will be carefully supervised as per the mitigation measures listed in Section 8.5.1 within Chapter 8, Soils and Geology.

A number of ephemeral drainage features (drains) are also present on site. These appear dry except during dry weather. Culverting of these will only take place during dry weather periods. Culverts will be designed to be of a size adequate to carry expected peak flows. Culverts will be installed to conform, wherever possible, to the natural slope and alignment of the drainage line. Where required, culverts will be buried at an appropriate depth below the channel bed and the original bed material placed at the bottom of the culvert. The sizing of any new internal drainage crossings will maintain existing depth of flow and channel characteristics.

9.5.3.7 Grid and Gas Connection Routes

Silt fencing will be erected at the location of stream crossings along the grid connection route. Silt curtains and floating booms will also be used where deemed to be appropriate and this will be assessed separately at each individual location.

Excavated material will not be stockpiled or side-cast within 10m of a watercourse. Appropriate steps will be taken to prevent soil/dirt generated during the grid connection route works from being transported on the public road. Road sweeping vehicles will be used to ensure that the public road network remains free of soil/dirt from the location of the grid connection when required. This will reduce the potential for sedimentation of surface watercourses locally.

Further mitigation measures in relation to the grid connection cable route works are outlined in the CEMP.

There will be no natural watercourse crossings along the grid connection route.

9.5.3.8 Major Accidents/Disasters

The most likely major accidents that could occur as a result of the proposed power plant (and its associated works) include:

- Significant hydrocarbon spillage;
- Power plant infrastructure collapse; and
- Power plant infrastructure or substation fire.

The most likely natural disasters that might occur and potentially impact the proposed power plant (and its associated works) include:

- Fire

Due to the limited quantities of fuel on site and 110% bunded fuel storage and appropriate chemical storage, the potential for a significant spillage of hydrocarbons is negligible and does not give risk to a major accident or disaster. Notwithstanding the negligible risk of serious spillage, additional spillage protection measures are included in the mitigation measures for the Proposed power plant. In the unlikely event of a minor spill, the spill will be collected by the dedicated refuelling hardstand area, only completed by trained operatives and spill kits to be made readily available.

Baldonnell Stream is located within the site boundary. There are no streams in close proximity to the substation location. Due to the nature of Profile Park being an urban environment, in the unlikely event of a fire there is no significant additional fire risk due to separation distances from any fuel sources such as hydrocarbons and chemicals. In the event of substation or power plant infrastructure fire there is minimal potential for fire spread due to the proposed design (i.e. hardstand areas) and the firefighting protection system philosophy is based on National Fire Protection Association (NFPA) standards. The volumes of hydrocarbons and chemical storage or will be kept to a minimum (as required), subject to a COSHH (Control of Substances Hazardous to Health) assessment and compliance with the requirements of REACH, i.e. European Communities Regulation 1907/2006 for the Regulation, Evaluation, Authorisation and Restriction of Chemicals. Operators will receive specific training on the handling, containment, use and disposal for all hazardous substances on site. There is no significant impact on the surface water from power plant infrastructure collapse or substation fire.

It can be concluded that the risk of major accidents associated with this development and hydrological/hydrogeological factors is very low and would not cause unusual, significant or adverse effects on the hydrological or hydrogeological environment during the construction, operational and decommissioning phases.

9.5.4 OPERATIONAL PHASE

The following mitigation measures will be implemented during the operational stage.

9.5.4.1 Hardstanding

The operational team will carry out maintenance works such as servicing of the power plant infrastructure, upkeep of access, any hardstand and sealed areas (i.e. foundations for power plant buildings, car park, bunded structures), ensuring drainage system remains functional throughout the operation of the power plant.

Mitigation for the operational maintenance works include regular scheduled maintenance works, regular inspections of all project elements with any unscheduled repairs or maintenance arising to be undertaken.

The potential impact of hydrocarbon or oil spills during the operational phase of the power plant are limited by the size of the fuel tank of vehicles used on the site. Mitigation measures for the potential release of hydrocarbons or oil spills include:

- The plant and vehicles to attend site should be regularly inspected or at least prior to the scheduled site visit to be free from leaks and is fit for purpose;
- Fuels stored on site will be minimised, any storage areas will be bunded appropriately for the fuel storage volume for the time period of the operation;
- Operational team to be competent and trained in an emergency plan for the operation phase to deal with accidental spillages; and
- Spill kits will be available to deal with accidental spillages.

9.5.4.2 Hydrocarbon Fuel/ Oils

All fuel will be stored in bunded areas. The bund capacity will be sufficient to accommodate 110% of the largest tank's maximum. The exception to this being double walled tanks equipped with leak detection, which do not require additional retention.

A hydrocarbon interceptor will be installed at the proposed fuel (fuel tanks, lubricating oil storage) site with regular inspection and maintenance, to ensure optimal performance. Regular bund testing will be undertaken in accordance with BAT guidance.

In order to comply with CRU requirements, low sulphur diesel oil will be stored as a backup fuel. The tanks will be bunded in accordance with the requirements set out in the EPA publication, 'Storage and Transfer of Materials for Scheduled Activities' (2004), which states bunds are to contain 110% of the volume of the tank in the event of a tank rupture.

Diesel oil will be delivered to site by road tankers. The maximum number of expected tankers travelling to and from the site in any one day will be in the region of 2- 3 tankers, however this would be an extremely infrequent occurrence of once every 12 months when oil would start to degrade and would need to be replenished.

A standard operating procedure will be followed during tanker unloading and filling of the bulk tank. The bulk tank will be fitted with a high-level alarm to prevent overfilling. There will be a dedicated tanker unloading area surrounded by a drainage channel which will drain to a petrol interceptor. This separator will provide for full retention of any material in the event of a rupture and spillage of a tanker compartment. A shut-off device incorporated into the separator will close the outlet in the event of its capacity being exceeded.

9.5.4.3 Drainage

Surface Water Drainage

As part of the surface water drainage design strategy, the following items have been included in order to effectively manage surface water at the site:

- Surface Water Pumps in Duty/Standby Arrangement – A standard duty/standby arrangement including high level alarms, float switches, and associated telemetry will be provided;
- Petrol Interceptor – Full retention petrol interceptors have been included in the surface water collection system on a precautionary basis. The full retention petrol interceptors will be fitted with visual and audible alarms to ensure containment facilities are adequately maintained. In addition, this alarm will be linked to telemetry facilities such that relevant staff will be alerted if oil is detected at trigger levels; and
- Down Pipes/Gullies – It is proposed that surface water will be collected from roofed buildings via standard rainwater down pipes while runoff from un-roofed structures will drain to the access roads where it will enter the drainage network via road gullies. It is also proposed that gullies and drain entry points will incorporate silt traps to remove any grit or silt which may be washed into the drainage system.
- Flow Control Device – It is proposed to limit the surface water runoff from the site to be similar to the Greenfield runoff as per the requirements of the Great Dublin Strategic Drainage Study. It is proposed to install a Hydrobrake downstream of an attenuation tank to limit the flow from the site to 4.1l/s.
- Attenuation Tank – it is proposed to attenuate all storm water accumulated on site within an underground attenuation tank, which will be discharged to the Baldonnel stream via a Hydrobrake.
- Swale – it is proposed to install a swale to collect runoff from the adjacent North East road. The water once permeated into the swale will be directed towards the surface water drainage infrastructure via a perforated pipe and above ground falls. The swale will also slow the surface water at source, increase the quality of water which is intercepted by the system through infiltration, biodegradation and pollutant settlement.
- Permeable Paving – It is proposed to install permeable paving within the car parking areas of the site. The water once permeated into the pavement will be directed towards the surface water drainage infrastructure via a perforated pipe and above ground falls. The permeable paving will also slow the surface water at source, increase the quality of water which is intercepted by the system through infiltration, biodegradation and pollutant settlement.
- Infiltration Basin – It is proposed to install an infiltration basin within the site to allow for surface water collected from the southern end of the site to infiltrate into the ground water. The infiltration basin will also be provided with a perforated overflow pipe to direct the excess surface water to the attenuation tank during heavier rainfall events.

Foul Wastewater Drainage

Domestic type wastewater effluent will be generated on site. It is estimated that at any one time, there will be no more than 12 personnel on site, i.e. the maximum number of people on site at any given time for testing, maintenance, site meetings etc. An approximate volume of 0.1157 l/sec of domestic type wastewater was identified as the maximum domestic wastewater flow which may be generated on site. Wastewater will be pumped to the existing foul sewer in Profile Park which is directly adjacent to the site.

Process Wastewaters

There will be no process wastewater generated from the power plant.

9.5.4.4 Chemical Storage

Operators will receive specific training on the handling, containment, use, and disposal requirements for all potentially polluting products on site. All chemicals stored on site will be subject to a COSHH (Control of Substances Hazardous to Health) assessment and compliance with the requirements of REACH, i.e. European Communities Regulation 1907/2006 for the Regulation, Evaluation, Authorisation and Restriction of Chemicals. Chemicals will be managed in accordance with European Chemicals Agency's Guidance for Downstream Users (2014). Final selection of bulk chemicals will be subject to an assessment of trace elements to ensure that they are within acceptable limits. In addition to this:

- All potentially polluting substances, including waste, will be stored in designated areas in appropriate UN approved containers within bunds, drip trays, or spill pallets, as deemed necessary;
- All containers and bunds will be inspected regularly to ensure they have not become damaged or degraded;
- Hazardous compressor cleaning products will be segregated in a locked cabinet with limited access to prevent misuse. This cabinet will be made of suitably fire rated material;
- All areas on site with potentially polluting substances will be hardstanding with drainage networks directing run-off to contained areas;
- Accidental spillages will be contained and cleaned immediately by suitably trained personnel;
- Spill equipment stocks will be stored at strategic locations around the site. Stocks will be subject to regular inventory checks. Incidents, accidents, and near-misses will be recorded on site and notified to the appropriate authorities in accordance with licence requirements; and
- An Emergency Incident Response Plan will be developed and implemented in consultation with the local emergency services. This plan will include emergency response contact details for site personnel and emergency services, maps and plans of the facility, emergency procedures, chemical inventories, and equipment lists.

9.5.4.5 Firefighting Systems and Controls

The fire-fighting protection system philosophy is based on widely recognized National Fire Protection Association (NFPA) standards. Piping and equipment may still follow standards used by the fire protection equipment supplier.

The stand pipe system inside the engine hall will follow 'NFPA14 class II stand pipe system' requirements. Additionally, mobile foam units will be provided. For immediate action against small local fires, the engine hall will be equipped with a number of powder extinguishers at strategic locations and CO2 extinguishers for electrical fires (spacing as per NFPA10). The fire main will be built using the design guideline 'NFPA24 Private fire service main'.

The firefighting pump will operate on diesel. The pump will be located within the fire pump house. The pump will only be used in an emergency and for short duration testing.

9.5.5 DECOMMISSIONING PHASE

In the event that the facility is decommissioned, the following programme will be implemented:

- All plant equipment and machinery will be emptied, dismantled, and stored under appropriate conditions until it can be sold. If a buyer cannot be found, the material will be recycled or disposed of through licensed waste contractors and hauliers. If plant and machinery is required to be cleaned on site prior to removal, all necessary measures will be implemented to prevent the release of contaminants;
- All waste will be removed from the facility; and
- The site and all associated buildings will be secured.
- Waste will be recycled wherever possible. Licensed waste contractors will control all waste movement, recycling, and disposal operations.

Details of provisions to decommission and render safe or remove all materials, waste, ground, plant, or equipment contained on or in the site that may result in environmental pollution will be agreed with the Environmental Protection Agency as part of the Industrial Emissions Licensing process.

Mitigation measures applied during decommissioning activities will be similar to those applied during construction where relevant. Mitigation measures to avoid contamination by accidental fuel leakage and compaction of soil by on-site plant will be implemented as per the construction phase mitigation measures.

These effects have therefore been assessed as similar to the construction phase. Mitigation measures for the construction phase will therefore also be implemented during decommissioning.

9.6 CUMULATIVE EFFECTS

In terms of the potential effects of power plant developments on downstream surface water bodies, the biggest risk is during the construction phase of the development as this is the phase when earthworks and excavations will be undertaken at the sites.

Potential hydrological cumulative effects arising from the proposed power plant and proposed grid and gas connections are also not expected to be significant because the cables/pipes will be placed within the one trench along existing roads or under the fence to adjacent site thereby reducing overall excavation requirements. Also, no in-stream works are required.

The proposed power project has potential hydrological and hydrogeological connectivity at downstream sites and therefore there can be potential cumulative effect or interaction with both the construction, operation, and decommissioning phases of other developments as identified in Chapter 6 Planning Policy. However, the implementation of the proposed drainage mitigation will ensure there will be no cumulative significant adverse effects on the water environment from the proposed power plant in combination with other data centre developments and non-data centre farm developments within a 10km radius in the Liffey and Dublin Bay catchment.

9.7 RESIDUAL EFFECTS

The potential residual effects on the surrounding water quality, hydrology and existing drainage regime at the site are considered to be slight and temporary/short term in nature.

The construction timescale of activities within the site will be short-term in duration and, thereafter, the only activities occurring within the site will be associated with maintenance, such as maintaining the hardstanding and existing drains, ongoing maintenance, replacement of infrastructure and onsite infrastructure and monitoring during the operational phase. There are no significant long-term effects.

The design of the proposed power plant has taken account of the potential effects of the development and the risks to the surface water and groundwater environment. Measures have been developed to mitigate the potential effects on the water environment. These measures seek to avoid or minimise potential effects in the main through the implementation of best practice construction methods and adherence to all relevant legislation. Residual effects are outlined in Table 9-8 to Table 9-10.

Table 9-8: Magnitude and Significance of Hydrological Criteria – construction (residual effects)

Criteria	Duration and Frequency of Effects	Significance of Potential Effect
Runoff Regime	Short term and rarely	Not significant
Surface Water Quality	Temporary and occasional	Not significant
Groundwater Levels	Short term and rarely	Not significant
Groundwater Quality	Short term and occasional	Not significant

Potential residual effects from the construction phase of the proposed power plant on the hydrological and hydrogeological environment are considered to be negative, short term and not significant.

Table 9-9: Magnitude and Significance of Hydrological Criteria – operational (residual effects)

Criteria	Duration and Frequency of Effects	Significance of Potential Effect
Runoff Regime	Long term and rarely	Not Significant
Surface Water Quality	Long term and rarely	Not Significant
Groundwater Levels	Long term and rarely	Imperceptible
Groundwater Quality	Long term and rarely	Imperceptible

Potential residual effects from the operational phase of the proposed power plant on the hydrological and hydrogeological environment are considered to be negative, of an unlikely probability, long term and not significant.

Table 9-10: Magnitude and Significance of Hydrological Criteria – Decommissioning (residual effects)

Criteria	Duration and Frequency of Effects	Significance of Potential Effect
Runoff Regime	Short term and rarely	Not Significant
Surface Water Quality	Temporary and occasional	Not Significant
Groundwater Levels	Short term and rarely	Imperceptible
Groundwater Quality	Short term and occasional	Imperceptible

The decommissioning phase would have an unlikely and imperceptible impact for the high sensitivity watercourses.