

Appendix 8-4 – WFD Compliance Assessment



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Appendix 8-5 WFD Compliance Assessment Report

1. Introduction

CDM Smith Ireland Ltd (CDM Smith) was requested by Bord Na Móna (BnM) to complete a Water Framework Directive (WFD) Compliance Assessment for the planning application for a proposed landfill expansion at the Drehid Waste Management Facility (WMF) site in Timahoe South Bog (TSB), Co. Kildare.

Details of the proposed landfill extension (referred to herein as the 'Proposed Development') are presented in full in Chapter 2 of the Environmental Impact Assessment Report (EIAR).

1.1 Purpose of Assessment

The purpose of the WFD Compliance Assessment is to determine if any specific components or activities associated with the Proposed Development may compromise WFD status objectives assigned by the Environmental Protection Agency (EPA) for surface water and groundwater bodies that are hydrologically linked with the Proposed Development, whether directly or indirectly. This WFD Compliance Assessment supplements Chapter 7 (Soils, Geology and Hydrogeology) and Chapter 8 (Water) of the EIAR.

1.2 Statement of Authority

CDM Smith in Ireland is a specialist hydrological, hydrogeological and environmental practice that delivers a range of water and environmental management consultancy services to the private and public sectors. CDM Smith conducts environmental risk assessments for a large variety of projects, including waste disposal, discharges to waters, flood risk assessment, and water resources management.

This WFD Compliance Assessment was prepared by Henning Moe (registered P. Geo.), a hydrogeologist with over 30 years of practical experience. He was the lead hydrogeologist for the Eastern River Basin District project which was part of Ireland's implementation of the first cycle of the WFD. He has subsequently supported Irish public bodies through the second and third cycles of WFD implementation, including Further Characterisation studies to help select WFD Programmes of Measures, and conducting risk assessments in support of Ireland's WFD reporting to the European Commission. As such, he is experienced with the WFD implementation process, including the details of EPA's water body status requirements and classification tests.

2. Water Framework Directive

The EU Water Framework Directive (2000/60/EC) is a holistic approach towards water resources management across the EU. The WFD was transposed into Irish law by the European Communities (Water Policy) Regulations 2003 (S.I. No. 722 of 2003).

The WFD requires that EU Member States achieve at least 'Good' status for all water bodies by year 2027 at the latest. Additionally, where Member States assign 'High' status objectives to water bodies, then 'High' status must be achieved or maintained in 2027.

In Ireland, water body status objectives and water body status (assigned by EPA) are presented in successive 6-year river basin management plans. Status objectives define what must be achieved. Status assignment defines what was achieved in the preceding 6-year reporting cycle. For each successive river basin management plan, EPA determines where objectives have been met and where they have not.

In all water bodies, Programmes of Measures are implemented to protect and/or improve the biological quality elements and environmental supporting conditions which guide EPA's determination of status. There are two

types of measures: Basic Measures, which are statutory and enforceable (e.g., the Sustainable Use of Pesticides regulations); and Supplementary Measures, which are non-statutory and voluntary (e.g., pilot schemes, awareness campaigns).

As part of the WFD implementation process, EPA also completes a risk assessment every 6 years, with outcomes that are also presented in successive river basin management plans. Water bodies are either 'At Risk' or 'Not At Risk' of meeting WFD environmental objectives. Where a water body is 'At Risk', EPA determines the 'significant pressures' that places the water body 'At Risk' and which may prevent the water body from meeting its status objective. This determination focuses the Programmes of Measures in the relevant subcatchment(s).

Ireland is currently in the third cycle of WFD implementation, which covers the period 2022-2027. Ireland's latest river basin management plan, which was published in 2021, sets out the status objectives to be achieved by year 2027 (DHLGH, 2021). The latest available status classification for all water bodies covers the period 2016-2021.

Besides the status classification of water bodies, the WFD also requires that 'designated sites' meet their environmental requirements and conservation objectives. Designated sites are Natura 2000 sites (Special Areas of Conservation, SACs, with water-dependent habitats, and Special Protection Areas for species listed in the EU Habitats Directive); drinking water protected areas; bathing waters; shellfish waters; salmonid waters; and nutrient sensitive waters. Environmental requirements and conservation objectives for designated sites are stipulated in existing regulations or are being developed by the relevant public bodies (e.g., National Parks and Wildlife Service for SACs).

2.1 WFD Classification Scheme

EPA's WFD status classification of surface water bodies¹ is based on a schema which considers:

- Data and information related to biological quality elements (BQEs) which are stipulated in the European Union Environmental Objectives (Surface Waters) (Amendment) Regulations 2019 (S.I. 77 of 2019). The BQEs include, for example, fish and invertebrate communities in streams.
- Data on the physico-chemical conditions that support the BQEs. Specifically, EPA reviews water quality data from a dedicated network of sampling stations in context of a) environmental quality standards (EQS) for 'Good' or 'High' status conditions which are also stipulated in S.I. 77 of 2019, and b) data trends and patterns.
- Measurable changes to BQEs against established reference conditions that apply for 'Good' and 'High' status.
- Flows and levels of surface waters.
- Visual indicators of impact, such as hydromorphological alterations to streams.
- 'Best available information' from research publications.

As such, WFD status classification of surface water bodies is supported by data and survey findings but the assessment of status also relies on technical judgement.

In contrast to the status classification schema for surface water bodies, the status classification for groundwater bodies (GWBs) considers:

¹ <https://www.epa.ie/our-services/monitoring--assessment/freshwater--marine/conditions-of-our-water/>

- 'Quantitative status', whereby (known) total consumptive abstraction rates within a GWB are compared to estimated total recharge volumes, as well as trends in groundwater levels using data from EPA's national monitoring well network.
- 'Qualitative status', whereby groundwater quality data from a network of wells and springs are compared to 'chemical test' threshold values which are stipulated in the European Union Environmental Objectives (Groundwater) (Amendment) Regulations 2016 (S.I. 366 of 2016). EPA also applies technical judgement from review of data trends and patterns.

3. Water Body Identification

The surface water and groundwater bodies that can potentially be affected by the Proposed Development are identified below.

3.1 Surface Water Bodies Considered

The Proposed Development is situated within WFD Catchment 12, Barrow, specifically:

- Subcatchment 14_3, 'Figile_SC_010' (**Figure 1**).

Two WFD river water bodies originate within this subcatchment, namely:

- 'Figile_010' (code IE_SE_14F010061).
- 'Abbeylough_010' (code IE_SE_14A010840).

The headwater of 'Figile_010' within TSB is the Cushaling River, and under bog drainage conditions, both the existing WMF and the Proposed Development are situated entirely within the subcatchment of TSB that drains to the 'Figile_010' river water body. The Cushaling River flows west from TSB where it is joined by tributaries from the north. These tributaries are also part of the 'Figile_010' river water body.

Just downstream of the village of Ticknevin, the 'Figile_010' river water body merges with the 'Abbeylough_010' river water body and jointly become the 'Figile_020' river body. From their point of confluence, the merged rivers also become known as the Figile River. This flows southward and subsequently merges with the River Barrow near the town of Monasterevin.

Because the 'Figile_010' river water body includes Cushaling River, and the Cushaling River is identified as the main receptor of potential pollution from the Proposed Development (Chapter 8 of the EIAR), the focus of the WFD Compliance Assessment is on 'Figile_010'. Unlike 'Figile_010', the 'Abbeylough_010' river water body drains from a subcatchment of TSB that is outside the influence of the Proposed Development (Chapter 8 of the EIAR). For this reason, it was not considered further in the WFD Compliance Assessment. 'Figile_020' is also downstream of both the 'Figile_010' and 'Abbeylough_010' water bodies, and for this reason, the 'Figile_020' river water body was also excluded from further consideration.

A small stream to the northeast of the existing WMF, the Mulgeeth Stream (**Figure 1**), was considered in the WFD Compliance Assessment. This is because Mulgeeth Stream becomes indirectly linked to the Proposed Development after implementation of the TSB Decommissioning and Rehabilitation Plan², which is part of BnM's broader

² <https://www.bnmpcas.ie/wp-content/uploads/sites/18/2022/10/Timahoe-South-Rehab-Plan-Final-v5.pdf>, with further reporting at: <https://www.bnmpcas.ie/2022bogsrehabilitation/> (last accessed 03 March 2023).

Peatlands Climate Action Scheme³, has been reviewed by NPWS, and is separate from the current planning application.

As presented in Chapter 8 of the EIAR, the Mulgeeth Stream is a headwater of the Blackwater (Longwood) River which flows north to the River Boyne. Once the TSB Decommissioning and Rehabilitation Plan is implemented, runoff from a planned peat berm and overflow from blocked drains to the east of the landfill expansion footprint will be transmitted via a new bog drain (east of the landfill expansion footprint) to the Mulgeeth Stream. As explained in Chapter 8 of the EIAR, this new south-to-north oriented bog drain reconfigures subcatchment boundaries around the WMD and landfill expansion area. By redirecting runoff (from the peat berm) and overflow (from blocked drains) to the Mulgeeth Stream, the Proposed Development becomes indirectly linked with WFD Catchment 07, Boyne, specifically:

- WFD Subcatchment 7_06, 'Blackwater(Longwood)_SC_010'.
- 'Blackwater(Longwood)_010' river water body (code IE_EA_07B020060).

In this case, the Mulgeeth Stream becomes an intermediate pathway to the Blackwater (Longwood) River.

It is noted that there are no WFD reportable lake water bodies (*i.e.*, >50 hectares in size) in any of the named subcatchments.

3.2 Groundwater Bodies Considered

As shown in **Figure 2**, the majority of TSB, including the subcatchment that drains to the Cushaling River, is underlain by the Kildare groundwater body (GWB) (code IE_SE_G_077). As presented in Chapter 7 of the EIAR, the Kildare GWB comprises carbonate bedrock, specifically the 'Waulsortian limestone', which the Geological Survey Ireland (GSI) has classified as a "*poorly productive*" in the general TSB area.

The northern extremity of TSB (outside the Proposed Development boundary) drains to the Mulgeeth Stream. This part of TSB is underlain by the Trim GWB (code IE_EA_G_002) which the GSI considers a "*locally important aquifer*" at this location, specifically a bedrock aquifer which is "*moderately productive only in local zones*".

4. WFD Status Objectives and Classification

4.1 WFD Status Objectives

Based on the information provided by EPA in their 'Water' web viewer⁴, each of the named water bodies in Section 3 have been assigned WFD 'Good' status objectives.

4.2 WFD Status Classification – Surface Water Bodies

Using the same data source, and based on EPA's latest WFD status classification covering the period 2016-2021, the named river water bodies were classified as follows (**Figure 3**):

- Figile_010: 'Poor' ecological status (medium confidence)
- Blackwater (Longwood)_010: 'Poor ecological status'

Therefore, none of the named river water bodies met their WFD status objectives. Reasons given by EPA are:

³ <https://www.bnmpcas.ie/> (last accessed 03 March 2023)

⁴ <https://gis-stg.epa.ie/EPAMaps/Water> (last accessed 03 March 2023)

- Figile_010: 'Poor' invertebrate status and 'Moderate' nutrient conditions
- Blackwater (Longwood)_010: 'Poor' invertebrate status

The determination of invertebrate status is based on monitoring surveys conducted by EPA. The monitoring includes a location on the Cushaling River downstream of TSB, but not on the Mulgeeth Stream directly. Rather, monitoring is conducted by EPA at a station on the Blackwater (Longwood) River downstream of the point where Mulgeeth Stream flows into the Blackwater (Longwood) River. As shown in **Figure 4**, the latest available Q-values on the named streams are 2 to 3 (indicated by orange dots, which is defined as 'moderately polluted' waters in 'unsatisfactory' conditions.⁵

4.3 WFD Status Classification – Groundwater Bodies

For the latest WFD status classification period (2016-2021), both the Kildare and Trim GWBs were assigned 'Good' status (**Figure 5**) which means that WFD status objectives were met in the reporting period.

5. WFD Risk Assessment

5.1 WFD Risk Assessment – Surface Water Bodies

Based on the latest WFD risk assessment covering the period 2022-2027⁶, both the Figile_010 and Blackwater (Longwood) river water bodies are 'At Risk' of failing to achieve WFD status objectives by year 2027 (**Figure 6**).

Significant environmental pressures that have been flagged by EPA as putting the respective water bodies 'At Risk' are:

- Figile_010: Industry (Section 4 discharges and industrial emissions), Extractive Industry (peat), Urban wastewater discharges (agglomeration population equivalent (PE) of 1001 to 2000), and Hydromorphology (channelisation and embankment).⁷
- Blackwater (Longwood)_010: "Anthropogenic pressures" (unspecified).⁸

5.2 WFD Risk Assessment – Groundwater Bodies

Based on the latest WFD risk assessment covering the period 2022-2027, the Kildare GWB is considered to be 'Not At Risk' of failing to achieve WFD status objectives in year 2027 (**Figure 7**). No significant pressures have been identified that are placing WFD status objectives at risk.

The Trim GWB to the north and west of TSB is considered to be 'At Risk' of failing to achieve WFD status objectives in year 2027. The significant pressure identified by EPA is 'domestic wastewater'. The 'At Risk' classification by EPA refers to the GWB as a whole, which covers a total area of 669 km² and extends the length of the Boyne catchment to Drogheda).⁹

⁵ <https://epawebapp.epa.ie/qvalue/webusers/> (last accessed 03 March 2023)

⁶ <https://gis-stg.epa.ie/EPAMaps/Water> (last accessed 03 March 2023)

⁷ https://stg.catchments.ie/wp-content/files/subcatchmentassessments/14_3%20Figile_SC_010%20Subcatchment%20Assessment%20WFD%20Cycle%202.pdf (last accessed 03 March 2023)

⁸ [https://catchments.ie/wp-content/files/subcatchmentassessments/07_6%20Blackwater\[Longwood\]_SC_010%20Subcatchment%20Assessment%20WFD%20Cycle%202.pdf](https://catchments.ie/wp-content/files/subcatchmentassessments/07_6%20Blackwater[Longwood]_SC_010%20Subcatchment%20Assessment%20WFD%20Cycle%202.pdf) (last accessed 03 March 2023)

⁹ <https://gsi.geodata.gov.ie/downloads/Groundwater/Reports/GWB/TrimGWB.pdf> (last accessed 03 March 2023)

6. WFD Compliance Assessment

As described in Chapter 2 of the EIA, the construction of the Proposed Development will be implemented over a 24 year period, across 12 new waste cells (or phases). Works involve excavations, installations, waste filling and capping. The operational phase covers a total of approximately 25 years and is staggered with the construction phase, meaning that construction of new cells proceeds as landfill operations and capping proceed in other previously constructed cells.

Before the initial stage of construction can begin, the modified drainage network that is part of the TSB Decommissioning and Rehabilitation Plan to the east of the proposed landfill extension has been established.

Based on Chapter 2 of the EIA, and with an assumed start of construction in 2024, the capping of the last cell is projected for year 2050. WFD status is assigned by EPA every 6 years, which means the Proposed Development works will span 5 successive river basin management planning cycles.

3.1 Risks - Surface Water

Even though the named surface water receptors are already at 'Poor' ecological status, the Proposed Development has the potential to affect the WFD status classification of the Cushaling River and Mulgeeth Stream further (to 'Bad'), both with regard to BQEs and hydrochemical conditions that support BQEs. Risks to Cushaling River are direct. Risks to Mulgeeth Stream are indirect, i.e., can occur in combination with other projects.

Without mitigation, risks to water body status are defined by:

- **Sedimentation of suspended matter** arising from planned works along river/streambeds. Sedimentation relates to transport and deposition of fine particles and organic matter. Sediments that settle along the river/streams can cause a deterioration of streambed conditions and associated aquatic habitat.
- **Changes in water quality** arising from leachates escaping waste cells, stormwater management, and licensed discharges. This translates to chemical loading of surface waters which can result in shifts of baseline conditions and the metrics that EPA uses to determine status. Besides the specific and hazardous pollutants named in the Surface Water Regulations, the principal constituents of concern are ammonia, suspended solids, dissolved organic matter, and pH.
- **Pollution 'events'** arising from accidental spills and leaks of fuel and other chemicals. Individual, accidental pollution events are unlikely to affect water body status, although serious contamination events (e.g., of hazardous substances) can have longer-term ramifications on aquatic biota.
- **Direct, physical damage** caused by machinery during construction and maintenance activities, which can lead to hydromorphological changes.

Overall, the risks of affecting WFD status are significant and the greater risks are associated with construction activity, earthworks in particular, and mainly because the scale of works is considerably greater during construction compared to operational aspects and decommissioning phases of the Proposed Development. Proposed mitigation measures are presented in Section 7.

3.2 Risks - Groundwater

Without mitigation measures, the Proposed Development can affect groundwater quality, from:

- **Changes in water quality** arising from leachates escaping new landfill phases.
- **Pollution 'events'**, as defined above.

Overall, risk of affecting WFD qualitative status are low, for three reasons:

- The landfill is engineered, with three protective barriers: a) impermeable liners; b) leachate collection system; and c) an under cell drainage system which will lower groundwater levels, capture groundwater, and will serve to contain leachate migration in the groundwater environment.
- The Quaternary sediments beneath the Proposed Development generally have low permeability characteristics which afford natural protection of the underlying Kildare and Trim GWBs (Chapter 7 of the EIA).
- Outside the hydraulic influence of the Proposed Development drainage system, groundwater will flow and discharge to the Cushing River (Chapter 7 of the EIA). There are no groundwater-sourced public or private water supplies downgradient of the Proposed Development (Chapter 7 of the EIA).

With regard to WFD quantitative status, the Proposed Development does not include any large or long-term groundwater abstractions. There will be a need for temporary sump pumping during construction to keep excavation floors free of water. However, guided by experiences from the construction of the WMF (Chapter 7 of the EIA), the volumes are expected to be small (<10 m³/hr, or 2.6 l/s) and thus manageable. The discharge water will contain suspended sediments, which is addressed in Section 7 below. The pumping duration is also brief, and the temporary effect will be imperceptible in context of the overall water balance of Kildare and Trim GWBs. Accordingly, the Proposed Development will not affect the WFD quantitative status classification of either GWB.

7. Mitigation to Prevent Status Deterioration

In order to mitigate potential negative effects on surface water and/or groundwater quality, as well as flow conditions in the Cushing River, mitigation measures will be implemented during all phases of the Proposed Development. These are outlined in Table 1 below, as derived from Chapters 7 and 8 of the EIA.

Table 1: Summary of Proposed Mitigation Measures

Mitigation Type	Description	EIA Chapter/Section Ref.
Construction Phase		
Sequencing of Works	<ul style="list-style-type: none"> ■ Constructing the Proposed Development in managed stages 	<ul style="list-style-type: none"> ■ Chapter 2 ■ Chapter 8/Section 8.5.2
Avoidance Controls	<ul style="list-style-type: none"> ■ Working only during appropriate weather conditions. Suspending work in advance of or when periods of heavy rainfall occur. ■ Keeping machinery out of water courses. ■ Excluding cement-batching in works areas. 	<ul style="list-style-type: none"> ■ Chapter 8/Sections 8.5.2.1, 8.5.2.2, 8.5.2.6
Source Controls	<ul style="list-style-type: none"> ■ Capturing stormwater and seepage waters by perimeter swales and sumps. ■ Silt fences, straw bales, flume pipes, sandbags, oyster bags (e.g., filled with gravel), and filter fabrics 	<ul style="list-style-type: none"> ■ Chapter 8/Sections 8.5.2.1, 8.5.2.2
	<ul style="list-style-type: none"> ■ Minimizing footprints of works. ■ Using dedicated staging areas. ■ Covering stockpiles. ■ Maintaining buffer zones from existing drains. ■ Refueling only in designated, managed locations. ■ Maintaining dedicated welfare facilities in dedicated areas. 	<ul style="list-style-type: none"> ■ Chapter 8/Sections 8.5.2.1 through 8.5.2.7
In-line Controls	<ul style="list-style-type: none"> ■ Drain blocks and overflow pipes. ■ Sandbags, silt fences, straw bales. ■ Temporary pumping systems (e.g., from sumps). 	<ul style="list-style-type: none"> ■ Chapter 8/Sections 8.5.2.1 through 8.5.2.4

Mitigation Type	Description	EIAR Chapter/Section Ref.
Construction Phase		
	<ul style="list-style-type: none"> ▪ Sediment traps in drains (with overflow pipes). 	
Treatment Controls	<ul style="list-style-type: none"> ▪ Existing and new attenuation lagoons. ▪ Integrated Constructed Wetland. ▪ Silt bags, oyster bags, filter fabrics. 	<ul style="list-style-type: none"> ▪ Chapter 2 ▪ Chapter 8/Sections 8.5.2.1 through 8.5.2.5
Discharge/Outfall Controls	<ul style="list-style-type: none"> ▪ Buffered outfalls to break energy of discharges and reduce soil erosion. ▪ Vegetation filters. ▪ Attenuation lagoons. ▪ Integrated Constructed Wetland. ▪ Overflow pipes in blocked drains. 	<ul style="list-style-type: none"> ▪ Chapter 2 ▪ Chapter 8/Sections 8.5.2.1 through 8.5.2.4
Accidental spills and leaks	<ul style="list-style-type: none"> ▪ Spill Response Procedures. ▪ Surface Water Management Plan. ▪ Visual inspections. 	<ul style="list-style-type: none"> ▪ Chapter 8/Sections 8.5.2.2 and 8.5.2.5
Other	<ul style="list-style-type: none"> ▪ Dedicated welfare facilities, sealed storage tanks, offsite disposal. ▪ Construction and Environmental Management Plan. ▪ Surface Water Management Plan. ▪ Supervision of Works. 	<ul style="list-style-type: none"> ▪ Chapter 8/Section 8.5.2.7 ▪ Appendix 2.X ▪ Appendix 2.Y
Operational Phase		
Source Controls	<ul style="list-style-type: none"> ▪ Engineered landfill liner and leachate collection system. ▪ Under-cell drainage system. ▪ Leachate recording and monitoring programme. 	<ul style="list-style-type: none"> ▪ Chapter 2
In-line Controls	<ul style="list-style-type: none"> ▪ Perimeter swale around the landfill extension footprint. ▪ Modified drainage network in TSB. ▪ New attenuation lagoons. 	<ul style="list-style-type: none"> ▪ Chapter 2
Treatment Controls	<ul style="list-style-type: none"> ▪ New attenuation lagoons. ▪ Integrated Constructed Wetland. ▪ Existing 'Old Settlement Ponds' 	<ul style="list-style-type: none"> ▪ Chapter 2
Accidental spills and leaks	<ul style="list-style-type: none"> ▪ Maintenance procedures (e.g., drain/swale/ICW cleaning) ▪ Spill response procedures. ▪ Surface water quality monitoring ▪ Visual inspections and monitoring. 	<ul style="list-style-type: none"> ▪ Chapter 8/Section 8.4.19, Section 8.5.3.1 and 8.5.3.2
Other	<ul style="list-style-type: none"> ▪ Dedicated welfare facilities, sealed storage tanks, offsite disposal. ▪ Compliance Monitoring (surface water and groundwater) ▪ Environmental Monitoring (surface water and groundwater) 	<ul style="list-style-type: none"> ▪ Chapter 8/Section 8.5.3.1 ▪ Chapters 7 and 8 – proposed monitoring
Decommissioning Phase		
<p>Same as Construction Phase, except:</p> <ul style="list-style-type: none"> ▪ Leaving ducts in ground to reduce earthworks further. ▪ Rehabilitating hard standing and promoting re-vegetation. Maintaining/repairing necessary infrastructure which will be left in place at the end of the decommissioning phase. 		

4.4 Residual Effects After Implementing Mitigation Measures

With the implementation of the mitigation measures outlined above, likely significant effects from the Proposed Development on surface water or groundwater will not occur. Risks are managed and the current (2016-2021) WFD status classification of named water bodies will not be affected by the Proposed Development.

8. Designated Sites and Protected Areas

As presented in Chapter 8 of the EIAR, and shown in Figure 8, the Proposed Development is hydrologically linked with:

- The River Nore and River Barrow Special Area of Conservation (SAC) and Special Protected Area (SPA) near the town of Monasterevin, more than 30 km flow distance southwest of TSB.
- The Barrow_130 Drinking Water Protected Area (DWPA) on the River Barrow near Athy, which supplies the Srowland Water Treatment Plant operated by Irish Water.

These are surface water sourced and dependent, and the pathway that connects the Proposed Development with each is the Figile River.

As explained in Chapter 8 of the EIAR, likely significant effects on the named SAC/SPA and DWPA in the Barrow Catchment will not occur because of the significant dilution/mixing and other attenuation mechanisms that will take place along the pathway (e.g., nitrification of ammonia). The estimated mean flow of Cushaling River at the western TSB boundary is approximately 0.03 m³/s. The gauged mean flow of Figile River at gauging station ID 14004 (“Clonbulloge”, operated by OPW) approximately 13 km south of TSB is 3.084 m³/s. The gauged mean flow of the Barrow River at gauging station ID 14005 (“Pass Br”) just downstream of the confluence of the Barrow and Figile Rivers is 10.575 m³/s. Hence, the mean flow of the Barrow near the confluence is approximately 350 times greater than the estimated mean flow of the Cushaling River at the TSB boundary. This value also represents a dilution factor.

If a catastrophic spill of a liquid hazardous chemical were to occur within the PD, the travel time to the Barrow_130 DWPA is estimated to be just under 10 hours. In such an instance, Irish Water will be alerted per the spill response procedure which is mentioned in **Table 1**.

Because of the indirect connection between the Proposed Development and Mulgeeth Stream, the nearest distance to designated sites and protected areas in the Boyne catchment were also assessed. As shown in **Figure 9**, the nearest designated site and protected areas that are hydrologically connected with Mulgeeth Stream are:

- The River Boyne And River Blackwater SAC/SPA to the north of Longwood, more than 28 km flow distance north of TSB.
- The Boyne_100 drinking water protected area on the River Boyne, which begins just downstream of Trim, approximately 33 km flow distance from TSB. The Blackwater (Longwood) River merges with the Boyne River approximately 4 km north of the town of Longwood.

As presented in Chapter 8 of the EIAR, the Boyne River is also a designated salmonid water, with environmental requirements that are stipulated in the European Communities (Quality of Salmonid Waters) Regulations, 1988, S.I. No. 293 of 1988. For the same reasons outlined above (with the Figile and Barrow Rivers), likely significant effects on designates sites and protected areas in the Boyne Catchment will not occur, and the spill response plan will serve to alert Irish Water of any spills that may occur within the Proposed Development.

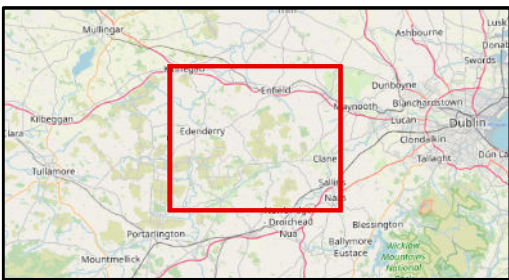
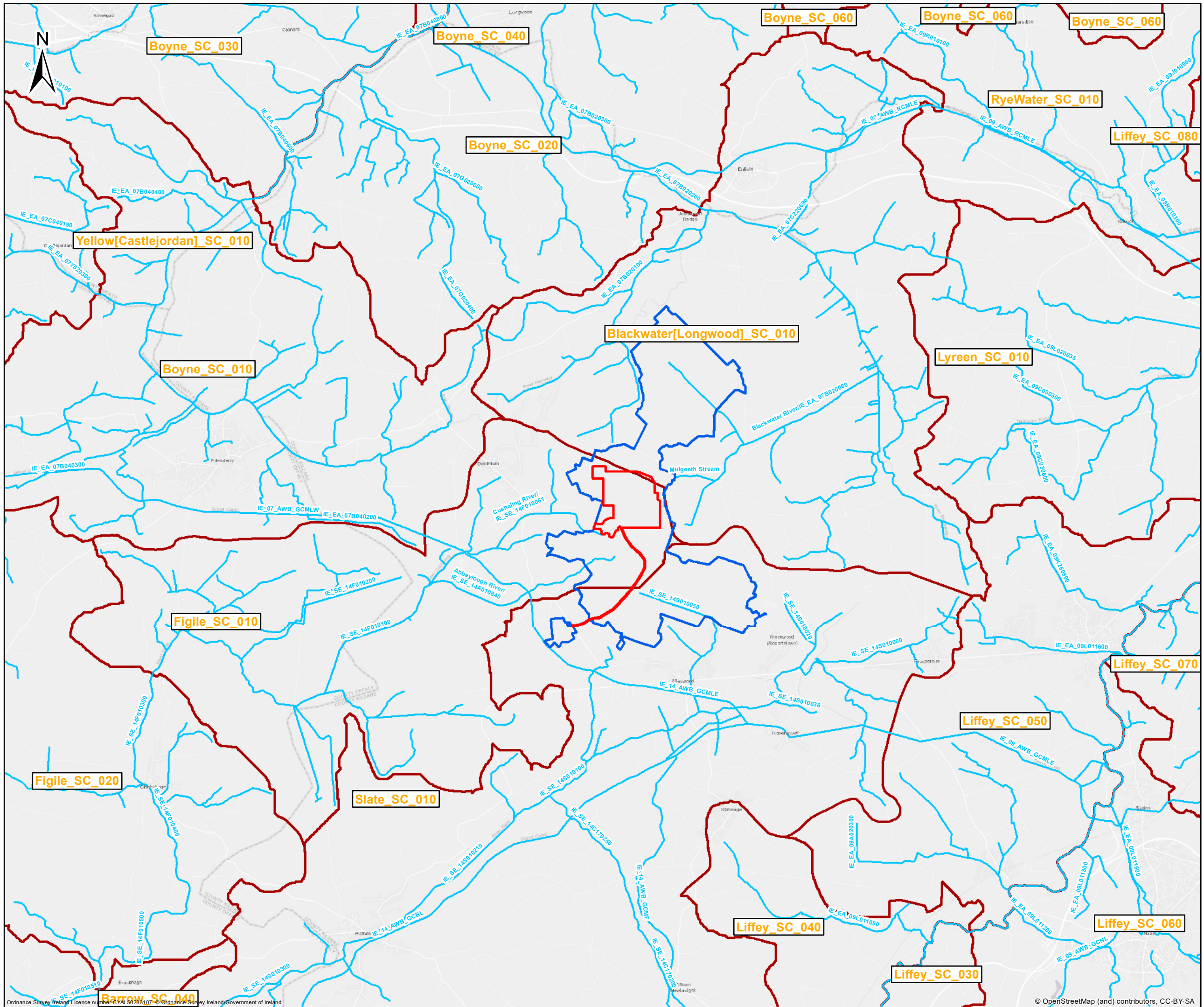
9. Summary

The Proposed Development is located within the subcatchment of Cushaling River. For the WFD reporting period 2026-2021, the associated ‘Figile_010’ river water body was classified by EPA to be at ‘Poor ecological status’, thus failing to meet its WFD ‘Good’ status objective. In their WFD implementation reporting, EPA have assigned a range of ‘significant pressures’ to the ‘Figile_010’ water body which are both linked and separate from TSB.

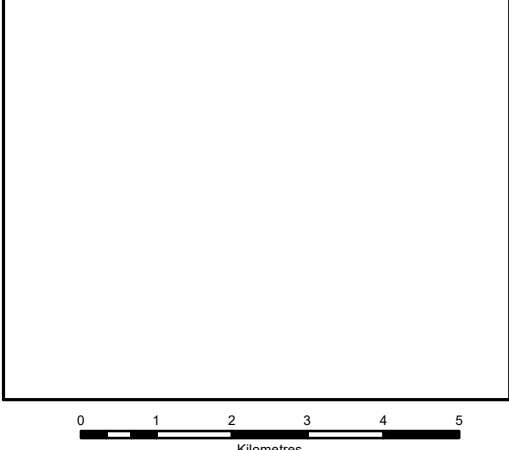
Deterioration of WFD status is not permitted by the WFD and Irish Law. Without mitigation measures, the Proposed Development has the potential to cause further deterioration of status for the Cushaling River. For this reason, mitigation measures are necessary and proposed to break potential source-receptor linkages. The means and methods of achieving the necessary levels of protection are proven and established based on existing guidance and practical experiences from the existing WMF.

Relevant measures are incorporated into the CEMP (**Appendix X-Y**), which the Contractor will be legally required to adhere to. The proposed mitigation measures will be strictly supervised and enforced. Extensive monitoring will also be practiced (Section 8.4.19 of Chapter 8 of the EIAR) in order to be able to track water quality and identify any potential effects.

With the proposed mitigation measures, the Proposed Development will not result in any likely significant effects on water quality or a deterioration in the WFD status of Cushaling River or the Figile River further downstream. The same applies for the Blackwater (Longwood) River to the northeast of TSB which will receive, via Mulgeeth Stream, minor runoff from a peat berm and overflow from blocked drains to the east of the landfill expansion footprint as a result of modifications to the drainage network in TSB which are part of the implementation of the TSB Decommissioning and Rehabilitation Plan.



- Legend**
- Planning Application Boundary
 - Bord na Móna Ownership Boundary
 - WFD - River Water Bodies
 - WFD - Subcatchments



- 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	15/03/2023	Draft issue	S.P	J.S

Client:
Bord na Móna

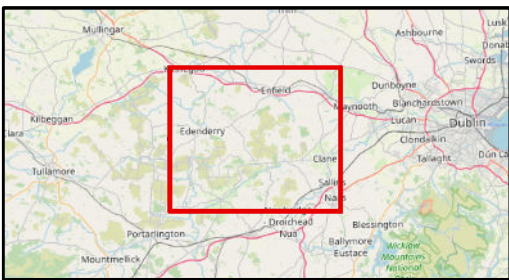
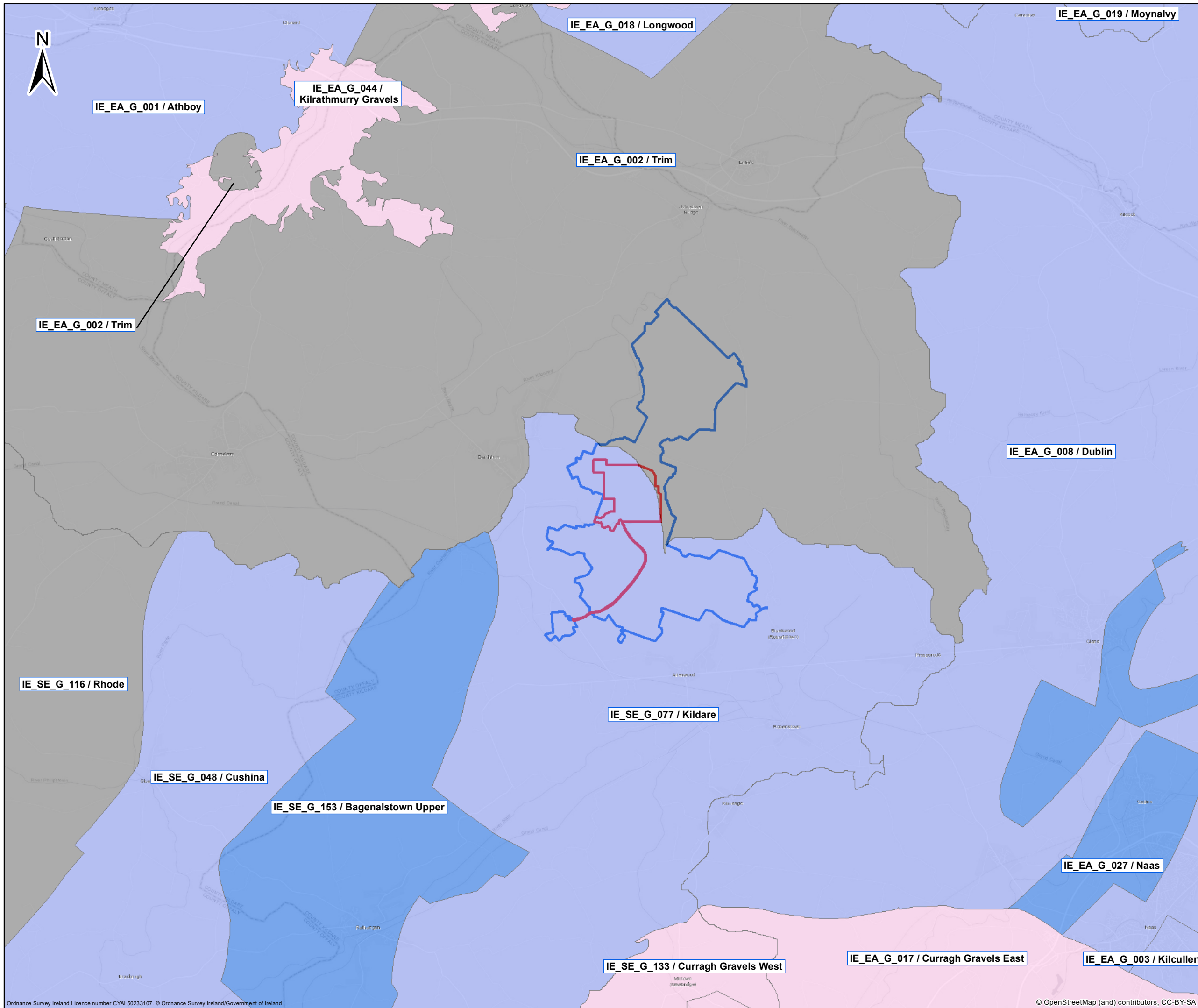
Project:
**Drehid Landfill
Planning Application**

Title:
**Surface Water Bodies and
WFD Subcatchments**

Scale @ A3: 1:100,000
Prepared by: S.Pezzetta
Checked: J.Staunton
Date: March 2023
Project Director: D.Grehan

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Figure 1
D01



Legend

- Planning Application Boundary
- Bord na Móna Ownership Boundary

WFD - Groundwater Bodies

- Gravel
- Karstic
- Poorly productive bedrock
- Productive fissured bedrock



- NOTES**
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 - ALL LEVELS RELATE TO ORDNANCE SURVEY DATUM AT MALIN HEAD

Issue	Date	Description	By	Chkd.
D01	15/03/2023	Draft issue	S.P	J.S

Client:
Bord na Móna

Project:
**Drehid Landfill
Planning Application**

Title:
Groundwater Bodies

Scale @ A3: 1:100,000

Prepared by: S.Pezzetta Checked: J.Staunton Date: March 2023

Project Director: D.Grehan

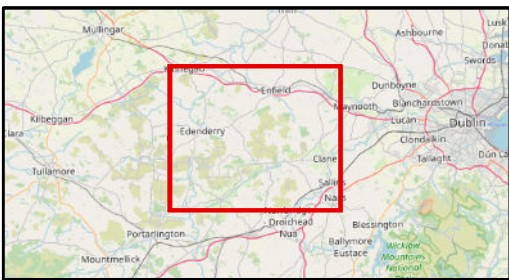
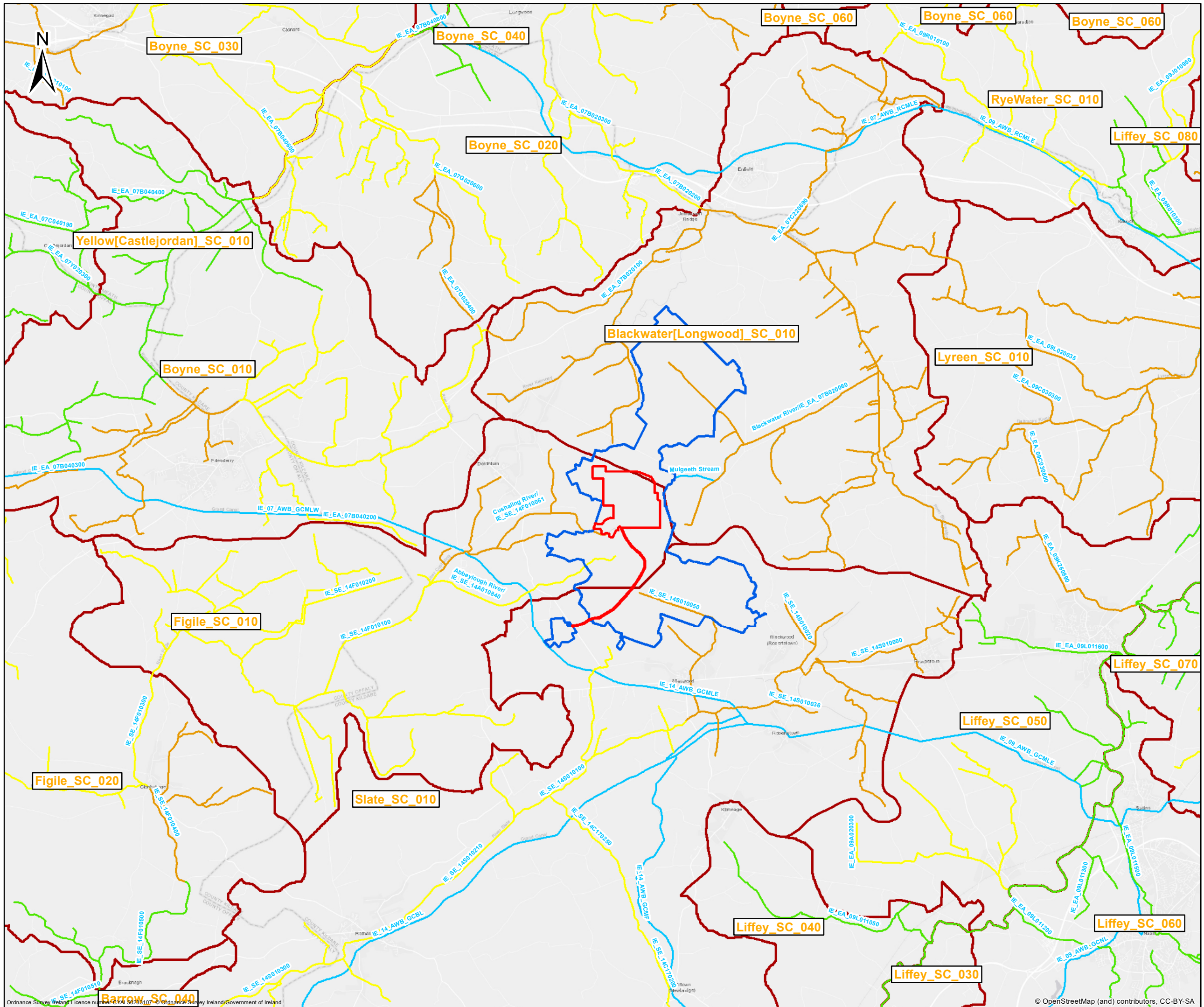
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Figure 2

Draft: D01

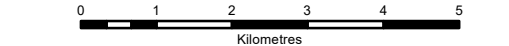


Legend

- Planning Application Boundary
- Bord na Móna Ownership Boundary
- WFD - River Water Bodies

WFD - River Water Bodies Status 2016-2021

- Good
- Moderate
- Poor
- WFD - Subcatchments



- NOTES**
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Issue	Date	Description	By	Chkd.
D01	15/03/2023	Draft issue	S.P	J.S

Client:
Bord na Móna

Project:
Drehid Landfill
Planning Application

Title:
Surface Water Body Status 2016-2021

Scale @ A3: 1:100,000

Prepared by: S.Pezzetta Checked: J.Staunton Date: March 2023

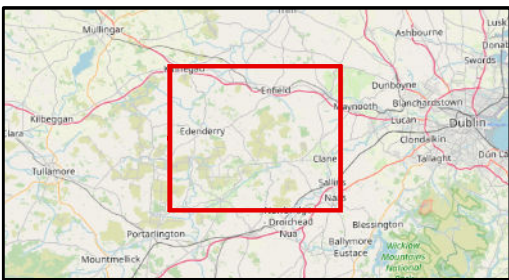
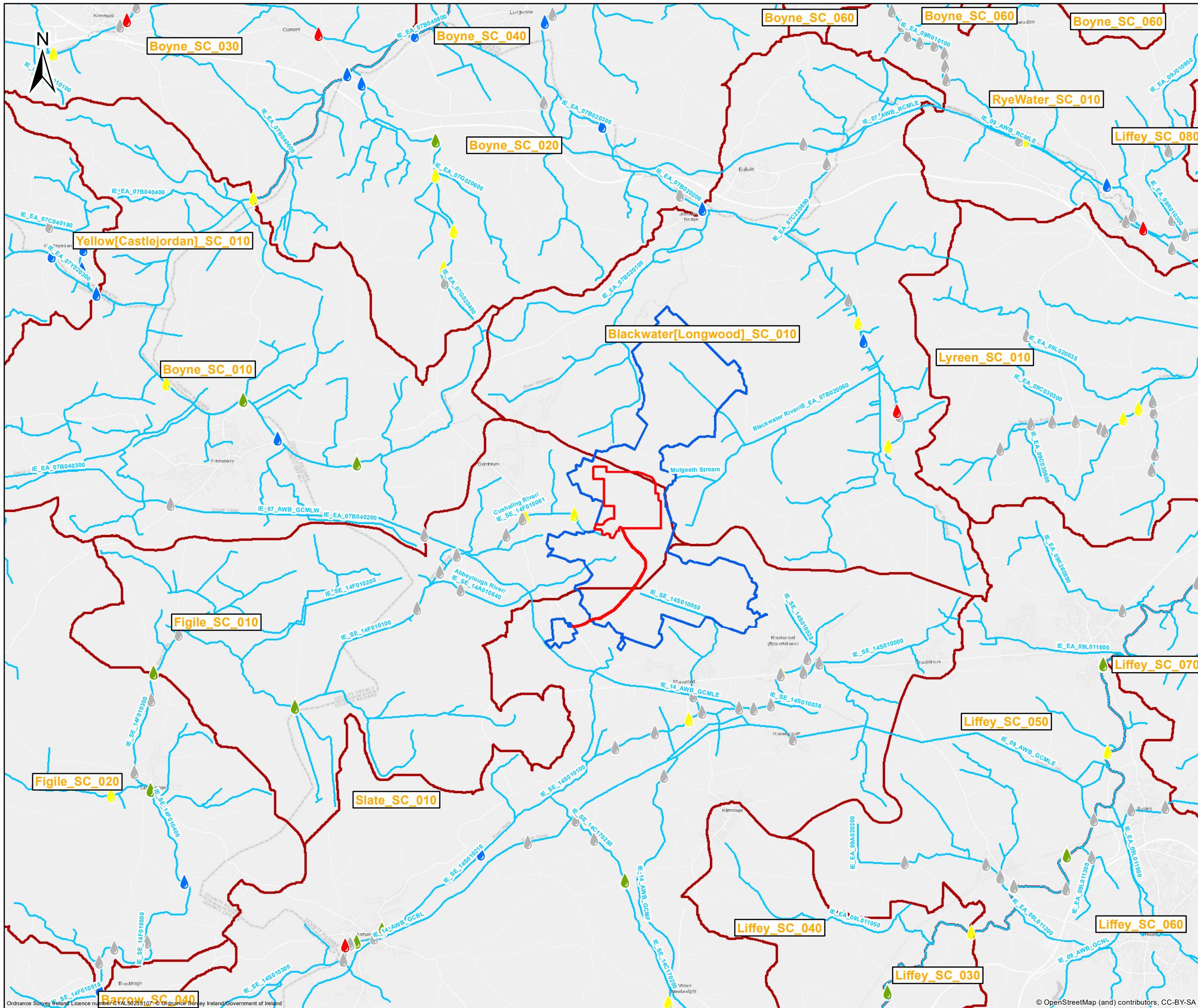
Project Director: D.Grehan

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Figure 3

Draft:
D01

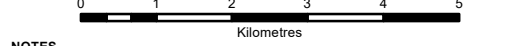


Legend

- Planning Application Boundary
- Bord na Móna Ownership Boundary
- WFD - River Water Bodies
- WFD - Subcatchments

River Q Values 2022

- 💧 No Q-Value
- 💧 Q4 - Q5 Unpolluted
- 💧 Q3-4 Slightly Polluted
- 💧 Q2 - Q3 Moderately Polluted
- 💧 Q1 - Q2 Seriously Polluted



- NOTES**
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D01	15/03/2023	Draft issue	S.P	J.S
Issue	Date	Description	By	Chkd.

Client:
Bord na Móna

Project:
Drehid Landfill
Planning Application

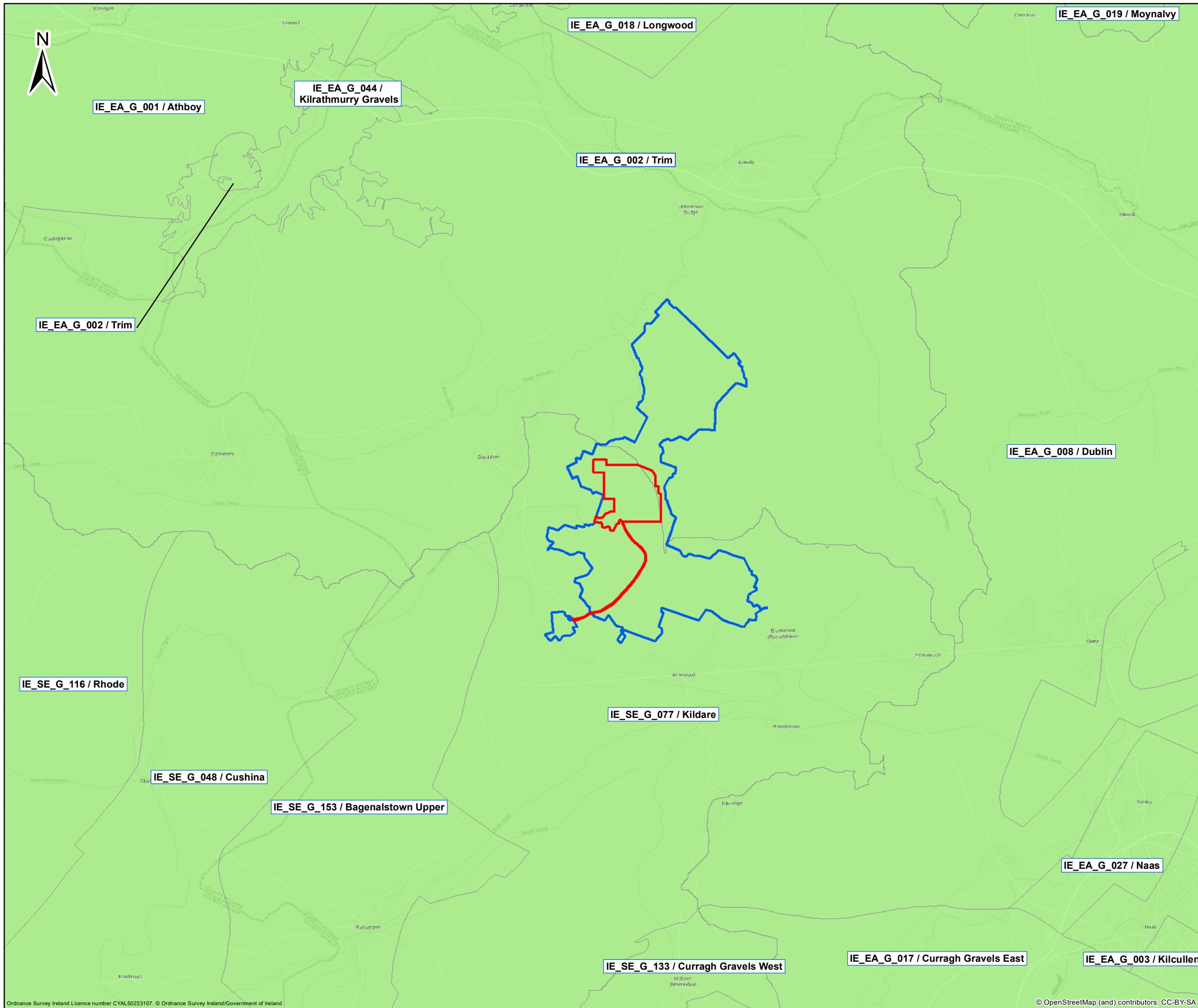
Title:
River Q-Values 2022

Scale @ A3: 1:100,000
Prepared by: S.Pezzetta
Checked: J.Staunton
Date: March 2023
Project Director: D.Grehan

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Figure 4
D01

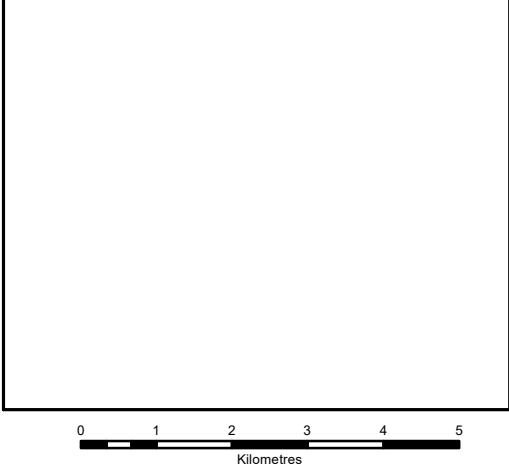


Legend

- Planning Application Boundary
- Bord na Móna Ownership Boundary

WFD - Groundwater Bodies Status 2016-2021

- Good
- Poor



- NOTES**
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Issue	Date	Description	By	Chkd.
D01	15/03/2023	Draft issue	S.P	J.S

Client:
Bord na Móna

Project:
**Drehid Landfill
Planning Application**

Title:
Groundwater Bodies Status 2016-2021

Scale @ A3: 1:100,000

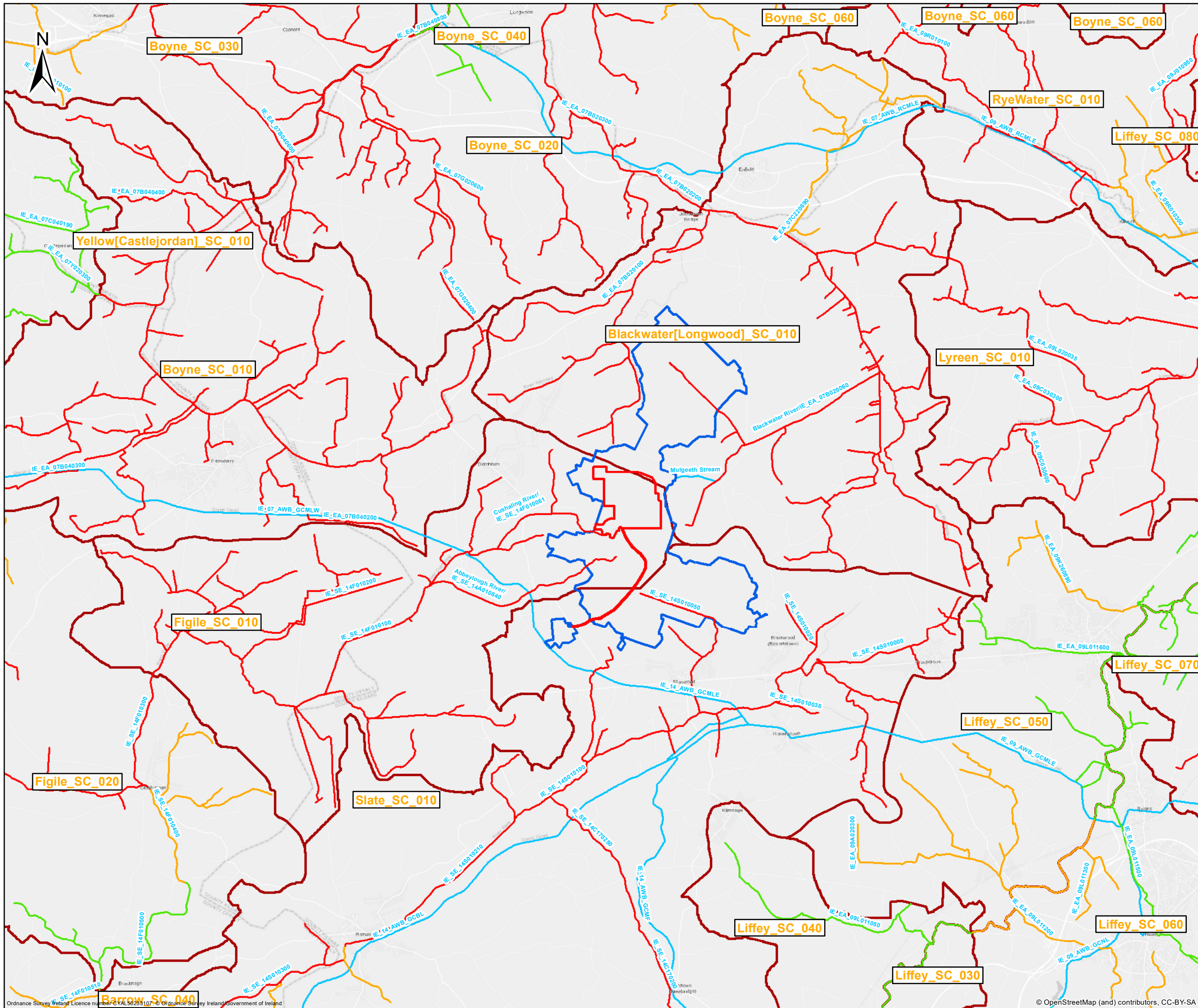
Prepared by: S.Pezzetta Checked: J.Staunton Date: March 2023

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Figure 5 Draft: D01

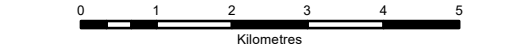


Legend

- Planning Application Boundary
- Bord na Móna Ownership Boundary
- WFD - River Water Bodies
- WFD - Subcatchments

WFD - River Water Bodies Risk

- At risk
- Not at risk
- Review



- NOTES**
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Issue	Date	Description	By	Chkd.
D01	15/03/2023	Draft issue	S.P	J.S

Client: **Bord na Móna**

Project: **Drehid Landfill Planning Application**

Title: **Surface Water Body Risk Assessment 2021-2027**

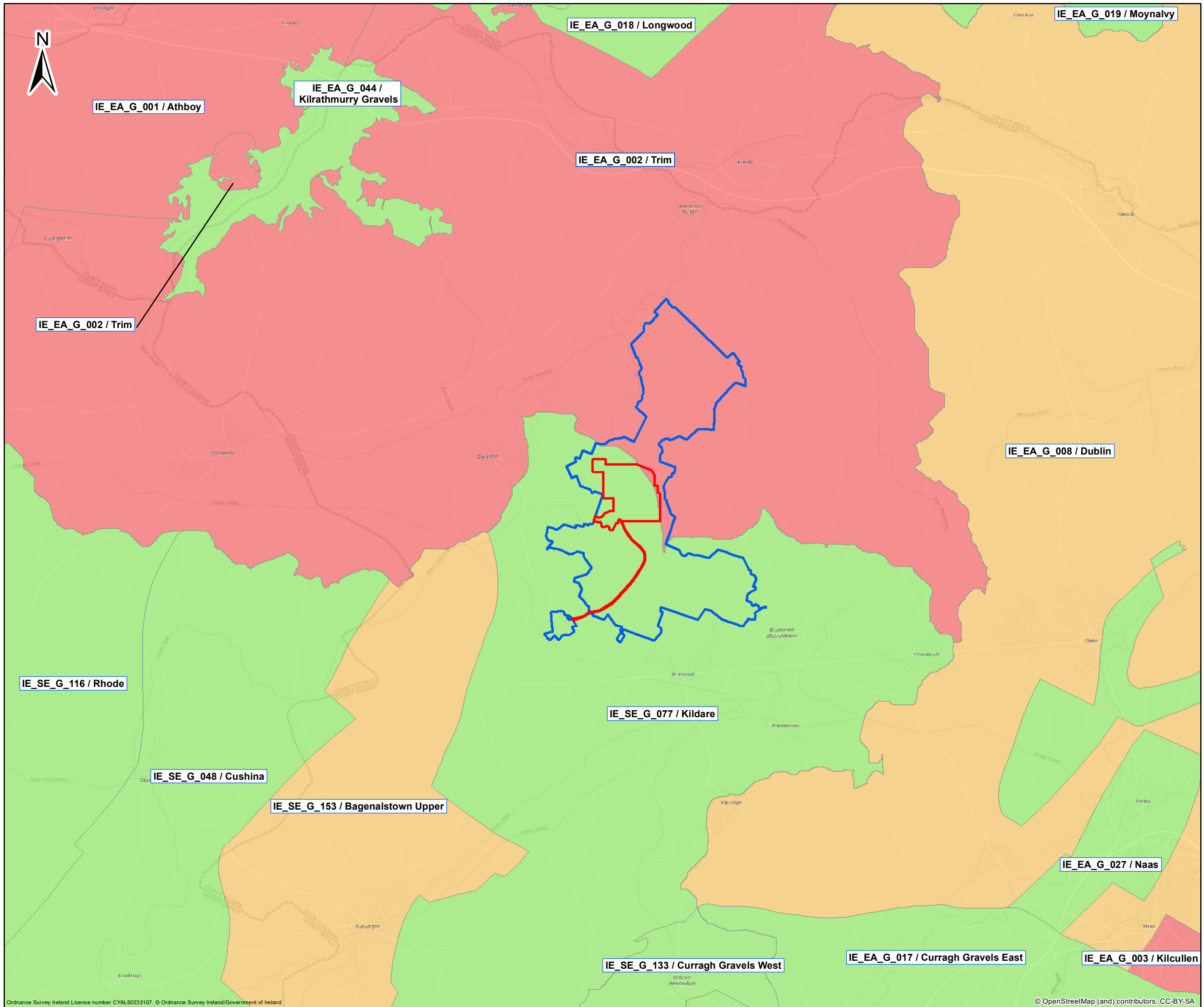
Scale @ A3: 1:100,000

Prepared by: S.Pezzetta Checked: J.Staunton Date: March 2023

Project Director: D.Grehan

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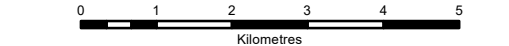


Legend

- Planning Application Boundary
- Bord na Móna Ownership Boundary

WFD - Groundwater Bodies Risk

- At risk
- Not at risk
- Review



- NOTES**
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Issue	Date	Description	By	Chkd.
D01	15/03/2023	Draft issue	S.P.	J.S.

Client:
Bord na Móna

Project:
Drehid Landfill
Planning Application

Title:
Groundwater Bodies
Risk Assessment 2021-2027

Scale @ A3: 1:100,000

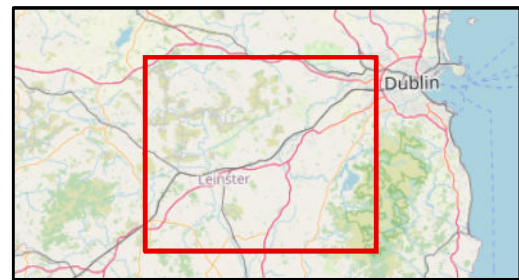
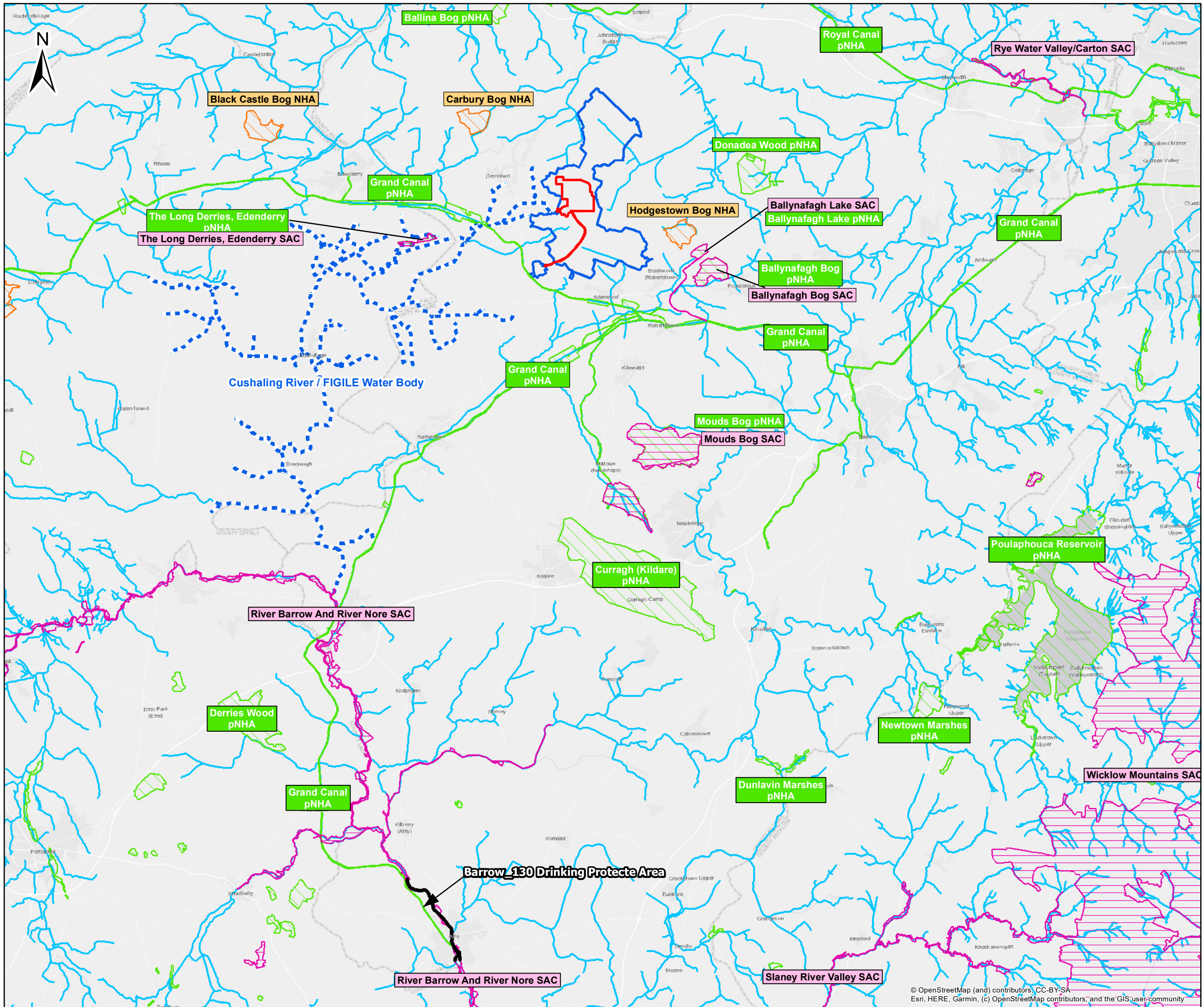
Prepared by: S.Pezzetta Checked: J.Staunton Date: March 2023

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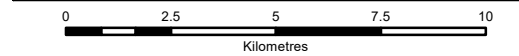
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Figure 7

Draft: D01



- Legend**
- Planning Application Boundary
 - Bord na Móna Ownership Boundary
 - Special Areas of Conservation (SACs)
 - National Heritage Areas (NHAs)
 - proposed National Heritage Areas (pNHAs)
 - WFD - River Water Bodies



- NOTES**
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Issue	Date	Description	By	Chkd.
D01	15/03/2023	Draft issue	S.P	J.S

Client:
Bord na Móna

Project:
**Drehid Landfill
Planning Application**

Title:
**Designated Protected Areas
- Map 1 of 2 -**

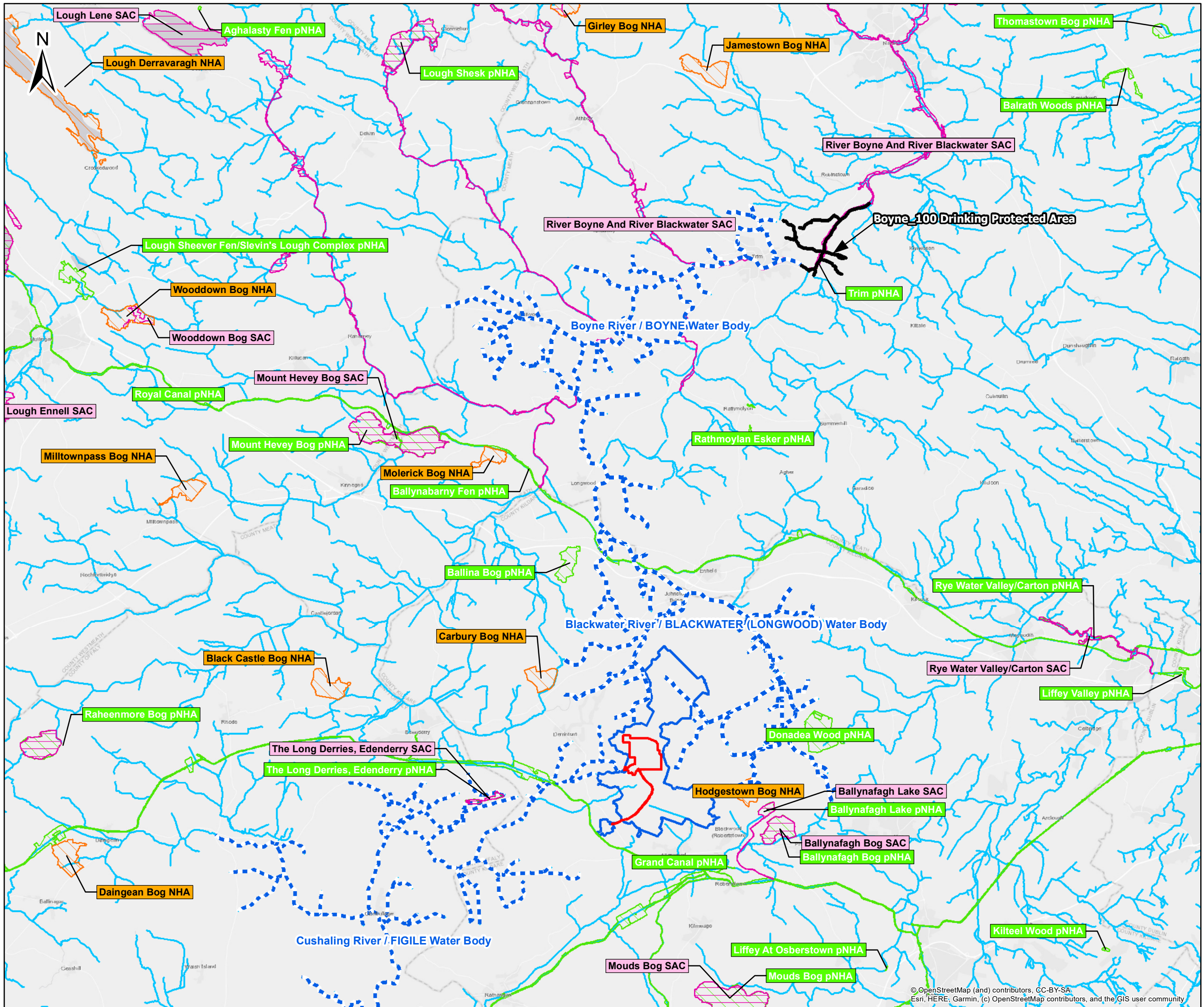
Scale @ A3: 1:180,000

Prepared by: S.Pezzetta Checked: J.Staunton Date: March 2023

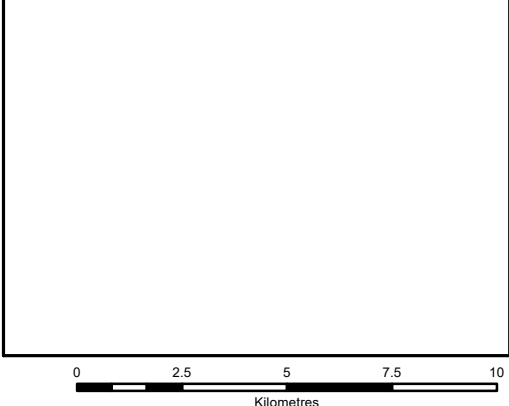
Project Director: D.Grehan

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- Legend**
- Planning Application Boundary
 - Bord na Móna Ownership Boundary
 - WFD - River Water Bodies
 - National Heritage Areas (NHAs)
 - Special Areas of Conservation (SACs)
 - proposed National Heritage Areas (pNHAs)



- NOTES**
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Issue	Date	Description	By	Chkd.
D01	15/03/2023	Draft issue	S.P.	J.S.

Client:
Bord na Móna

Project:
Drehid Landfill
Planning Application

Title:
Designated Protected Areas
- Map 2 of 2 -

Scale @ A3: 1:180,000

Prepared by: S.Pezzetta Checked: J.Staunton Date: March 2023

Project Director: D.Grehan

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