



This Report has been cleared for submission to the Director by Marie O'Connor, Programme Manager.

Signed: 

Dated: 11/08/20

	OFFICE OF ENVIRONMENTAL SUSTAINABILITY
INSPECTOR'S REPORT ON AN APPLICATION FOR A CERTIFICATE OF AUTHORISATION FOR A CLOSED LANDFILL	
TO:	Dr. Eimear Cotter, Director
FROM:	Ewa Babiarczyk, Inspector, Environmental Licensing Programme
DATE:	11 th August 2020
RE:	Application by Cavan County Council for a Certificate of Authorisation for a closed landfill at Rantavan, Mullagh, County Cavan . Certificate of Authorisation Register Number H0022-01 .

1. Application details

Type of facility:	Closed landfill as defined in the Regulations ¹
Original site ownership	Cavan County Council
Current site ownership	Cavan County Council
Operator of closed landfill	Cavan County Council operated this site since 1972.
Proposed use post remedial works	The site will not be used for development. It will be closed and fenced-off.
Risk category of closed landfill:	Moderate risk (class B) due to the following Source-Pathway-Receptor linkage: <ul style="list-style-type: none">o leachate migration to surface water (SPR 8)
Section 22 register number:	S22-02586
Grid Reference	268004 E and 284298 N
Application received:	2 nd April 2013
AA screening determination:	20 th August 2019

¹ Waste Management (Certification of Historic Unlicensed Waste Disposal and Recovery Activity) Regulations 2008 (S.I. No. 524 of 2008).

Regulation 7(4) notice:	No further information requested.
Additional information received:	Unsolicited information was received on 20 th August 2019, 4 th September 2019, 17 th October 2019 and 22 nd October 2019.
Name of Qualified Person:	Tim Moynihan Credentials provided by Institute of Geologists of Ireland.
EPA site inspection:	No inspection was required.

2. Information on the closed landfill

Location of facility	The closed landfill is located at the L71140 Road, 1.2km from Mullagh village in the townland of Rantavan, Co. Cavan. The location of the landfill site is shown in Figure 1.
Period of landfilling	1972 to 1989
Surrounding area	The closed landfill site is located in a remote area. The surrounding land is predominately flat and undulates in a south-easterly direction. There is agricultural land to the north and east of the site and forestry and scrubland to south and west of the closed landfill. A vast bog area spreads to the north-west of the site. There are also dwelling houses to the north, north-east and south-east of the closed landfill. The nearest dwellings are located 160m from the site. There is an unnamed open drain which flows along the northern and eastern boundary of the closed landfill as shown in Figure 2.
Area of the closed landfill	The landfill covers an area of 0.7 ha.
Quantity of waste at the facility	Approximately 18,900 tonnes.
Characterisation of waste deposited	The waste body comprises of municipal waste, construction & demolition (C&D) waste, industrial waste, end-of-life vehicles (ELV), vehicle parts, scrap metal, agricultural waste and hazardous waste such as oils. The deposited waste includes concrete, plastic and glass bottles, empty flattened steel drums, empty plastic drums, concrete pipes, steel, tyres, tyre tubes, wire, glass bottles, paper, timber and trees. There is also stony clay, which the applicant assumes was used as cover material when the site was operational. The extent of the deposited waste is shown in Figure 2.

3. Site investigations

Current Condition and appearance of closed landfill:	The site investigations undertaken as part of the Tier 1 assessment indicate that the closed landfill site is predominantly flat and has assimilated into the surrounding environs. The landfill is unlined and there is no landfill gas collection system in place. The deposited waste protrudes through the capping and encroaches on the adjacent drain. No vegetation die offs, bare ground or leachate
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	<p>seepages were observed during the site walk-over carried out as part of Tier 1 Assessment. However, a water logged area within the closed landfill was observed.</p>
<p>Site investigations</p>	<p>The site investigations established the following facts:</p> <ul style="list-style-type: none"> • the waste is covered by a thin layer of topsoil, which in some areas of the site is underlain by a layer of clay; • the clay over the waste is free draining; • waste was found in 18 trial holes (TH1 to TH18) as shown in Figure 3. There was no waste in TH19, TH20 and TH21 to the southeast of the closed landfill; • the waste is thickest in the centre of the site, with an average thickness across the site of 1.25m; • the waste is underlain by a layer of peat; • some of the deposited waste has undergone considerable biodegradation; • there is poor water runoff from the surface of the waste body with precipitation entering the landfill and being retarded by the underlying peat layer and migrating laterally to the adjacent drain; • the closed landfill is having a negative impact on the adjacent drain; • leachate was encountered in the majority of the trial holes; • landfill gas was being generated within the waste body; and • groundwater is contaminated with mineral oil and there were elevated hydrocarbons recorded in the off-site monitoring location TH21.
<p>Monitoring and analysis of samples (water, gas, waste):</p>	<p>The most recent groundwater and surface water round of sampling was carried out on 24th September 2019 at the following locations as shown in Figure 4:</p> <ul style="list-style-type: none"> - groundwater sampling: GW1, GW2 and GW3; - surface water sampling: SW1, SW2, SW3 and SW4. <p>Prior to this, the following site investigations were carried out as part of Tier 1 and Tier 2 assessments:</p> <ul style="list-style-type: none"> • site walk-over survey (carried out in 2009); • topographical survey (carried out in 2010); • trial hole survey (one round of sampling was carried out in 2010 at 21 trial holes: TH1 to TH21. Waste was found in TH1 to TH18); • groundwater sampling (one round of sampling was carried out in 2010 at TH3, TH6, TH8, TH11, TH13, TH15 and TH21); • soil sampling (one round of sampling was carried out in 2010 at four locations: TH11, TH13, TH18 and TH21); • gas monitoring (one round of gas monitoring was carried out in 2010 at 8 trial holes GR1 to GR8);

	<ul style="list-style-type: none"> • surface water sampling (one round of sampling was carried out in 2010 at locations SW1 to SW4); and, • ecological survey, including assessment of biological water quality in the adjacent drain (one round of sampling was carried out in 2010 at 3 locations: SW1 to SW3).
Hydrology	<p>This adjacent drain flows in a south-eastern direction. The gradients within the drain are minimal and the flow is limited during periods of low precipitation.</p> <p>1.2km downstream of the closed landfill the drain discharges into Killyconny Bog designated at Killyconny Bog (Cloghbally) SAC [Site Code: 000006]. There are two watercourses flowing out from this SAC. Both watercourses discharge into the River Boyne and River Blackwater SAC [Site Code: 002299] and River Boyne and River Blackwater SPA [Site Code: 004232]; however, only one of these watercourses discharges into the said European Sites directly. This discharge is into the Blackwater (Kells) River (waterbody code: IE_EA_07B011100) which forms part of the said European sites 4.3km downstream of the closed landfill. The status of the Blackwater (Kells) River is moderate. The other watercourse flows into other surface waters that ultimately discharge into the River Boyne and River Blackwater SAC [Site Code: 002299] and River Boyne and River Blackwater SPA [Site Code: 004232] 20km downstream of the closed landfill.</p> <p>The overall quality of the water in the drain adjacent to the landfill is poor. The site investigations showed that the drain is impacted by the landfill leachate. As part of Tier 2 Assessment Q value monitoring was carried out on the drain. A Q value of 2-3, which indicates a moderately poor water quality, was recorded upstream of the closed landfill. The Risk Assessment states that the water pollution upstream of the closed landfill is associated with agriculture and discharges from private wastewater treatment systems. A Q value of 2, which indicates that water is seriously polluted, was recorded at the landfill's boundary. However, a Q value of 3, which indicates moderately poor water quality, was recorded 70m downstream of the closed landfill. This shows that although the closed landfill negatively impacts on the water quality in the drain, the water quality improves downstream of the site. The monitoring also shows that, apart from the closed landfill, there are other sources of contamination, such as agriculture and septic tanks, that contribute to the poor water quality in the drain.</p> <p>Appropriate capping of the closed landfill will reduce the infiltration of precipitation into the waste body. This will minimise the generation of leachate. The applicant also proposes to install a drainage channel upslope of the landfill and redirect part of the drain away from the site boundary. This will break the interface between the waste and the drain.</p> <p>These measures will prevent the ingress of rain water into the waste body and prevent interaction of the waste body with the drain thus breaking the source-pathway-receptor linkage No. 8 (SPR 8). Condition 3.8 requires monitoring on a biannual basis of water</p>

	<p>quality in the adjacent drain at locations upstream and downstream of the closed landfill.</p>
<p>Hydrogeology</p>	<p>The site overlies Groundwater Dependent Terrestrial Ecosystem (GWDTE)-Killyconny Bog (Cloghbally) (SAC000006) (Groundwater body Code: IE_EA_G_073). The quality status of this groundwater body is good. The bedrock aquifer beneath the site is classified as Poor aquifer (PI). The groundwater vulnerability beneath the site is moderate. The groundwater flow is from north-west to south-east.</p> <p>Sampling carried out as part of Tier 2 Assessment showed that groundwater beneath the site is contaminated with mineral oil, polyaromatic hydrocarbons, copper and zinc.</p> <p>The most recent sampling of groundwater was carried out on 24th September 2019 at locations GW1, GW2 and GW3 as shown in Figure 4.</p> <p>Due to the fact that the main waste body is in the middle of the site and the groundwater flow is towards the south-east, it is considered that monitoring at GW2 and GW3 might not be reflective of the actual impact the waste body is having on groundwater quality. Accordingly, Condition 3.1 requires installation of an additional monitoring borehole (GW4) outside the closed landfill and between GW2 and GW3.</p> <p>Notwithstanding the above, the groundwater monitoring on 24th September 2019 shows the following:</p> <ul style="list-style-type: none"> - exceedance of ammonium (as N) threshold value of 175µg/l as set out in the EU Environmental Objectives (Groundwater) Regulations 2010, as amended, at GW1 (560µg/l) and GW2 (290µg/l); - Cyanide concentrations at all monitoring locations were recorded as less than 50 µg/l (the applicant expressed the actual results as <0.050 mg/l) - Iron concentrations exceeded the Interim Guideline Value (IVG) of 200 µg/l at all monitoring locations: GW1 (470 µg/l), GW2 (250 µg/l) and GW3 (480 µg/l); - Manganese concentration exceeded the IVG threshold of 50 µg/l at all monitoring locations: GW1 (640 µg/l), GW2 (2,500 µg/l) and GW3 (910 µg/l); - E.Coli exceeded at all locations the limit of 0 per 100ml set out in the EU (Drinking Water) Regulations 2014. The measured concentration of E.Coli was recorded at less than 10 at GW1 to GW3; and - Total Coliforms, referenced as Coliform bacteria in the EU (Drinking Water) Regulations 2014, as amended, exceeded at all locations the limit of 0 per 100ml set out in the said regulations. Total Coliforms were recorded at less than 10 Cfu/100ml at GW1, 60 Cfu/100ml at GW2 and 110 Cfu/100ml at GW3.

	<p>It is noted that the most recent groundwater monitoring event did not include monitoring for copper or zinc. Condition 3.8(e) requires groundwater monitoring to include monitoring for these parameters together with ammonium as N, cyanide, iron, manganese, polyaromatic hydrocarbons and mineral oils.</p> <p>The groundwater monitoring results show that groundwater is contaminated with landfill leachate but other sources, such as agriculture and discharges from septic tanks, also contribute to this contamination.</p> <p>The nearby dwellings are serviced by Bailieborough Public Water Supply (PWS code: 0200PUB1002_1) with the exception of one dwelling which is serviced by a private well located 340m to the east of the closed landfill. Bailieborough Public Water Supply is sourced from Upper Lough Skeagh lake located 16km north of Mullagh therefore, there will be no impact from the closed landfill on the quality of the water which is being abstracted at this water supply. As the groundwater flow is from north-west to south-east and the said private well is located to the east of the landfill, there will be no impact from the closed landfill on this well.</p> <p>There is also a groundwater abstraction located within Wellman International Limited which operates under Licence Reg. No. P0236-01 (Abstraction code: 2300IPC0236_1). This abstraction is located 2.8km north-east of the closed landfill. Given that the groundwater flow is from north-west to south-east, there will be no impact from the closed landfill on the quality of the water which is being abstracted at the licensed site.</p>
<p>Leachate and water quality:</p>	<p>The site investigation showed that the waste body is partially saturated with landfill leachate and that the landfill leachate migrates into the groundwater body and towards surface waters.</p> <p>The most recent monitoring of water quality at locations SW1 to SW4, as shown in Figure 4, was carried out on 24th September 2019 and showed the following:</p> <ul style="list-style-type: none"> - Biochemical Oxygen Demand (BOD) exceeded the threshold of 2.6 mg O₂/l in the EU Environmental Objectives (Surface Waters) Regulations 2009 and was recorded as less than 4 mg O₂/l at all monitoring locations (SW1 to SW4); - Cadmium threshold of 0.45 µg/l was exceeded at monitoring locations: SW1 (1.9 µg/l), SW2 (2 µg/l) and SW4 (1.6 µg/l); - Mercury concentration exceeded the threshold of 0.07 µg/l at all monitoring locations: SW1 (0.55 µg/l) and SW2 to SW4 (less than 0.5 µg/l); - Total Coliforms reached 840 Cfu/100ml at SW1, 720 Cfu/100ml at SW2 and 470 Cfu/100ml at SW3; and - E.Coli was recorded at 330 Cfu/100ml at SW1, 270 Cfu/100ml at SW2 and 180 Cfu/100ml at SW3.

	<p>It was noted that no Total Ammonia (mg N/l) or Molybdate Reactive Phosphorus (MRP) (mg P/l) were monitored. Condition 3.8(d) requires monitoring for Total Ammonia.</p> <p>The monitoring results show that the closed landfill is negatively impacting the water quality in the drain. However, in respect of the Total Coliforms or E. Coli, the deposited waste does not impact on the water quality. The Risk Assessment states that agriculture and septic tanks in the area are the contributors to surface water contamination with Coliforms and E. Coli.</p> <p>Condition 3.8 requires monitoring on a biannual basis of groundwater from at least three groundwater monitoring boreholes, two of which shall be downgradient of the closed landfill.</p>
<p>Landfill gas:</p>	<p>There is a risk of landfill gas migration to nearby houses, the nearest being 160m away from the landfill. The most likely pathway for the migration of the landfill gas is through the underlying bedrock and through the existing landfill cap.</p> <p>The trial holes and the spoil heap were monitored for landfill gas. No landfill gas was detected during the excavation of the trial holes although slight transient odours were detected when the waste body was disturbed.</p> <p>Gas monitoring was carried out at eight trial holes, as shown in Figure 5, as part of the Tier 2 Assessment. The monitoring results show that methane was recorded at 0.01% at all trial holes apart from trial holes No GR3 and GR4. Carbon dioxide was recorded only at GR1, GR4 and GR8. The recorded level at all three locations was 0.01%. Oxygen was recorded at all locations and its recordings varied from 21.3% to 21.6%. Nitrogen dioxide was detected at all locations and its recordings varied from 78.2% to 78.5%.</p> <p>The Risk Assessment states that due to the fact that negligible landfill gas levels were detected during that monitoring event, the risk posed by the landfill gas was considered to be insignificant and the applicant decided to cease the gas monitoring at the site.</p> <p>Given the proximity of the houses to the landfill site, Condition 3.8(c) requires monitoring on a quarterly basis and for a period of at least two years to detect the presence and concentration of landfill gas in all monitoring boreholes.</p>
<p>Conceptual site model:</p>	<p>The original conceptual site model was developed in 2009. Following the site investigations the site model was reviewed in 2010. No pathways were identified in Tier 2 as High Risk. One pathway was identified in Tier 2 as Moderate Risk: Migration of leachate through surface water run-off into surface water body (SPR8).</p> <p>The conceptual site model is shown in Figure 6. The source, pathways and receptors can be described as follows:</p>

	<p>Source:</p> <ul style="list-style-type: none"> - Rainfall on the landfill will preferentially percolate through the cap and into the waste; - Leachate is generated in the waste; - Gas is generated at the landfill. <p>Pathway:</p> <ul style="list-style-type: none"> - Leachate migration from the site through the bedrock into the aquifer; - Leachate can migrate through the base of the landfill into underlying aquifer beneath and discharge to the adjacent/ nearby surface water bodies and private wells; - Gas migration can occur through the permeable cap and through the bedrock beneath the waste; - Gas migration beyond the site boundary. <p>Receptors:</p> <ul style="list-style-type: none"> - the underlying bedrock and aquifer; - houses outside the site; - Surface water bodies. <p>No public groundwater supply sources are present within 1km of the site.</p>
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4. SPR linkages and remedial actions

<p>SPR linkage scenarios (applicable ones only):</p>	<p>Leachate migration scores:</p> <p><u>Low scores:</u></p> <p>Seven pathways were identified in Tier 2 as Low Risk: SPR1, SPR2, SPR3, SPR4, SPR5, SPR7 and SPR9:</p> <ul style="list-style-type: none"> • Migration of leachate to surface water (SPR1); • Migration of leachate to surface water body protected areas (SPR2); • Migration of leachate to private wells (SPR 3); • Migration of leachate to groundwater protected area (SPR4); • Migration of leachate to the underlying aquifer (SPR 5); • Migration of leachate via groundwater to surface water bodies (SPR7); and • Migration of leachate via surface water drainage/runoff to surface water body protected area (SPR9). <p><u>Moderate scores:</u></p> <ul style="list-style-type: none"> • Migration of leachate to surface water (SPR 8). <p><u>High scores:</u></p> <p>No High scores for leachate migration were identified.</p>
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	<p>Landfill gas migration scores:</p> <p><u>Low scores:</u></p> <ul style="list-style-type: none"> • human health exposure pathway of off-site migration of landfill gas and emission into nearby houses (SPR 10). <p><u>Moderate scores:</u></p> <p>No Moderate scores for gas migration were identified.</p> <p><u>High scores:</u></p> <p>No High scores for gas migration were identified.</p> <p>Summary:</p> <p>Upon the review of the monitoring data and surface water assessment;</p> <ul style="list-style-type: none"> • remedial action is warranted to address the risk of leachate migrating from the site into the surface water, aquatic habitats and groundwater. • remedial action is warranted to address the risk of off-site migration of landfill gas.
<p>Proposed remedial actions:</p>	<p>The Tier 3 Report considered two remedial options; Option A and Option B.</p> <p>Option A considers the following measures:</p> <ul style="list-style-type: none"> • Removal of hazardous waste Hazardous waste was identified in trial holes TH3, TH6, TH8, TH11, TH13 and TH18. It is proposed to remove the hazardous waste and clay around these trial holes and send it for disposal to an authorised company. The applicant estimates that there are 3,360 tonnes of hazardous waste, including the clay around this waste, within the closed landfill. The removal of hazardous waste will result in cessation of interaction between groundwater and hazardous waste causing contamination of groundwater with hazardous substances. • Removal of contaminated soil and contaminated groundwater The applicant proposes the complete removal of contaminated soil around trial holes TH3, TH6, TH8, TH11, TH13 and TH18. The removed soil will be sent off-site for disposal. Groundwater samples taken from trial holes TH3, TH6, TH8, TH11, TH13 and TH18 were classified as hazardous. The applicant proposes pumping and disposal of contaminated groundwater. The contaminated groundwater would be removed by a vacuum tanker with same sent for disposal using a hazardous waste disposal contractor. It is also proposed that groundwater from trial holes with only oil contamination will be passed through a Class 1 oil/water separator. The oily content of the separator would be sent for

disposal. The applicant proposed that resultant wastewater would be discharged to the nearby drain but this would be dependent on a "full schedule of testing prior to discharging".

The applicant's proposal to remove contaminated soil and contaminated groundwater is based on the findings from trial hole investigations and therefore the extent of contamination may not be fully established from such investigations. Condition 3.4 requires the applicant to undertake geophysical surveys across the site to further refine the information collected in investigations to date and establish the full extent of soil and groundwater contamination, followed by a detailed programme of works to be undertaken to remove the contaminated soil and contaminated groundwater, to be submitted to the Agency's Office of Environmental Enforcement for approval prior to any removal of hazardous waste or contaminated soil and groundwater.

- Installation of an interceptor drain upslope of the closed landfill
The installation of such a drain would divert clean surface water run-off away from the landfill site. Such a drain would also aid diverting shallow groundwater flow away from the landfill minimising the ingress of clean groundwater during the pump-out phase. The applicant stressed that this should be carried out prior to the commencement of any remedial works.
- Remediation/removal of contaminated soil from the base of the existing drain
The applicant recommends the removal of the substrate at the base of the drain and its safe disposal and that this would be subject to testing for contaminants bound within the substrate prior to any works taking place. The applicant adds that if the substrate proves negative for contamination, the drain will still undergo excavation and that this work will enhance drainage and break the interface between the landfill and the drain.
- Capping of the landfill.

The Option B considers the following measures:

- Installation of interceptor drain upslope of the closed landfill, as described in Option A above;
- Re-engineering of the adjacent drain to prevent the interaction of the drain with the waste body;
The engineering works would create a physical barrier between the waste body and the drain disrupting a pathway for contaminants from the waste body and isolating the receptor (the drain). However, the applicant added, the re-engineering works could result in the release of contaminants bound within the substrate at the base of the drain and impact negatively on water quality downstream of the site.
- Capping the landfill.

Overall, on the basis of the risk assessment carried out, the applicant recommends the measures outlined in Option A and states that the main aim of these measures is to break SPR 8 linkage.

The applicant also states that the application of the remediation measures outlined in Option B would not significantly change this linkage for the following reasons:

- the installation of an interceptor drain upslope of the waste body could minimise the ingress of shallow groundwater flow into the waste body. However, the complete isolation of groundwater cannot be guaranteed by this measure;
- hazardous waste will still remain in-situ and intermittent discharges from the waste body would be expected;
- the drain would still be at risk and the connection between both entities would still exist;
- the said re-engineering of the drain could potentially break the connection between the waste body and the existing drain. However, the complete cessation of shallow groundwater flow and surface water infiltration into the waste body cannot be guaranteed;
- hazardous waste will be left in-situ and any interactions between groundwater flow and infiltration water could result in contaminated discharges from the site thus posing a risk to the nearby drain;
- the potentially hazardous basal discharge from the waste body will exist regardless whether the drain is isolated or not; and
- the capping of the landfill would significantly reduce the infiltration of surface water into the waste body and thus minimise the generation of leachate. However, capping in itself cannot eliminate the infiltration of surface water into the waste body.

The applicant also considered installation of sheet piling along the north eastern aspect of the landfill as an alternative to an interceptor drain. The sheet piling would act as a barrier to the movement of shallow groundwater flow minimising the interaction of groundwater with the waste body. However, the use of sheet piling would not guarantee the complete isolation of groundwater from the waste body. The applicant also states that sheet piling could lead to the puncture of the peat layer thus enabling the vertical migration of contaminants.

Having regard to the surface, groundwater and gas monitoring results submitted in support of the application for certificate of authorisation and considering the age of the closed landfill, the location of the nearest private well, the fact that the nearby

	<p> dwellings are serviced by Bailieborough Public Water Supply (PWS code: 0200PUB1002_1), the following remedial measures are considered appropriate and recommended in Condition 3.1:</p> <ul style="list-style-type: none"> • Removal of hazardous waste and contaminated soil; • Removal of contaminated groundwater; • Install a low permeability landfill cap, minimum 1m, with 1mm thick low permeability geomembrane having a hydraulic conductivity of less than or equal to $1 \times 10^{-9} \text{m/s}$; • Install passive gas venting system, which includes gas vent pipes with fans for gas extraction. The gas vent pipes shall not be perforated above the ground level; • Installation of an interceptor drain upslope of the closed landfill; • Remediation/removal of contaminated soil from the base of the existing drain; and • Reseed grass within the site. <p>Additionally, Condition 3.8(c) requires monitoring to detect the presence and concentration of landfill gas on a quarterly basis and for a period of at least two years.</p> <p>The proposed remedial actions are intended to break the SPR linkages by preventing:</p> <ul style="list-style-type: none"> • migration of leachate into the drain; • migration of leachate to groundwater; • migration of landfill gas to off-site locations. <p>The proposed capping will also prevent any waste materials from appearing on the surface of the landfill site.</p> <p>The recommended certificate of authorisation allows for the importation and use of soil and stone to complete the works.</p>
<p>Proposed aftercare monitoring and assessment:</p>	<p>Monitoring as specified in Condition 3.8 of the recommended certificate of authorisation.</p> <p>Validation report to be submitted within 30 months.</p>
<p>Adequacy of risk assessment:</p>	<p>Regulation 7(7) of the Regulations states that the EPA must be satisfied with the risk assessment before proposing to grant a certificate of authorisation. The risk assessment is adequate for the following reasons:</p> <ul style="list-style-type: none"> • It has identified, assessed and adequately addressed the associated risks inherent with the landfill site; • An Appropriate Assessment was also completed to evaluate the potential risk to the European sites associated with the adjoining surface waters. It concluded that the remedial measures will not impact on the protected sites at Killyconny Bog (Cloghbally) SAC [Site Code: 000006], River Boyne and River Blackwater SAC [Site Code: 002299] and River Boyne and River Blackwater SPA [Site Code: 004232].

5. Appropriate assessment

There are three European Sites within the vicinity of the facility. These are listed in the Appendix 1.

A screening for Appropriate Assessment was undertaken to assess, in view of best scientific knowledge and the conservation objectives of the site, if the activity, individually or in combination with other plans or projects is likely to have a significant effect on any European Site. In this context, particular attention was paid to the European Sites at Killyconny Bog (Cloghbally) SAC [Site Code: 000006], River Boyne and River Blackwater SAC [Site Code: 002299] and River Boyne and River Blackwater SPA [Site Code: 004232].

The activity is not directly connected with or necessary to the management of any European Site and the Agency considered, for the reasons set out below, that it cannot be excluded, on the basis of objective information, that the activity, individually or in combination with other plans or projects, will have a significant effect on any European Site and accordingly determined that an Appropriate Assessment of the activity was required.

The reason for this determination is as follows:

- there is hydrological connectivity between the landfill site and surface waters which discharge into the above European Sites.

An Inspector's Appropriate Assessment has been completed and has determined, based on best scientific knowledge in the field and in accordance with the European Communities (Birds and Natural Habitats) Regulations 2011 as amended, pursuant to Article 6(3) of the Habitats Directive, that the activity, individually or in combination with other plans or projects, will not adversely affect the integrity of any European Site, in particular Killyconny Bog (Cloghbally) SAC [Site Code: 000006], River Boyne and River Blackwater SAC [Site Code: 002299] and River Boyne and River Blackwater SPA [Site Code: 004232], having regard to their conservation objectives and will not affect the preservation of these sites at favourable conservation status if carried out in accordance with the application, risk assessment and recommended certificate of authorisation and the Conditions attached hereto for the following reasons:

- specifically, the remedial works will be undertaken to avoid the potential for water pollution and will ensure that there will be no significant impact on Killyconny Bog (Cloghbally) SAC [Site Code: 000006], River Boyne and River Blackwater SAC [Site Code: 002299] and River Boyne and River Blackwater SPA [Site Code: 004232], and with a further objective to result in positive impacts to current water quality Conditions;
- the project alone, which consists of the remediation of the closed landfill, or in combination with other projects, will not adversely affect the integrity, and conservation status of any of the qualifying interests of Killyconny Bog (Cloghbally) SAC [Site Code: 000006], River Boyne and River Blackwater SAC [Site Code: 002299] and River Boyne and River Blackwater SPA [Site Code: 004232];
- also, there are no significant emissions to air from the landfill which could affect the bird species that the River Boyne and River Blackwater SPA [Site Code: 004232] is designated for; and
- Condition 3.8 requires ongoing environmental assessment and monitoring.

In light of the foregoing reasons, no reasonable scientific doubt remains as to the absence of adverse effects on the integrity of those European Sites: Killyconny Bog (Cloghbally) SAC [Site Code: 000006], River Boyne and River Blackwater SAC [Site Code: 002299] and River Boyne and River Blackwater SPA [Site Code: 004232].

6. Recommendation

I recommend granting the certificate of authorisation as proposed.

Signed



Date 11th August 2020

Ewa Babiarczyk

Procedural Note

Any representations received by the Agency within 30 days of the draft certificate of authorisation being made available will be considered by the Agency.

As soon as practicable after the expiry of the 30-day period the Agency will determine the certificate of authorisation, which may vary from the draft certificate, and shall issue an appropriately validated certificate of authorisation in accordance with the Waste Management (Certificate of Historic Unlicensed Waste Disposal and Recovery Activity) Regulations 2008.

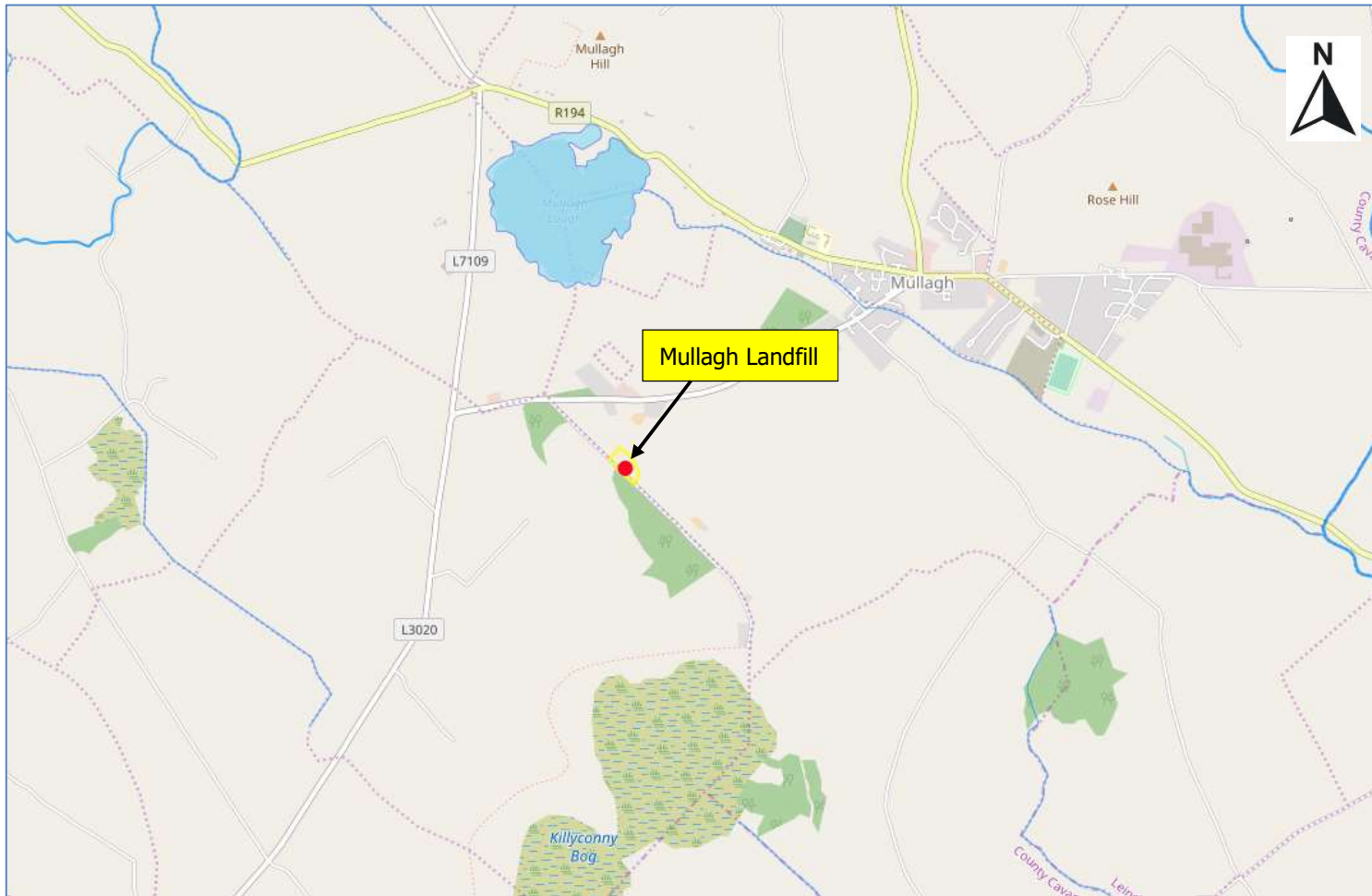


Figure 1: Location of Mullagh Landfill

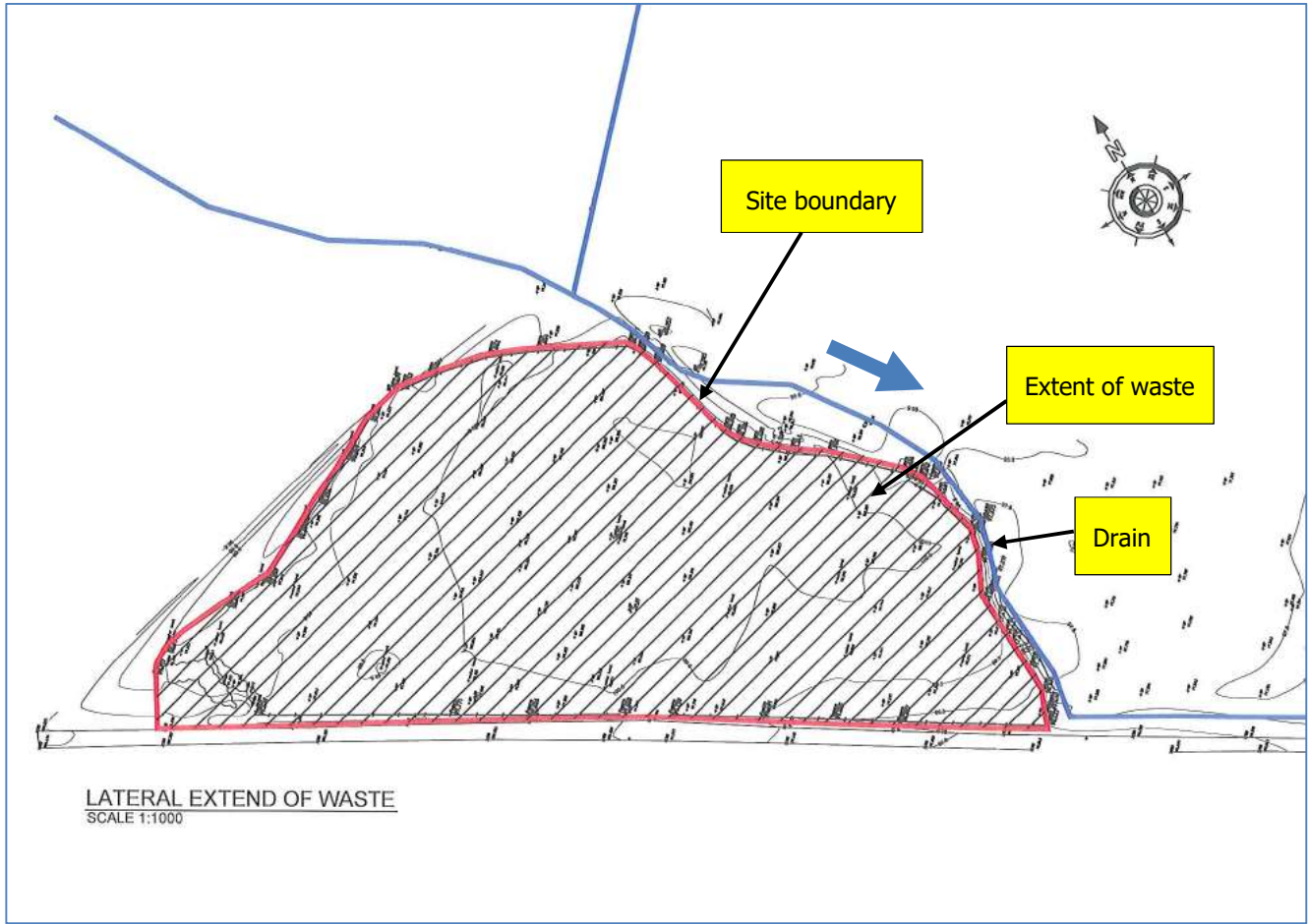


Figure 2: Extent of deposited waste and local surface water network

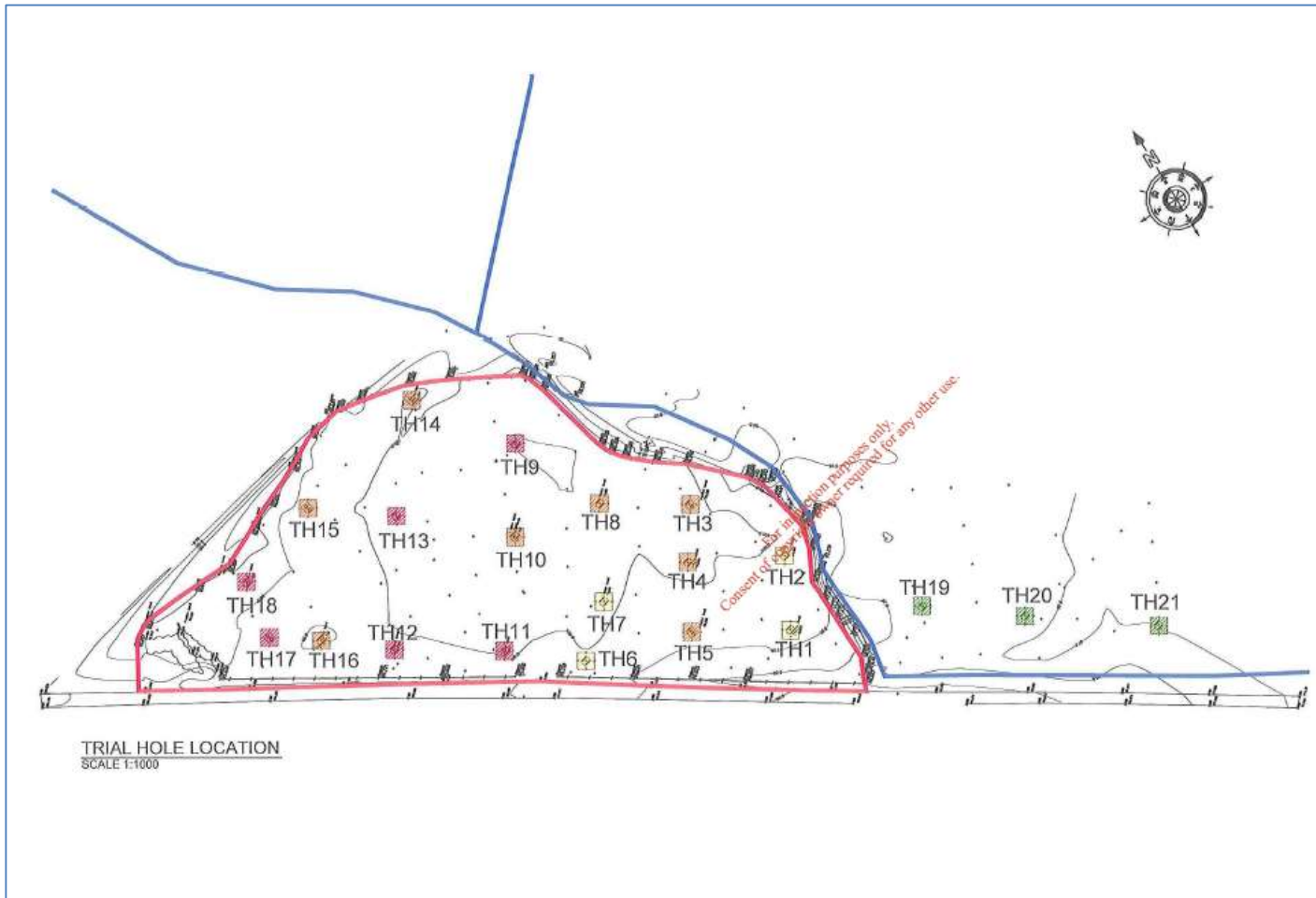


Figure 3: Location of trial holes.

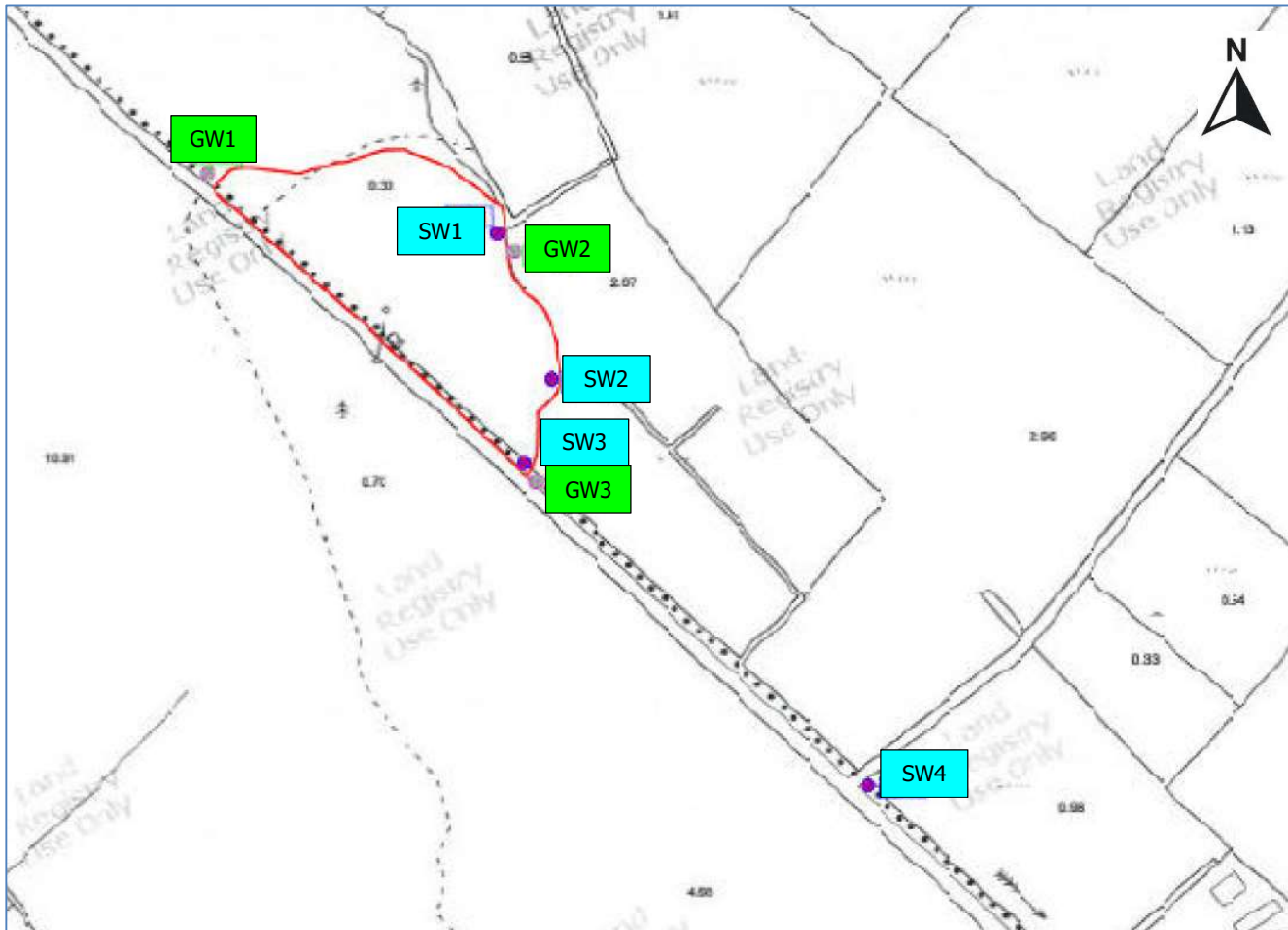


Figure 4: Groundwater and surface water monitoring locations

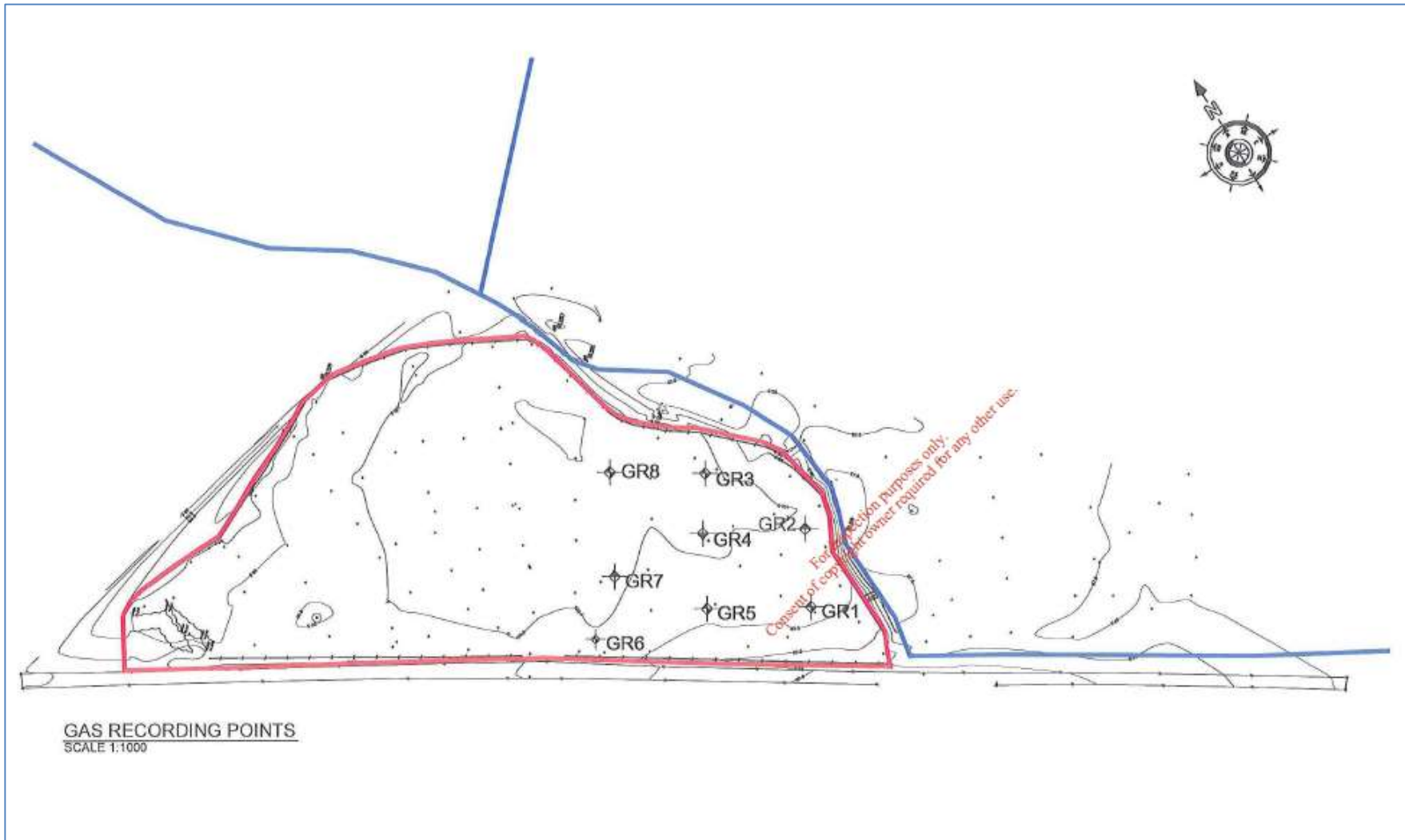


Figure 5: Gas monitoring locations

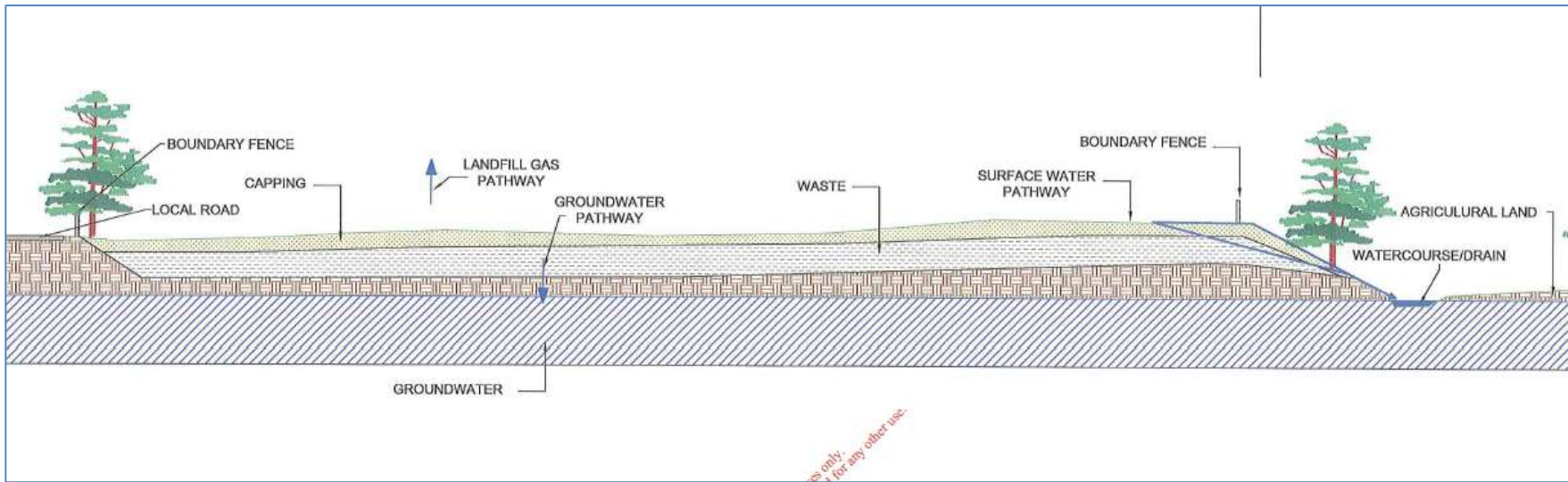


Figure 6: Conceptual site model for Mullagh Landfill site

Appendix 1: Assessment of the effects of activity on European sites and proposed mitigation measures.

European Site	Distance from the facility (km)	Qualifying Interests (* denotes priority habitat)	Conservation Objectives	Assessment
Killyconny Bog (Cloghbally) SAC [Site Code: 000006]	1.2 km south of the closed landfill	7110 Active raised bogs* 7120 Degraded raised bogs still capable of natural regeneration	NPWS (2015) Conservation Objectives: Killyconny Bog (Cloghbally) SAC 000006. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht [dated 2 nd November 2015].	<p><u>Emissions to Water</u></p> <p>There will be no emissions from the landfill site to surface water.</p> <p><u>Conclusion:</u></p> <p>Condition 3.1 of the certificate of authorisation outlines the remedial actions required at the site.</p> <p>Condition 3.8 requires monitoring, sampling, analysis and characterisation of leachate. It also requires biannual sampling of the adjacent surface water drain and sampling, analysis and characterisation of groundwater from on-site and off-site boreholes.</p> <p>The controls in the recommended certificate of authorisation ensure the qualifying interests of this European site are protected.</p> <p><u>Emissions to Air</u></p> <p>Recommended certificate of authorisation requires installation of a landfill cap and passive gas venting system.</p> <p><u>Conclusion:</u></p> <p>The controls in the recommended certificate of authorisation ensure the qualifying interests of</p>

				this European site are protected.
River Boyne and River Blackwater SAC [Site Code: 002299]	5 km south of the closed landfill	1099 River Lamprey <i>Lampetra fluviatilis</i> 1106 Salmon <i>Salmo salar</i> 1355 Otter <i>Lutra lutra</i> 7230 Alkaline fens 91E0 Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae)*	NPWS (2018) Conservation objectives for River Boyne and River Blackwater SAC [002299]. Generic Version 6.0. Department of Culture, Heritage and the Gaeltacht [dated 21 st February 2018].	<p><u>Emissions to Water</u></p> <p>There will be no emissions from the landfill site to surface water.</p> <p><u>Conclusion:</u></p> <p>Condition 3.1 of the certificate of authorisation outlines the remedial actions required at the site.</p> <p>Condition 3.8 requires monitoring, sampling, analysis and characterisation of leachate. It also requires biannual sampling of the adjacent surface water drain and sampling, analysis and characterisation of groundwater from on-site and off-site boreholes.</p> <p>The controls in the recommended certificate of authorisation ensure the qualifying interests of this European site are protected.</p> <p><u>Emissions to Air</u></p> <p>Recommended certificate of authorisation requires installation of a landfill cap and passive gas venting system.</p> <p><u>Conclusion:</u></p> <p>The controls in the recommended certificate of authorisation ensure the qualifying interests of this European site are protected.</p>

<p>River Boyne and River Blackwater SPA [Site Code: 004232]</p>	<p>5 km south of the closed landfill</p>	<p>A229 Kingfisher <i>Alcedo atthis</i></p>	<p>NPWS (2018) Conservation objectives for River Boyne and River Blackwater SPA [004232]. Generic Version 6.0. Department of Culture, Heritage and the Gaeltacht [dated 21st February 2018].</p>	<p><u>Emissions to Water</u></p> <p>There will be no emissions from the landfill site to surface water.</p> <p><u>Conclusion:</u></p> <p>Condition 3.1 of the certificate of authorisation outlines the remedial actions required at the site.</p> <p>Condition 3.8 requires monitoring, sampling, analysis and characterisation of leachate. It also requires biannual sampling of the adjacent surface water drain and sampling, analysis and characterisation of groundwater from on-site and off-site boreholes.</p> <p>The controls in the recommended certificate of authorisation ensure the qualifying interests of this European site are protected.</p> <p><u>Emissions to Air</u></p> <p>There are no significant emissions to air from the landfill which could affect the bird species River Boyne and River Blackwater SPA [Site Code: 004232] is designated for.</p> <p>Recommended certificate of authorisation requires installation of a landfill cap and passive gas venting system.</p> <p><u>Conclusion:</u></p> <p>The controls in the recommended certificate of authorisation ensure the qualifying interests of this European site are protected.</p>
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