

**TULLYVOGHEEN HISTORIC LANDFILL
TULLYVOGHEEN,
CLIFDEN, CO. GALWAY**

**APPLICATION TO EPA
FOR
CERTIFICATE OF AUTHORISATION**

**VOLUME I. APPLICATION FORM &
SECTIONS A, B, C, E & F**

29TH JUNE, 2020

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Certificate of Authorisation Application Form for Tullyvogheen Historical Landfill, Clifden, Co. Galway

Waste Management (Certification of Historic Unlicensed Waste
Disposal and Recovery Activity) Regulations, 2008

EPA Ref. No: <i>(Office use only)</i>	<input type="text"/>
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CHECKLIST

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Tier 1 Risk Assessment:

Requirement	Section or attachment no.	Applicant	EPA
Conceptual site model.	See Section 3 & Appendix 1 of <i>Tier 2 Site Investigation & Tier 3 GQRA of Former Tullyvogheen Landfill Report</i> in Volume II – Section D/Part A	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Identification of conservation areas, foreshore areas or other relevant designations.	See Section 3 & Appendix 1 of <i>Tier 2 Site Investigation & Tier 3 GQRA of Former Tullyvogheen Landfill Report</i> in Volume II – Section D/Part A	<input checked="" type="checkbox"/>	<input type="checkbox"/>
SPRs ¹ and SPR linkages: justified and scored.	See Section 3 & Appendix 1 of <i>Tier 2 Site Investigation & Tier 3 GQRA of Former Tullyvogheen Landfill Report</i> in Volume II – Section D/Part A	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Tier 1 risk classification. Risk: _	High - Class A Section 3 & Appendix 1 of <i>Tier 2 Site Investigation & Tier 3 GQRA of Former Tullyvogheen Landfill Report</i> in Volume II – Section D/Part A	<input checked="" type="checkbox"/>	<input type="checkbox"/>

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Tier 2 Risk Assessment:

Requirement	Section or attachment no.	Applicant	EPA
Walk over survey checklist.	See 2019 revised Walkover Survey Checklist in Appendix 1 of <i>Tier 2 Site Investigation & Tier 3 GQRA Assessment of Tullyvogheen Landfill Report</i> in Volume II – Section D/Part A	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Justification for chosen site investigations (SI), SI methods and sampling strategies.	See Sections 1 and 3 and annotated EPA Matrices 1 & 2 in Appendix 1 of <i>Tier 2 Site Investigation & Tier 3 GQRA Assessment of Tullyvogheen Landfill Report</i> in Volume II – Section D/Part A	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Justification for any SPR linkage not investigated as part of the SI.	SPR4 - Groundwater Protected area (GWDTE) not in vicinity of site & SPR6 - Public Supply (Well) (includes Group Water Schemes) not in vicinity of site, not viable receptors and not investigated - see Appendix 1 of <i>Tier 2 Site Investigation & Tier 3 GQRA Assessment of Tullyvogheen Landfill Report</i> in Volume II – Section D/Part A	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Description of how the matrix was used.	For rationale behind site investigation methods see annotated EPA Matrices 1 & 2 in Appendix 1 of <i>Tier 2 Site Investigation & Tier 3 GQRA Assessment of Tullyvogheen Landfill Report</i> in Volume II – Section D/Part A	<input checked="" type="checkbox"/>	<input type="checkbox"/>
SI result comparison against the requirements of the EC Environmental Objectives (Surface Waters) Regulations 2009.	Yes. See Sections 3 & 8 (Table 5) of <i>Tier 2 Site Investigation & Tier 3 GQRA Assessment of Tullyvogheen Landfill</i> in Volume II – Section D/Part A	<input checked="" type="checkbox"/>	<input type="checkbox"/>
SI result comparison against the requirements of the EC Environmental Objectives (Groundwater) Regulations 2010.	Yes. See Sections 3 & 7 (Table 4) of <i>Tier 2 Site Investigation & Tier 3 GQRA Assessment of Tullyvogheen Landfill</i> in Volume II – Section D/Part A	<input checked="" type="checkbox"/>	<input type="checkbox"/>
SI result comparison against the guidance document 'Guidance on the Authorization of Discharges to Groundwater', EPA 2011.	Yes. A review of Threshold Value Range in Table C.3 in EPA <i>Guidance on the Authorization of Discharges to Groundwater</i> indicates that the same Threshold Values were used for surface water and groundwater results risk assessment in the 2014 Report. See Tables 4 & 5 and Tables A10.1-A10.6 in <i>Tier 2 Site Investigation & Tier 3 GQRA Assessment of Tullyvogheen Landfill</i> in Volume II – Section D/Part A	<input checked="" type="checkbox"/>	<input type="checkbox"/>
SI result comparison against the Department of the Environment publication on the 'Protection of New Buildings and Occupants from Landfill Gas' (1994).	Yes. See Section 10 and Table 6 (methane levels compared to LEL & UEL) of <i>Tier 2 Site Investigation & Tier 3 GQRA Assessment of Tullyvogheen Landfill</i> in Volume II – Section D/Part A	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Requirement	Section or attachment no.	Applicant	EPA
Justification for any conclusions drawn from the comparison of SI results to current standards.	See Section 12 of <i>Tier 2 Site Investigation & Tier 3 GQRA Assessment of Tullyvogheen Landfill Report</i> in Volume II – Section D/Part A	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Comparison of SI results against each SPR linkage and justification for any conclusions drawn.	See Section 11 and Table 7 of <i>Tier 2 Site Investigation & Tier 3 GQRA Assessment of Tullyvogheen Landfill Report</i> in Volume II – Section D/Part A	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Justification for the risk ranking of each SPR linkage.	See Table A1.1 and Tables 1A to 3F in Appendix 1 of <i>Tier 2 Site Investigation & Tier 3 GQRA Assessment of Tullyvogheen Landfill Report</i> in Volume II – Section D/Part A See Section 11 and Table 7 of <i>Tier 2 Site Investigation & Tier 3 GQRA Assessment of Tullyvogheen Landfill Report</i> in Volume II – Section D/Part A	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Source/Hazard – Pathway – Receptor.

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Appropriate Assessment (AA):

Requirement	Section or attachment no.	Applicant	EPA
AA Stage 1 – Screening for Appropriate Assessment.	See Appendix 2 of Tier 2 Site Investigation & Tier 3 GQRA of Former Tullyvogheen Landfill Report in Volume II – Section D/Part A	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Statement confirming the result of Stage 1 Screening, e.g. <i>"The screening assessment (Stage 1) undertaken demonstrated that the project is/is not likely to have significant effects on the European site(s) having regard to its conservation objectives"</i> .	See Section 5 of the Appropriate Assessment Screening Report in Appendix 2 of Tier 2 Site Investigation & Tier 3 GQRA of Former Tullyvogheen Landfill Report in Volume II – Section D/Part A	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Requirement	Section or attachment no.	Applicant	EPA
AA Stage 2 – Natura Impact Statement.	Given conclusions of Screening Report – Not applicable – NIS not required	<input type="checkbox"/>	<input type="checkbox"/>
Statement confirming the result of Stage 2 of the Appropriate Assessment, e.g. <i>"The assessment (Stage 2) demonstrates that the project will/will not adversely affect the integrity of the European site(s) having regard to its conservation objectives"</i> .	Given conclusions of Screening Report – Not applicable – NIS not required	<input type="checkbox"/>	<input type="checkbox"/>

Tier 3 Risk Assessment:

Requirement	Section or attachment no.	Applicant	EPA
Refined conceptual site model.	See Section 8 of the <i>Further Information – Hydrology/Tier 3 GQRA/CSM of Former Tullyvogheen Landfill Report</i> in Volume III – Section D/Part B	<input checked="" type="checkbox"/>	<input type="checkbox"/>
SPRs and SPR linkages: justified and scored.	See Section 8 – Table 5 & Charts 1-3 of the <i>Further Information – Hydrology/Tier 3 GQRA/CSM of Former Tullyvogheen Landfill Report</i> in Volume III – Section D/Part B	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Tier 3 risk classification and justification.	See Section 8 – Table 5 & Charts 1-3 of the <i>Further Information – Hydrology/Tier 3 GQRA/CSM of Former Tullyvogheen Landfill Report</i> in Volume III – Section D/Part B	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Generic Quantitative Risk Assessment (QRA)	See Section 7 of the <i>Further Information – Hydrology/Tier 3 GQRA/CSM of Former Tullyvogheen Landfill Report</i> in Volume III – Section D/Part B	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Detailed QRA	Not Applicable/Not completed/not required	<input type="checkbox"/>	<input type="checkbox"/>
Justification for generic QRA/detailed QRA	See Section 7 of the <i>Further Information – Hydrology/Tier 3 GQRA/CSM of Former Tullyvogheen Landfill Report</i> in Volume III – Section D/Part B	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Overall site risk evaluation	See Section 9 of the <i>Further Information – Hydrology/Tier 3 GQRA/CSM of Former Tullyvogheen Landfill Report</i> in Volume III – Section D/Part B	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Remediation Strategy:

Requirement	Section or attachment no.	Applicant	EPA
Description of remediation works.	See Section 6 of <i>Tier 2 Site Investigation & Tier 3 GQRA Assessment of Tullyvogheen Landfill Report</i> in Volume II–Section D/Part A	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Comparison of the proposed remediation works against the ' <i>Landfill Restoration and Aftercare Manual</i> ', EPA 1999 and justification for any departure from the manual.	See Section 6 of <i>Tier 2 Site Investigation & Tier 3 GQRA Assessment of Tullyvogheen Landfill Report</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Comparison of the proposed remediation works against the ' <i>Landfill Site Design Manual</i> ', EPA 2000 and justification for any departure from the manual.	See Section 6 of <i>Tier 2 Site Investigation & Tier 3 GQRA Assessment of Tullyvogheen Landfill Report</i> in Volume II–Section D/Part A	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Comparison of the proposed remediation works against the report on the ' <i>Management of Low Levels of Landfill Gas</i> ', EPA 2011 and justification for any departure from the report.	Not applicable/ Not necessary given negligible levels of methane encountered on site	<input type="checkbox"/>	<input type="checkbox"/>
Demonstration of how the remediation works will allow for the completion of a validation report and the breakage of each SPR linkage.	See Section 6 of <i>Tier 2 Site Investigation & Tier 3 GQRA Assessment of Tullyvogheen Landfill Report</i> in Volume II–Section D/Part A	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Date on which the proposed remediation works are due to be completed: _____	No further mitigation measures/capital works proposed for site	<input type="checkbox"/>	<input type="checkbox"/>
Demonstration of how SPR linkages which have no remediation measures proposed will meet the requirements of a validation report.	For SPR linkage to surface water see Sections 9 & 10 of <i>Further Information – Hydrology/Tier 3 GQRA/CSM of Former Tullyvogheen Landfill Report</i> in Volume III–Section D/Part B	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Date on which a completed validation report is proposed to be submitted to the Agency:	Recommended <i>Follow-up Invertebrate Testing on Surface Water Body Report</i> to be submitted to EPA by 30 th October, 2020.	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Monitoring Programme:

Requirement	Section or attachment no.	Applicant	EPA
Identification of the parameters which require analysis and the related sampling plan for any ongoing or long-term monitoring or assessment programme required to ensure the effectiveness of completed remediation measures.	See Section 10 of the <i>Further Information – Hydrology/Tier 3 GQRA/CSM of Former Tullyvogheen Landfill Report</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Comparison of the proposed monitoring or assessment programme against the ' <i>Landfill Monitoring Manual</i> ', EPA 2003 and justification for any departure from the manual.	See Section 10 of the <i>Further Information – Hydrology/Tier 3 GQRA/CSM of Former Tullyvogheen Landfill Report</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Demonstration of how the proposed monitoring or assessment programme will confirm that the objectives of the remediation measures have been met.	See Section 10 of the <i>Further Information – Hydrology/Tier 3 GQRA/CSM of Former Tullyvogheen Landfill Report</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

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SECTION A. NON-TECHNICAL SUMMARY

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SECTION A: NON-TECHNICAL SUMMARY

A non-technical summary of the application is to be included here. The summary should identify all environmental impacts of significance associated with the site.

The following information must be included in the non-technical summary:

A description of:

- The site location.
- A brief history of the site, types and volumes of waste deposited, duration of disposal activities and date of cessation.
- The hydrogeology and ecology of the site and surrounding area, to include protected areas.
- Risk category of the site
- Actual and potential environmental impacts.
- Proposed remediation including timescale.

Supporting information should form **Attachment A.1**.

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Site Location

The site is approximately 2 km east of the town centre of Clifden and is located on a narrow country road that leads uphill approximately 660m from the Clifden to Galway National Road (the N59) which runs west to east (see Figures 1 and 2). At a distance of approximately 600m from the N59, the country road turns eastwards. Where the site is located, this country road has been constructed at the edge of a valley between a small mountain to the south and a large hill to the north. The valley is orientated in an approximate west to east direction. The landfill to the south of the country road consists of a substantial infill operation where the valley was raised approximately 3.5m on the eastern side of the site and approximately 7-8m on the western side of the site. The landfill is located between a small mountain, Cooravoughil Mountain to the south and a number of large hills to the north in an area where the valley widens out into upland bog. A mountain lake, Lough Nambrackeagh, is located 350m to the northwest of the site. Clifden derives its water supply primarily from Lough Nambrackeagh. A small stream discharges from this lake and joins a larger stream which flows in a north to south direction along the country road leading to the landfill. This stream appears to originate from a small lake, Lough Cashleen located approximately 650m to the east of the site. This stream which runs in an east to west direction through the valley is culverted through the landfill before continuing in a south-westerly direction alongside the country road for a distance, then heading south-westwards and eventually joining the Owenglen River 735m to the south of the site.

Site History

According to Galway C.C., the former municipal landfill at Tullyvogheen, Clifden, County Galway, was in operation between the years of 1984 and 1999. During this period, it is estimated by Galway County Council that approximately 23,000 tonnes of mixed waste including domestic, commercial and construction & demolition (i.e. C & D) waste per annum was deposited annually (see Plate 3 following). The site area is 1.27 hectares (ha) and the total waste body is estimated at 114,000m³ or 205,000 tonnes.

Hydrogeology of the Site

The bedrock map indicates that Streamstown Schist Formation (ST) underlies the site. This formation consists of Pre-cambrian quartzite, gneisses and schists. This is classed as a 'P1 - Poor Aquifer - Bedrock which is generally unproductive except for local zones.'

The site is located with the Clifden-Castlebar Groundwater Body. This GWB is composed primarily of Precambrian Quartzites, Gneisses & Schists, Ordovician Metasediments and Silurian Metasediments and Volcanics. Most groundwater flux will be in the uppermost part of the aquifer. Subsoil thickness data are also sparse. Available data indicate the thickness of the subsoils is generally less than 3m over the GWB. Subsoils are thicker in the low lying flatter areas of the GWB. The thickness of the blanket peat ranges from 0-6 m, depending on topography.

Groundwater will discharge locally to streams and rivers crossing the aquifer and also to small springs and seeps. Owing to the poor productivity of the aquifers in this body it is unlikely that any major groundwater - surface water interactions occur. Lakes comprise approximately 3% of the GWB. It should also be noted that a study carried out by the Western River Basin Management Body under the Water Framework Directive in 2008 has classed the 'Clifden-Castlebar' Groundwater Body, in which the site is located as '2a – Probably Not at Risk'.

Hydrology of the Site

It is understood that a number of years after the infilling of waste at Tullyvogheen Landfill commenced, the stream which runs through the site was culverted. The stream is culverted approximately 27m to the east of the site. This stream originates from a small lake, Lough Cashleen located approximately 650m to the east of the site. This stream runs the full length of the landfill (i.e. 260m) and exits to the west of the landfill before continuing in a south-westerly direction alongside the country road for a distance, then heading south-westwards and eventually joining the Owenglen River 735m to the south of the site. A mountain lake, Lough Nambrackeagh, is located 350m to the northwest of the site. Clifden derives its water supply primarily from Lough Nambrackeagh. A small stream discharges from this lake and joins the above-mentioned larger stream which flows in a north to south direction along the country road.

The EPA have carried out biological monitoring upgradient and downgradient of the junction at which the above-mentioned stream joins the Owenglen River. A biological quality value (Q-Rating) of 5 or 'High' status has been given by the EPA for the upgradient point and a biological quality value (Q-Rating) of 4 or 'Good' status has been given for the downgradient location which is adjacent to the bridge in Clifden town.

Risk Category

Using the Environmental Protection Agency Code of Practice, the site is classified as 'Class A – High Risk' due to the risk of leachate migration to surface waters.

Impacts

The results of the surface water analysis indicate that the landfill site, although still impacting on the subject stream, is producing lower volumes of contaminated leachate than in 2014. This is clear on reviewing the reduction in the ammonia, potassium and sodium levels. The combined results of the invertebrate assessment and the surface water quality assessment indicate that, where KS3 and SW4 are located, the stream has a 'Q4 – Good – Unpolluted' status. This clearly indicates that the impact on the ecology of the stream shown at KS2 has not extended as far downstream as KS3. It is anticipated that with time, the levels of contamination within the leachate and the surface water will decrease and the ecosystem within the stream will continue to improve from Q3 to Q4 at locations KS1 and KS2. The high levels of oxygen present in the fast flowing stream will also assist in the mineralisation, oxygenation and breakdown of contaminants within the stream over time.

The results of the surface water and invertebrate assessment do not indicate that the Owenglen River is being impacted by the subject stream. As such, the findings of the appropriate assessment screening report of 2014 remain.