Mobuoy Road Waste Site

Review of Public Consultation Feedback – Consultation Response 26

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V2

NIEA

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1.0 INTRODUCTION

1.1 INSTRUCTION

Tetra Tech Consulting NI Limited (Tetra Tech or TT) were appointed by Northern Ireland Environment Agency (NIEA), an executive Agency within the Department of Agriculture, Environment and Rural Affairs (DAERA), under the Mobuoy Road Waste Site Remediation Project to undertake a review of the Consultation Response 26 prepared by AECOM on behalf of Derry City and Strabane District Council of the Draft Remediation Strategy for the Mobuoy Road waste site in Co. Londonderry.

A site location plan is provided in Figure 1.

1.2 PROJECT BACKGROUND

The Mobuoy Remediation Project herein referred to as the 'site' is located on the outskirts of the city of Derry/Londonderry on the Mobuoy Road. It encompasses an area of approximately 46ha and currently consists of two distinct parcels of land either side of Mobuoy Road identified as City Industrial Waste (CIW) and Campsie Sand and Gravels (CS&G) as shown on Figure 1. The surrounding land use is agricultural, and the site is bounded to the west by the River Faughan.

The CIW site is located to the east of Mobuoy Road and covers an area of approximately 14Ha. It comprises of a former Materials Recycling Facility (MRF), closed landfill and an area of former sand and gravels extraction located approximately 100m east of the River Faughan. The CS&G site is located to the west of Mobuoy Road and adjacent to the River Faughan which was subject to extensive sand and gravel extraction over a number of years.

Historical context (Mills Report[1]) indicates a landfill was present on the site from at least 1980. CIW was granted a waste disposal licence in 1996 and by 2004 the MRF was established. A landfill Closure Notice was issued in 2007. In 2012 the NIEA Environmental Crime Unit investigated alleged illegal waste activities, and the waste management licence for the MRF was revoked in June 2013. A Departmental investigation in 2015 estimated that large volumes of illegally deposited waste remained on the site.

TT joined the Integrated Consultancy Team (ICT) for Mobuoy in 2021. Between 2021 and 2022 TT reviewed historical environmental risk assessments, carried out supplementary intrusive ground investigations, completed follow-up monitoring to improve site characterisation, and prepared an updated Detailed Quantitative Risk Assessment (DQRA, October 2022) which recommended remediation. A Remediation Options Appraisal was produced in March 2023, and a Draft Remediation Strategy was prepared in June 2023. The Draft Strategy was subject to public consultation which opened on 13th June 2025 and closed on 2nd October 2025.

[1] A review of waste disposal at the Mobuoy site and the lessons learnt for the future regulation of the waste industry in Northern Ireland, Christopher Mills, December 2013

1.3 LAND CONTAMINATION TECHNICAL FRAMEWORK

The land contamination management approach at the Mobuoy Road Waste Site Remediation Project follows the Land Contamination Risk Management (LCRM[2]) published by the Environment Agency (8th October 2020, last updated 12th June 2025). These procedures provide a structured framework for making decisions in the assessment and management of contaminated sites such as the Mobuoy waste site. LCRM uses a staged risk-based approach with 3 stages, each stage further broken down into steps.

Stage 1: Risk assessment

1. Preliminary risk assessment.
2. Generic quantitative risk assessment.
3. Detailed quantitative risk assessment.

Stage 1 establishes whether contamination poses a plausible risk to receptors and, if so, quantifies that risk. The Preliminary Risk Assessment compiles site history, conceptual site model (CSM) and identifies potential contaminant–pathway–receptor linkages. Where needed, Generic Quantitative Risk Assessment (GQRA) includes intrusive site investigation and screens contaminant concentrations against conservative assumptions to assess the risks. If GQRA indicates potential unacceptable risk or uncertainty, a Detailed Quantitative Risk Assessment (DQRA) refines the CSM with site-specific data, targeted sampling, and modelling to produce more accurate risk estimates and to inform remediation requirements.

Stage 2: Options appraisal

1. Identify feasible remediation options.
2. Do a detailed evaluation of options.
3. Select the final remediation option.

Stage 2 identifies and evaluates feasible remediation and management options to address the risks identified in Stage 1. The process begins with a longlist of technically feasible measures, narrows to a short-list through screening (technical, environmental, health & safety, deliverability), and then carries out a detailed appraisal (effectiveness, cost, sustainability, timescale, residual risk). The objective is to select a practicable, proportionate and cost-effective remediation approach that meets the risk-based remediation objectives and regulatory expectations. The Mobuoy Road Waste Site Remediation Project currently sits within Stage 2/3, whereby the Draft Remediation strategy has been produced but subject to further refinement following the public consultation.

Stage 3: Remediation and verification

1. Develop a remediation strategy.
2. Remediate.

[2] Land contamination risk management (LCRM) - GOV.UK

3. Produce a verification report.
4. Do long term monitoring and maintenance, if required.

Stage 3 delivers the selected remedial work and demonstrates that the remediation objectives have been achieved. This begins with preparation of a detailed remediation strategy and works specification (method statements, health & safety, environmental controls, waste management). During remediation, actions are implemented and monitoring/controls applied. On completion, a verification report documents the work, presents confirmation sampling and demonstrates compliance with the remediation objectives. Where appropriate, a long-term monitoring and maintenance plan is prepared to manage residual risks and ensure continued protection of receptors.

1.4 PURPOSE OF REPORT

The purpose of this document is to present Tetra Tech's review of Consultation Response 26 (AECOM, on behalf of Derry City and Strabane District Council) in relation to the Draft Remediation Strategy for the Mobuoy Road site. This review will:

- Summarise the key points raised in the response including technical aspects;
- Identify outcomes, implications or issues arising from those points in relation to the Draft Remediation Strategy and the LCRM process; and
- Where relevant, suggest clarifications, further actions, or follow-up by the ICT, NIEA or other parties.

This review is intended to inform decision-making and next steps.

1.5 LIMITATIONS, TERMS AND CONDITIONS

Attention is drawn to the report conditions, included in Appendix A, and the terms and conditions of the engagement as detailed in our accepted proposal.

2.0 CONSULTATION RESPONSE 26

Consultation Response 26 was prepared by AECOM and comprised an independent review of the draft Remediation Strategy on behalf of Derry City and Strabane District Council. Their review assessed the process used to prepare the draft Remediation Strategy for the Mobuoy site to ensure that the work had been carried out in accordance with LCRM guidance. The AECOM report reviewed an extensive list of site environmental risk assessments that had ultimately informed the draft Remediation Strategy, examining the scope and suitability of intrusive investigations, monitoring, geotechnical and environmental testing and laboratory analysis, and the drainage and flood risk assessment processes. AECOM also examined whether ecological factors had been appropriately considered within the draft Remediation Strategy. In addition, their review assessed the modelling within the DQRA that supported the draft Remediation Strategy, checked whether relevant environmental and waste legislation requirements had been addressed, and considered whether all feasible remediation options had been identified and rigorously evaluated against the project brief. AECOM acknowledges that the remediation process was generally robust and appropriately followed the LCRM framework, despite noting some limitations. Further consideration of the key points raised is provided in the subsequent sections.

2.1 KEY POINTS RAISED

2.1.1 Preliminary Risk Assessment

AECOM provided a review of the WYG Preliminary Risk Assessment (dated July 2016) and identified the following issues:

- AECOM noted that WYG's PRA did not present a clear rationale or the design principles for the preliminary ground investigation. In the absence of this information, it is not possible to confirm that all potential sources and contaminant linkages were identified and addressed during the investigation.
  TT Commentary
  Following public consultation review on the draft Remediation Strategy, which is an outline of proposed remediation solutions for the site , it is recognised that further detailed design work is planned. TT will consider whether potential contaminant sources and contaminant–receptor linkages have been adequately addressed during future design phases of the remediation strategy and subject to further detailed assessment. Any remaining uncertainties will be resolved through targeted design-stage investigations and detailed assessment, as necessary.

- AECOM also identified that there was limited interpretation of contaminant results within the WYG PRA (July 2016); only a few analytes discussed while PAHs, hydrocarbons, VOCs, SVOCs are tabulated without commentary. This ultimately raises an issue of an incomplete data interpretation whereby key contaminants and trends were not analysed.

TT Commentary
The WYG PRA reviewed by AECOM is dated July 2016 and therefore represents a historical assessment. Subsequent site investigation and reporting (post-2016) are considered to supersede that document for the purposes of current risk evaluation.

- AECOM noted there are two on-site groundwater abstractions/boreholes however the current status of them is unclear i.e. if they have been decommissioned or not. If not decommissioned, they represent a potential direct pathway to bedrock.
  TT Commentary
  TT agrees that if two on-site groundwater abstractions remain intact and not decommissioned then they represent a potential unassessed pathway to bedrock/aquifer. Further action is considered necessary in this regard to comprise a contemporary assessment of on/offsite boreholes.

- AECOM noted asbestos was not referenced as a contaminant of concern within the WYG PRA 2016, however was referenced in other parts of the desk study thus representing incomplete contaminant screening within the PRA process.
- **TT Commentary**
  It is not considered to present a significant issue as later assessments have incorporated assessment of asbestos, across all made ground.

- AECOM highlighted that the PRA did not consider UXO risk within the report which would not be compliant with LCRM guidance.
  TT Commentary
  TT agrees that UXO risk should be included in the PRA to satisfy LCRM requirements. Local knowledge and available online assessment of UXO risk information suggests a low likelihood of UXO.

2.1.2 Generic Quantitative Risk Assessment

Within AECOMs review they indicate that the GQRA stage of the LCRM process has been inadequately documented, especially in integrating all available data. They state that whilst a DQRA has generally considered the full data set, the rationale for this omission within a GQRA is not fully explained.

They mention that the GQRA presented within the Updated DQRA (dated October 2022) does not appear to comment on previous Sirius / WYG data or present findings on concentration trends across the datasets, therefore previous datasets and temporal trends may not have been integrated, weakening the robustness of source-zone definitions and risk conclusions.

TT Commentary

The understanding of the various stages of the conceptual site model for the site has been progressively developed by TT over the years and whilst this may not be fully documented in the form of a standalone current GQRA, TT considers that the DQRA mitigates this concern. With regards to the concerns of comment of previous

datasets TT suggests that this will be addressed with further action in the form an assessment of data trends from contemporary analysis.

2.1.3 Detailed Quantitative Risk Assessment

SIRIUS DQRA (January 2017)

AECOM provided a review of the Sirius DQRA (dated January 2017) and identified there was key data, scope, and modelling transparency gaps in the DQRA. It was noted that several WYG-identified source zones appear omitted or unjustified; therefore, the GQRA lacks spatial detail, location-by-location exceedance magnitudes, and clear contaminant selection for DQRA. AECOM noted that hydraulic conductivity inputs used in the models appeared to exclude extreme values without explanation and overall considered insufficiently supported by site characterisation data. Several potential groundwater receptors were not included in the assessment and no adequate justification provided for their omission. In addition, the Water Balance Model's methodology for deriving Remedial Target Criteria is not presented. Collectively, these omissions and the limited transparency around key data and modelling choices undermine confidence in the DQRA results.

Tt Commentary

Following public consultation on the draft Remediation Strategy, which is an outline of proposed remediation solutions for the site, it is recognised that further detailed design work is planned. TT will consider during any future design phases of the remediation strategy.

Tetra Tech Risk Assessment Review & Site Investigation Scope (September 2021)

AECOM provided comment on the Tetra Tech Risk Assessment Review & Site Investigation Scope (dated September 2021) and indicated it was unclear whether the consideration of all available (at the time) laboratory data has been undertaken in the preparation of the scope of additional works.

Tt Commentary

The concerns highlighted by AECOM are considered mitigated by phased investigation.

Tetra Tech Updated DQRA (October 2022)

AECOM provided a review of the Tetra Tech Updated DQRA (October 2022)) and identified the following issues:

- AECOM indicates that the DQRA does not clearly explain how historical data (from WYG or Sirius) were integrated.

  TT Commentary

  It is recognised that, due to the passage of time, further action may be required in the form of updating the DQRA, undertaking sensitivity analysis or further modelling. It is planned that TT will consider this during any future design phases of the Remediation Strategy.

- AECOM indicates the shallow aquifer and downstream abstraction (Cloghole) may not be adequately considered numerically against DWS. Drinking water receptors were not explicitly assessed against UK

Drinking Water Standards (DWS) and there was a reliance on EQS for River Faughan without clear justification.

TT Commentary
TT recommend an initial review of EQS and DWS, with the outcome of this review to confirm next steps.

- AECOM indicates there is an unclear status of recommended additional investigations including outstanding data gaps may remain unaddressed. Recommendation for further investigation northeast/northwest of CIW (potential waste areas) not clearly carried into report conclusions or draft Remediation Strategy.

  TT Commentary
  TT recommend completing a review of ground investigation data and whether northeast/northwest of CIW has been assessed.

- AECOM states that PFAS sampling/assessment is not discussed in the TT risk assessments despite PFAS being monitored by NIEA.

  TT Commentary
  It is recognised that the published DQRA pre-dates some of the monitoring of emerging pollutants that has been carried out by NIEA. A review of emerging pollutants potentially present in groundwater at the site is planned.

- AECOM indicated TT excluded potential pathway between CIW lagoon and tributary without presenting the supporting lines of evidence used to justify exclusion.

  TT Commentary
  TT acknowledges the comment from AECOM and awaits response from the NIEA in order to provide further comment on this matter.

- AECOM commented that ConSim, RTM and water-balance model inputs of hydraulic conductivity and gradient rely on older Sirius values and comparability with TT 2022 data and appropriateness for site-scale modelling was not demonstrated.

  TT Commentary
  Following public consultation on the draft Remediation Strategy, which is an outline of proposed remediation solutions for the site, it is recognised that further detailed design work is planned. TT will consider this concern during any future design phases of the remediation strategy.

- AECOM mentioned that TT noted data may be unsuitable for site-scale use yet appear to use the same hydraulic conductivity values anyway. This represents a contradiction between TT's stated data limitations and modelling choices.

  TT Commentary
  TT acknowledges the comment from AECOM and It is recognised that, due to the passage of time, further action may be required in the form of updating the DQRA, undertaking sensitivity analysis or

further modelling. It is planned that TT will consider this during any future design phases of the Remediation Strategy.

- AECOM commented that the Water balance modelling methodology not provided with the report.

  TT Commentary

  TT acknowledges the comment from AECOM and It is recognised that, due to the passage of time, further action may be required in the form of updating the DQRA, undertaking sensitivity analysis or further modelling. It is planned that TT will consider this during any future design phases of the Remediation Strategy.

- AECOM state that Iron and Manganese frequently exceed assessment criteria but were not included in modelling or used to derive SSAC/RTC and the rationale not clearly explained. This exclusion of frequently exceeding contaminants from modelling may underestimate risks or misinform target setting.

  TT Commentary

  TT acknowledges the comment from AECOM and It is recognised that, due to the passage of time, further action may be required in the form of updating the DQRA, undertaking sensitivity analysis or further modelling. It is planned that TT will consider this during any future design phases of the Remediation Strategy.

- AECOM states that attenuation-based back-calculated soil / leachate targets (from ConSim Level 3a -> Level 1/2) are referenced but not presented in the report body. This missing presentation of derived targets reduces transparency of target-setting and hinders review of protective endpoints.

  TT Commentary

  TT acknowledges the comment from AECOM and It is recognised that, due to the passage of time, further action may be required in the form of updating the DQRA, undertaking sensitivity analysis or further modelling. It is planned that TT will consider this during any future design phases of the Remediation Strategy.

- AECOM stated that the justification and rationale of the various investigations undertaken should have been described in more detail.

  TT Commentary

  TT acknowledges AECOM's point and confirms that the overall justification and rationale for the phased site investigations are set out in detail in the September 2021 Site Investigation Report. That report established the conceptual site model, the targeted investigation objectives and the rationale for the initial borehole and trial pit locations, sampling depths, and analytical suites. As the works progressed during 2021–2022, additional investigative phases were implemented in response to observed ground conditions and to address previously unidentified or emerging contamination evidence. Each subsequent phase was scoped to target specific uncertainties identified by earlier phases.

- The assessment of risks associated with controlled waters does not fully address the potential risks to groundwater abstractions intended for human consumption (drinking water). This omission needs to be justified or rectified.

  Tt Commentary

  There are no known private or public groundwater supplies locally. However, this should be reviewed periodically. It is recognised that, due to the passage of time, further action may be required in the form of updating the DQRA, undertaking sensitivity analysis or further modelling, this could also involve a contemporary update and strengthen explanation that the risk has been assessed. It is planned that TT will consider this during any future design phases of the Remediation Strategy.

2.1.4 Ground Gas Risk Assessment

Point 1 - AECOM provided a review of the WYG Gas Risk Assessment (May 2016) and identified the following issues:

- AECOM identified that there was a TDL survey reported but results such as survey area and concentrations were not provided. This missing TDL lines of evidence leaves conclusions open to challenge.
- AECOM indicated that the risk scenarios used within the assessment do not align with proposed end use (Public Open Space).
- It is noted by AECOM that pressure variation has not been assessed which may affect interpretation of gas migration/emission rates.
- AECOM indicated that there were poorly justified waste inputs to the model which could have potentially significant impact on model outputs.
- It was noted by AECOM that there was no sensitivity analysis performed on empirical gas models.
- AECOM stated there was numerical/reporting inconsistencies in model outputs (e.g., component sums not matching bulk gas; reported >100% v/v methane).

Tt Commentary

Tetra Tech acknowledged the points raised and with regards to the final end use for the site this had not been fully known at the time of the report in 2016 and as such, difficult to assess for the relevant scenario at the time. Overall, the ground gas risk assessment is considered to be a reasonable assessment in comparison to typical practice guidance and presents a reasonably comprehensive assessment of potential gas risk at the site.

Point 2 - A further gas risk assessment titled Tetra Tech Updated Gas Risk Assessment (September 2022) was reviewed by AECOM who identified the following issues:

- A similar concern as mentioned on the earlier assessment was raised by AECOM regarding the assessment scenarios considered might not accurately reflect the planned end use of the site.
- The proportions of waste have been assumed based on experience of waste inputs with a sizeable proportion of inert waste which will not generate gas.

- Absence of sensitivity analysis of the modelling is questionable, as sensitivity analysis forms a key component of deterministic modelling approaches.
- Inconsistencies with the reported values in terms of bulk gas concentrations and methane volume concentrations which are outside of the specified /theoretical ranges.
- Assessment does not consider BS 8485:2015 trigger concentrations nor justify why they are not applicable given the site is unlikely to have built development.
- Use of gas screening values (GSV's)s and CIRIA characteristic situations may not represent risks to an active landfill with non-building receptors.

Tt Commentary

Following public consultation on the draft Remediation Strategy, which is an outline of proposed remediation solutions for the site, it is recognised that further detailed design work is planned. TT will consider gas regime post remediation during any future design phases of the remediation strategy.

2.1.5 Vapour Risk Assessment

As part of the AECOM review there are points raised with regards to a limited vapour risk assessment being undertaken despite site evidence of hydrocarbons/VOCs in leachate and groundwater.

Tt Commentary

A standalone Vapour Risk Assessment has not been undertaken, however there have been some considerations within past ground gas risk assessments.

Following public consultation on the draft Remediation Strategy, which is an outline of proposed remediation solutions for the site, it is recognised that further detailed design work is planned. TT will consider a vapour risk assessment during any future design phases of the remediation strategy and subject to further detailed assessment and acknowledge of end uses.

2.1.6 Ecological Assessment

AECOM provided a review of the ecological assessments and identified the draft Remediation Strategy must consider the ecological impacts of the remediation works. This includes conducting further ecological assessments, implementing a habitat regulation assessment, and appointing an Ecological Clerk of Works (ECoW) to advise on ecological implications. Further details on the concerns pertaining to ecological assessment is provided below:

- Ecological Value (Ecological Impact Assessment) not available, so mitigation scale may be under- or over-estimated;
- Limited scope for aquatic species; aquatic invasive species present in large northwest lake, but aquatic assessment limited;
- Potential habitats for additional protected/priority species (e.g., red squirrel, pine marten, hedgehog, stoat) lack adequate survey and assessment;

- No specific invertebrate surveys conducted despite likelihood of priority butterflies and other species being present;
- No information on extent/location of habitat loss, including loss of Priority Habitats; Landscaping Plan is high level with limited detail; and
- Species protection plans (newt, otter, badger, invasive species) are referenced but not fully integrated into a single Ecological Management Plan / ECoW framework; pre-construction update surveys not consistently proposed.

TT Commentary

It is recognised further ecological assessment and integration are needed, at the appropriate time. Until public consultation on the draft Remediation Strategy had been completed, agreed remediation proposals have been available to fully assess ecological impacts. It is also recognised that ecology has high potential to change over time. It is planned that further detailed ecological assessments will be scoped and completed to inform detailed design and the production of an EIA.

2.1.7 Flood Risk Assessment

AECOM provided a review of the TT Preliminary Flood Risk Assessment (dated December 2021) and identified the following key points:

- A flood risk assessment in line with PPS15 is required. The remediation works should be designed to be resilient to future flood events and sympathetic to flood plain functionality;
- Lack of detailed topographic information affect the flood risk assessments;
- The pre-development impermeable area for the site is stated to be 4.68ha, but there is no explanation as to how this figure has been determined;
- The flood defences are not shown on the indicative layout drawings, these should be highlighted, along with the exclusion zone;
- Climate change allowances not addressed for longer return periods (0% stated); no in-combination assessment with A6 scheme;
- Zone strategies (1–9 and CIW Yard) are conceptual with no sizing, modelling, or flood impact assessment;
- Zones 1–3: pond backfill and capture drainage shown but no drainage sizing or flood mitigation; 30,000 m3 waterbody removal not addressed;
- Zone 4: lagoon dewatering/decommissioning and culvert proposals unquantified;
- Zones 5–8: proposed flood embankments, ditches and Sustainable Drainage Systems (SuDS) referenced but not shown or sized; inconsistent labelling on discharge routes;
- Zone 9: wetlands/SuDS shown but no sizing; not demonstrated these replace existing pond attenuation; and
- CIW Yard: drainage remediation and potential lagoon upgrade lack sizing and treatment plant connections not shown.

TT Commentary

Following public consultation on the draft Remediation Strategy, which is an outline of proposed remediation solutions for the site, it is recognised that further detailed design work is planned. TT will consider during any future design phases of the remediation strategy.

Detailed ecological and technical design work will be developed during Stage 3; at that stage outstanding survey requirements, mitigation and management measures will be scoped and delivered as appropriate.

TT completed topographical surveys in 2021 and again in 2022/2023, which follows the preliminary FRA in 2021, therefore an update is necessary.

The implications of climate change and any required in-combination assessments will be addressed through the Flood Risk Assessment (FRA) update in line with PPS15. This updated will consider relevant climate change scenarios and any combined effects with other project impacts as part of the Stage 3 assessment work.

2.1.8 Waste Characterisation and Classification

AECOM provided comments with regards to waste characterisation and classification including differences of waste volumes noted in different reports. The previous WYG PRA report identifies approximately 2,300,000m3 of waste material throughout the site, though the remediation strategy appears to identify only circa 1,300,000m3 of material.

Furthermore, AECOM mention the strategy should include a detailed characterization and classification of the waste present in each zone. This involves identifying the types and volumes of waste, including industrial waste, inert reworked waste, municipal waste, and construction and demolition (C&D) waste.

TT Commentary

TT acknowledges the points raised and consider that various reports have been completed over several years therefore it is possible that there may be differences in terms of the waste volume estimates provided. The relevant reports can be updated to remove any inconsistencies. With regards to detailed characterisation there are a number of assumptions and detail potentially contained in other documents that were prepared by TT outside of the remediation commission, a list of all documents are available from the project website : Mobuoy Road waste project documents | Department of Agriculture, Environment and Rural Affairs

2.1.9 Remediation Options Appraisal

AECOM provided a review of the TT Remediation Options Appraisal (dated March 2023) and identified the following key points:

- Scoring tables not attached to report.
- Inconsistencies between the individual zone tables (sections 7.1.2.1 to 7.1.2.9).
- Justification for use of the lower scoring technology does not appear to have been provided in the ROA report, i.e. the use of passive leachate management via engineered wetlands is proposed in zone 9.
- Sensitivity analysis for volume changes, costs, and risks in options scoring was not performed.

TT Commentary

Following public consultation on the draft Remediation Strategy, which is an outline of proposed remediation solutions for the site, it is recognised that further detailed design work is planned. TT will consider during any future design phases of the remediation strategy.

2.1.10 Detailed Design for Engineering Elements

AECOM provided comment on detailed design for engineering elements and stated that the remediation strategy lacks significant detail in the design for engineering elements such as drainage, leachate, and gas management infrastructure. This includes specifics like sizing, volumes, treatment processes, and gas flaring.

AECOM also mentioned it was not clear at this stage if the most up to date scheme for the A6 has been accounted for in the design.

TT Commentary

Following public consultation on the draft Remediation Strategy, which is an outline of proposed remediation solutions for the site, it is recognised that further detailed design work is planned. TT will consider during any future design phases of the remediation strategy. There has been a significant amount of work and collaboration taken place to date and there will be continued engagement with A6 team.

2.1.11 Remedial Targets and Performance Criteria

AECOM provided a review of the remedial targets and performance criteria within the draft Remediation Strategy and commented that the strategy needs clearly set-out remedial targets, performance criteria, and criteria for validating the remedial action. This includes a detailed validation and verification plan, including a long-term monitoring plan.

TT Commentary

Following public consultation on the draft Remediation Strategy, which is an outline of proposed remediation solutions for the site, it is recognised that further detailed design work is planned. TT will consider during any future design phases of the remediation strategy.

2.1.12 Remediation Implementation

From AECOMs review of the draft Remediation Strategy, they highlighted key points in regard to the remediation implementation as provided below:

- The strategy should include measures to prevent pollution during the remediation works. This involves adhering to relevant guidance documents and pollution prevention guidelines;
- Unclear why remediation strategy prepared at this stage given data gaps; likely for early stakeholder consultation but this is not stated;

- Post-remediation end-use (Public Open Space (POS) and A6 Roads Scheme) not clearly integrated into engineering and zone layouts (notably for open water areas and bioactive cap design where public contact with leachate could occur);
- Materials Management Plan (MMP) proposed per DOW COP to manage material movement across site zones; DOW COP not strictly applicable in Northern Ireland. Application to landfilled materials will need close regulator engagement (particularly for reworking materials from CIW/CSG deposit areas);
- Environmental controls (flooding, ecology, H&S) are summarised and appear to cover key risks, but monitoring/implementation detail (noise, dust, etc.) by control area is lacking;
- Design must consider how the cap affects gas regime; this risk is noted but not quantified;
- Earthworks - Uncertainty in volumes and material types due to potential unknown ground conditions between investigation/survey points; risks may only appear once earthworks start;
- Earthworks - Uncertainty whether materials are suitable for on-site retention/reuse, require off-site processing prior to disposal, or must be replaced with imported materials; decision logic not demonstrated;
- Interaction between capping and leachate drainage systems needs clearer integration;
- Earthworks - Use of waste or reworked in-situ materials (including manufactured soils) flagged as potentially sustainable but requires further detailed risk evaluation at design stage;
- Earthworks quantities based on dated/topographic survey data (2010 topo, 2017 UAV) while further landfilling and site changes may have occurred. UAV-derived levels can be inaccurate where vegetation/structures exist; and
- The strategy should outline the specific remediation methods for each zone and further details of specific remediation methods is needed. In draft Remediation Strategy construction of an environmental cap is not sustainable in zone 5 & 6 and reasons for this change of remedial approach should be provided.

TT Commentary

TT acknowledges the point raised and recommends further detail will be required in respect of pollution controls. These will have to be developed in Stage 3 and incorporated into a CEMP or similar management plan.

Following public consultation on the draft Remediation Strategy, which is an outline of proposed remediation solutions for the site, it is recognised that further detailed design work is planned. TT will consider the majority of points, including additional consideration of gas regime post remediation during any future phases of the project.

The publication of the draft Remediation Strategy at these early stages are to allow engagement of stakeholders early on the process.

2.1.13 Monitored Natural Attenuation (MNA)

From AECOMs review of the draft Remediation Strategy, they highlighted key points in regard to the MNA as a remedial option. They state that the strategy should include a detailed plan for MNA, including screening, demonstration, assessment, and implementation phases. MNA principles referenced in draft Remediation

Strategy but site-specific MNA method, compliance/performance criteria, monitoring method and action plans are deferred to the Implementation Plan rather than included for affected zones (e.g., groundwater downgradient of CIW/CSG).

TT Commentary

It is recognised that the published draft Remediation Strategy pre-dates some of the groundwater quality monitoring that has been carried out by NIEA to support MNA at the site. A review of groundwater quality and monitoring data collected at the site is planned and will be considered.

2.1.14 Implementation Monitoring and Long-Term Monitoring

AECOM provided comment on draft Remediation Strategy in relation to implementation Monitoring and Long-Term Monitoring. They stated the strategy should outline the performance monitoring requirements, including groundwater monitoring, soil and ground gas sampling, and continuation of the NIEA quarterly monitoring.

AECOM also commented that groundwater monitoring objectives set (performance monitoring, continuation of quarterly monitoring, long-term monitoring) but performance criteria and action plans for breaches are not defined for receptors influenced by different zones (e.g., shallow aquifer, River Faughan tributary near lagoon, downstream abstraction).

TT Commentary

Following public consultation on the draft Remediation Strategy, which is an outline of proposed remediation solutions for the site, it is recognised that further detailed design work is planned. TT will consider during any future design phases of the remediation strategy.

2.1.15 Health and Safety

AECOM provided comment on draft Remediation Strategy stating that the strategy should ensure that the remediation works are conducted in accordance with relevant health and safety guidelines and regulations.

TT Commentary

Following public consultation on the draft Remediation Strategy, which is an outline of proposed remediation solutions for the site, it is recognised that further detailed design work is planned. TT will consider during any future design phases of the remediation strategy.

2.1.16 Public Exposure and Safety

AECOM provided comment on the draft Remediation Strategy in relation to public exposure and safety and mentions that the strategy should better outline how the proposed remediation addresses safety in the context of the proposed Public Open Space scenario. This includes measures for segregation, engineering controls, and ensuring that the public is not exposed to leachate or other contaminants. They mention that there is insufficient clarity on how the site's future use as Public Open Space will be safely accommodated.

TT Commentary

Following public consultation on the draft Remediation Strategy, which is an outline of proposed remediation solutions for the site, it is recognised that further detailed design work is planned. TT will consider during any future design phases of the remediation strategy.

2.1.17 Verification Plan

AECOM provided comment on draft Remediation Strategy and stated that the strategy should include a verification plan that sets out the methods of verification, performance criteria, lines of evidence, and action plans for addressing any breaches of performance criteria.

TT Commentary

Following public consultation on the draft Remediation Strategy, which is an outline of proposed remediation solutions for the site, it is recognised that further detailed design work is planned. TT will consider during any future design phases of the remediation strategy.

2.1.18 Permitting

AECOM provided comment on the draft Remediation Strategy relevant to permitting, recommending that the requirement for permitting (and statutory approvals) is fully determined as part of the next phases of design development.

TT Commentary

TT indicated within the draft Remediation Strategy that details of works required to ensure compliance with permitting was not included at the time of writing the report due to the early stages of design and can only be ascertained upon completion of the detailed design and specifications, therefore the permitting will be considered during future design phases of the remediation strategy.

2.2 FURTHER RECOMMENDATIONS

From review of AECOMs comments on the draft Remediation Strategy TT recommends the following actions be scoped and delivered as part of Stage 3 (detailed design) to address the data gaps, increase transparency, assure LCRM compliance and reduce uncertainty in the remediation strategy:

1. **Contemporary data review**

   Undertake a comprehensive review of all environmental data acquired since the October 2022 DQRA, including, but not limited to a review of asbestos screening across all stages of investigation completed on site.

2. **UXO Assessment**

   Recommend completion of an up-to-date UXO assessment to ensure documentation of UXO risks have been considered and provided for the site as a whole.

3. **DQRA update and sensitivity analysis**

   Consider an update to the DQRA where necessary and undertake a formal sensitivity analysis. The update should demonstrate how historical and recent datasets have been integrated, test key modelling inputs (hydraulic conductivity, gradients, attenuation factors, contaminant selection including iron and manganese and emerging pollutants such as PFAS), and quantify uncertainty and its effect on remedial target setting and preferred options.

4. **Monitoring borehole and abstraction review**

   Update register of all on site and nearby boreholes and abstractions, including status (active, disused, decommissioned). Where uncertainties remain, undertake targeted checks or reinstatement surveys (if required).

5. **Emerging pollutant screening**

   Consider a review of emerging pollutants including PFAS results to date and undertaking a risk assessment for the site.

6. **Ground gas and vapour assessment**

   Consider further gas and vapour risk assessment, including review of previous gas modelling inputs and assumptions, performance of sensitivity analyses, reconciliation of reported bulk and methane concentrations. Consider undertaking a site wide vapour risk assessment where hydrocarbons or VOCs are present or likely to affect receptors. Ensure scenarios reflect the intended end uses (Public Open Space and A6 scheme interfaces) and relevant guidance such as BS 8485 where applicable.

7. **Flood Risk Assessment**

   Update the FRA in line with PPS15 and Stage 3 design information including most recent topographic data. Consider appropriate climate change allowances and in combination effects (including the A6 scheme), provide flood defence and exclusion zone mapping on layout drawings, and include sizing and assessment of proposed SuDS, ponds, culverts, and embankments for each zone.

8. **Ecological Assessment**

   Consider scope and deliver a full Ecological Impact Assessment where required, targeted species and invertebrate surveys, extended aquatic and invasive species surveys including the large northwest lake, and quantification and mapping of habitat extent and loss including Priority Habitats. Consider provision of an Ecological Management Plan and appoint an Ecological Clerk of Works to oversee preconstruction update surveys, mitigation implementation, and monitoring.

9. **Materials management**

   Consider undertaking zone by zone waste characterisation and classification to reconcile differing volume estimates and determine suitability for on-site reuse, reprocessing or off-site disposal. Use these data to finalise a Materials Management Plan to inform sustainable earthworks strategies.

10. **Remediation options sensitivity and justification**

Consider revisit the Remediation Options Appraisal to attach scoring tables, reconcile inconsistencies between zone tables, provide justification for lower scoring or passive technologies, and run sensitivity testing for volume, cost, and risk assumptions to ensure robust option selection.

11. **Engineering design detailing**

    Further development of detailed designs for drainage, leachate management, gas control, capping, and earthworks during Stage 3. These should include sizing, volumes, treatment processes, integration between capping and drainage and gas regimes, and clarity on interfaces with the A6 scheme.

12. **MNA scoping and performance criteria**

    Recommend where Monitored Natural Attenuation is proposed for any zones, prepare a detailed MNA method statement and demonstration plan including screening, performance criteria, monitoring regime and contingency and trigger action plans.

13. **Health and safety**

    Ensure Health and Safety and pollution prevention controls are fully specified within the Stage 3 documentations including Construction Environmental Management Plan and risk assessment and method statements.

14. **Verification and long-term monitoring**

    Recommend preparing a Verification Plan and a Long-Term Monitoring and Maintenance Plan that define verification lines of evidence, performance criteria, monitoring frequencies, reporting protocols and action plans for breaches, including responsibilities and handover arrangements.

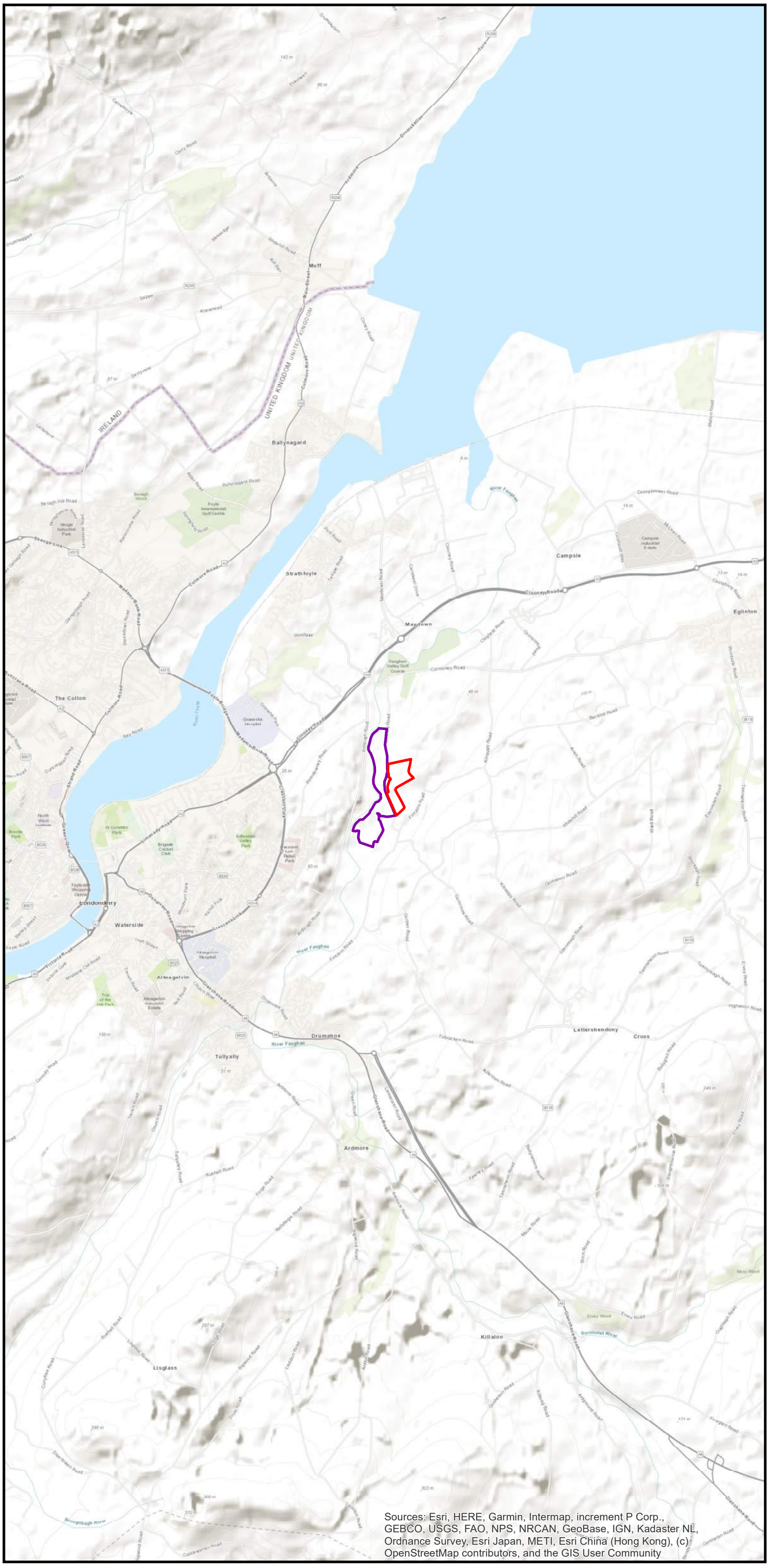
15. **Permitting**

    Recommend determining statutory consents and permitting requirements including any licensing implications and engage with regulators early. Document the permitting pathway, responsibilities, and timing as part of the Stage 3 programme.

It is recommended that in order to undertake the further recommendations listed above a staged work programme should be prepared that prioritises actions to reduce the most significant uncertainties ahead of detailed design (for example targeted investigations, ecological surveys, DQRA updates), identifies responsibility for delivery, and sets target dates for completion to ensure outputs are available to inform Stage 3 design and subsequent draft Remediation Strategy revisions.

FIGURE 1: SITE LOCATION PLAN

Figure 1. Site Location Plan



N

Legend

- City Industrial Waste
- Campsie Sand Gravel

Note:

Drawn by: [redacted]

Checked by: [redacted]

Office: Belfast Revision: No.1

Client: NIEA Project: B030252 - Mobuoy Road Remediation

0 850 1,700 3,400 Meters

Date: 30/06/2022

Locksley Business Park
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BT6 9UP
Tel: 028 9070 6000
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APPENDIX A: REPORT CONDITIONS

REPORT CONDITIONS

This report is produced solely for the benefit of ***NIEA,*** and no liability is accepted for any reliance placed on it by any other party unless specifically agreed in writing otherwise.

This report is prepared for the proposed uses stated in the report and should not be used in a different context without reference to Tetra Tech. In time improved practices, fresh information or amended legislation may necessitate a re-assessment. Opinions and information provided in this report are on the basis of Tetra Tech using due skill and care in the preparation of the report.

This report refers, within the limitations stated, to the environment of the site in the context of the surrounding area at the time of the inspections. Environmental conditions can vary, and no warranty is given as to the possibility of changes in the environment of the site and surrounding area at differing times.

This report is limited to those aspects reported on, within the scope and limits agreed with the client under our appointment. It is necessarily restricted, and no liability is accepted for any other aspect. It is based on the information sources indicated in the report. Some of the opinions are based on unconfirmed data and information and are presented as the best obtained within the scope for this report.

Reliance has been placed on the documents and information supplied to Tetra Tech by others but no independent verification of these has been made and no warranty is given on them. No liability is accepted, or warranty given in relation to the performance, reliability, standing etc of any products, services, organisations, or companies referred to in this report.

Whilst skill and care have been used, no investigative method can eliminate the possibility of obtaining partially imprecise, incomplete, or not fully representative information. Any monitoring or survey work undertaken as part of the commission will have been subject to limitations, including for example timescale, seasonal and weather-related conditions.

Although care is taken to select monitoring and survey periods that are typical of the environmental conditions being measured, within the overall reporting programme constraints, measured conditions may not be fully representative of the actual conditions. Any predictive or modelling work, undertaken as part of the commission will be subject to limitations including the representativeness of data used by the model and the assumptions inherent within the approach used. Actual environmental conditions are typically more complex and variable than the investigative, predictive, and modelling approaches indicate in practice, and the output of such approaches cannot be relied upon as a comprehensive or accurate indicator of future conditions.

The potential influence of our assessment and report on other aspects of any development or future planning requires evaluation by other involved parties.

The performance of environmental protection measures and of buildings and other structures in relation to acoustics, vibration, noise mitigation and other environmental issues is influenced to a large extent by the degree to which the relevant environmental considerations are incorporated into the final design and specifications and the quality of workmanship and compliance with the specifications on site during construction. Tetra Tech accepts no liability for issues with performance arising from such factors.

APPENDIX B: CONSULTATION RESPONSE SCREENING TABLE

Stage	Theme	Description	Main Issues Identified in Consultation Response	Update to dRS Required ?	Action Required?	Detail of further action / justification for no further action
1: Risk Assessment	Preliminary Risk Assessment - WYG Preliminary Risk Assessment (July 2016)	Rationale and design principles of the preliminary ground investigation not provided within WYG Preliminary Risk Assessment (July 2016)	Without this discussion on the design principles of the preliminary ground investigation it does not appear to be clear whether all potential sources and potential contaminant linkages have been addressed sufficiently	No	No	Will be considered during future design phases of the remediation strategy and subject to further detailed assessment.
		Limited assessment/interpretation of contaminant results; only a few analytes discussed while PAHs, hydrocarbons, VOCs, SVOCs are largely tabulated without commentary.	Incomplete data interpretation — key contaminants and trends not analysed.	No	No	Historical assessment, superseded by more recent reporting
		Unknown status of two on-site groundwater abstractions/boreholes.	Potential unassessed pathway to bedrock/aquifer.	No	Yes	Undertake contemporary assessment of on/offsite boreholes
		Asbestos referenced elsewhere but omitted from the PRA.	Incomplete contaminant screening (should be included).	No	No	Review of asbestos screening across all stages of investigation
	Generic Quantitative Risk Assessment (included within TT DQRA)	The current assessment lacks a comprehensive GQRA that considers all available data. While the Detailed Quantitative Risk Assessment (DQRA) has generally considered the full data set, the rationale for this omission is not fully explained.	Lacks a comprehensive GQRA. rationale for this omission is not fully explained. However mitigated by consideration within DQRA	No	No	mitigated by consideration within DQRA
		the GQRA presented within the DQRA does not appear to comment on previous Sirius / WYG data or present findings on concentration trends across the datasets	previous datasets and temporal trends may not have been integrated, weakening the robustness of source-zone definitions and risk conclusions.	No	Yes	Assessment of data trends to be reviewed
	Sirius DQRA	Key data, scope and modelling transparency gaps in the DQRA — several WYG-identified source zones appear omitted or unjustified; the GQRA lacks spatial detail, location-by-location exceedance magnitudes and clear contaminant selection for DQRA; hydraulic conductivity inputs exclude unexplained extremes and lack sufficient site characterisation; groundwater receptors are omitted without adequate justification; the Water Balance Model's derivation of Remedial Target Criteria is not shown and model averaging may mask localized hotspots — collectively these omissions and limited transparency undermine confidence in the DQRA conclusions and should be resolved before finalising remedial decisions.	data, scope and modelling transparency gaps undermine confidence in the DQRA conclusions.	No	No	Will be considered during future design phases of the remediation strategy and subject to further detailed assessment.
	Tetra Tech Risk Assessment Review & Site Investigation Scope (September 2021)	unclear whether the consideration of all available (at the time) laboratory data has been undertaken in the preparation of the scope of additional works.	proposed scope may not address existing data gaps or reflect the full dataset.	No	No	Considered mitigated by phased investigation
	Tetra Tech Updated DQRA (October 2022)	TT's DQRA does not clearly explain how historical data (from WYG or Sirius) were integrated.		No	Yes	Consider updating DQRA, undertaking sensitivity analysis or ensure further modelling undertaken ahead of Stage 3
		Drinking water receptors not explicitly assessed against UK Drinking Water Standards (DWS); reliance on EQS for River Faughan without clear justification.	Potentially incomplete controlled-waters receptor assessment. Shallow aquifer and downstream abstraction (Cloghole) may not be adequately considered numerically against DWS.	No	Yes	Initial review of EQS vs DWS, outcome will determine next steps
		Recommendation for further investigation northeast/northwest of CIW (potential waste areas) not clearly carried through into report conclusions or DORS.	Unclear status of recommended additional investigations — outstanding data gaps may remain unaddressed.	No	Yes	Review GI assessed northeast/northwest of CIW
		PFAS sampling/assessment is not discussed in the TT risk assessments despite PFAS being monitored by NIEA.	Emerging contaminant omission. PFAS monitoring to be reviewed.	No	Yes	Review of emerging pollutants to be undertaken,
		TT excluded potential pathway between CIW lagoon and tributary without presenting the supporting lines of evidence used to justify exclusion.	Pathway exclusion insufficiently justified and may overlook a plausible contaminant linkage.	No	Yes	NIEA to provide response
		ConSim RTM and water-balance model inputs (hydraulic conductivity/gradient) rely on older Sirius values; comparability with TT 2022 data and appropriateness for site-scale modelling not demonstrated.	Model input uncertainty / inconsistent application of recommendations — reliance on legacy parameters without clear validation reduces confidence in model outputs.	No	No	Will be considered during future design phases of the remediation strategy and subject to further detailed assessment.
		TT noted data may be unsuitable for site-scale use yet appear to use the same hydraulic conductivity values anyway.	Contradiction between TT's stated data limitations and modelling choices.	No	Yes	Consider updating DQRA, undertaking sensitivity analysis or ensure further modelling undertaken ahead of Stage 3
		Water balance modelling methodology not provided with the report.	Prevents full peer review of methodology and outputs.	No	Yes	Consider updating DQRA, undertaking sensitivity analysis or ensure further modelling undertaken ahead of Stage 3
		Iron and manganese frequently exceed assessment criteria but were not included in modelling or used to derive SSAC/RTC; rationale (background vs waste input) not clearly explained.	Exclusion of frequently-exceeding contaminants from modelling, may underestimate risks or misinform target setting.	No	Yes	Consider updating DQRA, undertaking sensitivity analysis or ensure further modelling undertaken ahead of Stage 3
		Attenuation-based back-calculated soil / leachate targets (from ConSim Level 3a -> Level 1/2) are referenced but not presented in the report body.	Missing presentation of derived targets , reduces transparency of target-setting and hinders review of protective endpoints.	No	Yes	Consider updating DQRA, undertaking sensitivity analysis or ensure further modelling undertaken ahead of Stage 3
		justification and rationale of the various investigations undertaken should have been described in more detail.	justification and rationale of the various investigations undertaken should have been described in more detail.	No	No	Will be considered during future design phases of the remediation strategy and subject to further detailed assessment.
		The assessment of risks associated with controlled waters does not fully address the potential risks to groundwater abstractions intended for human consumption (drinking water). This omission needs to be justified or rectified.	Rationale for omission of risks associated with potential groundwater abstractions for human consumption	No	Yes	Consider updating DQRA, undertaking sensitivity analysis or ensure further modelling undertaken ahead of Stage 3
		WYG Gas Risk Assessment (May 2016) TDL survey reported but results (survey area, max concentrations, elevated locations) not provided.	Missing TDL lines of evidence — weakens verification of emission rates/permeability and leaves conclusions open to challenge.	No	No	

Stage	Theme	Description	Main Issues Identified in Consultation Response	Update to dRS Required ?	Action Required?	Detail of further action / justification for no further action
	WYG Gas Risk Assessment (May 2016) Review	WYG Gas Risk Assessment (May 2016) Only three boreholes sampled for gas/vapour with no justification and no supporting PID/VOC borehole monitoring despite known hydrocarbons/VOCs in leachate.	Insufficient vapour sampling/lines of evidence — potential vapour risks not adequately assessed.	No	No	Overall, the ground gas risk assessment is considered to be a reasonable assessment in comparison to typical practice guidance and presents a reasonably comprehensive assessment of potential gas risk at the site.
		WYG Gas Risk Assessment (May 2016) Use of CIRIA C665 GSVs/Characteristic Situations (building-based approach) is not clearly applicable to an active landfill with no built development; worker/trespasser criteria (HSE/LFTGN03/Mines Regs) may be more relevant.	Unclear/inappropriate applicability of assessment criteria — may misrepresent risk to actual site users.	No	No	
		WYG Gas Risk Assessment (May 2016) Atmospheric pressure variation not assessed in analysis of monitoring results.	Omission of pressure effects — may affect interpretation of gas migration/emission rates.	No	No	
		WYG Gas Risk Assessment (May 2016) Model waste composition inputs (triangular distribution inert/domestic/industrial) based on experience rather than site-specific data; no justification or conservative basis shown.	Poorly justified model inputs — potentially significant impact on model outputs.	No	No	
		WYG Gas Risk Assessment (May 2016) No sensitivity analysis performed on empirical gas models.	Missing sensitivity analysis — model uncertainties not quantified; weakens confidence in model conclusions.	No	No	
		WYG Gas Risk Assessment (May 2016) Numerical/reporting inconsistencies in model outputs (e.g., component sums not matching bulk gas; reported >100% v/v methane).	Reporting/math inconsistencies — require clarification to confirm they do not affect conclusions.	No	No	
		WYG Gas Risk Assessment (May 2016) Model aims to assess off-site receptor risk but lacks empirical receptor data for validation.	Limited model validation for off-site receptors — reliance on unverified model outputs.	No	No	
	Tetra Tech Updated Gas Risk Assessment (September 2022)	The assessment of risks associated with ground gas is limited. The scenarios considered might not accurately reflect the planned end use of the site, potentially considering inappropriate receptor scenarios (human health). Additionally, risks associated with vapours have not been fully investigated.	Assessment of ground gas risk is limited and may not accurately reflect planned end uses	No	Yes	Additional consideration of gas regime post remediation
			Comprehensive investigation of vapour risks not included	No	No	Will be considered during future design phases of the remediation strategy and subject to further detailed assessment. And knowledge of end uses
		The proportions of waste have been assumed based on experience of waste inputs with a large proportion of inert waste which will not generate gas	further justification needed	No	No	Will be considered during future design phases of the remediation strategy and subject to further detailed assessment. And knowledge of end uses
		absence of sensitivity analysis of the modelling is questionable, as sensitivity analysis forms a key component of deterministic modelling approaches.	sensitivity analysis may be required	No	No	Will be considered during future design phases of the remediation strategy and subject to further detailed assessment. And knowledge of end uses
		inconsistencies with the reported values in terms of bulk gas concentrations and methane volume concentrations which appear to be outside of the specified / theoretical ranges	gas data inconsistencies	No	No	Will be considered during future design phases of the remediation strategy and subject to further detailed assessment. And knowledge of end uses
		Assessment does not consider BS 8485:2015 trigger concentrations nor justify why they are not applicable given the site is unlikely to have built development.	Lack of justification for omission of BS 8485 triggers — weakens clarity of assessment basis.	No	No	Will be considered during future design phases of the remediation strategy and subject to further detailed assessment. And knowledge of end uses
		use of GSVs and CIRIA characteristic situations may not represent risks to an active landfill with non-building receptors.	Potentially inappropriate assessment framework — may mischaracterise risk to workers/trespassers; alternative criteria may be needed.	No	No	Will be considered during future design phases of the remediation strategy and subject to further detailed assessment. And knowledge of end uses
		Vapour risk assessment is not included or is limited despite site evidence of hydrocarbons/VOCs in leachate and groundwater.	Insufficient vapour assessment — potential vapour risks may be under-assessed and require additional lines of evidence.	No	No	Will be considered during future design phases of the remediation strategy and subject to further detailed assessment. And knowledge of end uses
2.0 Options Appraisal	Options appraisal	scoring tables not attached to report	reviewer not provided scoring tables	No	No	For Comment
		inconsistencies between the individual zone tables (Sections 7.1.2.1 to 7.1.2.9)	cause of these discrepancies is unclear	No	No	Will be considered during future design phases of the remediation strategy and subject to further detailed assessment.
		justification for use of the lower scoring technology does not appear to have been provided in the ROA report, i.e. the use of passive leachate management via engineered wetlands is proposed in zone 9	no justification for use of the lower scoring technology in zone 9	No	No	Will be considered during future design phases of the remediation strategy and subject to further detailed assessment.
		Sensitivity analysis for volume changes, costs, and risks in options scoring was not performed.		No	No	Will be considered during future design phases of the remediation strategy and subject to further detailed assessment.

Stage	Theme	Description	Main Issues Identified in Consultation Response	Update to dRS Required ?	Action Required?	Detail of further action / justification for no further action
	Detailed Design for Engineering Elements	The remediation strategy lacks significant detail in the design for engineering elements such as drainage, leachate, and gas management infrastructure. This includes specifics like sizing, volumes, treatment processes, and gas flaring.	Lack of significant detailed designs of engineering elements in remedial strategy	No	No	Will be considered during future design phases of the remediation strategy and subject to further detailed assessment.
		It is not clear at this stage if the most up to date scheme for the A6 has been accounted for in the design.	Consider engineering elements and possible clashes in relation to earthworks (cut/fill areas), drainage, capping and other infrastructure for the construction phase, as well as the operational phase of both schemes.	No	No	Will be considered during future design phases of the remediation strategy and subject to further detailed assessment. Continued engagement with A6 team
			Timing of construction of the two schemes will also be a factor to consider.	No	No	Will be considered during future design phases of the remediation strategy and subject to further detailed assessment. Continued engagement with A6 team
	Remedial Targets and Performance Criteria	The strategy needs clearly set-out remedial targets, performance criteria, and criteria for validating the remedial action. This includes a detailed validation and verification plan, including a long-term monitoring plan.	Detailed validation plan required setting out clear remedial targets, performance criteria and criteria for validating the remedial action	No	No	Will be considered during future design phases of the remediation strategy and subject to further detailed assessment.
			Long term monitoring plan required	No	No	Will be considered during future design phases of the remediation strategy and subject to further detailed assessment.
	Waste Characterisation and Classification	The previous WYG PRA report identifies approximately 2,300,000m3 of waste material throughout the site, though the remediation strategy appears to identify only circa 1,300,000m3 of material	confirm and justify the waste volumes differences between reports.	No	No	Updated FAQ undertaken
		The strategy should include a detailed characterization and classification of the waste present in each zone. This involves identifying the types and volumes of waste, including industrial waste, inert reworked waste, municipal waste, and construction and demolition (C&D) waste.	detailed characterization and classification of the waste present in each zone not provided	No	No	Updated FAQ undertaken
	Ecology and Habitat Protection	The strategy must consider the ecological impacts of the remediation works. This includes conducting further ecological assessments, implementing a habitat regulation assessment, and appointing an Ecological Clerk of Works (ECoW) to advise on ecological implications.	Lack of ecological impact assessment	No	No	Will be considered during future design phases of the remediation strategy and subject to further detailed assessment.
			Further ecological assessments required	No	No	Will be considered during future design phases of the remediation strategy and subject to further detailed assessment.
			Ecological management plan required	No	No	Will be considered during future design phases of the remediation strategy and subject to further detailed assessment.
			Ecological clerk of works to be appointed	No	No	Will be considered during future design phases of the remediation strategy and subject to further detailed assessment.
		Ecological Value (Ecological Impact Assessment) not available, so mitigation scale may be under- or over-estimated.	Lack of EIA baseline — uncertainty in required mitigation/compensation.	No	No	Will be considered during future design phases of the remediation strategy and subject to further detailed
		Limited scope for aquatic species; aquatic invasive species present in large NW lake but aquatic assessment limited.	Incomplete aquatic species assessment — potential risks to/in from invasive species not fully addressed.	No	No	Will be considered during future design phases of the remediation strategy and subject to further detailed assessment.
		Potential habitats for additional protected/priority species (e.g., red squirrel, pine marten, hedgehog, stoat) lack adequate survey and assessment.	Incomplete protected species survey coverage — possible overlooked receptors requiring mitigation.	No	No	Will be considered during future design phases of the remediation strategy and subject to further detailed assessment.

Stage	Theme	Description	Main Issues Identified in Consultation Response	Update to dRS Required ?	Action Required?	Detail of further action / justification for no further action
3: Remediation		No specific invertebrate surveys conducted despite likelihood of priority butterflies and other species being present.	Absence of invertebrate surveys — risk of missing priority species and underestimating ecological impacts.	No	No	Will be considered during future design phases of the remediation strategy and subject to further detailed assessment.
		No information on extent/location of habitat loss, including loss of Priority Habitats; Landscaping Plan is high level with limited detail.	Missing habitat-loss quantification and compensation strategy — cannot verify adequacy of proposed landscaping and enhancement.	No	No	Will be considered during future design phases of the remediation strategy and subject to further detailed assessment.
		Species protection plans (newt, otter, badger, invasive species) are referenced but not fully integrated into a single Ecological Management Plan / ECoW framework; pre-construction update surveys not consistently proposed.	Lack of consolidated Ecological Management Plan and consistent update survey requirements — weakens delivery and supervision of mitigation.	No	No	Will be considered during future design phases of the remediation strategy and subject to further detailed assessment.
	Flood Risk and Drainage Management	Given the site's location within the River Faughan flood plain, a flood risk assessment in line with PPS15 is required. The remediation works should be designed to be resilient to future flood events and sympathetic to flood plain functionality.	a flood risk assessment in line with PPS15 is required	No	No	Will be considered during future design phases of the remediation strategy and subject to further detailed assessment.
		Lack of detailed topographic information affect the flood risk assessments	future flood risk assessment will have to evaluate in combination effects of RS and A6 scheme	No	No	Will be considered during future design phases of the remediation strategy and subject to further detailed assessment.
		The pre-development impermeable area for the site is stated to be 4.68ha, but there is no explanation as to how this figure has been determined.	no explanation for how pre-development impermeable area for the site was determined	No	No	Will be considered during future design phases of the remediation strategy and subject to further detailed assessment.
			post-development impermeable area has been stated as being unknown, a subsequent amendment to the flood risk assessment will be required once this has been determined.	No	No	Will be considered during future design phases of the remediation strategy and subject to further detailed assessment.
		The flood defences are not shown on the indicative layout drawings, these should be highlighted, along with the exclusion zone.	flood defences not marked on indicative layout drawings	No	No	Will be considered during future design phases of the remediation strategy and subject to further detailed assessment.
		Climate change allowances not addressed for longer return periods (0% stated); no in-combination assessment with A6 scheme.	Inadequate climate change and in-combination assessment — may underestimate future flood risk.	No	Yes	Consider implications of climate change and in-combination assessment as part of FRA update
		Zone strategies (1–9 and CIW Yard) are conceptual with no sizing, modelling or flood impact assessment.	Zone drainage strategies unquantified — adequacy for attenuation and flood risk unknown.	No	No	Will be considered during future design phases of the remediation strategy and subject to further detailed assessment.
		Zones 1–3: pond backfill and capture drainage shown but no drainage sizing or flood mitigation; 30,000 m3 waterbody removal not addressed.	Pond removal and conveyance not quantified — risk to attenuation capacity and downstream impacts.	No	No	Will be considered during future design phases of the remediation strategy and subject to further detailed assessment.
		Zone 4: lagoon dewatering/decommissioning and culvert proposals unquantified.	Dewatering/culvert approach not specified — potential downstream impacts and design uncertainty.	No	No	Will be considered during future design phases of the remediation strategy and subject to further detailed assessment.
		Zones 5–8: proposed flood embankments, ditches and SuDS referenced but not shown or sized; inconsistent labelling on discharge routes.	Flood embankment/SuDS measures undefined and inconsistently presented — undermines flood protection and routing.	No	No	Will be considered during future design phases of the remediation strategy and subject to further detailed assessment.
		Zone 9: wetlands/SuDS shown but no sizing; not demonstrated these replace existing pond attenuation.	Unproven attenuation capacity — uncertainty over flood storage and treatment equivalence.	No	No	Will be considered during future design phases of the remediation strategy and subject to further detailed assessment.
		CIW Yard: drainage remediation and potential lagoon upgrade lack sizing and treatment plant connections not shown.	CIW drainage/treatment details missing — constructability and performance unclear.	No	No	Will be considered during future design phases of the remediation strategy and subject to further detailed assessment.
	Pollution Prevention	The strategy should include measures to prevent pollution during the remediation works. This involves adhering to relevant guidance documents and pollution prevention guidelines.	Identification of pollution prevention measures in RS	No	No	Will be considered during future design phases of the remediation strategy and subject to further detailed assessment.
		Unclear why remediation strategy prepared at this stage given data gaps; likely for early stakeholder consultation but this is not stated.	Purpose/timing not clarified of DORS	No	Yes	DAERA to comment
			final assessments for the flood and drainage assessment, vision consultation, research still underway, bench trials still underway and remedial design not finalised	No	Yes	
		Post-remediation end-use (Public Open Space (POS) and A6 Roads Scheme) not clearly integrated into engineering and zone layouts (notably for open water areas and bioactive cap design where public contact with leachate could occur).	End-use/zonal design not fully considered. Exposure pathways for POS/users in affected zones (CIW/CSG/lagoon areas) not adequately addressed.	No	No	Will be considered during future design phases of the remediation strategy and subject to further detailed assessment.
		Materials Management Plan (MMP) proposed per DOW COP to manage material movement across site zones; DOW COP not strictly applicable in Northern Ireland. application to landfilled materials will need close regulator engagement (particularly for reworking materials from CIW/CSG deposit areas).	Regulatory alignment gap. MMP needs tailoring to NI waste exemptions and regulator sign-off for landfilled materials by zone. Could consider Construction Soil Passport Declaration Scheme.	No	No	Will be considered during future design phases of the remediation strategy and subject to further detailed assessment.
		Environmental controls (flooding, ecology, H&S) are summarised and appear to cover key risks, but monitoring/implementation detail (noise, dust, etc.) by control area is lacking.	Insufficient control/monitoring detail by control area.	No	No	Will be considered during future design phases of the remediation strategy and subject to further detailed assessment.
		Design must consider how the cap affects gas regime; this risk is noted but not quantified.		No	Yes	Additional consideration of gas regime post remediation
		earthworks - Uncertainty in volumes and material types due to potential unknown ground conditions between investigation/survey points; risks may only appear once earthworks start.	Unquantified ground-condition risk — earthworks may encounter unexpected materials/volumes that affect scope, cost and method.	No	No	Will be considered during future design phases of the remediation strategy and subject to further detailed assessment.

Stage	Theme	Description	Main Issues Identified in Consultation Response	Update to dRS Required ?	Action Required?	Detail of further action / justification for no further action
	Remediation Implementation	earthworks - Uncertainty whether materials are suitable for on-site retention/reuse, require off-site processing prior to disposal, or must be replaced with imported materials; decision logic not demonstrated.	Undeveloped materials-management assumptions — sustainability, cost and technical efficacy of reuse/import options not justified.	No	No	Will be considered during future design phases of the remediation strategy and subject to further detailed assessment.
		Interaction between capping and leachate drainage systems needs clearer integration.		No	No	Will be considered during future design phases of the remediation strategy and subject to further detailed assessment.
		earthworks - Use of waste or reworked in-situ materials (including manufactured soils) flagged as potentially sustainable but requires further detailed risk evaluation at design stage.	Incomplete assessment of risks from reuse of wastes/manufactured soils — regulatory, contaminant and suitability checks pending.	No	No	Will be considered during future design phases of the remediation strategy and subject to further detailed assessment.
		Earthworks quantities based on dated/topographic survey data (2010 topo, 2017 UAV) while further landfilling and site changes may have occurred; UAV-derived levels can be inaccurate where vegetation/structures exist.	Potentially inaccurate quantity and level data — current surveys may under/over-estimate earthworks, material needs and design interfaces.	No	No	Update topographical surveys have been undertaken
		The strategy should outline the specific remediation methods for each zone. This includes:				
		Zones 1, 2, and 3: Construction of infrastructure, groundwater and leachate treatment, draining and backfilling of surface water ponds, re-profiling of the ground, and installation of a biologically active capping layer.	further details of specific remediation methods for zones	No	No	Will be considered during future design phases of the remediation strategy and subject to further detailed assessment.
		Zone 3 (Tarry Waste): Groundwater treatment, removal of heavily impacted soils, and stabilization of residual tarry wastes.	further details of specific remediation methods for zones	No	No	Will be considered during future design phases of the remediation strategy and subject to further detailed assessment.
		CIW Yard: Removal of buildings, upgrade of the concrete yard and drainage, and excavation of surface wastes.	further details of specific remediation methods for zones	No	No	Will be considered during future design phases of the remediation strategy and subject to further detailed assessment.
		Zone 4: Excavation and removal of waste materials, profiling of grounds for the A6 road scheme, and assessment of the lagoon.	further details of specific remediation methods for zones	No	No	Will be considered during future design phases of the remediation strategy and subject to further detailed assessment.
		Zones 5 and 6: Excavation of hydrocarbon-impacted hotspots, groundwater bioremediation, and installation of a biologically active capping layer.	in DORS construction of an environmental cap is not sustainable in zone 5&6 and reasons for this change of remedial approach should be provided.	No	No	Will be considered during future design phases of the remediation strategy and subject to further detailed
		Zones 7 and 8: Installation of a Permeable Reactive Barrier (PRB) to intercept the dissolved phase plume of contamination.	further details of specific remediation methods for zones	No	No	Will be considered during future design phases of the remediation strategy and subject to further detailed assessment.
		Zone 9: Construction of water balance management and an engineered wetland.	further details of specific remediation methods for zones	No	No	Will be considered during future design phases of the remediation strategy and subject to further detailed assessment.
	Monitored Natural Attenuation (MNA)	The strategy should include a detailed plan for MNA, including screening, demonstration, assessment, and implementation phases.	no detailed plan for MNA	No	Yes	MNA Review (ongoing)
		MNA principles referenced in DORS but site-specific MNA method, compliance/performance criteria, monitoring method and action plans are deferred to the Implementation Plan rather than included for affected zones (e.g., groundwater downgradient of CIW/CSG).	Missing MNA details in remediation strategy, not compliant with LCRM; site- and zone-specific MNA criteria are required at strategy stage.	No	Yes	MNA Review (ongoing)
	Implementation Monitoring and Long-Term Monitoring	The strategy should outline the performance monitoring requirements, including groundwater monitoring, soil and ground gas sampling, and continuation of the NIEA quarterly monitoring.	Monitoring objectives are set (performance, quarterly continuation, long-term) but performance criteria and action plans for breaches are not defined by zone or receptor	No	No	Will be considered during future design phases of the remediation strategy and subject to further detailed assessment.
		Groundwater monitoring objectives set (performance monitoring, continuation of quarterly monitoring, long-term monitoring) but performance criteria and action plans for breaches are not defined for receptors influenced by different zones (e.g., shallow aquifer, River Faughan tributary near lagoon, downstream abstraction).	Missing performance criteria/action triggers by zone, core LCRM requirement absent.	No	No	Will be considered during future design phases of the remediation strategy and subject to further detailed assessment.
	Health and Safety	The strategy should ensure that the remediation works are carried out in accordance with relevant health and safety guidelines and regulations.	Health & safety requirements are broadly referenced but lack site-specific implementation detail for works and contractor controls.	No	No	Noted
	Public Exposure and Safety:	The strategy should better outline how the proposed remediation addresses safety in the context of the proposed Public Open Space scenario. This includes measures for segregation, engineering controls, and ensuring that the public is not exposed to leachate or other contaminants.	The remediation strategy lacks clear, site-specific measures (segregation, engineering controls and exposure prevention) to ensure the proposed Public Open Space will protect the public from leachate and other contaminants.	No	No	Will be considered during future design phases of the remediation strategy and subject to further detailed assessment.
		insufficient clarity on how the site's future use as Public Open Space will be safely accommodated.	Detailed design of end use required	No	No	Will be considered during future design phases of the remediation strategy and subject to further detailed assessment.
	Verification Plan	The strategy should include a verification plan that sets out the methods of verification, performance criteria, lines of evidence, and action plans for addressing any breaches of performance criteria.	Verification requirements omitted from strategy — contrary to LCRM; site-specific verification criteria are required to confirm remediation success.	No	No	Will be considered during future design phases of the remediation strategy and subject to further detailed assessment.

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	Permitting	recommended that the requirement for permitting (and statutory approvals) is fully determined as part of the next phases of design development	further consideration to the permitting scheme	No	No	Will be considered during future design phases of the remediation strategy and subject to further detailed assessment.
			leachate management will have to consider the proposed land use and potential for members of the public and other receptors to come into contact with untreated leachate.	No	No	Will be considered during future design phases of the remediation strategy and subject to further detailed assessment.