A TETRA TECH COMPANY

Letterkenny Regional Sports Activity Hub

Volume III

Environmental Impact Assessment Report (EIAR) Technical Appendices

rpsgroup.com

OUTLINE CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN (OCEMP)

Letterkenny Sports Hub

Outline Construction Environmental Management Plan (oCEMP) Letterkenny Sports Hub
D01
June 2023

Environmental Protection Agency (EPA) Dedicated Low Call Number 0818 33 55 99

Quality Management

Version	Status	Authored by	Reviewed by	Approved by	Review date
D01	Final for EIAR	SM	Multi	RH	21.06.2023

Approval for issue

S.McAfee	*SMcA*	21 June 2023

Prepared by:

RPS

Prepared for:

Atlantic Technological Institute

Contents

Appendices

1 INTRODUCTION

1.1 Purpose of this Document

This document is an Outline Construction and Environmental Management Plan (OCEMP) and contains all the appropriate environmental mitigation and management techniques to help ensure no significant impacts are caused to the environment during the construction phase of the proposed development. It is a **'live'** document and may be updated as the project progresses. This OCEMP sets out the minimum requirements which will be adhered to during the construction phase of the proposed development.

1.2 The Proposed Development

The proposal is for the development of Letterkenny Regional Sports Activity Hub in Letterkenny, Co. Donegal, Ireland. The location of the proposed development site is shown in Figure 1.1 and the Proposed Site Plans are illustrated in Figure 1.2.

Details of the application are detailed below:

Location: The proposed development site is located 2km to the north of Letterkenny town centre, north of the N56 National Road, at a greenfield site at Carnamoggagh / Knocknamona.

Proposed Development: *proposed development of Letterkenny Regional Sports Activity Hub (LRSAH).*

1.2.1 Site Location

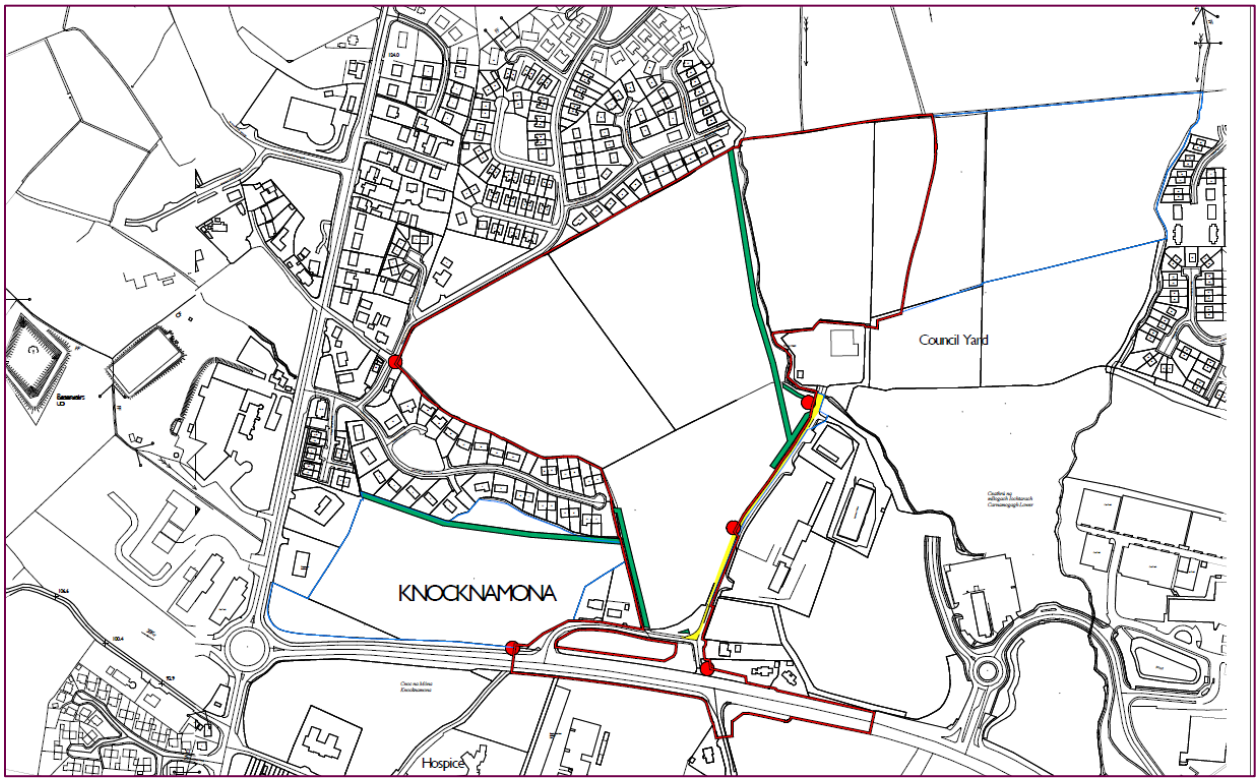


Figure 1.1: Proposed Development Site

The site of the proposed development is located in a mixed area of development to the north of Letterkenny Town, Co. Donegal, in northwest Ireland approximately 240 km northwest of Dublin. Letterkenny is the most populated town in Co. Donegal, ca. 19,274 residents (2016 Census). The site is located in the townlands of Knocknamona and Carnamogagh Lower.

The site is close to the Letterkenny hospital campus, IDA business park and a number of large industrial employers such as Pramerica and Optum. The site is located directly adjacent to the N56. There are three existing site entrances - two entrances from a local road linking the ESB depot and the DCC Civic Amenity site to the N56, and a third entrance off the local roadway serving the Ashfield residential development.

The western perimeter of the site is bound principally by residential estates which are accessed from the Kilmacrenan Road (N56). The southern/eastern boundary of the site adjoins the N56 to the south of the site (recently constructed distributor road), agricultural fields, an IDA premises and the council-run civic amenity centre. The north-western boundary bounds a residential development while the northern section perimeter bounds agricultural fields.

1.2.2 Site Plans

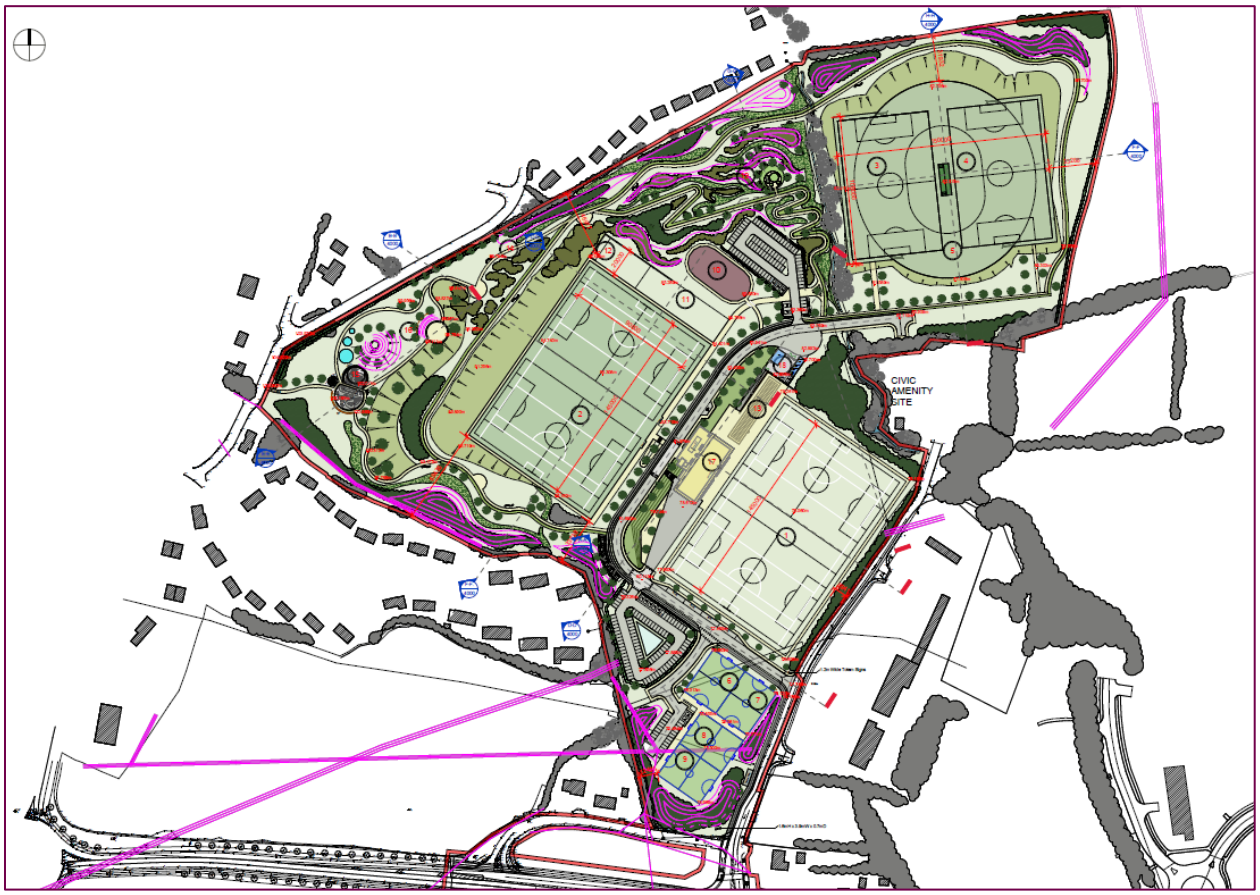


Figure 1.2: Proposed Site Plan

1.2.2.1 Key Components of the Proposed Development

It is proposed development will consist of the following.

The proposed development includes the provision of following facilities and elements:

a. Outdoor sports pitches as follows:

- 1 artificial grass GAA pitch (Pitch 1). Line markings permit rugby and 2 x cross-play soccer pitches.
- 1 Grass / Sand GAA competition pitch (Pitch 2). Line markings permit rugby and 2 cross-play soccer pitches.
- 2 natural grass soccer pitches with Cricket Creases (Pitch 3,4, 5)
- 4 synthetic 5-a-side soccer pitches (Pitches 6,7, 8, 9)

b. 1,000m^2 Indoor Sports Dome [Height = 10.8m] suitable for warm up, a range of sports and activities

c. Additional outdoor sports and recreation areas to include Training/Practice Area (25x80m), 5m high Hurling/Handball Wall, 6 Lane Athletic Sprint Track (50x7.5m) with PV panels to roof, walking / running trails / children's playpark and community garden.

d. 1,399m^2 pavilion building [Height = 11.2m] to accommodate changing facilities, office / reception, self-serve catering facility, storage and flexible space for community programmes.

e. Equipment Store and service compound.

f. Hard and soft landscaping to include biodiversity garden.

g. Vehicular and pedestrian access to include new junction from N56, internal access roads / footpath / cycleway and provision of 205 onsite vehicle parking spaces, 4 coach parking spaces and 120 cycle parking spaces. Additional pedestrian access point from Ashfield.

h. Closure of existing vehicular access from N56 to Knocknamona Crescent.

i. Ancillary infrastructure to include drainage, ESB substation, fencing and entrance gates, signage, retaining walls, floodlighting, netting and culverting watercourse at two locations to accommodate vehicle / pedestrian / cycle crossing.

The scope of the project also includes:

- Drainage
- Floodlighting to Pitches 1, 2, 6-9
- Fencing and netting to pitches 1, 2, 6-9
- Goal posts and ball stop netting.
- Tiered spectator viewing facilities to Pitches 1 and 2
- Site lighting
- Access roads, footpaths and cycleways
- Coach Parking
- Parking including disabled parking
- Creation of new 4 way junction at the N56
- Realignment of part of the site boundary with the adjoining local road to improve visibility
- Site preparation including:
  - cut and fill and soil importation to prepare sloping areas of site
  - ducting for undergrounding of overhead electrical services

2 DEFINING THE OCEMP

2.1 Purpose of the OCEMP

An OCEMP is a key tool for delivering environmental management during the construction phase. It sets out the mechanisms by which the various construction activities would be managed to comply with the relevant environmental legislation and best practice to minimise the impacts and effects on human receptors and environmental receptors.

It provides the framework for recording environmental risks and also defines the measures required to mitigate and monitor construction effects, including the mitigation measures set out in the associated supporting environmental documents and assessments. It also outlines provisions for auditing and reporting and sets out action to be taken to resolve any corrective actions arising during the course of construction. The purpose of the OCEMP is to:

1. Record environmental risks and identify how they would be managed during the construction period;
2. Provide a means of identifying environmental commitments, objectives and targets;
3. Provide a means of monitoring and reporting performance against the objectives and targets;
4. Provide a framework to ensure that all parties are aware of their responsibilities;
5. Establish a checklist of control procedures which can then be integrated into an overall environmental management protocol;
6. Describe how construction activities would be undertaken and managed in accordance with the obligations of environmental legislation and policy, and the requirements of environmental regulatory authorities;
7. Provide detailed environmental mitigation measures for reducing the potential for environmental impacts during pre-construction and construction;
8. Highlights that some activities may require consents or licences;
9. Act as a link and main document reference for environmental issues between the design, and construction stages; and,
10. Ensure the mitigation requirements of the associated environmental assessments (contained in supporting environmental documents for the planning application) are met.

The Appointed Contractor is required to develop and implement a CEMP to help ensure that construction activities are planned and managed in accordance with the environmental requirements. The contractor will use this OCEMP as the template for their own individual CEMP.

2.2 Scope of the OCEMP

The scope of the OCEMP covers all environmental effects related to the construction of the proposed development. The term 'construction' in the OCEMP includes all site preparation, earthworks, waste removal and related engineering and construction activities as authorised by the local authority and associated permissions. The OCEMP will document the Contractor's plans to ensure compliance with their legal and contractual obligations as well as implement best practice in construction environmental management. The OCEMP will be applicable to all works associated with the proposed development including those carried out by sub-contractors.

2.3 Status of the OCEMP

The status of the OCEMP is as follows:

1. This document comprises the OCEMP and has been prepared during the preliminary design and in parallel with submission of full planning application stage of the proposed development.
2. The OCEMP (and adopted version before onsite works i.e. CEMP) is a 'live' document that can be reviewed on a regular basis and updated where necessary to include the further requirements from the local authority.
3. The CEMP would identify any further mitigation methods and control measures to be agreed with key stakeholders, including the Environmental Protection Agency (EPA) and Donegal County Council and would be in place before construction begins.
4. During construction, the CEMP may be revised to take into account any modifications to the design, changes in external factors (for example, regulations or standards), any unforeseen circumstances, and any failings in environmental performance arising from routine inspections.
5. The provisions of the OCEMP would be incorporated into the contracts for construction of the proposed development. It would be a mandatory requirement for both the Principal Contractor and all subcontractors to comply with the OCEMP to ensure that best practice is implemented during construction and to safeguard the environment.
6. The requirements of the OCEMP do not remove or overwrite the legal duties, responsibilities or obligations of the Principal Contractor (and subcontractors) and other parties in accordance with the contract documents and legislation.
7. The CEMP is the mechanism for ensuring that the proposed development adopts relevant best practice management techniques for sustainable construction.

2.4 Structure of the OCEMP

The following appendices are included in the OCEMP:

- **Appendix A: Proposed Site Plan, Sections and Elevations**
- **Appendix B: Environmental Inspection Schedule**
- **Appendix C : Complaints Form**
- **Appendix D: Incident Report Form**
- **Appendix E: Site Waste Management Plan**
- **Appendix F: Construction Method Statement**
- **Appendix G: Pollution Prevention Plan**
- **Appendix H: Emergency Response & Environmental Plan**

3 ROLES AND RESPONSIBILITIES

3.1 Introduction

The Project Manager/Construction Manager would have overall responsibility for the construction of the proposed development. A full-time Environmental Manager would be responsible for developing and implementing the Final CEMP (and its various potential iterations as it is a **'live'** document) during construction.

Other members of the project team would be assigned specific roles to assist the Project Manager in the implementation of the Final CEMP and individual specialists would be appointed to provide expert advice. The key environmental roles and responsibilities are in the sections that follow.

The assigned environmental roles and responsibilities for the relevant project personnel are detailed in this section.

3.2 Construction Director

The Construction Director will have an overall responsibility for the organisation and execution of all related environmental activities as appropriate, in accordance with regulatory and project environmental requirements. The principal duties and responsibilities of this position will include:

1. Overall responsibility for the proposed development and implementation of the CEMP;
2. Allocating resources to ensure the implementation of the CEMP;
3. Participates in the management review of the CEMP for suitability, adequateness and effectiveness; and,
4. Sets the focus of environmental policy, objectives and targets for the Contractor.

3.3 Construction Manager/Site Manager

The Construction Manager/Site Manager is directly responsible to the Construction Director for the successful execution of the project. The principal duties and responsibilities of this position will include:

1. To report to the Construction Director on the on-going performance of the CEMP;
2. To discharge his/her responsibilities as outlined in the CEMP; and,
3. To support and augment the Environmental Officer through the provision of adequate resources and facilities in the implementation of the CEMP.

3.4 Environmental Officers

The Environmental Officer will be responsible for, but not limited to, the following activities:

1. Ensuring that the requirements of the CEMP are developed and environmental system elements (including procedures, method statements and work instructions) are implemented and adhered to with respect to environmental requirements;
2. Reviewing the environmental responsibilities of other managed Contractors in scoping their work and during contract execution;
3. To ensure that advice, guidance and instruction on all CEMP matters are provided to all their managers, employees, construction contractors and visitors on site;
4. Report to the Construction Manager on the environmental performance of Line Management, Supervisory Staff, Employees and Contractors;
5. Advise site management (including, but not limited to, the site Construction/Commissioning Manager) on environmental matters;

6. maintaining environmental records;
7. providing guidance for the site team in dealing with environmental matters, including legal and statutory requirements affecting the works;
8. reviewing environmental management content of method statements;
9. reporting environmental performance to the Site Manager;
10. liaison with statutory and non-statutory bodies and third parties with an environmental interest in the proposed development;
11. Monitoring and completing the waste register and ensuring the correct waste management procedures are implemented (An example Site Waste Management Plan (SWMP) is set out in **Appendix E**);
12. Implementing and maintaining environmental controls on site. (Refer to **Appendix B** Environmental Inspection Schedule and details of what is included in method statements are set out in **Appendix F**).
13. Attending to any spills or environmental incidents that may occur on site. (Refer to **Appendix G** Pollution Prevention Plan, **Appendix H** Emergency Response & Environmental Plan);
14. Undertake site environmental monitoring and walk overs (Refer to **Appendix B** Environmental Inspection Schedule);
15. Ensuring correct procedures are followed in the event of environmental incidents (Refer to **Appendix D** Incident Report Form and **Appendix H** Emergency Response & Environmental Plan).

3.5 Site Supervisors

Site Supervisors are required to:

1. Promote a Health & Safety culture on site, to read, understand and implement the CEMP;
2. Know the broad requirements of the relevant law in environmental matters and take whatever action is necessary to achieve compliance;
3. Ensure that environmental matters are taken into account when considering Contractors' construction methods and materials at all stages;
4. Be aware of any potential environmental risks relating to the site, plant or materials to be used on the premises and bring these to the notice of the appropriate management;
5. Ensure plant suggested is environmentally suited to the task in hand;
6. Co-ordinate environmental planning of all construction activities to comply with environmental authorities' requirements and with minimum risk to the environment. Give Contractors precise instructions as to their responsibility to ensure correct working methods where risk of environmental damage exists;
7. Where appropriate, ensure Contractors method statements include correct waste disposal methods;
8. Be aware of any potential environmental risks relating to the Contractors and bring these to the notice of the appropriate management; and,
9. Ensure materials/waste register is completed as appropriate.

3.6 Site Personnel

All Contractors, and other site personnel, on the project will adhere to the following principal duties and responsibilities:

1. To support and promote the Health & Safety culture on site.
2. To co-operate fully with the General Contractor and the Environmental Officer in the implementation and development of the CEMP at the site;
3. To conduct all their activities in a manner consistent with regulatory and best environmental practice;
4. To participate fully in the environmental training program and provide management with any necessary feedback to ensure effective environmental management at the site; and,
5. Adhere fully to the requirements of the site environmental rules.

3.7 Team Structure & Distribution List

All personnel working on the project will be responsible for the environmental control of their own work and will perform their duties in accordance with the requirements of the CEMP (as updated) and in compliance with the controls referenced therein.

A distribution list for the CEMP should be developed when all contact names and companies are known. The purpose of the distribution list is to establish communication channels that will enable more effective control of environmental-related issues. The distribution list should identify individuals and organizations that have received or will receive a copy of the construction stage CEMP for implementation.

Individuals of importance could include the developer, the environmental consultant, lead contractors, subcontractors, and any appointed environmental managers (or other identifiable titles for the persons in charge of implementing the contents of the construction stage CEMP).

The distribution list will be established prior to commencement of construction by the appointed contractor. Prior to commencement of construction, all roles and responsibilities should be confirmed in the CEMP as updated. Table 3.1 shows a template for project roles and responsibilities and can act as a template for the distribution list for the CEMP.

Table 3.1: Role, Company, Named Contact & Contact Details

Role	Company	Named Contact	Contact Details
Construction Director	Write name of company here	Write name of person here	Write phone number here
Construction Manager	Write name of company here	Write name of person here	Write phone number here
Environmental Officer	Write name of company here	Write name of person here	Write phone number here
Site Supervisors	Write name of company here	Write name of person here	Write phone number here
Site Personnel	Write name of company here	Write name of person here	Write phone number here
Health & Safety Representative (May be combined with Construction Manager role)	Write name of company here	Write name of person here	Write phone number here
Other specialists as required (e.g. geotechnical , drainage/civil engineer)	Write name of company here	Write name of person here	Write phone number here
Other specialists as required (e.g. geotechnical , drainage/civil engineer)	Write name of company here	Write name of person here	Write phone number here
Other specialists as required (e.g. geotechnical , drainage/civil engineer)	Write name of company here	Write name of person here	Write phone number here
Other specialists as required (e.g. geotechnical , drainage/civil engineer)	Write name of company here	Write name of person here	Write phone number here
Other specialists as required (e.g. geotechnical , drainage/civil engineer)	Write name of company here	Write name of person here	Write phone number here
Environmental Protection Agency (EPA)	**EPA Dedicated Low Call Number** **0818 33 55 99** **Any spillages / pollution incidents should be reported to the EPA hotline within 30 minutes of the incident occurring unless it is not safe to do so**		

The Principal Contractor as appointed has ultimate responsibility for the successful environmental performance of the proposed development through appointment and management of subcontractors and environmental specialists, as required, as detailed in Table 3.1. Specifically, this includes:

1. Principal Contractor & all sub-contractors will need to c**omply with all** relevant environmental legislation when carrying out work on the site;
2. **Definition** of environmental standards and requirements for the contractors throughout the contract stages;
3. **Acting as a point of contact** for consultation and feedback with landowners/occupiers, statutory and non-statutory consultees, other interested parties and the public;
4. **Auditing** of the performance of sub-contractors;

5. **Environmental monitoring and reporting (in conjunction with Environmental Officer)** - Environmental issues relevant to the project will be discussed during weekly Site Progress Meetings attended by the Site Manager and Environment Manager. Environmental performance will also be discussed at regular HSEQ meetings. This will include dissemination and discussion of the findings of audits, environmental reports and other inspections where appropriate. Other responsibilities are as follows:
6. **Health and Safety** - The site will be managed by a full time project management team who will be responsible for the Health and Safety of all personnel on site.
7. **Site Rules** - All personnel must comply with the rules and regulations laid down in the appropriate site rules.
8. **Induction and signing in and out** - All visitors to the site will be required to sign in and out and all personnel working on the site will be subject to an induction by the Principal Contractor.
9. **Training** - All construction staff, including sub-contractors, would receive structured training on the requirements of the CEMP and the associated environmental control plans, as developed. They would also be required to attend a site induction which would include the key environmental issues identified for the proposed development. The briefing would emphasise the methods and working practices which must be employed to protect the environment, including emergency procedures for reporting and dealing with environmental incidents. Records of training and those attended will also be retained.

4 COMMUNICATIONS

Effective communication is essential to ensure the appropriate employment of environmental standards and relaying of information, reports/assessments and data. The following points are some of the key forms of communication required:

1. **Statutory and Non-Statutory Bodies** - During the construction works, communication may be required with external parties such as, statutory authorities, interest groups and the public/business owners. Communication may take the form of scheduled meetings, site visits and written correspondence.
2. As the project progresses, there may be a requirement by the client, his representatives and any appointed contractor to clarify potential issues with relevant statutory bodies – including those with an environmental remit.
3. Detailed in Table 4.1 is a basic list of statutory bodies with an environmental remit within Ireland and the local authority area who may require consultation – in particular during the construction phase of the project. Also provided is a link to their internet sites from which useful information and contact details of these organisations can be obtained.
4. This list will be reviewed by the contractor, added to or amended if required. This list therefore should not be seen as a definitive list.
5. It should also be noted that there are a wide range of non-statutory bodies within Ireland who play an active role in protecting the environment. These organisations are not listed in this CEMP as yet but will be if required e.g. perhaps to seek further clarification.
6. **Public/businesses** - The Site Manager shall ensure that the public/businesses are kept informed of operations that may have an effect upon them. This may involve letter drops and meetings to keep local commercial premises owners up to date with progress with the proposed development and any new operations that are to be carried out. The Site Manager will provide details of contacts within the project team for the public/businesses to contact should any issues arise;
7. **Consents, Licences and Permits** - The provisions for controlling, pumping and discharging water will be agreed with the Environmental Protection Agency (EPA). The Contractor will ensure that any licences required are in place;
8. **Changes in legislation or guidance** - Legislative changes or proposed improvements to manage processes on site that have a bearing on the commitments given in the supporting environmental documents or other consultations will be communicated by the Site Manager to the Client and;
9. **Meetings & Records** - Environmental issues relevant to the project will be discussed during weekly Site Progress Meetings attended by the Site Manager and Environment Manager. Environmental performance will also be discussed at regular HSEQ meetings. This will include dissemination and discussion of the findings of audits, environmental reports and other inspections where appropriate.

Table 4.1: Basic list of statutory bodies with an environmental remit within Ireland

Organisation	Weblink
Environmental Protection Agency (EPA)	https://www.epa.ie/
EPA - Rivers Agency	https://www.epa.ie/our-services/monitoring--assessment/freshwater--marine/rivers/
Waterways Ireland	https://www.waterwaysireland.org/
Inland Fisheries Ireland	https://www.fisheriesireland.ie
Irish Water	http://www.water.ie
Health and Safety Authority (HSA)	https://www.hsa.ie/
Donegal County Council	https://www.donegalcoco.ie

5 GENERAL POLLUTION CONTROL AND CONTINGENCY PLAN

5.1 Oil Storage and Refuelling

A number of minor watercourses are present within the proposed development site, the largest being the narrow central stream, which runs north to south along the western boundary of the willow plantation and to the west of the recycling centre which lies adjacent to the site. Further minor watercourses and flowing wet ditches are present along agricultural field boundaries.

With the implementation of water pollution mitigation measures set out below, there will be no effects to watercourses or downstream designated sites. The following measures must be implemented;

1. **Dedicate specific areas for oil storage and refuelling, bunds sized to contain 110% of fuel storage capacity.**
2. **The contractor will use fill point drip trays, bunded pallets and secondary containment units.**
3. **The site will be enclosed and secured and fuel storage areas will be secondarily secured.**
4. **All fuel, oil and chemical deliveries will be supervised by a responsible person who will be trained to deal with any spillage to prevent a pollution problem occurring.**
5. **Storage of COSHH items is not permitted and only brought to site as required, fuel is provided by client from an existing bunded static supply, where small portable machines are to be fuelled up a drip tray is used.**

5.2 Emergency Procedures

A Site Environmental Emergency Plan will be prepared prior to construction and communicated to all members of the project team including sub-contractors and emergency services. A Pollution Incident Emergency Response Plan would be developed in accordance with the guidance set out in the Guidance for Pollution Prevention GPP 21: Pollution Incident Response Plans (NIEA, July 2017). **Appendix H** of this OCEMP contains an example Emergency Response & Environmental Plan. The Environmental Emergency Plan would set out the procedures to be followed and measures to be implemented in the event of a pollution incident. These incidents may be the result of:

1. **delivery and use of materials;**
2. **spillages of oils or chemicals;**
3. **discharge of silty water or other pollutants to watercourses;**
4. **flooding event; and,**
5. **fire (emissions to air) and failure to contain firewater runoff.**

Emergency procedures are developed to support the response plan. The procedures define the circumstances when the plan should be activated and include:

1. **the names and contact details of staff trained in incident response,**
2. **clearly defined roles and responsibilities,**
3. **the types and location of emergency response equipment available,**
4. **the location of the emergency assembly point, and,**
5. **Procedures for recovering spilled product.**

Responsible staff will be trained in emergency procedures to form an Emergency Team, so that these procedures can be implemented swiftly and effectively. Periodic testing of emergency procedures will be undertaken by the Site Manager.

The Environmental Manager will observe the test and to report on results. Any corrective actions are taken forward for review and approval.

Should an emergency incident occur, the Environmental Manager will be notified immediately. The emergency response will be co-ordinated by the Site Manager

EPA Dedicated Low Call Number

0818 33 55 99

Any spillages / pollution incidents should be reported to the EPA hotline within 30 minutes of the incident occurring unless it is not safe to do so

Table 5.1: Organisations to Contact in the Event of an Emergency

Organisation	Weblink	Phone
An Garda Siochana	https://www.garda.ie/en/contact-us/	999 / 112 Local Garda Station 074 916 7100
Donegal Fire Service	https://www.donegalcoco.ie/services/fireservice/	999 / 112 Letterkenny Central Fire Station 0749121676
Environmental Protection Agency (EPA)	https://www.epa.ie/	0818 33 55 99
DS Environmental Services	http://www.dsenvironmental.ie/	24 Hr Emergency +353 (0)74 9139522

Protective measures, mitigation, clean up and remediation actions will be identified from the evaluation and shall be put into place, having regard for the sensitivities of the environment.

A record of the emergency incident will be kept to show the nature of the corrective action undertaken. (See **Appendix D** for an example template).

Appendix H of this OCEMP contains an example Emergency Response & Environmental Plan. All relevant staff would be trained in how and when to contact the emergency services, NIEA and other organisations identified in the Environmental Emergency Plan.

5.3 Concrete Pouring

Concrete, cement and grouts are very alkaline and corrosive and can cause serious pollution to water. The following measures shall be followed on-site during construction and pouring of concrete:

1. Ensure that concrete pour are contained within the working area and do not enter any watercourses or surface water drains.
2. When mixing grout on site, construct a suitable barrier around mixing areas, supply lines and around working areas to prevent its escape.
3. Trucks, hoppers, mixers and concrete pumps that have contained concrete must be washed out in a contained area, see ‘management of concrete wash out areas’ below.
4. All concrete pours will be carried out under supervision,
5. Pours will be properly prepared to avoid run off (shuttering, mud matts, membranes used) and waste.
6. **Pouring of concrete should not take place when heavy rain is imminent.**

Wash down water arising from the washing of equipment that has come into contact with concrete will be collected in an impervious container.

5.4 Stockpiles

The following measures are proposed in relation to stockpiling of materials:

1. Locate stockpiles out of the wind or provide wind breaks to minimise dust generation
2. Keep stockpiles to minimum practicable height and use gentle slopes
3. Minimise the storage time of materials on site
4. Store materials away from the site boundary
5. Minimise the height of fall of all materials
6. Avoid spillage, and clean any spill up as soon as possible
7. Good soil handling and storage methods including protection of stockpiles with geotextiles.

Stockpiled material is located more than 10m away from the exclusion zone around the water body.

5.5 Silt Management

Good soil use and management is crucial to preventing silt pollution which is a major cause of environmental incidents. It can harm water quality, damage and kill aquatic life by smothering and suffocation and can cause flooding by blocking culverts and channels. The following will be implemented on-site:

1. Minimising the amount of time stripped ground and soil stockpiles are exposed
2. Only removing vegetation from the area that needs to be exposed in the near future
3. Plant washing is carried out in a designated area of hard standing at least 10 metres from any surface water drain
4. Where run off water is contaminated with silt or other pollutants such as oil this water must not be pumped or allowed to flow (directly or indirectly) into the water environment without treatment
5. Silt controls in place to prevent silt entering drains
6. Silt treatment options can be complex or relatively simple depending on the volume of water, the amount and type of silt and the type and size of site. Whichever method is used, an area where water can be undisturbed for a period of time. These facilities must be correctly installed, routinely maintained and inspected to ensure they're working efficiently.

6 ENVIRONMENTAL PERFORMANCE MANAGEMENT

6.1 Environmental Risk Register

The Environmental Manager/Officer should prepare and maintain an Environmental Risk Register having regard for legal requirements, project environmental commitments the potential for aspects of works to cause significant environmental impact.

The Environmental Manager should record responsibilities assigned for actions required for mitigation and control of the environmental risks in the Environmental Risk Register.

The Environmental Risk Register will be subject to regular review by the Environmental Manager together with the Site Manager.

6.2 Consents

Copies of legal consents, permits and licences obtained will be held in the site environmental file by the Environmental Manager.

6.3 Method Statements and Risk Assessments

Specific environmental risks will be assessed during preparation of method statements. Actions and environmental constraints associated with specific construction operations will be included in method statements, field control sheets and activity plans where appropriate. Generic environmental requirements will be included in all method statements. Details of what should be included in method statements are set out in **Appendix F**.

6.4 Inspections

Routine inspections to check that pollution control measures are in place will be undertaken by the Environmental Manager, who will produce weekly inspection reports. Daily inspections will be made by the supervisors during each shift and any environmental problems or risks that are identified will be actioned as soon as is reasonably practicable. Any issues arising from the daily inspections will be notified to the Environmental Manager. **Appendix B** of this OCEMP details an example environmental inspection schedule.

6.5 CEMP Review Programme

The CEMP is a **'live'** document that will be updated by the Contractor and reviewed by the Environmental Manager on a monthly basis as a minimum. The CEMP will also be reviewed following any environmental incidents which require the works methods to be updated or changed.

6.6 Notices of Non-Conformance

In instances where the requirements of the CEMP are not upheld a non-conformance and corrective action notice/procedure will be produced. The notice/procedure will be generated during the inspections conducted by the Supervisors, the Site Manager, Environmental Manager or any external third-party audits.

The Site Manager will be responsible for ensuring a corrective action plan is established and implemented to address the identified shortcoming. An incident report form is set out in **Appendix D**.

6.7 Complaints Handling

The response to any complaints will be managed by the Site Manager, who will inform the Environmental Manager of any environmental complaints. A Complaints Register will be maintained to detail the name and contact details of the complainant, date and time of the complaint, nature of complaint, action taken to resolve issues, and date of complaint handover.

The Environmental Manager will ensure that all environmental complaints and concerns will be responded to in 24 hours. An example complaints form is contained with **Appendix C** of this OCEMP.

6.8 Key Performance Indicators and Objectives

The Contractor should set environmental objectives in order to continuously improve environmental performance on the site. The Contractor will set objectives based on each significant environmental impact and they will be reviewed, and revised if necessary, on a monthly basis. Procedures, monitoring requirements and key performance indicators will be measured against achievable targets.

7 WORK PROGRAMME

7.1 Proposed Programme of Works

The programme of works for the proposed development will be outlined in the final CEMP.

7.2 Construction Hours

It is assumed that the construction hours will be:

- **08:00 to 18:00 Monday to Friday;**
- **From 08:00 to 13:00 on Saturdays,**
- **No construction works on Sundays and Bank Holidays.**

Precise timings and phasing of the proposed works are not known at this stage as this will be dependent upon the completion of the planning process and the subsequent appointment of a contractor.

Working hours outside of this regime will only occur in exceptional circumstances – of these are known in advance (i.e. not under emergency conditions), discussions will be held with representatives of the Donegal County Council environment and planning team to ensure that the works can be completed with minimal impact on sensitive receptors.

7.3 General Site Set Up

The following will be considered during site mobilisation:

7.3.1 Site Construction Compound

The construction site will operate within a secure hoarded compound site in line with CDM 2015 Regulations and will be controlled by the General Contractor. All access will be monitored and recorded.

All construction support activities will be controlled within the site construction compound including office facilities, toilets, canteen etc. Materials and waste handling and storage will be within the confines of the site. The work area will be protected from the public at all times. CCTV may be installed and compliant Health & Safety information signs will be installed.

The external façade of the solid hoarding panels will have a mix of Health & Safety warning signs.

7.3.2 Plant and Equipment

The plant and equipment likely to be associated with the construction process is set out as follows:

- Dumpers;
- Mobile cranes;
- Hand held tools including breakers (pneumatic and hydraulic);
- Power tools including percussion drills, cutting disks, pipe-threaders;
- Scaffold;
- Mobile access platforms;
- Delivery trucks;
- Skips / Skip trucks;
- Forklift trucks;
- Ready mix concrete wagons; and

- Concrete placing booms & pumps.

7.3.2.1 Specific to Plant & Tools

Specific to plant and tools the following shall be adhered too:

- All electrical tools that will be used on site will have a valid PAT Test within the last 12 month period.
- All electrical/ hand tools are to be checked prior to use by the operators to ensure they are fit for purpose.
- In regard to kango hammers, grinders, still saws and drills all users are to be competent to operate and have had the relevant training applicable to that tool.
- Electrics will be provided on site for all tools by means of a Petrol and Diesel Generators these must have an RCD fitted for emergency purposes.
- All plant i.e. Forklift, excavator, dumper trucks, Cherry Pickers, Mobile Elevating Work Platforms (MEWPS) must be certified and a copy of this placed on file.
- Any lifting equipment i.e. slings, chains, shackles and harnesses, inertial reels etc. must have valid certs every 6 months

7.4 Deliveries

Delivery of equipment and materials will be carefully controlled and managed at the site. Access and egress to the proposed area will be managed by the General Contractor. Delivery times will be planned in advance.

7.5 Construction Traffic

It is assumed typical construction traffic will comprise of ready-mix lorries, articulated low loaders, plant delivery and rigid vehicles. It is not anticipated that any specialist vehicles will be required to serve the site. However, if an abnormal load is required prior notice would be agreed with the police, highway and other relevant authorities. Following this, appropriate routing requirements would be agreed.

It is proposed that temporary signage be located in the vicinity of the site access during the construction period to warn drivers of the site entrance, as shown in Figure 7.1.

Figure 7.1: Temporary Signage at Site Access

Additional signage located on the N56 Road will advise motorists of HGVs turning, as shown in Figure 7.2.

Figure 7.2: Temporary Signage on the N56 Road

The Site Manager for the project will undertake the transport co-ordination role for the site. In this respect, their main responsibilities will include:

- Vehicle scheduling;
- Checking for scheduled road works that could disrupt arrivals;
- Checking for scheduled refuse collections to avoid conflict with HGV deliveries within built up areas;
- Handling any complaints; and
- Acting as a point of contact for employees, contractors and the general public.

7.5.1 Construction Traffic Management Plan

A construction stage Construction Site Traffic Management Plan (CSTMP) will be prepared and agreed with the relevant authorities to address the detailed procedures, sequencing and construction methodology anticipated by the project team engaged in the planning, liaison, and construction of the project.

The site entrance and exit accesses will be manned by a security that will ensure vehicles make their way off and on to site in a manner that does not cause disruption to the neighbours or cause blockages on the main road. The internal site layout has been prepared to provide a one way traffic system to further ensure no queuing or traffic disruption on the N56. The site will be securely enclosed using a high quality solid hoarding with intermittent vision panels to improve security and to accommodate public curiosity. This will be inspected daily as part of routine operating procedures. Gates will be kept closed as a rule being opened for authorised movements by security or banksmen as applicable to location.

It is proposed that the site compound will be located as shown on the attached Construction Management Plan Drawing:

- Access Routes
- Vehicle/Emergency Routes
- Welfare Facilities
- Offices/Car parking
- Materials Of Loading/Storage Area
- Waste Compounds (limited storage for bulk materials that will be dealt with at source)

This location has been selected to avoid disruption to residents, new services and drainage lines throughout the project. The compound will be used predominantly for office and welfare facilities, waste segregation and material off-loading and would also be used for limited storage of bulk materials and for secure container storage of relatively small high value items.

Separate, clearly marked pedestrian routes & vehicle access will be provided throughout the site and movements will be monitored/authorised by Security via a turnstile. Operatives, staff and visitors arriving at the site on foot will be provided with a separate gate with a footpath to the site offices. At the personnel gate, visitors will be required to sign the 'Sign In Register' in the gatehouse. The access footpath to the offices will be segregated by suitable barriers so that pedestrians are kept away from the site works.

The construction stage CSTMP which will provide further details on logistics of site arrival and material handling and distribution on site. This will include arrangements for removal of debris by appointed Waste Management Contractors as part of the draft Site Waste Management Plan.

Suppliers and subcontractors will be briefed prior to first coming to site on the route to be taken to and from the site to minimise traffic impact and to ensure unnecessary disruption for adjacent residents/businesses. All new delivery/collection drivers will receive an induction on arrival to reinforce the routes they are to take and ensure they are aware of the need for extreme caution working in a busy location. Clear signage will be erected to enable site related traffic to find its way in and out of the site without disruption to neighbouring residents/businesses.

7.6 Services

Note that in relation to working near services such as electricity, gas, water etc., liaison will take place with the service provider.

All utility services discovered adjacent to the site will be treated as "live" until proven otherwise and the co-ordination of switchovers and temporary disruptions for new constructions will be undertaken in accordance with the standard procedures of the relevant statutory authorities.

7.7 Construction Site Security

Throughout the construction phase, adherence to high standards of Health and Safety for all construction workers, site visitors and members of the public will be of paramount importance. All construction activities will take place in the context of the relevant Irish Health and Safety legislation.

As such, it is important that the construction site is secured adequately to ensure that uncontrolled access e.g. by children or vandals, is restricted as much as possible. As well as the potential health and safety risk from uncontrolled access, it is recognised that one of the biggest causes of pollution events from construction sites is due to the activities of vandals.

8 ENVIRONMENTAL MITIGATION MEASURES

Supporting environmental assessments (submitted in support of the planning application) have been undertaken which have assessed the likely impacts that the proposed development may have on the environment. Those supporting environmental assessments also propose mitigation measures to reduce the magnitude of effect of those likely impacts. Sections 8.1 - 8.4 details mitigation measures proposed for the Development.

An environmental inspection schedule is set out in **Appendix B**. An incident report form is set out in **Appendix D**. A site waste management plan (SWMP) is set out in **Appendix E**. An Emergency Response & Environmental Plan is located in **Appendix H** of this document. Details of what should be included in method statements are set out in **Appendix F**.

8.1 Environmental Guidance - Guidance for Pollution Prevention (GPPS)

The proposed works will demonstrate adherence to good working practices as detailed in current guidance in the PPGs and GPPs below:

GPP 1: Understanding your environmental responsibilities - good environmental practices.

A basic introduction to pollution prevention, with signposts to other PPGs and publications. (October 2020)

GPP 2: Above ground oil storage tanks

For above ground oil storage, excluding oil refineries and distribution depots. (January 2018)

GPP 3: Use and design of oil separators in surface water drainage systems

For identifying where an oil separator is required and, if so, what size and type of separator is appropriate. (March 2022)

GPP 4: Treatment and disposal of wastewater where there is no connection to the public foul sewer

For selecting the correct sewage disposal, treatment and disposal options, and maintenance and legal requirements. Also, for what to have in mind, in terms of wastewater treatment, when buying a house. (November 2017)

GPP 5: Works and maintenance in or near water

For construction or maintenance works near, in, or over water. (February 2018)

PPG 6: Working at construction and demolition sites

For the construction and demolition industry. (2012)

PPG 7: Safe storage - The safe operation of refuelling facilities

For operators of liquid fuel refuelling facilities, it applies to all types of fixed refuelling facilities. (July 2011)

GPP 8: Safe storage and disposal of used oils

For storing and disposing of used oils. Applies to activities ranging from a single engine oil change to those of large industrial users. (July 2017)

PPG 18: Managing fire water and major spillages

For identifying equipment and techniques available to prevent damage to the water environment caused by fires and major spillages. (June 2000)

GPP 20: Dewatering underground ducts and chambers

For dewatering underground ducts and inspection chambers. (January 2018)

GPP 21: Pollution incident response planning

For producing emergency pollution incident response plans to deal with accidents, spillages and fires. (June 2021)

GPP 22: Dealing with spills

For anyone who is responsible for storing and transporting materials that could cause pollution if they spill. (October 2018)

Spill kit must be kept on site with sand, earth or commercial products for the containment of fuel and other material spillages. All staff will receive appropriate training in the use of these kits and are to be made aware of where the kit is stored.

In the event of a spillage of oils or chemicals resulting in contamination of water courses or damage to habitats, the following procedure will be adopted:

- *The appropriate spill kit is to be deployed immediately and the site manager is to be informed;*
- *The incident is to be recorded within the site logbook; and*
- *In the event of contaminants being discharged directly to water courses, or in the event of significant spillage (in excess of 10 litres), the Environment Protection Agency (EPA) is to be contacted on 0818 33 55 99.*

Figure 8.1: Example Spill Kit

PPG 26: Safe storage - drums and intermediate bulk containers

For site operators of industrial and commercial premises storing and handling drums and intermediate bulk containers (IBCs) containing oil, chemicals or potentially polluting substances. (February 2019).

PPG 27: Installation, decommissioning and removal of underground storage tanks

For installing, removing and decommissioning all underground storage tanks (USTs), including those containing petroleum, diesel, fuel oil, aviation fuel, waste oil, domestic heating oil and other potentially polluting materials such as organic solvents. (April 2002).

All of the PPGs and GPPS are downloadable in full from this link:
http://www.netregs.org.uk/environmental-topics/pollution-prevention-guidelines-ppgs-and-replacement-series/guidance-for-pollution-prevention-gpps-full-list/

8.2 The Water Environment

A number of minor watercourses are present within the proposed development site, the largest being the narrow central stream, which runs north to south along the western boundary of the willow plantation and to the west of the recycling centre which lies adjacent to the site.

These features were not noted to support aquatic vegetation and are generally associated with adjacent hedgerows and stands of salmonberry.

These features are nonetheless of some ecological value and are considered to be of significance at the local level

Based on the nature of the components of works proposed, temporary impacts on water quality have the potential to occur during the construction phase of the works.

Mitigation measures for the water environment are detailed in this section.

8.2.1 Existing Watercourses

A number of minor watercourses are present within the proposed development site, the largest being the narrow central stream, which runs north to south along the western boundary of the willow plantation and to the west of the recycling centre which lies adjacent to the site. Further minor watercourses and flowing wet ditches are present along agricultural field boundaries.

Pollution prevention measures detailed below will be incorporated during the construction phase to prevent any possibility of sediments and other pollutants entering any nearby watercourses or surface drainage systems. The following measures must be implemented;

1. **Dedicate specific areas for oil storage and refuelling, providing bunds sized to contain 110% of fuel storage capacity.**
2. **The contractor will use fill point drip trays, bunded pallets and secondary containment units.**
3. **The site will be enclosed and secured and fuel storage areas will be secondarily secured.**
4. **All fuel, oil and chemical deliveries will be supervised by a responsible person who will be trained to deal with any spillage to prevent a pollution problem occurring.**
5. **Storage of COSHH items is not permitted and only brought to site as required, fuel is provided by client from an existing bunded static supply, where small portable machines are to be fuelled up a drip tray is used.**

Figure 8.2 below illustrates the location of the watercourses and a 10m exclusion zone. The exclusion zone is a 10m distance banding or buffer from the watercourse and NO material shall be stored in the area for the duration of the construction works. There shall be no cement, concrete, grout, fuels/ oil/ hydrocarbons stored in the exclusion zone.

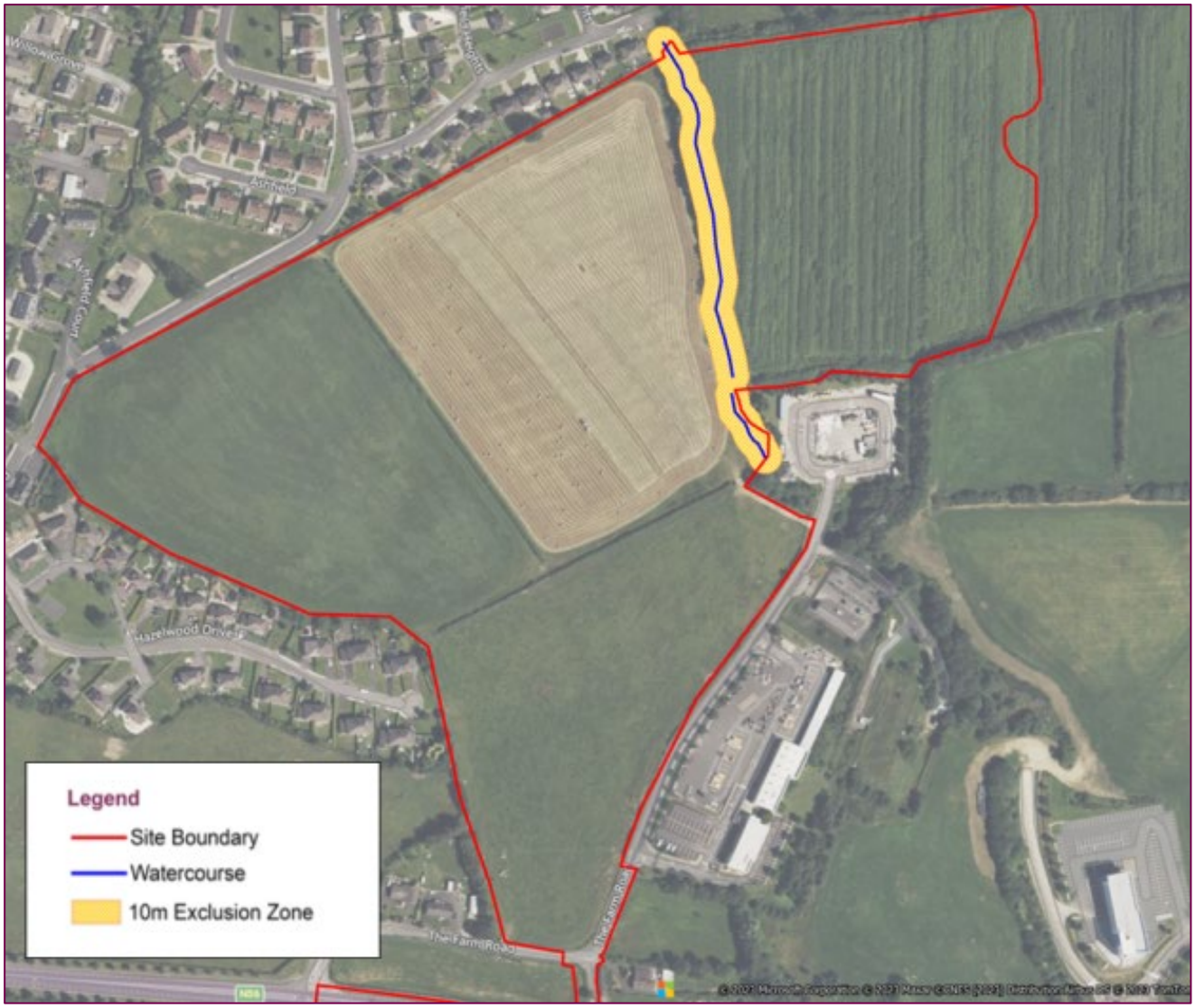


Figure 8.2: Watercourse 10m Exclusion Zone

8.2.2 Suspended Sediment / Sedimentation

Preventing run-off is an effective method of preventing sediment pollution in the water environment. The adoption of appropriate sediment controls during construction is essential to prevent sediment pollution.

The contractor will ensure that mitigation measures are carried out in accordance with the CEMP are adhered to. Sediment control measures will be consistent with the following guideline:

- GPP5 Works in, near or liable to affect watercourses; and,
- PPG 6 Working at demolition & construction sites (Environment Agency, 2012).

The following measures are suggested to limit any potential water quality issues during construction:

- The location of any stockpile storage areas will be carefully chosen, clearly identified and planned to ensure the best location to reduce material movements and minimal possibility of erosion and cross contamination;
- Any stockpile storage areas will not be stored in the exclusion zone;
- The exclusion zone shall be marked out with tape and cones to provide a visual reminder of the exclusion zone.

8.2.3 Concrete and Cement Pollution

The impacts in relation to cement and concrete for the proposed development are, for the most part (but not limited to) the installation of concrete flooring and construction works of buildings. Mitigation measures to prevent cement contamination of water bodies will be carried out in accordance with the outlined recommendations within the CEMP. The following measures are to be undertaken to mitigate against potential water quality issues:

- A risk assessment will be carried out to ensure the best location for concrete washout facilities for plant required on site;
- If required, washout from mixing works will be undertaken in a contained impermeable area;
- Any stockpile storage areas will not be stored in the exclusion zone;
- The exclusion zone shall be marked out with tape and cones to prevent provide a visual reminder of the exclusion zone.

In circumstances where the above mitigation measures are employed during construction operations, the potential magnitude of the impact to receiving water environment will be reduced to negligible thus reducing the significance of environmental effect will be reduced to minor on a temporary basis.

8.2.4 General Construction Works

The risk of water quality impacts associated with works machinery, infrastructure and on-land operations (for example leakages/spillages of fuels, oils, other chemicals and wastewater) will be controlled through good site management and the adherence to codes and practices which limit the risk to within acceptable levels.

In circumstances where mitigation measures are employed during construction operations, the potential magnitude of the impact on receiving water environment will be reduced to negligible thus reducing the significance of environmental effect will be reduced to minor on a temporary basis.

Appendix G details GPP 1 in full and Table 8.1 gives a summary of mitigation measures.

Table 8.1: The Water Environment Mitigation Measures

	Mitigation Measure	When?	By whom?
i.	All mitigation measures detailed herein will be subject to periodic inspection and maintenance.	Before Construction Phase	Principal Contractor to deliver
ii.	The Principal Contractor will dedicate specific areas for oil storage and refuelling and will use fill point drip trays, bunded pallets and secondary containment units. The site will be enclosed and secured and fuel storage areas will be secondarily secured.	Construction Phase	Principal Contractor to deliver
iii.	Reference and adherence to all the relevant precepts contained in the EU Integrated Pollution Prevention and Control (IPPC) Directive (Directive 96/61/EC) paying particular attention to where further information can be found regarding oil storage, safe storage - drums and intermediate bulk containers, and the use of oil separators in surface water systems (including the restrictions due to use of detergents).	Construction Phase	Principal Contractor to deliver
iv.	A discharge consent, issued by the EPA, is required for any discharges to the Aquatic Environment and may be required for Site Drainage during the construction stages of the development. Reference to Standing Advice Discharges to the Water Environment.	Construction Phase	Principal Contractor to deliver
v.	Reference and adherence to all the relevant precepts contained in Standing Advice Discharges to the Water Environment.	Construction Phase	Principal Contractor to deliver
vi.	Guidance for Pollution Prevention (GPPs) {Replacing Pollution Prevention Guidelines (PPGs)} are a series of documents developed by the Environment Agency for the Northern Ireland Environment Agency (NIEA). The GPPs/PPGs make reference to environmental legal obligations and are an acknowledged source of best practice guidance for pollution prevention across different sectors. Whilst some of these PPGs have now been withdrawn they still provide useful information on good practice and are used as a source of information. **Appendix G details GPP 1 October 2020 in full for convenience**. **A full list of PPG/GPPs are set out at the end of this section and will be adhered to as appropriate.**	Construction Phase	Principal Contractor to deliver
vii.	The contractor will adopt a site specific Emergency Response & Environmental Plan (**Appendix H** of this **OCEMP** provides a template than can be adopted and used) in accordance with PPG6, appoint a responsible person and train operatives in implementation and testing of the Plan periodically throughout construction of the works. An Emergency Spill Response Plan, the content of which is included in this **OCEMP** (Please refer to **Appendix H**), will detail actions to be taken in the event of an accidental spillage of fuel, chemicals or other hazardous material.	Construction Phase	Principal Contractor to deliver
viii.	During the construction stage foul discharges will be collected and stored locally for removal off site. As such, no burden will be placed on any existing foul infrastructure and no further mitigation measures are required.	Construction Phase	Principal Contractor to deliver
ix.	Suitable training will be provided to relevant personnel detailed within the Emergency Response & Environmental Plan (Please refer to **Appendix H)** to ensure that appropriate and timely actions will be taken should an incident occur.	Construction Phase	Principal Contractor to deliver

EPA Dedicated Low Call Number

0818 33 55 99

It is recommended that in the event of a water pollution incident the EPA hotline is contacted within 30 minutes unless it is not safe to do so.

8.3 Contaminated Land

During construction works, should unexpected contamination be encountered in soils or groundwater with visual or olfactory signs of contamination, samples of the potentially contaminated material should be obtained and sent for chemical analysis. An updated risk assessment should be completed to assess risks to human health and environmental receptors. Should unacceptable risks be identified then appropriate remedial works will be conducted and agreement sought from the relevant regulatory bodies.

8.4 Biodiversity

8.4.1 Designated Sites

8.4.1.1 Water Quality and Habitat Deterioration

The proposed development has limited potential to give rise to significant effects upon the Lough Swilly SAC, Lough Swilly SPA, and Lough Swilly including Blanket Nook and Inch Lake pNHA through water quality and habitat deterioration effects via the supported hydrological links to the site.

A range of mitigation measures are proposed to mitigate the identified potential effects upon designated sites and will include the requirements for best practice and adherence to the following relevant Irish guidelines and recognised international guidelines:

The construction works shall be undertaken within a framework of environmental protection practices defined and co-ordinated via the Final CEMP. The Final CEMP shall provide measures that meet legislative requirements, and key regulatory guidance that define good working practices during construction, most notably the CIRIA guidance for the 'Control of Water Pollution from Construction Sites' (CIRIA, 2001).

- Good practice guidelines on the control of water pollution from construction sites developed by the Construction Industry Research and Information Association (CIRIA, 2001);
    - Existing surface water drainage infrastructure (e.g. gullies) will be 'plugged' to prevent contaminated surface water entering the relevant watercourses, via drainage;
    - Stockpiling of construction materials shall be strictly prohibited within 15 m of any existing surface water drainage, ditch or water-laden channel;
    - Excavations shall be left open for minimal periods to avoid acting as a conduit for surface water flows;
    - All ready-mixed concrete shall be brought to site by truck. A suitable risk assessment for wet concreting will be completed prior to works being carried out which will include measures to prevent discharge of alkaline waste waters or contaminated storm water to the underlying subsoil. Wash down and washout of concrete transporting vehicles will take place at an appropriate location within the site;
    - Concrete shall be contained and managed appropriately to prevent pollution of watercourses.
    - Concrete pouring will be prevented during periods of heavy rainfall, and quick setting mixes will be used;

- Waste materials shall be stored in designated areas that are isolated from surface water drains.
- Skips will be closed or covered to prevent materials being blown or washed away and to reduce the likelihood of contaminated water leakage;
- No harmful materials shall be deposited into nearby watercourses, including drainage ditches/pipes, on or adjacent to the site;
- Protection measures shall be put in place to ensure that all hydrocarbons used during the Construction are appropriately handled, stored and disposed of in accordance with recognised standards. These measures will include:
    - Hazardous materials including diesel, fuel oils, solvents, paints and/or lubricants stored on site will be stored within suitably designed bunded areas with a bund volume of 110% of the capacity of the largest tank/container.
    - Re-fuelling of plant will not occur within 50 m of any watercourse or surface water/groundwater feature. Drip trays will be used and spill kits will be kept available;
    - Machinery used on site will be regularly inspected to ensure there is no leakage from them and to ensure the machinery will not cause contamination of watercourses;
    - Where required, fuel will be transported in a mobile, double skinned tank and a spill tray will be used when refuelling (if taking place outside a compound area);
    - Waste oils and hydraulic fluids will be collected in leak-proof containers and removed from the site for disposal or re-cycling;
    - Only emergency breakdown maintenance will be carried out on site. Emergency procedures and spillage kits will be readily available at strategic site locations and construction staff will be familiar with emergency procedures; and
    - Any spillage of fuels, lubricants of hydraulic oils will be immediately contained, with an appropriate emergent response put in place. Any contaminated soil will be removed from the site and properly disposed of.
- Fisheries Guidelines for Local Authority Works. Department of Communications, Marine & Natural Resources, Dublin, (Anonymous, 1998);
- Guidelines on protection of fisheries habitats during construction projects (Eastern Regional Fisheries Board, 2006); and
- Control of Substances Hazardous to Health (COSHH) Handling of Hazardous Materials.

The use of oils and chemicals on-site will receive significant care and attention. The following procedures will be followed to reduce the potential risk from oils and chemicals:

- Fuel, oil and chemical storage will be sited on an impervious base within a bund and secured. The base and bund walls must be impermeable to the material stored and of adequate capacity. The control measures in GPP2: Above Ground Oil Storage Tanks and PPG 26 “Safe storage – drums and intermediate bulk containers” (Environment Agency, 2011) shall be implemented to ensure safe storage of oils and chemicals.
- The safe operation of refuelling activities shall be in accordance with PPG 7 “Safe Storage – The safe operation of refuelling facilities” (Environment Agency, 2011).

Where works are required within 15 m of the watercourse, an ecologist shall assess and verify that appropriate demarcation and signage is in place before works commence. Demarcation shall be physically marked out using post and rail/post and rope/bunting, or equivalent, and be signposted to identify an ecological sensitivity;

The following mitigation will be applies in respect of proposed bridging structures, including any required culvert installation:

- The culvert must be designed in accordance with Transport Infrastructure Ireland's Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes and Inland Fisheries Ireland's (2016) Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters.
- It is recommended that a bottomless culverts or bridging structures are used wherever possible. This type of design is less likely to result in any future fish or macroinvertebrate passage problems (notwithstanding that the existing structures along the watercourse may already present such issues);
- If an embedded box or pipe culvert is required, the following, as specified in IFI (2016), must be adhered to:
    - The culvert must maintain the natural channel gradient, width and substrate configuration;
    - The culvert should be buried to a minimum of 500mm below the stream bed at the natural gradient;
    - The culvert must be sized to maintain the natural stream channel width;
    - The gradient should not exceed 3% - note , however, that according to TII guidelines the effective slope of the culvert should generally not exceed 1.0% for a culvert less than 24m in length, unless baffles are added;
    - The culvert should be positioned such that both the upstream and downstream invert shall be 500mm below the upstream and downstream river bed invert levels respectively.
- While the stream is highly unlikely to support salmonids or lamprey, the potential for some individuals to occur within the stream exists. Therefore, as per fisheries restrictions stipulated by IFI, any instream works shall be carried out during the period July 1st to September 30th of any year;
- The finalised stream crossing method statement must be agreed with IFI well in advance and IFI must be given sufficient notice before consented in-stream works commence;
- Silt fencing shall be installed for all work within 15m of the stream on site. Silt fencing shall consist of a maintainable geotextile membrane. Installation, maintenance, and removal shall follow the manufacturers' specifications. The geotextile membrane will be inspected at least once a week and following any period of heavy rainfall (i.e. Met Éireann Orange and Red rain warning).
- The Contractor will monitor weather forecasts for heavy rain and where required, certain works and in particular excavations/earthworks will cease in order to minimise exposed soil entering surface water run-off; and
- Soil excavation will not be completed during periods of prolonged or heavy rain (i.e. Met Éireann Orange and Red rain warning).

For the protection of watercourses associated with the use of concrete, the following measures shall be employed:

- All ready-mixed concrete shall be brought to site by truck. A suitable risk assessment for wet concreting shall be completed prior to works being carried out which will include measures to prevent discharge of alkaline waste waters to the underlying subsoil. Wash down and washout of concrete transporting vehicles shall take place at an appropriate facility off site;
- Concrete shall be contained and managed appropriately to prevent pollution of watercourses. Concrete pouring will be prevented during periods of heavy rainfall, and quick setting mixes shall be used; and
- Waste materials shall be stored in designated areas that are isolated from surface water drains. Skips shall be closed or covered to prevent materials being blown or washed away.

Subject to implementation of these mitigation measures it is considered that any potential effects associated with water quality, including pollutants and sediments, will be fully mitigated.

8.4.2 Spread of Scheduled Invasive Species

Appendix I details an Outline Invasive Species Management Plan (OISMP). Please refer to Appendix I for detailed mitigation measures to prevent the spread of scheduled invasive species.

In order to prevent the proposed development giving rise to the inadvertent spread of the recorded non-native invasive species, Himalayan balsam and salmonberry, it is proposed that all aspects of the proposed development will be undertaken in accordance with an appropriately worded Invasive Species Management Plan, which accompanies the submitted EIAR.

The implementation of the ISMP which includes for a range of measures to prevent the spread of Himalayan balsam and salmonberry and will ensure that the proposed project does not give rise to the spread of this species into the freshwater environment and consequently any European site. Measures in the ISMP include:

- Appropriate demarcation of areas supporting invasive species, to prevent the inadvertent spread of the plant during construction;
- That all machinery entering the site during construction activities shall be free from contamination with scheduled invasive plants. This can be achieved through wheel wash stations for vehicles entering and exiting the proposed development site;
- That materials which are introduced to the site during the construction shall be free from scheduled invasive species, with certification of such; and
- Options for treatment or eradication of the existing stands as appropriate, in-keeping with current guidance and legislation.

8.4.3 Habitats

Mitigation measures are proposed in respect of watercourses and associated water quality and habitat deterioration effects as discussed above in respect of downstream designated sites.

In order to mitigate for potential impacts associated with the loss of lengths of hedgerow scrub and other habitats within the site, it is proposed that a range of landscape planting will be undertaken. Various areas around the margins of the site, in addition to areas of unused or open space within the scheme design will be subject to planting with a range of native tree species

8.4.4 Otter

Proposed measures to safeguard water quality within the freshwater environment, as discussed above in respect of designated sites and within Chapter 15 of the EIAR will fully mitigate any predicted impacts upon otter.

8.4.5 Birds

The proposed development has potential to give rise to significant effects upon nesting bird's species which are likely to utilise habitats including scrub, scattered trees, hedgerows, amenity planting and buildings within the Application Site.

In order to avoid any significant impacts upon birds all site clearance, in addition to demolition of buildings, will take place during the period 1st September to 28th February which is outside the breeding season for those bird species that are likely to breed on the site.

It is recommended that the scheme provide ecological enhancement for this group through the provision of nest boxes within the scheme design which will provide nesting opportunities for birds post development.

8.5 Noise

Worst-case construction noise predictions can be reduced through use of appropriate mitigations as detailed below in Section Construction Mitigation.

BS 5228-1 states that:

"…if the site noise level exceeds the appropriate category value, then a potential significant effect is indicated. The assessor then needs to consider other project specific factors, such as the number of receptors affected and the duration and character of the impact, to determine if there is a significant effect."

These factors have therefore been considered to determine the effect significance.

As a summary of proposed construction works:

1. Construction works will be temporary and limited in duration;
2. Construction plant and machinery has been assessed as operating for the full working period of the day, i.e. 100% duty cycle. Due to natural pauses in activity and rest breaks equipment will not be fully operational during the working day;
3. Construction works are not proposed to occur during night-time or on Sundays, unless for emergency works. Therefore, there will be no associated construction noise impact during these times at construction noise receptors; and
4. Temporary construction noise barriers will be used to achieve attenuation of noise levels between ground based construction plant and the nearest noise sensitive properties;
5. The use of the proposed construction noise mitigation measures outlined below will ensure that construction noise levels are controlled to the lowest levels practicable.

In order to minimise the likelihood of complaints, Donegal County Council and potentially affected residents will be kept informed of the works to be carried out and of any proposals for work outside normal hours.

A complaints procedure (**Appendix C** contains a complaints form) will be operated by the appointed contractor throughout the construction phase.

8.5.1 Construction Noise Mitigation

Table 8.2 below outlines construction noise mitigation measures which must be adopted during the construction phase of the proposed development.

Table 8.2: Construction Noise Mitigation

Mitigation Measures	When?	By whom?
i. ensuring that mechanical plant and equipment used for the purpose of the works are fitted with effective exhaust silencers and are maintained in good working order;	Throughout	Appointed Contractor
ii. careful selection of quiet plant and machinery to undertake the required work where available;	Throughout	Appointed Contractor
iii. all major compressors will be 'sound reduced' models fitted with properly lined and sealed acoustic covers which will be kept closed whenever the machines are in use;	As required	Appointed Contractor

iv. any ancillary pneumatic percussive tools will be fitted with mufflers or silencers of the type recommended by the manufacturers;	As required	Appointed Contractor
v. machines in intermittent use will be shut down in the intervening periods between work;	Throughout	Appointed Contractor
vi. ancillary plant such as generators, compressors and pumps will be placed behind existing physical barriers, and the direction of noise emissions from plant including exhausts or engines will be placed away from sensitive locations, in order to cause minimum noise disturbance. Where possible, in potentially sensitive areas, acoustic barriers of enclosures will be utilised around noisy plant and equipment.	As required	Appointed Contractor
vii. Handling of all materials will take place in a manner which minimises noise emissions;	As required	Appointed Contractor
viii. Audible warning systems will be switched to the minimum setting required by the Health & Safety Executive.	Throughout	Appointed Contractor
ix. In order to minimise the likelihood of complaints, Donegal County Council and affected residents will be kept informed of the works to be carried out and of any proposals for work outside normal hours. Construction noise monitoring will be undertaken throughout the construction duration to ensure compliance with the construction noise threshold limits.	Throughout	Appointed Contractor
x. A complaints procedure should be operated by the Contractor throughout the construction phase.	Throughout/As required	Appointed Contractor
xi. Construction works along the site boundary will be limited in duration; plant and machinery will not be fully operational during the working day	As required	Appointed Contractor

The use of the proposed construction noise mitigation measures above, will ensure that construction noise levels are controlled to the lowest levels practicable.

8.6 Air Quality

Mitigation measures are divided into general measures applicable to the entire and measures applicable specifically to the defined construction activities (i.e. demolition, earthworks, construction and track-out). As the risk of dust impact on receptors from soiling has been identified to range from medium to high during the demolition stage specifically, the highest risk category should be applied when considering general mitigation measures (IAQM, 2016).

A Dust Management Plan (DMP) will be prepared by the appointed contractor for the site and submitted to the MCC for written agreement prior to commencement of construction. The DMP will at a minimum include the following mitigation measures listed below to minimise and manage potential dust emissions.

10.5.1.1 Communications

With respect to communications, the following will be implemented:

- Develop and implement a stakeholder communications plan that includes community engagement;
- Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the Site Manager;
- Appropriate training will be provided to all staff to ensure that they are aware of and understand the dust control and other environmental control measures; and,
- Display the head or regional office contact information.

To be implemented before works commence on site and training given as appropriate by the appointed contractor.

10.5.1.2 Site Management

With respect to site management, the following will be implemented:

- Daily visual inspections of the site and site boundary for evidence of dust depositions will be made. A dust inspection of the site will be undertaken by a suitable person, trained and nominated by the site manager. Increase frequency of site inspections will be undertaken when activities with a high potential to produce dust are being carried out, such as earthworks activities, power tool use and during prolonged windy or dry condition;
- Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken;
- Make the complaints record available to the relevant regulatory authorities when asked;
- Record any exceptional incidents that cause dust and/or air emissions, either on or offsite, and the action taken to resolve the situation in an environmental logbook;
- Avoid site runoff of water or mud;
- Use covered skips;
- No bonfires and burning of waste materials on site;
- It is recommended that passive monitoring at three - site boundary locations should be completed for the duration of the demolition & earthworks (Bergerhoff method);
- Keep surfaces such as Site fencing and barriers clean using wet methods.

To be implemented during works as required by the appointed contractor.

10.5.1.3 Earthworks

Earthworks are planned as part of the Proposed Development including foundations (and associated excavation of soils and materials), creation of stockpiling and cut and fill areas. With respect to earthworks, the following will be implemented:

- Disturbance of the ground will be kept to a minimum wherever possible;
- Soil handling should be restricted during adverse weather conditions such as high winds or exceptionally dry spells – depending on outcome of walk over survey identifying any potential issues;
- Minimise drop heights from loading or handling equipment/materials and use fine water sprays on such equipment wherever appropriate;
- Dampening methods will be used where necessary; and,
- Methods and equipment will be in place for immediate clean-up of spillages of dusty or potentially dusty materials.

To be implemented during earthworks by the appointed contractor.

10.5.1.4 Construction

With respect to construction, the following will be implemented:

- Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place;
- Ensure bulk cement and other fine powder materials are delivered in enclosed;
- For smaller supplies of fine power materials ensure bags are sealed after use and stored appropriately to prevent dust;
- Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems; and,
- Cleaning of hard stand areas by personnel only or if required mechanical road sweepers (with water suppressant fitted) to clean any site hard stand area.

To be implemented during construction period by the appointed contractor.

10.5.1.5 Vehicle Movement and Vehicle Emissions

As with any construction site, there are associated vehicle movement, emissions and plant use. With respect to vehicle movement and vehicle emissions, the following will be implemented:

- Implement a wheel washing system until earthworks are completed. Wheel wash system should have an adequate amount of hard surface between it and the Site exit;
- Transportation of dusty/fine materials will be conducted in enclosed or sheeted vehicles;
- An onsite speed limit (to be displayed) will be implemented by the main contractor that will be appropriate to the types of construction plant utilised;
- Regular cleaning and maintenance of site roads as appropriate. Hard surface roads should be swept to remove mud and aggregate materials from their surface while any un-surfaced roads will be restricted to essential site traffic only;
- Public roads outside the site will be regularly inspected for cleanliness and cleaned as necessary;
- Ensure all vehicles switch off engines when stationary and not in immediate use - no idling vehicles (emissions to air controlled);
- All plant utilised should be regularly inspected (emissions to air controlled);
- Visual monitoring of plant will include ensuring no black smoke is emitted other than during ignition (emissions to air controlled);
- Ensuring exhaust emissions are maintained to comply with the appropriate manufacturer's limits (emissions to air controlled); and,
- Vehicle exhausts will be directed away from the ground and other surfaces and preferably upwards to avoid road dust being re-suspended to the air.
- Avoid the use of diesel or petrol powered generators where possible, using mains electricity or battery powered items where practicable;
- Impose and signpost a speed limit of 20 km/hr on sealed surfaces and 15 km/hr on unsealed surfaces.

To be implemented throughout by the appointed contractor.

9 ENVIRONMENTAL RISK ASSESSMENTS

An example environmental inspection schedule is set out in **Appendix B**. An example incident report form is set out in **Appendix D**.

10 EMERGENCY RESPONSE & ENVIRONMENTAL PLAN

An emergency response & environmental plan is located in **Appendix H** of this document.

11 SITE WASTE MANAGEMENT PLAN

An example site waste management plan (SWMP) is located in **Appendix E** of this document.

12 FINAL COMMENT

The Contractor is required to develop and implement this Outline Construction Environmental Management Plan (OCEMP) to help ensure that construction activities are planned and managed in accordance with the environmental requirements identified within and the relevant guidance and legislation.

This is VERSION 01 of the OCEMP.

Future updates to the CEMP will be sequential and be saved as such (i.e. VERSION 02, 03 etc.) and shall be adopted on site in full.

Appendix A

Proposed Plan

1 Proposed Planning Master Plan
1 : 1250

Notes:
1. Do not scale
2. Contractor to check all dimensions and report omissions and errors to the Architect
3. Hamilton Architects LLP accepts no liability for use of this drawing by parties other than the party for whom it was prepared or for purposes other than those for which it was prepared.
4. If this drawing is issued in dwg/dxf format as an uncontrolled version to enable the recipient to prepare their own documents/drawings/models for which they are solely responsible. This drawing is based on project information current at the time of issue.
5. Hamilton Architects LLP accepts no liability for any alterations or additions to or discrepancies arising out of any change to such project information that occurs after it is issued by Hamilton Architects LLP.
This drawing does not contain shared coordinates and is not issued for coordination purposes.

Existing Site - 191,834m2 / 19.2Ha

KEY:

1. 1x 4G Synthetic Pitch (Pitch 1)
2. 1x Grass/Sand Competition Pitch (Pitch 2)
3. Natural Grass Soccer Pitch
4. Natural Grass Soccer Pitch
5. Cricket Crease
6. Syntheic 5-a-side Soccer Pitch
7. Syntheic 5-a-side Soccer Pitch
8. Syntheic 5-a-side Soccer Pitch
9. Syntheic 5-a-side Soccer Pitch
10. Indoor Sports Dome
11. Additional Outdoor Sports and Recreation Areas to Include Training/Practice Area (25x60m)
12. High Hurling/Handball Wall
13. 6 Lane Athletic Sprint Track (50x7.5m)
14. Walking/Running Trails
15. Childrens Playpark
16. Community Garden
17. Pavilion Building 1,340m2
18. Equipment Store and Service Compound
19. Biodiversity Garden

LEGEND:

- Public Landscaped Area
- Community Benefit Area (Garden/Playpark)
- Hard Surface
- 4m Public Footpath & Cycle Lane
- Public Road
- Public Spaces
- Slope to be graded
- Existing Trees
- Proposed New Trees
- Secure Bike Shelter
- Site Boundary (Site Area)
- Adjoining land owned by client
- Retaining Wall
- Existing Houses
- Existing Sewer
- Existing Waterway
- Proposed Bridge
- Existing overhead power cables
- Lands owned by third parties
- Paved Area
- External Furniture

Rev	Description	Ckd	Apr	Date
P19	Updated Red Line Boundary	WT	MP	20.06.23
P18	Updated Red Line Boundary	RK	MP	16.06.23
P17	Updated Red Line Boundary	RK	MP	15.06.23
P16	Key Updated	RK	MP	18.05.23
P15	Site Plan Updated	RK	MP	12.05.23
P14	Site Plan coordinated with landscape drawing	RK	MP	03.05.23
P13	site plan general amendments	RK	WT	28.04.23
P12	Site compound amended. Ramp added.	RK	MP	20.04.23
P11	Drawing uodated for following public consultation event.	WT	MP	03.04.23
P10	Drawing amended to clients comments.	AM	MP	06.02.23
P9	Shared cycle/pedestrian path layout amended to follow road. Carpark numbers amended. clients comments included	AM	MP	19.01.23
P8	N56 junction updated. Floodlighting and street lighting indicated. Bicycle shelters shown.	MP	MP	20.12.22
P7	Road layout and pavilion updated. Car park omitted to playground	MP	MP	23.11.22
P6	Pitches 1&2 relocated away from open stream. Roads & site adjusted accordingly.	RK	MP	31.10.22
P5	Cricket pitch rotated & road layout updated	JH	MP	02.08.22
P4	Key amended to show third party lands	WT	MP	21.06.22
P3	Boundary line amended	WT	MP	16.06.22
P2	Boundary line amended	WT	MP	14.06.22
P1	First Issue	WT	MP	30.05.22

Project Title
ATU Regional Sports Activity Hub

Drawing Title
Proposed Planning Master Plan

Scale: A1 @As indicated
Date: 04/24/23

Status Code
S2 - Suitable for Information

Drawing Number: 22018-HAM-XX-XX-DR-A-1001
Rev: P19

hamilton ARCHITECTS
W: www.hamiltonarchitects.co.uk E: design@hamiltonarchitects.co.uk

Appendix B

Environmental Inspection Schedule

Environmental Inspection Schedule		Site:	
Inspected by:		**Date:**	
	Assessment Ratings *0 – Not in place = Non Compliance* *1 – In place but not full Compliance = Non Compliance* *2 – Full Compliance* ***Actions raised from this audit must be closed out within the agreed time scale with Donegal County Council***	*0/1/2*	
1.0	***Emergency preparedness and incidents response***	*0/1/2*	*Comment*
1.1	*Is environmental response equipment held on-site?*		
1.2	*Where is it located?*		
1.3	*Is it all in working order?*		
1.4	*Can site staff operate the equipment?*		
2.0	***Environmental Incidents***	*0/1/2*	*Comment*
2.1	*Have any incidents been reported?*		
2.2	*Have all such incidents been investigated?*		
2.3	*Have they all been documented?*		
2.4	*Have all relevant parties been made aware of any incident?*		
2.5	*Has the Incident Report Form* **(Appendix *D*)** *been completed ?*		
3.0	***Hazardous Materials Storage***	*0/1/2*	*Comment*
3.1	*Are hazardous materials kept in secure areas?*		

3.2	*Are stores of fuels or oils bunded?*		
3.3	*Has any damage occurred to Mobile Bowsers or tanks?*		
3.4	*Are containers/drums labelled with content and capacity?*		
3.5	*Are drip trays empty of water ?*		
3.6	*Are hoses inside bunds/cabinets ?*		
3.7	*Are spill kits fully stocked and have all staff been trained to use equipment ?*		
3.8	*Has an individual been appointed for the safe handling of fuels ?*		
4.0	***Waste minimisation***	*0/1/2*	*Comment*
4.1	*Are all waste containers covered and labelled?*		
4.2	*Is waste segregated correctly ?* *Do skips need to be emptied ?*		
4.3	*Have waste skips been located on-site?*		
4.4	*Are different waste types segregated for recycling?*		
4.5	*Are staff and contractors encouraged to recycle? Is relevant signage in place*		
4.6	*Has litter been removed from site and the external boundary*		
4.7	*Is all appropriate duty of care documentation in place i.e. waste licence, Carrier's licence all kept on file ?*		
4.8	*Does the external appearance of the site present a positive image of the industry?*		
4.9	*Does the site appear well organised, clean and tidy?*		

4.10	*Does the appearance of all facilities, stored materials, vehicles and plant make a positive impression?*		
5.0	***Water Discharges & Pollution Control***	*0/1/2*	*Comment*
5.1	*Are there any de-watering activities conducted on-site?*		
5.2	*Any visible signs of spillage on site (fuel, oil, lubricants etc)? Including from machinery and plant.*		

5.3	*PPG/GPP guidance being followed as stipulated in CEMP/CEMP ?* ***1.Annotated Sketch if appropriate of any spillage and clean up detailed***		
6.0	***Site Boundary & Access***	*0/1/2*	*Comment*

6.1	*Site boundary fencing in place ?* *No visible signs of breaches*		
6.2	*Site signage and information boards in place ?*		
6.3	*Appropriate sign in followed and appropriate health and safety followed ? Hi-vis, boots, hard hat worn for site visit. Appropriate PPE and H&S recommendations for this site in particular.*		
7.0	***Land contamination***		
7.1	*Has any unforeseen historical land contamination been discovered on-site?* *IF yes, please detail.* ***Annotated Sketch if Appropriate***		

7.2	*Has this been managed?* ***Please detail***
8.0	Site Photographs – labelled, detailed and saved on file
8.1	**SITE PHOTOS TO BE TAKEN DURING CONSTRUCTION PHASE (From first commencement of works). These will include; boundary photographs, internal roadways, fuel storage areas, pollution control in place (inc. spill kits), spills, waste storage areas, recycling signs, machinery.**
8.2	*Have site photos been taken of any specific environmental incidents ? If yes please details:*
8.3	*Have site photos been stored on file, labelled and dated ? Please ensure this is completed*

Corrective Action Plan relating to this environmental inspection schedule:						
		Site :	**Actionee**	**Target date (if not immediate)**	**Close out by Actionee**	**Issue dealt with ? Y/N**
	Count	Proposed Corrective Action				
	1					
	2					
	3					
	4					
	5					
	6					
	7					
	8					
	9					
	10					
Managers use only		**Follow up Action from Incidents?**		**Closed out by Manger**		
Acknowledged		Signed:		Signed:		

PLEASE KEEP ON FILE with other completed environmental inspections

Appendix C

Complaints Form

	Complaints Form
	Make the complaints log available to the local authority when asked
1.	**Have any complaints been received? If so please detail**
2.	**The name and contact details of the complainant:**
3.	**Date and time of the complaint:**
4.	**Nature of complaint:**
5.	**Action taken to resolve issues:**
6.	**Date of complaint handover:**
7.	**Name of person addressing the complaint:** **Company:** **Signature:**

Appendix D

Incident Report Form

INCIDENT DATE	INCIDENT TIME	REPORT DATE	REPORT TIME

INCIDENT OWNERSHIP		
DIVISION	SUB-DIVISION	UNIT OR DEPT

DESCRIPTION OF WHAT HAPPENED

EXACT INCIDENT LOCATION			
On or Off Site		**Location**	**Sub-Area**

PERSON INVOLVED

CATEGORY OF PERSON [✓]											
Employee	[ ]	Contractor	[ ]	Visitor	[ ]	Environmental	[ ]	Mem of. Public	[ ]		

NATURE OF INVOLVEMENT [✓]					
Witness	[ ]	First Person on Scene	[ ]	Other	[ ]

PERSON'S NAME					
Name:	Mr/Mrs/Miss/Ms	First Name:		Last Name:	

OTHER **INFORMATION**

Site Manager in attendance (if applicable)							
Reported in Duty Log/Site Book?	Yes	[ ]	No	[ ]	N/A	[ ]	

TYPE OF INCIDENT [✓]					
Breach of Limits/Licence Cond.	[ ]	Oil & Chemical Storage	[ ]	Spillage/Spillage Response	[ ]
Waste Storage & Disposal	[ ]	Serious Public/Other Complaint	[ ]	Water Abstraction/Disposal	[ ]
Third Parties and Supply Chain	[ ]	Smoke, Fumes & Odours	[ ]	Natural Envnment & Wildlife	[ ]
Light Pollution	[ ]	Noise Nuisance	[ ]	Other	[ ]
If "Other" please describe:					

Is this a reportable incident?	Yes	[ ]	No	[ ]	Unknown [ ]
If "Yes" which agency					

What are the actual or foreseeable potential consequences known at this time? [✓]					
Prosecution	[ ]	Enforcement Notice (Imp/Proht)	[ ]	Civil Claim	[ ]
Clean-up/Restoration	[ ]	Breach of Licence Requirements	[ ]	Adverse Publicity/Reaction	[ ]
Adverse Customer Reaction	[ ]	Contamination of Water	[ ]	Habitat or Species	[ ]
Health Effects	[ ]				

Please provide any other relevant information

What immediate actions have been taken?

INCIDENT REPORTED BY		
Name	Telephone No.	Date

Appendix E

Site Waste Management Plan (SWMP)

In the course of the Project, it is estimated that the following quantities of C & D Wastes/material surpluses will arise:

C & D Waste Material	**Quantity** (tonnes)
Clay and Stones	To be completed for Final CEMP
Concrete	To be completed for Final CEMP
Masonry	To be completed for Final CEMP
Wood	To be completed for Final CEMP
Packaging	To be completed for Final CEMP
Hazardous Materials	To be completed for Final CEMP
Other Waste Materials	To be completed for Final CEMP
TOTAL Arisings	To be completed for Final CEMP

Proposals for Minimisation, Reuse and Recycling of C & D Waste

j. **C & D Waste will arise on the Project mainly from excavation and unavoidable construction waste/material surpluses/damaged materials.**

k. **The Contractors Purchasing Manager etc. shall ensure that materials are ordered so that the quantity delivered, the timing of the delivery and the storage is not conducive to the creation of unnecessary waste.**

l. **Excavated soils will be carefully stored in segregated piles on the site for subsequent re-use/removed from site for direct beneficial use elsewhere.**

m. **Concrete waste will be recycled where possible or source segregated/collected in receptacles with mixed C & D Waste materials, for subsequent separation and recovery at a remote facility.**

n. **Masonry and wood will be source segregated/collected in receptacles with mixed C & D Waste materials, for subsequent separation and recovery at a remote facility.**

o. **Packaging will be source segregated for recycling or return to suppliers.**

p. **Hazardous wastes will be identified, removed and kept separate from other C & D Waste materials in order to avoid further contamination.**

q. **Other C & D Waste materials will be collected in receptacles with mixed C & D Waste materials, for subsequent separation and disposal at a remote facility.**

Excavation soils and C & D Waste-derived aggregates are considered suitable for certain on-site construction applications. It is proposed that the following quantities, corresponding to all C & D Waste arisings from the project, will be used within the works and beyond the site confines:

Standard form that will be completed by the contractor on-site: Proposals for Beneficial Use/Management of C & D Material Surpluses/Deficits and Waste Arisings on and off the Project

C & D Waste Type	**Clay and Stones** (t)	**Concrete** (t)	**Masonry** (t)	**TOTALS**
Proposed Use				
Earthworks	To be completed for Final CEMP			
General Fill/Hardcore				
Pipe Bedding				
Selected Trench Backfill				
Fill to Structures				
Beneath Paths Structure				
Beneath Road Structure				
Other Site Use A				
Other Site Use B				
Off-Site Use				
TOTAL				

It is anticipated that waste materials will have to be moved off site. It is the intention to engage specialist waste service Contractors (as required), who will possess the requisite authorisations, for the collection and movement of waste off-site, and to bring the material to a facility which currently holds a Waste Licence/Waste Permit. Accordingly, it will be necessary to arrange the following waste authorisations specifically for the Project:

Specific Waste Authorisations Necessary for the Scheme

Authorisation Type	Specific Need for Project (Yes/No?)	
Waste Licence	Yes	No
Waste Permit	Yes	No
Waste Collection Permit	Yes	No
Transfrontier Shipment Notification	Yes	No
Movement of Hazardous Waste Form	Yes	No

Assignment of Responsibilities

r. **The appointed contractor shall be designated as the Responsible Person and have overall responsibility for the implementation of the on-site Waste Management Plan.**

s. **The Responsible Person will be assigned the authority to instruct all site personnel to comply with the specific provisions of the Plan.**

t. **At the operational level, a site manager/foreman from the main contractor and appropriate personnel from each sub-contractor on the site shall be assigned the direct responsibility to ensure that the discrete operations stated in the Waste Management Plan are performed on an on-going basis.**

Training

a. **Copies of the Waste Management Plan will be made available to all personnel on site (as required).**

b. **All site personnel and sub-contractors will be instructed about the objectives of the Waste Management Plan and informed of the responsibilities which fall upon them as a consequence of its provisions.**

Site Waste Management Plan **Checklist**

Planning and preparation

- ☐ Have you set aside time to prepare your SWMP?
- ☐ Have you considered the construction methods and materials that you can use to reduce the amount of waste your project produces?
- ☐ Have you thought about ordering materials that have less or reusable/returnable packaging?
- ☐ Have you recorded all of your waste reduction decisions in your plan?

Allocation responsibility

- ☐ Has someone with authority been assigned overall responsibility for the SWMP?
- ☐ Have you included a declaration from the client and principal contractor in your SWMP?

Identifying your waste

- ☐ Have you assessed the waste produced at each stage of the project- the types, how much and when, including the processes involved?
- ☐ Have you identified which workers will produce waste?

Managing your waste

- ☐ Has an area of the site been set aside for storing new materials and waste, including separate containers for different types of waste? You must store new materials separately from waste, and make sure storage areas are secure against vandalism.
- ☐ Have you set targets for the different types of waste likely to be produced by the project? Include targets for the amounts of each waste type to be reused, recycled and disposed of.
- ☐ Have measures been put in place to deal with expected and unexpected hazardous waste?
- ☐ Have you considered whether you can reuse materials either on-site or off-site?
- ☐ Have you considered on-site and off-site processing and reuse of materials?

Disposing of your waste

- ☐ Have you considered how you will dispose of liquid wastes such as wash-down water and lubricants?
- ☐ Have you got agreement from your water and sewerage operator for trade effluent discharge?
- ☐ Are you complying with your duty of care, including waste transfer notes or consignment notes for all movements of waste from your site and checking the details of those removing the waste?
- ☐ Has someone been made responsible for checking that loads of waste leaving your site are accurately described, and waste transfer notes and consignment notes completed correctly?
- ☐ Have you checked that every waste carrier you use is registered with your environmental regulator?
- ☐ Have you checked that all sites receiving your waste have the appropriate permits, licences or registered exemptions?
- ☐ Have you identified your nearest waste sites? Use our Waste Directory (http://ww.netregs.org.uk/library_of_topics/waste/waste/_site_directories.aspx).
- ☐ Have you considered how to reduce disposal costs by reusing or recycling waste materials with a commercial value?

Organising materials and waste

- ☐ Have you assessed the quantities of materials you need to order to reduce over-ordering and site waste?
- ☐ Can you return unused materials to the supplier, sell them or use them on another job?
- ☐ Have you considered using recycled materials?
- ☐ Can you return unwanted packaging to the supplier for reuse or recycling?
- ☐ Will you separate different types of waste to enable you to get best value from good waste management practices?
- ☐ Have you labelled containers and skips clearly to avoid confusion? Colour coding you containers could help.
- ☐ Are your storage areas secure and weatherproof to prevent wind and rain damaging your materials?

- ☐ Have you covered or nettled any loose materials to prevent them being spread and possibly causing pollution?
- ☐ Is everyone who will handle waste aware of the SWMP requirements?

Communicating and training

- ☐ Have you planned site inductions and toolbox talks for all site staff?
- ☐ Are contractors and subcontractors trained and aware of their responsibilities?
- ☐ Have contractors and subcontractors understood and agreed the SWMP?
- ☐ Are SWMP requirements built into contracts?
- ☐ Are you carrying out spot checks and monitoring your staff regularly to make sure they are following procedures?

Measuring and monitoring your waste

- ☐ Are you updating your plan every time waste is removed from your site?
- ☐ Are you checking the SWMP regularly and making sure targets are being reached?
- ☐ Are the agreed waste management procedures being checked and monitored regularly?
- ☐ Are you producing regular reports on waste quantities, treatment/disposal routes and costs?
- ☐ When construction is underway, are you making notes of problem and recording them for your next plan?

Appendix F

Construction Method Statement

Appendix F Construction Method Statement must be read in conjunction with Appendix I Outline Invasive Species Management Plan (OISMP)

The Appointed Contractor is aware of Environmental Protection Agency Act 1992 (as amended). Protection of the Environment Act 2003 (as amended). Local Government (Water Pollution) Acts 1977 to 1990 and will ensure the following measures are taken:

1. The handling, use and storage of hazardous materials will be undertaken in line with the Pollution Prevention Guidelines (e.g. PPG2 above Ground Oil Storage Tanks).
2. All site operatives will receive a Site Induction which includes Health & Safety, Waste & Environmental details (Pollution Prevention Requirements) and Quality Management Procedures.
3. Regular Environmental Toolbox talks will be delivered on site - at least one per week.
4. ***A named person*** has been nominated as the responsible person for pollution prevention on site.
5. ***The Appointed Contractor*** will have spill kits on site and all concerned will be briefed during site inductions on the contents and their use.
6. A spill kit will be on hand during fuel deliveries
7. ***The Appointed Contractor*** will manage any waste arising on site and ensure it is kept to a minimum
8. ***The Appointed Contractor*** will keep in touch with weather forecasts throughout the project and take appropriate action.
9. Daily site inspections will be carried out to check for pollution incidents and/or potential problems.
10. Times for deliveries will be controlled to avoid major disruption to neighbouring traffic.
11. The site manager/site foreman will be on hand to supervise deliveries.
12. Any drums, containers and/or tanks whether used for deliveries to site or on site will be inspected and verified as fit for purpose before accepted to site or used on site.
13. Any plant wheel and/or boot washing will be sited at least 10 metres from the waterbody on the site periphery.
14. There will be no oil or fuel stored on site.
15. Appropriate fuel transfer techniques will be employed such as fuel transfer pumps, drip trays and spill kits.
16. ***The Appointed Contractor*** will Inspect and maintain on a regular basis all temporary and permanent drainage systems and water courses.

Spread of Scheduled Invasive Species

At construction stage, all contractors, sub-contractors and site personnel should be briefed on the presence and location of invasive non-native species; the site practices put in place to avoid further spread and contamination; and receive training in the identification of Himalayan balsam. A poster or leaflet highlighting the key features of the plant will be displayed in all communal areas. Signs should be erected in relevant areas including those proposed for works in associated with the proposals, where the species is present. These measures will help to avoid the potential spread of invasive non-native species either around the site or off.

Appendix I details an Outline Invasive Species Management Plan (OISMP). Please refer to Appendix I for detailed mitigation measures to prevent the spread of scheduled invasive species.

Protection of Surface Waters

During construction, protection measures to control the risk of pollution to surface waters will be adopted, these will include:

a. Any containers of contaminating substances on site will be leak proof and kept in a safe and secure building or compound from which they cannot leak, spill or be open to vandalism.

b. Vehicles will not be left unattended during refuelling.

c. Only construction equipment and vehicles free of oil/fuel leaks which could cause contamination will be permitted on site.

d. There will be regular inspections of machinery on site.

Preventing Contamination

During construction of culverts, the watercourse will be managed to allow for clear unobstructed flows at all times. This would effectively mitigate suspended solids entering the existing watercourse.

Water Pollution Prevention Controls During Culvert Construction

Water pollution will be prevented during the construction phase of the proposed development by following good working practices. Specific controls that will be in place during construction are outlined in Table F.1 below.

Table F.1: Water Pollution Prevention Controls

TASK	RESPONSIBILITY
General:	
All water bodies **that occur in areas proposed for site compounds and storage facilities** will be fenced off to a minimum distance of 10m. Appropriate sediment control measures in line with guidance provided in Pollution Prevention Guidelines and/or updated GGP's and CIRIA guidelines will be installed to ensure silt laden or contaminated surface runoff from the compound does not discharge directly to a water body	Project Manager/ Environmental Advisor/ Foreman
Toolbox talks and water quality awareness training will be given to all site personnel and subcontractors	Project Manager/ Environmental Advisor
Drip trays must be placed under all mobile plant & equipment.	Foreman
Oils and diesels must be stored on drip trays (incl. when in vans).	Foreman
Locate plant & equipment as far away as possible from drains.	Foreman
Do not refuel near drains. Refuel at a designated area on impermeable surface and do not leave the activity unsupervised	All Staff
Check the plant, equipment & vehicles for leaks on a regular basis, and at least twice daily if working in or near waterways.	All Staff
Stand small plant that is leaking in drip trays.	All Staff
If plant & equipment is leaking report to your Supervisor.	All Staff
Arrange for leaking plant to be taken out of service and maintained.	Project Manager
A permit to pump, permit to dig and permit to refuel system will be used to ensure the appropriately trained personnel undertake these tasks to ensure these activities do not impact on water quality.	Project Manager/Environmental Adviser

TASK	RESPONSIBILITY
Check for underground services before starting to excavate.	Project Manager/ Construction Manager
Never pump silt laden water into a watercourse.	All Staff
Do not disturb water in excavations to prevent stirring up silt.	All Staff
Use the lowest corner of the excavation as a pump sump.	All Staff
Position the pump off the bottom of the excavation.	All Staff
Remove light contamination with absorbent pads from your spill kit.	All Staff
Store water heavily contaminated with oil in containers & tanker off-site.	Project Manager/ Environmental Advisor/ Foreman
When disposing of silt laden water from pumping out excavations/ dewatering: ▪ Pump via a settlement tank/ lagoon (with sufficient retention time to settle any silt) ▪ Obtain permission from the landowner and then pump onto grasslands / fields. Monitor pump to prevent scouring and generation of suspended solids. ▪ Obtain permission from Rivers Agency and NIEA Water Order Consent and discharge to surface watercourse/ surface water drain. **Note:** It is recommended the Environmental Adviser is contacted for advice first.	Project Manager/ Environmental Advisor/ Foreman
For very small quantities of water in excavations – pump onto grassland with the landowners' permission pprovided there is no potential from preferential flow paths and overland flow to the aquatic environment.	All Staff
Never pump silt laden water into the watercourse.	All Staff
Watercourse banks will be left intact where possible in order to prevent soils from entering the watercourse.	All Staff
Silt fences or other suitable measures will be installed where the working area encroaches within 10m of a watercourse (with the exception of dedicated water course crossing points) and the local topography indicates there is potential for run-off to directly enter the watercourse. Silt fences will be monitored to ensure working effectively.	All Staff
Keep all materials, plant & equipment over 10m away from the watercourse.	All Staff
Excess material stockpiles will be managed to prevent siltation of water bodies through run-off and overland flow during rainfall events.	All Staff
Where the soil stockpiles represent a particular risk of runoff an interception ditch (cut-off) or silt fencing will be deployed to contain and direct run-off to a treatment area will be provided.	All Staff
Do not re-fuel within 10m of a watercourse or 50m of a borehole without the prior agreement of the EPA.	All Staff
Prevent vehicles & plant from entering the watercourse.	Foreman
Where possible, place a boom across the watercourse directly downstream of where you are working.	Foreman
The volume of water entering the construction site shall be reduced to decrease the volume of silt laden water that could be generated.	Foreman
Keep a spill kit handy.	All Staff.

TASK	RESPONSIBILITY
Allocate a designated wash-out area at least 10m from the water body.	Environmental Manager/ Foreman
Only wash-out concrete in the designated, contained wash-out area.	All Staff
Forward a copy of the Consent to the Project Manager/Quality Manager.	Environmental Adviser/ Client (if applicable)
Inform the Agent/Team Leader of the consent conditions and any required controls.	Environmental Adviser
Follow the additional controls as required.	Construction Manager/ Foreman

Existing Watercourses

A number of minor watercourses are present within the proposed development site, the largest being the narrow central stream, which runs north to south along the western boundary of the willow plantation and to the west of the recycling centre which lies adjacent to the site. Further minor watercourses and flowing wet ditches are present along agricultural field boundaries.

Pollution prevention measures detailed below will be incorporated during the construction phase to prevent any possibility of sediments and other pollutants entering any nearby watercourses or surface drainage systems. The following measures must be implemented;

1. **Dedicate specific areas for oil storage and refuelling, providing bunds sized to contain 110% of fuel storage capacity.**
2. **The contractor will use fill point drip trays, bunded pallets and secondary containment units.**
3. **The site will be enclosed and secured and fuel storage areas will be secondarily secured.**
4. **All fuel, oil and chemical deliveries will be supervised by a responsible person who will be trained to deal with any spillage to prevent a pollution problem occurring.**
5. **Storage of COSHH items is not permitted and only brought to site as required, fuel is provided by client from an existing bunded static supply, where small portable machines are to be fuelled up a drip tray is used.**

Figure F.1 below illustrates the location of the watercourses and a 10m exclusion zone. The exclusion zone is a 10m distance banding or buffer from the watercourse and NO material shall be stored in the area for the duration of the construction works. There shall be no cement, concrete, grout, fuels/ oil/ hydrocarbons stored in the exclusion zone.

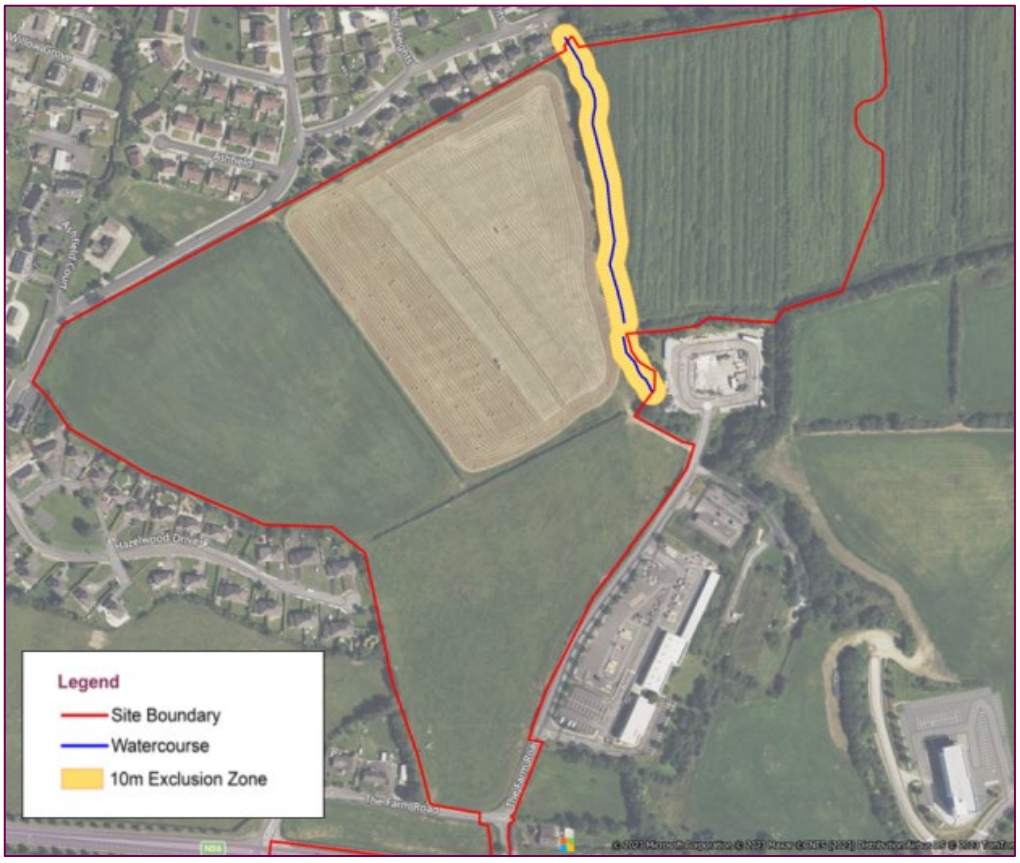


Figure F.1: Watercourse 10m Exclusion Zone

Appendix G

Pollution Prevention Plan

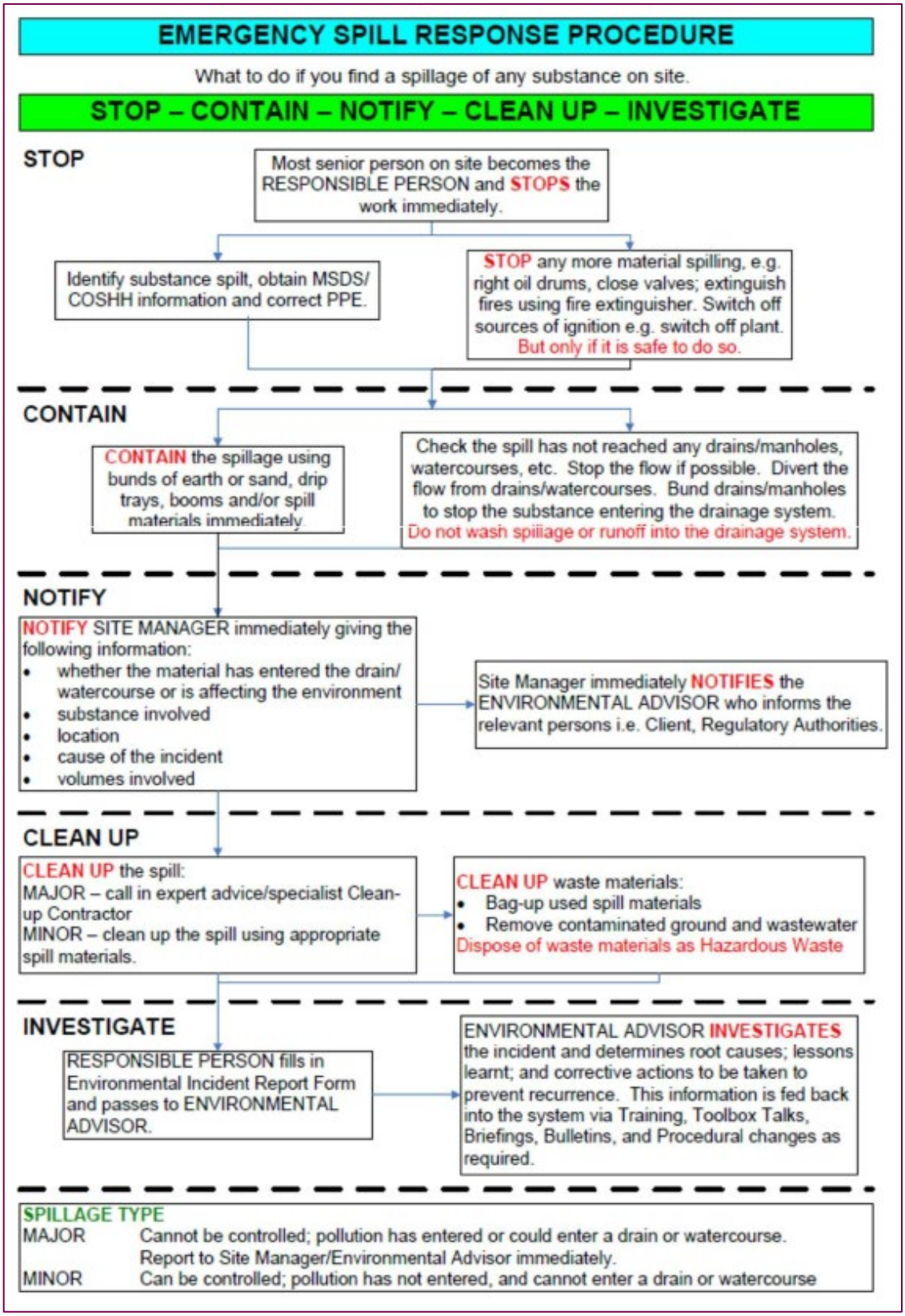


Figure G1: Emergency Spill Response Procedure

GPP 1: A general guide to preventing pollution

Guidance for Pollution Prevention

Name: GPP 1

Date 30/10/2020

These guidelines are produced by the environmental regulators Natural Resources Wales (NRW), the Northern Ireland Environment Agency (NIEA) and the Scottish Environment Protection Agency (SEPA).

For Northern Ireland, Scotland and Wales, this document provides guidance on environmental legislation.These guidelines are not endorsed by the Environment Agency for use in England however you may find them useful. For guidance on environmental regulations in England go to www.gov.uk

To find the relevant regulations visit www.legislation.gov.uk

Guidance for Pollution Prevention documents are based on relevant legislation and reflect current good practice. Following these notes will help you manage your environmental responsibilities to prevent pollution and comply with the law.

If you cause pollution or allow it to occur, you may be committing a criminal offence. Following these guidelines will help you reduce the likelihood of an incident. If one does occur contact your environmental regulator immediately on the hotline number 0800 80 70 60

SECTION 1

1.1 Legal compliance

The basis of any good environmental performance is compliance with environmental regulations. You must be aware of your environmental responsibilities and make sure that you operate in a completely legal way.

Non-compliance brings the risk of enforcement action, possible fines and real damage to your reputation as a business.

1.2 Save money

Good environmental performance includes reducing waste, minimising energy and water use and taking steps to reduce other environmental impacts that your business might have. This creates a leaner and more efficient business with lower costs.

1.3 Manage risk

Businesses which manage the risks to their success are often better prepared to deal efficiently with problems when they happen. Managing risks gives you peace of mind and maximises your chances of running a successful business.

1.4 Enhance your reputation

Legal compliance and implementing good practice will improve your reputation with customers and your neighbours. Your environmental credentials can help you win contracts; an increasingly relevant part of the tendering process for many sectors.

1.5 Why we need to protect our environment

Pollution occurs when substances released to water, land or to air have a harmful effect on our environment. It can affect our drinking water supplies, people's health, business activities, wildlife and habitats, and our enjoyment and use of the environment. You might not see it, but you can pollute it.

Pollution can happen accidentally or deliberately and can come from a single place (point source) or from lots of different, possibly unknown and unconnected sources (diffuse sources).

Many different substances can cause pollution – common examples include:

- fuels and oils
- chemicals
- sewage
- farm manure
- slurry
- detergents
- milk
- fire-fighting run-off.

You should understand your premises and how your activities could affect the environment and cause pollution. Think about what pollution linkages you have.

Figure G2: Source, Pathway, Receptor

Your site and activities will only cause harm to the environment or people if you have all of these present: a source, a pathway and a receptor.

You should put in place measures to break the links or weaken the links between potential sources, the pathways and the final receptor.

By doing this, you can identify how to prevent or reduce the likelihood of pollution and reduce the impact of any problems which may occur.

SECTION 2

2.1 Where does “dirty water” come from?

Where does “dirty water” come from?

Almost all premises produce dirty water which could cause pollution if it enters rivers, streams, ditches or groundwater.

Dirty water comes from:

- Kitchens
- Bathrooms
- Toilet and laundry facilities
- Vehicle washing
- Rainwater run-off from dirty areas of your premises Rainwater run-off: spills from storage and delivery areas
- Liquid wastes or trade effluents from your business activities.

Many premises also store liquid materials such as chemicals, fuels and oils, milk or fertilisers which can spill, leak or release their contents if there is a fire or flood.

To protect your environment from spills, leaks and other accidents it is very important that you make sure that you know where your drains are, and where they go.

2.2 Drains - why are they important?

Drains are common pathways for dirty water to enter the environment and cause pollution. This can happen through wrong connections, spills and leaks, fires and poor or inadequate maintenance.

Your site can have two types of drain: surface water drains, and drains that connect to the sewer.

You must not allow dirty water to enter surface water drains

To reduce the risk of pollution, you should know where your drains are, where they go and correct any problems you may find, such as wrongly-connected pipes.

If you make changes to your premises, such as building an extension or changing activities, you should understand your drainage systems so you can manage these changes safely, cost-effectively and without causing pollution.

If you want to discharge anything other than clean rainwater runoff from your site onto land, or into a watercourse you must contact the EPA and get permission. You will probably have to treat any dirty runoff before you can discharge it. Contact details are at the end of this document. If you want to put dirty water into a sewer, you must contact your water and sewerage provider.

2.3 Where do your drains go?

All premises should have a drainage plan.

This will show where **surface water drains** are located and where they discharge to any nearby ditches, streams, rivers or other watercourses. This includes storm drains.

It will also show where **drains that connect to the sewer** are located. These can be sewers that remove dirty water only, or combined sewers, which take dirty water and runoff from some surface water drains to the sewage treatment plant.

This information should be available when you need it:

- when you plan activities on your site,
- when you to carry out inspection and maintenance of your drains
- when contractors or visitors need this information.

You can get help to work out where your drains are, and where they go, from:

- your sewerage provider
- your landlord
- a drainage consultant.

Produce a clear plan of your site, with all the drains identified, and include the direction of the drain, where it leaves your premises and where it goes. Include any nearby watercourses in your plan.

Colour code manhole covers and drains, **red for drains that lead to the sewer** and **blue for drains that lead to surface water.** This can prevent accidental contamination of the surface water drain.

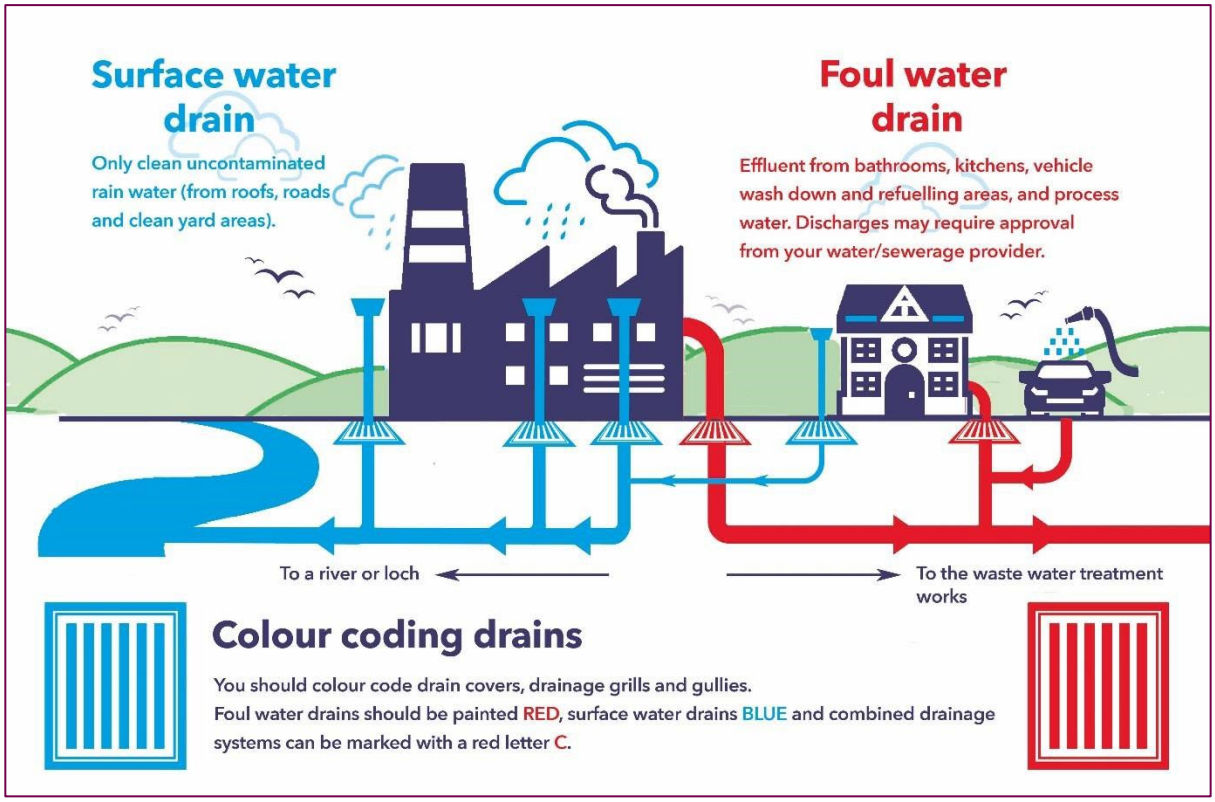


Figure G3: Surface Water and Foul Water Drainage

2.4 On site treatment facilities

You might have treatment facilities on your site, such as septic tanks, package treatment plants or oil separators.

Make sure that these are maintained properly as they can be a source of pollution if they are not working correctly.

Manufacturers will provide information on how to maintain these facilities, you should make sure you have this information available so you can correct any problems, or if you need to change your site layout.

2.5 SuDS

You might also use Sustainable Drainage Systems (SuDS) to treat lightly contaminated water that runs off your site. Speak to your environmental regulator before installing SuDS. It is important to make sure the system is properly maintained.

SuDS can treat runoff where there is a possibility that runoff will collect light contamination, for example from car parks, and will trap and help break down these pollutants. SuDs will also reduce the risk of downstream flooding, and can add green space to built-up areas.

SuDS require a certain amount of land and are not possible on every site. If you are designing new premises then consider SuDS from the outset. In Scotland all new developments (but not single dwellings) must include SuDS for the treatment and attenuation of surface water runoff.

If you wash or clean vehicles on site then make sure runoff from this activity does not go into surface water drains. Make sure that you have permission from your sewerage provider if you want to discharge this runoff to the foul sewer.

SECTION 3

You might store a number of different materials at your premises. Even materials that you think of as safe can cause serious damage to the environment.

Think of all the materials that arrive on your premises, including those delivered, collected, stored and handled by staff, and also by visitors or contractors.

Oils and chemicals are obvious sources of potential environmental harm, but other materials such as food and drink products and detergents can cause significant pollution. For example a spill of milk can cause more harm to a watercourse than the same volume of sewage.

Remember, you have already paid for these materials, and if you lose a quantity of them you are losing money. You will then also have clean-up costs. You also want to avoid any health and safety problems which could affect people on your premises or people nearby.

3.1 Plan your storage areas.

Make sure that you understand the risks associated with any materials you store on site. Suppliers will provide product information and highlight materials with particular risks associated with their storage or handling.

You must pay the same attention to the storage of waste, waste management companies can advise you about containers and storage areas.

Use your **drainage plan** to identify the safest places to store materials. Consider when and how you use these materials, and use this to plan your storage areas.

You should avoid storing materials:

- Near to open drains
- On bare ground; always use impermeable surfaces
- Anywhere near to watercourses, soakaways or other sensitive areas
- Anywhere there is a risk of flooding

Choose areas that are:

- Under cover – to prevent rainwater carrying pollutants away
- Bunded to prevent spills spreading
- In a safe place away from vehicles, to prevent collisions.

Leaks and spills can soak into unmade ground where there is a risk of pollution to groundwater. This can affect drinking water, and the clean-up can be a lengthy and expensive task.

Figure G4: Safe Storage, Bunded and Under Cover

3.2 Use suitable containers

Use containers that are suitable for the materials stored. Label them clearly and store them in a dedicated area.

Make sure your containers are in good condition by doing regular inspections. Any cracks or leaks can be dealt with before causing an incident.

Some materials must have specific storage, for example all kinds of oils and fuels.

Certain materials must be kept away from other materials to prevent reactions or fire.

Keep your storage areas secure, to prevent accidental damage, theft or vandalism.

You are responsible for clean-up costs even if the damage is caused by vandalism.

3.3 Contain leaks and spills.

You can't completely avoid spills and leaks, so put in place measures to reduce their likelihood and severity. You should be able to catch minor spills, leaks or overflows from your containers or stores, and be able to clean them up easily and safely.

Consider installing and maintaining secondary containment, such as a bund wall, or using bunded pallets. It's good practice for your secondary containment to be able to hold more than your tank or container is able to hold, commonly called 110% containment. In some cases this is a legal requirement, such as when storing oils. Secondary containment gives you time to either correct or minimise the problem and to get help.

Figure G5: Bunded Storage Drums and Containers

You should inspect and maintain your secondary containment so it's still effective, such as sealing any cracks or holes, making sure any walls or floors are rendered impermeable, and safely removing any rainwater from the secondary containment. If you store fuels or other liquids in underground storage tanks (USTs) you must take care when installing these tanks, or when decommissioning or removing them. If not carried out properly, these activities can result in serious pollution of soil, groundwater and nearby water courses.

You and others on your premises should know where to find your spill kits, understand how to use them properly and understand how to store and use materials safely. Label your spill kits and check their contents regularly.

If you have a spill or any pollution incident, report immediately by calling the EPA on

0818 33 55 99

3.4 Deliveries

Delivery and handling of materials can be risky, and delivery areas should be managed to prevent incidents.

Have procedures in place for safe deliveries, and make sure all your suppliers understand them. Supervise deliveries to make sure that procedures are followed.

Keep spill kits or appropriate clean-up equipment close to where deliveries are made, and make sure staff and suppliers understand how to use them.

Minimise the handling and movement of materials around your site by planning where deliveries take place. This reduces the risk of spills, and also saves time and money.

3.5 More information on storage of materials

All GPPs can be found at: https://www.netregs.org.uk/environmental-topics/pollutionprevention-guidelines-ppgs-and-replacement-series/guidance-for-pollutionprevention-gpps-full-list/

GPP 2 Above ground oil storage tanks.

GPP 8 Safe storage of used oils

GPP 13 Vehicle washing and cleaning

GPP 22 Dealing with spills

GPP 21 Pollution Incident Response Planning

GPP 26 Drums and intermediate bulk containers

Section 4

4.1 Minimising your waste (Appendix E details a SWMP)

Everything you buy and use on your premises might end up as waste, from food to packaging to off-cuts. Do you know what wastes are you generating at each stage of your activities?

Poorly managed wastes can pollute the environment, for example through illegal dumping or leaking into the ground or watercourses.

You have a responsibility – called **the duty of care** - to ensure you produce, store, transport and dispose of waste without harming the environment. This includes waste you produce directly and indirectly, such as waste produced by a contractor doing work on your behalf.

Wastes which are most hazardous to the environment or human health, such as solvents, asbestos and oils must be managed differently from other wastes. You have a legal duty to understand what types of waste you produce and how you need to manage them.

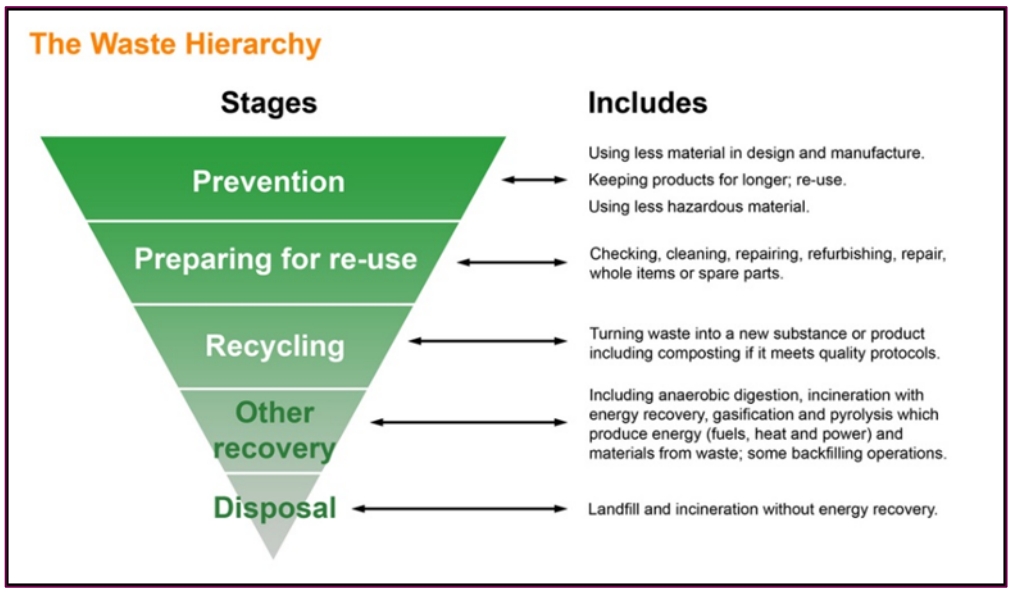


Figure G6: The Waste Hierarchy

Reduce

There are a number of ways to reduce the amount of waste you produce. This ranges from simple measures such as purchasing goods with less packaging or buying in bulk, not in individual packs, to entirely redesigning your products and processes to eliminate waste.

Reuse

Identify goods or materials that can be reused, perhaps with minimal cleaning and preparation. Design for re-use, e.g. your packaging.

Recycle

Items that can't be re-used can often have the materials they are composed of recycled. Items made of a single material are easier, however you may be able to find a cheap way of removing recyclable parts from more complex items.

Recover

Rather than dispose of materials to landfill, it is sometimes possible to recover some value from them, even if this is just heat from burning them. Energy from waste plants convert the waste into heat and power.

Dispose of.

The least desirable destination for waste. A last resort if all other options have been tried and have not been feasible.

4.2 Storage and handling

Store waste in secure containers. If they contain liquids, make sure they don't leak. Where appropriate keep waste in containers with lids. This will prevent the wind blowing waste around your site, and will keep the waste dry. Rain water could pick up pollutants from the waste and this contaminated water would need to be managed as a waste too. Also, for example, wet cardboard weighs more than dry, and if soaked you could end up paying extra to have this material removed from your site.

4.3 Segregate your wastes

In Ireland all businesses must segregate dry recyclable materials. Paper, cardboard, glass, metals and plastic must be segregated to allow for high quality recycling.

Clearly label the containers for different materials and make your staff aware so the right materials go into the right containers.

Identify all the waste materials you produce, then identify those that can be reused or recycled.

4.4 Hazardous/special waste

Some types of waste, called 'hazardous wastes', or, in Scotland, 'special wastes', are very harmful to human health or to the environment. You must store, handle and dispose of these differently to non-hazardous wastes.

You must not mix different types of hazardous/special wastes together. Also, if you mix hazardous wastes with non-hazardous wastes then you must consider it all as hazardous/special waste.

Consider the security of your premises too - any waste dumped on your property becomes your responsibility to remove, and it will cost you money.

4.5 Waste Disposal

You must only use a registered waste carrier to take your waste away. Check your environmental regulators website to find a list of all registered waste carriers.

Ask where they will take your waste, and check that waste site is authorised to accept your type of waste. Not all waste management sites can accept all types of waste.

You can transport your own business waste to a site for recovery or disposal, but you will need to register with your environmental regulator.

If waste is removed from your site you must complete a Waste Transfer Note, and keep your copy for 2 years. If the waste removed from your site is hazardous/special waste then you must complete a Consignment Note and keep your copy for at least 3 years.

4.6 More information on waste management

More information on waste management can be found through the weblink below;

https://www.epa.ie/our-services/monitoring--assessment/assessment/irelands-environment/waste/

Check if a waste carrier is licensed:

Ireland: Registered waste carriers/transporters;

https://www.epa.ie/our-services/licensing/waste/

SECTION 5

5.1 Preparation

Take time to consider all areas of your premises or site. Think about where things could go wrong and why. Consider fire, flooding, accidents, vandalism, leaks and spills and how materials and waste are moved around your premises.

Dealing with incidents mean significant disruption to your activities. The better prepared you are the less downtime you will experience. Preparing and incident response plan can save time and effort and will reduce the cost of dealing with an incident.

Remember, you are responsible for any contractors working on your behalf, so you must make sure you give them clear work instructions and supervise them appropriately

5.2 Planning and training

The best way for you to cope when problems and emergencies arise is to plan. Well managed premises are less likely to have problems in the first place.

You should create and implement an **incident response plan**. You may even have a legal responsibility to make a plan. It should include procedures to deal with problems and emergencies and importantly include a copy of your drainage plan.

5.3 Implement plans

Make sure everyone on your premises understands what to do in case of an emergency. Include advice to visitors and contractors. Keep a copy of your plan offsite, so you can always access it. Regularly train staff, and review your plans on a regular basis to make sure they are fit for purpose. Make sure the plan is updated if there are changes to you premises, or you change the materials or processes you carry out.

5.4 Flooding

You can check whether you are at risk from flooding on the flood maps available from your environmental regulator. You will also be able to sign up for free flood warnings direct to your phone.

5.5 Fire

Contact your local Fire and Rescue Service and ask them to visit and give you advice of fire safety and fire prevention. They can help you draw up a fire response plan for your premises.

5.6 Spill kits and pollution control equipment

Keep spill kits close to areas where there is a risk of spills, for example near to oil storage areas. Make sure these are maintained and restocked after any incident.

Train staff in when and how to use them.

Have pollution control equipment that is appropriate to your site, your activities, and the risks they pose.

5.7 If you have an incident

If you have a pollution incident:

Contact the EPA on

0818 33 55 99

Your environmental regulator can offer advice on what to do and can inform any other agencies that may be required.

5.8 More information on dealing with pollution incidents

More information can be found at: **https://www.epa.ie/**

Flood maps and guidance

https://www.floodinfo.ie/map/floodmaps/

Donegal Fire and Rescue Service: Business safety advice

https://www.donegalcoco.ie/services/fireservice/

Appendix H

Emergency Response & Environmental Plan

The contractor will be responsible for the preparation and implementation of the spillage response procedure. The key issues to consider for the spillage response procedure include:

1. **If the main contractor already has a standard spill response procedure in operation then this should be amended to reflect the local conditions on site;**

2. **It will be important to ensure that the Environmental Manager is notified of all incidents where there has been a breach in agreed environmental management procedures;**

3. **As a general rule the following principles should apply In the event of an environmental emergency:**

    a. **If SAFE, stop the source of the spill and raise the alarm to alert people working in the vicinity of any potential dangers. Inform Engineer immediately**

    b. **IF SAFE (USE PPE), contain the spill using the absorbent spill material provided. Do not spread or flush away the spill. Cover or bund off any vulnerable areas where appropriate.**

    c. **If possible, clean up as much as possible using the absorbent spills materials. Do not hose the spillage down or use any detergents.**

    d. **Contain any used absorbent material so that future contamination is limited.**

    e. **Notify the Construction Project Manager and environmental officer so that used absorbent material can be disposed of using a specialist contractor.**

4. The Construction Manager, in conjunction with the contractor's environmental manager, will develop and test, through exercises, the Emergency Spillage Procedure to ensure that appropriate measures to prevent and mitigate damage due to accidents and spillages are in place.

5. Testing of the Emergency Spillage Procedure shall be recorded on the relevant environmental control form.

6. Inform all personnel about the spill response procedure through toolbox talks and/or induction training. Consider the need for refresher training on long-term construction projects.

7. Use reminder posters, identifying the key essential elements of the spill response procedure, located in appropriate areas such as fuel storage areas, mess cabins, security points or on the back of toilet doors.

8. Example control containment measures for different pollutants are given here:

Control/Containment Measure	Pollutants				
Spill on ground	**Concrete / cement**	**Paints**	**Oils**	**Silt**	**Detergents**
Sand	✓	✓	✓	×	✓
Straw bales	×	×	✓	✓	×
Absorbent granules	×	×	✓	×	×
Geotextile fence	✓	×	×	✓	×
Drip trays	×	✓	✓	×	×
Pads/rolls	×	×	✓	×	×
Drain seal	✓	✓	✓	✓	✓
Earth bunds	✓	✓	✓	✓	✓
Spill in water					
Straw bales	×	×	✓	✓	×
Pads/rolls	×	×	✓	×	×
Booms	×	×	✓	×	×
Stop further spill contain and inform appropriate personnel immediately	✓	✓	✓	✓	✓

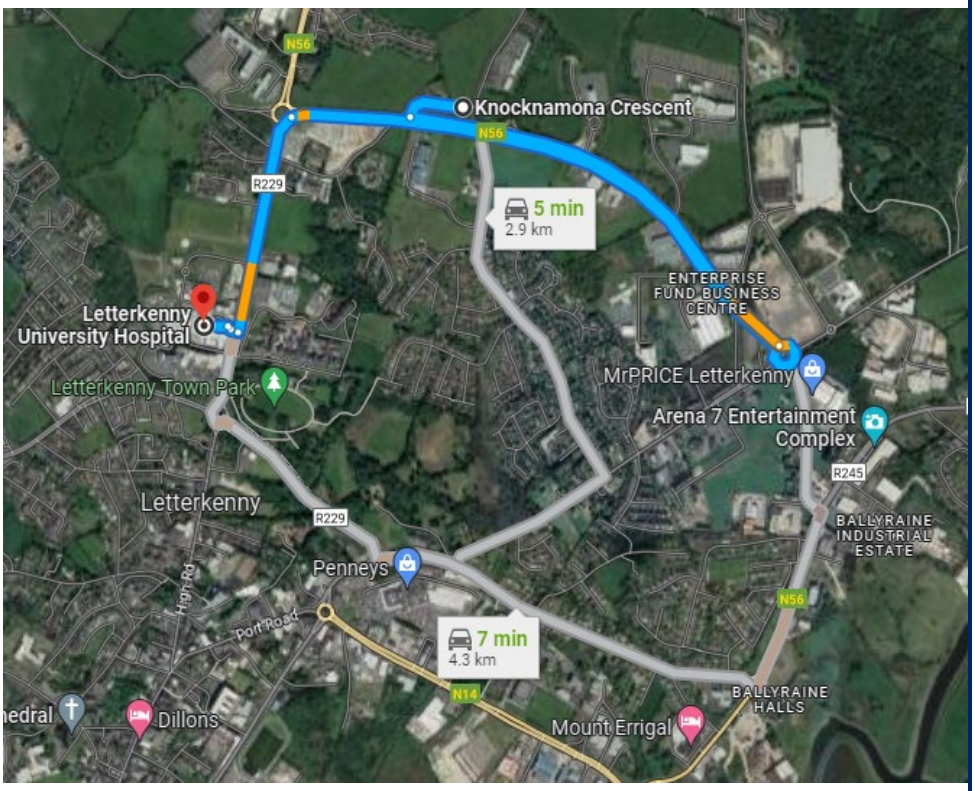
In the event of a significant spill contact the **EPA Phone Number: 0818 33 55 99**

It will be important to incorporate the names and telephone numbers of others you need to inform (includes alerting people out of hours) and who should contact them within the spillage response plan.

Further issues to be considered when the main contractor is preparing an emergency spill response plan include:

- Details of a professional 24 hour call-out clean-up service e.g.: Alpha Environmental Systems Ltd. Tel: 028 7035 4435
- Ensure sufficient types and quantities of spill response equipment are available on site. Keep spill kits where spills may occur, e.g. at refuelling points or on plant working near a watercourse.
- Material safety data sheets and COSHH assessments will assist in identifying appropriate spill measures for dealing with hazardous materials.
- Dispose of used spill response material appropriately, e.g. oily granules or pads should be bagged up and placed in the designated waste skip.

IMPORTANT TELEPHONE NUMBERS

Emergency Contact Details	
Emergency Services	999
Nearest hospital Letterkenny University Hospital, Kilmacrennan Road, Ballyboe Glencar, Letterkenny	
Environmental Protection Agency	**EPA Dedicated Low Call Number** **0818 33 55 99**

Contractor Contacts: (Out of Hours)	
Construction Director	TBC
Construction Manager/Site Manager	TBC
Environmental Manager	TBC

Incident response plan KEY POINTS (From: GPP 21: Pollution Incident Response Plans)

Procedure	Included?
Clearly define **when you will activate the plan**. This will depend on the nature of your site and the type of the incident.	
Ensure all relevant staff know how and when to **contact other emergency responders**: emergency services, environmental regulator, local authority, sewage undertaker and others identified in your plan.	
Agree **contact procedures**, if possible, with nearby properties, downstream abstractors, agricultural land or environmentally sensitive sites that could be affected by an incident on your site.	
Put in place **staff evacuation procedures** – your local authority emergency planning department will help you with these.	
Identify any special methods you need to deal with **substances** posing particular health or environmental risk.	
Train your staff in **the use of spill kits**, drain blockers and other pollution control equipment and the operation of pollution control devices.	
Identify procedures for recovering spilled product and the safe handling and **legal disposal of any waste** associated with the incident.	
Have staff available who are trained to deal with **media enquiries**.	

From: Guidance for Pollution Prevention Dealing with spills: GPP 22 October 2018 (Version 1)

PRINT OUT AND DISPLAY SIGN (To be located throughout site)

STOP

- Stop work immediately
- Stop the leak or elimimate the source of the spill
- Eliminate ignition sources and provide natural ventilation

CONTAIN

- Use pollution control equipment (e.g. spill kits, drip trays, bunds of earth and sand) to contain the spill
- Check the spill has not reched any drains, water courses or other sensitive areas
- Cover all drains / manholes to prevent the spill from entering the drainage system

NOTIFY

- Once the spill has been contained notify your emergency contact. Details at the bottom of the page:.

CLEAN-UP

- Attempt to soak up the spill using absorbent material
- Always follow your Duty of Care for waste when disposing of contaminated materials including spill kit/equipment.

EMERGENCY CONTACT DETAILS (Complete with your business details)

NAME	TELEPHONE	NEAREST SPILL KIT

EPA Dedicated Low Call Number

0818 33 55 99

Appendix I

Outline Invasive Species Management Plan (OISMP)

OUTLINE INVASIVE SPECIES MANAGEMENT PLAN

ATU Regional Sports Activity Hub

NI 2553 ATU Regional Sports
Activity HUb
Ecology
OISMP
F01
April 2023

www.rpsgroup.com

Document Status

Version	Purpose of document	Authored by	Reviewed by	Approved by	Review date
F01	OISMP	S. O'Hara	J.McCrory	J.McCrory	21/04/23

Approval for issue

James McCrory CEcol CEnv MCIEEM CBiol MRSB		21/04/23

Prepared by:

RPS Ireland Ltd (NI)

Samuel O'Hara
Associate - Ecology

Elmwood House, 74 Boucher Road
Belfast, Co. Antrim, BT12 6RZ

T 028 9066 7914
E samuel.ohara@rpsgroup.com

Prepared for:

Hamilton Architects

Mark Priestley
Senior Architect

Hamilton House, 3 Joy Street, The Linen Quarter, Belfast, BT2 8LE

T +44 (0)28 9033 4250
E mark.priestley@hamiltonarchitects.co.uk

Contents

Figures

Appendices

1 INTRODUCTION

1.1 Introduction

RPS was commissioned by Hamilton Architects, on behalf of Letterkenny Institute of Technology to produce an Outline Invasive Species Management Plan (OISMP) for lands north of the N56 Road, Letterkenny in association with the proposed Regional Sports Activity Hub.

1.2 Statement of Authority

The author and surveyor, Samuel O'Hara, is an Associate Ecologist with RPS and holds a BSc (Hons) in Ecology and has over eight years of experience in the field of ecology. Samuel has extensive experience of ecological field survey including habitat, mammal and bird survey and is a protected species license holder. Samuel is an Associate member of the CIEEM.

The reviewer, James McCrory, is a Senior Associate of Ecology within RPS and holds a BA (Hons) in Natural Sciences (Mod) Botany and a MSc in Habitat Creation and Management. James is a Chartered Environmentalist (CEnv), a Chartered Ecologist (CEcol) and a Chartered Biologist (CBiol). James is part of the CIEEM Policy Review Group in Ireland and is a member of the CIEEM technical committee updating the seminal Guidelines for Ecological Impact Assessment in the United Kingdom (IEEM, 2006).

We confirm that the professional judgement expressed herein is the true and bona fide opinion of our professional ecologists. The information prepared and provided is accurate at the time of issue of this report and has been prepared and provided in accordance with the CIEEM Code of Professional Conduct (CIEEM 2019).

1.3 Proposed Project

The scope of the project includes but not limited to the construction of a sports hub incorporating the following elements:

- Pitch 1: Full GAA sized 4G artificial grass pitch – split into 2 x 4G AGP soccer pitches when required.
- Pitch 2: Full sized grass GAA sized match pitch
- Pitch 3: Full size grass soccer pitch
- Pitch 4: Full size grass soccer pitch
- Pitch 5: Non-turf pitch cricket wicket and grass outfield over pitches 3 and 4
- Pitches 6 –7: 2 x small sided 4G artificial grass pitches 'caged' with 1.2m high rebound boards and 2.4m fencing over
- c.990 sqm Indoor dome covered sports courts and ancillary accommodation suitable for warm-up and a range of sports
- Training/Practice Area (25x80m)
- Hurling/Handball Wall
- 6 Lane Athletic Sprint Track (50x7.5m)
- Pavilion building (c.1,325m^2) with:

  - Booking office/reception
  - changing and meeting facilities
  - self-serve catering facility
  - stores
  - flexible space for group exercise and community programmes
- Grounds Equipment Store and service compound
- Walking Trail Loop
- Informal cross-country route
- Children's playpark, with amphitheatre and Community Garden
- Landscaping to include biodiversity garden

The scope of the project also includes:

- Drainage
- Floodlighting to Pitches 1, 2, 6 & 7
- Fencing and netting to pitches 1, 2, 6 & 7
- Goal posts and ball stop netting.
- Tiered spectator viewing facilities to Pitches 1 and 2
- Site lighting
- Access roads, footpaths and cycleways
- Coach Parking
- Parking including disabled parking
- Electricity line that needs to be realigned
- Improved access arrangements from the N56
- Realignment of part of the site boundary with the adjoining local road to improve visibility
- Site preparation including:
  - cut and fill and soil importation to prepare sloping areas of site
  - ducting for undergrounding of overhead electrical services

1.4 Site Description

The study area surveyed for invasive species and subject to the recommendations within this document consist of large areas of agricultural fields and adjacent areas of short-rotation willow coppice, in addition to associated hedgerows. The site is semi-urban, being largely surrounded by existing development.

The area subject to survey are illustrated on the accompanying Figures 1.0, invasive species outside of the proposed development boundaries were also noted, where these were recorded during survey works within the study area.

1.5 Invasive Species

Invasive non-native species are defined as those that have been introduced, either intentionally or unintentionally, outside of their natural range and that present a threat to biodiversity. They can have a

wide range of impacts on ecology, the environment and the economy. Once established they can be extremely difficult to control and costly to eradicate. It is also an offence to plant or otherwise cause to grow in the wild any plant listed on Part 1 of SI. No. 477 of 2011, European Communities (Birds and Natural Habitats) Regulations 2011.

Invasive non-native species listed on Part 1 of SI. No. 477 of 2011, European Communities (Birds and Natural Habitats) Regulations 2011 and recorded within the survey sites include Himalayan balsam *Impatiens glandulifera* and salmonberry *Rubus spectabilis*.

2 LEGISLATION & PLANNING POLICY

The principal legislation in Ireland relating to invasive non-native species and relevant to the proposed development are set out below.

2.1 European Communities (Birds and Natural Habitats) Regulations 2011 [SI. 477]

It is an offence under Article 49 (2) of the European Communities (Birds and Natural Habitats) Regulations 2011 for any person to plant, disperse, allow to grow or cause to disperse, spread or otherwise cause to grow throughout the state any plant included in Part 1 of the Third Schedule. Giant hogweed, Himalayan balsam, Himalayan knotweed, Japanese knotweed and rhododendron are included on the Third Schedule of the Regulations.

2.2 European Regulations

Regulation (EU) 1143/2014 on invasive alien species (the IAS Regulation) entered into force on 1 January 2015, fulfilling Action 16 of Target 5 of the EU 2020 Biodiversity Strategy, as well as Aichi Target 9 of the Strategic Plan for Biodiversity 2011-2020 under the Convention of Biological Diversity.

The core of the IAS Regulation is the list of Invasive Alien Species of Union concern ("the Union list").

The IAS Regulation provides for a set of measures to be taken across the EU in relation to invasive alien species included on the Union list. Three distinct types of measures are envisaged, which follow an internationally agreed hierarchical approach to combatting IAS:

Prevention: a number of robust measures aimed at preventing the intentional or unintentional introduction of IAS of Union concern into the EU.

Early detection and rapid eradication: Member States must put in place a surveillance system to detect the presence of IAS of Union concern as early as possible and take rapid eradication measures to prevent them from establishing.

Management: some IAS of Union concern are already established in certain Member States. Concerted management action is needed to prevent them from spreading any further and to minimize the harm they cause.

3 INVASIVE SPECIES SURVEY RESULTS

Invasive species survey at the site was undertaken by RPS in May 2022.

Invasive species survey findings are described below for the site are illustrated on the accompanying Figures 3.1.

3.1 Himalayan Balsam

The locations of these species within the survey area are illustrated on the accompanying Figure 3.1.

Himalayan balsam was recorded in two separate scattered stands within the study area, including a long and narrow stand (c.150m2) within the margins of short rotation coppice to the east of the central watercourse and a smaller stand (c.40m2) of recently colonised plants on an area of dumped spoil adjacent to the access track leading to the short rotation coppice in the central area of the site.

3.2 Salmonberry

Salmonberry was recorded scattered throughout the vast majority of the hedgerows within the study area in addition to scattered throughout areas of short-rotation coppice.

The locations of these species within the survey area are illustrated on the accompanying Figure 3.1.

4 OUTLINE MANAGEMENT PLAN

4.1 Responsibility

The OISMP has been drafted prior to procurement of a Contractor by Letterkenny Institute of Technology. The person responsible for the management of invasive non-native species on site and the implementation of the ISMP has therefore yet to be appointed. Once procured the Contractor will appoint an Environmental Manager (EM) and Ecological Clerk of Works (ECoW).

The EM will be responsible for the implementation and sign-off of the ISMP, liaison with the ECoW, ensuring that all contractors, sub-contractors and site personnel are aware of the plan and that provisions are made for avoiding any further contamination of the site. The EM will also be responsible for ensuring that the ISMP is updated and revised in light of any emerging civil engineering design and in advance of management works.

The ECoW will be a person with the qualifications, training, skills and relevant experience to undertake appropriate survey and monitoring and to provide specialist advice in relation to invasive non-native species to site personnel on the necessary working practices required to safeguard the site and to aid compliance with relevant legislation. The ECoW will be responsible for survey and identification of invasive non-native species; supervising management works where necessary and monitoring.

The ISMP is a working document, its appendices and any revisions will be kept for future site owners.

4.2 Site Management Objectives

The main management objective is to manage and/or eradicate invasive non-native species including Himalayan balsam and salmonberry located within the site boundary prior to commencement of initial site preparation works and any resulting construction contract.

Where proposed development will involve excavation or other works within areas supporting invasive non-native species it is envisaged that more rapid techniques for eradication will likely be required to ensure the future integrity of any constructed features and to prevent spread of the species during construction.

Where stands of invasive species will not be directly affected by the proposals it is considered that a more long-term approach may be more appropriate, involving management rather than eradication, to reduce expenses associated with large and unnecessary excavations, as may be required.

4.3 Himalayan Balsam

Himalayan balsam is an invasive non-native species in Ireland originating from the Himalayas. It is an annual plant that completes its life cycle in one growing season and reproduces from seed. Each plant can produce over 800 seeds which remain viable in the soil for up to two years. The mature seed capsules explode at the slightest touch and can scatter seeds up to 7 m from the parent plant. It can be spread by the movement of contaminated soil containing seeds and by transport of seed by water when located next to watercourses.

4.3.1 Management Options

There are a number management options for the control of balsam these include:

- Excavation & Removal of the Seed Bank Off Site
- Excavation of the Seed Bank, Cell Formation & Burial On Site
- In-situ Herbicide Treatment (folia application)
- Manual removal (pulling or cutting)
- Combined Method (combined treatment of cutting & herbicide)

It is not an acceptable option to consider doing nothing.

Given the timescales involved in the project it is proposed that feasible management options are limited to in-situ herbicide treatment or combined methods of cutting, removal and herbicide treatment. Such treatment can proceed as early as possible and in advance of the proposed development.

Stands of Himalayan balsam located outside of the site boundary or within areas not subject to direct disturbance, should be managed via in-situ herbicide treatment. This treatment will result in the eradication of the treated plants however treatment is likely to be required on a repeated basis over a number of years to exhaust the seed bank.

4.3.2 Preventing Further Spread

- At construction stage, all contractors, sub-contractors and site personnel should be briefed on the presence and location of invasive non-native species; the site practices put in place to avoid further spread and contamination; and receive training in the identification of Himalayan balsam. A poster or leaflet highlighting the key features of the plant will be displayed in all communal areas. Signs should be erected in relevant areas including those proposed for works in associated with the proposals, where the species is present. These measures will help to avoid the potential spread of invasive non-native species either around the site or off site.

4.3.3 Option 1: In-Situ Herbicide Treatment (Folia Application)

- Himalayan balsam stands managed using in-situ herbicide treatment. Herbicide must be applied by a '*Suitable Qualified and Fully Trained Operative'*. It is recommended that glyphosate is used to treat balsam growth. It should be noted however that glyphosate is a non-selective broad-spectrum systemic herbicide. Care should therefore be taken when using it around mature trees and desirable vegetation.
- Herbicide should be applied in late-spring in dry weather conditions (no rain for 24 hours). Spraying should not be carried out in wind speeds above Force 2 on the Beaufort scale to avoid spray drift.
- Details of all herbicide applications should be recorded and documented in Appendix I. Details should include the name of personnel, date, balsam stands treated, herbicide brand name, active ingredient, amount used and weather conditions.
- The treated stand should be monitored to check for new growth throughout the growing season and herbicide treatment carried out once a year in late-spring, prior to the plant setting seed.
- Herbicide treatment will kill each individual plant, however repeated treatment over a number of years will be required given the presence of a seed bank within the areas in which the plant is supported, as new growth from the seed bank arises.

4.3.4 Option 2: Manual Removal

- Himalayan balsam stands managed using manual removal. This methodology will involve the cutting of plants in the growing season before the plant has set seed. It is therefore recommended that such works would not take place when pods are visible on plants.
- Plants should be cut manually and cleanly using a cutter, hook or scythe. Plants should be cut below the lowest node of the plant to prevent regenerative growth. Cutting should be undertaken in late-spring before the plant sets seed.
- Plants should not be cut, strimmed or flailed during the active seeding period (June-September) to prevent dispersal of seeds.
- Where cutting is undertaken prior to the plant setting seed the cut material can be left in-situ or removed from site.
- Where cutting is required within the late-summer and autumn, when the plant has set seed, it will be necessary for plants to be individually bagged and subsequently cut. Bags will be of appropriate size and care taken to prevent the accidental spread of seed during the process. It is recommended however that cutting or other treatment of the species during the late-summer and autumn is avoided where possible.
- Where small areas are to be cleared manual control can be achieved through the pulling up of plants. Again such plants can be left in-situ or removed from site and it is recommended that such works take place in the late-spring to avoid the potential for inadvertent spreading of seeds.
- Manual removal will eradicate individual plants, however repeated treatment over a number of years will be required given the presence of a seed bank within the areas in which the plant is supported, as new growth from the seed bank arises.

4.3.5 Option 3: Combined Methodology

- A combined methodology can be utilised as required, including both the application of herbicide or cutting, where such solutions may complement each other and where one treatment option is not feasible.
- The methodology for such an approach is likely to be subject to tailoring by the contractor on the ground, but should be undertaken in line with the relevant information above in respect of the treatment options.

4.4 Salmonberry

R. spectabilis is a deciduous shrub from western North America. It is a deciduous, vigorous, suckering shrub, naturalising in woods and hedges, often forming extensive thickets. It is common throughout Ireland having naturalised in many areas. Forming dense thickets, it can inhibit the regeneration of native plant species, such as native trees in woodland. It can fully occupy a site through vegetative regeneration (suckering as well as layering of above-ground stems) and can spread through seed dispersal.

Rhizomes typically grow within several feet of the soil surface, but may be deeper. Often they form dense, interwoven mats. Each rhizome has the potential to produce buds every 0.5 to 1.0 inch. As such, a single network can therefore contain hundreds of thousands of buds per acre. Rhizomes grow rapidly, often several feet per year, particularly following disturbance (O'Rourke, E. & Lysaght, L., 2014).

In the Republic of Ireland it has been assessed as having a risk of Medium Impact.

4.4.1.1 Preventing Further Spread

- Immediate priority should be given to setting up a Contamination Zone around an individual plant or large thicket or stand. The Contamination Zone should extend 2m laterally from visible plant growth and hi-visibility hazard tape or barrier fencing mesh and signs should be erected warning of the presence of invasive non-native species. The Contamination Zone will demarcate the area of soil likely to be contaminated by the underground rhizome system of salmonberry. No access should be allowed within the Contamination Zones.
- Eradication works should avoid the use of machinery and vehicles with caterpillar tracks. Contractors should ensure that all machinery and vehicles used on site will be brushed down on root barrier membrane and cleaned immediately prior to leaving the Contamination Zone. Care must be taken to clean off all infective plant and soil material. The discarded material will not be allowed to contaminate drains, ditches or watercourses. The machinery and vehicles will be inspected before being taken off site and used for other work. All other equipment used on site including clothes and boots that have come into contact with contaminated material must also be cleaned and the discarded material must be disposed of appropriately with all other contaminated material. Materials leaving or brought onto site should be checked to ensure that invasive non-native species do not leave or enter the site via this route.
- All contractors, sub-contractors and site personnel should be briefed on the presence and location of invasive non-native species; the site practices put in place to avoid further spread and contamination; and receive training in the identification of Salmonberry. A poster or leaflet highlighting the key features of the plant will be displayed in all communal areas. Signs should be erected in Contamination Zones. These measures will help to avoid the potential spread of invasive non-native species either around the site or off site.

4.4.1.2 Herbicide Treatment

- Herbicide must be applied by a ‘suitable qualified and fully trained operative’. It is recommended that glyphosate is used to treat Salmonberry. It should be noted however that glyphosate is a non-selective broad-spectrum systemic herbicide. Care should therefore be taken when using it around mature trees and desirable vegetation.
- Herbicide should be applied in dry weather conditions (no rain for 24 hours). Spraying should not be carried out in wind speeds above Force 2 on the Beaufort scale to avoid spray drift.
- Details of all herbicide applications should be recorded and documented in Appendix I. Details should include the name of personnel, date, plant location(s), herbicide brand name, active ingredient (if not glyphosate), amount used and weather conditions.
- The stand(s) of salmonberry should be monitored to check for re-growth every 6 weeks throughout the growing season and herbicide treatment before Excavation, Cell Formation & Burial on Site can take place prior to the commencement of initial site preparation works and the main construction contract.

4.4.1.3 Removal Options

4.4.1.3.1 Option 1 – Excavation and Stockpiling and Treatment

It may be feasible to excavate plants and deposit this material and contaminated soil within a specific area of the site which is not proposed for development for ongoing herbicide treatment.

- The designed Spread Ground Location Area will be identified and prepared prior to the excavation.
- A haulage route and decontamination area, protected with a root barrier membrane, will be set up and isolated by exclusion fencing and signs erected to indicate Salmonberry contamination. The route barrier membrane will be protected from damage by a 100mm layer of sand above and below the membrane, topped with a layer of hardcore or other suitable material. All of this material will be removed off-site along with the last load of contaminated soil. The haulage route will be limited to machinery and vehicles involved in the transport of contaminated soil only. The location of the haulage route and decontamination area will be sited in consultation with the ECoW.
- Where ground conditions allow Salmonberry stands should be excavated to the recommended minimum depth of 2m below ground level and within 2m from the plant growth area. It is possible that the volume may be reduced by the presence of the ECoW who would identify the rhizome during excavation. A single excavator with the sole purpose of excavating contaminated soil will be used throughout the entire excavation to reduce the risk of further contamination.
- All machinery used in the excavation and transport of contaminated material must be brushed down in the decontamination area and then pressure washed immediately prior to leaving the site. Care must be taken to clean off all infective plant and soil material. All other equipment used on site including clothes and boots must also be cleaned. All machinery and vehicles will be inspected by the ECoW before being used for other work or taken off site. The decontamination area must be designed to collect and contain all contaminated material including soil, water and silt left behind after machinery and vehicles have been pressure washed. The discarded contaminated material should be disposed of in the Spread Ground Location Area.
- Care must be taken to ensure that all equipment used on site is cleaned and free from Salmonberry material before leaving the site to avoid committing an offence.
- The appointed Contractor should provide a site plan indicating the location of the cell formation area, haulage routes & decontamination areas; a technical specification drawing for cell formation taking into account existing site conditions and underground services; and method statements detailing the procedures for removal.
- The Contractor should provide method statements detailing the procedures for Salmonberry eradication including:
  - Method Statement for Application of Herbicide to Salmonberry
  - Method Statement for Spread Ground Location Area
  - Method Statement for Excavation of Salmonberry
  - Method Statement for Loading & Transporting Salmonberry
- Full details of the ISMP and the Spread Ground Location Area should be kept for future site owners.

- Following completion of all works with potential to give rise to disturbance to salmonberry, heribbicide treatment of the spread ground area should be undertaken in line with the prescription above.

4.4.1.3.2 Option 2 - Standard Excavation, Cell Formation & Burial on Site Method

- Plants will be treated with herbicide immediately prior to excavation using foliar application and left in-situ for a period of two weeks. Herbicide must be applied by a 'S*uitable Qualified and Fully Trained Operative'*. It is recommended that glyphosate is used. Note however that glyphosate is a non-selective broad-spectrum systemic herbicide. Care should therefore be taken when using it around mature trees and desirable vegetation. Herbicide Records including details of herbicides used, dose rate, application rates and dates applied should be kept in Appendix I.
- All contractors, sub-contractors and site personnel working on site should first be briefed on the presence and location of Salmonberry on site. They should receive a tool box talk in the identification of this invasive non-native species and the site practices put in place to avoid committing an offence under relevant legislation. A poster or leaflet illustrating and highlighting the key features of the plant will be given to all contractors, sub-contractors and site personnel. These measures will help avoid the unintentional spread of invasive species either within the site or off site.
- A Cell Formation Area will be identified and prepared prior to the excavation of all stands of Salmonberry. Cell formation will involve excavation of a pit to the require dimensions; installation of root barrier membrane to completely encapsulate the contaminated Salmonberry material; layering of sand to protect the membrane; insertion of contaminated Salmonberry material and all other contaminated material; adequate sealing of the root barrier membrane in accordance with manufacturer's instructions and finally capping off of the cell formation area to at least 2m deep.
- A haulage route and decontamination area, protected with a root barrier membrane, will be set up and isolated by exclusion fencing and signs erected to indicate Salmonberry contamination. The route barrier membrane will be protected from damage by a 100mm layer of sand above and below the membrane, topped with a layer of hardcore or other suitable material. All of this material will be removed off-site along with the last load of contaminated soil. The haulage route will be limited to machinery and vehicles involved in the transport of contaminated soil only. The location of the haulage route and decontamination area will be sited in consultation with the ECoW.
- Where ground conditions allow Salmonberry stands should be excavated to the recommended minimum depth of 2m below ground level and within 2m from the plant growth area. It is possible that the volume may be reduced by the presence of the ECoW who would identify the rhizome during excavation. A single excavator with the sole purpose of excavating contaminated soil will be used throughout the entire excavation to reduce the risk of further contamination.
- All machinery used in the excavation and transport of contaminated material must be brushed down in the decontamination area and then pressure washed immediately prior to leaving the site. Care must be taken to clean off all infective plant and soil material. All other equipment used on site including clothes and boots must also be cleaned. All machinery and vehicles will be inspected by the ECoW before being used for other work or taken off site. The decontamination area must be designed to collect and contain all contaminated material including soil, water and silt left behind after machinery and vehicles have been pressure washed. The discarded contaminated material should be disposed of in the Cell Formation Area.

- Care must be taken to ensure that all equipment used on site is cleaned and free from Salmonberry material before leaving the site to avoid committing an offence.
- The appointed Contractor should provide a site plan indicating the location of the cell formation area, haulage routes & decontamination areas; a technical specification drawing for cell formation taking into account existing site conditions and underground services; and method statements detailing the procedures for Salmonberry eradication.
- The Contractor should provide method statements detailing the procedures for Salmonberry eradication including:
  - Method Statement for Application of Herbicide to Salmonberry
  - Method Statement for Cell Formation
  - Method Statement for Excavation of Salmonberry
  - Method Statement for Loading & Transporting Salmonberry
- Full details of the ISMP and the location of the cell formation area should be kept for future site owners.
- The following risks remain with Excavation, Cell Formation & Burial On Site; limitations to future construction works within the location of the cell formation area; limitations to construction of new services or maintenance of existing services; risk of re-establishment of Salmonberry if the root barrier membranes is incorrectly sealed or if the integrity of the membrane is breeched.

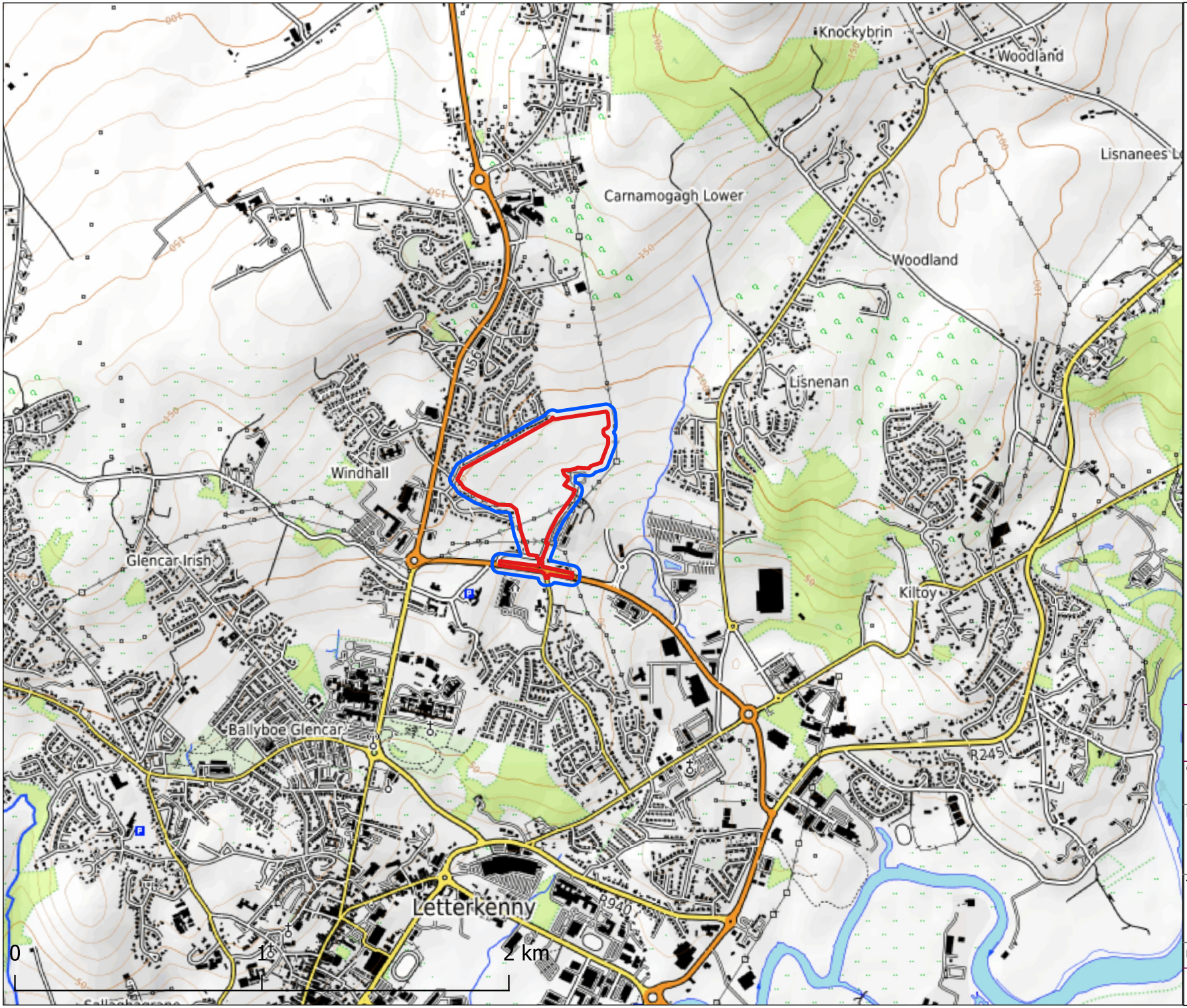
4.4.1.4 Ongoing Management

Maintenance of the proposed development at the operational phase should include for periodic inspection of the site for Salmonberry.

5 REFERENCES

CIEEM (2019) *Code of Professional Conduct*, Chartered Institute of Ecology and Environmental Management, Winchester

Figures



Legend

- Site Boundary
- Ecological Study Area

rps
Elmwood House T +44(0) 28 90 667914
74 Boucher Road F +44(0) 28 90 668286
Belfast W www.rpsgroup.com/ireland
BT12 6RZ E ireland@rpsgroup.com

Client: Hamilton Architects

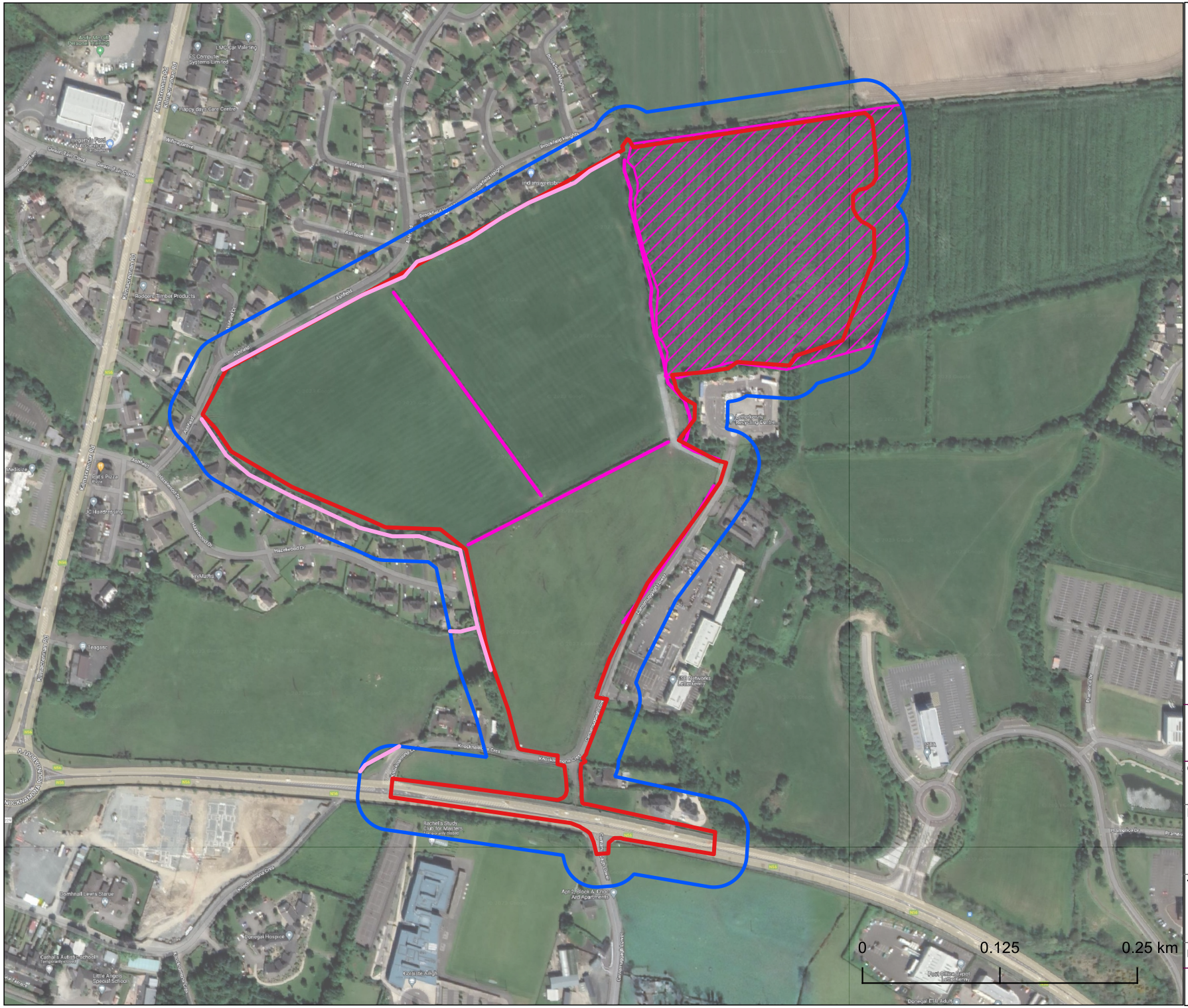
Project: Letterkenny Sports Hub

Title: Site Location

Figure No. 1.0

Project No.	Date	Revision
NI2553	07.06.2022	D01

Figure 3.1: Invasive Species Plan



Legend

- Site Boundary
- Ecological Study Area
- Salmonberry (Scattered)
- Salmonberry (Linear): (For Treatment)
- SalmonberryLinear: (Treatment TBC)

rps
Elmwood House
74 Boucher Road
Belfast
BT12 6RZ
T +44(0) 28 90 667914
F +44(0) 28 90 668286
W www.rpsgroup.com/ireland
E ireland@rpsgroup.com

Client: Hamilton Architects

Project: ATU Regional Sports Hub

Title: Invasive Species

Figure No. 3.1

Project No.	Date	Revision
NI2553	07.06.2022	D01

Appendix I

Herbicide Records

Attach details of herbicides used, dose rate and application rates and dates applied.

Appendix II

Waste Records

Attach details of waste records for any material containing invasive non-native species taken off site.

Appendix III

Monitoring Records

Attach copies of data collection sheets.

Our Reference: SR.2302 & PP6591

11th May 2023

Carlin Planning Ltd,
c/o Ciaran Carlin,
The Courtyard,
380c Belmont Road
Belfast
BT4 2NF

Re: Request under Section 173 of the Planning & Development Act, 2000 (as amended) in accordance with Article 95 of the Planning & Development Regulations 2001 (as amended) for a written opinion on the information to be contained in an Environmental Impact Statement for a proposed Regional Sports-Activity Hub Project by ATU

Location: Carnamoggagh Upper/Lower, Letterkenny.

Dear Sir,

I refer to the Pre-application Environmental Impact Assessment (EIA) Scoping Consultation on the above-referenced Regional Sports-Activity Hub on a 17.68 hectares site at Carnamuggagh, Letterkenny initially submitted on 24th February 23. Schedule 5 of the Planning & Development Regulations 2001 (as amended) sets out development requiring a mandatory EIA. Schedule 5, Part 2, 10(b)(iv) lists infrastructural projects consisting of "Urban development which would involve an area greater than 2 hectares in the case of a business district, 10 hectares in the case of other parts of a built-up area and 20 hectares elsewhere" as requiring mandatory EIA which include the proposed development and Schedule 6 sets out the contents of an EIAR.

The planning authority is satisfied that the Scoping Report comprehensively deals with the broad heading issues to be contained in an EIAR as set out in Schedule 6 of the Planning & Development Regulations 2001 (as amended).

Following receipt of the Scoping Report the planning authority referred the documentation to relevant prescribed bodies but no comments from the prescribed bodies were received.

The planning authority has been engaged with ATU in pre-planning discussions on this development with certain fundamental aspects of the proposal not being agreed to date.

- Chief amongst the unresolved issues is the preferred access to the proposed Sports-Activity Hub. Currently TII National Policy does not support an access from the N56

(Urban) road between the Kiltoy and Knocknamona Roundabouts and therefore an alternative access from the public road network (potentially from the Lisnenan side) to the development site should be explored with a Traffic and Transport Assessment and Road Safety Audits included within the EIAR with recommendations being made for both the construction and operational phases of the proposed development. Furthermore the TIA should not be restricted to the specifics of access junction arrangements, layout, and capacity but should provide for safety for all transport modes and consideration should be given to the inclusion of a Live Travel Plan or Mobility Management Plan within the Transport and Transport Assessment. Furthermore the scheme needs to consider and provide for pedestrian and cycle paths to show future connections to the adjoining residential & commercial sites.

- As there are flooding issues down gradient from the development site the EIAR should include a Flood Risk Impact Assessment detailing measures to improve drainage including detailed attenuation proposals.
- The site is clearly hydrological linked to the Lough Swilly SAC and Lough Swilly SPA and as such a Habitat Regulations assessment is required. An NIS is required to assess the impact and mitigation of the risks to the Qis of the Natura sites during the construction and operational phases of the proposal.
- There should also be a Landscape and Visual Impact Assessments given the extent/area of the proposed development site in the urban environment.

I trust this is of assistance.

Yours sincerely,

_____

Frank Sweeney
A/Senior Executive Planner
Community Development & Planning Services

CONFIRMATION OF FEASIBILITY

Roseane Montibeler
TOBIN Consulting Engineers
Fairgreen House
Fairgreen Road
Co. Galway
H91AXK8

18 October 2022

Uisce Éireann
Bosca OP 448
Oifig Sheachadta na
Cathrach Theas
Cathair Chorcaí

Irish Water
PO Box 448,
South City
Delivery Office,
Cork City.

www.water.ie

Our Ref: CDS22007030 Pre-Connection Enquiry
Carnamogagh Lower, Letterkenny, Co. Donegal

Dear Applicant/Agent,

We have completed the review of the Pre-Connection Enquiry.

Irish Water has reviewed the pre-connection enquiry in relation to a Water & Wastewater connection for a Business Connection of 2 unit(s) at Carnamuggagh Lower, Carnamogagh Lower, Letterkenny, Donegal, (the **Development)**.

Based upon the details provided we can advise the following regarding connecting to the networks;

- **Water Connection**
  - **Feasible without infrastructure upgrade by Irish Water**
  - Please note, while flows in excess of your required demand may be achieved in the Irish Water network and could be utilised in the event of a fire, Irish Water cannot guarantee a flow rate to meet your fire flow requirement. To guarantee a flow to meet the Fire Authority requirements you should provide adequate fire storage capacity within your development.

    Please note that according to our records there is existing water mains running through this site (see drawing attached).

    Any structures or works over or in close proximity to Irish Water infrastructure that will inhibit access for maintenance or

endanger structural or functional integrity of the infrastructure are not allowed.

The layout of the development must ensure that this pipe is protected and adequate separation distances are provided between Irish Water infrastructure and any structures on site. Alternatively you may enter into a diversion agreement with Irish Water and divert the pipe to accommodate your development. If you wish to proceed with this option please contact Irish Water at Diversions@water.ie and submit detailed design drawings before submitting your planning application.

It will be necessary to provide a wayleave over this pipe to the benefit of Irish Water and ensure that it is accessible for maintenance. For more information, please see go to the link below: https://www.water.ie/connections/developer-services/diversions/

- **Wastewater Connection**
  - **Feasible without infrastructure upgrade by Irish Water**
  - It is noted on the drawings submitted with the application that there is an existing foul sewer traversing the site. These are recently completed main drainage as part of the Letterkenny Phase 3 upgrade works (these have not been mapped on the IW GIS system yet as per snipping in section B)

    Any structures or works over or in close proximity to Irish Water infrastructure that will inhibit access for maintenance or endanger structural or functional integrity of the infrastructure are not allowed.

    The layout of the development must ensure that this pipe is protected and adequate separation distances are provided between Irish Water infrastructure and any structures on site. Alternatively you may enter into a diversion agreement with Irish Water and divert the pipe to accommodate your development. If you wish to proceed with this option please contact Irish Water at

Diversions@water.ie and submit detailed design drawings before submitting your planning application.

If this is an IW asset, It will be necessary to provide a wayleave over this pipe to the benefit of Irish Water and ensure that it is accessible for maintenance. For more information, please see go to the link below: https://www.water.ie/connections/developer-services/diversions/

This letter does not constitute an offer, in whole or in part, to provide a connection to any Irish Water infrastructure. Before the Development can be connected to our network(s) you must submit a connection application and be granted and sign a connection agreement with Irish Water.

As the network capacity changes constantly, this review is only valid at the time of its completion. As soon as planning permission has been granted for the Development, a completed connection application should be submitted. The connection application is available at www.water.ie/connections/get-connected/

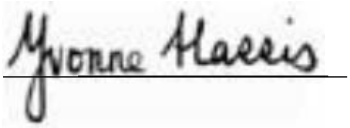
Where can you find more information?

- **Section A -** What is important to know?
- **Section B -** Details of Irish Water's Network(s)

This letter is issued to provide information about the current feasibility of the proposed connection(s) to Irish Water's network(s). This is not a connection offer and capacity in Irish Water's network(s) may only be secured by entering into a connection agreement with Irish Water.

For any further information, visit **www.water.ie/connections, email newconnections@water.ie** or contact 1800 278 278**.**

Yours sincerely,



Yvonne Harris
Head of Customer Operations

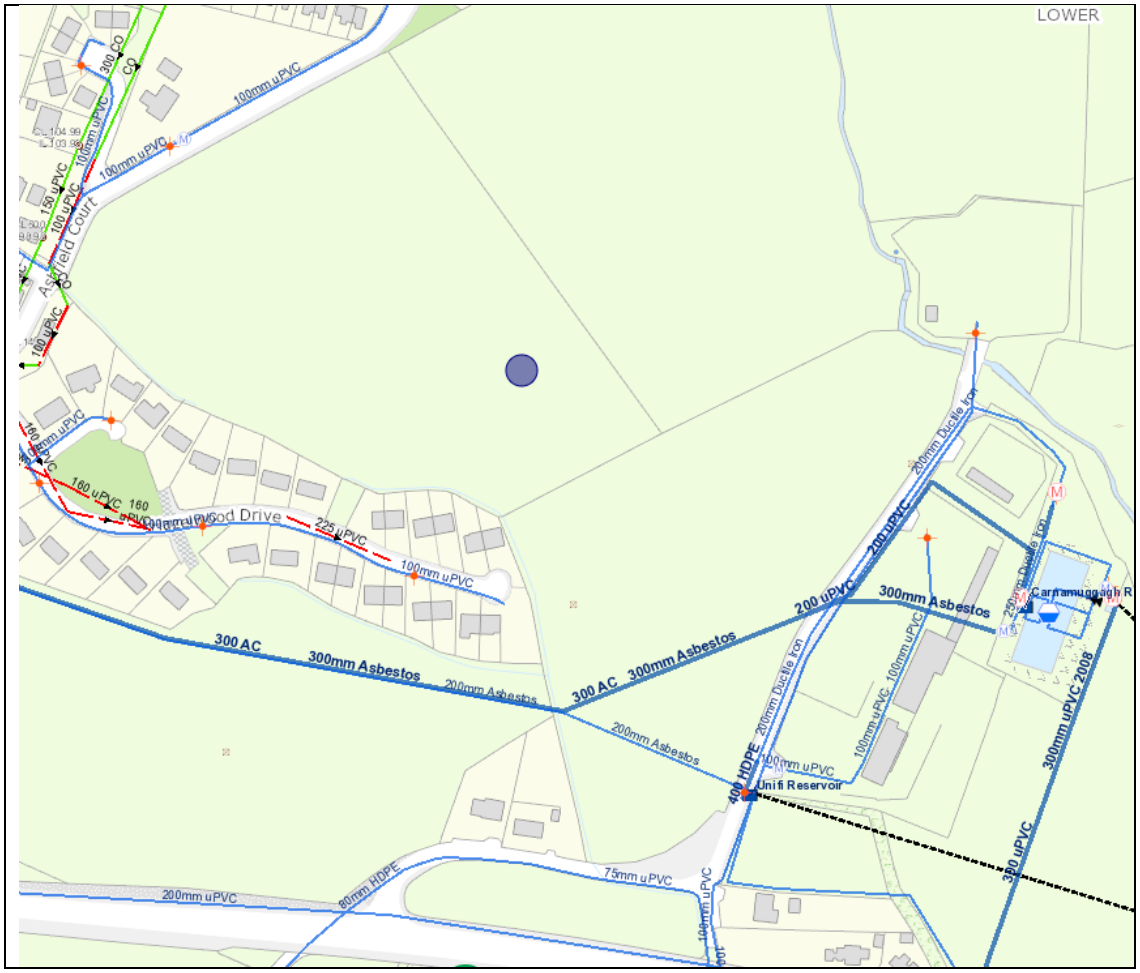
Section A - What is important to know?

What is important to know?	Why is this important?
Do you need a contract to connect?	• Yes, a contract is required to connect. This letter does not constitute a contract or an offer in whole or in part to provide a connection to Irish Water's network(s). • Before the Development can connect to Irish Water's network(s), you must submit a connection application and be granted and sign a connection agreement with Irish Water.
When should I submit a Connection Application?	• A connection application should only be submitted after planning permission has been granted.
Where can I find information on connection charges?	• Irish Water connection charges can be found at: https://www.water.ie/connections/information/charges/
Who will carry out the connection work?	• All works to Irish Water's network(s), including works in the public space, must be carried out by Irish Water*. *Where a Developer has been granted specific permission and has been issued a connection offer for Self-Lay in the Public Road/Area, they may complete the relevant connection works
Fire flow Requirements	• The Confirmation of Feasibility does not extend to fire flow requirements for the Development. Fire flow requirements are a matter for the Developer to determine. • **What to do?** - Contact the relevant Local Fire Authority
Plan for disposal of storm water	• The Confirmation of Feasibility does not extend to the management or disposal of storm water or ground waters. • **What to do?** - Contact the relevant Local Authority to discuss the management or disposal of proposed storm water or ground water discharges.
Where do I find details of Irish Water's network(s)?	• Requests for maps showing Irish Water's network(s) can be submitted to: datarequests@water.ie

What are the design requirements for the connection(s)?	• The design and construction of the Water & Wastewater pipes and related infrastructure to be installed in this Development shall comply with ***the Irish Water Connections and Developer Services Standard Details and Codes of Practice,*** available at www.water.ie/connections
Trade Effluent Licensing	• Any person discharging trade effluent** to a sewer, must have a Trade Effluent Licence issued pursuant to section 16 of the Local Government (Water Pollution) Act, 1977 (as amended). • More information and an application form for a Trade Effluent License can be found at the following link: https://www.water.ie/business/trade-effluent/about/ **trade effluent is defined in the Local Government (Water Pollution) Act, 1977 (as amended)

Section B – Details of Irish Water's Network(s)

The map included below outlines the current Irish Water infrastructure adjacent the Development: To access Irish Water Maps email datarequests@water.ie



Reproduced from the Ordnance Survey of Ireland by Permission of the Government. License No. 3-3-34

Note: The information provided on the included maps as to the position of Irish Water's underground network(s) is provided as a general guide only. The information is based on the best available information provided by each Local Authority in Ireland to Irish Water.

Whilst every care has been taken in respect of the information on Irish Water's network(s), Irish Water assumes no responsibility for and gives no guarantees, undertakings or warranties concerning the accuracy, completeness or up to date nature of the information provided, nor does it accept any liability whatsoever arising from or out of any errors or omissions. This information should not be solely relied upon in the event of excavations or any other works being carried out in the vicinity of Irish Water's underground network(s). The onus is on the parties carrying out excavations or any other works to ensure the exact location of Irish Water's underground network(s) is identified prior to

excavations or any other works being carried out. Service connection pipes are not generally shown but their presence should be anticipated.

Letterkenny Sports Activity Hub
Atlantic Technological University (ATU)

Landscape Maintenance & Management

Prepared by MLA
June 2023

mullin
landscape architecture

Mullin Landscape Architecture registered trade name of Mullin Design Associates, Chartered Landscape Architects - Landscape Institute No. 14592
Registered Office: 4 Annadorn Road , Downpatrick , BT30 8JU - mob.0044 (0)7775752010 - mail@mullin.ie - www.mullin.ie

CONTENTS

1 INTRODUCTION

This Landscape Maintenance and Management document has been prepared by Mullin Landscape Architecture, Chartered Landscape Architects for the Letterkenny Sports Activity Hub, Letterkenny on behalf of Atlantic Technical College (ATU)

The Management Plan is intended to identify the long term objectives, performance indicators, management responsibilities and annual maintenance procedures which should be undertaken to ensure the successful establishment and long term future condition of all planted (Soft Landscape) areas.
The Management Plan is intended to span a 25 year period after implementation of the grassing and planting works, to be read in conjunction with the plans and schedules prepared for this project by MLA.

2 LANDSCAPE OBJECTIVES

The primary objective of the landscape proposals are to:

- Assist with the integration of the development into its setting.
- Create a design which responds appropriately to the landscape / urban character of the area.
- The creation of an attractive learning environment around the entire grounds through introduction of a simple palette of plant species offering seasonal interest and variation.
- Creation of spaces suitable for outdoor learning and sensory experience such as community areas rainwater gardening (SUDS), Biodiversity Area (pollinators/ birds), and active play.
- All planting proposed to be introduced during the first available planting season either during or immediately after the development has been completed on site.
- Soil should meet the required specification and be test, examined and approved before acceptance. It is essential that all areas of soft landscape to be free draining.
- Any existing planting and healthy trees where indicated will be protected and retained. (Protection measures to comply with BSBS 5837 2012 'Trees in relation to Construction')

3 RESPONSIBILITIES

Whilst implementation and maintenance of all soft landscape areas should be undertaken by a suitably qualified Landscape Sub-Contractor, during the works period and first year post completion (Defects Period) responsibility for maintenance and management of all landscape areas rests with the Main Contactor.
Unless maintenance is extended through direct agreement between the College and the Main Contractor and/or their Landscape Sub Contractor, then after 1 year (End of Defects), responsibility for maintenance and management will transfer to ATU.

For the purpose of this document parties responsible for landscape works (including ongoing Maintenance and Management) will be referred to as:

The Contractor	For all works up to end of Defects period	-	(Year 1)
ATU	For all works after end of Defects period	-	(Year 2 Onwards)

4 SUMMARY OF PLANTING & SEEDING TIMES

This summary is for god practice guidance only.

- Deciduous trees and shrubs: Late October to late March
- Conifers and evergreens: September/ October or April / May.
- Container grown plants: At any time if ground and weather conditions are favourable. Ensure that adequate watering and weed control is provided. (Zero Herbicide use)
- Dried bulbs, corms and tubers: September/ October.
- Grass Seed: Spring -April to May or Late Summer August to September

5 SUMMARY OF ANNUAL MAINTENANCE

This summary provides guidance for annual maintenance of soft landscape areas, it is important that those responsible for maintenance operations continually monitor and assess conditions through the year, increasing or decreasing the number of visits and operations as required to keep the landscape in optimum condition.

- Amenity Grass — To be cut as often as required to maintain at lengths specified in Section 6 below under heading 'Amenity Grass'. During growing season /2 fertiliser applications/ 2 edgings with iron/ weed suppression and removal / 2 spike aerations.
- Species Rich Grass — Generally 1 cut per year (Late Summer)
- Hedging — Generally 6 weedings/2 firm ups/ 1 fertiliser/ 1 trim to shape
- Shrubs Beds — Generally 6 weedings/ 2 firm ups/ 1 fertiliser/ 1 prune if directed / Water as required.
- Woodland Planting — Generally 6 weedings/ 2 firm ups/ 1 fertiliser/ 1 prune if directed / Water as required.
- Staked Trees — Generally 6 visits for stakes, ties and firming/ 1 fertiliser/ 1 crown prune (when required watering to field capacity/ cut stakes down to half height at end of third year or as directed.

6 YEAR 1 /DEFECTS PERIOD INSTRUCTIONS FOR THE CONTRACTOR

AMENITY GRASS (EXCLUDES PLAYING PITCHES)

NOTE: THIS EXCLUDES ALL PLAYING PITCHES WHICH WILL BE COVERED BY SEPARATE SPECIALIST MAINTENANCE AND MANAGEMENT REGIME.

The contractor should undertake ground preparation for all proposed grassed areas, adhering to the landscape specification (Appendix 1) and or plant supplier's specific instructions. Prior to seeding or laying of turves, the area should be appropriately prepared, tilled and cultivated to achieve a free draining, nutrient rich loamy soil. Prior to seeding **the Contractor** will remove all perennial weeds, litter, stones / objects of over 50 mm diameter and any other items likely to be hazardous to the students and users such as glass, metal or sharp objects.

- Seed / turf will be sown/laid following completion of development activities to avoid damage/ compaction from construction related activities. Where damage does occur **the Contractor** to make good.

- Seeding / laying will take place during periods of sufficient warmth and moisture, ideally in late spring or early autumn when temperatures are consistently above 4 degrees.

- Prior to commencement of any cutting operations, litter and other debris shall be removed from all grass areas, with particular attention being paid to the removal of broken bottles, glass, tins, sharp objects and other items likely to be hazardous to students and users.

- All grassed areas are to be cut regularly for a period of 1Year after sowing by **the Contractor** (unless extended by agreement with **ATU** – thereafter responsibility for all future landscape maintenance and management will transfer to **ATU**.

- Cutting frequency will be determined by growth rate. Therefore height of grass prior to first cut is not to exceed 75mm, with grass being cut to a height of 35mm. In subsequent cuts, heights of grass is not to exceed 100mm at anytime between cuts, with finished height of cut grass sward 30mm. The frequency of cutting will be flexible and is to be adjusted to suit the particular weather conditions and growth rates as appropriate. However typically it is expected that cutting will be required approx. every 10-12 days during growing season.

- All maintained grass areas shall be mown using machinery appropriate to the specific task and size / location of the area. All grass cuttings are to be removed off site or saved for compost on site. Following grass cutting operations, all adjacent hard areas shall be cleared of arisings.

- All grass edges are to be dealt with during each maintenance visit so that they are neat, with obstacles such as lamp posts, manholes, boundary fences and walls either strimmed, handweeded or an alterative herbicide free technology such as 'Foamstream' considered. Strimmers must not be used around young staked tress, in such located, grass should be cut by hand.

  NOTE:
  IT IS RECOMMENDED THAT HERBICIDES SHOULD NOT BE USED WITHIN THE GROUNDS AT ANYTIME. THAT IT IS PREFERABLE FOR HERBICIDE FREE ALTERNATIVES TO BE INCORPORATED INTO THE ON GOING MAINTENANCE & MANAGEMENT REGIME.

- Grass cutting operations shall not be carried out where, due to ground conditions, the use of machinery would damage the surface or compact the sub surface layers. In this instance where grass cuttings has to be suspended due to incremental weather, the postponed maintenance visit shall be rescheduled, not cancelled, and carried out as soon conditions permit. Any damage caused to grass areas or, any other surface must be made good by **the Contractor** at their own expense.
- All grass areas are to be kept substantially free of broad-leaved perennial weeds and moss using herbicide free techniques such as regular use of weed removal tools and raking.
- After moss or weeds have been removed, or where grass is growing sparsely, over-seeding may be necessary.
- All grass areas to receive the following fertiliser applications:
  - In Spring, 35/M2 of 15:10:10 Spring turf fertiliser
  - In September, 50/M2 of 5:10:10 Autumn turf fertiliser

  NOTE: No fertiliser applications to be applied to any areas assigned for wildflower.

Performance Indicator/ Target
A key priority for all grassed areas maintained for amenity use, should be free draining soils – poor soil condition and maintenance can lead to compaction and waterlogging which will limit potential usage. Aeration, sand slitting and other interventions should be employed as required to maximise the number of days that amenity grass areas are available for use.

WILDFLOWER AND MEADOW GRASSES
Ground preparation should follow the supplier's instructions with the soil across proposed wildflower areas to be free draining, with low nutrient levels. Area to be tilled and cultivated prior to seeding, debris, litter and stones of over 50 mm diameter. The seed will be sown following development activities during times of sufficient warmth and moisture, ideally in late spring or early autumn when temperatures are consistently above 4 degrees.
The majority of the sown meadow species are perennial and therefore will be slow to germinate and grow. They will generally not flower in the first growing season. There will often be a flush of annual weeds from the

soil in the first growing season. This weed growth is easily controlled by topping. Avoid cutting in the spring and early summer if the mixture is autumn sown and contains Yellow Rattle, or if the mixture has been sown with a nurse of cornfield annuals. These sown annuals should be allowed to flower, then in mid-summer cut and remove the vegetation. It is important to cut back the annuals before they die back, set seed and collapse: this cut will reveal the developing meadow mixture and give it the space it needs to develop.

Where grass/wildflower mix has failed to establish or growing sparsely, over-seeding may be necessary.

Wildflower areas shall generally only require one cut per year in late summer.

Performance Indicator/ Target
Areas identified for species rich grasses will require ongoing monitoring & intervention. The mowing regime is critical to long term success, and **ATU** should insure that landscape operatives are familiar with maintaining species rich grassland. – The resultant matrix should contain a rich diversity of species throughout the year.

AVENUE AND SPECIMEN TREES: (All staked trees):
During Year 1 all new planting area to have maintenance visits at 4 or max 6 week intervals as required, and depending on weather and general growing conditions.
These maintenance visits shall include the inspection and care for all existing trees and planting within the site, including minor pruning, bark and general health inspection by suitably qualified and experienced person. All trees to be inspect a minimum of twice per year.

- All trees planted will be staked as per submitted landscape detail. **The Contractor** is to check all trees on each visit for wind firmness, and carry out a stake and tree tie check. Damaged stakes and ties should be replaced immediately.
- Biodegradable tree guards, where provided, to be inspected and made good as necessary to ensure that they are securely fixed, and that all trees are adequately watered during dry periods.
- During the first 3 years of establishment staked trees in grass areas to have a c.800mm dia area around their base kept grass and weed free - This can be achieved through, cultivation and or application of mulch layer or approved mulch mat.
- Dead, dying or diseased trees to be removed and replaced with plant of same species / height as specified, during next available planting season.
- Formative pruning to remove dead or damaged branches is to be carried out as necessary. Any trees which have been damaged, broken or stolen due to vandalism are to be brought to the attention of **ATU** who will assess and determine if they should be replaced.
- Orchard / fruit trees to be pruned according to best horticultural practice.

Performance Indicator/ Target
All existing and proposed trees to be maintained to maturity in a healthy condition. Should any trees die or become diseased or damaged during the defects period, this is the responsibility of **The Contractor** to replace, thereafter ATU should take action as required. Should any tree or shrub require removal with agreement of **ATU**, it shall be replaced with a suitable substitute during the next available planting season. Actions required to trees and shrubs in order to maintain a quality landscape setting at the site.

HERBACEOUS, SHRUBS AND WOODLAND MIX PLANTING

- In the early stages of establishment within shrub and woodland areas, the primary objective is the suppression of perennial weeds and grasses which if unchecked can dominate and outcompete young trees and shrubs. If action to remove weed/ dominate grass, this should be carried out immediately by cultivation, forking, handweeding or through other herbicide free techniques such as Formstream.

- The maintenance visit will also remove any letter and foreign matter from shrub beds or gravelled areas, with particular attention been given to paper, plastic bags, bottles and glass.
- Any dead dying or diseased shrub or plants to be removed and replaced with a plant of similar species size and original specification as soon as possible.
- Shrubs are to be pruned at appropriate times of the year according to species to remove dead, dying and diseased wood and suckers to promote healthy growth and natural shape. Long shoots of shrubs are to be pruned where they adjoin footpaths or road curbs, and whips and shrub understory planting shall be inspected and straightened as required with all minor pruning undertaken during this period as required.
- All shrub planting areas are to be watered as necessary by the contractor to ensure proper plant establishment, the contractor will be entirely responsible for all deaths including those caused by drought during the defects period.
- The contractor is to check all plants for wind firmness on regular visits and take appropriate action when necessary.
- Any plants which have been staked and tied are also to be checked and ties replaced as necessary.
- All plant beds to receive the following fertiliser applications:
  In Spring, 35/M2 of 15:10:10 Spring fertiliser
- Any shrubs or tree whips which have been damaged broken or stolen due to vandalism are the **contractors** responsibility whilst they have charge of the grounds security – thereafter should this occur it should be brought to the attention of **ATU** as soon as possible. ATU will assess the need for replacement.

- Feature herbaceous beds will require additional maintenance to the actions outlined above. By the end of Autumn old foliage and flowers of herbaceous plants will begin to die back. With the exception of plants that retain an attractive seedheads (which should be retained through the winter), old foliage should be cut back to the ground (care should be taken not to damage the crown or base of the plant) then lightly mulch round the base.
- Some perennials, such as pulmonaria, retire back to a dense clump of basal foliage that should be left in place. Leave evergreen perennials, such as epimediums, euphorbias and hellebores. Don't cut back penstemons until spring – the old stems will protect the crown from frost over Winter.
- In spring as new growth emerges from the plant crown, all dead stems from the previous year should be cut away (including seedheads) etc and suitable fertiliser added.

<u>Performance Indicator/ Target</u>
All existing and proposed trees and shrubs to be maintained to maturity in a healthy condition. Should any plants die or become diseased or damaged during the defects period, this is the responsibility of The Contractor to replace, thereafter ATU should take action as required. Should any tree or shrub require removal with agreement of ATU, it shall be replaced with a suitable substitute during the next available planting season.
Actions required to trees and shrubs in order to maintain a quality landscape setting at the site.

HEDGES
- All hedges to be grown and maintained to heights as indicated on landscape plan.
- All hedges species as per landscape plan.
- Hedges should ideally be planted in the autumn when the soil is warm after the summer and damp from autumn rain. Planted in double or triple row of trees to create width. If space is restricted a single row of plants zig-zagged slightly to allow root space. Do not cut top leader growth until plants have reached 1.1m high.
- Prune hedges in the autumn when there is no chance of disturbing nesting birds. The nesting season

usually runs from 1st March to 31st August each year, however time of nesting can be weather dependent and some birds may nest outside this period, so it is essential to always check carefully for active nests prior to cutting.
Section 40 of the Wildlife Acts restrict the cutting, grubbing, burning or destruction by other means of vegetation growing on uncultivated land or in hedges or ditches during the nesting and breeding season for birds and wildlife from 1stMarch to 31stAugust. It is an offence to remove or disturb a nest during the nesting season. Dormant nest may only be removed during the open season 1st September to 28th February in any year. Irish Wildlife (Amendment) Act 2000

- It is best to prune deciduous varieties in late autumn when they are dormant. Cut back quite hard in the first couple of years so the hedge thickens up at the base.
- Deciduous species are usually pruned twice annually, first in winter (before 1st March) while dormant and again in late summer (after 31st Aug). If using electrical or fuel powered shears, exercise all precautions as instructed by manufacturer.
- Cut hedge in an 'A' profile (Tapered sides) Heavy snowfall lying on top of a hedge can cause serious damage. Ensure snow is removed as soon as possible to reduce the unaccustomed weight.
- Woody pruning's can attract fungal diseases such as coral spot if they are left to decay where they fall. It is best to clear them up when you finish hedge trimming.
- All Hedge planting areas to receive the following fertiliser applications:
  In Spring, 35/M2 of 15:10:10 Spring fertiliser

NOTE:
Unless specified on the landscape plan – in general all internal hedging should not exceed 1.1m height, and all external hedging (site boundaries) should not exceed 2m in height unless specified on landscape plan.

Performance Indicator/ Target
All hedges to be maintained to maturity in a healthy condition. Should any sections die or become diseased or damaged, they should be replaced with a suitable substitute during the next available planting season.
Actions required to hedges in order to maintain a quality landscape setting at the site.

7 YEAR 2 ONWARDS INSTRUCTIONS FOR ATU

AMENITY GRASS (EXCLUDES PLAYING PITCHES)
Ongoing maintenance of amenity grass areas should follow instructions set out in section 6 above, with maintenance visits generally being undertaken at 4 week intervals (6 week Max)

- Cutting frequency will be determined by growth rate. Therefore height of grass should not exceed 100mm at anytime between cuts with finished height of cut grass sward 30mm. The frequency of cutting will be flexible and is to be adjusted to suit the particular weather conditions and growth rates as appropriate. However typically it is expected that cutting will be required approx. every 10-12 days during growing season.
- In addition every 3-4 years or as required, amenity grass areas should be spiked and or sand slits to reduced root density and maintain good drainage.

Performance Indicator/ Target
A key priority for any amenity grassed area is availability for use, these areas should be free draining soils, as poor soils and lack of maintenance can lead to compaction and waterlogging which can severely limit potential usage for ATU.
Aeration, sand slitting and other interventions should be employed as required to maximise the number of days that amenity grass areas are available for use.

WILDFLOWER AND MEADOW GRASSES
Ongoing maintenance of wildflower and meadow grass areas should follow instructions set out in section 6 above.
It is important to emphasise that whilst wildflower areas are low maintenance, they are not maintenance free.

- Wildflower areas shall be cut once per year in late summer.
- Typically 80% of the seed mix will be grass species (predominantly fescues) which are selected to complement wildflower species. However over time should more vigorous grasses emerge, it will important to supress these so that they do not dominate and outcompete wildflowers. This can be achieved by adding Yellowrattle seeds into the area to weaken grass growth.
- In a learning environment such as a school, it will be acceptable to add annual wildflower seeds for immediacy and impact.

Performance Indicator/ Target
Areas identified for species rich grasses will require ongoing monitoring & intervention. The mowing regime will be critical to success and ATU should insure that landscape operatives are familiar with maintaining species rich grassland. – The resultant matrix should contain a rich diversity of species throughout the year.

AVENUE AND SPECIMEN TREES: (All staked trees):
Ongoing maintenance of Avenue and Specimen Trees should follow instructions set out in section 6 above. In addition over time interventions and guidance as set out below may be required.

- Staked Trees Year 4-10
  1 no. basic-level inspection per annum.(Trees subject to cable bracing, staking or other mechanical support should be inspected twice each year). Trees in lower-risk areas may be subject to longer inspection intervals by qualified arboriculturist (in spring to identify foliar issues) to check physiological and biological condition.
  Mulching tree base (c800m dia) in April and/or August as required to control weed growth
  Stakes removed at year 5 or as instructed.
  Remove dead, dying or deformed branches every other year

Prune, shape and raise crown years 5 and 10
Replace damaged or failed trees in accordance with the original planting specification. A method statement should be prepared for these operations.

- Staked Trees Year 11-20
  1 no. basic-level inspection per annum by qualified arboriculturist (in autumn to coincide with fungal fruiting) to check physiological and biological condition
  Professional-level inspections and arboricultural works as necessary arising from basic-level inspections
  Prune and remove basal growth (3 year cycle)
  Prune, shape and raise crown years 15 and 20

- Staked Trees Year 21 +
  1 no. basic-level inspection per annum by qualified arboriculturist (in autumn to coincide with fungal fruiting) to check physiological and biological condition
  Professional-level inspections and arboricultural works as necessary arising from basic-level inspections
  Prune and remove basal growth (3 year cycle)
  Pollard and crown reduction and even selective removal of trees considered at year 21would be carried out to maintain attractive form, regular and compact crown architecture, prevent the development of heavy branches and reduce the overall requirement of the trees' rooting systems. This operation would be repeated as necessary to prevent crown interference in adjacent trees, typically every 10 years. A method statement should be prepared for these operations

NOTE : Following the annual inspection, a report will be submitted to ATU outlining any recommendations in relation to trees on the site.
All works to trees and shrubs to comply with BS 3998:2010 and Health & Safety Executive (HSE) 'Forestry and arboriculture safety leaflets'.

Performance Indicator/ Target
All existing and proposed trees to be maintained to maturity in a healthy condition. Should any trees die or become diseased or damaged, ATU should be informed and actions agreed. Should any tree require removal with agreement of ATU, it shall be replaced with a suitable substitute during the next available planting season.
Actions required to trees in order to maintain a quality landscape setting at the site.

HERBACEOUS, SHRUBS AND WOODLAND MIX PLANTING
Ongoing maintenance of Herbaceous, Shrubs and Woodland Planting should follow instructions set out in section 6 above. In addition:

- The spread of self-suckering and self-seeded plants should be monitored. Typically after a number of years some species may begin to dominate others, at this point ATU may consider it appropriate to cut back or thin out.
- Alternatively some beds may become sparse due to disease to other environmental factors, again ATU may consider it appropriate to interplant with new plants or relocate plants from elsewhere in the grounds.
- Landscape operatives should be trained in recognising invasive species and plant disease and should monitor the grounds for their presence. Should invasive emerge, ATU should agree an action plan to address the problem.

Woodland planting will typically over time require additional intervention such as set out in the guidance below.

- Woodland Planting Years 4-10
  As canopies merge, remove guards and stakes, and cease weed control.
  Thin out weakest specimens if planting becomes overcrowded and start to restrict growth.
  1 no. basic-level inspection per annum by qualified arboriculturist (in autumn to coincide with fungal fruiting) to check physiological and biological condition
  Professional-level inspections and arboricultural works as necessary arising from basic-level inspections.
  At the end of this period determine if thinned to 5 m to maintain continued grassland cover beneath.

- Woodland Planting Year 11-20
  1 no. basic-level inspection per annum by qualified arboriculturist (in autumn to coincide with fungal fruiting) to check physiological and biological condition
  Professional-level inspections and arboricultural works as necessary arising from basic-level inspections.
  Thin out weakest specimens every 5 years as planting becomes overcrowded and start to restrict growth.

- Woodland Planting Year 20+
  1 no. basic-level inspection per annum by qualified arboriculturist (in autumn to coincide with fungal fruiting) to check physiological and biological condition
  Professional-level inspections and arboricultural works as necessary arising from basic-level inspections.
  Remove diseased specimens as required.
  Interplant gaps and openings with new transplants every 5 years

  NOTE : Following the annual inspection, a report will be submitted to ATU outlining any recommendations in relation to trees on the site.
  All works to trees and shrubs to comply with BS 3998:2010 and Health & Safety Executive (HSE) 'Forestry and arboriculture safety leaflets'.

Performance Indicator/ Target
All existing and proposed trees to be maintained to maturity in a healthy condition. Should any trees die or become diseased or damaged, ATU should be informed and actions agreed. Should any tree require removal with agreement of ATU, it shall be replaced with a suitable substitute during the next available planting season.
Actions required to trees in order to maintain a quality landscape setting at the site.

HEDGES
Ongoing maintenance of hedges should follow instructions set out in section 6 above.

NOTE:
All internal hedging should not exceed 1.1m height,
All external hedging (site boundaries) should not exceed 2m in height unless specified on landscape plan.

APPENDIX 1 LANDSCAPE MAINTENANCE SPECIFICATION

Q35 Landscape maintenance

To be read with Preliminaries/ General conditions.

GENERALLY

110 NOTICE
- Give notice before:
- Application of herbicide.
- Application of fertilizer.
- Watering.
- Each site maintenance visit.
- Period of notice: 7 days.

130 REINSTATEMENT
- Damage or disturbance to soil structure, planting, grass, fencing, hard landscaping, structures or buildings: Reinstate to original condition.

140 CONTROL OF MAMMALIAN PESTS
- Specialist firms: Submit proposals.
- Method: Submit proposals.

155 WATERING
- Supply: Potable mains water.
- Quantity: Wet full depth of topsoil .
- Application: Do not damage or loosen plants.
- Compacted soil: Loosen or scoop out, to direct water to rootzone.
- Frequency: As necessary for the continued thriving of all planting.

160 WATER RESTRICTIONS
- General: If water supply is, or is likely to be, restricted by emergency legislation, submit proposals for an alternative suitable source of water. Obtain instructions before proceeding.

170 DISPOSAL OF ARISINGS
- General: Unless specified otherwise, dispose of arisings as follows: - Biodegradable arisings: Remove to recycling facility.
- Grass cuttings: Remove to recycling facility.
- Tree roots and stumps: Remove from site.
- Shrub and tree prunings: Remove to recycling facility.
- Litter and nonbiodegradable arisings: Remove from site.

180 CHIPPING, SHREDDING OR BURNING
- General: Not permitted on site.

190 LITTER
- Extraneous rubbish not arising from the contract work: Collect and remove from site.

195 PROTECTION OF EXISTING GRASS
- General: Protect areas affected by maintenance operations using boards/tarpaulins.

Do not place excavated or imported materials directly on grass.

197 CLEANLINESS
- Soil and arisings: Remove from hard surfaces.
- General: Leave the works in a clean, tidy condition at completion and after any maintenance operations.

198A REVIEW
- The implementation and effectiveness of the maintenance operations described above shall be kept under review by the contractor and the Employer during each season and adjustments made accordingly.

GRASSED AREAS

210A MAINTENANCE OF GRASSED AREAS
- General: Maintain turf in a manner appropriate to the intended use.
- Soil and grass:
  - Condition: Maintain a healthy vigorous sward, free from disease, fungal growth, discolouration, scorch or wilt.
  - Waterlogging and compaction: Prevent.
  - Damage: Repair trampling, abrasion or scalping.
- Litter and fallen leaves: Remove regularly to maintain a neat appearance.

220 GRASS CUTTING GENERALLY
- Before mowing: Remove litter, rubbish and debris.
- Finish: Neat and even, without surface rutting, compaction or damage to grass.
- Edges: Leave neat and well defined. Neatly trim around obstructions.
- Adjoining hard areas: Sweep clear and remove arisings.
- Drought or wet conditions: Obtain instructions.

226 TREE STEMS
- Precautions: Do not allow nylon filament rotary cutters and other mechanical tools closer than 100 mm to the stem of any tree.
  - Operations close to stems: Complete using hand tools.

250 LEAF REMOVAL
- Operations: Collect fallen leaves.
- Special requirements: None.
- Disposal: Remove from site for recycling.

255 FIRST CUT OFSPECIES RICH GRASSLAND
- Height of initial growth: 75 mm.
- Preparation:
  - Debris and litter: Remove.
  - Stones and earth clods larger than 50 mm in any dimension: Remove
- Height of first cut: 50 mm.
- Mower type: Strimmer.
- Arisings: Cut in late Oct or as above, leave to dry for 2-3 weeks until seeds have dropped Shake and remove chaff after this period.

255A FIRST CUT OF WET WILDFLOWER GRASSLAND

- Height of initial growth: 100 mm.
- Preparation:
- Debris and litter: Remove.
- Stones and earth clods larger than 25 mm in any dimension: Remove
- Height of first cut: 50 mm.
- Mower type: Contractor's choice.
- Arisings: Remove for composting on site.

265 MOWING GENERAL AREAS
- Grass height: Maintain between 25 and 50 mm.
- Arisings: Remove for composting on site.

272 MAINTAINING GRASSED AREAS WITH PERENNIAL WILD FLOWERS
- Preparation: Before each cut remove litter and debris.
- Height and frequency of cut in first growing season:
- Time of first cut: March/ April after autumn sowing or May/ June after spring sowing if 100mm high.
- Height of first cut: 50 mm .
- Frequency of subsequent cutting (minimum): Every 6 to 8 weeks until autumn.
- Height of growth permitted (maximum): 150 mm.
- Height and frequency of cut in second growing season:
- Time of cut: March/ April to remove excess grass and September/ october after flowering.
- Height of cut: 75 mm.
- Trimming: All edges.
- Arisings: Remove.
- Watering: as clause 155.

295 SPIKING
- Location: as required.
- Timing: As necessary to relieve compaction.
- Operations: Aerate the soil and improve surface water penetration.
- Depth (minimum): Contractor's choice.

325 RELIEVING SURFACE COMPACTION IN TURF
- Standard: To BS 7370-3.
- Method: Spiking.
- Top dressing: Not required.
- Depth: -.

345 CONTROL OF JAPANESE KNOTWEED
- Operations: Spot treat in June and September during suitable weather conditions and when plants are growing vigorously.
- Herbicide: In accordance with the Environment Agency 'Code of Practice for the management, destruction and disposal of Japanese knotweed'.
- Application: In accordance with the Environment Agency 'Code of Practice for the management, destruction and disposal of Japanese knotweed'.
- Arisings: In accordance with the Environment Agency 'Code of Practice for the management, destruction and disposal of Japanese knotweed'.

SHRUBS/TREES/HEDGES

500 ESTABLISHMENT OF NEW PLANTING

- Duration: Five years.
- Weed control:
- Method: Keep planting beds clear of weeds by use of suitable herbicides.
- Area: Maintain a weed free area around each tree and shrub, minimum diameter the larger of 1 m or the surface of the original planting pit.
- Soil condition: Fork over beds to keep soil loose, with gentle cambers and no hollows. Do not reduce depth or effect of mulch.
- Watering: as required to ensure establishment and continued growth.

510 TREE STAKES AND TIES

- Inspection/ Maintenance times: As scheduled and immediately after strong winds.
- Stakes:
- Replace loose, broken or decayed stakes to original specification.
- If longer than half of clear tree stem height, cut to this height in spring. Retie to tree firmly but not tightly with a single tie.
- Ties: Adjust, refix or replace loose or defective ties, allowing for growth and to prevent chafing.
- Where chafing has occurred, reposition or replace ties to prevent further chafing.
- Removal of stakes and ties: When instructed.
- Fill stake holes with lightly compacted soil.

520 REFIRMING OF TREES AND SHRUBS

- Timing: After strong winds, frost heave and other disturbances.
- Refirming: Tread around the base until firmly bedded.
- Collars in soil at base of tree stems, created by tree movement: Break up by fork, avoiding damage to roots. Backfill with topsoil and refirm.

540 PRUNING GENERALLY

- Pruning: In accordance with good horticultural and arboricultural practice.
- Removing branches: Do not damage or tear the stem or bark.
- Wounds: Keep as small as possible and cut cleanly back to sound wood.
- Cutting: Make cuts above and sloping away from an outward facing healthy bud, angled so that water will not collect on cut area.
- Larger branches: Prune neither flush nor leaving a stub, but using the branch bark ridge or branch collar as a pruning guide.
- Appearance: Thin, trim and shape each specimen appropriately to species, location, season, and stage of growth, leaving a well balanced natural appearance.
- Tools: Use clean sharp secateurs, hand saws or other approved tools. Trim off ragged edges of bark or wood with a sharp knife.
- Disease or infection: Give notice if detected.
- Growth retardants, fungicide or pruning sealant: Do not use unless instructed.

545 PRUNING OF EXCESSIVE OVERHANG

- Timing: As instructed .
- Operations: Remove growth encroaching onto grassed areas, paths, roads, signs, sightlines and road lighting luminaires.
- Special requirements: None.

550 PRUNING OF EXCESSIVE HEIGHT

- Timing: As instructed.

Operations: Remove excessive height As instructed.

555 PRUNING TREES AND SHRUBS
- Standard: To BS 7370-4.
- Special requirements: Growth retardents not permitted.

570 FORMATIVE PRUNING OF YOUNG TREES
- Standard: Type and timing of pruning operations to suit the plant species.
- Time of year: Do not prune during the late winter/ early spring sap flow period.
- Young trees up to 4 m high:
- Crown prune by removing dead branches and reducing selected side branches by one third to preserve a well balanced head and ensure the development of a single strong leader.
- Remove duplicated branches and potentially weak or tight forks. In each case cut back to live wood.
- Whips or feathered trees: Do not prune.
- Operatives: Member of the Arboricultural Association.

580 PRUNING FLOWERING SPECIES OF SHRUBS AND ROSES
- Time of year:
- Winter flowering shrubs: Spring.
- Shrubs flowering between March and July: Immediately after the flowering period.
- Shrubs flowering between July and October: Back to old wood in winter.
- Rose bushes: Early spring to encourage basal growths and a balanced, compact habit.

600 TRIMMING RAPIDLY ESTABLISHING HEDGES
- General: Allow to reach planned height as rapidly as possible. - Form: Trim back lateral branches moderately.

605 TRIMMING SLOWLY ESTABLISHING HEDGES
- Operations:
- Timing: Cut back hard in June and September to encourage bushy growth down to ground level.
- Form: Allow to reach planned dimensions only by gradual degrees, depending on growth rate and habit.

620 REMOVAL OF DEAD PLANT MATERIAL
- Operations: At the end of the growing season, check all shrubs and remove all dead foliage, dead wood, and broken or damaged branches and stems.

630 DEAD AND DISEASED PLANTS
- Removal: As soon as possible.
- Replacement: In the next scheduled round of replacement planting.

635 REINSTATEMENT OF SHRUB/ HERBACEOUS AREAS
- Dead and damaged plants: Remove.
- Mulch/ matting materials:
- Carefully move to one side and dig over the soil, leaving it fit for replanting. - Do not disturb roots of adjacent plants.
- Replacement plants:
- Use pits and plants: To original specification or to match the size of adjacent or nearby plants of the same species, whichever is the greater.
- Additional requirements: Submit details and cost of plants before ordering.
- Dressing: Slow release fertilizer:
- Type: Organic. Suitable for use near water.

- Application rate: As manufacturer's recommendations.

645 WEED CONTROL GENERALLY
- Weed tolerance: At all times, weed cover less than 5% and no weed to exceed 100 mm high.
- Adjacent plants, trees and grass: Do not damage.

650 HAND WEEDING
- General: Remove weeds entirely, including roots.
- Disturbance: Remove the minimum quantity of soil, and disturb plants, bulbs and mulched surfaces as little as possible.
- Completion: Rake area to a neat, clean condition.
- Mulch: Reinstate to original depth.

655 WEED CUTTING BY HAND OR MACHINE
- Undesirable grass, brambles and herbaceous growth: Cut down cleanly to a maximum height of 75 mm.
- Herbicides: Do not use.

680 SOIL AERATION
• Compacted soil surfaces:
- Prick up: To aerate the soil of root areas and break surface crust.
- Size of lumps: Reduce to crumb and level off.
- Damage: Do not damage plants and their roots.

685 SOIL LEVEL ADJUSTMENT
• Level of soil/mulch at edges of beds: Reduce to 50 mm below adjacent grass or hard surface.
- Arisings (if any): Spread evenly over the bed.

690 MAINTENANCE OF LOOSE MULCH
- Thickness (minimum): 75 mm.
- Top up: as required.
- Mulch spill on adjacent areas: Remove weeds and rubbish and return to planted area.
- Weeding: Remove weeds growing on or in mulch by hand weeding.

693 MAINTENANCE OF MULCH MATTING/ SHEET MULCHES
- General: Inspect and reattach or refirm mulch mats and sheet mulches.
- Type: biodegradeable.
- Remove: After -.

710 WOODLAND PLANTING MAINTENANCE
- Watering: In exceptional circumstances to prevent plants dying.
- Loose plants: Refirm surrounding soil, without compacting.
- Vegetation: Except trees and coppice shoots to be retained, cut down to 100 mm above ground level within the plantation area.
- Arisings: Leave between rows.
- Ditches and drains: Keep clear.

TREE WORK

810 TREE WORK GENERALLY

• Identification: Before starting work agree which trees, shrubs and hedges are to be removed or pruned.
• Protection: Avoid damage to neighbouring trees, plants and property.
• Standards: To BS 3998 and Health & Safety Executive (HSE) 'Forestry and arboriculture safety leaflets'.
• Removing branches: Cut as Arboricultural Association Leaflet 'Mature tree management'. Cut vertical branches similarly, with no more slope on the cut surface than is necessary to shed rainwater.
• Appearance: Leave trees with a well balanced natural appearance.
• Chain saw work: Operatives must hold a Certificate of Competence.
• Tree work: To be carried out by an approved member of the Arboricultural Association.

815 ADDITIONAL WORK
• Defective, diseased, unsafe or weak parts of trees additional to those scheduled for attention: Give notice if detected.

820 PREVENTION OF WOUND BLEEDING
• Standard: To BS 3998, clause 8.

825 PREVENTION OF DISEASE TRANSMISSION
• Standard: To BS 3998, clause 9 and Appendix B.

830 CLEANING OUT AND DEADWOODING
• Remove:
- Dead, dying, or diseased wood, broken branches and stubs.
- Fungal growths and fruiting bodies.
- Rubbish, wind blown or accumulated in branch forks.
- Wires, clamps, boards and metal objects, if removable without causing further damage and not part of a support structure that is to be retained.
- Other unwanted objects, e.g. tree houses, swings. - Climbing plants -.

835 CUTTING AND PRUNING GENERALLY
• Tools: Appropriate, well maintained and sharp.
• Final pruning cuts:
- Chainsaws: Do not use on branches of less than 50 mm diameter.
- Hand saws: Form a smooth cut surface. - Anvil type secateurs: Do not use.
• Removing branches: Do not damage or tear the stem.
• Wounds: Keep as small as possible, cut cleanly back to sound wood leaving a smooth surface, and angled so that water will not collect on the cut area.
• Cutting: Cut at a fork or at the main stem to avoid stumps wherever possible. Large branches: Remove only with prior approval.
- Remove in small sections and lower to ground with ropes and slings.
• Dead branches and stubs: When removing, do not cut into live wood.
• Unsafe branches: Remove epicormic shoots and potentially weak forks that could fail in adverse weather conditions.
• Disease or fungus: Give notice if detected. Do not apply fungicide or sealant unless instructed.

860 REMOVING TREES, SHRUBS AND HEDGES
• Standards: To BS 3998, Appendix A and Health & Safety Executive (HSE)/ Arboricultural and Forestry Advisory Group Safety Leaflets.
• Existing services: Check for below and above ground services. Give notice if they may be affected.
• Shrubs and smaller trees: Cut down and grub up roots.
• Tree stumps:

- Removal: Remove mechanically to a minimum depth of 300 mm below ground level.
- Removal by winching: Give notice. Do not use other trees as supports or anchors.
• Protection: Avoid damage to neighbouring trees, plants and property.
• Work near retained trees: Where tree canopies overlap and in confined spaces generally, take down trees carefully in small sections to avoid damage to adjacent trees that are to be retained.
• Filling holes:
- Material: Use as-dug material and/ or imported soil as required.
- Finishing: Consolidate and grade to marry in with surrounding ground level.

865 BARK DAMAGE
• Wounds:
- Do not attempt to stop sap bleeding.
- Bark: Remove ragged edges using a sharp knife.
- Wood: Remove splintered wood from deep wounds. - Size: Keep wounds as small as possible.
• Liquid or flux oozing from apparently healthy bark: Give notice.

WATER AREAS

895 CLEARANCE OF WATERCOURSES

• Clearance: Remove litter, debris, accumulated silt and excessive vegetation causing an obstruction.
• Frequency: As instructed.
• Time of year: Autumn.
• Method: By land based excavator.
- Access: From one bank only.
- Position: At least 1 m from the top of the bank.
• Phasing: A 10 m² section each year from alternate sides.

HARD LANDSCAPE AREAS/FENCING

920A FENCING
• Fences: Inspect and repair to maintain boundary definition March

Letterkenny Regional Sports Hub.

Landscape Design Report

Prepared by MLA
June 2023

1 INTRODUCTION

Atlantic Technological University (ATU) aim to develop a high-quality community sports hub for use by college students, local residents, as well as both local and regional sports teams on its lands located at Knocknamona on the Northern side of Letterkenny.
This facility will be a multipitch community hub with additional built facilities, and both passive and active amenity / recreational spaces.

The strategic aims of the site are to :

- Provide the college and its teams with a high-quality sports facility that meets the demand from growing student numbers and an increasingly active student population.
- Develop a community sports hub that is accessible by all parts of the community, from individual residents through to multi-team sports clubs.
- Improve the access to sports provision for target groups, such as women and girls, areas of high deprivation, minority ethnic groups and those with special needs or requirements.
- Use sport to encourage the growth of community spirit and cohesion in a rapidly expanding industrial town.
- Develop a sustainable managerial system in order for the site to have along-lasting legacy.

The Masterplan also aims to provide for the development of agri-education and other educational and enterprise facilities in the longer term.

2 LOCATION & CONTEXT

The subject site is located 1.5km to the North of Letterkenny Upper Main Street and 1.2km North of the main ATU campus building on Ramelton Road.

Figure 1 – Location Plan

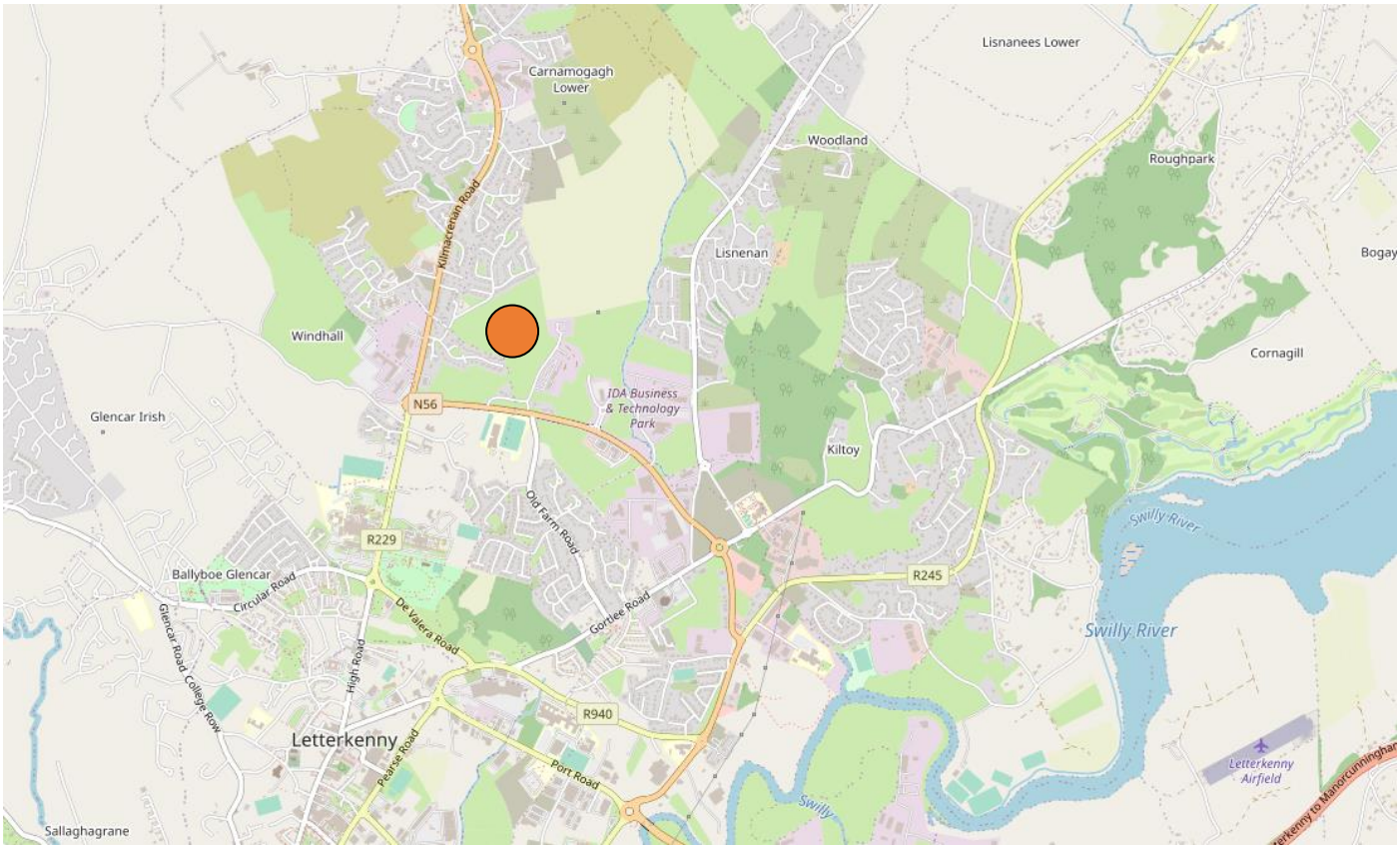


Figure 2 – Extract Letterkenny Development Plan - Map 12.1B: Letterkenny Land Use Zoning

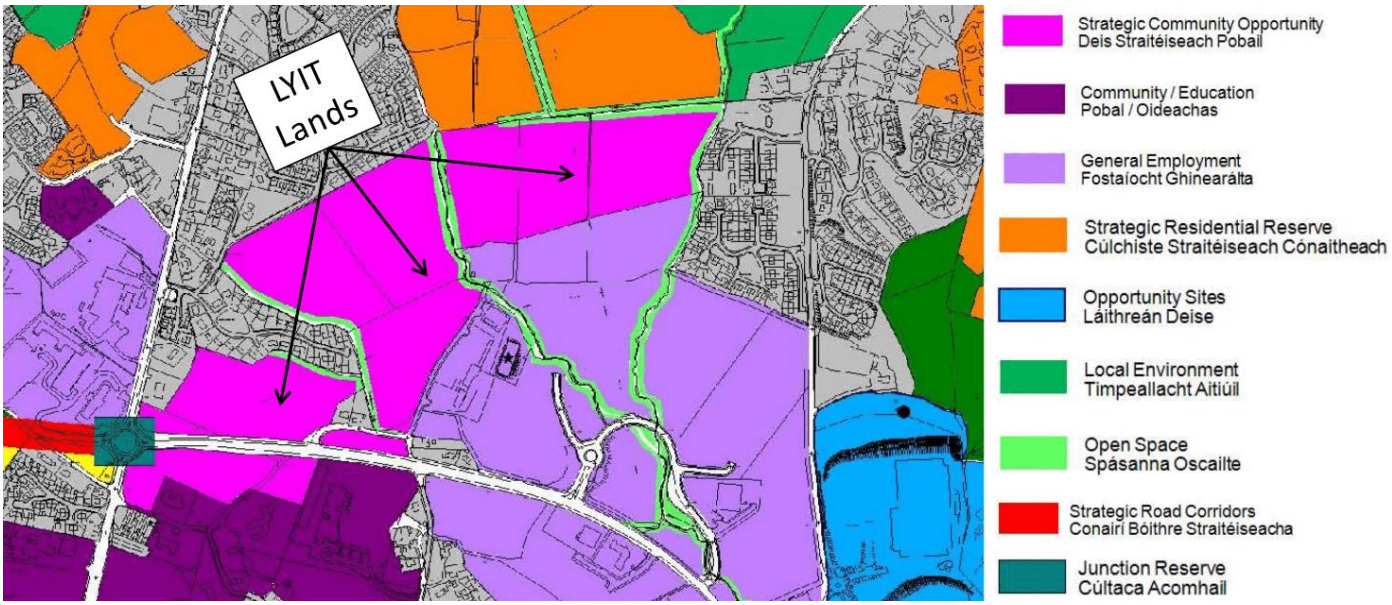


Figure 3 – Overview Image

3 EXISTING CONDITIONS

The subject site was visited on the 1st June 2022. It is currently good quality agricultural land occupying an area of approx. 66 acres. These lands are bound to the Northwest and West by existing residential properties and to the south by the N56 Letterkenny relief road. To the East are lands which are Zoned general employment, which are currently a combination of grazing pasture, existing recycling centre and ESB yards and buildings.
The LYIT lands which are the subject of the masterplan area, are composed of 7No agricultural fields, subdivided by fragmented predominantly native thorn hedgerows. 3No fields to the North east are currently set in short rotation forestry.

The landform generally falls in a North to South direction from a high point of 92mAOD at Ashfield and Brookfield Heights to 70mAOD at the N52.
An existing watercourse runs north south through the centre of the subject site. This feature is allocated as Open Space within the development plan.

Figure 4 – Topographical Site survey

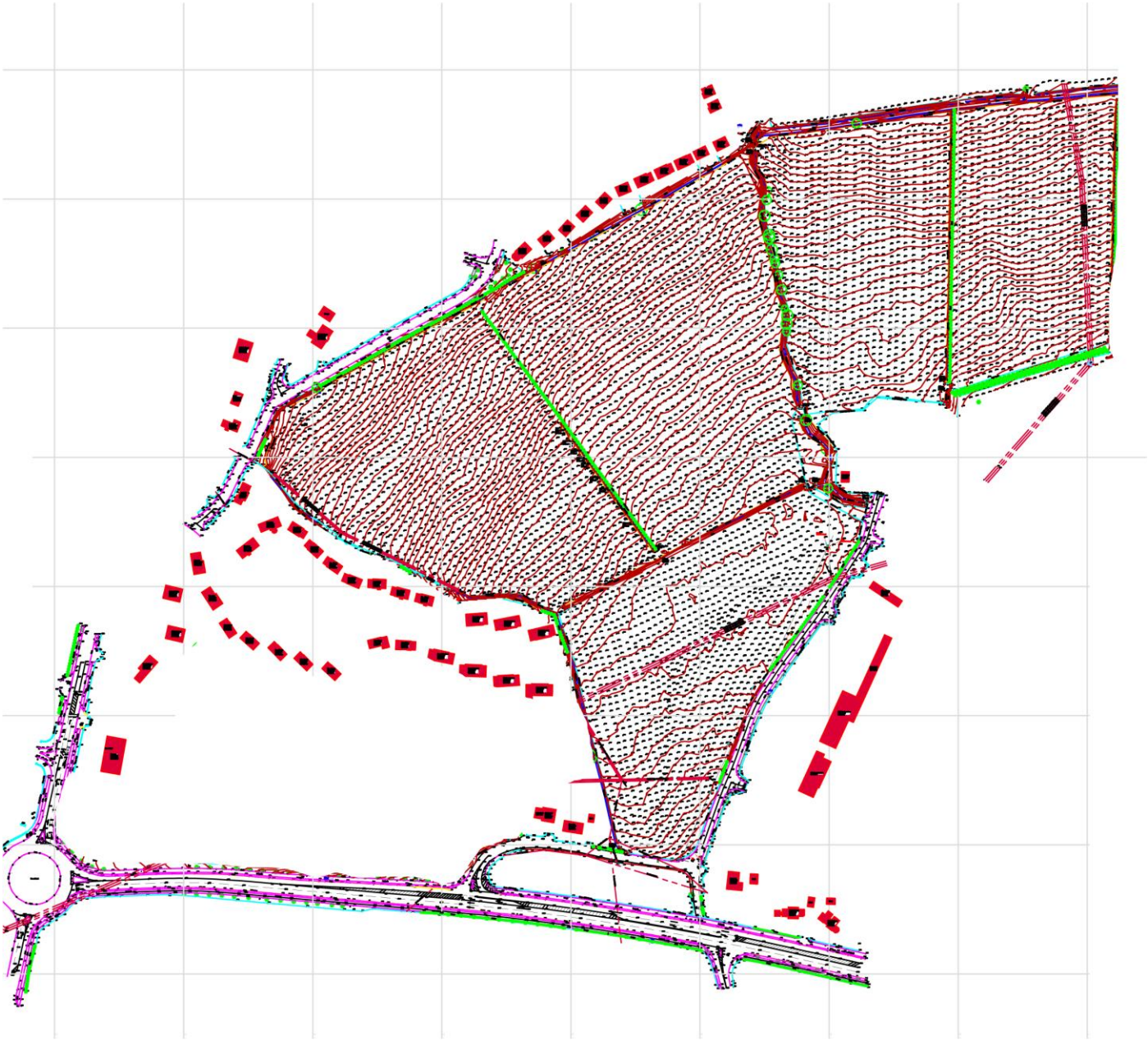


Figure 5 – View towards Brookfield Heights beyond the sites Northern Boundary

Figure 6 – View towards Hazelwood Drive beyond the sites of Western Boundary

Figure 7 – View East towards Cashel Park / Amalfi Court

Figure 8 – View South from Ashfield

Figure 9 - Hedgerow associated with open watercourse

Figure 10 – Existing watercourse

Figure 11 – Existing watercourse

Figure 12 – Group of coniferous trees at South of site

Figure 13 – View Northeast

Figure 14 – View Southeast (Towards the Sperrin Mountains)

6 HISTORIC LANDSCAPE

Figure 15 below illustrates the context of the site c.1850.
It is notable that many of the history hedgerows have been removed across much of these lands.
It is also notable how the existing watercourse supplied a flax mill located further downstream, with a former mill pond also identifiable to the Northeast of the subject site.

Figure 15 – Historic Plan c. 1850s (Also overlaid with current aerial)

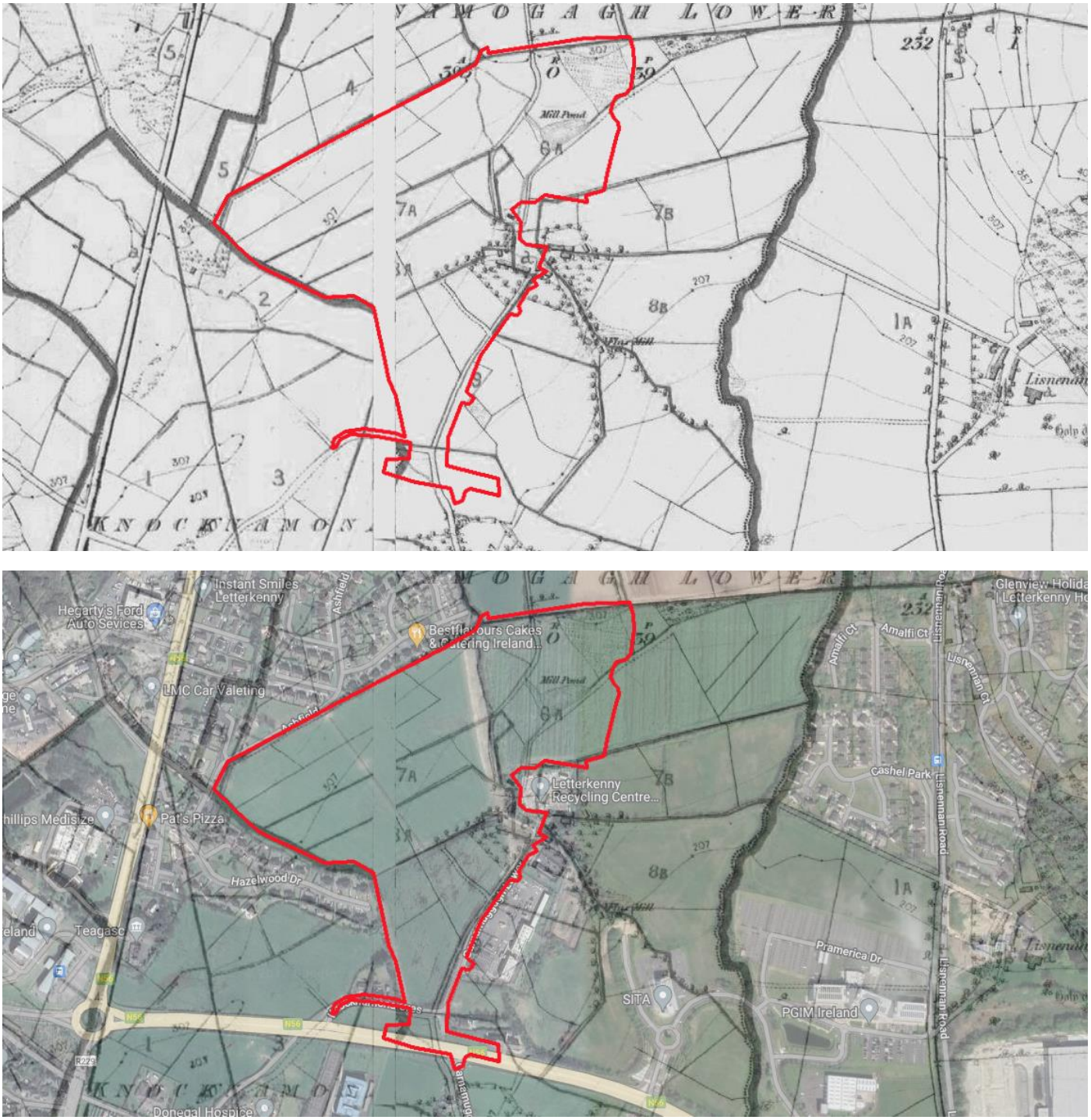


Figure 16 – Indicative Masterplan

8 GENERAL LANDSCAPE DESIGN OBJECTIVES

- Deliver a positive, unique, and stimulating external environment which is inspiring for all.
- Assist with the spatial / visual integration of the development, with balanced screening, open and framed views.
- Create a design which responds appropriately to the landscape / urban character of the area giving the facility a distinctive character and reinforce its sense of place.
- Consider opportunities for connectivity (pedestrian, cycling and vehicular) between the facility, the surrounding neighbourhoods and the wider community.
- Create an external environment that is inclusive for all abilities, with facilities that deliver positive physical health well-being outcomes by inspiring active sport participation and team building; whilst also creating quiet and passive areas that focus on delivery of positive mental health well-being outcomes.
- Promote a stimulating external environment that supports positive outdoor learning opportunities, environmental awareness and sensory experiences. This should be a multifunctional landscape, meeting the needs of the college and community, but with flexibility to evolve and meet changing future need.
- Create an attractive learning environment through introduction of Growing Areas (allotments), Rainwater Gardens (SUDS), Wildlife Gardens (pollinators/ birds) with art installations interspersed with a simple palette of plant species offering seasonal interest and variation.
- Where it is possible and appropriate, protect and retain existing trees and structure planting associated with the site. This is most notable in association with the existing site boundaries and the watercourse through the site. There can be significant environmental and cost benefits to retain mature existing landscape features and whilst the watercourse requires intervention in relation to non-native species, it offers an excellent foundation to build valuable biodiversity.
- Opportunities for improved biodiversity should be integrated throughout the plan.
- Appropriately address the sites relationship with its immediate surroundings, with site boundaries in particular being carefully considered to minimise and mitigate potential impacts on neighbouring visual amenity.
- Identify potential attractive external views of surroundings from the development, and consider how these might be incorporated into the design layout, whilst ensuring the development itself does not detract from the wider landscape setting.
- Identify (through assessment and consultation) which long distant views are important to protect and retain. There will be a balance to be struck between partial screening of the development and maintaining open views across and beyond the site.
- Design a landscape and external circulation which is distinct and attractive, but importantly remains easy to orientate within.
- Prepare maintenance and management objectives which are clear and deliverable.

9 PROPOSED LANDSCAPE CHARACTER AREAS.

The proposed development character areas identified below provide outline guidance for the sites landscape design and management.

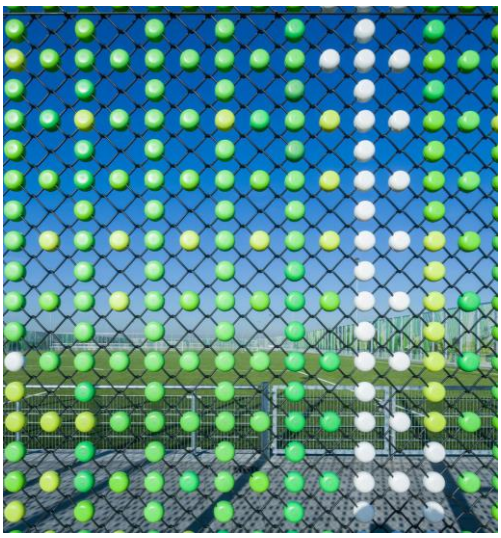
Figure 17 – Landscape Character Areas

- **Pitches & Pavilions**
- **Parking & Hedging**
- **Wet Woodland & Meadow**
- **Community Parkland**
- **Boundary Belt**

Pitches & Pavilions

This character area forms the main core and centre of the masterplan area. It includes the main spine road, pavilion structures, dome and the main playing pitch areas. This is the predominant character area.

Landscape Qualities :- Structured – Avenue planting , Poplar/ Hornbeam / Columnar Oak
Hornbeam hedging / Maintained Pitches and Grasses verges with seasonal bulbs.
Fencing / Netting/ Floodlights and hard standing terraced amphitheatre area.



Parking & Hedging

This character area is associated with the main 'Pitches and Pavilions' character area.
Whilst interlinked, it remains distinctive with a consistent palette of plant species and finishes.

Landscape Qualities :- Arrival / Contained / Formal
Clipped Hedges: (Hormbeam)
Feature Trees: Cherry / Pear / Columnar Hornbeam.
Groundcover / shrubs: Ornamental Grasses / Seasonal Colour with low maintenance

Wet Woodland & Meadow

Habitat creation and biodiversity improvement is the primary role of this character area which is focused on, and spreading out from, an existing water course which passes North South through the site.

Fencing and signage will prevent access for domestic pets and grazing livestock to this area, with human access also largely restricted. An accessible area (Biodiversity Garden) will be allocated for education and interpretation. The majority of this area will see the creation of intimate secluded spaces were wildlife can flourish with minimal disturbance.

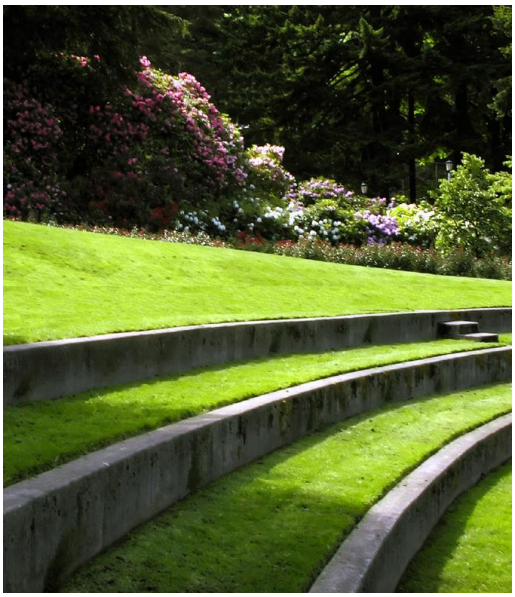
Landscape Qualities :- Enclosed Wetland – Woodland
Plant species to be exclusively native Willow/ Poplar/ Alder / Birch / Oak
Wetland grasses / rolling localised undulations landforming / Swales / Reeds.

Hedging to include Native mix species.

Community Parkland

This character area is in part defined by being the highest part of the site, offering extensive views in a southerly direction as far as the Sperrins .
The area will have an informal parkland feel with individual trees, clusters , grassland, hedges and limited areas of feature ornamental planting. Space has been allocated for a small equipped play park which would be designed in consultation with the local community. The elevated nature of this part of the site lends itself well to seated viewing areas.

Landscape Qualities:- Open Elevated Parkland
Field and meadow feel, interspersed with copses of native trees and occasion feature estate trees.
Oak / Acer / Willow/ Poplar/ Alder
Hedging to include Hornbeam

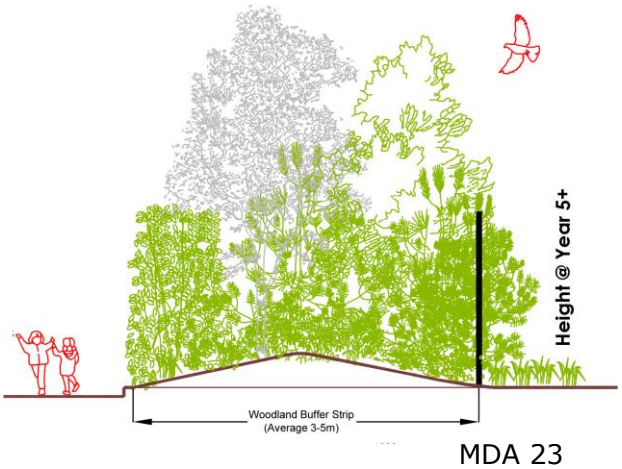


Boundary Belt

This is a long linear character area, which as its name suggests follows the boundary of the site. The existing boundaries (as illustrated in section 4 above) are composed of private property boundaries, fragmented hedgerows, and a variety of walls, fences and open drainage ditches.

In addition to clearer definition of boundaries through the introduction of earthworks, woodland and hedgerows planting and fencing, this character area a pathway follows the majority of length

Landscape Qualities :-
Wetland - Coastal feel Willow/ Poplar/ Alder / Ponds/ Swales / Reeds/ Wetland Grasses. / Oak/ Hornbeam, Walled enclosures - Stone



10 EQUIPPED PLAY AREA

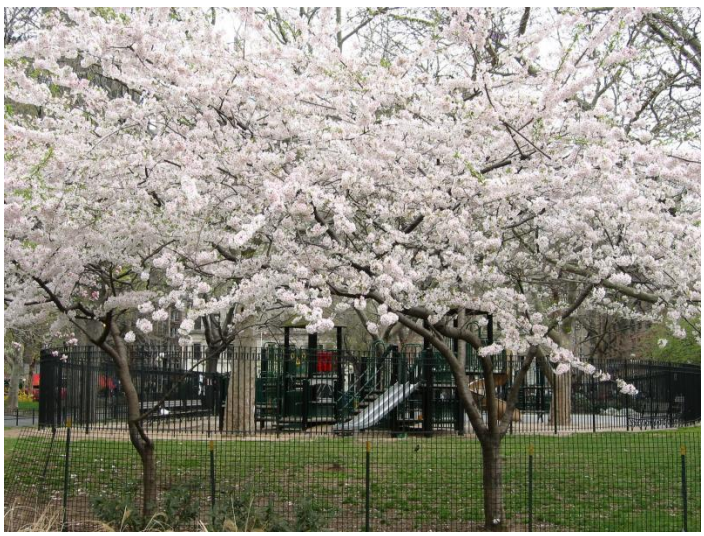
LEAP (Local Equipped Area for Play)
A feature of the proposed masterplan (within the Community Parkland Character Area) is an area allocated for the creation of an equipped play area for children of early school age. It will include some play equipment designed to stimulate social play e.g. small-scale adventure playground and located at the highest part of the site surrounded b`y an attractive and stimulating landscape of landform and planting.

CHILDREN'S PLAY AREAS
Local Equipped Area for Play (LEAP)
Location and scale:
Within 400m walking distance of every family dwelling. 400m5 of play area with a minimum distance of 10 metres3 between the edge of the play area and the boundary of any residential property.
Users:
4 to 8 year olds. Should be accessible by children (and carers) with disabilities such as mobility and sensory problems and suitable for their use.
Conditions:
Reasonably flat, and/or feature earthworks with well-drained with grass and/or hard surface.
Contents:
At least 5 types of play equipment should be provided. Surfacing and equipment to comply with the relevant British standards. Should have seating for accompanying adults. Where boundary to play area not secure, guard rail of appropriate design (1.1m high) around site with offset entry/exit point where adjoining any area used by vehicular traffic. Display of 'No dogs' and target user age group sign.
Appearance:
Landscape features to enhance the development including tree planting and low level planting including hedging behind guard rail.

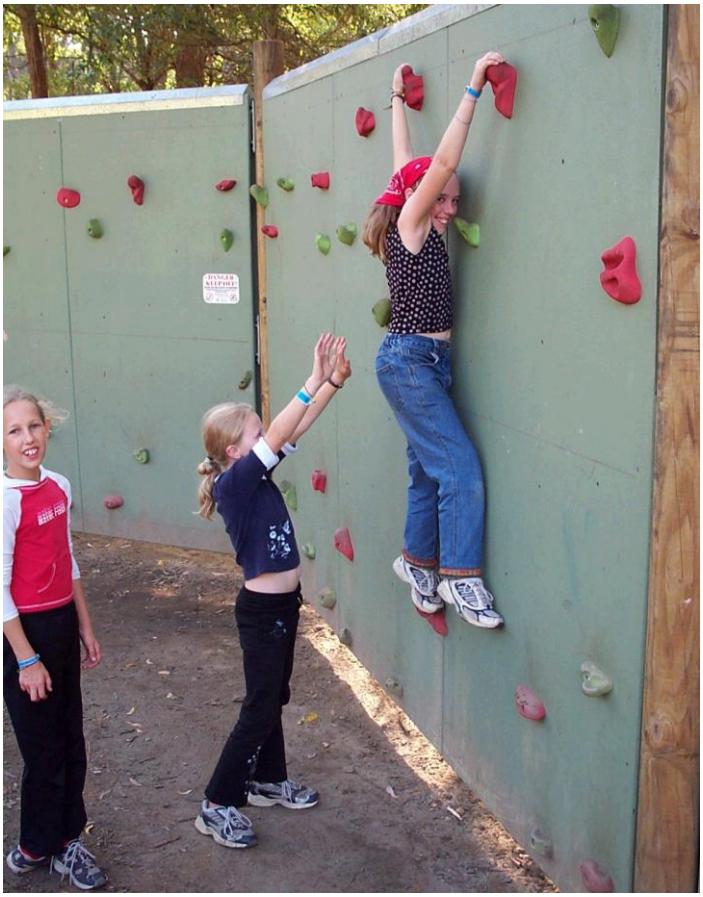
The following factors will need to be considered:-

- It is preferable and generally more successful to design and agree play equipment in consultation with the requirements of the end user community;
- Play space should be located to allow informal supervision from nearby houses or from well used pedestrian routes;
- Open, and/or south facing locations should be provided, not backland sites with accesses along high-fenced narrow alleyways;
- Preferably children should not need to cross major hazards such as roads;
- sites should be separated from areas of major vehicle movements and preferably accessible directly from pedestrian routes;
- every effort should be made to avoid locating play space near high voltage electricity cables and substations;
- to provide maximum separation from nearby residents, sites should be linked, as far as possible, with other open spaces, footpath systems and planting areas.

LEAP (Local Equipped Area for Play)

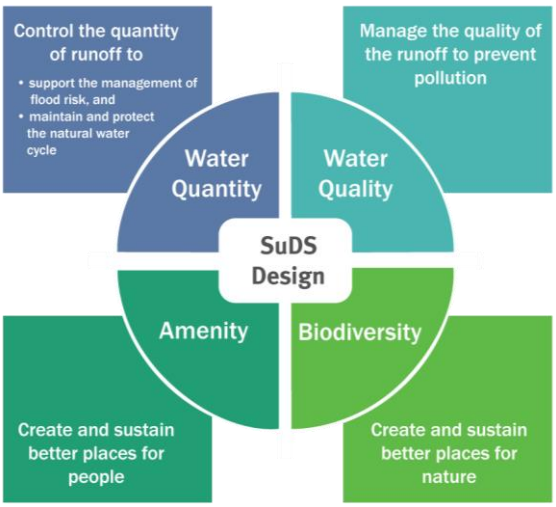


LEAP (Local Equipped Area for Play)



11 SUDS (SUSTAINABLE URBAN DRAINAGE SYSTEMS)

Sustainable drainage systems (SuDS) are a natural approach to managing drainage within developments - Subject to soil percolation testing, a SUDs approach is proposed for this development.
SuDS work by slowing and holding back the water that runs off from a site, allowing natural processes to break down pollutants.



The benefits of SuDS are:

- preventing water pollution
- slowing down surface water run-off and reducing the risk of flooding
- reducing the risk of sewer flooding during heavy rain
- recharging groundwater to help prevent drought
- providing valuable habitats for wildlife in urban areas
- creating green spaces for people in urban areas.

Typical SuDS Installations
SuDS systems vary from infiltration trenches/soakaways, filter drains and permeable pavements to swales, detention basins and stormwater wetlands. Other options which can also be used to assist stormwater runoff control include water-reuse, roof water collection (water butts) and rooftop gardens.
Typical examples of SuDS installations and the way they operate are as follows:

- **Permeable Pavements**

Use of porous asphalt, porous paving or similar concepts to reduce imperviousness thus minimising runoff. Runoff infiltrates to a stone reservoir where some breakdown of pollutants occurs before controlled discharge to a drain or watercourse or direct infiltration.

- **Filter Drains**

A gravel filled trench, generally with a perforated pipe at the base which conveys runoff to a drain or watercourse. These provide attenuation and trap sediments.

- **Infiltration Trenches/ Soakways**

Gravel or rock filled pits or trenches designed to store runoff while letting it infiltrate slowly to the ground. Provide treatment of runoff through filtration, absorption and microbial decomposition.

- **Bio-Retention**

These devices are depressions back filled with sand and soil and planted with native vegetation. Provide filtration, settlement and some infiltration. Piped drainage provided at the base to pipe filtered runoff back to the drainage system or watercourse.

- **Swales**

Grass lined channel designed to convey water to infiltration or a watercourse. Delays runoff and traps pollutants via infiltration for filtering effects of vegetation.

- **Detention Basins**

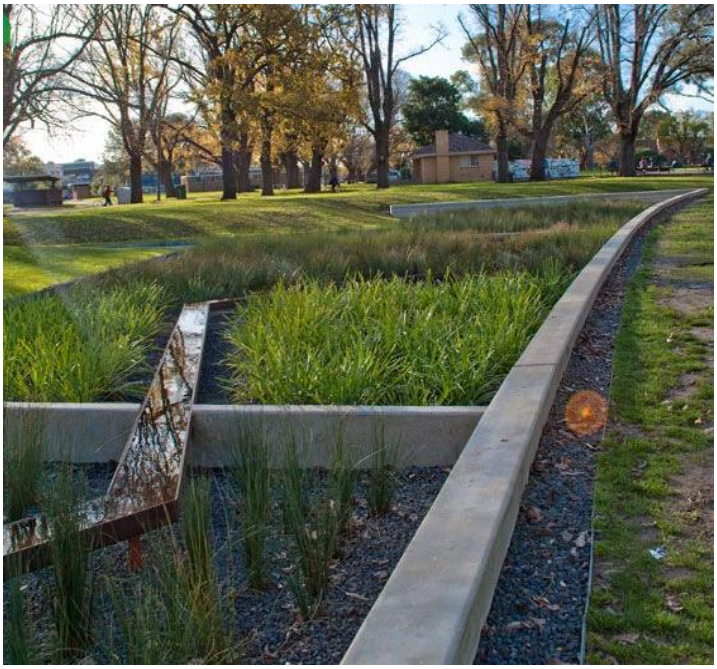
Dry vegetated depressions which impound stormwater during an event and gradually release it. Mostly for volume control but some pollutant removal achieved via settlement of suspended solids and some infiltration.

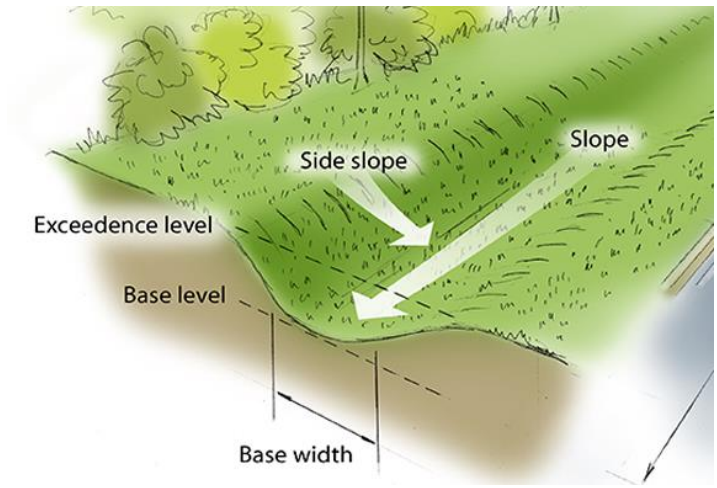
- **Retention Ponds**

Permanent water bodies which store excess water for long periods allowing particle settlement and biological treatment. Very effective for pollutant removal but limited to larger developments. Have high habitat and aesthetic benefits.

- **Stormwater Wetlands**

Like retention ponds but with more vegetation and less open water area. Excellent for pollutant removal. Also provide aesthetic and habitat benefits.




Slope
Side slope
Exceedence level
Base level
Base width

PLANT SCHEDULES

W1 MAIN WOODLAND MIX

	%	SPECIES	COMMON	SIZE	GROWN	TRANSPLANTS	DENSITY
Qr	35	Quercus robur	Oak	40-60cm	BR	1 + 2 Branched	3750 Plants Per Hectare
Ps	15	Pinus sylvestris	Scots Pine	40-60cm	BR	1 + 1 Branched	
Bp	20	Betula pendula	Birch	40-60cm	BR	1 + 1 Branched	
Ag	15	Alnus glutinosa	Alder	40-60cm	BR	1 + 1 Branched	
Sa	10	Sorbus aucuparia	Rowan	40-60cm	BR	1 + 1 Branched	
Pa	5	Prunus avium	Cherry	40-60cm	BR	1 + 1 Branched	

W2 WOODLAND EDGE MIX

	%	SPECIES	COMMON	SIZE	GROWN	TRANSPLANTS	DENSITY
Ca	30	Corylus avellana	Hazel	40-60cm	BR	1 + 1 Branched	3750 Plants Per Hectare
Cm	15	Crataegus monogyna	Hawthorn	40-60cm	BR	1 + 1 Branched	
Ps	10	Prunus spinosa	Blackthorn	40-60cm	BR	1 + 1 Branched	
Ia	15	Ilex aquifolium	Holly	40-60cm	BR	1 + 1 Branched	
Qi	5	Acer campestre	Field Maple	40-60cm	BR	1 + 1 Branched	
Ue	5	Ulex europaeus	Gorse	40-60cm	BR	1 + 1 Branched	
Ag	5	Alnus glutinosa	Alder	40-60cm	BR	1 + 1 Branched	
Ms	5	Malus sylvestris	Crabapple	40-60cm	BR	1 + 1 Branched	
Vo	5	Viburnum opulus	Guelder Rose	40-60cm	BR	1 + 1 Branched	
Sci	5	Salix cinerea	Grey Willow	40-60cm	BR	1 + 1 Branched	

H1 HEDGEROW MIX

	%	SPECIES	COMMON	SIZE	GROWN	TRANSPLANTS	DENSITY
Cm	75	Crataegus monogyna	Hawthorn	40-60cm	BR	1 + 1 Branched	5 per lin m
Ca	5	Coryllus avellana	Hazel	40-60cm	BR	1 + 1 Branched	1 per lin m random selection & distribution
Ps	5	Prunus spinosa	Blackthorn	40-60cm	BR	1 + 1 Branched	
Ia	5	Ilex aquifolium	Holly	40-60cm	BR	1 + 1 Branched	
Sc	5	Salix caprea	Goat Willow	40-60cm	BR	1 + 1 Branched	
Vo	5	Viburnum opulus	Guelder Rose	40-60cm	BR	1 + 1 Branched	

H2 CLIPPED HEDGES

		COMMON	SIZE	GROWN	TRANSPLANTS	DENSITY
Cm	Carpinus betulus	Hawthorn	40-60cm	BR	1 + 1 Branched	5 per lin m
Ia	Ilex aquifolium	Holly	40-60cm	BR	1 + 1 Branched	

AVENUE & FEATURE TREES

%	SPECIES	COMMON	SIZE	GROWN	DENSITY
QR	Quercus robur	Oak	18-20cm	Rootball	Clear Stem
QR'F'	Quercus robur 'Fastigiata'	Oak - Columner	18-20cm	Rootball	Clear Stem
BP	Betula pendula	Birch	16-18cm	Rootball	Clear Stem
CB	Carpinus betulus Frans Fon	Hornbeam	16-18cm	Rootball	Clear Stem
TC'G'	Tilia cordata 'Greenspire'	Lime	16-18cm	Rootball	Clear Stem
PC	Pyrus calleryana 'Chanticleer'	Pear	14-16cm	Rootball	Branched
MD	Malus domestica 'Bramleys'	Apple	14-16cm	Rootball	Clear Stem
PA	Prunus avium 'Plena'	Cherry	14-16cm	Rootball	Clear Stem

NORTHERN MEADOW MIXTURE
Applied to Sloped Areas)

Grasses

Agrostis capillaris {Common bent}
Anthoxanthum odoratum {Sweet vernal}
Cynosurus cristatus {Crested dogs-tail}
Festuca rubra {Red fescue}

Forbs

Achillea millefolium {Yarrow}
Centaurea nigra {Common knapweed}
Conopodium majus {Pignut}
Galium verum {Ladys bedstraw}
Hypochoeris radicata {Cats-ear}
Lathyrus pratensis {Meadow vetchiing}
Leontodon autumnalis {Autumn hawkbit}
Leucanthemum vulgare{Oxeye daisy]
Lotus corniculatus {Bird's-foot-trefoil}
Plantago lanceolata {Ribwort plantain}
Prunella vulgaris {Selfheal}
Ranunculus acris {Meadow buttercup]
Rhinanthus minor {Yellow-rattle}
Rumex acetosa {Common sorrel}
Succisa pratensis {Devil's-bit scabious}
Trifolium pratense {Red clover}
Vicia cracca {Tufted vetch}

WETLAND MEADOW MIXTURE
(Applied to Wetter Lands)

Grasses

Anthoxanthum odoratum {Sweet vernal}
Cynosurus cristatus {Crested dog's-tail}
Festuca rubra {Red fescue}
Poa trivialis {Rough meadow-grass}

Forbs

Achillea ptarmica (Sneezewort)
Angelica sylvestris (Wild angelica)
Bellis perennis (Daisy)
Caltha palustris (Marsh-marigold)
Centaurea nigra (Common knapweed)
Filipendula ulmaria (Meadowsweet)
Galium palustre (Common marsh-bedstraw
Geum rivale (Water avens)
Leontodon autumnalis (Autumn hawkbit)
Leucanthemum vulgare (Oxeye daisy)
Lotus pedunculatus (Greater bird's-trefoil)
Lychnis flos-cuculi (Ragged robin)
Plantago lanceolata (Ribwort plantain)
Prunella vulgaris (Selfheal)
Ranunculus acris (Meadow buttercup)
Rhinanthus minor (Yellow-rattle)
Rumex acetosa (Common sorrel)
Succisa pratensis (Devil's-bit scabious)
Trollius europaeus (Globeflower)

13 STREET FURNITURE

Furniture		
Material Application	**Material Description**	**Material Appearance**
Street furniture throughout should be coordinated and visually consistent. It should be physically robust and of simple dimension and form. The basic palette of material should be restricted to timber; natural stone/ textured concrete in basic combination with minimal use of metals. Dimensions of furniture should be generous and should avoid over elaborate and fussy detail.	Bench dimensions to be designed to acceptable ergonomic proportions. The design to accommodate back support as an option. Material to be hardwood with bullnose edge aggregate concrete. Approx dimensions: 3000mm length 600mm width 440mm high	
Bollards As with benches any bollards or markers used in the area to be distinct and potentially unique. They should to be sturdy and robust in construction and appearance. Bollards to be constructed of timber, stone or textured concrete. Materials to be of generous dimensions and with minimum decoration. Colour of natural stone or concrete in buff, browns and greys (No Pink tones). Wood to be hard wood such as kiln dried Oak.		
LitterBins Bin design is an integral part of the street furniture suite and should complement other elements. It is essential for maintenance and management purposes that bins throughout are consistent in design terms so that waste management is kept as simple as possible. It is impractical to have a variety of locks, keys, and basket sizes etc, therefore consistency of design is very important. As with the other furniture items the colour selection should be browns (wood) and grey tones.		

Lighting		
Material Application	**Material Description**	**Material Appearance**
Lighting throughout as with the proposed street furniture should be coordinated and visually consistent. The design should be physically robust and of simple dimension and form avoiding over elaboration / ornamentation. Medium Level Lighting Option 1 Streets will have reduced column sizes, 6m max Columns to be tapered, with straight bracket or curved column.	Column mounted, top post luminaire to be Tech series LED or similar approved. Used extensively and successfully throughout Ireland on local authority adopted streetscapes. Refer to project Lighting report for further detail.	
Medium Level Lightings Option 2 These medium sized light columns will be introduced at feature locations along primary paths such as the central park. Whilst the style of these light can be contrasting to the main columns the finish should be consistent in galvanised, cast aluminium and polyester-coated stove black.	Medium Level Lighting	
Feature Lighting Low (Bollard Lighting) Bollard lighting on pedestrian areas and junctions and should be constructed from cast steel or stone. Alternatively lighting could be integrated into other street furniture such as benches. Dimensions of bollards should be of generous dimensions and	Ground based uplighters and other feature lights can be utilised to illuminate planters and or street trees at locations of particular public interest such as squares and wider junction areas.	

avoid over elaborate design. Focal points and detail areas may require specialised lighting (floodlit, up lit or mood). These should be discreet and easily maintained, Yet robust in nature for public realm.		

gahanandlong ltd
archaeological services

ARCHAEOLOGICAL &

CULTURAL HERITAGE ASSESSMENT

Contents

Plates and figures

1 Introduction

1.1 Background

It is proposed to construct sports facilities, agri-education facilities and other potential further developments on approximately 66 acres within the townlands Carnamoggagh Lower/Knocknamona, Letterkenny, approximately 1km from the Letterkenny Institute of Technology at Port Road, Letterkenny (figures 1 and 2). This cultural heritage assessment has been commissioned to assess the cultural heritage potential of the proposed works.

This Report describes the surveys and assessments conducted as part of the impact assessment for the proposed development. It describes the archaeological baseline (monuments and historic buildings) of the site and the surrounding area; and presents an assessment of the impact of the proposed development on said monuments and historic buildings.

This Report also contains a detailed method statement outlining steps that should be taken prior to and during construction to minimise any potential impact.

1.2 Methodology

This cultural heritage impact assessment was conducted in three stages. Firstly a detailed desktop survey was undertaken. Known cultural heritage sites were reviewed along with aerial photography and Ordnance Survey Ireland (OSI) First Edition Mapping (Circa 1830) and Second Edition Mapping (circa 1900). Previously recorded cultural heritage sites reviewed included the following:

- National Monuments, be they in the ownership or guardianship of the State, in the ownership of a local authority or monuments under preservation orders;
- Record of Monuments & Places (RMP) and Sites and Monuments Record (SMR) from www.archaeology.ie;
- Architectural Conservation Areas;
- Records of Protected Structures;
- National Inventory of Architectural Heritage (NIAH); and
- Demesnes Landscapes and Historic Gardens indicated on the OSI First Edition Mapping.
- Excavations Bulletin;
- Cartographic Sources;
- Toponyms;

The Letterkenny & Environs Development Plan 2009-2015 was reviewed to obtain a comprehensive understanding of the cultural heritage of the region. The development plans contain lists of cultural

heritage sites including national monuments, recorded monuments, architectural conservation areas, protected structures and protected views as well as baseline assessments of the landscape character of the county. The plans also outline the county's heritage policies and objectives that aim to protect and promote the archaeological, architectural and cultural heritage of the region. This assessment was carried out with due regard to these policies and other relevant information contained within the plans.

Secondly, a site inspection of the development area was carried out to identify any previously unknown archaeological sites which could exist within the red line boundary and finally, the information provided by the desk top survey and site inspection was assessed in relation to the potential impact of the proposed development on cultural heritage. Having assessed the potential impact upon cultural heritage, a detailed mitigation strategy and method statement has been established.

2 Archaeological and Cultural heritage baseline

A desk top survey was carried out for the area of the proposed development extending to a wider study area of a radius of up to 1km from the development area (figure 3).

Data Source	Results
National Monuments	None within the study area
Record of monuments & places (RMP)	7
National inventory of architectural heritage (NIAH)	5
Record of Protected Structures	None within the study area
Demesnes Landscapes and Historic Gardens	None within the study area
Excavations Bulletin	Information on relevant excavations is contained within the RMP
Pre-Ordnance Survey maps	No maps identified
Early edition Ordnance Survey Maps	1st edition onwards

2.1 Development site

The proposed development is located within the townlands of Carnamoggagh Lower and Knocknamona covering an area of 66 acres on the N outskirts of Letterkenny.

A review of the archaeological and cultural heritage databases has identified no known recorded cultural heritage assets within the proposed development area (figure 3).

A cartographic regression study was also carried out. This identified a mill pond within the area designated for future development on the 1st edition OS map which dates to the mid 19th century

(figure 4). It appears, although it is unclear, that this mill pond is related to a flax mill located due south of the mill pond. The mill pond and the flax mill are not recorded on the Historic 25" map which dates to the later 19th – early 20th century map (figure 5).

The area of the proposed development consists of 66 acres, which is largely used for agricultural purposes which is generally flat but slopes SE in the W are of the site and N to S in the E portion of the development area. 23 acres of the development area is planted with short rotation willow, a biomass fuel crop.

2.2 Cultural Heritage Assets within the wider study area

Looking beyond the development area a number of cultural heritage assets were identified in the wider study area (figure 3).

2.2.1 Recorded monuments and places (RMP)

A review of the Record of Monument and Places (RMP) dataset identified 7 RMP's in the wider study area.

RMP No	Classification	Description
DG053-045--	Souterrain	The Archaeological Survey of Ireland (ASI) is in the process of providing information on all monuments on The Historic Environment Viewer (HEV). Currently the information for this record has not been uploaded. However, an excavation of the monument was carried in September 2006, licence No. 06E0945. The monument had been quite disturbed by the development works with no capstones left *in situ*, however, the stone-lined walls remained, 1.45m in max. depth. Apart from the collapsed material within the souterrain no other archaeological material was uncovered during the excavation.
DG053-053---	Standing Stone	Excavation licence number 02E0202. Monitoring was carried out at the IDA Business and Technology Park, Lisnenan, Letterkenny, from 12 to 25 March 2002. Phase 1 of the development comprises the building of distributor roads and services. The site comprised pasture fields with frequent rock outcrops on a south-facing slope overlooking the wide valley of the River Swilly. A flax mill and pond formerly stood slightly to the north-east of the site, but this area is now occupied by a reservoir and pump-house built in the 1970s. Stratigraphy encountered comprised topsoil, a gravelly silt with stone inclusions, overlying a mid-olive to yellow/brown, sandy boulder clay, which in turn overlay schist bedrock. Nothing of archaeological significance was noted during the

		monitoring. However, a rounded upright stone, 0.8m high, was observed at the north-eastern edge of the site. This may be a prehistoric standing stone or a modern scratching stone for livestock. It will not be affected by Phase 1 of the works but would be by future phases of the development.
DG053-055--	Souterrain	During the course of preparatory soil-stripping to facilitate the construction of an apartment block at a proposed apartment complex and housing development at Lisnenan, Letterkenny, Co. Donegal, the client's contractor uncovered a possible souterrain. No archaeological condition applied to the development, which is 60m to the west of a cashel (DG053–015----) and 370m NNE of a holy well (DG053–017----). The client contacted the DEHLG and reported the discovery. Upon consultation with the NMI and DEHLG, and in consideration of the advanced stage of construction, it was recommended that the souterrain be preserved by record. The excavation was carried out under licence No. 06E0945 in September 2006. The site had been significantly disturbed. No archaeological material other than the souterrain was encountered. The site is located on a west-facing slope in pasture with occasional rock outcrops and presented as a topsoil-stripped, scarped-out area. A platform upon which the site was located had been left in situ. Little remained in the area of the souterrain. Much of the overlying material had been removed. Only the stone-lined walls remained in situ. A number of flat stones (possible capstones or lintels) lay in the general area. No capstones remained in situ. The possible entrance was located at the western end (equating to the lower end of the original slope). A section face at the northern limit of the development site (25m north of the souterrain) provided a base point/indication of the original levels and topography. This indicated a gentle east–west gradient. The entrance area appeared to be a roughly rectangular pit at the western end of the souterrain. There were a number of large rounded stones at the base. Due to disturbance, it was difficult to discern for certain the nature of the entrance. It was roughly here that the client's representatives had uncovered the souterrain when a tractor collapsed. The cut for the souterrain measured c. 5m in length and curved from east to west. It was filled by the stone walling. At the eastern end an extension to the cut, beyond the area which was walled, was excavated. It was roughly rounded in shape and narrowed to the west at the possible

		entrance. The corners at the east were roughly rounded in shape. The break of slope throughout was rounded and sharp in parts. The sides were generally vertical and there was a sharp break of slope at the base throughout. The base of the cut was relatively level. The cut for the entranceway was contemporary with the cut for the souterrain and was roughly rectangular in shape, forming a court shape at the western end of the souterrain. The break of slope was rounded with a sharp slope and rounded break of slope at the base. Collapsed stones were evident at the base. These may have formed some sort of path, although it is not possible to say for certain whether they were in their original location, as this area had been significantly disturbed. The stone walling of the souterrain was single skinned. It survived on both sides to roughly nine courses. The stones varied in size, measuring from 100mm by 100mm to 400mm by 500mm. There were occasional slates and some daub in places. The maximum depth of the walling was 1.45m. The first two to three courses comprised smaller stones, with the basal layers comprising much larger stones.
DG053-015---	Ringfort – cashel	Internal diam. c. 19m. A subcircular area enclosed by a much overgrown and partially destroyed stone wall. Small sections of the internal and external facing of the wall can be traced demonstrating its thickness to have been between 2m and 3m. Field boundaries abut onto and cross the site. On the N side a boulder which forms part of the wall is decorated with 7 cupmarks (DG053-015001-). Kinahan (1885-86, 427) referred to a chamber and door-way in the N wall but no trace of either was found on this occasion. The interior is level. The site is located S of the crest of a low hill in good farmland but with a lot of scrub and woods. The above description was derived from the 'Archaeological Survey of County Donegal. A description of the field antiquities of the County from the Mesolithic Period to the 17th century.' Compiled by: Brian Lacey with Eamon Cody, Claire Cotter, Judy Cuppage, Noel Dunne, Vincent Hurley, Celie O'Rahilly, Paul Walsh and Seán Ó Nualláin (Lifford: Donegal County Council, 1983).
DG053-015001-	Rock Art	A subcircular area (DG053-015-) enclosed by a much overgrown and partially destroyed stone wall. On the N side a boulder which forms part of the wall is decorated with 7 cupmarks.

		The above description was published in the 'Archaeological Survey of County Donegal. A description of the field antiquities of the County from the Mesolithic Period to the 17th century.' Compiled by: Brian Lacey with Eamon Cody, Claire Cotter, Judy Cuppage, Noel Dunne, Vincent Hurley, Celie O'Rahilly, Paul Walsh and Seán Ó Nualláin (Lifford: Donegal County Council, 1983).
DG053-017---	Ritual Site – holy well	Marked as a 'Holy Well', on the 2nd and 3rd editions of the OS 6-inch maps. There are now no special features, or traditions, associated with it. It is located on good land. The above description was derived from the 'Archaeological Survey of County Donegal. A description of the field antiquities of the County from the Mesolithic Period to the 17th century.' Compiled by: Brian Lacey with Eamon Cody, Claire Cotter, Judy Cuppage, Noel Dunne, Vincent Hurley, Celie O'Rahilly, Paul Walsh and Seán Ó Nualláin (Lifford: Donegal County Council, 1983). Excavation licence number 01E0233 Monitoring was carried out on 20 and 21 March 2001 on the site of the proposed development of sixteen two-storey semi-detached dwelling-houses and associated services and access road at Lisnenan, Letterkenny, Co. Donegal. The proposed development is on a south-facing slope, at the base of which there is a holy well, marked on the 2nd and 3rd editions of the OS 6-inch maps. No traditions are associated with the well. The underlying geology consists of a compact mid-brown gravelly silt with inclusions of frequent small to medium-sized, both rounded and angular, stones. This stratum consistently overlay a mid-olive to yellowish-brown sandy silty boulder clay and schist bedrock exposed at the base of excavations. Nothing of archaeological significance was noted during the course of monitoring. (Excavations Bulletin 2001) Excavation licence number 01E0287 Monitoring of topsoil-stripping was carried out at Lisnenan, Letterkenny, Co. Donegal, on 13 November 2001 on the proposed location of five private residences, associated driveway and services. The site is on a steep west-facing slope in pasture with occasional rock outcrops. Letterkenny is visible to the west. At the base of the slope is a holy well. The area stripped measured c. 110m north-south by 40m. The underlying geology

		consists of a compact mid-brown gravelly silt with inclusions of frequent small to medium-sized rounded and angular stones. This stratum consistently overlay a mid-olive to yellowish brown sandy silt boulder clay and schist bedrock exposed at the base of excavations. Nothing of archaeological significance was noted during the course of monitoring. (Excavations Bulletin 2001)
DG053-021---	Bullaun Stone	The Archaeological Survey of Ireland (ASI) is in the process of providing information on all monuments on The Historic Environment Viewer (HEV). Currently the information for this record has not been uploaded.

A total of 4 structures were identified in NIAH database within the study area (figure 3). The identified structures are detailed in the table below (figure 3).

NIAH No	Classification	Description
40905319	Regional	St. Conal's Psychiatric Hospital, High Road, Letterkenny. This former graveyard was originally built to serve St. Conal's psychiatric hospital (see 40905317 for main building), and was in use from 1866 until around 1900. An interesting addition to the hospital site, this peaceful quarter of the complex constitutes an important part of the social history of the area when many of those dying in such hospitals were buried in a graveyard to site. There are few gravemarkers to site, which suggests that many of the patients were buried in unmarked graves. The modern commemoration plaque adds some dignity to this largely forgotten site. The walls are of sturdy rubble stone construction and typical of the period. Despite the loss of a gate pier, sections of wall, and associated buildings, the graveyard retains a peaceful air and is significant as part of a group of related sites.
40905318	Regional	St. Conal's Psychiatric Hospital, Hospital Grounds, High Road. This impressive and well-proportioned former hospital building, dating to the very start of the twentieth century, retains its early form and character despite being now out of use. Its visual appeal and integrity is enhanced by the retention of salient fabric such as a variety of timber sliding sash windows and timber panelled doors with fielded panels, albeit in a dilapidated condition. The contrast between the roughcast rendered walls and the yellow brick detailing creates pleasing textural and tonal variation to the exterior. The fine ashlar sandstone clock tower with sheet lead and copper dome over and the

		doorway with overlight, sidelights and segmental pedimented doorcase provide an effective and attractive central focus. Its scale and detailing is typical of the grand hospital architecture found across Ireland and Britain during the late Victorian and Edwardian periods. Its imposing scale is softened by some fine detailing such as that to the tower and the cut stone stringcourse at plinth level. This fine building was originally built between 1902-4 by the Derry architect James Patrick McGrath (1875-1948) as new male and female wings to the earlier St. Conal's hospital (see 40905317 for main building to south). The main contractor involved was a J&W Stewart of Belfast and its estimated cost was £20,690. Its visual expression with roughcast walls and yellow brick detailing compliments the detailing to the main hospital complex adjacent to the south. It was later in use as part of the Letterkenny RTC\IT college complex but has being unfortunately out of use since c. 2000. This monumental building forms an important element of an interesting group of structures at St. Conal's hospital that together illustrate the changing theories and practice in hospital design over a one hundred year period, and is an integral element of the built heritage of the Letterkenny area in its own rights.
40905317	Regional	St. Conal's Psychiatric Hospital, Kilmacrenan Road. This complex and monumental Victorian hospital complex retains much of its early character and form despite alterations and the construction of various extensions. Interestingly it retains the symmetry evident in the original block despite been successively extended throughout the last decades of the nineteenth century with new blocks to accommodate the needs of contemporary hospital practice. It is a complex that is typical of the grand hospital architecture found across Ireland and Britain during the Victorian period. Its imposing scale is softened by some fine detailing such as the cut stone surrounds to some of the openings and the Italianate detailing to the tower-like blocks. The unfortunate loss of many original windows does not compromise the building's character adversely, and with a great deal of the building's intrinsic features, including some fine sandstone finishes, surviving in good condition, this building represents an important part of Letterkenny's Victorian heritage whilst serving an essential practical role in the modern affairs of Letterkenny and County Donegal. The central part of this complex was originally erected to a design prepared by

		George Wilkinson (1814-90), Architect to the Commissioners of Asylums for the Lunatic Poor (appointed 1860; resigned 1886). The original building had a 'three-storey façade extending to 521ft with projecting wings to either side, chapel to the centre, and a great corridor to the rear extending the length of the building' (IAA). The main contractor involved was a Matthew McClelland of Derry and the Clerk of Works was an Arthur Kent. Building works commenced in 1860 and works were completed in February 1865. The building was described as ready for occupation in January 1866. This was one of a number of monumental district lunatic asylums that were constructed throughout Ireland following the enactment of the 1845 Lunatic Asylum (Ireland) Act (between 1810 and 1870, twenty two district lunatic asylums were built in Ireland). This building is quite similar in form and appearance to the contemporary asylum at Castlebar, County Mayo (see 31209001), built also to designs by Wilkinson in 1860-6. Wilkinson is best known for his workhouse designs, and was responsible for the designs of administration block (now a museum and the workhouse (now demolished(at the former workhouse in Letterkenny. This hospital was later extended in 1872, 1876, and in 1886 (to designs by the architect John Boyd of Belfast), 1893 (to designs by the architect William McElwee of Derry), and possibly between 1902-4 (to designs by the architect James Patrick McGrath of Derry). This monumental building forms the centerpiece of an interesting group of structures at St. Conal's hospital that together illustrate the changing theories and practice in hospital design over a one hundred year period. Slater's Directory of 1894 records that the 'district lunatic asylum is a handsome building, erected at a cost of about £30,000, and since considerably extended, and will now hold 600 patients.
40905320	Regional	Tir Conaill House/Parkview House, Kilmacrenan Road. This impressive and substantial former dwelling was originally built as the medical superintendent's house associated with St. Conal's psychiatric hospital (see 40905317). It dates to the very end of the nineteenth century and its complex irregular plan and asymmetrical form with various gabled bays and canted bays is typical of many houses built at this time. Its visual expression is enhanced by the retention of salient fabric such as the variety of timber sliding sash windows and panelled timber doors. Decorative interest is added by the pronounced moulded

		render cornice stringcourse and the elaborate canopy over the window opening to the west elevation (possibly formerly a doorway). The contrast between the roughcast rendered walls at first floor level, the brick walls at ground floor level, and the brick detailing add further interest to the principal elevations. Although now converted to new uses, it survives in good condition and forms part of an interesting collection of structures associated with St. Conal's psychiatric hospital. Occupying attractive mature grounds to the north of the centre of Letterkenny, this building is an integral element of the built heritage of the local area. The gateways to site add to the setting and context, and complete this composition. This was possibly the house if Edward E. Moore M.D. in 1894, the resident medical superintendent at the hospital at this time (Slater's Directory).

2.2.2 Previous Archaeological Fieldwork

The Excavations Bulletin is both a published annual directory and an on-line database that provides summary accounts of all the excavations carried out in Ireland – North and South – from 1970. A number of excavations were identified within the general study area which have been included in the RMP and are described above.

2.2.3 Toponym Analysis

Townland names are a rich source of information for the land use, history, archaeology and folklore of an area. The placename can have a variety of language origins such as, Irish, Viking, Anglo-Norman and English. The names can provide information on families, topographical features, and historical incidents. In terms of the built environment many names reference churches, fords, castles, raths, graveyards, roads and passes etc. In compiling the following data, a number of resources were consulted including the Placenames Database of Ireland www.logainm.ie and Irish Names of Places by P.W. Joyce (Joyce, 1913).

Townland Name/ Name	Irish Version	Translation
Carnamogagh Lower	Ceathru na mBogach Iochtarach	Ceathru means quarterland. This townland is first recorded in 1611 as Carrownamogagh. In the mid 17th century it is recorded as Cornemogagh becoming Lower Carnabogagh in the 19th century when it is also recorded as 'quarter of the bogs'.
Knocknamona	Cnoc na Móna	Cnoc meaning Hill and Móin meaning bogland. The hill of the bogland.

2.3 Topographic files

The topographic files of the National Museum of Ireland (NMI) identify all recorded finds held in the NMI archive. A review of the NMI finds database on the Heritage Council website identified no recorded finds within the townland of Carnamogagh Lower and Knocknamona.

3 Archaeological potential of the development area.

The desk top survey identified no known cultural heritage assets within the development area. However, a number of assets were identified within the wider study area, some of which were subsequently excavated, which indicates that the proposed development is located within an area of archaeological significance. As such it is possible therefore that previously unknown archaeological remains could exist subsurface within the development area, for which there are now no surface expressions.

3.1 Physical impact of the proposed development

Given the potential for subsurface archaeological remains to survive within the development area, the possibility exists that these remains could be negatively impacted upon by construction. As a result further archaeological mitigation, prior to construction will be required.

3.2 Visual impact of the proposed development

The proposed development is not located in close proximity to any upstanding cultural heritage assets and will therefore not impact on the visual aspect of any archaeological monument or historic building.

4 Archaeological Mitigation Strategy

Prior to construction commencing it is recommended that the following mitigation strategy be implemented, subject to the approval of the statutory bodies.

4.1 Statutory Requirements

Archaeological excavation licence to be obtained from National Monuments Service.

4.2 Methodology

- A geophysical survey of the development is recommended to identify, non-intrusively any potential anomalies which could indicate the presence of archaeological remains within the development area.

- A series of targeted archaeological test trenches should be excavated across the development area to ascertain the presence or absence of archaeological remains. The location of the trenches will be based on the results of the geophysical survey. The test trenches will be excavated using a back acting machine fitted with a toothless bucket under strict archaeological supervision. They will be excavated to the upper levels of archaeological strata or naturally occurring subsoil, whichever is highest. The trenches will be a minimum of 1.8-2m wide and no more than 10-12m apart.

- Should archaeological deposits or features be identified then the area surrounding the uncovered remains will be extended to a distance of 10m beyond the limit of the identified archaeology. This will ensure that all associated remains and features are uncovered.

- Should archaeological deposits be identified then the area of archaeological activity will be cordoned off, and work in that area will be stopped until such time as an appropriate mitigation strategy has been established, in agreement with all stakeholders. This mitigation strategy may include extending the area to reveal the full extent of the deposits uncovered.

- Should archaeological deposits be exposed their nature and extent will be assessed by the archaeologist present. This will entail the manual excavation of a small area of the material exposed.

- Any identified deposits or features will be recorded with pro forma recording sheets. A drawn and photographic record of all archaeological features will also be made. Archaeological plans will be drawn at 1:20 and sections at 1:10 or 1:20 (as appropriate).

- All finds recovered from this site will be cleaned/ washed, labelled accordingly, bagged and boxed immediately by an appointed member of staff. The location of the finds and the context from which they were obtained will also be recorded. Any items recovered which will require urgent conservation, will be treated immediately by a professional conservator. A comprehensive finds list will subsequently be compiled. All finds will be removed from the site office to the Gahan and Long Ltd office where they will be drawn (if necessary), catalogued and stored until they are transferred to the museum at Collins Barracks. Any items recovered during excavation requiring urgent conservation will be treated immediately by a professional conservator on contract in consultation with the National Museum of Ireland. Where appropriate a conservator will be contracted to assist with the excavation of vulnerable finds. The National Museum of Ireland will be notified immediately of any significant or vulnerable finds.

- Upon completion of the on site works a preliminary report will be submitted to the National Monuments Service and National Museum of Ireland within four weeks. This will be presented as one digital copy in pdf format and two hard copies. The preliminary report will be in the recommended format set out in the Guidelines for Authors of Reports on Archaeological Excavations (2006) issued by the National Monuments Service.

- An appendix within the preliminary report will contain a 'Monument Report Form' for every previously-unrecorded monument discovered in the course of the excavation. The monument classification used on the form must accord with that operated by the National Monuments Service.

- Unless it has been otherwise agreed, a final report will be submitted to the National Monuments Service and National Museum of Ireland within 12 months of completion of the on site works. This will be submitted as one pdf copy and two hard copies. The final report will be in the recommended format set out in the Guidelines for Authors of Reports on Archaeological Excavations (2006) issued by the National Monuments Service. This report must be to publication standard and include a full account, suitably illustrated, of all archaeological features, finds and stratigraphy along with a discussion and specialist reports. In addition a concise report to the standard accepted for publication on the www.excavations.ie website for the year in which the licence is valid.

- A copy of any publication where the results of the excavation have been published will be lodged with the National Monuments Service.

5 Conclusion

It is proposed to construct sports facilities, agri-education facilities and other potential further developments on approximately 66 acres within the townlands Carnamoggagh Lower/Knocknamona, Letterkenny, approximately 1km from the Letterkenny Institute of Technology at Port Road, Letterkenny (figures 1 and 2). This cultural heritage assessment has been commissioned to assess the cultural heritage potential of the proposed works.

The desk top survey identified no known cultural heritage assets within the development area. However, a number of assets were identified within the wider study area, which indicates that the proposed development is located within an area of archaeological significance. It was assessed that it was possible therefore that previously unknown archaeological remains could exist subsurface within the development area, for which there are now no surface expressions. Should such remains exist they could be negatively impacted upon by development. To ameliorate any potential impact a mitigation strategy has been proposed. All recommendations are made subject to the approval of the statutory bodies.

Figure 1: Site location

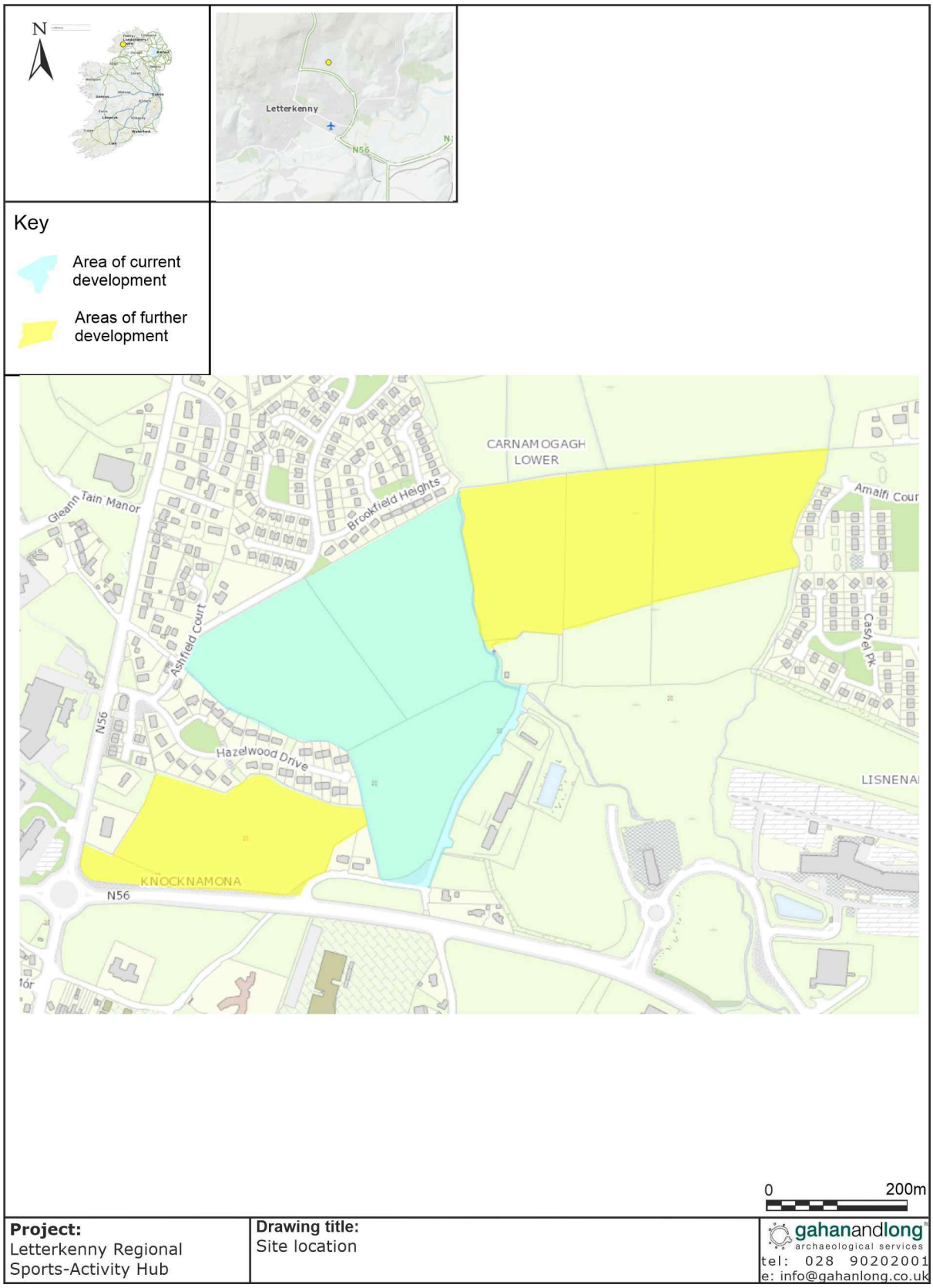
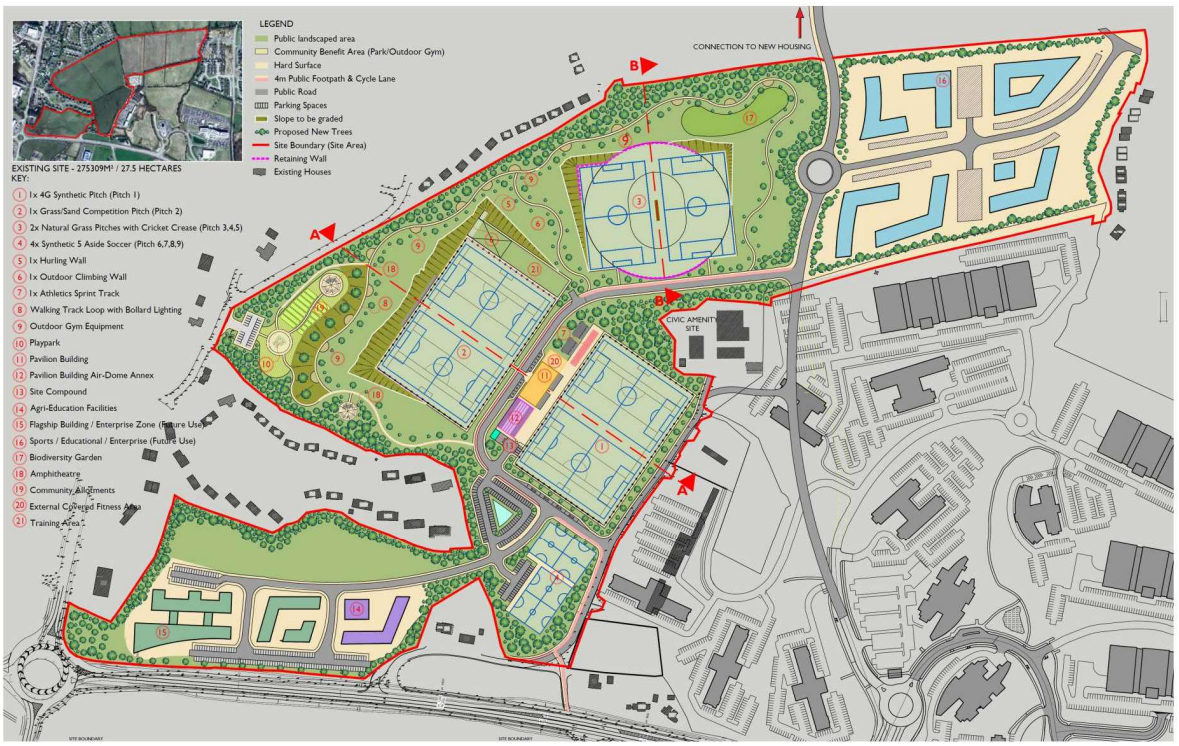


Figure 2: Layout of proposed development



Project:	Drawing title:	
Letterkenny Regional Sports-Activity Hub	Layout of the current phase of proposed development and potential layout of further development	gahanandlong archaeological services tel: 028 90202001 e: info@gahanlong.co.uk

Figure 3: Known cultural heritage assets in the vicinity of the proposed development

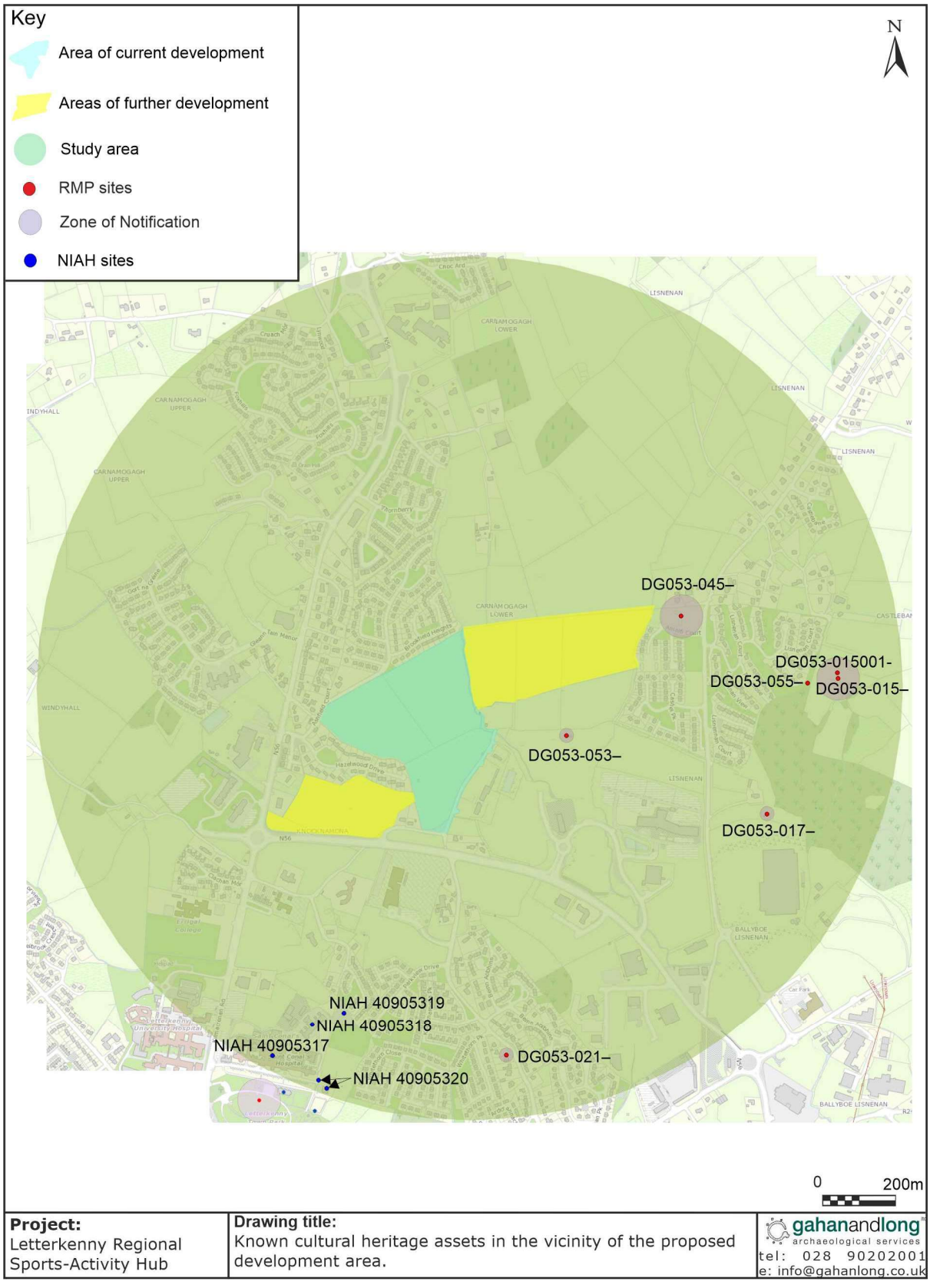


Figure 4: 1st edition OS map showing approximate location of the proposed development

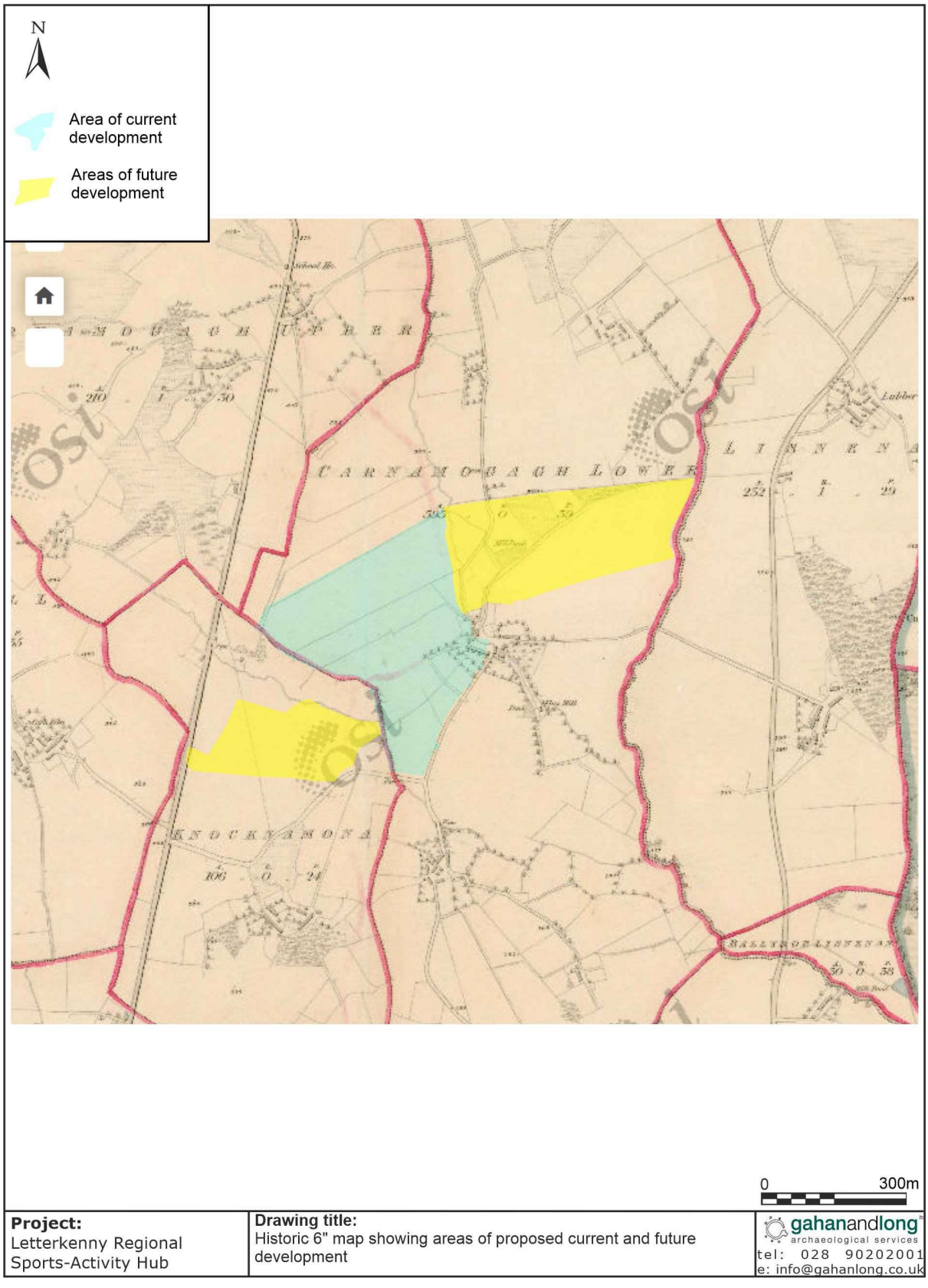
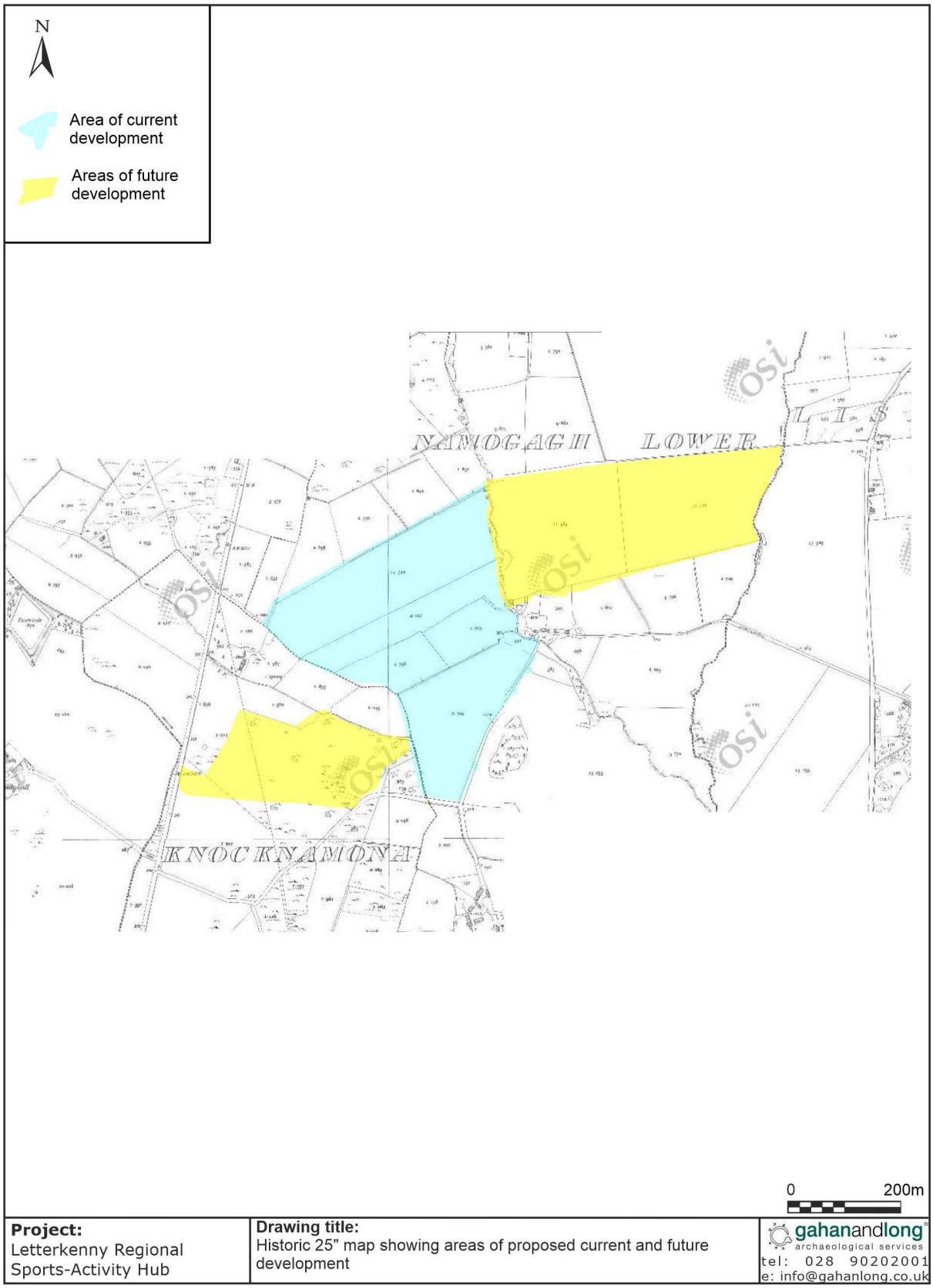


Figure 5: Early 20th century OS map showing approximate location of the proposed development



gahanandlong ltd
archaeological services

ARCHAEOLOGICAL MONITORING

OF GEOTECHNICAL WORKS

Report	Archaeological monitoring of geotechnical works
Project	Letterkenny Regional Sports Hub
Planning ref	N/A
Townlands	Carnamogagh Lower/Knocknamona
Barony	Kilmacrenan
Parish	Conwal
County	Donegal
Grid Ref	Centred on 217781, 413403
Licence No	Audrey Gahan
Licence no	22E0872
Date	15/12/2022

Abstract

It is proposed to construct sports facilities, agri-education facilities and other potential further developments on approximately 66 acres within the townlands Carnamoggagh Lower/Knocknamona, Letterkenny, approximately 1km from the Letterkenny Institute of Technology at Port Road, Letterkenny (centred on 696924, 765573). The development will be carried out over two phases (figures 1 and 2).

This report details the results of archaeological monitoring of a series of geotechnical test pits and soak away pits excavated across the development area to assess ground conditions. Nothing of archaeological significance was identified in any of the pits. The archaeological works were carried out under licence 22E0872.

Contents

Figures and Tables

1 Introduction

It is proposed to construct sports facilities, agri-education facilities and other potential further developments on approximately 66 acres within the townlands Carnamoggagh Lower/Knocknamona, Letterkenny, approximately 1km from the Letterkenny Institute of Technology at Port Road, Letterkenny (centred on 696924, 765573). The development will be carried out over two phases (figures 1 and 2).

This report details the findings of archaeological monitoring of the excavation of geotechnical test pits and soak away areas. In all the works consisted of 11 test pits and 7 soak away areas (only 6 of which could be excavated) which were monitored under licence 22E0872.

Figure 1: showing location of the proposed development site.

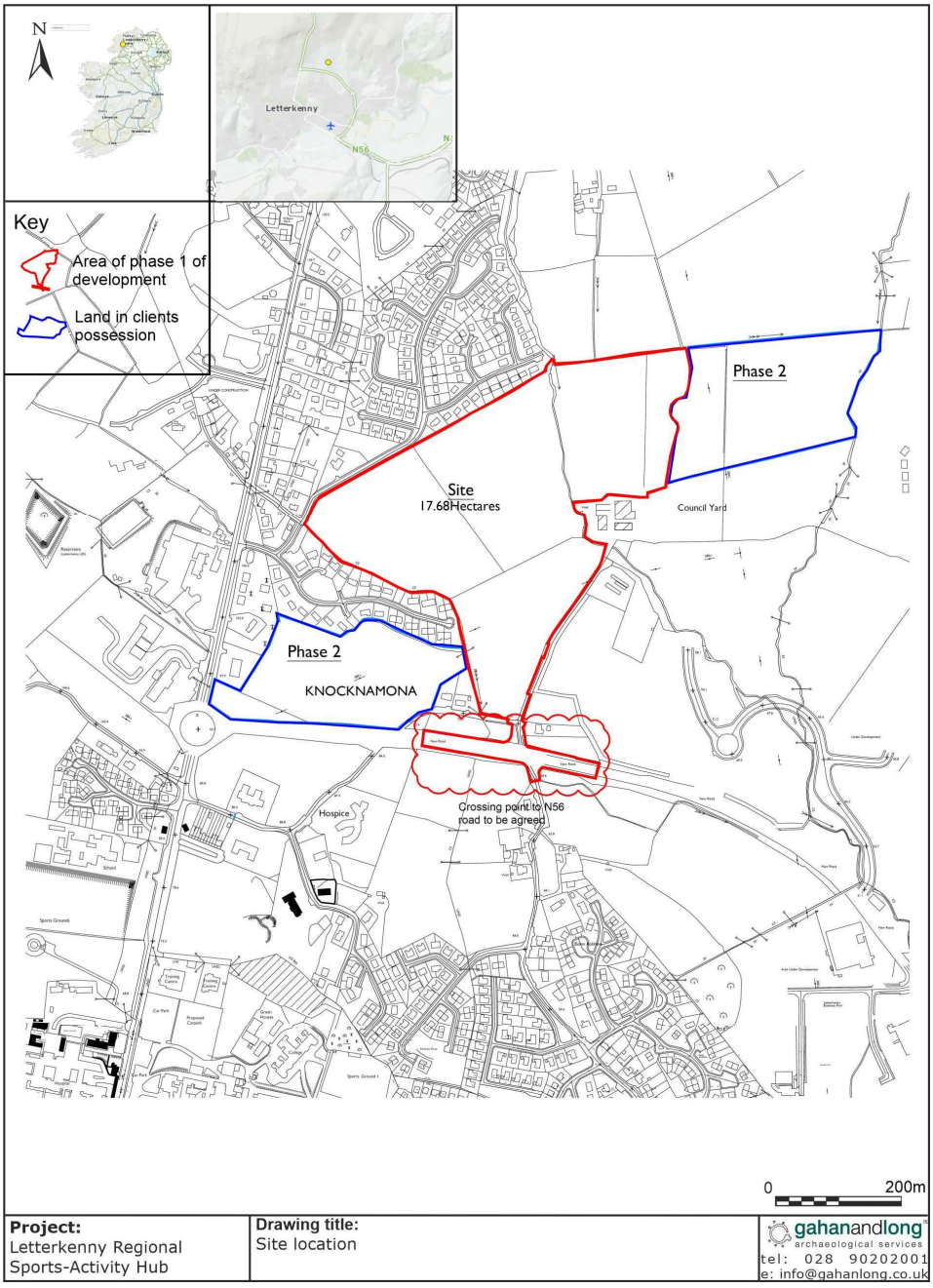


Figure 2: showing the layout of the proposed development site.

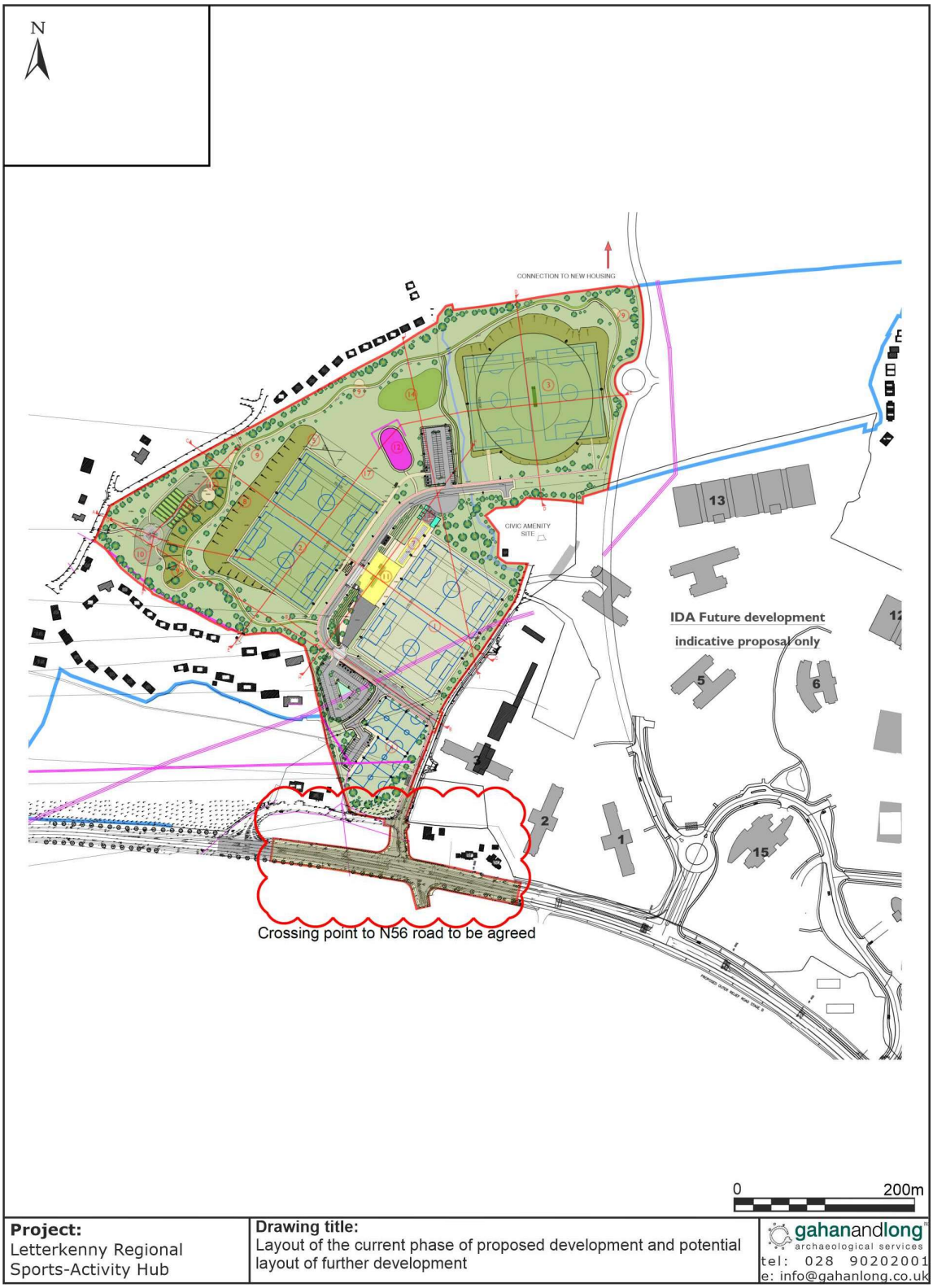
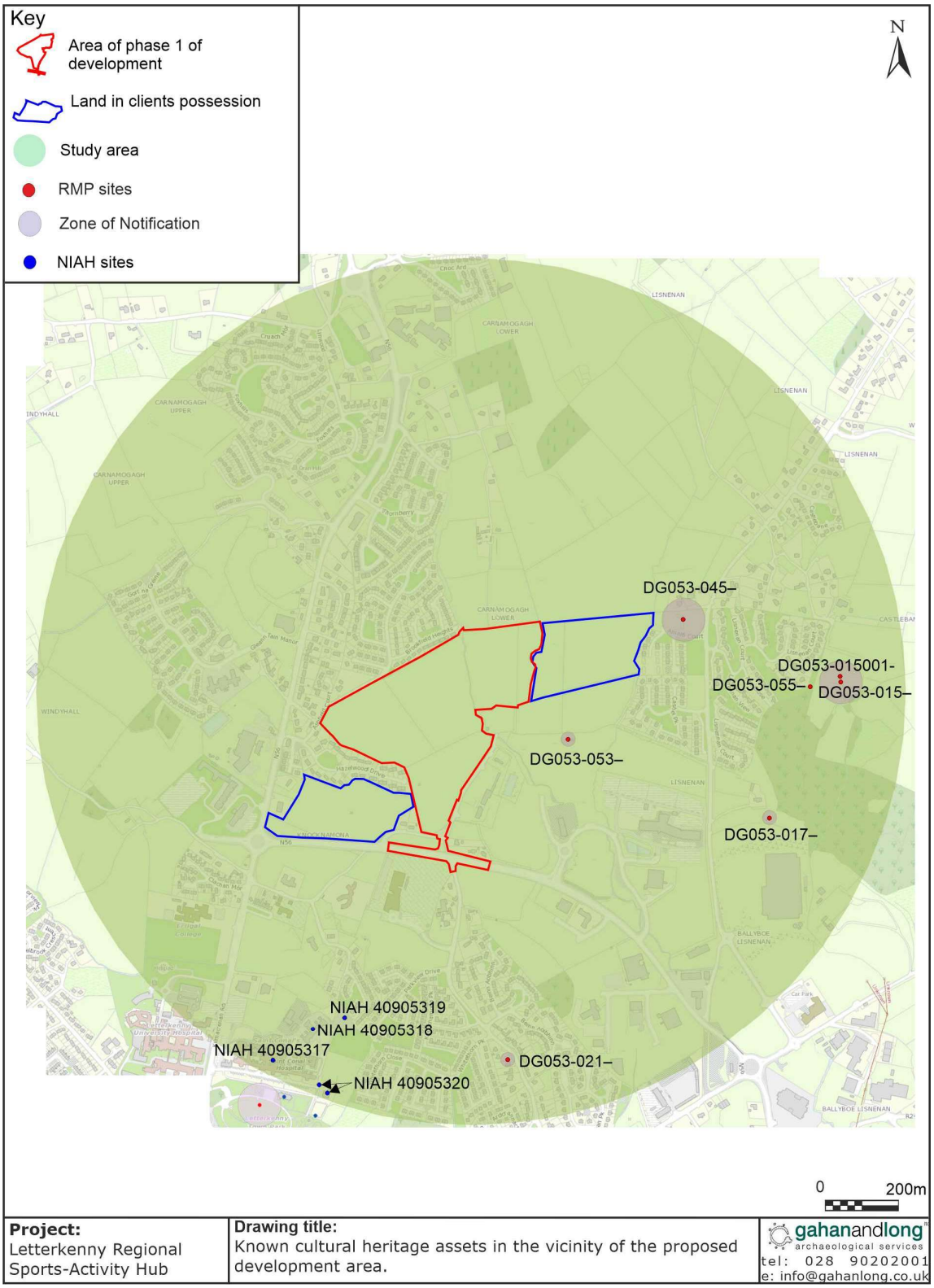


Figure 3: Known cultural heritage assets in the vicinity of the proposed development



2 Archaeological and Cultural heritage baseline

A desk top survey was carried out for the area of the proposed development extending to a wider study area of a radius of up to 1km from the development area (figure 3).

Data Source	Results
National Monuments	None within the study area
Record of monuments & places (RMP)	7
National inventory of architectural heritage (NIAH)	5
Record of Protected Structures	None within the study area
Demesnes Landscapes and Historic Gardens	None within the study area
Excavations Bulletin	Information on relevant excavations is contained within the RMP
Pre-Ordnance Survey maps	No maps identified
Early edition Ordnance Survey Maps	1st edition onwards

2.1 Development site

The proposed development is located within the townlands of Carnamoggagh Lower and Knocknamona covering an area of 66 acres on the N outskirts of Letterkenny. A review of the archaeological and cultural heritage databases has identified no known recorded cultural heritage assets within the proposed development area (figure 3).

A cartographic regression study was also carried out. This identified a mill pond within the area designated for future development on the 1st edition OS map which dates to the mid 19th century (figure 4). It appears, although it is unclear, that this mill pond is related to a flax mill located due south of the mill pond. The mill pond and the flax mill are not recorded on the Historic 25" map which dates to the later 19th – early 20th century map (figure 5).

The area of the proposed development consists of 66 acres, which is largely used for agricultural purposes which is generally flat but slopes SE in the W are of the site and N to S in the E portion of the development area. 23 acres of the development area is planted with short rotation willow, a biomass fuel crop.

Figure 4: 1st edition OS map showing approximate location of the proposed development

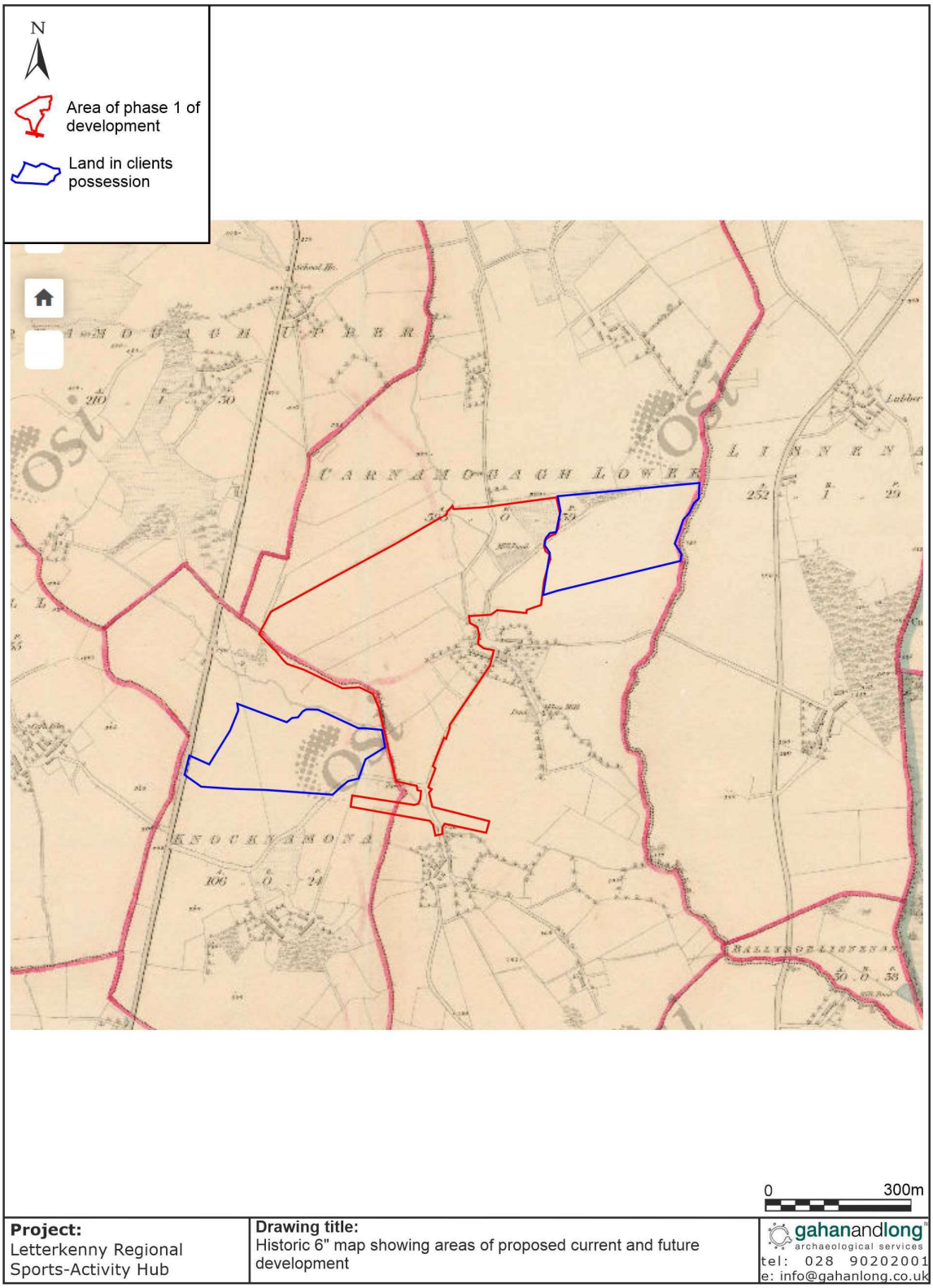
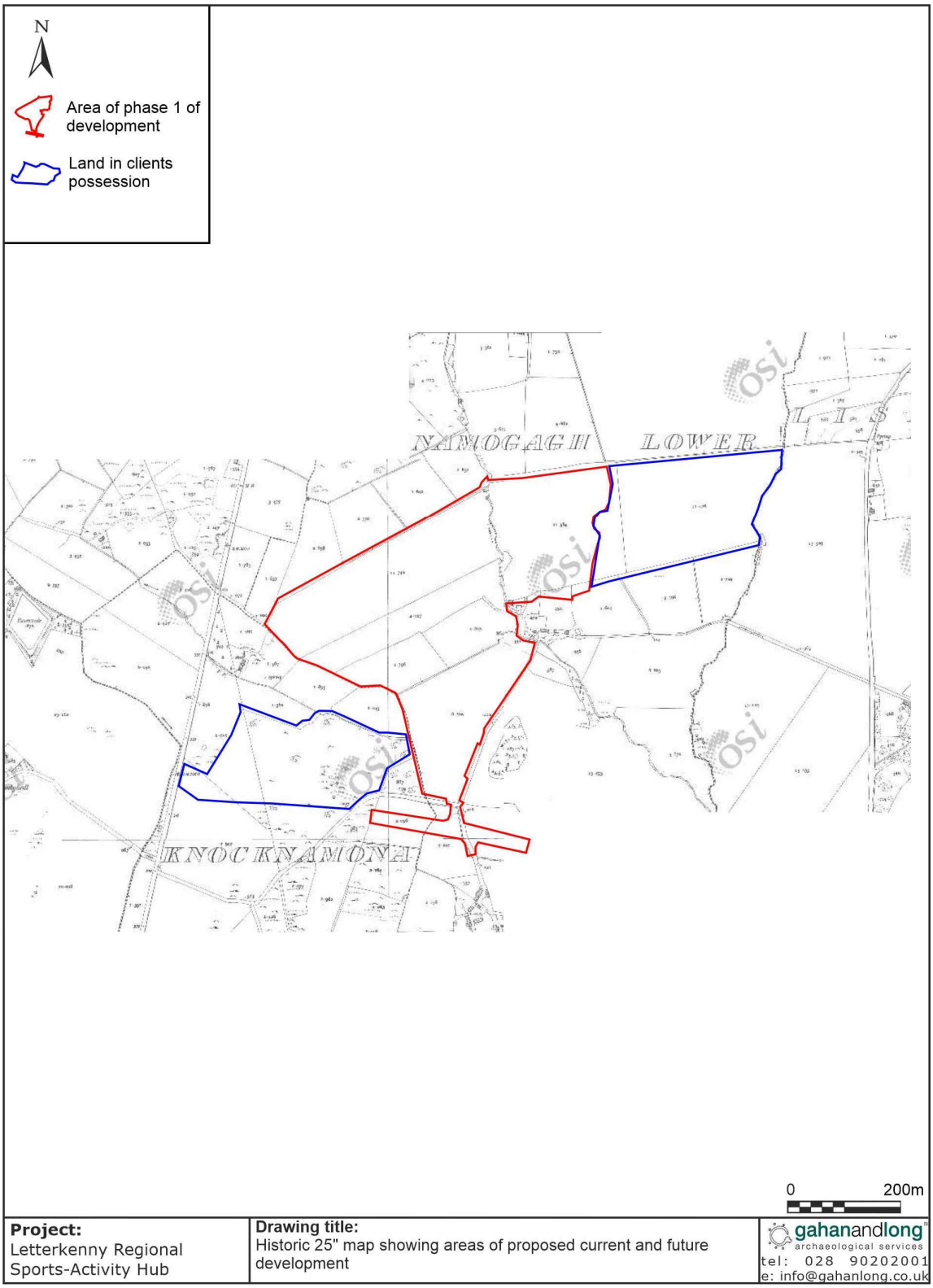


Figure 5: Historic 25" map showing approximate location of the proposed development



2.2 Cultural Heritage Assets within the wider study area

Looking beyond the development area a number of cultural heritage assets were identified in the wider study area (figure 3).

2.2.1 Recorded monuments and places (RMP)

A review of the Record of Monument and Places (RMP) dataset identified 7 RMP's in the wider study area.

RMP No	Classification	Description
DG053-045--	Souterrain	The Archaeological Survey of Ireland (ASI) is in the process of providing information on all monuments on The Historic Environment Viewer (HEV). Currently the information for this record has not been uploaded. However, an excavation of the monument was carried in September 2006, licence No. 06E0945. The monument had been quite disturbed by the development works with no capstones left *in situ*, however, the stone-lined walls remained, 1.45m in max. depth. Apart from the collapsed material within the souterrain no other archaeological material was uncovered during the excavation.
DG053-053---	Standing Stone	Excavation licence number 02E0202. Monitoring was carried out at the IDA Business and Technology Park, Lisnenan, Letterkenny, from 12 to 25 March 2002. Phase 1 of the development comprises the building of distributor roads and services. The site comprised pasture fields with frequent rock outcrops on a south-facing slope overlooking the wide valley of the River Swilly. A flax mill and pond formerly stood slightly to the north-east of the site, but this area is now occupied by a reservoir and pump-house built in the 1970s. Stratigraphy encountered comprised topsoil, a gravelly silt with stone inclusions, overlying a mid-olive to yellow/brown, sandy boulder clay, which in turn overlay schist bedrock. Nothing of archaeological significance was noted during the monitoring. However, a rounded upright stone, 0.8m high, was observed at the north-eastern edge of the site. This may be a prehistoric standing stone or a modern scratching stone for livestock. It will not be affected by Phase 1 of the works but would be by future phases of the development.
DG053-055--	Souterrain	During the course of preparatory soil-stripping to facilitate the construction of an apartment block at a proposed apartment complex and housing development at Lisnenan, Letterkenny, Co. Donegal, the client's contractor uncovered a possible souterrain. No archaeological condition applied to the development, which is 60m to the west of a cashel (DG053–015----) and 370m NNE of a holy well (DG053–017----). The client contacted the DEHLG and reported the discovery. Upon consultation with the NMI and DEHLG, and in consideration of the advanced stage of construction, it was recommended that the souterrain be preserved by record. The excavation was carried out under licence No. 06E0945 in September 2006. The site had been significantly disturbed. No archaeological material other than the souterrain was encountered. The site is located on a west-facing slope in pasture with

		occasional rock outcrops and presented as a topsoil-stripped, scarped-out area. A platform upon which the site was located had been left in situ. Little remained in the area of the souterrain. Much of the overlying material had been removed. Only the stone-lined walls remained in situ. A number of flat stones (possible capstones or lintels) lay in the general area. No capstones remained in situ. The possible entrance was located at the western end (equating to the lower end of the original slope). A section face at the northern limit of the development site (25m north of the souterrain) provided a base point/indication of the original levels and topography. This indicated a gentle east–west gradient. The entrance area appeared to be a roughly rectangular pit at the western end of the souterrain. There were a number of large rounded stones at the base. Due to disturbance, it was difficult to discern for certain the nature of the entrance. It was roughly here that the client's representatives had uncovered the souterrain when a tractor collapsed. The cut for the souterrain measured c. 5m in length and curved from east to west. It was filled by the stone walling. At the eastern end an extension to the cut, beyond the area which was walled, was excavated. It was roughly rounded in shape and narrowed to the west at the possible entrance. The corners at the east were roughly rounded in shape. The break of slope throughout was rounded and sharp in parts. The sides were generally vertical and there was a sharp break of slope at the base throughout. The base of the cut was relatively level. The cut for the entranceway was contemporary with the cut for the souterrain and was roughly rectangular in shape, forming a court shape at the western end of the souterrain. The break of slope was rounded with a sharp slope and rounded break of slope at the base. Collapsed stones were evident at the base. These may have formed some sort of path, although it is not possible to say for certain whether they were in their original location, as this area had been significantly disturbed. The stone walling of the souterrain was single skinned. It survived on both sides to roughly nine courses. The stones varied in size, measuring from 100mm by 100mm to 400mm by 500mm. There were occasional slates and some daub in places. The maximum depth of the walling was 1.45m. The first two to three courses comprised smaller stones, with the basal layers comprising much larger stones.
DG053-015---	Ringfort – cashel	Internal diam. c. 19m. A subcircular area enclosed by a much overgrown and partially destroyed stone wall. Small sections of the internal and external facing of the wall can be traced demonstrating its thickness to have been between 2m and 3m. Field boundaries abut onto and cross the site. On the N side a boulder which forms part of the wall is decorated with 7 cupmarks (DG053-015001-). Kinahan (1885-86, 427) referred to a chamber and door-way in the N wall but no trace of either was found on this occasion. The interior is level. The site is located S of the crest of a low hill in good farmland but with a lot of scrub and woods.

		The above description was derived from the 'Archaeological Survey of County Donegal. A description of the field antiquities of the County from the Mesolithic Period to the 17th century.' Compiled by: Brian Lacey with Eamon Cody, Claire Cotter, Judy Cuppage, Noel Dunne, Vincent Hurley, Celie O'Rahilly, Paul Walsh and Seán Ó Nualláin (Lifford: Donegal County Council, 1983).
DG053-015001-	Rock Art	A subcircular area (DG053-015-) enclosed by a much overgrown and partially destroyed stone wall. On the N side a boulder which forms part of the wall is decorated with 7 cupmarks. The above description was published in the 'Archaeological Survey of County Donegal. A description of the field antiquities of the County from the Mesolithic Period to the 17th century.' Compiled by: Brian Lacey with Eamon Cody, Claire Cotter, Judy Cuppage, Noel Dunne, Vincent Hurley, Celie O'Rahilly, Paul Walsh and Seán Ó Nualláin (Lifford: Donegal County Council, 1983).
DG053-017---	Ritual Site – holy well	Marked as a 'Holy Well', on the 2nd and 3rd editions of the OS 6-inch maps. There are now no special features, or traditions, associated with it. It is located on good land. The above description was derived from the 'Archaeological Survey of County Donegal. A description of the field antiquities of the County from the Mesolithic Period to the 17th century.' Compiled by: Brian Lacey with Eamon Cody, Claire Cotter, Judy Cuppage, Noel Dunne, Vincent Hurley, Celie O'Rahilly, Paul Walsh and Seán Ó Nualláin (Lifford: Donegal County Council, 1983). Excavation licence number 01E0233 Monitoring was carried out on 20 and 21 March 2001 on the site of the proposed development of sixteen two-storey semi-detached dwelling-houses and associated services and access road at Lisnenan, Letterkenny, Co. Donegal. The proposed development is on a south-facing slope, at the base of which there is a holy well, marked on the 2nd and 3rd editions of the OS 6-inch maps. No traditions are associated with the well. The underlying geology consists of a compact mid-brown gravelly silt with inclusions of frequent small to medium-sized, both rounded and angular, stones. This stratum consistently overlay a mid-olive to yellowish-brown sandy silty boulder clay and schist bedrock exposed at the base of excavations. Nothing of archaeological significance was noted during the course of monitoring. (Excavations Bulletin 2001) Excavation licence number 01E0287 Monitoring of topsoil-stripping was carried out at Lisnenan, Letterkenny, Co. Donegal, on 13 November 2001 on the proposed location of five private residences, associated driveway and services. The site is on a steep west-facing slope in pasture with occasional rock outcrops. Letterkenny is visible

		to the west. At the base of the slope is a holy well. The area stripped measured c. 110m north-south by 40m. The underlying geology consists of a compact mid-brown gravelly silt with inclusions of frequent small to medium-sized rounded and angular stones. This stratum consistently overlay a mid-olive to yellowish brown sandy silt boulder clay and schist bedrock exposed at the base of excavations. Nothing of archaeological significance was noted during the course of monitoring. (Excavations Bulletin 2001)
DG053-021---	Bullaun Stone	The Archaeological Survey of Ireland (ASI) is in the process of providing information on all monuments on The Historic Environment Viewer (HEV). Currently the information for this record has not been uploaded.

A total of 4 structures were identified in NIAH database within the study area (figure 3). The identified structures are detailed in the table below.

NIAH No	Classification	Description
40905319	Regional	St. Conal's Psychiatric Hospital, High Road, Letterkenny. This former graveyard was originally built to serve St. Conal's psychiatric hospital (see 40905317 for main building), and was in use from 1866 until around 1900. An interesting addition to the hospital site, this peaceful quarter of the complex constitutes an important part of the social history of the area when many of those dying in such hospitals were buried in a graveyard to site. There are few gravemarkers to site, which suggests that many of the patients were buried in unmarked graves. The modern commemoration plaque adds some dignity to this largely forgotten site. The walls are of sturdy rubble stone construction and typical of the period. Despite the loss of a gate pier, sections of wall, and associated buildings, the graveyard retains a peaceful air and is significant as part of a group of related sites.
40905318	Regional	St. Conal's Psychiatric Hospital, Hospital Grounds, High Road. This impressive and well-proportioned former hospital building, dating to the very start of the twentieth century, retains its early form and character despite being now out of use. Its visual appeal and integrity is enhanced by the retention of salient fabric such as a variety of timber sliding sash windows and timber panelled doors with fielded panels, albeit in a dilapidated condition. The contrast between the roughcast rendered walls and the yellow brick detailing creates pleasing textural and tonal variation to the exterior. The fine ashlar sandstone clock tower with sheet lead and copper dome over and the doorway with overlight, sidelights and segmental pedimented doorcase provide an effective and attractive central focus. Its scale and detailing is typical of the grand hospital architecture found across Ireland and Britain during the late Victorian and Edwardian periods. Its imposing scale is softened by some fine detailing such as that to the tower and the cut stone stringcourse at plinth level. This fine building was originally built between 1902-4 by the Derry architect James Patrick McGrath (1875-1948) as new male and female wings to the earlier St. Conal's hospital (see 40905317 for main building to south). The main contractor involved was a J&W Stewart of

		Belfast and its estimated cost was £20,690. Its visual expression with roughcast walls and yellow brick detailing compliments the detailing to the main hospital complex adjacent to the south. It was later in use as part of the Letterkenny RTC\IT college complex but has being unfortunately out of use since c. 2000. This monumental building forms an important element of an interesting group of structures at St. Conal's hospital that together illustrate the changing theories and practice in hospital design over a one hundred year period, and is an integral element of the built heritage of the Letterkenny area in its own rights.
40905317	Regional	St. Conal's Psychiatric Hospital, Kilmacrenan Road. This complex and monumental Victorian hospital complex retains much of its early character and form despite alterations and the construction of various extensions. Interestingly it retains the symmetry evident in the original block despite been successively extended throughout the last decades of the nineteenth century with new blocks to accommodate the needs of contemporary hospital practice. It is a complex that is typical of the grand hospital architecture found across Ireland and Britain during the Victorian period. Its imposing scale is softened by some fine detailing such as the cut stone surrounds to some of the openings and the Italianate detailing to the tower-like blocks. The unfortunate loss of many original windows does not compromise the building's character adversely, and with a great deal of the building's intrinsic features, including some fine sandstone finishes, surviving in good condition, this building represents an important part of Letterkenny's Victorian heritage whilst serving an essential practical role in the modern affairs of Letterkenny and County Donegal. The central part of this complex was originally erected to a design prepared by George Wilkinson (1814-90), Architect to the Commissioners of Asylums for the Lunatic Poor (appointed 1860; resigned 1886). The original building had a 'three-storey façade extending to 521ft with projecting wings to either side, chapel to the centre, and a great corridor to the rear extending the length of the building' (IAA). The main contractor involved was a Matthew McClelland of Derry and the Clerk of Works was an Arthur Kent. Building works commenced in 1860 and works were completed in February 1865. The building was described as ready for occupation in January 1866. This was one of a number of monumental district lunatic asylums that were constructed throughout Ireland following the enactment of the 1845 Lunatic Asylum (Ireland) Act (between 1810 and 1870, twenty two district lunatic asylums were built in Ireland). This building is quite similar in form and appearance to the contemporary asylum at Castlebar, County Mayo (see 31209001), built also to designs by Wilkinson in 1860-6. Wilkinson is best known for his workhouse designs, and was responsible for the designs of administration block (now a museum and the workhouse (now demolished(at the former workhouse in Letterkenny. This hospital was later extended in 1872, 1876, and in 1886 (to designs by the architect John Boyd of Belfast), 1893 (to designs by the architect William McElwee of Derry), and possibly between 1902-4 (to designs by the architect James Patrick McGrath of Derry). This monumental building forms the centerpiece of an interesting group of structures at St. Conal's hospital that together illustrate the changing theories and practice in hospital design over a one hundred year period. Slater's

		Directory of 1894 records that the 'district lunatic asylum is a handsome building, erected at a cost of about £30,000, and since considerably extended, and will now hold 600 patients.
40905320	Regional	Tir Conaill House/Parkview House, Kilmacrenan Road. This impressive and substantial former dwelling was originally built as the medical superintendent's house associated with St. Conal's psychiatric hospital (see 40905317). It dates to the very end of the nineteenth century and its complex irregular plan and asymmetrical form with various gabled bays and canted bays is typical of many houses built at this time. Its visual expression is enhanced by the retention of salient fabric such as the variety of timber sliding sash windows and panelled timber doors. Decorative interest is added by the pronounced moulded render cornice stringcourse and the elaborate canopy over the window opening to the west elevation (possibly formerly a doorway). The contrast between the roughcast rendered walls at first floor level, the brick walls at ground floor level, and the brick detailing add further interest to the principal elevations. Although now converted to new uses, it survives in good condition and forms part of an interesting collection of structures associated with St. Conal's psychiatric hospital. Occupying attractive mature grounds to the north of the centre of Letterkenny, this building is an integral element of the built heritage of the local area. The gateways to site add to the setting and context, and complete this composition. This was possibly the house if Edward E. Moore M.D. in 1894, the resident medical superintendent at the hospital at this time (Slater's Directory).

2.2.2 Previous Archaeological Fieldwork

The Excavations Bulletin is both a published annual directory and an on-line database that provides summary accounts of all the excavations carried out in Ireland – North and South – from 1970. A number of excavations were identified within the general study area which have been included in the RMP and are described above.

2.2.3 Toponym Analysis

Townland names are a rich source of information for the land use, history, archaeology and folklore of an area. The placename can have a variety of language origins such as, Irish, Viking, Anglo-Norman and English. The names can provide information on families, topographical features, and historical incidents. In terms of the built environment many names reference churches, fords, castles, raths, graveyards, roads and passes etc. In compiling the following data, a number of resources were consulted including the Placenames Database of Ireland www.logainm.ie and Irish Names of Places by P.W. Joyce (Joyce, 1913).

Townland Name/ Name	Irish Version	Translation
Carnamogagh Lower	Ceathru na mBogach Iochtarach	Ceathru means quarterland. This townland is first recorded in 1611 as Carrownamogagh. In the mid 17th century it is recorded as

		Cornemogagh becoming Lower Carnabogagh in the 19th century when it is also recorded as 'quarter of the bogs'.
Knocknamona	Cnoc na Móna	Cnoc meaning Hill and Móin meaning bogland. The hill of the bogland.

2.3 Topographic files

The topographic files of the National Museum of Ireland (NMI) identify all recorded finds held in the NMI archive. A review of the NMI finds database on the Heritage Council website identified no recorded finds within the townland of Carnamogagh Lower and Knocknamona.

3 Archaeological Monitoring

The archaeological evaluation consisted of the excavation of 11 test pits and 6 soak away pits across the development site (figure 6 and table 1). The test pits were between 2.2-2.7m long (NW x SE) and were on average 1.4m wide (NE x SW). The soak away pits were between 2.5-3m long (NW x SE) and were also on average 1.4m wide (NE x SW). During the excavation of soak away pit 6, evidence for a modern service was present at a depth of approximately 0.05m. Due to this, the pit was moved 6m directly to the southeast. A second modern service was present in this pit and it was decided to abandon further excavation. All excavation was carried out using a back acting machine fitted with a toothless bucket and under strict archaeological supervision. Each pit was recorded photographically and with detailed written descriptions which are contained within table 2.

4 Conclusions

It is proposed to construct sports facilities, agri-education facilities and other potential further developments on approximately 66 acres within the townlands Carnamoggagh Lower/Knocknamona, Letterkenny, approximately 1km from the Letterkenny Institute of Technology at Port Road, Letterkenny (centred on 696924, 765573). The development will be carried out over two phases (figures 1 and 2).

This report details the results of archaeological monitoring of a series of geotechnical test pits and soak away pits excavated across the development area to assess ground conditions. Nothing of archaeological significance was identified in any of the pits.

.

Figure 6: Proposed development showing location of excavated test pits and soak away pits

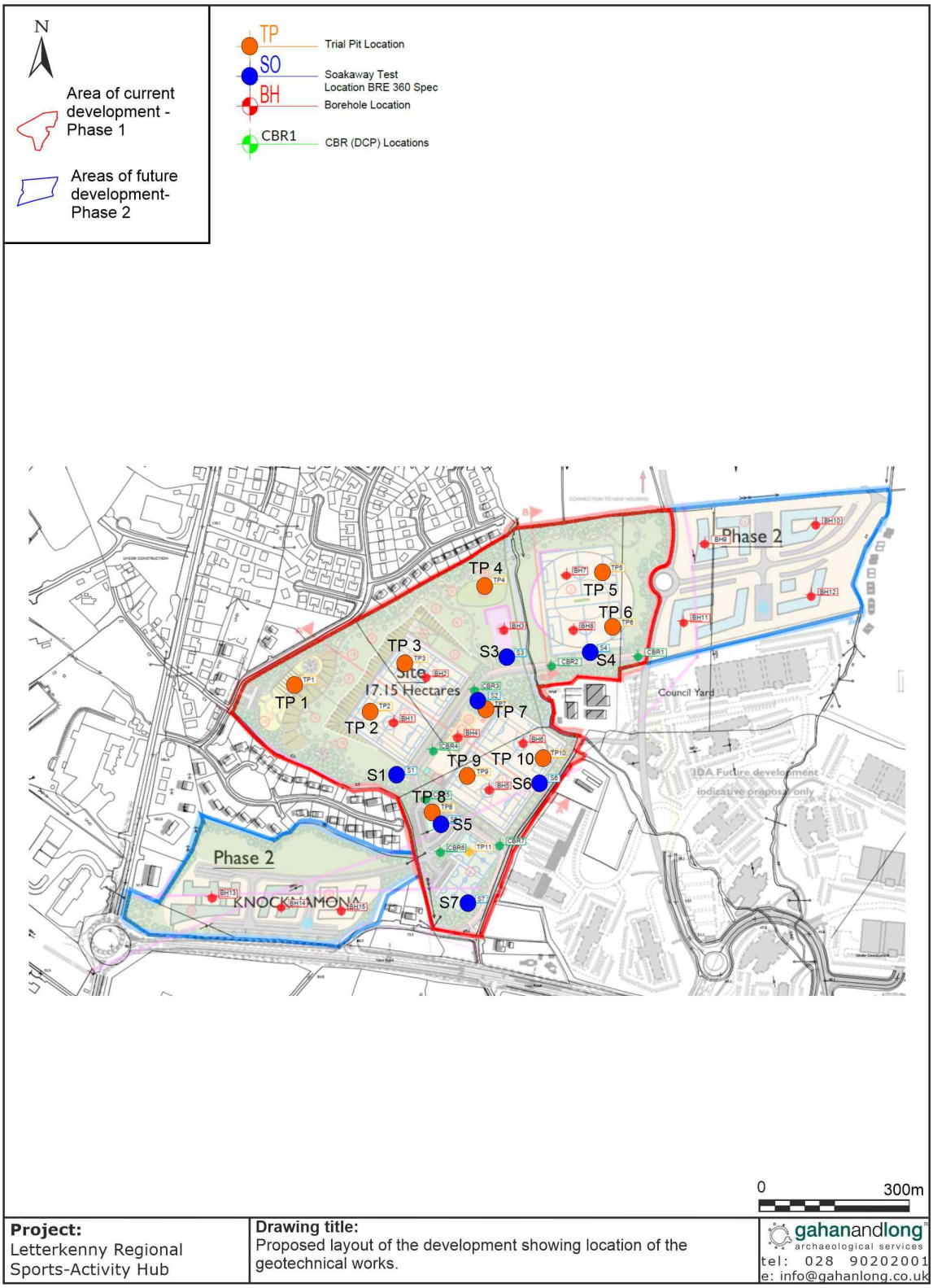


Table 1: Evaluation trench details.

Test PitNo.	Length	ITM 1	ITM 2
1	2.4m NW x SE	617481	913324
2	2.3m NW x SE	617588	913394
3	2.2m NW x SE	617644	913454
4	2.2m NW x SE	617759	913563
5	2.7m NW x SE	617911	913586
6	2.5m NW x SE	617930	913486
7	2.3m NW x SE	617769	913402
8	2.4m NW x SE	617670	913238
9	2.3m NW x SE	617730	913285
10	2.2m NW x SE	617839	913330
11	2.2m NW x SE	617736	913190
Soak Away Pit			
1	3m NW x SE	617633	913302
2	2.6m NW x SE	617743	913412
3	2.5m NW x SE	617785	913469
4	3m NW x SE	617896	913478
5	2.8m NW x SE	617697	913218
6	NA		
7	2.7m NW x SE	617728	913144

Table 2: Geotechnical test and soak away pits.

Test Pit Number	Length	Depth (m)	Archaeology Identified
1	2.4m NW x SE	0.34m	No archaeological deposits identified

Post-excavation shot of Test Pit 1 looking southeast

Description

The topsoil was removed to an average depth of 0.34m and overlay the naturally occurring subsoil which consisted of a greyish brown sandy clay.

Test Pit Number	Length	Depth (m)	Archaeology Identified
2	2.3m NW x SE	0.33m	No archaeological deposits identified

Post-excavation shot of Test Pit 2 looking northeast

Description

The topsoil was removed to an average depth 0.33m and overlay the naturally occurring subsoil which consisted primarily of a streaky light brown sandy clay.

Test Pit Number	Length	Depth (m)	Archaeology Identified
3	2.2m NW x SE	0.3m	No archaeological deposits identified

Post-excavation shot of Test Pit 3 looking southeast

Description

The topsoil was removed to an average depth 0.3m and overlay the naturally occurring subsoil which consisted of a brown sandy clay. A natural deposit of stone was present in test pit 3.

Test Pit Number	Length	Depth (m)	Archaeology Identified
4	2.2m NW x SE	0.3m	No archaeological deposits identified

Post-excavation shot of Test Pit 4 looking southeast

Description

The topsoil was removed to an average depth of 0.3m and overlay the naturally occurring subsoil which consisted of a streaky light brown or greyish brown sandy clay.

Test Pit Number	Length	Depth (m)	Archaeology Identified
5	2.7m NW x SE	0.3m	No archaeological deposits identified

Post-excavation shot of Test Pit 5 looking southeast

Description

The topsoil was removed to an average depth of 0.3m and overlay the naturally occurring subsoil which consisted of a slightly reddish brown gravelly sandy clay.

Test Pit Number	Length	Depth (m)	Archaeology Identified
6	2.5m NW x SE	0.38m	No archaeological deposits identified

Post-excavation shot of Test Pit 6 looking southeast

Description

The topsoil was removed to an average depth of 0.38m and overlay the naturally occurring subsoil which consisted predominately of a pale brown sandy clay.

Test Pit Number	Length	Depth (m)	Archaeology Identified
7	2.3m NW x SE	0.42m	No archaeological deposits identified

Post-excavation shot of Test Pit 7 looking northwest

Description

The topsoil was removed to an average depth of 0.42m and overlay the naturally occurring subsoil which consisted of a pale brown clay and gravel.

Test Pit Number	Length	Depth (m)	Archaeology Identified
8	2.4m NW x SE	0.28m	No archaeological deposits identified

Post-excavation shot of Test Pit 8 looking northwest

Description

The topsoil was removed to an average depth 0.28m and overlay the naturally occurring subsoil which consisted of a brown or greyish brown sandy clay.

Test Pit Number	Length	Depth (m)	Archaeology Identified
9	2.3m NW x SE	0.34m	No archaeological deposits identified

Post-excavation shot of Test Pit 9 looking southeast

Description

The topsoil was removed to an average depth of 0.34m and overlay the naturally occurring subsoil which consisted of a blue silty sandy clay.

Test Pit Number	Length	Depth (m)	Archaeology Identified
10	2.2m NW x SE	0.3m	No archaeological deposits identified

Post-excavation shot of Test Pit 10 looking northwest

Description

The topsoil was removed to an average depth 0.3m and overlay the naturally occurring subsoil which consisted of an orangey brown gravelly clay and bedrock.

Test Pit Number	Length	Depth (m)	Archaeology Identified
11	2.2m NW x SE	0.3m	No archaeological deposits identified

Post-excavation shot of Test Pit 11 looking southeast

Description

The topsoil was removed to an average depth of between 0.3m and overlay the naturally occurring subsoil which consisted of a pale brown sandy clay.

Soak Away Pit Number	Length	Depth (m)	Archaeology Identified
1	3m NW x SE	0.3m	No archaeological deposits identified

Post-excavation shot of Soak Away Pit 1 looking southwest

Description

The topsoil was removed to an average depth 0.3m and overlay the naturally occurring subsoil which consisted primarily of a brownish grey sandy clay.

Soak Away Pit Number	Length	Depth (m)	Archaeology Identified
2	2.6m NW x SE	0.38m	No archaeological deposits identified

Post-excavation shot of Soak Away Pit 2 looking northwest

Description

The topsoil was removed to an average depth of 0.28m and overlay the naturally occurring subsoil which consisted of a light brown slightly gravelly sandy clay.

Soak Away Pit Number	Length	Depth (m)	Archaeology Identified
3	2.5m NE-SW	0.3m	No archaeological deposits identified

Post-excavation shot of Soak Away Pit 3 looking southeast

Description

The topsoil was removed to an average depth 0.3m and overlay the naturally occurring subsoil which consisted of a light brown sandy clay.

Soak Away Pit Number	Length	Depth (m)	Archaeology Identified
4	3m NW x SE	0.24m	No archaeological deposits identified

Post-excavation shot of Soak Away Pit 4 looking northeast

Description

The topsoil was removed to an average depth of 0.24m and overlay the naturally occurring subsoil which consisted of a brown gravelly sand and stone.

Soak Away Pit Number	Length	Depth (m)	Archaeology Identified
5	2.8m NE-SW	0.3m	No archaeological deposits identified

Post-excavation shot of Soak Away Pit 5 looking southwest

Description

The topsoil was removed to an average depth 0.3m and overlay the naturally occurring subsoil which consisted of a blue and white sandy clay.

Soak Away Pit Number	Length	Depth (m)	Archaeology Identified
6	2.2m NW x SE	0.1m	No archaeological deposits identified

Post-excavation shot of Soak Away Pit 6 (2) looking northwest

Description

Due to the presence of a modern service soak away pit 6 was not fully excavated. A second pit was opened 6m directly to the southeast but it too contained a modern service and was therefore not fully excavated.

Soak Away Pit Number	Length	Depth (m)	Archaeology Identified
7	2.7m NE-SW	0.33m	No archaeological deposits identified

Post-excavation shot of Soak Away Pit 7 looking northwest

Description

The topsoil was removed to an average depth of 0.33m and overlay the naturally occurring subsoil which consisted of a light or orangey brown slightly gravelly sandy clay.

APPENDIX 9.A
Noise Monitoring Survey and Data

NOISE MONITORING LOCATIONS

RPS has been commissioned by Hamilton Architects to undertake a noise monitoring survey in relation to the proposed Letterkenny Sports Hub.

The noise monitoring locations and meteorological weather station location are illustrated in Figure 9.A. 1.

Figure 9.A. 1: Noise Monitoring Locations

Unattended Noise Monitoring

To be representative of existing noise sources RPS have undertaken unattended noise monitoring for both daytime and night-time at 3 locations. Unattended noise monitoring has been undertaken from the 24th March 2023 to 31st March 2023. Figure 9.A. 1 above illustrates the location of the unattended noise monitoring survey.

The details of the unattended noise monitoring survey, including a description of the noise monitoring location (NML), date, time and sound level meter used, are summarised in Table 9.A 1. The calibration certificates and sound level meter specifications from the noise survey equipment are detailed below.

Table 9.A 1: Unattended Noise Monitoring Summary

Noise Monitoring Location	Description of Noise Monitoring Location	Start Date and Time	End Date and Time	Sound Level Meter
NML 1	Located at southern boundary of site adjacent to Knocknamona Crescent	24/03/2023 15:00hrs	31/03/2023 12:15hrs	Rion NL52
NML 2	Located at western corner of site, adjacent to Hazelwood Drive	24/03/2023 14:30hrs	31/03/2023 13:15hrs	Norsonic 140
NML 3	Located at northern boundary of site, adjacent to Brookfield Heights	24/03/2023 14:45hrs	31/03/2023 13:00hrs	Norsonic 140

Methodology

At each NML the microphone was placed at a height of 1.2 - 1.5m above ground level and equipped with an all-weather wind shield which also provides water resistance. The proprietary wind shield used is certified by the manufacture as meeting Type 1 / Class 1 precision standards.

The following parameters were recorded during each 15-minute measurement:

- L_{Aeq} The continuous equivalent A-weighted sound pressure level.
- L_{Amax} This is the maximum A-weighed sound level measured during the sample period.
- L_{Amin} This is the minimum A-weighted sound level measured during the sample period.
- L_{A10} This is the A-weighted sound level that is exceeded for noise for 10% of the sample period.
- L_{A90} This is the A-weighted sound level that is exceeded for 90% of the sample period.

The weather during each set of measurements was monitored throughout the unattended survey to enable the identification and removal of data measured during periods of precipitation or winds greater than 5 m/s.

Unattended Noise Survey Results

Recorded noise data was analysed and visualised using RPS in house software. The software is written in Python and uses advanced statistical and visualisation libraries. The approach to analysing the recorded noise data involved compiling all observations into a single dataset for the noise monitoring location using their respective time stamps before reading into the software.

The main steps the software takes are described below:

- Before any further analysis, all monitoring data is visualised and dubious records were also highlighted and removed;
- Data was divided into 2 sets daytime (07:00 – 23:00hrs Monday to Sunday) and night-time (23:00-07:00hrs Monday to Sunday)
- The daytime data analysis for L_{Aeq} and L_{A90} were calculated to hourly averages; the night-time data remained as 15 minute interval averages.

Note: There is an hour of erroneous data from 02:00hrs – 03:00hrs on 26th March 2023 at NML 1 – NML 3 which is due to the clocks going forward for daylight saving time

Weather Station

Meteorological conditions were surveyed within the development site boundary for the duration of the noise monitoring surveys from 24th to 31st March 2023, with the following equipment deployed to recording rainfall and wind speed in 15-minute measurements.

- Davis Vantage Pro 2;
- Weatherlink Data Logger and
- Outdoor enhanced weather case.

Noise Monitoring Location 1 Survey Results

Sound Level Meter Specifications and Calibration Certificates

The baseline noise monitoring survey at NML1 was carried out using a Rion NL-52 Class 1 Sound Level Analyser in conjunction with the following:

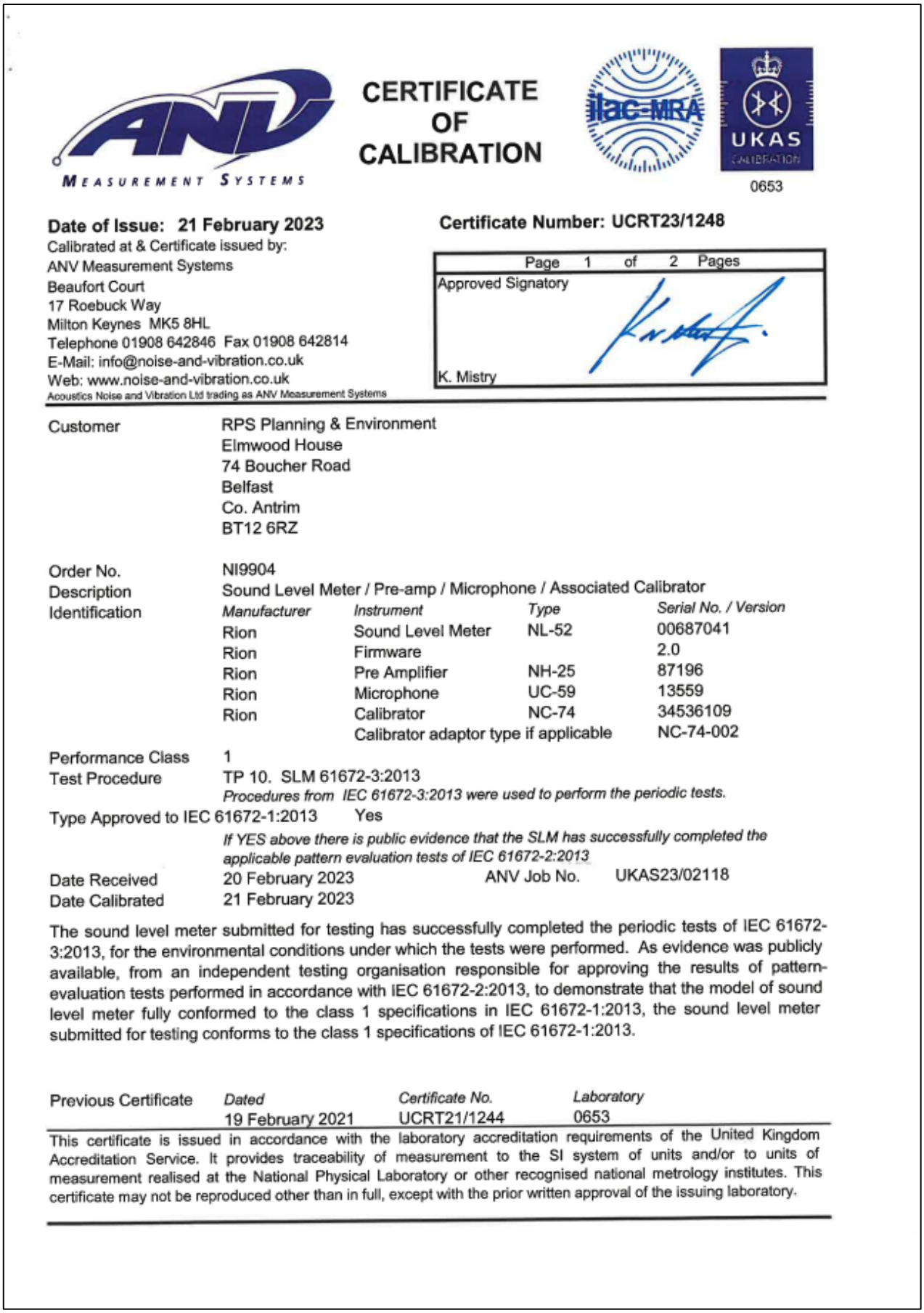
- Outdoor kit enhanced NL-52;
- Rion WS-03SO1 Windscreen head assembly (inc. WS-03051);
- Rion EC-04 2m Extension Cable (7 Pin); and
- Rion NC-74 Class 1 Acoustic Calibrator.

The sound level meter specifications from the noise survey equipment are detailed in Table 9.A 2.

Table 9.A 2: Rion NL-52 Noise Instrument Records

Equipment	Model / Type	Serial Number	Calibration Certificate Number	Last Calibration Date
Sound Level Meter	Rion NL- 52	00687041	UCRT23/1248	21/02/2023
Preamplifier	Rion NH-25	87196	UCRT23/1248	21/02/2023
Microphone	Rion UC-59	13559	UCRT23/1248	21/02/2023
Calibrator	Rion NC-74	35105042	UCRT23/1032	10/01/2023

The calibration certificates and sound level meter specifications from the noise survey equipment are detailed in Figure 9.A. 2.



MEASUREMENT SYSTEMS

CERTIFICATE OF CALIBRATION

ilac-MRA UKAS CALIBRATION 0653

Date of Issue: 21 February 2023

Certificate Number: UCRT23/1248

Calibrated at & Certificate issued by:
ANV Measurement Systems
Beaufort Court
17 Roebuck Way
Milton Keynes MK5 8HL
Telephone 01908 642846 Fax 01908 642814
E-Mail: info@noise-and-vibration.co.uk
Web: www.noise-and-vibration.co.uk
Acoustics Noise and Vibration Ltd trading as ANV Measurement Systems

Page 1 of 2 Pages

Approved Signatory

K. Mistry

Customer: RPS Planning & Environment, Elmwood House, 74 Boucher Road, Belfast, Co. Antrim, BT12 6RZ

Order No. NI9904

Description: Sound Level Meter / Pre-amp / Microphone / Associated Calibrator

Identification

Manufacturer	*Instrument*	*Type*	*Serial No. / Version*
Rion	Sound Level Meter	NL-52	00687041
Rion	Firmware		2.0
Rion	Pre Amplifier	NH-25	87196
Rion	Microphone	UC-59	13559
Rion	Calibrator	NC-74	34536109
	Calibrator adaptor type if applicable		NC-74-002

Performance Class 1

Test Procedure: TP 10. SLM 61672-3:2013

Procedures from IEC 61672-3:2013 were used to perform the periodic tests.

Type Approved to IEC 61672-1:2013 Yes

If YES above there is public evidence that the SLM has successfully completed the applicable pattern evaluation tests of IEC 61672-2:2013

Date Received 20 February 2023 ANV Job No. UKAS23/02118

Date Calibrated 21 February 2023

The sound level meter submitted for testing has successfully completed the periodic tests of IEC 61672-3:2013, for the environmental conditions under which the tests were performed. As evidence was publicly available, from an independent testing organisation responsible for approving the results of pattern-evaluation tests performed in accordance with IEC 61672-2:2013, to demonstrate that the model of sound level meter fully conformed to the class 1 specifications in IEC 61672-1:2013, the sound level meter submitted for testing conforms to the class 1 specifications of IEC 61672-1:2013.

Previous Certificate	*Dated*	*Certificate No.*	*Laboratory*
	19 February 2021	UCRT21/1244	0653

Figure 9.A. 2: Calibration Certificate of Rion NL-52

Photographs of the Noise Monitoring Location

Photographs of Noise Monitoring Location 1 are shown in Table 9.A 3.

Table 9.A 3: Photographs of Rion NL-52 Sound Level Meter at NML1 facing in Northern, Southern, Easterly and Westerly Directions (24/03/2022)

North	East
	
South	**West**
	

Noise Survey Results

NML1 was located at the southern boundary of the site, at the southern end of the field adjacent to Knocknamona Crescent. Noise monitoring commenced at 15:00hrs on 24th March 2023 measuring in 15-minute intervals and was completed at 12:15hrs on 31st March 2023. Subjective notes were recorded and are summarised in Table 9.A 4.

Table 9.A 4: Subjective Noise Monitoring Notes at NML1

Noise Monitoring Commenced 24/03/2023	Noise Monitoring Complete 31/03/2023
Upon commencement at 15:00hrs the dominant noise sources at NML1 included road traffic noise from surrounding road network. No audible noise from ESB networks, recycling centre and adjacent residential properties.	Upon completion at 12:15hrs, the dominant noise source was road traffic noise from on N56 Road with traffic flowing constantly. Small road words intermittently audible from Carnamuggagh Road. Cars audible on Carnamuggagh Road. No audible noise from ESB networks, recycling centre and adjacent residential properties.

The complete noise monitoring and weather results at NML1 is shown below in Figure 9.A. 3 and Figure 9.A. 4. Daytime and night-time histograms were plotted L_{A90} and L_{Aeq} for the noise monitoring. The graphical displays of the analysis undertaken is detailed in Figure 9.A. 5 and Figure 9.A. 6.

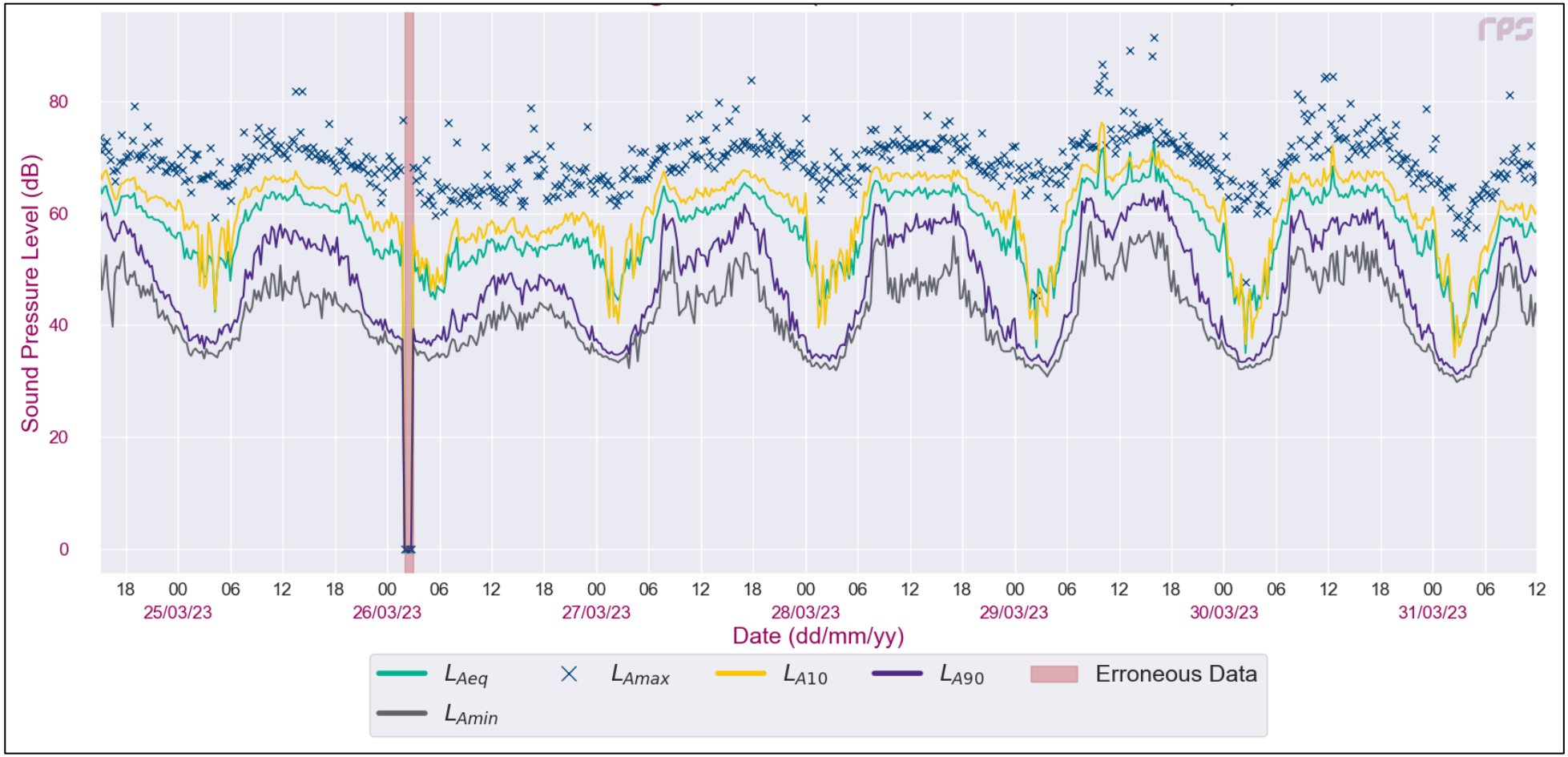


Figure 9.A. 3: NML1 Complete Noise Data (24/03/2023 – 31/03/2023)

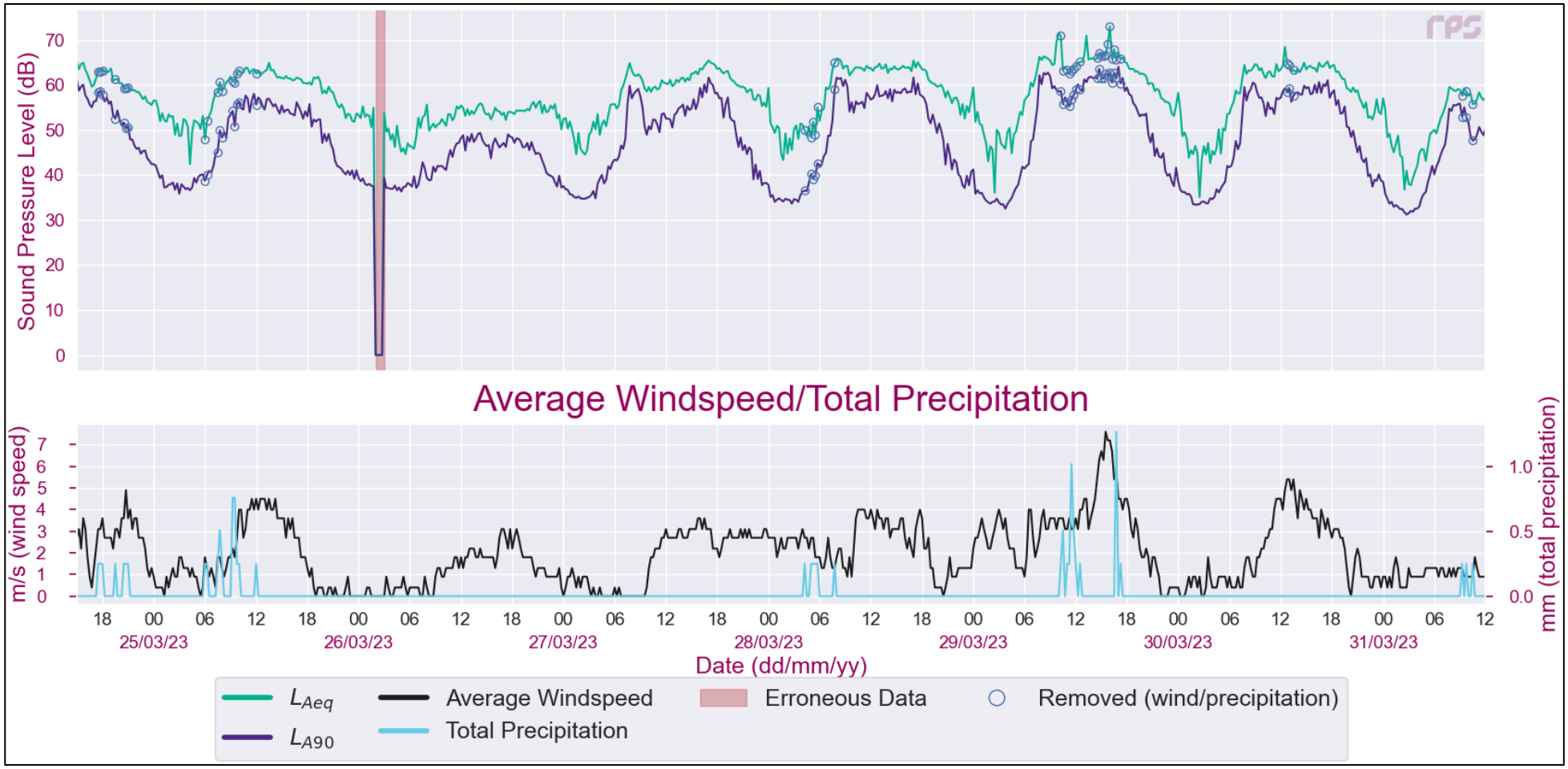


Figure 9.A. 4: NML1 Complete Noise and Weather Data (24/03/2023 – 31/03/2023)

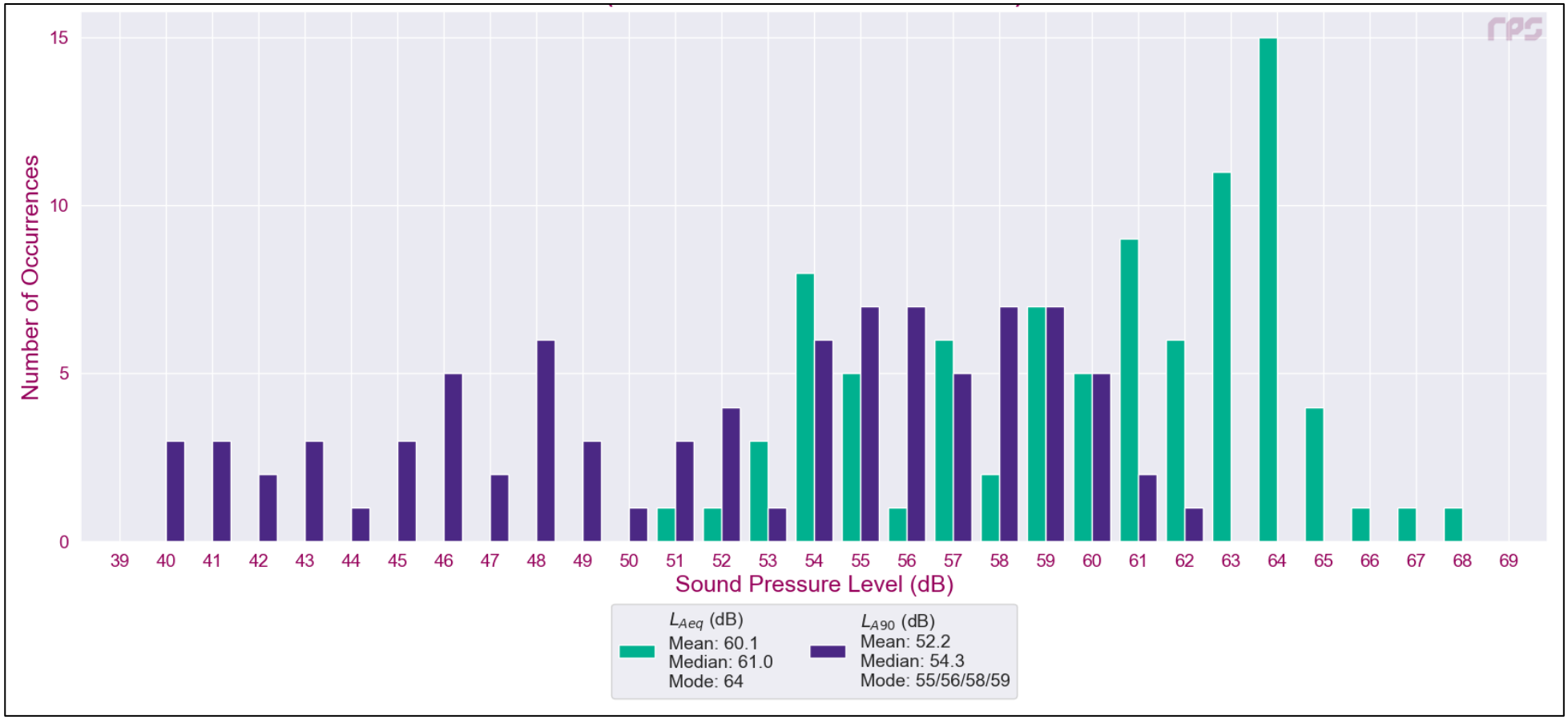


Figure 9.A. 5: Daytime $L_{Aeq,\ 1hr}$ and $L_{A90\ 1hr}$ Histograms at NML 1 (24/03/2023 – 31/03/2023)

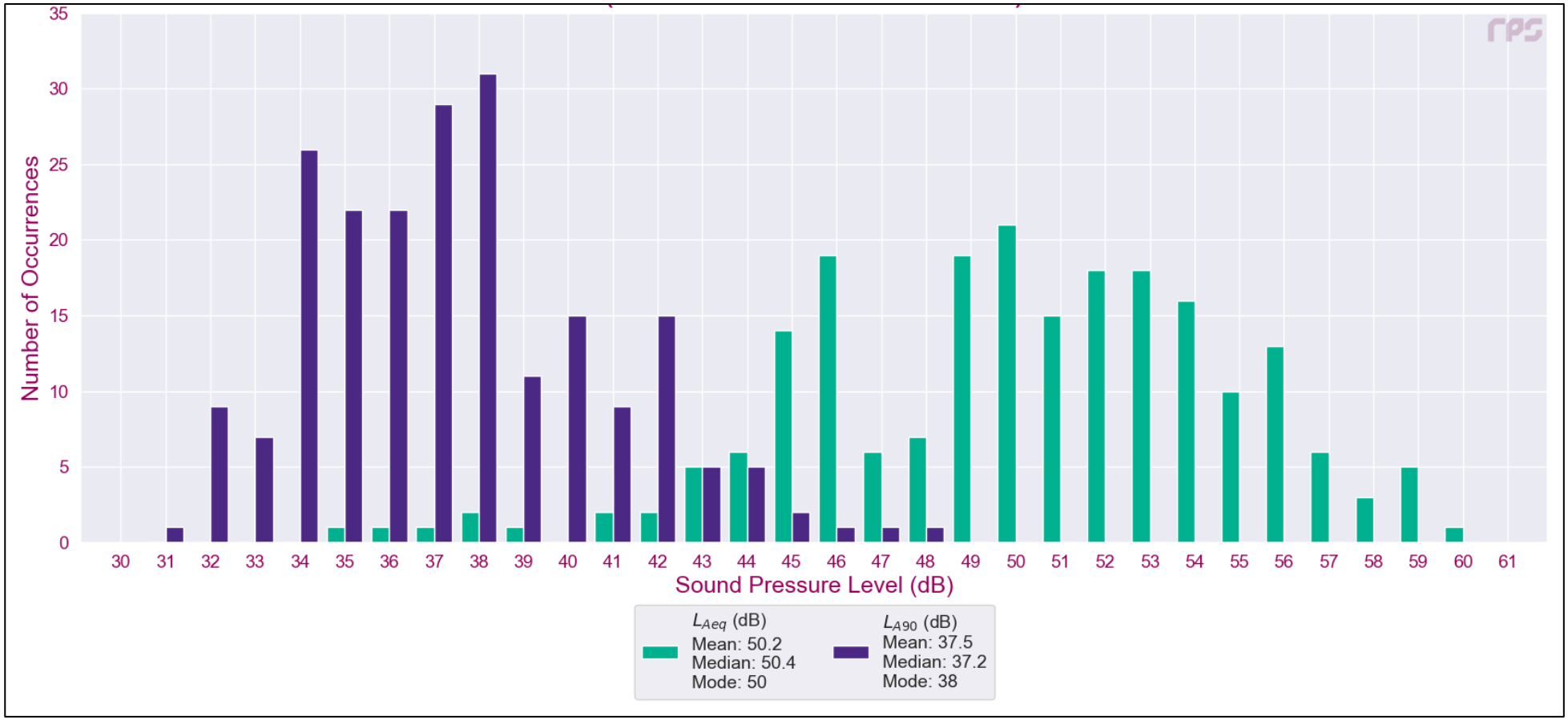


Figure 9.A. 6: Night-time $L_{Aeq,\ 15mins}$ and $L_{A90\ 15mins}$ Histograms at NML 1 (24/03/2023 – 31/03/2023)

The typical background noise levels in accordance with BS 4142 for each analysis completed are summarised below in Table 9.A 5 including statistical analysis L_{A90} noise levels.

Table 9.A 5: Daytime and Night-time L_{A90} and L_{Aeq} Noise Levels NML1 (24/03/2023 – 31/03/2023)

Datasets	L_{A90} Analysis		L_{Aeq} Analysis	
	Daytime dB	Night-time dB	Daytime dB	Night-time dB
Complete Data	55	38	64	50

There was no single mode value of daytime L_{A90}, with the most frequently occurring sound pressure levels ranging from 55 – 59 dB; were 7 occurrences of 55, 56, 58 and 59 dB. The median of L_{A90} values was 54.3 dB and the mean was 52.2 dB, both lower than the mode values. As such, 55 dB L_{A90} has been selected as the representative background level, as the lowest of the four mode values.

Noise Monitoring Location 2 Survey Results

Sound Level Meter Specifications and Calibration Certificates

The unattended baseline noise monitoring survey at NML2 24th March 2023 to the 31st March 2023 was carried out using a Norsonic 140 Class 1 Sound Level Analyser in conjunction with the following:

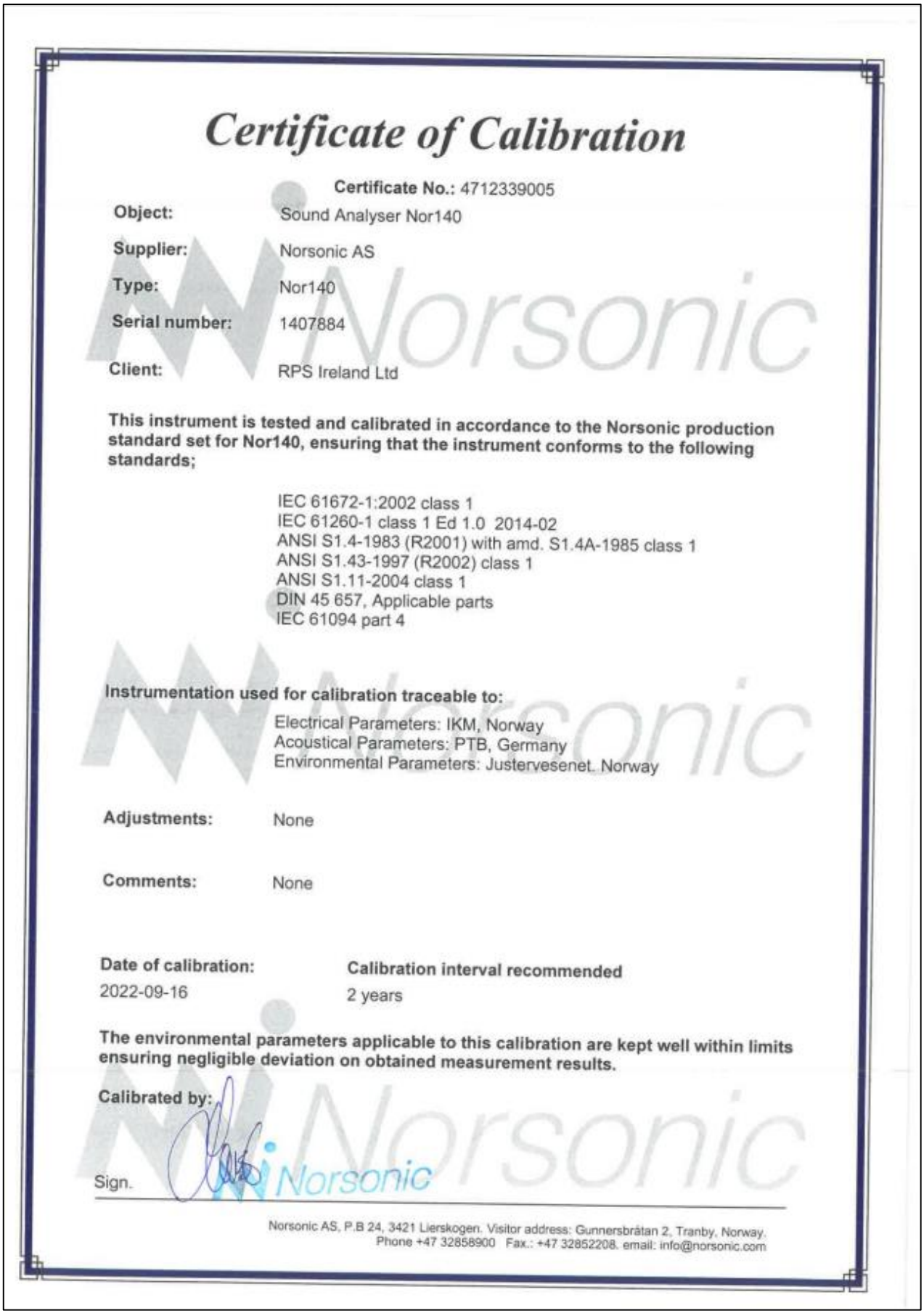
- Norsonic 1211 Outdoor Microphone System and Storage Case;
- Norsonic 1212 – Microphone Dehumidifier Unit;
- CA 1317 – Weather Protection Kit – Type L; and
- Brüel & Kjær 4231 Calibrator.

Table 9.A 6 shows the instrument records for the Norsonic 140 SLM.

Table 9.A 6: Norsonic 140 Noise Instrument Records.

Norsonic 140 Sound Level Meter				
Equipment	**Model / Type**	**Serial Number**	**Calibration Certificate Number**	**Last Calibration Date**
Sound Level Meter	Norsonic 140	1407884	4712339005	16/09/2022
Preamplifier	Norsonic 1209	23500	4712339005	16/09/2022
Microphone	Norsonic 1225	505496	4712339005	16/09/2022
Calibrator	Rion NC-74	35105042	UCRT23/1032	10/01/2023

The calibration certificates and sound level meter specifications from the noise survey equipment are detailed in Figure 9.A. 7.



Certificate of Calibration

Certificate No.: 4712339005

Object:	Sound Analyser Nor140
Supplier:	Norsonic AS
Type:	Nor140
Serial number:	1407884
Client:	RPS Ireland Ltd

This instrument is tested and calibrated in accordance to the Norsonic production standard set for Nor140, ensuring that the instrument conforms to the following standards;

IEC 61672-1:2002 class 1
IEC 61260-1 class 1 Ed 1.0 2014-02
ANSI S1.4-1983 (R2001) with amd. S1.4A-1985 class 1
ANSI S1.43-1997 (R2002) class 1
ANSI S1.11-2004 class 1
DIN 45 657, Applicable parts
IEC 61094 part 4

Instrumentation used for calibration traceable to:

Electrical Parameters: IKM, Norway
Acoustical Parameters: PTB, Germany
Environmental Parameters: Justervesenet. Norway

Adjustments: None

Comments: None

Date of calibration: 2022-09-16

Calibration interval recommended 2 years

The environmental parameters applicable to this calibration are kept well within limits ensuring negligible deviation on obtained measurement results.

Calibrated by:

Sign.

Norsonic AS, P.B 24, 3421 Lierskogen. Visitor address: Gunnersbråtan 2, Tranby, Norway.
Phone +47 32858900 Fax.: +47 32852208. email: info@norsonic.com

Figure 9.A. 7: Calibration Certificate of Norsonic 140

Photographs of the Noise Monitoring Location

Photographs of Noise Monitoring Location 2 are shown in Table 9.A 7.

Table 9.A 7: Photographs of Norsonic 140 Sound Level Meter at NML2 facing in Northern, Southern, Easterly and Westerly Directions (24/03/2022)

North	East
	
South	**West**
	

Noise Survey Results

NML2 was located at the western boundary of the site, adjacent to properties on Hazelwood Drive.

Noise monitoring commenced at 14:30hrs on 24th March 2023 measuring in 15-minute intervals and was completed at 13:15hrs on 31st March 2023. Subjective notes were recorded and are summarised in Table 9.A 8.

Table 9.A 8: Subjective Noise Monitoring Notes at NML2

Noise Monitoring Commenced 24/03/2023	Noise Monitoring Complete 31/03/2023
Upon commencement at 14:30hrs the dominant noise sources at NML1 included road traffic noise from N56 Road. No audible noise from ESB networks, recycling centre and adjacent residential properties. No sheep present in field.	Upon completion at 13:15hrs, the dominant noise source was road traffic noise from on N56 Road with traffic flowing constantly. Small road words intermittently audible from Carnamuggagh Road. Cars audible on Carnamuggagh Road. No audible noise from ESB networks, recycling centre and adjacent residential properties. No sheep present in field.

The complete noise monitoring results and weather data at NML2 is shown below in Figure 9.A. 8 - Figure 9.A. 9. Daytime and night-time histograms were plotted L_{A90} and L_{Aeq} for the noise monitoring. The graphical displays of the analysis undertaken is detailed in Figure 9.A. 10 and Figure 9.A. 11.

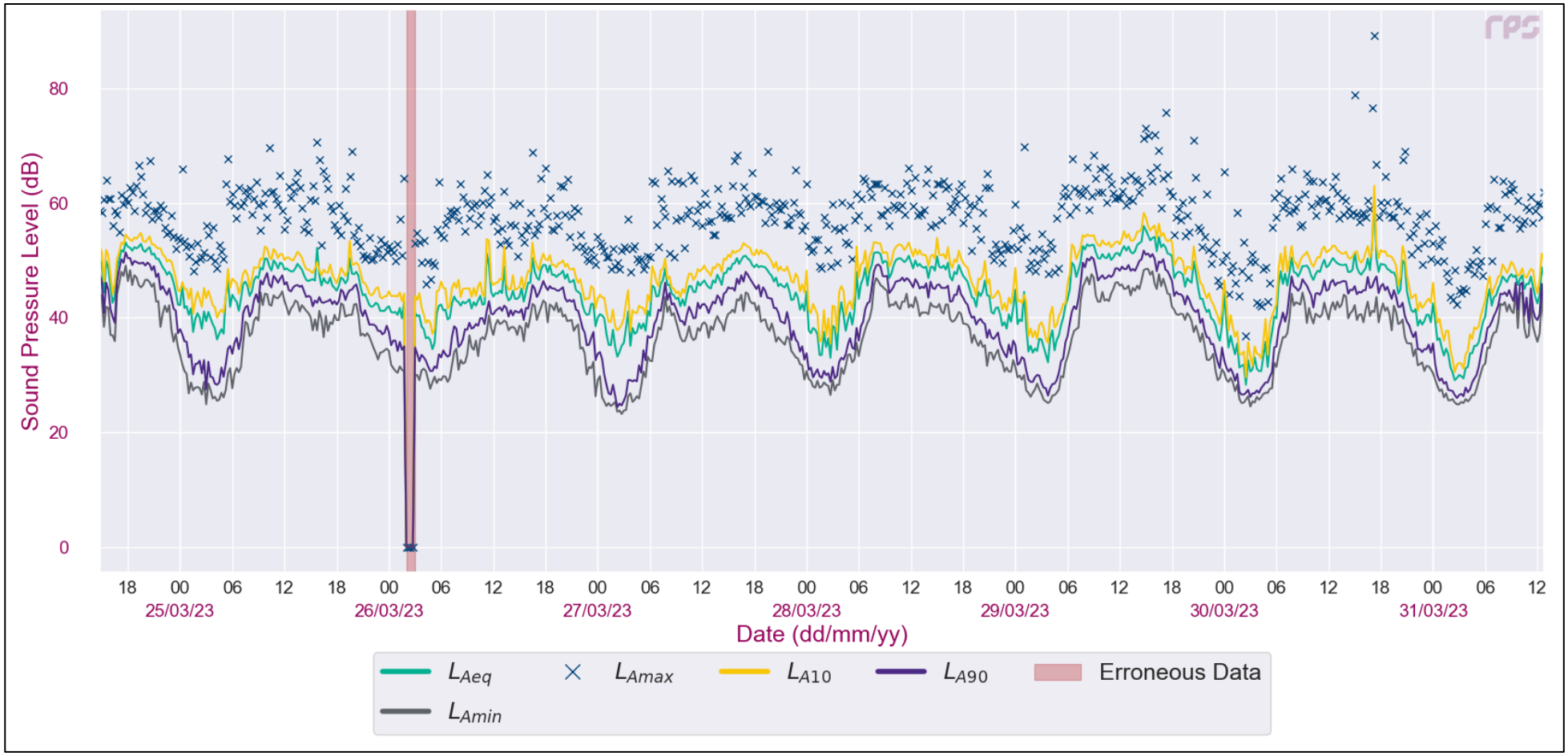


Figure 9.A. 8: NML2 Complete Noise Data (24/03/2023 – 31/03/2023)

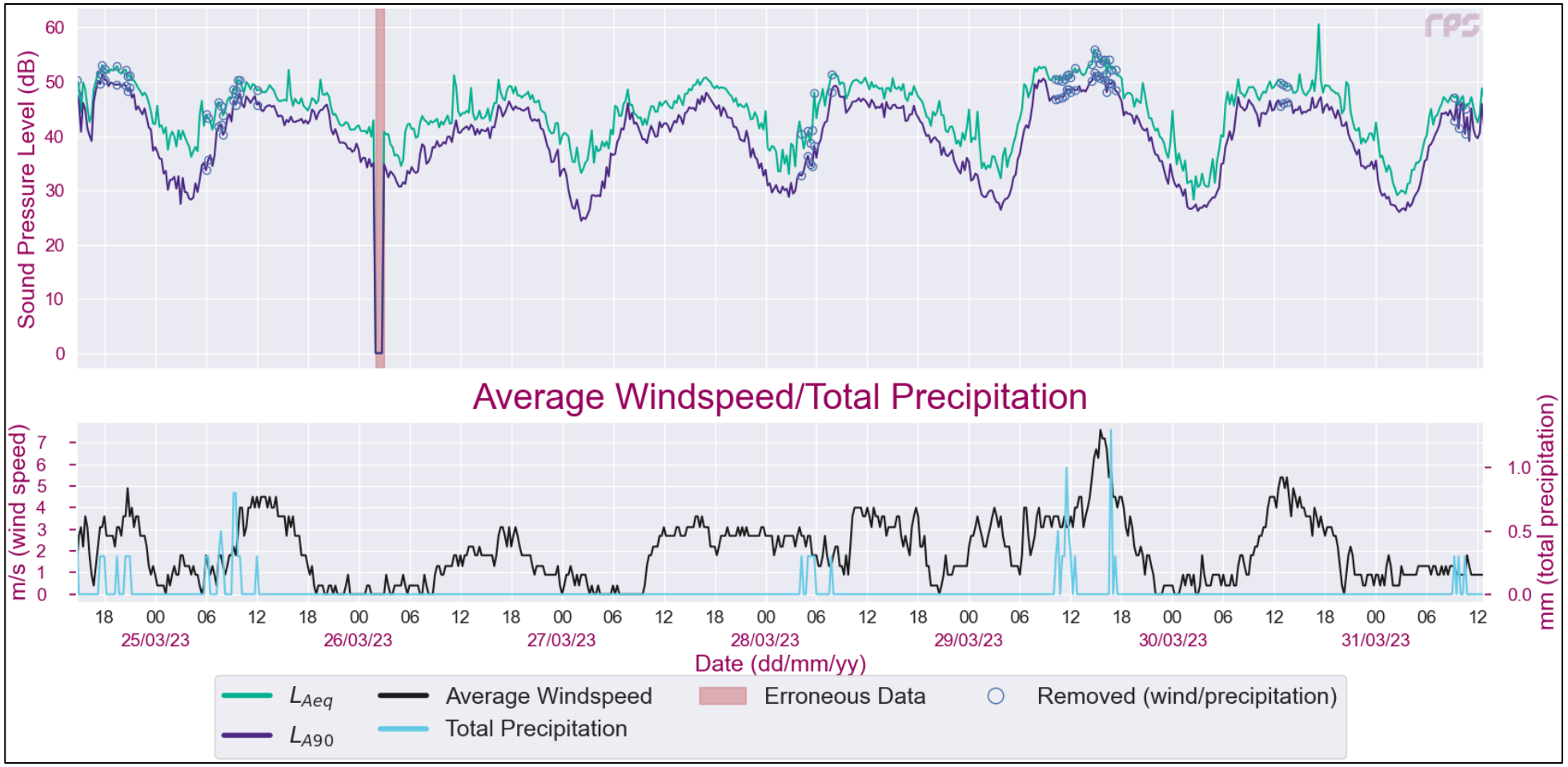


Figure 9.A. 9: NML2 Complete Noise and Weather Data (24/03/2023 – 31/03/2023)

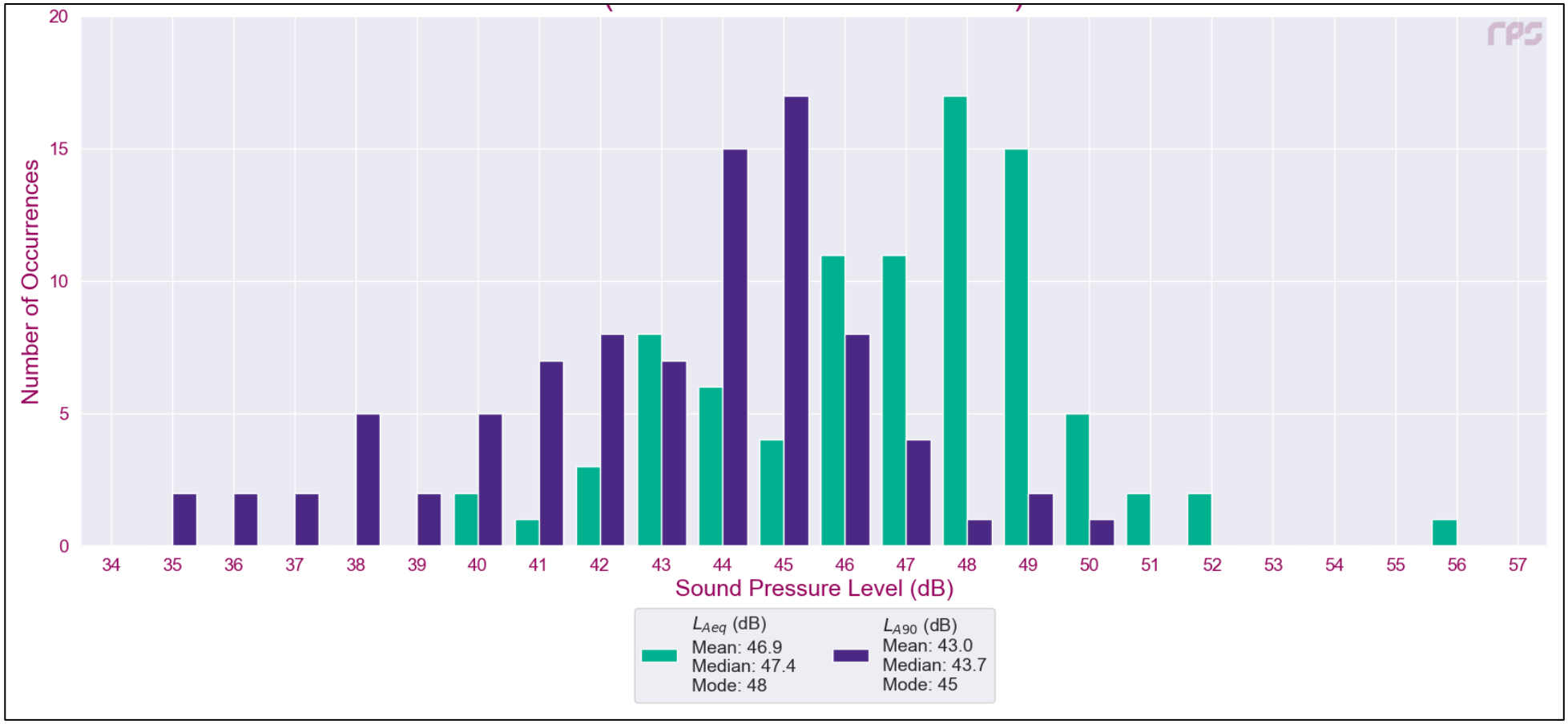


Figure 9.A. 10: Daytime $L_{Aeq,\ 1hr}$ and $L_{A90\ 1hr}$ Histogram at NML 2 (24/03/2023 – 31/03/2023)

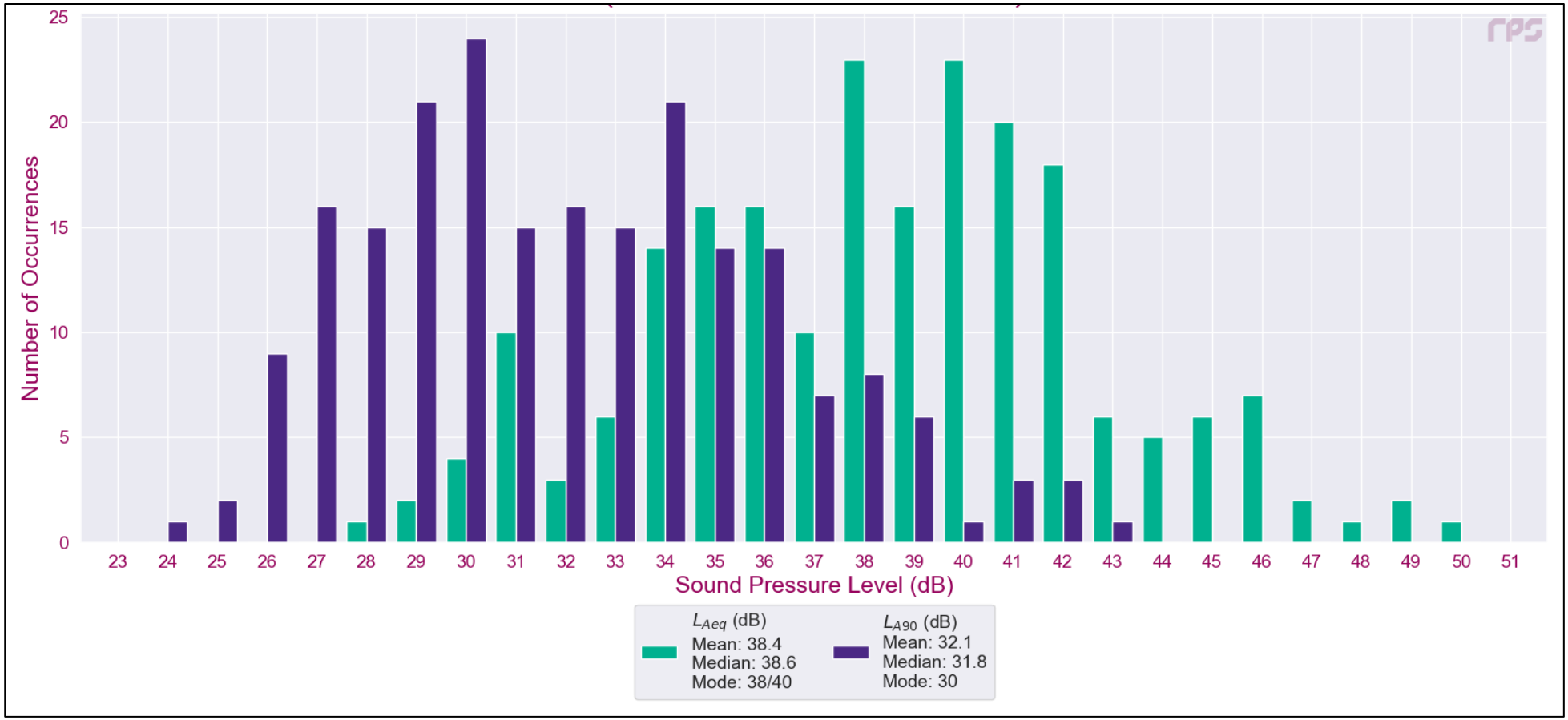


Figure 9.A. 11: Night-time $L_{Aeq,\ 15mins}$ and $L_{A90\ 15mins}$ Histograms at NML 2 (24/03/2023 – 31/03/2023)

The typical background noise levels in accordance with BS 4142 for each analysis completed are summarised below in Table 9.A 9 including statistical analysis L_{A90} noise levels.

Table 9.A 9: Daytime and Night-time L_{A90} and L_{Aeq} Noise Levels NML2 (24/03/2023 – 31/03/2023)

Datasets	L_{A90} Analysis		L_{Aeq} Analysis	
	Daytime dB	Night-time dB	Daytime dB	Night-time dB
Complete Data	45	30	48	38/40

There was a clear modal value for daytime and night-time L_{A90} and daytime L_{Aeq}, which have been selected as the representative values for the BS4142 assessment.

There were two modal values for night-time L_{Aeq}; 38 dB and 40 dB. The mean and median values of night-time L_{Aeq} were 38.4 dB and 38.6 dB respectively. Therefore, 38 has been selected as the representative night-time L_{Aeq} at NML2.

Noise Monitoring Location 3 Survey Results

Sound Level Meter Specifications and Calibration Certificates

The unattended baseline noise monitoring survey at NML3 24th March 2023 to the 31st March 2023 was carried out using a Norsonic 140 Class 1 Sound Level Analyser in conjunction with the following:

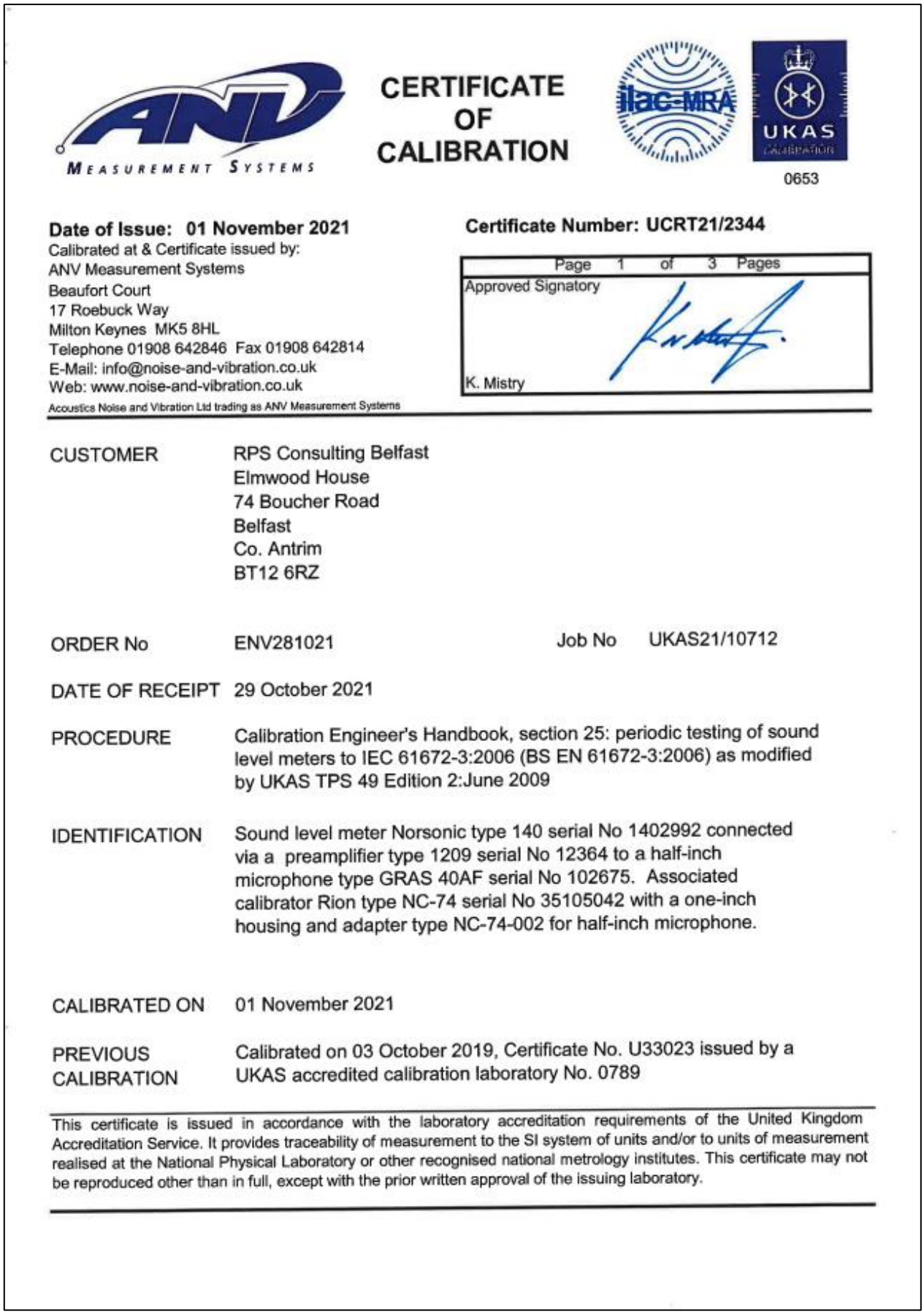
- Norsonic 1211 Outdoor Microphone System and Storage Case;
- Norsonic 1212 – Microphone Dehumidifier Unit;
- CA 1317 – Weather Protection Kit – Type L; and
- Brüel & Kjær 4231 Calibrator.

Table 9.A 10 shows the instrument records for the Norsonic 140 SLM.

Table 9.A 10: Norsonic 140 Noise Instrument Records.

Norsonic 140 Sound Level Meter				
Equipment	**Model / Type**	**Serial Number**	**Calibration Certificate Number**	**Last Calibration Date**
Sound Level Meter	Norsonic 140	1402992	UCRT21/2344	01/11/2021
Preamplifier	Norsonic 1209	12364	UCRT21/2344	01/11/2021
Microphone	GRAS 40AF	102675	UCRT21/2344	01/11/2021
Calibrator	Rion NC-74	35105042	UCRT23/1032	10/01/2023

The calibration certificates and sound level meter specifications from the noise survey equipment are detailed in Figure 9.A. 12.



MEASUREMENT SYSTEMS

CERTIFICATE OF CALIBRATION

ilac-MRA UKAS CALIBRATION 0653

Date of Issue: 01 November 2021

Certificate Number: UCRT21/2344

Calibrated at & Certificate issued by:
ANV Measurement Systems
Beaufort Court
17 Roebuck Way
Milton Keynes MK5 8HL
Telephone 01908 642846 Fax 01908 642814
E-Mail: info@noise-and-vibration.co.uk
Web: www.noise-and-vibration.co.uk
Acoustics Noise and Vibration Ltd trading as ANV Measurement Systems

Page 1 of 3 Pages

Approved Signatory

K. Mistry

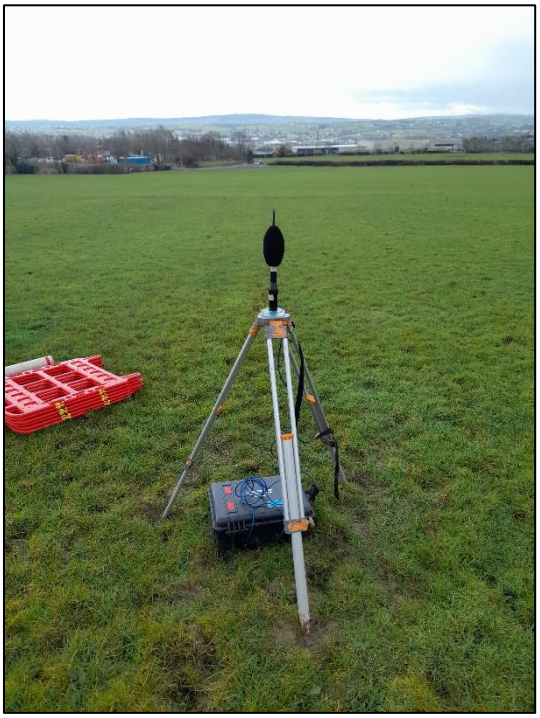
CUSTOMER	RPS Consulting Belfast Elmwood House 74 Boucher Road Belfast Co. Antrim BT12 6RZ
ORDER No	ENV281021
Job No	UKAS21/10712
DATE OF RECEIPT	29 October 2021
PROCEDURE	Calibration Engineer's Handbook, section 25: periodic testing of sound level meters to IEC 61672-3:2006 (BS EN 61672-3:2006) as modified by UKAS TPS 49 Edition 2:June 2009
IDENTIFICATION	Sound level meter Norsonic type 140 serial No 1402992 connected via a preamplifier type 1209 serial No 12364 to a half-inch microphone type GRAS 40AF serial No 102675. Associated calibrator Rion type NC-74 serial No 35105042 with a one-inch housing and adapter type NC-74-002 for half-inch microphone.
CALIBRATED ON	01 November 2021
PREVIOUS CALIBRATION	Calibrated on 03 October 2019, Certificate No. U33023 issued by a UKAS accredited calibration laboratory No. 0789

Figure 9.A. 12: Calibration Certificate of Norsonic 140

Photographs of the Noise Monitoring Location

Photographs of Noise Monitoring Location 3 are shown in Table 9.A 11.

Table 9.A 11: Photographs of Norsonic 140 Sound Level Meter at NML3 facing in Northern, Southern, Easterly and Westerly Directions (24/03/2022)

North	East
	
South	**West**
	

Noise Survey Results

NML3 was located at the western boundary of the site, adjacent to properties on Hazelwood Drive.

Noise monitoring commenced at 14:45hrs on 24th March 2023 measuring in 15-minute intervals and was completed at 13:00hrs on 31st March 2023. Subjective notes were recorded and are summarised in Table 9.A 12.

Table 9.A 12: Subjective Noise Monitoring Notes at NML3

Noise Monitoring Commenced 24/03/2023	Noise Monitoring Complete 31/03/2023
Upon commencement at 14:45hrs the dominant noise sources at NML1 included road traffic noise from N56 Road.	Upon completion at 13:00hrs, the dominant noise source was road traffic noise from on N56 Road with traffic flowing constantly.
Road traffic noise on Brookfield Heights and surrounding area intermittently audible.	Operational activity intermittently audible from recycling centre.
No audible noise from ESB networks and recycling centre.	Small road words intermittently audible from Carnamuggagh Road.
Hammering occasionally audible emanating from residential property located at Brookfield Heights	Road traffic noise on Brookfield Heights and surrounding area intermittently audible.
Sheep present in field but located south-west corner.	Sheep present in field but not audible.

The complete noise monitoring results and weather data at NML3 is shown below in Figure 9.A. 13 - Figure 9.A. 14. Daytime and night-time histograms were plotted L_{A90} and L_{Aeq} for the noise monitoring. The graphical displays of the analysis undertaken is detailed in Figure 9.A. 15 and Figure 9.A. 16.

Figure 9.A. 13: NML3 Complete Noise Data (24/03/2023 – 31/03/2023)

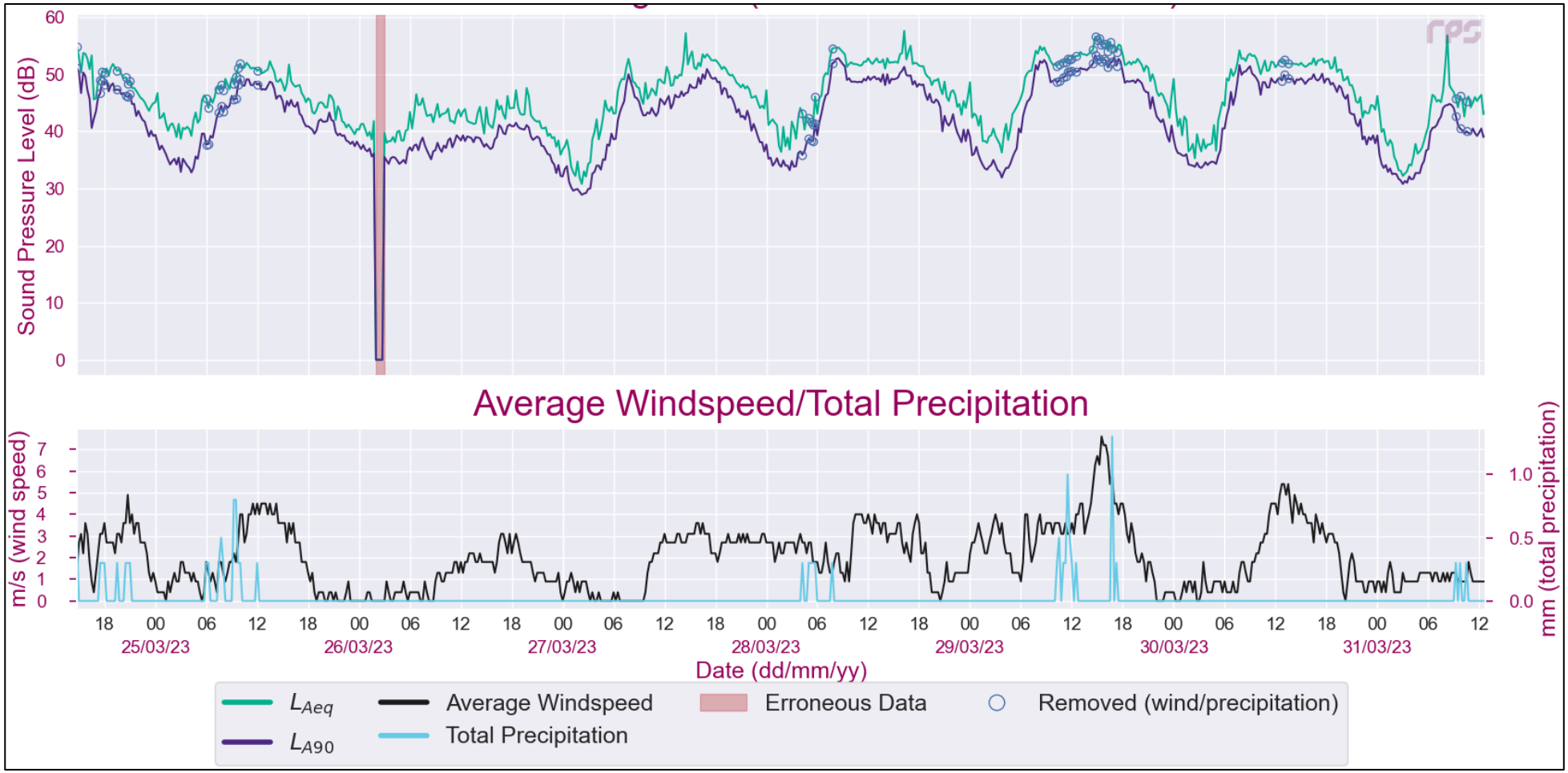


Figure 9.A. 14: NML3 Complete Noise and Weather Data (24/03/2023 – 31/03/2023)

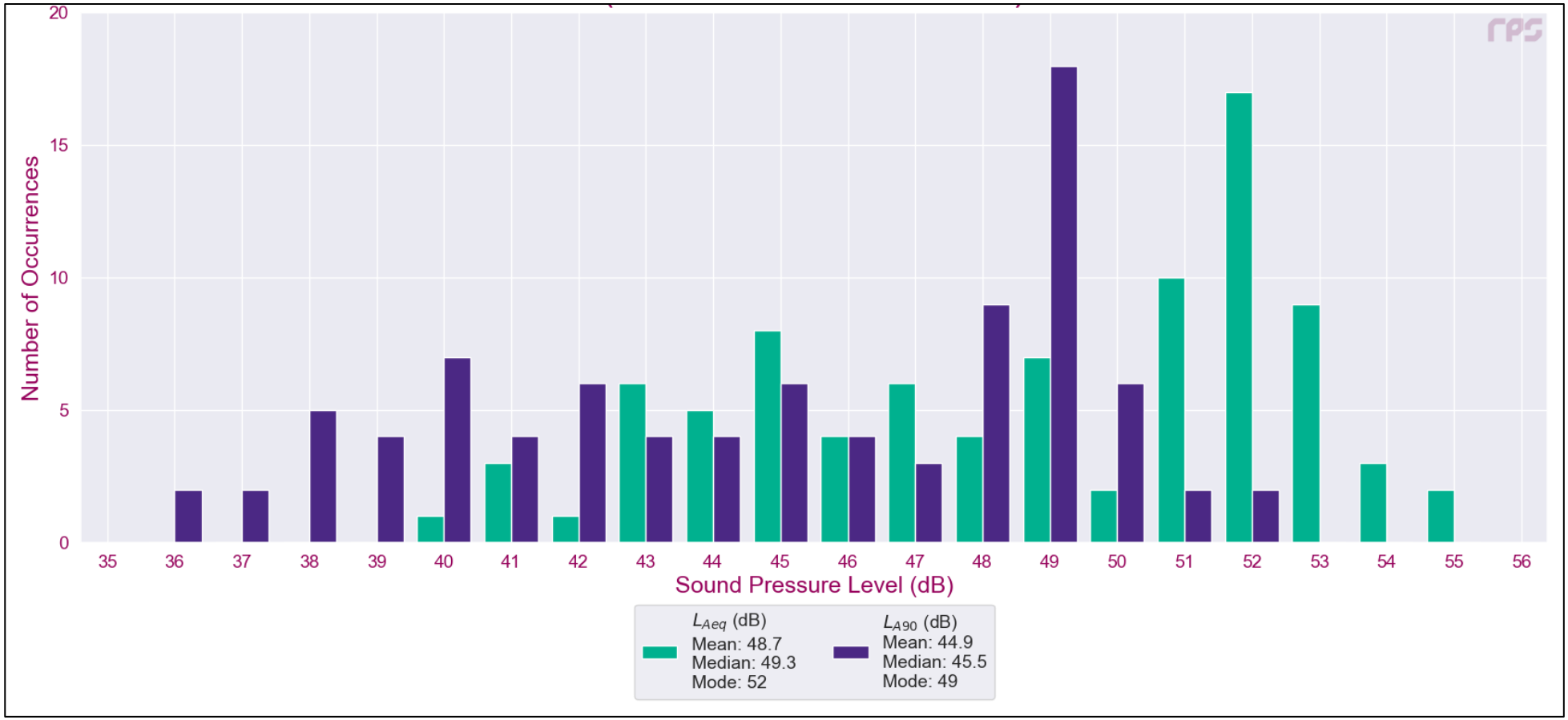


Figure 9.A. 15: Daytime $L_{Aeq,\ 1hr}$ and $L_{A90\ 1hr}$ Histograms at NML 3 (24/03/2023 – 31/03/2023)

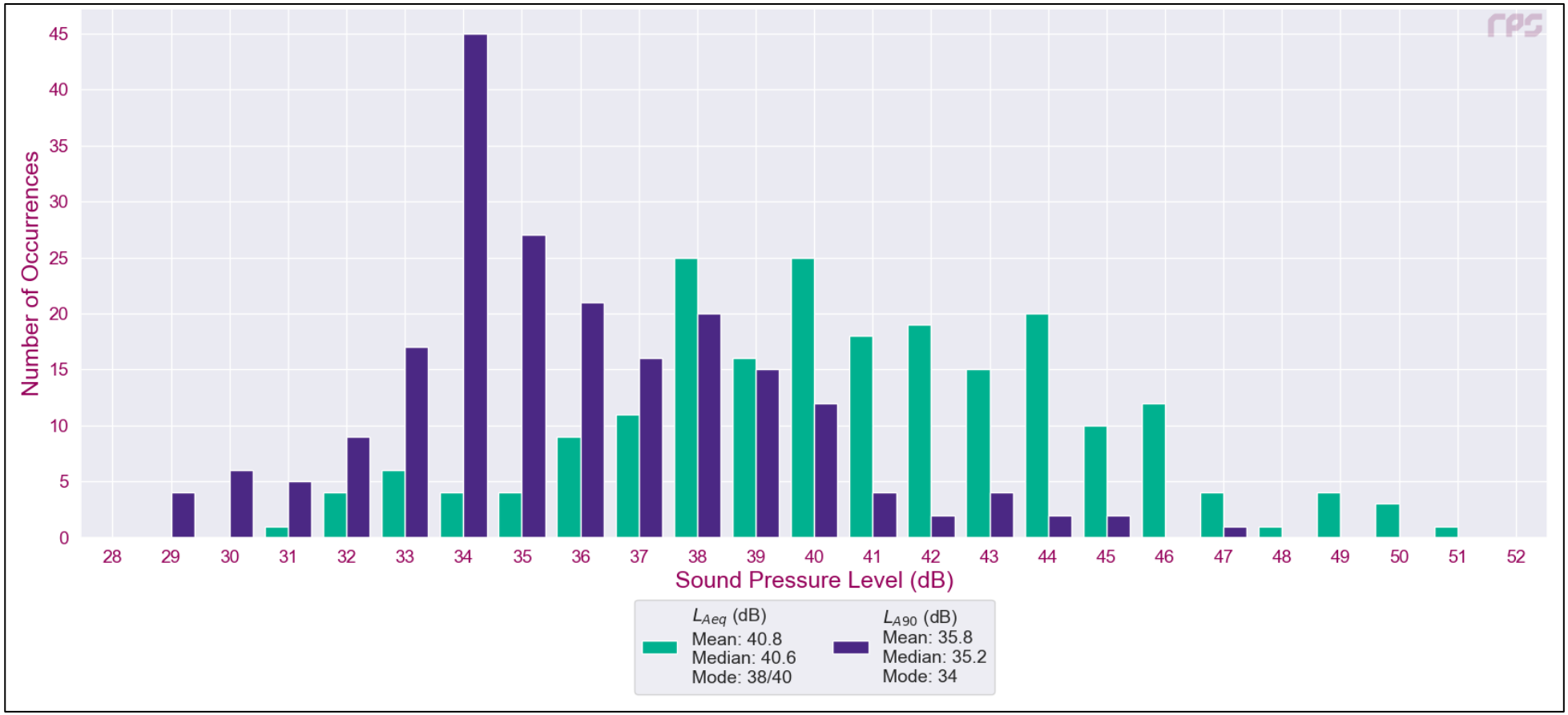


Figure 9.A. 16: Night-time $L_{Aeq,\ 15mins}$ and $L_{A90\ 15mins}$ Histograms at NML 3 (24/03/2023 – 31/03/2023)

The typical background noise levels in accordance with BS 4142 for each analysis completed are summarised below in Table 9.A 13 including statistical analysis L_{A90} noise levels.

Table 9.A 13: Daytime and Night-time L_{A90} and L_{Aeq} Noise Levels NML3 (24/03/2023 – 31/03/2023)

Datasets	L_{A90} Analysis		L_{Aeq} Analysis	
	Daytime dB	Night-time dB	Daytime dB	Night-time dB
Complete Data	49	34	52	40

There was a clear modal value for daytime and night-time L_{A90} and daytime L_{Aeq}, which have been selected as the representative values for the BS4142 assessment.

There were two modal values for night-time L_{Aeq}; 38 dB and 40 dB. The mean and median values of night-time L_{Aeq} were 40.8 dB and 40.6 dB respectively. Therefore, 40 has been selected as the representative night-time L_{Aeq} at NML3.

Appendix 9.B
Construction & Operational Noise Sensitive Receptors

Table 9.B.1: Residential Receptors within 300m of Development Site

Receptor ID	Irish Grid Easting	Irish Grid Northing
1	217676	413124
2	217696	413113
3	217823	413070
4	217871	413051
5	217903	413043
6	217805	412952
7	217814	412903
8	217858	412867
9	217911	412813
10	217903	412807
11	217894	412792
12	217897	412783
13	217851	412791
14	217908	412766
15	217905	412756
16	217890	412753
17	217881	412750
18	217866	412744
19	217866	412726
20	217870	412717
21	217873	412707
22	217876	412697
23	217932	412707
24	217939	412713
25	217953	412716
26	217959	412725
27	217962	412745

Receptor ID	Irish Grid Easting	Irish Grid Northing
28	217959	412749
29	217946	412765
30	217942	412769
31	217830	412698
32	217827	412718
33	217826	412736
34	217765	412698
35	217756	412697
36	217745	412699
37	217734	412698
38	217706	412711
39	217702	412705
40	217687	412719
41	217681	412724
42	217670	412734
43	217661	412732
44	217552	412773
45	217514	412771
46	217497	412818
47	217488	412816
48	217557	412962
49	217388	412956
50	217680	413220
51	217670	413219
52	217654	413227
53	217644	413226
54	217628	413234
55	217619	413235

Receptor ID	Irish Grid Easting	Irish Grid Northing
56	217604	413245
57	217593	413247
58	217571	413255
59	217549	413257
60	217519	413237
61	217496	413244
62	217478	413252
63	217455	413261
64	217440	413269
65	217422	413290
66	217410	413314
67	217397	413293
68	217390	413295
69	217399	413261
70	217393	413262
71	217367	413236
72	217353	413275
73	217353	413281
74	217355	413293
75	217356	413298
76	217360	413311
77	217361	413319
78	217369	413347
79	217448	413331
80	217469	413352
81	217489	413342
82	217502	413329
83	217514	413316

Receptor ID	Irish Grid Easting	Irish Grid Northing
84	217534	413306
85	217555	413305
86	217572	413297
87	217592	413292
88	217623	413275
89	217630	413275
90	217646	413271
91	217655	413272
92	217671	413262
93	217682	413263
94	217447	413374
95	217430	413391
96	217395	413379
97	217391	413401
98	217384	413431
99	217436	413425
100	217414	413449
101	217394	413473
102	217352	413493
103	217359	413508
104	217322	413537
105	217308	413550
106	217304	413568
107	217306	413584
108	217256	413555
109	217227	413520
110	217404	413513
111	217450	413486

Receptor ID	Irish Grid Easting	Irish Grid Northing
112	217507	413494
113	217468	413501
114	217455	413506
115	217453	413512
116	217457	413530
117	217461	413538
118	217477	413539
119	217489	413539
120	217408	413534
121	217409	413543
122	217413	413558
123	217412	413566
124	217413	413578
125	217419	413592
126	217466	413565
127	217527	413561
128	217551	413552
129	217564	413550
130	217570	413549
131	217584	413545
132	217589	413544
133	217602	413541
134	217608	413539
135	217425	413615
136	217470	413596
137	217498	413589
138	217439	413629
139	217470	413621

Receptor ID	Irish Grid Easting	Irish Grid Northing
140	217496	413613
141	217537	413592
142	217547	413597
143	217559	413587
144	217564	413585
145	217579	413580
146	217585	413579
147	217598	413575
148	217604	413575
149	217620	413573
150	217628	413572
151	217662	413560
152	217680	413570
153	217696	413577
154	217708	413588
155	217724	413599
156	217741	413608
157	217756	413615
158	217772	413623
159	217787	413629
160	217799	413635
161	217817	413643
162	217663	413595
163	217661	413613
164	217661	413628
165	217660	413641
166	217662	413660
167	217691	413611

Receptor ID	Irish Grid Easting	Irish Grid Northing
168	217700	413630
169	217694	413644
170	217689	413658
171	217685	413676
172	217696	413689
173	217705	413700
174	217718	413710
175	217731	413678
176	217735	413660
177	217766	413674
178	217761	413690
179	217756	413704
180	217743	413715
181	217741	413732
182	217752	413746
183	217756	413751
184	217764	413757
185	217767	413761
186	217779	413770
187	217785	413773
188	217791	413741
189	217788	413726
190	217792	413715
191	217797	413705
192	217802	413694
193	217806	413682
194	217812	413672
195	217627	413600

Receptor ID	Irish Grid Easting	Irish Grid Northing
196	217621	413601
197	217606	413603
198	217601	413605
199	217588	413608
200	217579	413609
201	217565	413613
202	217561	413618
203	217551	413631
204	217547	413636
205	217547	413653
206	217547	413662
207	217554	413679
208	217555	413689
209	217557	413706
210	217564	413710
211	217591	413691
212	217590	413700
213	217619	413631
214	217617	413648
215	217616	413654
216	217616	413668
217	217617	413673
218	217619	413688
219	217620	413693
220	217654	413682
221	217654	413689
222	217659	413701
223	217661	413707

Receptor ID	Irish Grid Easting	Irish Grid Northing
224	217623	413715
225	217619	413719
226	217606	413725
227	217601	413728
228	217585	413725
229	217580	413726
230	217563	413742
231	217564	413749
232	217578	413761
233	217584	413768
234	217600	413768
235	217609	413767
236	217623	413759
237	217626	413755
238	217637	413746
239	217642	413742
240	217667	413718
241	217670	413725
242	217490	413642
243	217460	413656
244	217478	413667
245	217511	413674
246	217516	413692
247	217522	413708
248	217525	413728
249	217528	413746
250	217519	413770
251	217505	413783

Receptor ID	Irish Grid Easting	Irish Grid Northing
252	217486	413714
253	217487	413729
254	217449	413682
255	217450	413707
256	217457	413730
257	217461	413768
258	217400	413692
259	217411	413728
260	217635	413786
261	217637	413782
262	217652	413762
263	217655	413767
264	217664	413777
265	217667	413782
266	217679	413746
267	217683	413744
268	217702	413743
269	217707	413745
270	217719	413753
271	217723	413757
272	217734	413767
273	217737	413770
274	217750	413784
275	217752	413787
276	217763	413806
277	217763	413811
278	217763	413828
279	217763	413835

Receptor ID	Irish Grid Easting	Irish Grid Northing
280	217713	413821
281	217720	413833
282	217724	413840
283	217734	413852
284	217741	413856
285	217752	413866
286	217643	413806
287	217648	413811
288	217659	413819
289	217664	413823
290	217672	413828
291	217677	413832
292	217687	413843
293	217691	413847
294	217699	413856
295	217703	413860
296	217711	413870
297	217715	413875
298	217725	413882
299	217729	413886
300	217737	413894
301	217743	413897
302	217757	413902
303	217764	413903
304	217555	413821
305	217572	413804
306	217583	413806
307	217590	413807

Receptor ID	Irish Grid Easting	Irish Grid Northing
308	217602	413815
309	217609	413820
310	217615	413826
311	217624	413836
312	217629	413839
313	217635	413843
314	217647	413869
315	217652	413865
316	217667	413874
317	217671	413879
318	217680	413889
319	217685	413893
320	217693	413903
321	217696	413907
322	217723	413923
323	217730	413926
324	217739	413932
325	217747	413936
326	218368	413654
327	218366	413646
328	218360	413633
329	218358	413627
330	218352	413617
331	218349	413608
332	218347	413597
333	218347	413588
334	218362	413519
335	218345	413519

Receptor ID	Irish Grid Easting	Irish Grid Northing
336	218340	413512
337	218340	413497
338	218341	413491
339	218343	413478
340	218343	413472
341	218339	413459
342	218331	413450
343	218329	413442
344	218319	413434
345	218315	413427
346	218312	413405
347	218316	413400
348	218330	413395
349	218336	413394

Table 9.B.2: Representative Residential Noise Sensitive Receptors

Receptor ID	Irish Grid Easting	Irish Grid Northing
1	217676	413124
2	217696	413113
3	217823	413070
4	217871	413051
5	217903	413043
6	217805	412952
7	217814	412903
8	217858	412867
48	217557	412962
50	217680	413220
51	217670	413219
80	217469	413352
81	217489	413342
83	217514	413316
85	217555	413305
87	217592	413292
88	217623	413275
90	217646	413271
92	217671	413262
93	217682	413263
94	217447	413374
95	217430	413391
99	217436	413425
111	217450	413486
112	217507	413494
113	217468	413501
134	217608	413539

Receptor ID	Irish Grid Easting	Irish Grid Northing
151	217662	413560
153	217696	413577
155	217724	413599
157	217756	413615
159	217787	413629
161	217817	413643
194	217812	413672

Appendix 9.C

Construction Noise Assessment

Construction Phasing Summary

The activities associated with each construction phase are summarised in Table 9.C.1

Table 9.C.1: Construction Phases

Phase	Construction Activities
Phase 1	Strip topsoil, cut & fill across whole site to formation levels (including rock breaking) Pitch 1,6,7,8 and 9, access roads, parking and temporary changing facilities.
Phase 2	Construct Pavilion Building
Phase 3	Construct Grass Pitch 2, Training Ground, Hurling Wall and Community Gardens
Phase 4	Construct Pitches 3,4 and 5. Walking and Running Trails Developed and Bio-Diversity Garden Established
Phase 5	Air-dome Structure and Associated Carpark

A Visual of the construction phases is outlined in Volume II figure 9.5.

An overview of the construction phases, including the construction activities in each phase, are detailed below.

Phase 1

Enabling Works

The first construction activity on site will be Enabling Works consisting of striping topsoil and carrying out cut and fill earthworks, as summarised in Figure 9.C.1.

Figure 9.C.1: Phase 1 Enabling Works

Cut and fill works will be carried out to achieve the required formation level across the site. This operation must be carried out for the entire site in a single operation to reduce the need of importing or exporting of sub-soil material.

The key cut and fill areas are summarised in Figure 9.C.2.

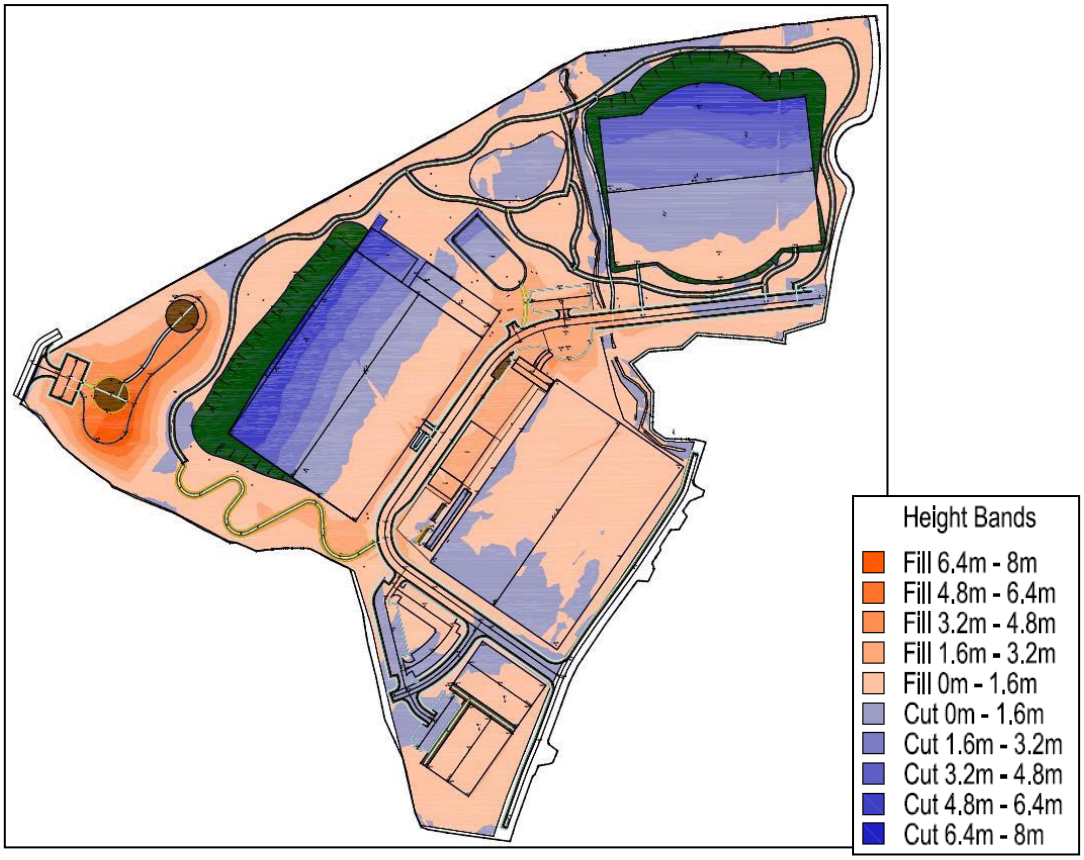


Figure 9.C.2: Cut and Fill Analysis Construction Area

A significant source of noise associated with phase 1 is rock breaking. Although it is possible that some rock breaking may be required at any location within site boundary, the cut and fill analysis has been reviewed to identify the areas in which rock breaking is likely to be concentrated or occur for the most significant duration.

The areas requiring 'cut' will most likely require rock breaking. The areas requiring deeper cut depths are likely to require the longest duration and most intensive rock breaking.

Construction

Phase 1 will also include the construction of artificial Pitch 1 and five-a-side pitches (Pitches 6,7,8 and 9), roads, car park 1 and ESB sub-station. Temporary changing facilities will be provided, with Phase 1a constructing the Pavilion building & sprint track. The extent of phase 1 is shown in Figure 9.C.3.

Figure 9.C.3: Phase 1 Construction Activities

Phase 2

Phase 2 will include the construction of grass pitch 2, training ground, hurling wall and community gardens, as summarised in Figure 9.C.4.

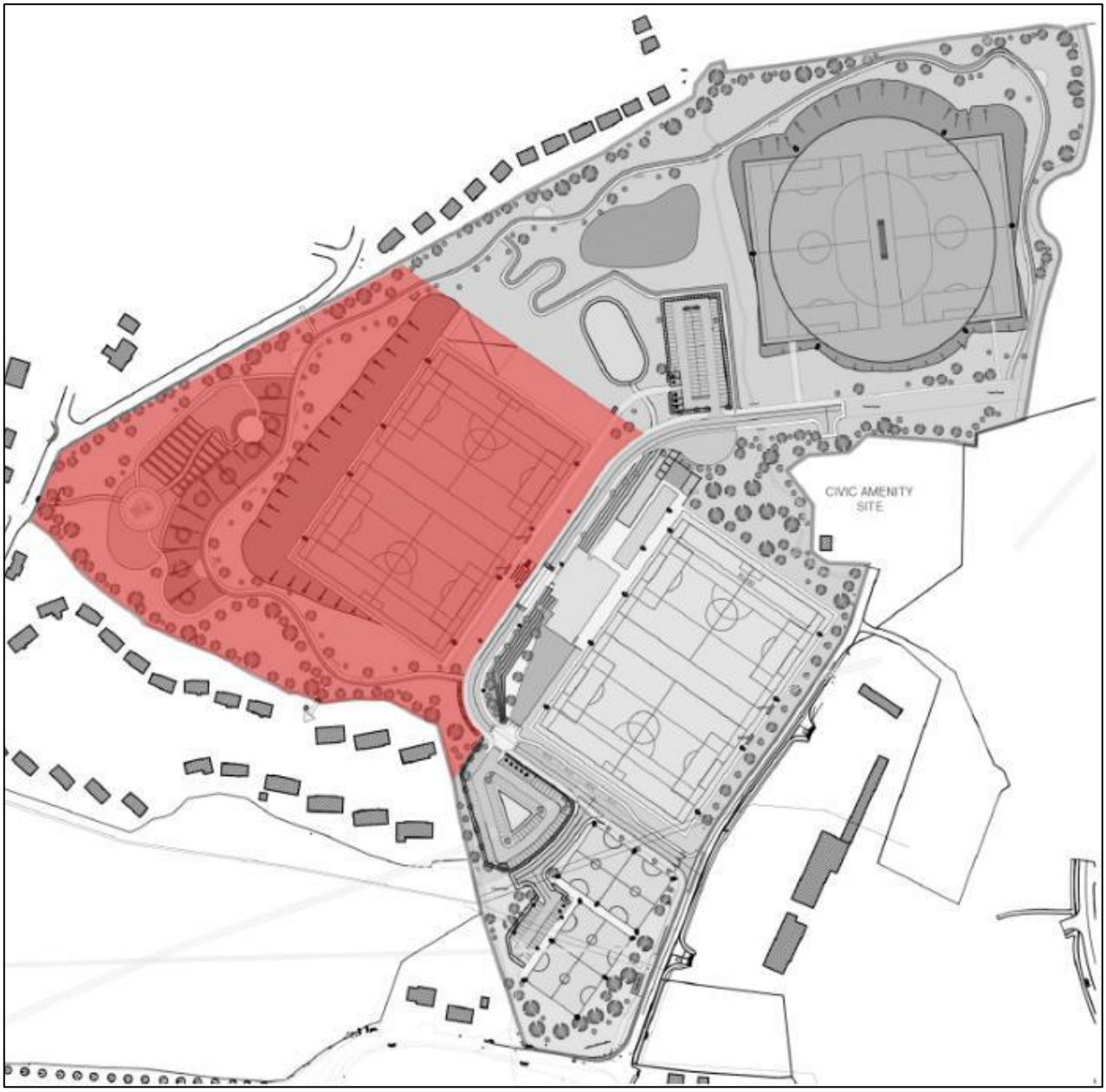


Figure 9.C.4: Phase 2

Phase 3

Phase 3 will include construction of soccer pitches, cricket pitch and stage where walking and running trails developed and bio-diversity garden are established, as summarised in Figure 9.C.5.

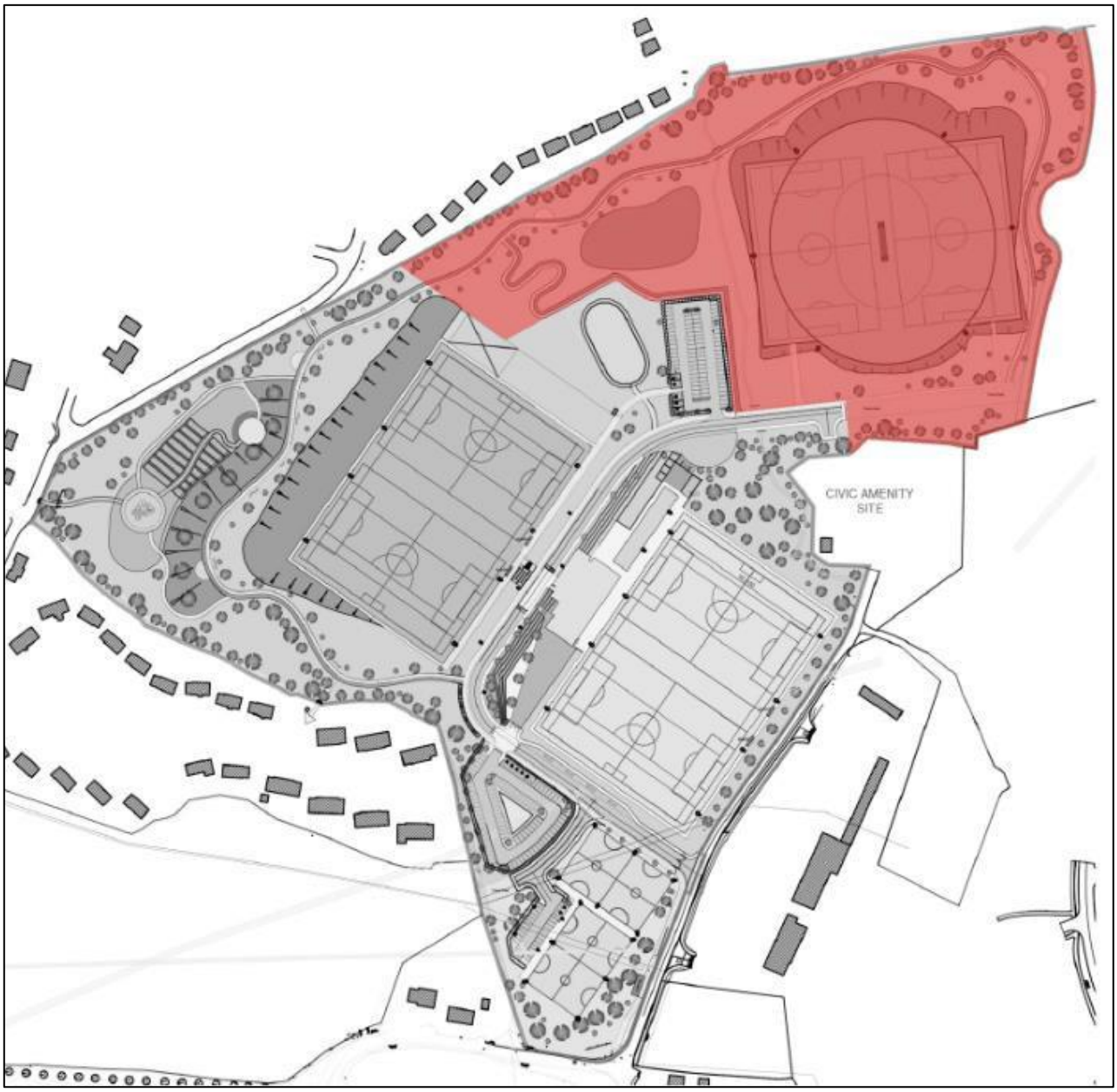


Figure 9.C.5: Phase 3

Phase 4

Phase 4 will include construction of air-dome and car park. Completion of remaining landscaping, as summarised in Figure 9.C.6.

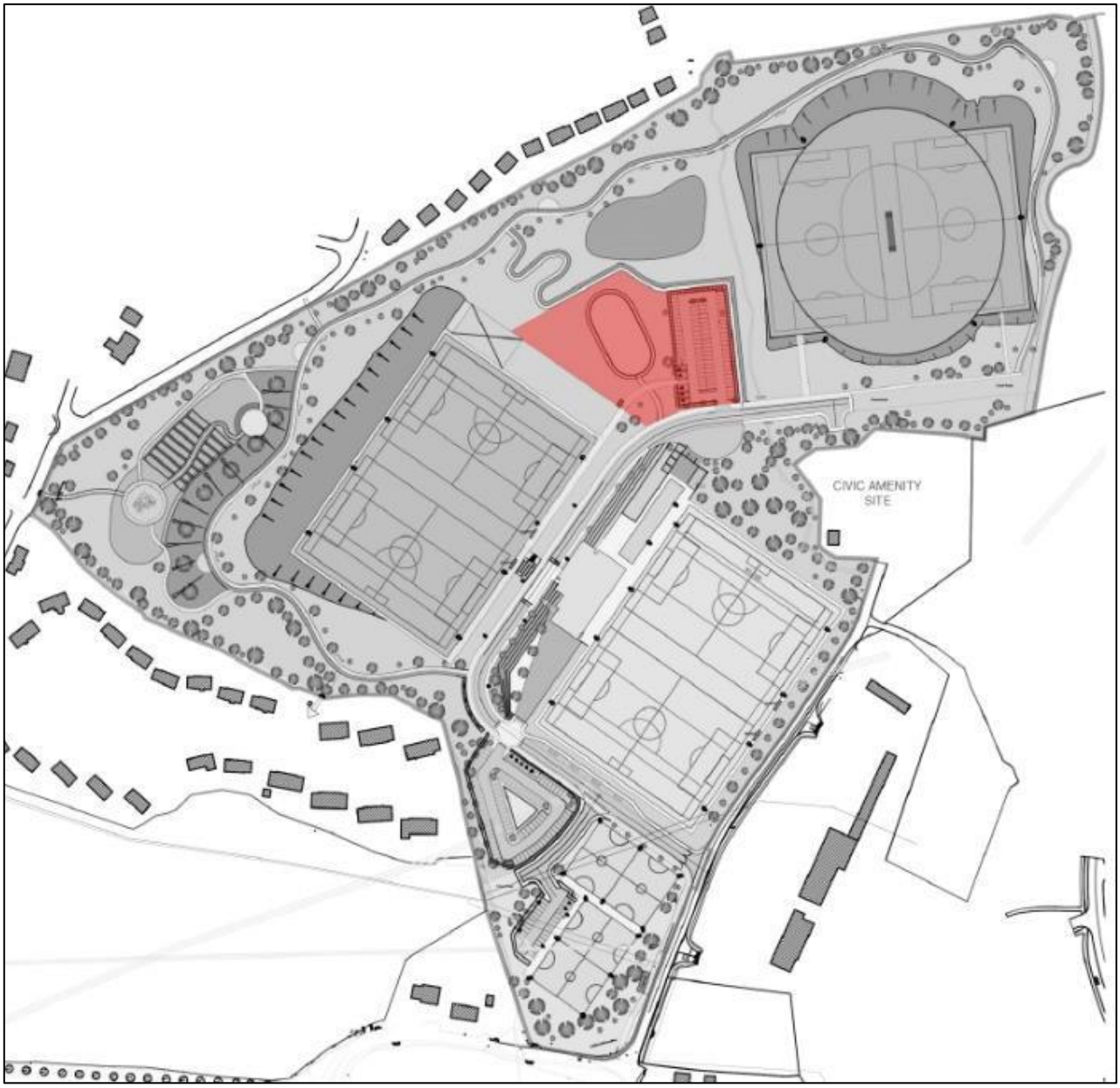


Figure 9.C.6: Phase 4

Construction Noise Sources

The noise sources associated with construction activities have been identified for each construction phase and are detailed in Table 9.C.2. The assumed construction plant shown is generally representative of the type of plant that will be in use for the construction phase of the Proposed Scheme.

Table 9.C.2: Construction Plant Noise Levels (REF: BS 5228:2009+A1:2014) Phase 1 No Rock Breaking

Phase[1]	Plant	Reference from Annex C & D BS5228	Numbers	Sound Pressure Level at 10m dB(A)	Cumulative Construction Sound Pressure Level at 10m dB(A)
Phase 1 No Rock Breaking	360º tracked/wheeled hydraulic excavators	C.4.56	3 (assumption only 1 used per location*)	83	83
	Dumper	C.4.6	6 (assumption only 2 used per location*)	79	82
	Cutter, drills and small tools	D.2.15	10 (assumption only used only 50% of the time*)	84	88.6
		C.4.93		80	
		C.4.95		73	
	Skip lorries	C.2.34	1	80	80
	Tracked bulldozers	C.2.1	1	75	75
	Road rollers	C.5.19	2	80	83.0
	Pedestrian rollers	C.2.38	1	73	73
	Pneumatic drills/hammers (hand held)	C.5.3	0	82	0
	Pneumatic drills/hammers (on back of excavator)	D.2.4		91	0
	Generators	C.4.76	2	61	64.0
	Pumping equipment	C.4.88	3	68	72.8
	Cranes	C.4.48	1	76	76
	Tipper lorries	C.2.30	5 (assumption only 3 used per location*)	79	83.8
	Diggers/TLB	C.2.2	1	77	77

[1] Details of the activities associated with each construction phase are detailed in

Table 9.C.3: Construction Plant Noise Levels (REF: BS 5228:2009+A1:2014) Phase 1 incl Rock Breaking

Phase[1]	Plant	Reference from Annex C & D BS5228	Numbers	Sound Pressure Level at 10m dB(A)	Cumulative Construction Sound Pressure Level at 10m dB(A)
Phase 1 with Rock Breaking	360º tracked/wheeled hydraulic excavators	C.4.56	3 (assumption only 1 used per location*)	83	83
	Dumper	C.4.6	6 (assumption only 2 used per location*)	79	82
	Cutter, drills and small tools	D.2.15	10 (assumption only used only 50% of the time*)	84	88.6
		C.4.93		80	
		C.4.95		73	
	Skip lorries	C.2.34	1	80	80
	Tracked bulldozers	C.2.1	1	75	75
	Road rollers	C.5.19	2	80	83.0
	Pedestrian rollers	C.2.38	1	73	73
	Pneumatic drills/hammers (hand held)	C.5.3	2	82	85
	Pneumatic drills/hammers (on back of excavator)	D.2.4	1	91	91
	Generators	C.4.76	2	61	64.0
	Pumping equipment	C.4.88	3	68	72.8
	Cranes	C.4.48	1	76	76
	Tipper lorries	C.2.30	5 (assumption only 3 used per location*)	79	83.8
	Diggers/TLB	C.2.2	1	77	77

Table 9.C.4: Construction Plant Noise Levels (REF: BS 5228:2009+A1:2014) Phase 2

Phase[2]	Plant	Reference from Annex C & D BS5228	Numbers	Sound Pressure Level at 10m dB(A)	Cumulative Construction Sound Pressure Level at 10m dB(A)
Phase 2	360º tracked/wheeled hydraulic excavators	C.4.56	1	83	83
	Dumper	C.4.6	3	79	84
	Concrete crusher	C.1.14	1	82	82
	Ready-mix concrete lorries	C.4.21	4	77	83
	Concrete splitters & concrete saws	C.4.71	4	85	91
	Cutter, drills and small tools*	D.2.15	10 (assumption only used only 50% of the time*)	84	91
		C.4.93		80	87
		C.4.95		73	80
	Skip lorries*	C.2.34	1	80	80
	Pedestrian rollers*	C.2.38	1	73	73
	Cement mixers	C.4.22	3	76	81
	Generators	C.4.76	2	61	64
	Pumping equipment	C.4.88	2	68	71
	'Cherry pickers' / Mobile platforms	C.4.57	1	67	67
	Cranes	C.4.48	1	76	76
	Diggers/TLB	C.2.2	1	77	77

[2] Details of the activities associated with each construction phase are detailed in

Table 9.C.5: Construction Plant Noise Levels (REF: BS 5228:2009+A1:2014) Phase 3

Phase[3]	Plant	Reference from Annex C & D BS5228	Numbers	Sound Pressure Level at 10m dB(A)	Cumulative Construction Sound Pressure Level at 10m dB(A)
Phase 3	360º tracked/wheeled hydraulic excavators	C.4.56	1	83	83
	Dumper	C.4.6	1	79	79
	Concrete crusher	C.1.14	1	82	82
	Ready-mix concrete lorries	C.4.21	2	77	80
	Concrete splitters & concrete saws	C.4.71	1	85	85
	Cutter, drills and small tools*	D.2.15	10 (assumption only used only 50% of the time*)	84	91
		C.4.93		80	87
		C.4.95		73	80
	Skip lorries*	C.2.34	1	80	80
	Tracked bulldozers	C.2.1	1	75	75
	Road rollers	C.5.19	1	80	80
	Pedestrian rollers*	C.2.38	1	73	73
	Pneumatic drills/hammers (hand held)	C.5.3	2 1	82	85
	Pneumatic drills/hammers (on back of excavator)	D.2.4		91	91
	Cement mixers	C.4.22	1	76	76
	Generators	C.4.76	1	61	61
	Pumping equipment	C.4.88	1	68	68
	'Cherry pickers' / Mobile platforms	C.4.57	1	67	67
	Tipper lorries	C.2.30	2	79	82
	Diggers/TLB	C.2.2	1	77	77

[3] Details of the activities associated with each construction phase are detailed in

Table 9.C.6: Construction Plant Noise Levels (REF: BS 5228:2009+A1:2014) Phase 4

Phase[4]	Plant	Reference from Annex C & D BS5228	Numbers	Sound Pressure Level at 10m dB(A)	Cumulative Construction Sound Pressure Level at 10m dB(A)
Phase 4	360º tracked/wheeled hydraulic excavators	C.4.56	1	83	83
	Cutter, drills and small tools	D.2.15	10 (assumption only used only 50% of the time*)	84	91
		C.4.93		80	87
		C.4.95		73	80
	Skip lorries*	C.2.34	1	80	80
	Tracked bulldozers	C.2.1	1	75	75
	Road rollers	C.5.19	1	80	80
	Pedestrian rollers*	C.2.38	1	73	73
	Pneumatic drills/hammers (hand held)	C.5.3	1	82	82
	Pneumatic drills/hammers (on back of excavator)	D.2.4	0	91	0
	Cement mixers	C.4.22	1	76	76
	Generators	C.4.76	2	61	64
	Pumping equipment	C.4.88	1	68	68
	'Cherry pickers' / Mobile platforms	C.4.57	1	67	67
	Tipper lorries	C.2.30	2	79	82
	Diggers/TLB	C.2.2	1	77	77

[4] Details of the activities associated with each construction phase are detailed in

Table 9.C.7: Construction Plant Noise Levels (REF: BS 5228:2009+A1:2014) Phase 5

Phase[5]	Plant	Reference from Annex C & D BS5228	Numbers	Sound Pressure Level at 10m dB(A)	Cumulative Construction Sound Pressure Level at 10m dB(A)
Phase 5	360º tracked/wheeled hydraulic excavators	C.4.56	1	83	83
	Dumper	C.4.6	1	79	79
	Ready-mix concrete lorries	C.4.21	2	77	80
	Concrete splitters & concrete saws	C.4.71	1	85	85
	Cutter, drills and small tools*	D.2.15	10 (assumption only used only 50% of the time*)	84	91
		C.4.93		80	87
		C.4.95		73	80
	Skip lorries*	C.2.34	1	80	80
	Tracked bulldozers	C.2.1	1	75	75
	Road rollers	C.5.19	1	80	80
	Pedestrian rollers	C.2.38	1	73	73
	Pneumatic drills/hammers (hand held)	C.5.3	10	82	82
	Pneumatic drills/hammers (on back of excavator)	D.2.4		91	0
	Cement mixers	C.4.22	1	76	76
	Generators	C.4.76	3	61	66
	Pumping equipment	C.4.88	1	68	68
	'Cherry pickers' / Mobile platforms	C.4.57	1	67	67
	Cranes	C.4.48	1	76	76
	Tipper lorries	C.2.30	2	79	82
	Diggers/TLB	C.2.2	1	77	77

The typical sound power level has been assumed as a worst-case scenario.

The sound power level of the equipment was converted to sound pressure level at 10m.

The following formula is used to convert sound power level (L_W) to sound pressure level (L_P) at distance r, which considers all plant as static point sources.

This calculation assumes hemispherical propagation:
$L_P = L_W - 10*\log_{10}(2*\pi*r^2)$
Where:
L_P = Sound Pressure level
L_W = Sound Power Level
r = Distance from source to receiver

The construction noise predictions of breakwater are deemed to be worst case based on the following:

- Full power operation of each construction activity throughout the daytime period;
- Ground absorption effects are ignored (ground absorption can provide some attenuation);
- Construction plant is assumed to be operational at closest point to receptors, the worst case result for each receptor is chosen for the report;
- Predictions are based on the construction plant simultaneously operational, where applicable.

All plant is assumed to be operational at closest point to receptors, e.g. for construction of breakwater all vessels were assumed to be operational at the closest point within the construction area to the receptors, the worst case result for each receptor is chosen for the report.

The worst case predicted construction noise levels have been compared to the derived threshold noise limits using ABC Method from British Standard BS 5228 as detailed in Chapter 9: Noise and Vibration.

Construction Noise Receptors and Distances

Construction Noise Receptors

The construction noise receptor locations[6] are illustrated in **Error! Reference source not found.** with a list of their identification references (ID's), and location coordinates summarised in Table 9.C.8. The majority of construction noise receptors identified within the noise study area are residential properties.

A visual of noise sensitive receptors is illustrated in Volume II Figure 9.4.

Table 9.C.8: Complete Construction Noise Sensitive Receptors Identification and Coordinates

Noise Sensitive Receptor	Irish Grid Easting	Irish Grid Northing
1	217676	413124
2	217696	413113
3	217823	413070
4	217871	413051
5	217903	413043
6	217805	412952
7	217814	412903
8	217858	412867
48	217557	412962
50	217680	413220
51	217670	413219
80	217469	413352
81	217489	413342
83	217514	413316
85	217555	413305
87	217592	413292
88	217623	413275
90	217646	413271
92	217671	413262
93	217682	413263
94	217447	413374
95	217430	413391
99	217436	413425
111	217450	413486
112	217507	413494
113	217468	413501
134	217608	413539
151	217662	413560
153	217696	413577
155	217724	413599

[6] (N. B. Addresses of the construction noise receptors have not been included due to General Data Protection Regulations (GDPR) and publication of personal data).

Noise Sensitive Receptor	Irish Grid Easting	Irish Grid Northing
157	217756	413615
159	217787	413629
161	217817	413643
194	217812	413672

Distances for Phase 1 Construction Activity

The construction noise receptor locations and associated distances in relation to the Phase 1 construction activities are summarised in Table 9.C.9.

Table 9.C.9: Distances from Receptors to Phase 1 Construction Activities

Noise Sensitive Receptor	Distance to Phase 1 Boundary, m	Distance to 3G Pitch 1, m	Distance to 5 a side Pitches, m	Distance to Access Roads, m	Distance to Parking, m	Distance to Rock Breaking
1	52	166	60	60	60	57
2	36	163	45	52	50	52
3	37	149	68	20	110	114
4	87	172	118	21	160	153
5	118	189	149	21	191	172
6	137	267	164	37	201	208
7	187	316	214	85	251	258
8	232	352	261	128	300	307
48	225	366	248	122	254	256
50	29	86	82	143	30	32
51	39	95	90	150	41	41
80	242	283	329	340	253	80
81	220	261	306	320	231	61
83	192	232	272	286	199	51
85	151	190	231	259	156	46
87	114	151	193	234	117	66
88	81	120	157	211	82	75
90	58	98	137	202	60	61
92	31	74	111	178	33	34
93	22	64	103	172	23	24
94	268	311	359	371	283	104
95	289	333	383	395	306	125
99	295	340	396	419	317	128
111	311	358	420	466	339	137
112	269	316	384	452	303	79
113	304	352	416	472	335	118
134	211	259	359	448	286	25
151	182	229	357	449	292	50
153	173	219	364	457	305	46
155	175	222	380	474	326	66
157	175	223	392	486	344	40
159	180	229	405	499	362	20
161	189	239	421	514	383	17
194	218	268	450	542	410	46

Distances for Phase 2 Construction Activities

The construction noise receptor locations and associated distances in relation to the Phase 2 construction activities are summarised in Table 9.C.10.

Table 9.C.10: Distances from Receptors to Phase 2 Construction Activities

Noise Sensitive Receptor	Distance to Pavilion Building, m	Distance to Sprint Track, m
1	222	274
2	225	276
3	263	301
4	294	327
5	315	343
6	376	418
7	426	467
8	468	506
48	419	473
50	136	190
51	143	197
80	281	320
81	261	301
83	236	281
85	197	244
87	164	213
88	142	194
90	124	178
92	109	163
93	101	156
94	305	341
95	324	359
99	322	356
111	327	356
112	279	306
113	317	344
134	223	242
151	207	211
153	207	201
155	220	204
157	231	206
159	246	212
161	263	224
194	291	253

Distances for Phase 3 Construction Activities

The construction noise receptor locations and associated distances in relation to the Phase 3 construction activities are summarised in Table 9.C.11.

Table 9.C.11: Distances from Receptors to Phase 3 Construction Activities

Noise Sensitive Receptor	Distance to Phase 3 Boundary, m	Distance to Grass Pitch 2, m	Distance to Training Ground, m	Distance to Hurling Wall, m	Distance to Community Gardens, m
1	126	194	335	358	318
2	135	204	339	367	336
3	217	279	375	419	442
4	261	320	402	450	488
5	289	345	418	469	516
6	314	381	491	531	529
7	363	431	540	581	577
8	413	479	581	625	629
48	318	379	528	689	703
50	33	97	243	693	703
51	41	100	248	706	712
80	22	137	288	714	721
81	17	121	275	697	693
83	22	109	268	734	741
85	17	87	244	743	749
87	11	77	230	742	744
88	18	74	227	743	743
90	24	64	217	747	742
92	22	58	209	764	757
93	12	55	204	774	768
94	24	157	299	784	778
95	25	175	310	794	788
99	27	175	296	797	805
111	52	188	277	793	803
112	31	146	221	793	807
113	56	182	261	787	803
134	21	89	134	769	787
151	14	65	102	764	782
153	38	75	94	745	762
155	73	102	107	740	756
157	104	130	122	786	769
159	134	158	143	766	750
161	163	187	168	748	732
194	183	208	193	780	747

Distances for Phase 4 Construction Activities

The construction noise receptor locations and associated distances in relation to the Phase 4 construction activities are summarised in Table 9.C.12.

Table 9.C.12: Distances from Receptors to Phase 4 Construction Activities

Noise Sensitive Receptor	Distance to Phase 4 Boundary (m)	Distance to Soccer Pitches (m)	Distance to Cricket Pitch (m)	Distance to Walking and Running Trails (m)	Distance to Biodiversity Garden (m)
1	384	429	442	173	433
2	385	429	441	191	440
3	381	436	434	264	473
4	389	450	443	304	496
5	394	459	448	329	509
6	500	555	553	367	591
7	545	602	599	417	640
8	574	635	627	464	678
48	568	628	642	329	623
50	288	344	361	85	339
51	291	351	368	85	343
80	281	435	450	87	361
81	274	420	437	71	350
83	279	408	426	64	347
85	263	378	396	51	325
87	252	354	373	22	313
88	253	342	361	13	311
90	248	328	347	32	304
92	248	317	334	43	302
93	246	309	327	44	298
94	282	449	463	105	368
95	287	461	473	123	376
99	264	448	458	122	357
111	228	427	432	138	326
112	172	370	375	99	269
113	207	408	412	134	306
134	63	264	270	35	163
151	15	209	216	31	109
153	13	174	183	31	78
155	18	144	157	29	60
157	17	112	129	37	49
159	15	85	105	31	50
161	11	66	85	38	53
194	34	90	106	68	83

Distances for Phase 5 Construction Activities

The construction noise receptor locations in relation to Phase 5 Construction Activities with associated receptor distances are summarised in Table 9.C.13.

Table 9.C.13: Distances from Receptors to Phase 5 Construction Activities

Noise Sensitive Receptor	Distance to Phase 5 Boundary, m	Distance to Airdome Structure, m
1	348	373
2	352	377
3	378	408
4	402	432
5	417	446
6	496	525
7	545	574
8	583	613
48	544	566
50	259	281
51	265	286
80	301	342
81	290	328
83	285	318
85	264	291
87	252	271
88	247	264
90	237	253
92	228	247
93	221	242
94	310	352
95	320	362
99	304	347
111	279	323
112	223	266
113	261	304
134	126	166
151	88	120
153	81	98
155	86	93
157	84	94
159	91	104
161	108	122
194	136	149

Predicted Construction Noise Impacts

Predicted Noise Effects Phase 1 Construction Activities

Predicted noise levels due to each activity within Phase 1 are presented in the following tables. The predicted sound pressure levels illustrate the worst-case predicted levels from the various construction activities. These worst-case predicted noise levels assume a level of simultaneous activity of plant/equipment close to the receptor. This is unlikely to occur in practice but the predictions present potential worst-case noise levels that may occur during the construction phase.

A list of all prediction results tables is shown below for reference:

Phase 1

Table 9.C.14 Predictions for Phase 1 Boundary 1

Table 9.C.15 Predictions for 3G Pitch 1

Table 9.C.16 Predictions for 5 a side Pitches

Table 9.C.17 Predictions for Access Roads

Table 9.C.18 Predictions for Parking

Table 9.C.19 Predictions for Rock Breaking

Phase 2

Table 9.C.20 Predictions for Pavilion Building

Table 9.C.21 Predictions for Sprint Track

Phase 3

Table 9.C.22 Phase 3 Boundary

Table 9.C.23 Predictions for Grass Pitch 2

Table 9.C.24 Training Ground

Table 9.C.25 Hurling Wall

Table 9.C.26 Community Gardens

Phase 4

Table 9.C.27 Phase 4 Boundary

Table 9.C.28 Predictions for Soccer Pitches

Table **9.C.29**9.C.29 Predictions for Cricket Pitch

Table 9.C.30 Walking and Running Trails

Table 9.C.31 Biodiversity Garden

Phase 5

Table 9.C.32 Phase 5 Boundary

Table 9.C.33 Predictions for Airdome Structure

.

Table 9.C.14: Predicted Noise Levels of Phase 1 Boundary 1

Noise Sensitive Receptor	Construction Noise Limits dB	Distance Attenuation	100% Utilisation	50% Utilisation	Predicted	
					100 % utilisation	50 % utilisation
1	65	14.3	92.5	89.5	78.2	75.2
2	65	11.1	92.5	89.5	81.4	78.4
3	65	11.4	92.5	89.5	81.1	78.1
4	65	18.8	92.5	89.5	73.7	70.7
5	65	21.4	92.5	89.5	71.1	68.1
6	65	22.7	92.5	89.5	69.8	66.8
7	65	25.4	92.5	89.5	67.1	64.1
8	65	27.3	92.5	89.5	65.2	62.2
48	65	27.0	92.5	89.5	65.5	62.5
50	65	9.2	92.5	89.5	83.3	80.3
51	65	11.8	92.5	89.5	80.7	77.7
80	65	27.7	92.5	89.5	64.8	61.8
81	65	26.8	92.5	89.5	65.7	62.7
83	65	25.7	92.5	89.5	66.8	63.8
85	65	23.6	92.5	89.5	68.9	65.9
87	65	21.1	92.5	89.5	71.4	68.4
88	65	18.2	92.5	89.5	74.3	71.3
90	65	15.3	92.5	89.5	77.2	74.2
92	65	9.8	92.5	89.5	82.7	79.7
93	65	6.8	92.5	89.5	85.7	82.7
94	65	28.6	92.5	89.5	63.9	60.9
95	65	29.2	92.5	89.5	63.3	60.3
99	65	29.4	92.5	89.5	63.1	60.1
111	65	29.9	92.5	89.5	62.7	59.7
112	65	28.6	92.5	89.5	63.9	60.9
113	65	29.7	92.5	89.5	62.9	59.9
134	65	26.5	92.5	89.5	66.0	63.0

Noise Sensitive Receptor	Construction Noise Limits dB	Distance Attenuation	100% Utilisation	50% Utilisation	Predicted	
					100 % utilisation	50 % utilisation
151	65	25.2	92.5	89.5	67.3	64.3
153	65	24.8	92.5	89.5	67.7	64.7
155	65	24.9	92.5	89.5	67.6	64.6
157	65	24.9	92.5	89.5	67.6	64.6
159	65	25.1	92.5	89.5	67.4	64.4
161	65	25.5	92.5	89.5	67.0	64.0
194	65	26.8	92.5	89.5	65.7	62.7

Table 9.C.15: Predicted Noise Levels of 3G Pitch 1

Noise Sensitive Receptor	Construction Noise Limits dB	Distance Attenuation	100% Utilisation	50% Utilisation	Predicted	
					100 % utilisation	50 % utilisation
1	65	166	24.4	92.5	89.5	68.1
2	65	163	24.3	92.5	89.5	68.3
3	65	149	23.4	92.5	89.5	69.1
4	65	172	24.7	92.5	89.5	67.8
5	65	189	25.5	92.5	89.5	67.0
6	65	267	28.5	92.5	89.5	64.0
7	65	316	30.0	92.5	89.5	62.5
8	65	352	30.9	92.5	89.5	61.6
48	65	366	31.3	92.5	89.5	61.2
50	65	86	18.7	92.5	89.5	73.8
51	65	95	19.5	92.5	89.5	73.0
80	65	283	29.0	92.5	89.5	63.5
81	65	261	28.3	92.5	89.5	64.2
83	65	232	27.3	92.5	89.5	65.2
85	65	190	25.6	92.5	89.5	66.9
87	65	151	23.6	92.5	89.5	68.9
88	65	120	21.6	92.5	89.5	70.9
90	65	98	19.8	92.5	89.5	72.7
92	65	74	17.4	92.5	89.5	75.1
93	65	64	16.1	92.5	89.5	76.4
94	65	311	29.8	92.5	89.5	62.7
95	65	333	30.4	92.5	89.5	62.1
99	65	340	30.6	92.5	89.5	61.9
111	65	358	31.1	92.5	89.5	61.4
112	65	316	30.0	92.5	89.5	62.5
113	65	352	30.9	92.5	89.5	61.6
134	65	259	28.3	92.5	89.5	64.2

Noise Sensitive Receptor	Construction Noise Limits dB	Distance Attenuation	100% Utilisation	50% Utilisation	Predicted	
					100 % utilisation	50 % utilisation
151	65	229	27.2	92.5	89.5	65.3
153	65	219	26.8	92.5	89.5	65.7
155	65	222	26.9	92.5	89.5	65.6
157	65	223	27.0	92.5	89.5	65.5
159	65	229	27.2	92.5	89.5	65.3
161	65	239	27.6	92.5	89.5	64.9
194	65	268	28.6	92.5	89.5	63.9

Table 9.C.16: Predicted Noise Levels of 5 a side Pitches

Noise Sensitive Receptor	Construction Noise Limits dB	Distance Attenuation	100% Utilisation	50% Utilisation	Predicted	
					100 % utilisation	50 % utilisation
1	65	60	15.6	92.5	89.5	76.9
2	65	45	13.1	92.5	89.5	79.4
3	65	68	16.7	92.5	89.5	75.8
4	65	118	21.5	92.5	89.5	71.0
5	65	149	23.5	92.5	89.5	69.0
6	65	164	24.3	92.5	89.5	68.2
7	65	214	26.6	92.5	89.5	65.9
8	65	261	28.3	92.5	89.5	64.2
48	65	248	27.9	92.5	89.5	64.6
50	65	82	18.2	92.5	89.5	74.3
51	65	90	19.1	92.5	89.5	73.4
80	65	329	30.3	92.5	89.5	62.2
81	65	306	29.7	92.5	89.5	62.8
83	65	272	28.7	92.5	89.5	63.8
85	65	231	27.3	92.5	89.5	65.2
87	65	193	25.7	92.5	89.5	66.8
88	65	157	23.9	92.5	89.5	68.6
90	65	137	22.7	92.5	89.5	69.8
92	65	111	20.9	92.5	89.5	71.6
93	65	103	20.2	92.5	89.5	72.3
94	65	359	31.1	92.5	89.5	61.4
95	65	383	31.7	92.5	89.5	60.9
99	65	396	32.0	92.5	89.5	60.6
111	65	420	32.5	92.5	89.5	60.0
112	65	384	31.7	92.5	89.5	60.8
113	65	416	32.4	92.5	89.5	60.1
134	65	359	31.1	92.5	89.5	61.4

Noise Sensitive Receptor	Construction Noise Limits dB	Distance Attenuation	100% Utilisation	50% Utilisation	Predicted	
					100 % utilisation	50 % utilisation
151	65	357	31.0	92.5	89.5	61.5
153	65	364	31.2	92.5	89.5	61.3
155	65	380	31.6	92.5	89.5	60.9
157	65	392	31.9	92.5	89.5	60.6
159	65	405	32.2	92.5	89.5	60.4
161	65	421	32.5	92.5	89.5	60.0
194	65	450	33.1	92.5	89.5	59.5

Table 9.C.17: Predicted Noise Levels of Access Roads

Noise Sensitive Receptor	Construction Noise Limits dB	Distance Attenuation	100% Utilisation	50% Utilisation	Predicted	
					100 % utilisation	50 % utilisation
1	65	60	15.5	92.5	89.5	77.0
2	65	52	14.3	92.5	89.5	78.2
3	65	20	5.8	92.5	89.5	86.7
4	65	21	6.4	92.5	89.5	86.1
5	65	21	6.4	92.5	89.5	86.1
6	65	37	11.3	92.5	89.5	81.2
7	65	85	18.5	92.5	89.5	74.0
8	65	128	22.1	92.5	89.5	70.4
48	65	122	21.7	92.5	89.5	70.8
50	65	143	23.1	92.5	89.5	69.4
51	65	150	23.5	92.5	89.5	69.0
80	65	340	30.6	92.5	89.5	61.9
81	65	320	30.1	92.5	89.5	62.4
83	65	286	29.1	92.5	89.5	63.4
85	65	259	28.2	92.5	89.5	64.3
87	65	234	27.4	92.5	89.5	65.1
88	65	211	26.5	92.5	89.5	66.0
90	65	202	26.1	92.5	89.5	66.4
92	65	178	25.0	92.5	89.5	67.5
93	65	172	24.7	92.5	89.5	67.8
94	65	371	31.4	92.5	89.5	61.1
95	65	395	31.9	92.5	89.5	60.6
99	65	419	32.4	92.5	89.5	60.1
111	65	466	33.4	92.5	89.5	59.1
112	65	452	33.1	92.5	89.5	59.4
113	65	472	33.5	92.5	89.5	59.0
134	65	448	33.0	92.5	89.5	59.5

Noise Sensitive Receptor	Construction Noise Limits dB	Distance Attenuation	100% Utilisation	50% Utilisation	Predicted	
					100 % utilisation	50 % utilisation
151	65	449	33.0	92.5	89.5	59.5
153	65	457	33.2	92.5	89.5	59.3
155	65	474	33.5	92.5	89.5	59.0
157	65	486	33.7	92.5	89.5	58.8
159	65	499	34.0	92.5	89.5	58.6
161	65	514	34.2	92.5	89.5	58.3
194	65	542	34.7	92.5	89.5	57.8

Table 9.C.18: Predicted Noise Levels of Parking

Noise Sensitive Receptor	Construction Noise Limits dB	Distance Attenuation	100% Utilisation	50% Utilisation	Predicted	
					100 % utilisation	50 % utilisation
1	65	60	15.6	92.5	89.5	76.9
2	65	50	13.9	92.5	89.5	78.6
3	65	110	20.9	92.5	89.5	71.6
4	65	160	24.1	92.5	89.5	68.4
5	65	191	25.6	92.5	89.5	66.9
6	65	201	26.1	92.5	89.5	66.4
7	65	251	28.0	92.5	89.5	64.5
8	65	300	29.5	92.5	89.5	63.0
48	65	254	28.1	92.5	89.5	64.4
50	65	30	9.7	92.5	89.5	82.8
51	65	41	12.2	92.5	89.5	80.3
80	65	253	28.1	92.5	89.5	64.4
81	65	231	27.3	92.5	89.5	65.2
83	65	199	26.0	92.5	89.5	66.5
85	65	156	23.9	92.5	89.5	68.6
87	65	117	21.4	92.5	89.5	71.1
88	65	82	18.3	92.5	89.5	74.2
90	65	60	15.5	92.5	89.5	77.0
92	65	33	10.3	92.5	89.5	82.2
93	65	23	7.4	92.5	89.5	85.1
94	65	283	29.0	92.5	89.5	63.5
95	65	306	29.7	92.5	89.5	62.8
99	65	317	30.0	92.5	89.5	62.5
111	65	339	30.6	92.5	89.5	61.9
112	65	303	29.6	92.5	89.5	62.9
113	65	335	30.5	92.5	89.5	62.0
134	65	286	29.1	92.5	89.5	63.4

Noise Sensitive Receptor	Construction Noise Limits dB	Distance Attenuation	100% Utilisation	50% Utilisation	Predicted	
					100 % utilisation	50 % utilisation
151	65	292	29.3	92.5	89.5	63.2
153	65	305	29.7	92.5	89.5	62.8
155	65	326	30.3	92.5	89.5	62.3
157	65	344	30.7	92.5	89.5	61.8
159	65	362	31.2	92.5	89.5	61.3
161	65	383	31.7	92.5	89.5	60.8
194	65	410	32.3	92.5	89.5	60.3

Table 9.C.19: Predicted Noise Levels of Rock Breaking

Noise Sensitive Receptor	Construction Noise Limits dB	Distance Attenuation	100% Utilisation	50% Utilisation	Predicted	
					100 % utilisation	50 % utilisation
1	65	15	93	90	77	74
2	65	14	93	90	79	76
3	65	21	93	90	72	69
4	65	24	93	90	69	66
5	65	25	93	90	68	65
6	65	26	93	90	67	64
7	65	28	93	90	65	62
8	65	30	93	90	63	60
48	65	28	93	90	65	62
50	65	10	93	90	83	80
51	65	12	93	90	81	78
80	65	18	93	90	75	72
81	65	16	93	90	77	74
83	65	14	93	90	79	76
85	65	13	93	90	80	77
87	65	16	93	90	77	74
88	65	17	93	90	76	73
90	65	16	93	90	77	74
92	65	11	93	90	82	79
93	65	8	93	90	85	82
94	65	20	93	90	73	70
95	65	22	93	90	71	68
99	65	22	93	90	71	68
111	65	23	93	90	70	67
112	65	18	93	90	75	72
113	65	21	93	90	72	69
134	65	8	93	90	85	82

Noise Sensitive Receptor	Construction Noise Limits dB	Distance Attenuation	100% Utilisation	50% Utilisation	Predicted	
					100 % utilisation	50 % utilisation
151	65	14	93	90	79	76
153	65	13	93	90	80	77
155	65	16	93	90	77	74
157	65	12	93	90	81	78
159	65	6	93	90	87	84
161	65	4	93	90	89	86
194	65	13	93	90	80	77

Table 9.C.20: Predicted Noise Levels of Pavilion Building

Noise Sensitive Receptor	Construction Noise Limits dB	Distance Attenuation	100% Utilisation	50% Utilisation	Predicted	
					100 % utilisation	50 % utilisation
1	65	26.9	95.0	92.0	68.0	65.0
2	65	27.0	95.0	92.0	67.9	64.9
3	65	28.4	95.0	92.0	66.6	63.6
4	65	29.4	95.0	92.0	65.6	62.6
5	65	30.0	95.0	92.0	65.0	62.0
6	65	31.5	95.0	92.0	63.4	60.4
7	65	32.6	95.0	92.0	62.4	59.4
8	65	33.4	95.0	92.0	61.5	58.5
48	65	32.5	95.0	92.0	62.5	59.5
50	65	22.7	95.0	92.0	72.3	69.3
51	65	23.1	95.0	92.0	71.9	68.9
80	65	29.0	95.0	92.0	66.0	63.0
81	65	28.3	95.0	92.0	66.6	63.6
83	65	27.5	95.0	92.0	67.5	64.5
85	65	25.9	95.0	92.0	69.1	66.1
87	65	24.3	95.0	92.0	70.7	67.7
88	65	23.0	95.0	92.0	71.9	68.9
90	65	21.9	95.0	92.0	73.1	70.1
92	65	20.7	95.0	92.0	74.2	71.2
93	65	20.1	95.0	92.0	74.9	71.9
94	65	29.7	95.0	92.0	65.3	62.3
95	65	30.2	95.0	92.0	64.8	61.8
99	65	30.2	95.0	92.0	64.8	61.8
111	65	30.3	95.0	92.0	64.7	61.7
112	65	28.9	95.0	92.0	66.0	63.0
113	65	30.0	95.0	92.0	64.9	61.9
134	65	27.0	95.0	92.0	68.0	65.0

Noise Sensitive Receptor	Construction Noise Limits dB	Distance Attenuation	100% Utilisation	50% Utilisation	Predicted	
					100 % utilisation	50 % utilisation
151	65	26.3	95.0	92.0	68.7	65.7
153	65	26.3	95.0	92.0	68.6	65.6
155	65	26.8	95.0	92.0	68.1	65.1
157	65	27.3	95.0	92.0	67.7	64.7
159	65	27.8	95.0	92.0	67.2	64.2
161	65	28.4	95.0	92.0	66.5	63.5
194	65	29.3	95.0	92.0	65.7	62.7

Table 9.C.21: Predicted Noise Levels for Construction of Sprint Track

Noise Sensitive Receptor	Construction Noise Limits dB	Distance Attenuation	100% Utilisation	50% Utilisation	Predicted	
					100 % utilisation	50 % utilisation
1	65	28.8	95.0	92.0	66.2	63.2
2	65	28.8	95.0	92.0	66.1	63.1
3	65	29.6	95.0	92.0	65.4	62.4
4	65	30.3	95.0	92.0	64.7	61.7
5	65	30.7	95.0	92.0	64.2	61.2
6	65	32.4	95.0	92.0	62.5	59.5
7	65	33.4	95.0	92.0	61.6	58.6
8	65	34.1	95.0	92.0	60.9	57.9
48	65	33.5	95.0	92.0	61.5	58.5
50	65	25.6	95.0	92.0	69.4	66.4
51	65	25.9	95.0	92.0	69.1	66.1
80	65	30.1	95.0	92.0	64.8	61.8
81	65	29.6	95.0	92.0	65.4	62.4
83	65	29.0	95.0	92.0	66.0	63.0
85	65	27.7	95.0	92.0	67.2	64.2
87	65	26.6	95.0	92.0	68.4	65.4
88	65	25.8	95.0	92.0	69.2	66.2
90	65	25.0	95.0	92.0	70.0	67.0
92	65	24.3	95.0	92.0	70.7	67.7
93	65	23.8	95.0	92.0	71.1	68.1
94	65	30.7	95.0	92.0	64.3	61.3
95	65	31.1	95.0	92.0	63.9	60.9
99	65	31.0	95.0	92.0	63.9	60.9
111	65	31.0	95.0	92.0	63.9	60.9
112	65	29.7	95.0	92.0	65.3	62.3
113	65	30.7	95.0	92.0	64.2	61.2
134	65	27.7	95.0	92.0	67.3	64.3

Noise Sensitive Receptor	Construction Noise Limits dB	Distance Attenuation	100% Utilisation	50% Utilisation	Predicted	
					100 % utilisation	50 % utilisation
151	65	26.5	95.0	92.0	68.5	65.5
153	65	26.1	95.0	92.0	68.9	65.9
155	65	26.2	95.0	92.0	68.8	65.8
157	65	26.3	95.0	92.0	68.7	65.7
159	65	26.5	95.0	92.0	68.4	65.4
161	65	27.0	95.0	92.0	68.0	65.0
194	65	28.1	95.0	92.0	66.9	63.9

Table 9.C.22: Predicted Noise Levels of Phase 3 Boundary

Noise Sensitive Receptor	Construction Noise Limits dB	Distance Attenuation	100% Utilisation	50% Utilisation	Predicted	
					100 % utilisation	50 % utilisation
1	65	22.0	94.6	91.6	72.6	69.6
2	65	22.6	94.6	91.6	72.0	69.0
3	65	26.7	94.6	91.6	67.9	64.9
4	65	28.3	94.6	91.6	66.2	63.2
5	65	29.2	94.6	91.6	65.4	62.4
6	65	29.9	94.6	91.6	64.6	61.6
7	65	31.2	94.6	91.6	63.4	60.4
8	65	32.3	94.6	91.6	62.3	59.3
48	65	30.1	94.6	91.6	64.5	61.5
50	65	10.4	94.6	91.6	84.2	81.2
51	65	12.2	94.6	91.6	82.4	79.4
80	65	6.7	94.6	91.6	87.9	84.9
81	65	4.5	94.6	91.6	90.1	87.1
83	65	7.0	94.6	91.6	87.6	84.6
85	65	4.5	94.6	91.6	90.1	87.1
87	65	0.8	94.6	91.6	93.7	90.7
88	65	5.3	94.6	91.6	89.2	86.2
90	65	7.8	94.6	91.6	86.8	83.8
92	65	6.8	94.6	91.6	87.8	84.8
93	65	1.4	94.6	91.6	93.1	90.1
94	65	7.4	94.6	91.6	87.1	84.1
95	65	7.8	94.6	91.6	86.7	83.7
99	65	8.8	94.6	91.6	85.8	82.8
111	65	14.4	94.6	91.6	80.2	77.2
112	65	9.8	94.6	91.6	84.8	81.8
113	65	15.0	94.6	91.6	79.6	76.6
134	65	6.6	94.6	91.6	88.0	85.0

Noise Sensitive Receptor	Construction Noise Limits dB	Distance Attenuation	100% Utilisation	50% Utilisation	Predicted	
					100 % utilisation	50 % utilisation
151	65	3.1	94.6	91.6	91.4	88.4
153	65	11.7	94.6	91.6	82.9	79.9
155	65	17.2	94.6	91.6	77.4	74.4
157	65	20.4	94.6	91.6	74.2	71.2
159	65	22.5	94.6	91.6	72.0	69.0
161	65	24.2	94.6	91.6	70.3	67.3
194	65	25.3	94.6	91.6	69.3	66.3

Table 9.C.23: Predicted Noise Levels of Grass Pitch 2

Noise Sensitive Receptor	Construction Noise Limits dB	Distance Attenuation	100% Utilisation	50% Utilisation	Predicted	
					100 % utilisation	50 % utilisation
1	65	25.7	94.6	91.6	68.8	65.8
2	65	26.2	94.6	91.6	68.4	65.4
3	65	28.9	94.6	91.6	65.7	62.7
4	65	30.1	94.6	91.6	64.5	61.5
5	65	30.8	94.6	91.6	63.8	60.8
6	65	31.6	94.6	91.6	62.9	59.9
7	65	32.7	94.6	91.6	61.9	58.9
8	65	33.6	94.6	91.6	61.0	58.0
48	65	31.6	94.6	91.6	63.0	60.0
50	65	19.7	94.6	91.6	74.8	71.8
51	65	20.0	94.6	91.6	74.6	71.6
80	65	22.8	94.6	91.6	71.8	68.8
81	65	21.6	94.6	91.6	72.9	69.9
83	65	20.7	94.6	91.6	73.8	70.8
85	65	18.8	94.6	91.6	75.8	72.8
87	65	17.7	94.6	91.6	76.9	73.9
88	65	17.3	94.6	91.6	77.2	74.2
90	65	16.1	94.6	91.6	78.4	75.4
92	65	15.3	94.6	91.6	79.3	76.3
93	65	14.8	94.6	91.6	79.8	76.8
94	65	23.9	94.6	91.6	70.6	67.6
95	65	24.9	94.6	91.6	69.7	66.7
99	65	24.8	94.6	91.6	69.7	66.7
111	65	25.5	94.6	91.6	69.1	66.1
112	65	23.3	94.6	91.6	71.3	68.3
113	65	25.2	94.6	91.6	69.4	66.4
134	65	19.0	94.6	91.6	75.6	72.6

Noise Sensitive Receptor	Construction Noise Limits dB	Distance Attenuation	100% Utilisation	50% Utilisation	Predicted	
					100 % utilisation	50 % utilisation
151	65	16.3	94.6	91.6	78.3	75.3
153	65	17.5	94.6	91.6	77.0	74.0
155	65	20.2	94.6	91.6	74.4	71.4
157	65	22.3	94.6	91.6	72.3	69.3
159	65	24.0	94.6	91.6	70.6	67.6
161	65	25.4	94.6	91.6	69.1	66.1
194	65	26.3	94.6	91.6	68.2	65.2

Table 9.C.24: Predicted Noise Levels of Training Ground

Noise Sensitive Receptor	Construction Noise Limits dB	Distance Attenuation	100% Utilisation	50% Utilisation	Predicted	
					100 % utilisation	50 % utilisation
1	65	30.5	94.6	91.6	64.1	61.1
2	65	30.6	94.6	91.6	64.0	61.0
3	65	31.5	94.6	91.6	63.1	60.1
4	65	32.1	94.6	91.6	62.5	59.5
5	65	32.4	94.6	91.6	62.1	59.1
6	65	33.8	94.6	91.6	60.7	57.7
7	65	34.7	94.6	91.6	59.9	56.9
8	65	35.3	94.6	91.6	59.3	56.3
48	65	34.5	94.6	91.6	60.1	57.1
50	65	27.7	94.6	91.6	66.9	63.9
51	65	27.9	94.6	91.6	66.7	63.7
80	65	29.2	94.6	91.6	65.4	62.4
81	65	28.8	94.6	91.6	65.8	62.8
83	65	28.6	94.6	91.6	66.0	63.0
85	65	27.8	94.6	91.6	66.8	63.8
87	65	27.2	94.6	91.6	67.3	64.3
88	65	27.1	94.6	91.6	67.5	64.5
90	65	26.7	94.6	91.6	67.8	64.8
92	65	26.4	94.6	91.6	68.2	65.2
93	65	26.2	94.6	91.6	68.4	65.4
94	65	29.5	94.6	91.6	65.0	62.0
95	65	29.8	94.6	91.6	64.7	61.7
99	65	29.4	94.6	91.6	65.1	62.1
111	65	28.9	94.6	91.6	65.7	62.7
112	65	26.9	94.6	91.6	67.7	64.7
113	65	28.3	94.6	91.6	66.2	63.2
134	65	22.6	94.6	91.6	72.0	69.0

Noise Sensitive Receptor	Construction Noise Limits dB	Distance Attenuation	100% Utilisation	50% Utilisation	Predicted	
					100 % utilisation	50 % utilisation
151	65	20.2	94.6	91.6	74.4	71.4
153	65	19.5	94.6	91.6	75.1	72.1
155	65	20.5	94.6	91.6	74.0	71.0
157	65	21.8	94.6	91.6	72.8	69.8
159	65	23.1	94.6	91.6	71.4	68.4
161	65	24.5	94.6	91.6	70.0	67.0
194	65	25.7	94.6	91.6	68.9	65.9

Table 9.C.25: Predicted Noise Levels of Hurling Wall

Noise Sensitive Receptor	Construction Noise Limits dB	Distance Attenuation	100% Utilisation	50% Utilisation	Predicted	
					100 % utilisation	50 % utilisation
1	65	31.1	94.6	91.6	63.5	60.5
2	65	31.3	94.6	91.6	63.3	60.3
3	65	32.4	94.6	91.6	62.1	59.1
4	65	33.1	94.6	91.6	61.5	58.5
5	65	33.4	94.6	91.6	61.2	58.2
6	65	34.5	94.6	91.6	60.1	57.1
7	65	35.3	94.6	91.6	59.3	56.3
8	65	35.9	94.6	91.6	58.7	55.7
48	65	36.8	94.6	91.6	57.8	54.8
50	65	36.8	94.6	91.6	57.8	54.8
51	65	37.0	94.6	91.6	57.6	54.6
80	65	37.1	94.6	91.6	57.5	54.5
81	65	36.9	94.6	91.6	57.7	54.7
83	65	37.3	94.6	91.6	57.3	54.3
85	65	37.4	94.6	91.6	57.2	54.2
87	65	37.4	94.6	91.6	57.2	54.2
88	65	37.4	94.6	91.6	57.1	54.1
90	65	37.5	94.6	91.6	57.1	54.1
92	65	37.7	94.6	91.6	56.9	53.9
93	65	37.8	94.6	91.6	56.8	53.8
94	65	37.9	94.6	91.6	56.7	53.7
95	65	38.0	94.6	91.6	56.6	53.6
99	65	38.0	94.6	91.6	56.5	53.5
111	65	38.0	94.6	91.6	56.6	53.6
112	65	38.0	94.6	91.6	56.6	53.6
113	65	37.9	94.6	91.6	56.6	53.6
134	65	37.7	94.6	91.6	56.8	53.8

Noise Sensitive Receptor	Construction Noise Limits dB	Distance Attenuation	100% Utilisation	50% Utilisation	Predicted	
					100 % utilisation	50 % utilisation
151	65	37.7	94.6	91.6	56.9	53.9
153	65	37.4	94.6	91.6	57.1	54.1
155	65	37.4	94.6	91.6	57.2	54.2
157	65	37.9	94.6	91.6	56.7	53.7
159	65	37.7	94.6	91.6	56.9	53.9
161	65	37.5	94.6	91.6	57.1	54.1
194	65	37.8	94.6	91.6	56.7	53.7

Table 9.C.26: Predicted Noise Levels of Community Gardens

Noise Sensitive Receptor	Construction Noise Limits dB	Distance Attenuation	100% Utilisation	50% Utilisation	Predicted	
					100 % utilisation	50 % utilisation
1	65	30.0	94.6	91.6	64.5	61.5
2	65	30.5	94.6	91.6	64.0	61.0
3	65	32.9	94.6	91.6	61.7	58.7
4	65	33.8	94.6	91.6	60.8	57.8
5	65	34.3	94.6	91.6	60.3	57.3
6	65	34.5	94.6	91.6	60.1	57.1
7	65	35.2	94.6	91.6	59.4	56.4
8	65	36.0	94.6	91.6	58.6	55.6
48	65	36.9	94.6	91.6	57.6	54.6
50	65	36.9	94.6	91.6	57.6	54.6
51	65	37.1	94.6	91.6	57.5	54.5
80	65	37.2	94.6	91.6	57.4	54.4
81	65	36.8	94.6	91.6	57.8	54.8
83	65	37.4	94.6	91.6	57.2	54.2
85	65	37.5	94.6	91.6	57.1	54.1
87	65	37.4	94.6	91.6	57.1	54.1
88	65	37.4	94.6	91.6	57.2	54.2
90	65	37.4	94.6	91.6	57.2	54.2
92	65	37.6	94.6	91.6	57.0	54.0
93	65	37.7	94.6	91.6	56.9	53.9
94	65	37.8	94.6	91.6	56.7	53.7
95	65	37.9	94.6	91.6	56.6	53.6
99	65	38.1	94.6	91.6	56.5	53.5
111	65	38.1	94.6	91.6	56.5	53.5
112	65	38.1	94.6	91.6	56.4	53.4
113	65	38.1	94.6	91.6	56.5	53.5
134	65	37.9	94.6	91.6	56.6	53.6

Noise Sensitive Receptor	Construction Noise Limits dB	Distance Attenuation	100% Utilisation	50% Utilisation	Predicted	
					100 % utilisation	50 % utilisation
151	65	37.9	94.6	91.6	56.7	53.7
153	65	37.6	94.6	91.6	56.9	53.9
155	65	37.6	94.6	91.6	57.0	54.0
157	65	37.7	94.6	91.6	56.9	53.9
159	65	37.5	94.6	91.6	57.1	54.1
161	65	37.3	94.6	91.6	57.3	54.3
194	65	37.5	94.6	91.6	57.1	54.1

Table 9.C.27: Predicted Noise Levels of Phase 4 Boundary

Noise Sensitive Receptor	Construction Noise Limits dB	Distance Attenuation	100% Utilisation	50% Utilisation	Predicted	
					100 % utilisation	50 % utilisation
1	65	31.7	93.3	90.3	61.6	58.6
2	65	31.7	93.3	90.3	61.6	58.6
3	65	31.6	93.3	90.3	61.7	58.7
4	65	31.8	93.3	90.3	61.5	58.5
5	65	31.9	93.3	90.3	61.4	58.4
6	65	34.0	93.3	90.3	59.3	56.3
7	65	34.7	93.3	90.3	58.6	55.6
8	65	35.2	93.3	90.3	58.1	55.1
48	65	35.1	93.3	90.3	58.2	55.2
50	65	29.2	93.3	90.3	64.1	61.1
51	65	29.3	93.3	90.3	64.0	61.0
80	65	29.0	93.3	90.3	64.3	61.3
81	65	28.8	93.3	90.3	64.5	61.5
83	65	28.9	93.3	90.3	64.4	61.4
85	65	28.4	93.3	90.3	64.9	61.9
87	65	28.0	93.3	90.3	65.3	62.3
88	65	28.1	93.3	90.3	65.2	62.2
90	65	27.9	93.3	90.3	65.4	62.4
92	65	27.9	93.3	90.3	65.4	62.4
93	65	27.8	93.3	90.3	65.5	62.5
94	65	29.0	93.3	90.3	64.3	61.3
95	65	29.1	93.3	90.3	64.1	61.1
99	65	28.4	93.3	90.3	64.8	61.8
111	65	27.2	93.3	90.3	66.1	63.1
112	65	24.7	93.3	90.3	68.6	65.6
113	65	26.3	93.3	90.3	67.0	64.0
134	65	16.0	93.3	90.3	77.3	74.3

Noise Sensitive Receptor	Construction Noise Limits dB	Distance Attenuation	100% Utilisation	50% Utilisation	Predicted	
					100 % utilisation	50 % utilisation
151	65	3.5	93.3	90.3	89.8	86.8
153	65	2.5	93.3	90.3	90.8	87.8
155	65	5.2	93.3	90.3	88.1	85.1
157	65	4.7	93.3	90.3	88.6	85.6
159	65	3.4	93.3	90.3	89.9	86.9
161	65	0.7	93.3	90.3	92.6	89.6
194	65	10.7	93.3	90.3	82.6	79.6

Table 9.C.28: Predicted Noise Levels of Soccer Pitches

Noise Sensitive Receptor	Construction Noise Limits dB	Distance Attenuation	100% Utilisation	50% Utilisation	Predicted	
					100 % utilisation	50 % utilisation
1	65	32.6	93.3	90.3	60.6	57.6
2	65	32.7	93.3	90.3	60.6	57.6
3	65	32.8	93.3	90.3	60.5	57.5
4	65	33.1	93.3	90.3	60.2	57.2
5	65	33.2	93.3	90.3	60.0	57.0
6	65	34.9	93.3	90.3	58.4	55.4
7	65	35.6	93.3	90.3	57.7	54.7
8	65	36.1	93.3	90.3	57.2	54.2
48	65	36.0	93.3	90.3	57.3	54.3
50	65	30.7	93.3	90.3	62.5	59.5
51	65	30.9	93.3	90.3	62.4	59.4
80	65	32.8	93.3	90.3	60.5	57.5
81	65	32.5	93.3	90.3	60.8	57.8
83	65	32.2	93.3	90.3	61.1	58.1
85	65	31.5	93.3	90.3	61.7	58.7
87	65	31.0	93.3	90.3	62.3	59.3
88	65	30.7	93.3	90.3	62.6	59.6
90	65	30.3	93.3	90.3	63.0	60.0
92	65	30.0	93.3	90.3	63.3	60.3
93	65	29.8	93.3	90.3	63.5	60.5
94	65	33.0	93.3	90.3	60.2	57.2
95	65	33.3	93.3	90.3	60.0	57.0
99	65	33.0	93.3	90.3	60.3	57.3
111	65	32.6	93.3	90.3	60.7	57.7
112	65	31.4	93.3	90.3	61.9	58.9
113	65	32.2	93.3	90.3	61.1	58.1
134	65	28.4	93.3	90.3	64.8	61.8

Noise Sensitive Receptor	Construction Noise Limits dB	Distance Attenuation	100% Utilisation	50% Utilisation	Predicted	
					100 % utilisation	50 % utilisation
151	65	26.4	93.3	90.3	66.9	63.9
153	65	24.8	93.3	90.3	68.5	65.5
155	65	23.1	93.3	90.3	70.1	67.1
157	65	21.0	93.3	90.3	72.3	69.3
159	65	18.6	93.3	90.3	74.7	71.7
161	65	16.3	93.3	90.3	77.0	74.0
194	65	19.1	93.3	90.3	74.2	71.2

Table 9.C.29: Predicted Noise Levels of Cricket Pitch

Noise Sensitive Receptor	Construction Noise Limits dB	Distance Attenuation	100% Utilisation	50% Utilisation	Predicted	
					100 % utilisation	50 % utilisation
1	65	32.9	93.3	90.3	60.4	57.4
2	65	32.9	93.3	90.3	60.4	57.4
3	65	32.8	93.3	90.3	60.5	57.5
4	65	32.9	93.3	90.3	60.4	57.4
5	65	33.0	93.3	90.3	60.3	57.3
6	65	34.9	93.3	90.3	58.4	55.4
7	65	35.5	93.3	90.3	57.7	54.7
8	65	36.0	93.3	90.3	57.3	54.3
48	65	36.1	93.3	90.3	57.1	54.1
50	65	31.1	93.3	90.3	62.1	59.1
51	65	31.3	93.3	90.3	62.0	59.0
80	65	33.1	93.3	90.3	60.2	57.2
81	65	32.8	93.3	90.3	60.5	57.5
83	65	32.6	93.3	90.3	60.7	57.7
85	65	32.0	93.3	90.3	61.3	58.3
87	65	31.4	93.3	90.3	61.8	58.8
88	65	31.1	93.3	90.3	62.1	59.1
90	65	30.8	93.3	90.3	62.5	59.5
92	65	30.5	93.3	90.3	62.8	59.8
93	65	30.3	93.3	90.3	63.0	60.0
94	65	33.3	93.3	90.3	60.0	57.0
95	65	33.5	93.3	90.3	59.8	56.8
99	65	33.2	93.3	90.3	60.1	57.1
111	65	32.7	93.3	90.3	60.6	57.6
112	65	31.5	93.3	90.3	61.8	58.8
113	65	32.3	93.3	90.3	61.0	58.0
134	65	28.6	93.3	90.3	64.7	61.7

Noise Sensitive Receptor	Construction Noise Limits dB	Distance Attenuation	100% Utilisation	50% Utilisation	Predicted	
					100 % utilisation	50 % utilisation
151	65	26.7	93.3	90.3	66.6	63.6
153	65	25.2	93.3	90.3	68.1	65.1
155	65	23.9	93.3	90.3	69.4	66.4
157	65	22.2	93.3	90.3	71.1	68.1
159	65	20.4	93.3	90.3	72.9	69.9
161	65	18.6	93.3	90.3	74.7	71.7
194	65	20.5	93.3	90.3	72.8	69.8

Table 9.C.30: Predicted Noise Levels of Walking and Running Trails

Noise Sensitive Receptor	Construction Noise Limits dB	Distance Attenuation	100% Utilisation	50% Utilisation	Predicted	
					100 % utilisation	50 % utilisation
1	65	24.8	93.3	90.3	68.5	65.5
2	65	25.6	93.3	90.3	67.7	64.7
3	65	28.4	93.3	90.3	64.9	61.9
4	65	29.7	93.3	90.3	63.6	60.6
5	65	30.4	93.3	90.3	62.9	59.9
6	65	31.3	93.3	90.3	62.0	59.0
7	65	32.4	93.3	90.3	60.9	57.9
8	65	33.3	93.3	90.3	60.0	57.0
48	65	30.3	93.3	90.3	62.9	59.9
50	65	18.6	93.3	90.3	74.6	71.6
51	65	18.6	93.3	90.3	74.7	71.7
80	65	18.8	93.3	90.3	74.5	71.5
81	65	17.1	93.3	90.3	76.2	73.2
83	65	16.1	93.3	90.3	77.2	74.2
85	65	14.1	93.3	90.3	79.1	76.1
87	65	7.0	93.3	90.3	86.3	83.3
88	65	2.5	93.3	90.3	90.7	87.7
90	65	10.1	93.3	90.3	83.2	80.2
92	65	12.6	93.3	90.3	80.7	77.7
93	65	12.9	93.3	90.3	80.4	77.4
94	65	20.4	93.3	90.3	72.8	69.8
95	65	21.8	93.3	90.3	71.5	68.5
99	65	21.8	93.3	90.3	71.5	68.5
111	65	22.8	93.3	90.3	70.5	67.5
112	65	19.9	93.3	90.3	73.4	70.4
113	65	22.6	93.3	90.3	70.7	67.7
134	65	10.8	93.3	90.3	82.5	79.5

Noise Sensitive Receptor	Construction Noise Limits dB	Distance Attenuation	100% Utilisation	50% Utilisation	Predicted	
					100 % utilisation	50 % utilisation
151	65	9.7	93.3	90.3	83.6	80.6
153	65	9.8	93.3	90.3	83.5	80.5
155	65	9.2	93.3	90.3	84.0	81.0
157	65	11.4	93.3	90.3	81.9	78.9
159	65	9.8	93.3	90.3	83.4	80.4
161	65	11.6	93.3	90.3	81.7	78.7
194	65	16.6	93.3	90.3	76.7	73.7

Table 9.C.31: Predicted Noise Levels of Biodiversity Garden

Noise Sensitive Receptor	Construction Noise Limits dB	Distance Attenuation	100% Utilisation	50% Utilisation	Predicted	
					100 % utilisation	50 % utilisation
1	65	32.7	93.3	90.3	60.5	57.5
2	65	32.9	93.3	90.3	60.4	57.4
3	65	33.5	93.3	90.3	59.8	56.8
4	65	33.9	93.3	90.3	59.4	56.4
5	65	34.1	93.3	90.3	59.2	56.2
6	65	35.4	93.3	90.3	57.9	54.9
7	65	36.1	93.3	90.3	57.2	54.2
8	65	36.6	93.3	90.3	56.7	53.7
48	65	35.9	93.3	90.3	57.4	54.4
50	65	30.6	93.3	90.3	62.7	59.7
51	65	30.7	93.3	90.3	62.6	59.6
80	65	31.1	93.3	90.3	62.1	59.1
81	65	30.9	93.3	90.3	62.4	59.4
83	65	30.8	93.3	90.3	62.5	59.5
85	65	30.3	93.3	90.3	63.0	60.0
87	65	29.9	93.3	90.3	63.4	60.4
88	65	29.9	93.3	90.3	63.4	60.4
90	65	29.7	93.3	90.3	63.6	60.6
92	65	29.6	93.3	90.3	63.7	60.7
93	65	29.5	93.3	90.3	63.8	60.8
94	65	31.3	93.3	90.3	62.0	59.0
95	65	31.5	93.3	90.3	61.8	58.8
99	65	31.1	93.3	90.3	62.2	59.2
111	65	30.3	93.3	90.3	63.0	60.0
112	65	28.6	93.3	90.3	64.7	61.7
113	65	29.7	93.3	90.3	63.6	60.6
134	65	24.2	93.3	90.3	69.1	66.1

Noise Sensitive Receptor	Construction Noise Limits dB	Distance Attenuation	100% Utilisation	50% Utilisation	Predicted	
					100 % utilisation	50 % utilisation
151	65	20.7	93.3	90.3	72.5	69.5
153	65	17.8	93.3	90.3	75.5	72.5
155	65	15.6	93.3	90.3	77.7	74.7
157	65	13.7	93.3	90.3	79.6	76.6
159	65	14.0	93.3	90.3	79.3	76.3
161	65	14.5	93.3	90.3	78.8	75.8
194	65	18.3	93.3	90.3	75.0	72.0

Table 9.C.32: Predicted Noise Levels of Phase 5 Boundary

Noise Sensitive Receptor	Construction Noise Limits dB	Distance Attenuation	100% Utilisation	50% Utilisation	Predicted	
					100 % utilisation	50 % utilisation
1	65	30.8	93.7	90.7	62.9	59.9
2	65	30.9	93.7	90.7	62.8	59.8
3	65	31.6	93.7	90.7	62.2	59.2
4	65	32.1	93.7	90.7	61.6	58.6
5	65	32.4	93.7	90.7	61.3	58.3
6	65	33.9	93.7	90.7	59.8	56.8
7	65	34.7	93.7	90.7	59.0	56.0
8	65	35.3	93.7	90.7	58.4	55.4
48	65	34.7	93.7	90.7	59.0	56.0
50	65	28.3	93.7	90.7	65.5	62.5
51	65	28.5	93.7	90.7	65.3	62.3
80	65	29.6	93.7	90.7	64.1	61.1
81	65	29.2	93.7	90.7	64.5	61.5
83	65	29.1	93.7	90.7	64.6	61.6
85	65	28.4	93.7	90.7	65.3	62.3
87	65	28.0	93.7	90.7	65.7	62.7
88	65	27.9	93.7	90.7	65.8	62.8
90	65	27.5	93.7	90.7	66.2	63.2
92	65	27.1	93.7	90.7	66.6	63.6
93	65	26.9	93.7	90.7	66.8	63.8
94	65	29.8	93.7	90.7	63.9	60.9
95	65	30.1	93.7	90.7	63.6	60.6
99	65	29.6	93.7	90.7	64.1	61.1
111	65	28.9	93.7	90.7	64.8	61.8
112	65	26.9	93.7	90.7	66.8	63.8
113	65	28.3	93.7	90.7	65.4	62.4
134	65	22.0	93.7	90.7	71.7	68.7

Noise Sensitive Receptor	Construction Noise Limits dB	Distance Attenuation	100% Utilisation	50% Utilisation	Predicted	
					100 % utilisation	50 % utilisation
151	65	18.9	93.7	90.7	74.8	71.8
153	65	18.1	93.7	90.7	75.6	72.6
155	65	18.7	93.7	90.7	75.0	72.0
157	65	18.5	93.7	90.7	75.2	72.2
159	65	19.2	93.7	90.7	74.5	71.5
161	65	20.7	93.7	90.7	73.0	70.0
194	65	22.7	93.7	90.7	71.1	68.1

Table 9.C.33: Predicted Noise Levels of Airdome Structure

Noise Sensitive Receptor	Construction Noise Limits dB	Distance Attenuation	100% Utilisation	50% Utilisation	Predicted	
					100 % utilisation	50 % utilisation
1	65	31.4	93.7	90.7	62.3	59.3
2	65	31.5	93.7	90.7	62.2	59.2
3	65	32.2	93.7	90.7	61.5	58.5
4	65	32.7	93.7	90.7	61.0	58.0
5	65	33.0	93.7	90.7	60.7	57.7
6	65	34.4	93.7	90.7	59.3	56.3
7	65	35.2	93.7	90.7	58.5	55.5
8	65	35.8	93.7	90.7	58.0	55.0
48	65	35.1	93.7	90.7	58.7	55.7
50	65	29.0	93.7	90.7	64.7	61.7
51	65	29.1	93.7	90.7	64.6	61.6
80	65	30.7	93.7	90.7	63.0	60.0
81	65	30.3	93.7	90.7	63.4	60.4
83	65	30.1	93.7	90.7	63.7	60.7
85	65	29.3	93.7	90.7	64.4	61.4
87	65	28.7	93.7	90.7	65.0	62.0
88	65	28.4	93.7	90.7	65.3	62.3
90	65	28.1	93.7	90.7	65.6	62.6
92	65	27.9	93.7	90.7	65.9	62.9
93	65	27.7	93.7	90.7	66.0	63.0
94	65	30.9	93.7	90.7	62.8	59.8
95	65	31.2	93.7	90.7	62.5	59.5
99	65	30.8	93.7	90.7	62.9	59.9
111	65	30.2	93.7	90.7	63.5	60.5
112	65	28.5	93.7	90.7	65.2	62.2
113	65	29.7	93.7	90.7	64.1	61.1
134	65	24.4	93.7	90.7	69.3	66.3

Noise Sensitive Receptor	Construction Noise Limits dB	Distance Attenuation	100% Utilisation	50% Utilisation	Predicted	
					100 % utilisation	50 % utilisation
151	65	21.6	93.7	90.7	72.2	69.2
153	65	19.8	93.7	90.7	73.9	70.9
155	65	19.4	93.7	90.7	74.3	71.3
157	65	19.4	93.7	90.7	74.3	71.3
159	65	20.3	93.7	90.7	73.4	70.4
161	65	21.7	93.7	90.7	72.0	69.0
194	65	23.5	93.7	90.7	70.2	67.2

Appendix 9.D

Noise Propagation Modelling Inputs and Results

OPERATIONAL NOISE MODELLING INPUTS AND ASSUMPTIONS

Prediction of plant equipment noise was carried out using CadnaA noise propagation software. Assumptions and model inputs are detailed below. Further details of noise propagation modelling methodology can be found in EIAR Chapter 9: Noise and Vibration.

Plant and Equipment

Plant and equipment is expected to comprise:

- 2no. Pavilion Air Source Heat Pumps (ASHP);
- 2no. Air-dome Air Source Heat Pumps (ASHP);
- 1no. ESB substation;
- 1no. Standby diesel generator.

The pavilion building and air-dome plant rooms will house Air Handling Units (AHUs) along with other items of plant and equipment. The break-out noise from these internal plant rooms is expected to be negligible in the context of the closest residential receptors, therefore has not been included in the acoustic model of plant and equipment.

Assumptions

Sound pressure levels were predicted at all 34 representative noise-sensitive receptors for both daytime (07:00 – 23:00) and night-time.(23:00 – 07:00) Receptor height for daytime predictions was 1.5m above ground level, with 4m above ground level assumed for night-time predictions. The CadnaA noise propagation model was configured with soft ground (G=1) adopted across the site and surrounding areas.

It is understood that the substation will be located within an enclosed masonry structure as per ESB standard drawings and construction standards document.

It has been assumed that the ASHP units and substation will operated continuously throughout the daytime and night-time periods. As such, both a daytime and night-time assessment has been carried out which includes all proposed plant and equipment for normal operations.

The diesel generator will only operate as a stand-by unit, as required, and will be considered as a separate daytime operational scenario in combination with the other plant and equipment. It is highly unlikely that the diesel generator will be in operation during the night-time period.

Air Source Heat Pumps

Air Source Heat Pumps (ASHPS) will provide hot water and space heating to the pavilion and air-dome. A manufacturer technical datasheet has been provided for the units, which is included in Figure 9.D.1.

The ASHP units have a height of 1.71 m, with air intake on the side of the unit. They have been modelled as point sources at 0.86 m above ground/roof level.

The highest sound pressure level for each ASHP is given on the datasheet as 72 dBA, when set to “capacity priority” mode. This sound pressure level was measured 1m below the unit in an anechoic room, which is equivalent to a free-field measurement, with a resultant sound power level of 83 dBA.

Commercial Heating | **Product Information**

CAHV-R450YA-HPB
Ecodan Air Source Heat Pump

MODEL			CAHV-R450YA-HPB
Power source			3-phase 4-wire 380-400-415V 50/60 Hz
Capacity (EN14511) *1		kW	40
	Power input	kW	14.03
	Current input	A	22.7-22.5-21.7
	COP (kW/kW)		2.85
	SCOP Low/Medium		3.57/3.24
Capacity *2		kW	33.4
	Power input	kW	16.6
	Current input	A	28.0-26.6-25.7
	COP (kW/kW)		2.01
Maximum current input		A	44.0-41.8-40.3
Water pressure drop *1			10.2 kPa (1.47 psi)
Temperature range *5	Outlet water temperature		24-70°C
	Outdoor temperature	D.B.	-25-43°C
Circulating water volume range *5			25 l/min-250 l/min
Sound pressure level (measured 1m below the unit in an anechoic room) *3*4		dB (A)	64
Sound pressure level (measured 1m below the unit in an anechoic room) *3*4		dB (A)	72
Water pipe diameter and type	Inlet	mm (in)	38.1 (1 1/2"), housing type joint
	Outlet	mm (in)	38.1 (1 1/2"), housing type joint
External finish			Acrylic painted steel sheet <Munsell 5Y 8/1 or similar>
External dimensions H x W x D		mm	1710 x 1750 x 740
Net weight		kg (lbs)	359 (791)
Design pressure	R454C	MPa	3.85
	Water	MPa	1.0
Heat exchanger	Water-side		Copper brazed stainless steel sheet
	Air-side		Plate fins and copper tubes
Compressor	Type		Inverter scroll hermetic compressor
	Manufacturer		MITSUBISHI ELECTRIC CORPORATION
	Starting method		Inverter
	Motor output	kW	12.1
	Lubricant		FVC32EA
Fan	Air flow rate	L/s	2500 x 2
	External static pressure		10 Pa (1mm H2O)
	Type and quantity		Propeller fan x 2
	Control and driving mechanism		Inverter control, direct driven by motor
	Motor output	kW	0.92 x 2
HIC (Heat inter-changer) circuit			Copper pipe
Protection devices	High pressure		High-pressure sensor and switch set at 3.85 MPa (643 psi)
	Inverter circuit		Overheat and overcurrent protection
	Compressor		Overheat protection
	Fan motor		Thermal switch
Defrosting method			Auto-defrost mode (Reversed refrigerant cycle)
Refrigerant	Type and factory charge	kg	R454C, 9.0 kg
	Flow and temperature control		LEV and HIC circuit

Notes:

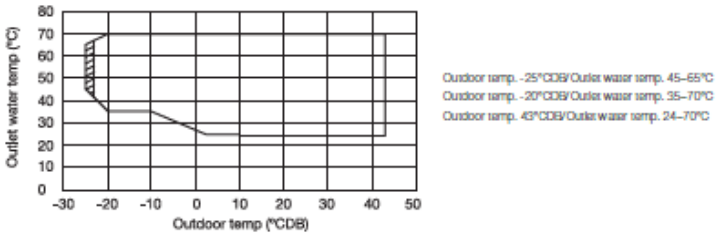
*1 Under normal heating conditions at the outdoor temperature of 7°CDB/6°CWB, the outlet water temperature of 45°C, and the inlet water temperature of 40°C.

*2 Under normal heating conditions at the outdoor temperature of -5°CDB/-6°CWB and the outlet water temperature of 55°C.

*3 Under normal heating conditions at the outdoor temperature of 7°CDB/6°CWB when the unit is set to the "Capacity Priority" mode through the dry NC-contact.

*4 The sound pressure level is a value measured in an anechoic room in accordance with the conventional method in JRA4060.

*5



*6 4.0 - 15.0 m³/h under the following conditions:

a. When the outdoor temperature is below 0°C,

b. When the outlet water temperature is 30°C or below AND the outdoor temperature is 6°C or below.

Figure 9.D.1: ASHP Manufacturer Datasheet

Pavilion

The final location of the 2no. pavilion ASHP units has not been finalised, therefore a worst-case assumption has been made whereby the external units are located on the roof of the pavilion building, within the 'notional plant area' indicated on the pavilion roof plan (Figure 9.D.2).

The roof of the pavilion at the plant area location is assumed to be 11.2 m above ground level.

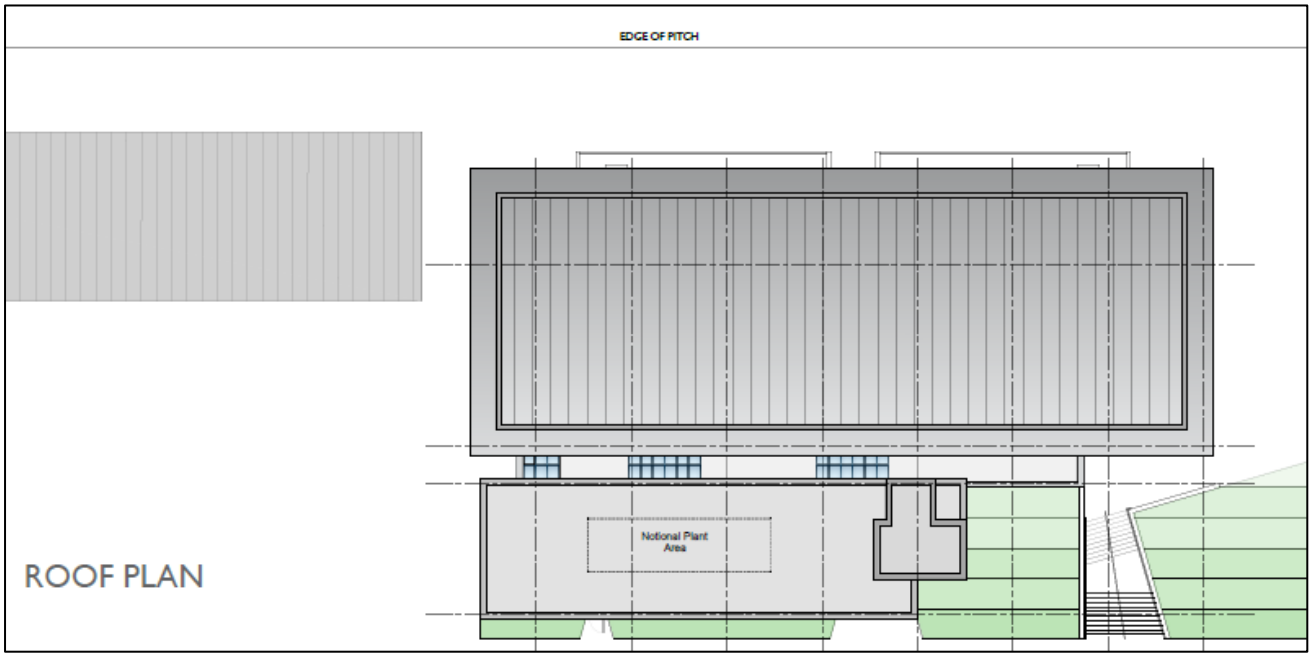


Figure 9.D.2: Pavilion Roof Plan

Air-Dome

It has been assumed that the 2no. ASHPs for the air-dome will be located on the external façade of the air-dome, adjacent to the plant room, which is shown in Figure 9.D.3.

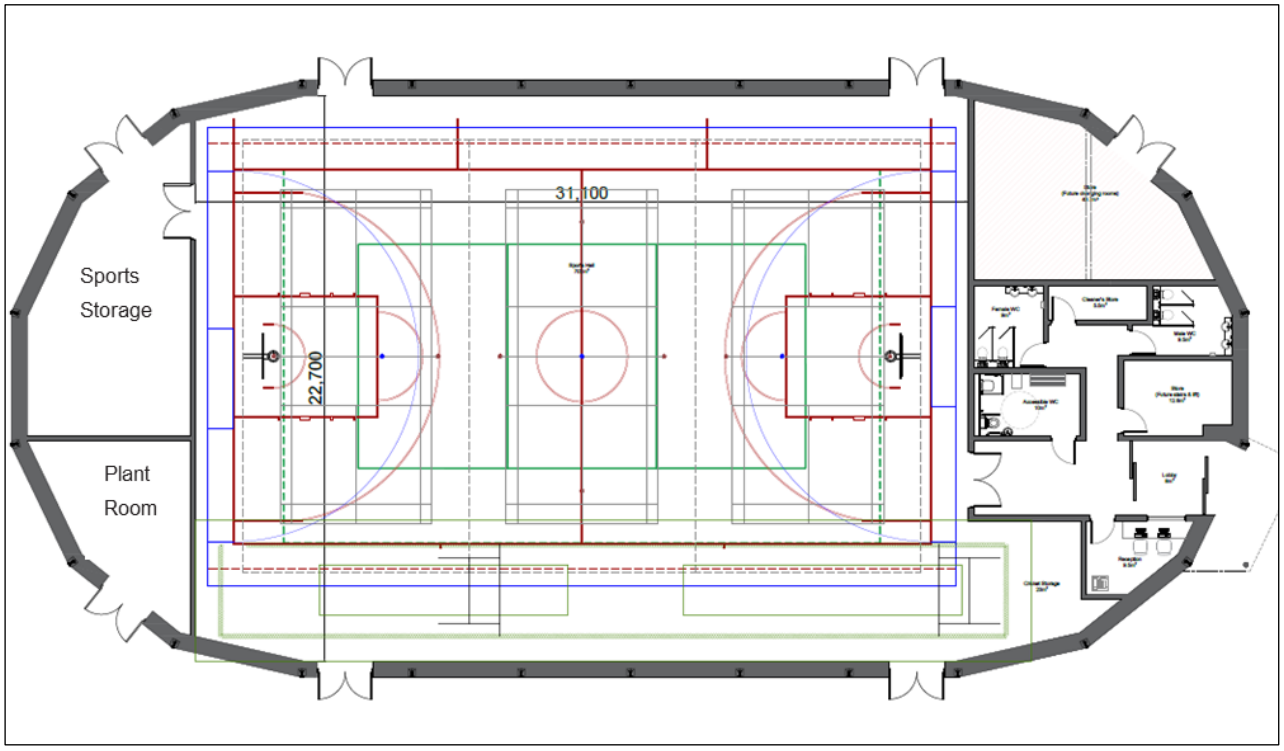


Figure 9.D.3: Air-Dome Layout

The air-dome roof is 10.8m, however for a simplified geometry of the domed roof has been modelled, due to constraints of the noise modelling software. The main walls of the air dome have been modelled as 3m above ground level, with the ridge height of 10.8m above ground level.

ESB Substation

The ESB MV substation will be housed within a building, to the construction specification contained in the "ESB MV Substation Details" document. Roof will be reinforced concrete, assumed to be 5" (127mm) thick, and walls will be cavity wall construction, as below:

- Inner leaf 215 mm thick constructed from blocks, cavity 100 mm wide with no insulation.
- External leaf block on edge with two coats of render or of brickwork

There will be a steel door to the substation, with an assumed sound reduction of 15 dB.

As per ESB requirements, noise from the transformer should not exceed 70 dBA as measured according to IEC60551. It is assumed that this is internal sound pressure level at 2m from the transformer.

The sound reduction indices of the walls and roof of the substation building have been calculated using INSUL software and are shown in Table 9.D.1.

The dimensions of the substation building will be 4m x 3.5m with a height of 2.6m.

Table 9.D.1: ESB Substation Assumed Sound Reduction Indices

	Sound Reduction Index, dB						
	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz
ESB Substation Walls	54	66	74	84	91	102	113
ESB Substation Roof	41	43	41	47	55	61	66

Diesel Generator

It is understood that the diesel generator is a standby generator and will not normally be in operation. As such, it has been included in the acoustic model as a separate, worst-case scenario. Acoustic data was not available for the diesel generator, however it is noted that the proposed P605-3 generator is available with a range of acoustic enclosures. The sound power level of the generator within a 'Level 2' manufacturer enclosure has 102 dBA (82 dBA at 1m).

The generator enclosure is assumed to 5.3 m length x 1.9 m width, with a height of 2.2 m. Noise from the generator exhaust has been assumed to be included in the manufacturer data, which states that the exhaust silencing system is fully enclosed.

OPERATIONAL NOISE MODELLING RESULTS

Plant and Equipment Noise Modelling Results

The results of the noise propagation modelling at the 34 representative noise-sensitive receptors are presented in Please refer to Volume II Figures 9.6 – 9.8 for noise propagation contour mapping.

Table 9.D.2**Error! Reference source not found.**. The predicted daytime and night-time sound pressure levels at each receptor for plant and equipment noise. Please refer to Volume II Figures 9.6 – 9.8 for noise propagation contour mapping.

Table 9.D.2: Plant and Equipment L_{Aeq} Noise Propagation Modelling Results

Receptor Location	Predicted Daytime Sound Pressure Level 1.5 m Receptor Height, dB $L_{Aeq, T}$		Predicted Night-Time Sound Pressure Level 4 m Receptor Height, dB $L_{Aeq, T}$
	ASHPs and Substation	ASHPs, Substation and Diesel Gen	ASHPs and Substation
1	24.2	46.8	24.7
2	25.5	46.8	25.7
3	21.7	45.3	22.2
4	20.2	44.4	20.3
5	19.4	43.9	19.6
6	18.1	42.5	19.2
7	17.2	42.1	17.8
8	16.3	41.2	17
48	17.2	41	17.3
50	25.5	39.6	26.6
51	25.7	38.4	25.5
80	22.3	40.3	25.3
81	23.5	40	25.9
83	25.6	39.9	26.6
85	25.5	46.1	26.4
87	22.3	39.1	26.8
88	26.6	38.8	26.1
90	26.3	38.7	26.8
92	24	39.1	27.4
93	20.8	39.2	27.6
94	20.8	40.3	22.2
95	19.7	39.9	21.5
99	20.5	42.5	22.3
111	21.7	43.4	23.7
112	22.1	44.6	23.3
113	21.9	43.7	23.7
134	26.9	45.9	27.6
151	29.6	46.9	30.9
153	31.2	47.4	32.7
155	31.5	49	33.4
157	30.5	47.3	33.1
159	30.4	47	31.9

161	28.3	48.9	29.9
194	27.1	46.3	28.8

Operational Traffic Noise Modelling Results

The Basic Noise Level (BNL) due to road traffic noise on Knocknamona Crescent has been predicted using CadnaA noise prediction software. The BNL for the baseline only and the combined baseline and development scenarios have been modelled for the 2028 and 2043 traffic flows shown in Table 9.D.3. The results of the BNL modelling are shown for the 34 representative noise-sensitive receptors. Please refer to Volume II Figure 9.9 for the noise propagation contour map.

Table 9.D.3: Predicted Knocknamona Crescent L_{10} Traffic Noise Levels

Receptor	Base 2028 dB	Base 2028+ Development dB	Base 2043 dB	Base 2043+ Development dB	Change in L_{10}, dB 2028	Change in L_{10}, dB 2043
1	47	35.5	47.4	35.5	-11.5	-11.9
2	49.6	36.5	50	36.6	-13.1	-13.4
3	45.4	50	45.8	50.3	4.6	4.5
4	38	40.5	38.3	40.7	2.5	2.4
5	35	36.8	35.4	37	1.8	1.6
6	32.8	36.6	33.2	37.2	3.8	4
7	31.3	37.2	31.7	37.1	5.9	5.4
8	29.4	33.4	29.8	33.5	4	3.7
48	34.1	29.9	34.5	30	-4.2	-4.5
50	35.1	31.9	35.5	31.9	-3.2	-3.6
51	34.5	31.5	34.9	31.6	-3	-3.3
80	25.7	24.7	26.1	24.8	-1	-1.3
81	26.4	25.3	26.7	25.4	-1.1	-1.3
83	27.7	26.3	28	26.4	-1.4	-1.6
85	28.3	27.1	28.7	27.2	-1.2	-1.5
87	29.4	28	29.8	28.1	-1.4	-1.7
88	30.2	28.4	30.6	28.5	-1.8	-2.1
90	30.5	27.9	30.9	28	-2.6	-2.9
92	31.2	26.4	31.5	26.5	-4.8	-5
93	31	25.2	31.3	25.3	-5.8	-6
94	24.9	24	25.3	24.1	-0.9	-1.2
95	24.5	23.7	24.9	23.8	-0.8	-1.1
99	24.2	23.7	24.6	23.8	-0.5	-0.8
111	23.7	23.5	24	23.6	-0.2	-0.4
112	23.7	23.4	24	22.7	-0.3	-1.3
113	23.5	23.5	23.9	23.6	0	-0.3
134	20.9	19.9	21.2	20	-1	-1.2
151	21.5	20.4	21.9	20.5	-1.1	-1.4
153	20.5	17.9	20.8	18.1	-2.6	-2.7
155	20.8	16.8	21.1	16.9	-4	-4.2
157	19.9	16.2	20.2	16.6	-3.7	-3.6
159	20.1	10.5	20.5	10.7	-9.6	-9.8
161	21.1	24	21.4	24.1	2.9	2.7
194	20.9	21.7	21.3	21.8	0.8	0.5