South Dublin Street & Backlands Regeneration Project

EIAR Volume II

Technical Appendices

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Contents: EIAR Volume II – Technical Appendices

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Preliminary CEMP (pCEMP)

SOUTH DUBLIN STREET & BACKLANDS REGENERATION PROJECT

Preliminary Construction and Environmental Management Plan (PCEMP)

South Dublin Street & Backlands Regeneration Project
Preliminary Construction and Environmental Management Plan (PCEMP)
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1 INTRODUCTION

1.1 Purpose of this Document

This document is a Preliminary Construction and Environmental Management Plan (PCEMP) 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 PCEMP sets out the minimum requirements which will be adhered to during the construction phase of the proposed development.

1.1.1 Background to Proposed Development

The proposed development, situated in Monaghan Town Centre, is known as the South Dublin Street and Backlands Regeneration Project, and is the initial phase of the Dublin Street and Backlands Regeneration Project. This proposed development focuses on the detailed design and delivery of a series of enabling works, which focus on enhancing and improving the layout and structure of the town centre urban realm. It is anticipated that these will also act as a stimulus for future town centre development and in particular, new built development within the future development plots, in broad conformity with the overall agreed design concept – shown below in Figure 1.1.

The proposed development provides a strategy to drive regeneration in this part of the town centre. This proposal aspires to meet the short term objectives of improving the physical and spatial quality of the streets and spaces in the area south of Dublin Street. The aim is to create new connections with new streets and spaces which enhance the urban structure, and quality of the public realm of the Dublin Street quarter. The new high quality public realm proposals for footpaths, street furniture, wayfinding, signage, landscaping, new public spaces, and new streets will set the standard for all new developments and where existing structures are reused and adapted. The Council has secured funding from the Urban Regeneration and Development Fund (URDF) to progress this work.

1.2 The Proposed Development

The application site is located in the central core of Monaghan town centre, Co. Monaghan. The site location is shown below in Figure 1.1.

The site is located south / south west of The Diamond and the main arterial route, Dublin Street, which flows through the town centre, and due north of Broad Road. It adjoins community, ecclesiastical, retail and commercial buildings to the north east and west along The Diamond and Dublin Street. The Shambles River defines part of the southern boundary, with existing car parking to the south/east, and a large shopping complex (Monaghan Shopping Centre) and car parking to the south/west.

The site currently comprises several retail /commercial buildings (both vacant and in-use) and backland areas comprising vacant / derelict land and properties, storage areas, and rear access points. It also contains extensive areas of existing car parking, roads/road infrastructure, pedestrian alleyways, and incidental green space.

A planning history search was carried out of the most recent planning applications within and immediately adjacent to the site boundary. A number of applications were identified as small scale new development, change of town centre uses, and refurbishments to existing buildings within the immediate area. It is unlikely that any of these will result in any significant cumulative effects on the environment. The red line boundary of the proposed development works extends to approximately 2.72ha.

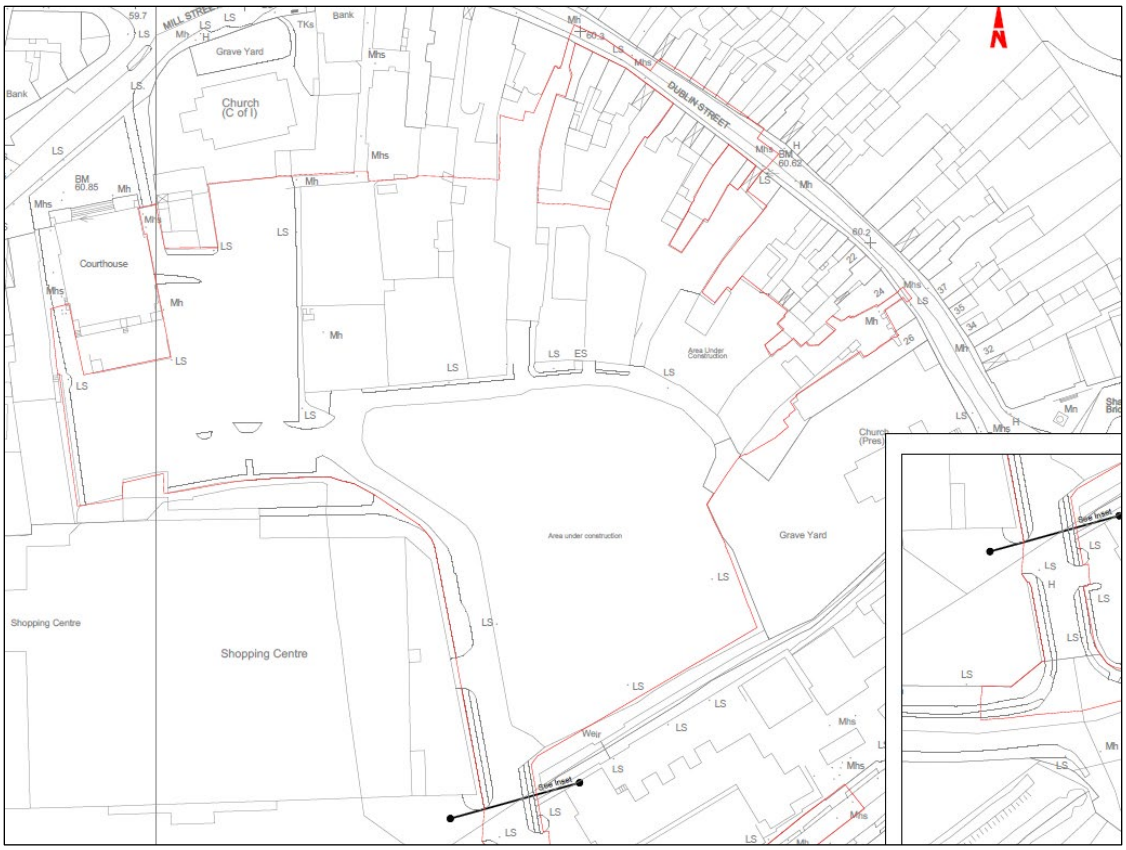


Figure 1.1: Site Location

1.3 Overview of Proposed Work Activities

A summary of the work activities involved in the proposed development is provided below. Note this list is not exhaustive and is provided to give an overview of the likely type of activities:

- The demolition of buildings and structures, including street frontage buildings No's 8-11 Dublin Street and associated outbuildings and structures; the building to the rear of No.24 Dublin Street; partial removal of the rear section of the Northern Standard building fronting the Lower Courthouse car park; storage sheds, walls, and fencing.
- New building façades/side elevations to No's 7 and 12-13 Dublin Street, likely to be a masonry wall with piers finished in render (for structural stability) to facilitate creation of the new junction onto Dublin Street;
- Creation of a new urban space, comprising a street, junction and extended footpaths to connect Dublin Street through to its backland areas, opening up new areas for development and enhancing the pedestrian linkages throughout this area. This area is intended as a multi-use space and is capable of being temporarily cordoned off for use as an event space, for a market, pop-up commercial/retail uses, or occasional festival events. The creation of this new space creates a new setting and enables new opportunities for future infill development and reuse/ adaptation of existing underutilised buildings on either side of the new space, creating opportunities for new commercial and residential activity. It is proposed that this area will be known as Charles Gavan Duffy Place.
- Creation of new streets:
  - New street connecting Charles Gavan Duffy Place to the Courthouse, to be known as Church Walk;
  - Realignment of an existing road to create a promenade, and to be known as The Mall;
  - Realignment of an existing road, to be known as Farney Road;
- Creation of new urban civic spaces, streets, junctions, pedestrian pavements, steps, and cycle routes
- Construction of new public realm comprising new surfaces, kerbing, street furniture, public street and feature lighting, soft landscape planting, cycle parking and signage
- Clearance, regrading and creation of two potential development areas with supporting embankments, hardcore surfacing and boundary fencing
- New boundary treatments comprising walls, railings and fencing
- Alterations to the existing car parking layouts within the Courthouse car park and Lower Courthouse car park, and a reduction in long stay parking spaces
- Upgrading and installation of new utility services, CCTV, and a new ESB sub-station
- All associated site development works
- Construction works including excavation, cut / fill, re-grading of land, and construction of retaining structures, to accommodate level changes, throughout the study area.

It is estimated that the proposed work will take between 12 - 24 months to complete on site.

Note that it will be a key element of all earthworks management to ensure that the risk of pollution to any watercourse (including drainage ditches) is minimised. It is also the case that the earthworks and level changes will be minimised as much as possible in keeping with the agreed site design and vehicular access points will be minimised.

Plant and machinery would be used for the construction activities involved in the development of this site. The choice of plant and machinery will be made by the appointed contractor, this is likely to include at least the following:

- Hydraulic excavators
- HGV / dumper trucks / cement lorries / skip lorries
- Tracked bulldozers
- Road rollers
- Pneumatic drills / hammers (hand held and on back of excavators)
- Cement mixers

- Generators
- Pumping equipment
- ‘Cherry Pickers’ / Mobile Platforms
- Cranes
- Works vans and 4WD vehicles

The plant / machinery to be used will be reviewed continuously by the contractor and this list may be updated as required and included in any updated versions of the PCEMP.

2 DEFINING THE PCEMP

2.1 Purpose of the PCEMP

A PCEMP 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 PCEMP is to:

- **record environmental risks and identify how they would be managed during the construction period;**
- **provide a means of identifying environmental commitments, objectives and targets;**
- **provide a means of monitoring and reporting performance against the objectives and targets;**
- **provide a framework to ensure that all parties are aware of their responsibilities;**
- **establish a checklist of control procedures which can then be integrated into an overall environmental management protocol;**
- **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;**
- **provide detailed environmental mitigation measures for reducing the potential for environmental impacts during pre-construction and construction;**
- **highlights that some activities may require consents or licences;**
- **act as a link and main document reference for environmental issues between the design, and construction stages; and,**
- **ensure the mitigation requirements of the associated environmental assessments (contained in supporting environmental documents for the planning application) are met.**

The 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. It is a **'live'** document and may be updated as the project progresses. This PCEMP sets out the minimum requirements which will be adhered to during the construction phase of the proposed development.

The contractor will use this PCEMP as a template for the development of an agreed CEMP.

2.2 Scope of the PCEMP

The scope of the PCEMP covers all environmental effects related to the construction of the Proposed Development. The term 'construction' in the PCEMP includes all site preparation, earthworks, waste removal and related engineering and construction activities as authorised by the local authority and associated permissions.

The PCEMP 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 PCEMP will be applicable to all works associated with the Proposed Development including those carried out by sub-contractors.

2.3 Status of the PCEMP

The status of the PCEMP is as follows:

- **This document comprises the PCEMP and has been prepared during the preliminary design and in parallel with submission of full planning application stage of the Proposed Development.**
- **The PCEMP (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.**
- **The PCEMP would identify any further mitigation methods and control measures to be agreed with key stakeholders and would be in place before construction begins.**
- **During construction, the PCEMP 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.**
- **The provisions of the PCEMP 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 PCEMP to ensure that best practice is implemented during construction and to safeguard the environment.**
- **The requirements of the PCEMP 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.**
- **The PCEMP is the mechanism for ensuring that the Proposed Development adopts relevant best practice management techniques for sustainable construction.**

2.4 Structure of the PCEMP

The following appendices are included in the PCEMP:

1. **Annex A: Site Drawings**
2. **Annex B: Environmental Inspection Schedule**
3. **Annex B1 : Complaints Form**
4. **Annex C: Incident Report Form**
5. **Annex D: Site Waste Management Plan**
6. **Annex E: Construction Method Statement**
7. **Annex F: Pollution Prevention Plan**
8. **Annex G: Environmental Emergency 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 the PCEMP and implementing the PCEMP (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 PCEMP 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.

For a project like this development the environmental officer role maybe combined with the site manager role due to the size of the project and development area. All roles are still listed for completeness.

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:

- Overall responsibility for the Proposed Development and implementation of the PCEMP;
- Allocating resources to ensure the implementation of the PCEMP;
- Participates in the management review of the PCEMP for suitability, adequateness and effectiveness; and,
- 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:

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

3.4 Environmental Officers

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

- Ensuring that the requirements of the PCEMP are developed and environmental system elements (including procedures, method statements and work instructions) are implemented and adhered to with respect to environmental requirements;
- Reviewing the environmental responsibilities of other managed Contractors in scoping their work and during contract execution;
- To ensure that advice, guidance and instruction on all PCEMP matters are provided to all their managers, employees, construction contractors and visitors on site;

- Report to the Construction Manager on the environmental performance of Line Management, Supervisory Staff, Employees and Contractors;
- Advise site management on environmental matters;
- maintaining environmental records;
- providing guidance for the site team in dealing with environmental matters, including legal and statutory requirements affecting the works;
- reviewing environmental management content of method statements;
- reporting environmental performance to the Site Manager;
- liaison with statutory and non-statutory bodies and third parties with an environmental interest in the Proposed Development;
- 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 **Annex D**);
- Implementing and maintaining environmental controls on site. (Refer to **Annex B** Environmental Inspection Schedule and details of what is included in method statements are set out in **Annex E**).
- Attending to any spills or environmental incidents that may occur on site. (Refer to **Annex F** Pollution Prevention Plan, **Annex G** Emergency Response & Environmental Plan);
- Undertake site environmental monitoring and walk overs (Refer to **Annex B** Environmental Inspection Schedule);
- Ensuring correct procedures are followed in the event of environmental incidents (Refer to **Annex C** Incident Report Form and **Annex G** Emergency Response & Environmental Plan).

3.5 Site Supervisors

Site Supervisors are required to:

- Promote a Health & Safety culture on site, to read, understand and implement the PCEMP;
- Know the broad requirements of the relevant law in environmental matters and take whatever action is necessary to achieve compliance;
- Ensure that environmental matters are taken into account when considering Contractors' construction methods and materials at all stages;
- 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;
- Ensure plant suggested is environmentally suited to the task in hand;
- 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;
- Where appropriate, ensure Contractors method statements include correct waste disposal methods;
- Be aware of any potential environmental risks relating to the Contractors and bring these to the notice of the appropriate management; and,
- 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:

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

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

ROLE	COMPANY	NAMED CONTACT	CONTACT DETAILS
Construction Director			
Construction Manager			
Environmental Officer			
Site Supervisors			
Site Personnel			
Health & Safety Representative (May be combined with Construction Manager role)			
Other specialists as required (e.g. geotechnical , drainage/civil engineer)			

	Notifying the EPA **1890 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**
Environmental Protection Agency (EPA)	**Notifying the EPA** **To notify the EPA by telephone, operators may call EPA HQ at 053 916 0600 or their Regional EPA Office.** **The EPA's business hours are 09:00 – 17:00 Monday to Friday except Public & Bank Holidays. Outside of these hours, contact the EPA on any of the above numbers or on our dedicated Low Call number 1890 33 55 99. Our Out of Hours line is open 24 hours a day, 7 days a week.** **To leave a message, please hold for a choice of the three options. Please be aware that all after-hour calls are recorded.** **Option 1 – non-emergency notification. This is for non-urgent incidents, which will be received by an EPA inspector on the next working day** **Option 2 – Emergency incident. This is an urgent notification of a significant incident at a licensed site or environmental pollution, which will be forwarded to an EPA manager for rapid response**

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:

- Principal Contractor & all sub-contractors will need to c**omply with all** relevant environmental legislation when carrying out work on the site;
- **Definition** of environmental standards and requirements for the contractors throughout the contract stages;
- **Acting as a point of contact** for consultation and feedback with landowners/occupiers, statutory and non-statutory consultees, other interested parties and the public;
- **Auditing** of the performance of sub-contractors;
- **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:
- **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.
- **Site Rules** - All personnel must comply with the rules and regulations laid down in the appropriate site rules.

- **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.
- **Training** - All construction staff, including sub-contractors, would receive structured training on the requirements of the PCEMP 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:

- **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.
- 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.
- Detailed below 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.
- 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.
- 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 PCEMP as yet but will be if required e.g. perhaps to seek further clarification.
- **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;
- **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;
- **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;
- **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

Organisation	Web link
Environmental Protection Agency (EPA)	https://www.epa.ie/
Waterways Ireland	https://www.waterwaysireland.org/
Inland Fisheries Ireland	https://www.fisheriesireland.ie
Irish Water	http://www.water.ie
Monaghan County Council	https://www.monaghan.ie

5 GENERAL POLLUTION CONTROL AND CONTINGENCY PLAN

5.1 Exclusion Zone & Materials

The contractor will:

- **dedicate specific areas for oil storage and refuelling, separated by a minimum of 10m from any existing waterbodies within or adjacent to the proposed development site and comply with legislation, including providing bunds sized to contain 110% of fuel storage capacity.**
- **The contractor 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.**
- **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.**

The exclusion zone is a 10m distance banding or buffer from any existing watercourse within or adjacent to the proposed development site. **NO** material shall be stored in the exclusion zone area for the duration of the construction works. **There shall be no cement, concrete, grout, fuels/ oil/ hydrocarbons stored in the exclusion zone**.

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 by the Environmental Protection Agency (EPA). **Annex E** of this PCEMP contains an example Emergency Response & Environmental Plan. The Response 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:

- **delivery and use of materials;**
- **spillages of oils or chemicals;**
- **discharge of silty water or other pollutants to watercourses;**
- **flooding event; and,**
- **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:

- the names and contact details of staff trained in incident response,
- **clearly defined roles and responsibilities,**
- **the types and location of emergency response equipment available,**
- **the location of the emergency assembly point, and,**
- **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.

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 **Annex C** for an example template).

All relevant staff would be trained in how and when to contact the emergency services, EPA and other organisations identified in the Response Plan. **Annex E** of this PCEMP contains an example Emergency Response & Environmental Plan.

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

The Proposed Development may require consents from various regulatory bodies in advance of construction activities. 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 **Annex E**.

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. **Annex B** of this PCEMP details an example environmental inspection schedule.

6.5 PCEMP Review Programme

The PCEMP 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 PCEMP 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 PCEMP 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 **Annex C**.

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 **Annex B1** of this PCEMP.

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

It is estimated that the proposed work will take between 12 - 24 months to complete on site.

7.2 Construction Hours

It is proposed 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.

It should be noted though, that typically the construction hours employed are dependent upon which season the work takes place in with hours in the summer months anticipated to be from 0800 to 1900 hours on weekdays, 0800 to 1300 on Saturdays with no work on Sundays, while in winter the hours would be expected to be 0800 to 1630 hours on weekdays, 0800 to 1300 on Saturdays and no work on Sundays.

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 representative of the Councils 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:

- Enabling Works - Liaison with regulators (if required)
  - Site Clearance/ground preparation
- Site Offices
  - Recycling will be managed within offices and office waste controlled.
- Site Security
  As vandalism is a major cause of pollution incidents at construction sites, the appointed contractor will be required to ensure that the site is secure and protected from unauthorised access. The site shall adhere to the following:
  - Site and compound boundaries i.e. fencing, gates, locks etc.
  - Any polluting materials to be well secured.

7.4 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.

The site compound will be position away from the **exclusion zone** and located in a safe and convenient area.

7.5 Traffic Management and Deliveries

Traffic management and the 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.

There will be occasions whereby materials are needed to be delivered to site, a banksman will be in place to ensure safe access is provided. The times of deliveries will be limited to arrive on site during off peak periods of time.

There will be periods of time during the construction programme whereby larger equipment is needed to construct the building including cranes required for installation of the steel frame and cladding for the building.

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 HSA 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 **Annex B**. An incident report form is set out in **Annex C**. A site waste management plan (SWMP) is set out in **Annex D**. An emergency response and environmental plan is located in **Annex G** of this document. Details of what should be included in method statements are set out in **Annex E**. A site waste management plan is summarised in the **Annex G** of this PCEMP.

8.1 Environmental Site Procedures

This Preliminary Construction and Environmental Management Plan (PCEMP) has been prepared in accordance with various best practice guidelines for construction and operational activities in general. It sets out recommended environmental management measures which shall be provided for in a final CEMP to be prepared following receipt of permission and to which the future development shall adhere. These management measures and those to be incorporated in the final CEMP have regard to, but not limited to the following guidelines:

- Construction Industry Guidelines (such as CIRIA C502 Environmental Good Practice on site).
- BS 5228-1:2009+A1:2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites – Part 1: Noise and BS 5228-2:2009+A1:2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites – Part2: Vibration (together referred to as B.S. 5228).
- Control of Dust from Construction and Demolition Activities (BRE, 2003).
- Control of Water Pollution from Construction Sites - Guide to Good Practice. SP156 (Murnane et al, 2002).
- Control of water pollution from construction sites. Guidance for Consultants and Contractors (C532). CIRIA (H. Masters-Williams et al), 2001).

The following project specific environmental management procedures will be developed and employed by the proposed contractor, while working on the project.

8.1.1 Outline of Potential Environmental Procedures

- Roles and Responsibilities
- Awareness and Training
- Environmental Emergency Response Plan
- Record Keeping, Auditing and Monitoring
- Good House-Keeping and Construction Best Practice
- Contaminated Material Plan
- Fuel Spill Management Plan
- Protection of Flora and Fauna
- Invasive Species Management
- Soil, Geology and Hydrogeology
- Water Management
- Sediment Control

- Air Quality and Climate Management
- Noise and Vibration Management
- Traffic Management Plan
- Landscape Restoration Plan

Because some management measures are set out under various specific environmental topic headings there is some overlap in recommended management measures specified.

8.2 ENVIRONMENTAL MANAGEMENT MEASURES

The following sections provide guidance on the requirements of for each of the specific environmental management procedures as set out in the EIAR. As appropriate, an outline of information to be contained within each procedure is provided.

N.B. This report should be considered as a live document which will be updated by the applicant prior to commencement of activities. It will be updated to incorporate the requirements of any relevant conditions attached to the grant of planning permission.

8.2.1 Roles and Responsibilities

This section will set out the roles and responsibilities of the principal parties involved in the construction of the proposed remediation solution once a Contractor has been appointed. The roles and responsibilities outlined below are indicative, and these will be updated upon appointment of the Contractor.

8.2.1.1 The Contractor

The contractor appointed will be responsible for all activities necessary to provide the works in accordance with the requirements stated or implied within the Contract, unless explicitly stated as being the responsibility of the Employer or others. This includes construction, testing and all associated management and supervision. It also includes implementation of mitigation measures and monitoring required.

The contractor shall resource, plan, progress and deliver the project in such a manner that all management systems are fully transparent and auditable.

The contractor's management systems shall be audited by the Project Manager as appropriate throughout the Contract.

The contractor appointed to the project shall be assigned the following responsibilities as a contractual requirement. It should be noted that this is an indicative list and does not limit the requirements of the Contract.

8.2.2 Awareness and Training

The contractor will be required to maintain procedures for identifying training needs, and for providing appropriate training, for all personnel whose work can have a significant effect upon the environment. Appropriate records of training to be maintained. Employees and site workers to be made aware of their potential impacts to the environment during an induction. The Facility Manager and deputy, and any replacement manager or deputy, shall successfully complete both the appropriate Waste Management Training Programme and associated site assessment appraisal within twelve months of appointment.

8.2.3 Environmental Emergency Response Plan

An ‘Accident Prevention and Emergency Response’ will provide for the protection of the environment. This will be implemented to ensure that a documented Accident Prevention Procedure is in place that will address the hazards on-site. The environmental emergency response will set out procedures and responsibilities to be followed in the event of emergency situation on the site. It will identify potential emergency occurrences and ensure appropriate provision is made on site to allow the specified procedure to be swiftly and safely performed. In the event of an incident the licensee shall immediately:

- Carry out an investigation to identify the nature, source and cause of the incident and any emission arising therefrom;
- Isolate the source of any such emission;
- Evaluate the environmental pollution, if any, caused by the incident;
- Identify and execute the measures to minimise the emissions/malfunction and the effectsthereof;
- Identify the date, time and place of the incident; and
- Notify the Agency and other relevant authorities.

The contractor will provide a proposal to the Agency for its agreement within one month of the incident occurring or as otherwise agreed by the Agency to:

- Identify and put in place measures to avoid reoccurrence of the incident; and
- Identify and put in place any other appropriate remedial action.

In ABPs Inspectors Report (ABP-309071-21), dated 23rd April 2021, a request was made to assess major accidents and disasters. The specific text is as follows:

The EIAR should also provide an assessment of the expected effects arising from the vulnerability of the project to major accidents and disasters that are relevant to the project. These risks should be considered in the context of the factors of the environment.

In accordance with the recommendation from ABP and with reference to the EPA guidance (May 2022)[1], the risk of accidents (and major disasters) and unplanned events which may be caused or have an impact on the proposed development have been assessed. A risk-based approach has been employed and is referenced in the following chapters and within this pCEMP:

- Chapter 6 Water Quality
- Chapter 7 Soils, Geology & Contaminated Land
- Chapter 8 Biodiversity
- Chapter 10 Air Quality & Climate
- Chapter 11 Waste

8.2.4 Good Site House-Keeping and Construction Management Best Practice

The purpose of the Good Site House-Keeping procedure is to ensure a good standard of 'house- keeping' across the proposed development while highlighting some standard best practice measures which will minimise environmental risk. Some of these measures are repeated as relevant and appropriate in following specialist environmental management procedures, which highlights the importance of such measures for the protection of the overall environment.

The proposed contractor, together with all staff and any subcontractor must plan, manage and monitor their work so it is carried out safely and without risks to health, including careful planning on how the site will be kept tidy and housekeeping actively managed.

The following mitigation methods shall be employed by the contractor to ensure good housekeeping on site and in the surrounding area:

- Spraying the road surface near the entrances to the subject site with water when necessary to limit dust emissions;
- Prompt removal of any material spillage at the site entrances to prevent dispersion along thepublic road due to wind/rain action and subsequent re-suspension due to passing vehicles;

- Stockpiles of loose, fine aggregate or other similar sized construction material which could beeasily re-suspended by the wind to be covered when not in use;
- Lorries importing/exporting loose materials to/from the construction areas to be covered;
- Establishing channels of communication between the contractor/developer, Planning Authorityand resident communities;
- Erection of barriers around items such as generators or high duty compressors;
- All works will be carried out under the supervision of suitably experienced and competent staff;
- Prior to any works, ensure that all plant and equipment is mechanically sound to avoid leaks ofoil, fuel, hydraulic fluids and grease;
- Car parking facilities will be available on site, as will wheel-wash facilities to minimise dust/dirtbeing transferred from the site to the public roads by vehicles; and
- Contractors shall prepare an assessment for potential noisy operation operations and outline the noise mitigation measures proposed, to protect local amenity.

8.2.5 Demolition and Construction Waste Management Plan

Please refer to Appendix 2B Preliminary Demolition & Construction Waste Management Plan.

8.2.6 Fuel Spill Management Plan

No fuels will be stored onsite, with fuel imported on an as-needs basis. Refuelling will only occur on appropriate hardstand area. The only containers of fuels permanently onsite will be those in vehicles. The proposed contactor will prepare and put in place a Fuel Spill Management Plan to contain, remove or remediate spillages before they reach a surface water receptor. In the event of a fuel spill the following procedure are followed:

- The source of the spill will be closed off immediately if possible. The Facility Manager or Deputy Manager will be notified immediately;
- Shut off valves will be closed off where appropriate;
- The liquid will be contained as far as is practicable by employing containment booms andabsorbent mats and/or suitable absorbent material to contain and absorb any spillage at the facility. Suitable booms and mats will be stored at the site office;
- A waste oil tanker (or tankers) will be contracted immediately to pump any liquid spill;
- The following authorities will be notified by telephone at the earliest opportunity: the EPA, Monaghan County Council, and the Inland Fisheries.
- All oil will be removed from the surface by either pumping or use of absorbent materials. Allwaste oils and materials will be disposed to an appropriate facility.
- Once used the absorbent material shall be disposed of at an appropriate facility.
- All staff will be informed as to the location and use of the absorbent materials and will be proficient in their use.
- All such spills will be recorded on an Incident Report Form.

8.3 Air Quality and Climate

8.3.1 Air Quality

The air quality section of this report focuses on the environmental management measures in place to minimise the impacts from the generation of dust, odour and vehicle movement and vehicle emissions.

8.3.1.1 Dust

A Dust Management Plan (DMP) will be prepared by the appointed contractor for the Site and submitted to 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:

8.3.1.1.1 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.

8.3.1.1.2 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 log book;
- 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.

8.3.1.1.3 Demolition

Demolition is planned as part of the development including the demolition of buildings and the breaking up of ground floor slabs (rock breaking excavators) and the breaking up of external concrete (rock breaking excavators). With respect to demolition, the following should be implemented:

- Soft strip inside buildings before demolition of the buildings;
- * The appropriate handling of asbestos is not outlined in this section rather it is detailed in the associated Asbestos Demolition Survey Report for the Proposed Devolvement.
- Ensure effective water suppression is used during demolition operations (especially breakup of concrete/floor slabs/buildings). Hand held sprays are more effective than hoses attached to equipment as the water can be directed to where it is needed. In addition high volume water suppression systems, manually controlled, can produce fine water droplets that effectively bring the dust particles to the ground.

To be implemented during demolition by the appointed contractor.

**Asbestos, including asbestos fibres, is treated as a special material under all types of regulation and as such has its own exposure limits. It is subject to high levels of regulation and control. The asbestos demolition survey (required for this project) is not presented in this section rather the asbestos works are a matter principally for Health and Safety Authority (HSA) and will be dealt with through appropriate survey, reporting, removal and disposal as required.*

8.3.1.1.4 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; 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.

8.3.1.1.5 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.

8.3.1.2 Odour

Despite the low risk of encountering odours, a series of odour mitigation measures (related only with emissions form construction plant, vehicles & machinery) have been presented to minimise the impact and to prevent any nuisance in the unlikely event that they are encountered.

8.3.1.3 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 manufacturers limits (emissions to air controlled);
- 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; and
- 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.

8.3.2 Climate

Consideration is given in this section to specific measures associated with the proposed development. It is noted that the mitigation measures proposed for air quality and climate will also benefit in terms of reducing CO_2 emissions. Mitigation measures to be employed by the contractor to minimise CO_2 emissions from the proposed development's construction and operation include the following;

- Consultation with a wider variety of internal and external stakeholders to ensure all relevant information is included in the development of the plans;

- Implementation of a Traffic Management Plan which will be prepared in advance of operation. This will outline measures to minimise congestion and queuing, reduce distances of deliveries and eliminate unnecessary loads;
- Turning off vehicular engines (and mobile plant) when not in use for more than five minutes. This restriction will be enforced strictly unless the idle function is necessary for security or functionality reasons;
- Regular maintenance of plant and equipment. Technical inspection of vehicles to ensure theywill perform the most efficiently;
- The use of thermostatic controls on all space heating systems in site buildings to maintain optimum comfort at minimum energy use;
- The use of sensors on light fittings in all site buildings and low energy lighting systems;
- The use of adequately insulated temporary building structures fitted with suitable vents; and
- The use of low energy equipment and 'power saving' functions on all PCs and monitors in thesite offices.

8.3.3 Traffic Management Plan

The appointed contractor will prepare a full Traffic Management Plan (TMP) for the combined construction and operation stage of the development. The characteristics of the TMP will be agreed with Monaghan County Council in advance.

The TMP will include measures for emergency access in the event of a road traffic accident or similar incident that hinders the site access and egress along the interconnector road. For such an event all customers and hauliers will be immediately notified via phone or email to advise of the following:

- The nature of the emergency.
- The expected duration (if known).
- Direction on the appropriate alternative route to be taken for committed vehicles.

Direction to halt all deliveries yet to leave the source site until the safe site access is restored.

8.4 The Water Environment

This section details measures to ensure effective avoidance and mitigation methodologies employed for the protection of the water environment.

The potential impact arising from the physical disturbance includes;

- **Sedimentation,**
- **Concrete or fuel/chemicals entering waterbodies through site run-off but also the potential for the creation of preferential pathways for leachate movement vertically to the groundwater body.**

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

8.4.1 Construction Phase Best Practice Measures

The mitigation measures implemented by the contractor will refer to the construction management procedures for best practice regarding the following recognised international guidelines:

- Good practice guidelines on the control of water pollution from construction sites developed by the Construction Industry Research and Information Association (CIRIA, 2001);
- Good practice guidelines from CIRIA's guidance document (C768 – Guidance on the Construction of SUDs) (2017).

8.4.2 Suspended Sediment / Sedimentation

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

Mitigation measures to address the potential impact from suspended solids will be carried out in accordance with a site-specific PCEMP. The measures will be employed prior to the commencement and during construction and will include such measures as:

- Drainage and measures to control run-off will be employed to manage sediments prior to any works to be undertaken at the site, i.e., arrangements for the treatment of dirty groundwater ingress from any excavations will be in place in advance of the dewatering to ensure it can be adequately managed on site.
- Throughout the works, all surface water (water from excavations etc.) will be pumped or directed to suitably size tanks or settlement lagoons/basins which will provide primary and secondary settlement. Discharge of treated water will be to a location agreed with the Monaghan County Council. Visual checks of the pumping and settlement system will be carried out on a routine basis.
- Stockpiling and storage areas to be located away from open drains, waterbodies and any other critical flow pathways to the river.
- Excavation works will be carried out during dry periods, where possible, to limit sediment run-off.
- Installation of silt trenches adjacent to water courses on site to provide a barrier to surface run-off and to prevent sediment entering the aquatic environment.
- Minimising exposed surfaces and employing silt fencing in areas of temporary topsoil stockpiling will limit the potential for excess sediment movement within the site at source.

The incorporation of these mitigation measures during the construction phase means the potential impact to receiving water environment will be *low adverse* reduced to thus reducing the significance of the environmental effect to *negligible,* based on the moderate sensitivity of the receiving environment**.**

8.4.3 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 PCEMP. 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 be not be stored in the exclusion zone;**
- **The exclusion zone may 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.

8.4.4 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 waste water) 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.

Annex F 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 contractor should adhere to standard requirements for the protection of watercourses ahering to the 10m exclusion zone.	Construction Phase	Principal Contractor to deliver
iii. The Principal Contractor will allocate a dedicated area for material deliveries separated a minimum of **10m** from adjacent waterbodies, manage the same and make sure that over-ordering and stockpiling is kept to a minimum.	Construction Phase	Principal Contractor to deliver
iv. 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
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. The contractor will adopt a site specific Incident Response Plan (**Annex G** of this **PCEMP** 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 the PCEMP (Please refer to **Annex G**), 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

Mitigation Measure	When?	By whom?
vii. 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
viii. Suitable training will be provided to relevant personnel detailed within the Emergency Response & Environmental Plan (Please refer to **Annex G)** to ensure that appropriate and timely actions will be taken should an incident occur.	Construction Phase	Principal Contractor to deliver

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

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

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

NEW GPP 2: Above ground oil storage tanks

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

PPG 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. (April 2006)

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

NEW GPP 5: Works and maintenance in or near water

For construction or maintenance works near, in, or over water. (January 2017)

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)

NEW 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)

NEW GPP 20: Dewatering underground ducts and chambers

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

NEW GPP 21: Pollution incident response planning

For producing emergency pollution incident response plans to deal with accidents, spillages and fires. (July 2017)

NEW GPP 22: Dealing with spills

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

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. (March 2011)

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)

EPA's Low Call Number

0800 80 70 60

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

8.5 Ecology

8.5.1 Designated Sites and Features of Natural Heritage Importance

The Proposed Development has limited potential to give rise to significant effects upon the Lough Neagh and Lough Beg SPA, via the supported hydrological links to the Application Site. Potential impacts are limited to the input of chemicals, pollutants and sediments into the freshwater environment, in addition to the potential for spread of a single invasive species, Japanese knotweed.

In respect of the potential for the proposals to give rise to the accidental release of chemical contaminants, pollutants and sediments into the freshwater environment, a range of mitigation measures are proposed to mitigate the identified potential effects upon designated sites.

Mitigation measures will include the requirements for best practice and adherence to the following relevant Irish guidelines and recognised international guidelines:

- Good practice guidelines on the control of water pollution from construction sites developed by the Construction Industry Research and Information Association (CIRIA, 2001);
- Netregs Guidance for Pollution Prevention series (GPP), Pollution prevention guidelines (PPGs);
  - GPP2: Above Ground oil storage tanks
  - PPG3: use and design of oil separators in surface water drainage
  - GPP5: Works and maintenance in or near water
  - PPG6: Working at construction and demolition sites
  - GPP8: Safe Storage and disposal of used oils
  - GPP13: Vehicle washing and cleaning
  - PPG20: Dewatering underground ducts and chambers
  - GPP21: Pollution incident response planning
  - GPP22: Dealing with spills
- 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).

Subject to implementation of the above mitigation measures, in the context of the proposals which are hydrologically linked to the Lough Neagh and Lough Beg SPA at some distance, it is considered that any potential effects associated with water quality, including pollutants and sediments, will be fully mitigated.

In respect of the potential of the Proposed Development to give rise to the inadvertent spread of invasive species into the Lough Neagh and Lough Beg SPA, via the supported hydrological pathway, it is noted that the Proposed Development will be undertaken in line with the Outline Invasive Species Management Plan (oISMP). This document sets out the various approaches which may be utilised in order to affect control or eradication of the stands of the plant recorded within the site, depending upon the context of these stands within the context of the scheme, in addition to the effective biocontainment of the species.

Subject to the appropriate implementation of this oISMP it is envisaged that any potential effects associated with the inadvertent spread of invasive species, will be fully mitigated.

8.5.2 Habitats

No significant effects upon habitats are predicated as a result of the Proposed Development. It is noted that landscape planting will involve the provision of scattered trees which will provide some opportunities for native birds and invertebrates.

8.5.3 Bats

No significant impacts upon bats are predicted as a result of the Proposed Development. As such no mitigation measures are proposed.

It is recommended that the scheme provide ecological enhancement for this group through the provision of bat boxes within the scheme design. This would provide additional roosting opportunities for bats post development.

8.5.4 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. Should clearance works be required within this period these works will be preceded by an inspection by a suitably qualified ecologist to ascertain the potential for impacts upon nesting birds. This will avoid any direct impacts of the Proposed Development on breeding birds.

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

8.6 Noise

8.6.1 Noise and Vibration Management

Mitigation measures may be introduced in order to ameliorate or reduce negative impacts. The site's Waste Licence may require monitoring of noise emissions

During the construction and operational phase, the following measures shall be employed by the contractor in order to reduce noise levels from plant and machinery at the site, as well as from HGV's travelling on the local roads:

- HGVs will only be allowed to import material to the site during the proposed operational hours.
- All equipment will be regularly maintained to ensure that they are operatingeffectively and not producing additional noise emissions or potential tonal sources;
- Where practicable the number of machines in simultaneous operation will beminimised;
- All vehicle engines will be switched off when not in use;
- Plant and machinery used on-site will comply with the EC (Construction Plant and Equipment) Permissible, Noise Levels Regulations, 1988 (S.I. No. 320 of 1988); and
- All contractors will employ the best practicable means to minimise noise emissions and will be obliged to comply with the general recommendations of BS 5228-1: 2009and 'Environmental Good Practice Site Guide' 2005 compiled by CIRIA and the UK Environmental Agency.

No mitigation measures are required or recommended for the post-remediation phase.

8.7 Waste Management

In order to mitigate against the potential impacts that the Proposed Development could have on the production of waste during each phase, mitigation measures will be put in place to ensure that all waste is dealt with in a sustainable and legislatively compliant manner. These measures are set out below for the various phases of the development.

8.7.1 Demolition and Site Clearance Phase Mitigation

The clearance of the proposed redevelopment site will generate mostly construction and demolition waste, with a small number of green wastes, such as plants, trees and vegetation. These wastes will be segregated and stored appropriately in skips in a designated area on-site. This waste stream will be collected by either the local council or by appropriately licensed or permitted private waste contractors that have been appointed by the contractor for disposal or composting and taken to suitably licensed facilities. RPS have provided two options for management of the knotweed:

Excavation, Cell Formation and Burial on site in-situ - recorded glyphosate herbicide treatment by a 'Suitable Qualified and Fully Trained Operative' for a period of two weeks. This phase will be followed by preparation of a Cell Formation Area, designed and excavated to size in order to encapsulate the total volume of knotweed material. The cell shall be sealed by a root barrier membrane, with a 100mm layer of sand on either side of the membrane acting as a protective buffer to avoid breeching of the membrane. The cell formation area will be capped to at least 2m deep. Each knotweed stand should be excavated to a depth of 3m below ground level and to a perimeter of 7m where conditions allow. This volume of material may be reduced depending upon ECoW determination of the size of the rhizome involved. This option leaves the remaining risk of limitations to future works at the cell formation area; limitations to construction of new services or maintenance

of existing services; risk of re-establishment of the IAS if the root barrier membrane is incorrectly sealed or if the integrity of the membrane is breeched.

Excavation & Removal off Site to Landfill - an in-situ, recorded glyphosate herbicide treatment by a 'Suitable Qualified and Fully Trained Operative' for a period of two weeks should be completed. This phase will be followed by establishing a haulage route, transfer site and decontamination area, protected with a root barrier membrane. The root barrier membrane will be protected by a 100mm layer of sand on either side of the membrane to act as a protective buffer, topped with a suitable layer of hard-core material. All of this material will be removed along with the last load of contaminated soil. Each knotweed stand should be excavated to a depth of 3m below ground level and to a perimeter of 7m where conditions allow. This volume of material may be reduced depending upon ECoW determination of the size of the rhizome involved.

All excavated soil will be removed in a securely covered tipper truck, passing through the decontamination area and with waste transfer documentation verified by the EM. As a controlled waste, the Japanese Knotweed material will be taken by a licensed waste carrier to a deep fill licensed landfill site. It is understood that option 2 will be the preferred option for the council due to the remaining risk of a buried cell of knotweed material on site.

The appointed contractor should appoint an Environmental Manager (EM) and an Ecological Clerk of Works (ECoW) who will work collaboratively to ensure the implementation of the Invasive Species Management Plan (ISMP) which will be considered a live document. A no access Contamination Zone should be established around each stand of the knotweed, to a radius of 7m laterally. This will demarcate the full potential extent of underground rhizome systems. Further, all site personnel should be briefed on the key facts, locations and requirements to arrest any further spread of the knotweed. A Construction Waste Management Plan (CWMP) forms part of the Preliminary Construction Environmental Management Plan (PCEMP) in order to minimise potential impacts associated with waste on the site.

A Main Works Contractor will be appointed, Monaghan County Council and its appointed MWC contractor will ensure that demolition wastes will be collected by an appropriately licensed waste management contractor and that all proposed management routes comply with the European Union waste hierarchy of prevention, preparing for reuse, recycling, and recovery with disposal being the last and final option and with other legal requirements. All waste materials leaving the site will be transported and disposed or recovered through licenced operators and in accordance with national waste legislation.

A Demolition Survey is required prior to any demolition work commencing. The Demolition Survey will set out all high value waste materials, such as metals, that will be removed from buildings and segregated for possible onward reuse or recycling to maximise recovery. The Demolition Survey will also include intrusive surveying with sampling which will identify the exact extent and location of any ACMs in the area. Removal offsite of any ACMs discovered will be required prior to demolition. Demolition debris will be separated into five waste streams on-site:

- Construction debris (i.e. ceramics, tiles, plasterboard)
- Masonry materials (i.e. brick, concrete blocks)
- Metals
- Timber
- Universal waste (i.e. fluorescent bulbs, ballast and mercury containing switches)

8.7.2 Construction Phase Mitigation

On-site segregation of all hazardous waste materials into appropriate categories:

- Waste oils and fuels;
- Paints, glues, adhesives and other known hazardous substances

The storage and reuse of demolition or excavation wastes on site may be subject to a number of waste licensing requirements. If these wastes are to be stored on site, prior to potential reuse or recovery during construction, this activity will be subject to a Waste Management Licence Exemption with a limited tonnage of material permitted to be stored on site. Storage will take place in a secure area on-site and the contractor will monitor the amount of waste stored to ensure that the permitted limits of the Exemption are not exceeded. Monaghan County Council and its appointed contractor will consult with the EPA prior to construction to ensure that the appropriate Waste Management Licence or Exemption is in place.

In order to divert waste from landfill, possibilities for reuse of inert demolition material as fill on site will be considered, following appropriate testing to ensure materials are suitable for their proposed end purpose.

It is proposed the following areas will be infilled using engineered fill material and suitable CDW arising from demolition works within the footprint of the development:

- Suitable hard fill foundation areas

Monaghan County Council and its appointed contractor will consult with the EPA prior to construction to ensure that the appropriate licences, permits and exemptions are in place prior to initiation.

Contractors working on site during the works will be responsible for the collection, control and disposal of all wastes generated by the works. Monaghan County Council and its appointed contractor will ensure that waste it is handled only by a body authorised under the Waste Management Act to manage it. This duty implies, at the very least, checking to see that the required authorisation is in place, has not expired and is appropriate for the waste types that are to be handled. Monaghan County Council and its appointed contractor will ensure that all waste materials leaving the site will be transported via a licensed carrier and disposed or recovered through licenced operators and in accordance with national waste legislation. Monitoring and updating of records will be implemented.

Project design will incorporate adequate dedicated space to cater for the segregation and storage of all various waste streams during construction. Separate compounds will be used for different phases of the works. Site compounds are located in or immediately adjacent to the relevant works phase, such as to cause minimal interference to the local community.

All waste materials will be stored in skips or other suitable receptacles in designated areas of the site. The waste storage area(s) will be assigned and all construction staff provided with training regarding the waste management procedures on commencement of the project.

Ensuring adequate security measures are put in place

Construction waste materials shall be segregated on-site for recycling into the following categories:

- Timber
- Metal
- Cardboard & paper
- Glass
- Rubble
- General waste

In order to divert waste from landfill, where possible, inert demolition material will be reused as fill on site, following appropriate testing to ensure materials are suitable for their proposed end purpose.

It is proposed that any appropriate areas will be infilled using engineered fill material and suitable CDW arising from demolition works within the footprint of the development:

Monaghan County Council and its appointed contractor will consult with the EPA prior to construction to ensure that the appropriate authorisations are in place.

Construction waste will be managed as part of the CWMP contained in the CEMP, which will be implemented by the appointed contractor for the duration of the construction works. As demonstrated in the draft CEMP, the CEMP will contain procedures for the management of waste and related pollution control measures. The CEMP will be a live document and will be subject to revision throughout the course of the construction phase but will contain all measures outlined in the draft CEMP appended to the EIAR. Specific waste management requirements include:

- Identify how the waste will be dealt with (i.e. disposal, re-use on/off site etc.).
- Building materials should be chosen with an aim to 'design out waste.'
- Identify potential end markets e.g. reuse, recycling facilities, waste treatment facilities and disposal sites.
- All waste leaving site will be recycled, recovered or reused where possible, with the exception of those waste streams for which appropriate facilities are currently not available.
- On-site segregation of non-hazardous waste materials into appropriate categories, where possible, including any excavated soils, concrete, bricks, tiles, ceramics and plasterboard, metals and timber.
- On-site segregation of all hazardous waste materials into appropriate categories including contaminated soils, waste oil and fuels and paints, glues, adhesives and other known hazardous substances.
- Control measures and attention to materials quantity requirements to avoid over-ordering and generation of waste materials.
- Agreements with materials suppliers to reduce the amount of packaging or to participate in a packaging take-back Scheme.
- Implement a 'just in time' materials delivery systems to avoid materials being stockpiled, which increases the risk of the damage and disposal as waste.
- Segregation of waste at source where practical.
- All waste materials will be stored in skips or other suitable receptacles in designated areas of the site. The waste storage area(s) will be assigned and all construction staff provided with training regarding the waste management procedures on commencement of the project.
- Measures to ensure appropriate staff training and levels of awareness in relation to waste management.
- Waste streams will be collected by an appropriately licensed and permitted private waste contractor, appointed by the contractor for recycling, recovery or disposal at suitably licensed facilities.
- Provide a method to calculate the difference between expected waste quantities prior to commencement of the project and actual waste quantities after the project is complete.
- The appointed contractors for the site preparation, piling, earthworks and construction phases of the works will be contractually obliged to follow the PCEMP and all relevant legislation.

The Plan will be implemented from the outset of the project and throughout the duration of the project taking into consideration the waste management hierarchy to encourage sustainable development, environmental protection and optimum use of resources. The appointed contractors for the site preparation, piling, earthworks and construction phases of the works will be contractually obliged to follow the Project C&D Waste Management Plan and all relevant legislation.

Contractors will ensure all plant is inspected and serviced in accordance with its schedule. A bunded disposal area will be provided. Contractors will provide staff training on the waste management strategy. Disposal/recovery under licence.

The current Connaught-Ulster Region (CUR) Waste Management Plan (WMP) underpins all waste related operations to be carried out on site. Monaghan County Council will continue to review and implement any required changes in the waste management plan in order to avoid and minimise the potential effects of increased footfall and traffic management throughout the new development areas.

8.7.3 Operational Phase Mitigation

Monaghan County Council will continue to provide additional litter bin options, incorporating the CUR recycling strategy. Monaghan County Council will continue to encourage the responsible management of waste, including minimisation and recycling, at the point of generation throughout the new public realm and amenity areas. This will include the disposal of wastes responsibly in facilities provided as well as continued extensive scheduled waste collection throughout Monaghan town centre.

It is important that waste arisings throughout the town centre are managed appropriately in line with the waste management hierarchy in order to achieve good recycling performance and high landfill diversion.

On-site segregation of waste materials into appropriate categories. Appropriate separation of waste needs to occur in public areas. In addition to recyclable items such as paper and drinks bottles, separation of food and food contaminated packaging and consumable items for composting will be implemented.

Appropriate receptacles and recycling bins will be clearly labelled for the collection and segregation of each of these waste materials and will be provided throughout the development and open space areas, as appropriate. Wastes will be stored in these receptacles in a designated, easily accessible area of the site until collection by an appropriately licensed waste management contractor.

All wastes generated will be managed in accordance with appropriate waste management legislation and policy, and will be transported and recovered / disposed of by licensed waste management contractors.

New bins will allow for waste segregation and sufficient waste storage

9 ENVIRONMENTAL RISK ASSESSMENTS

An example environmental inspection schedule is set out in **Annex B**. An example incident report form is set out in **Annex C**.

10 EMERGENCY RESPONSE & ENVIRONMENTAL PLAN

An emergency response & environmental plan is located in **Annex G** of this document.

11 SITE WASTE MANAGEMENT PLAN

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

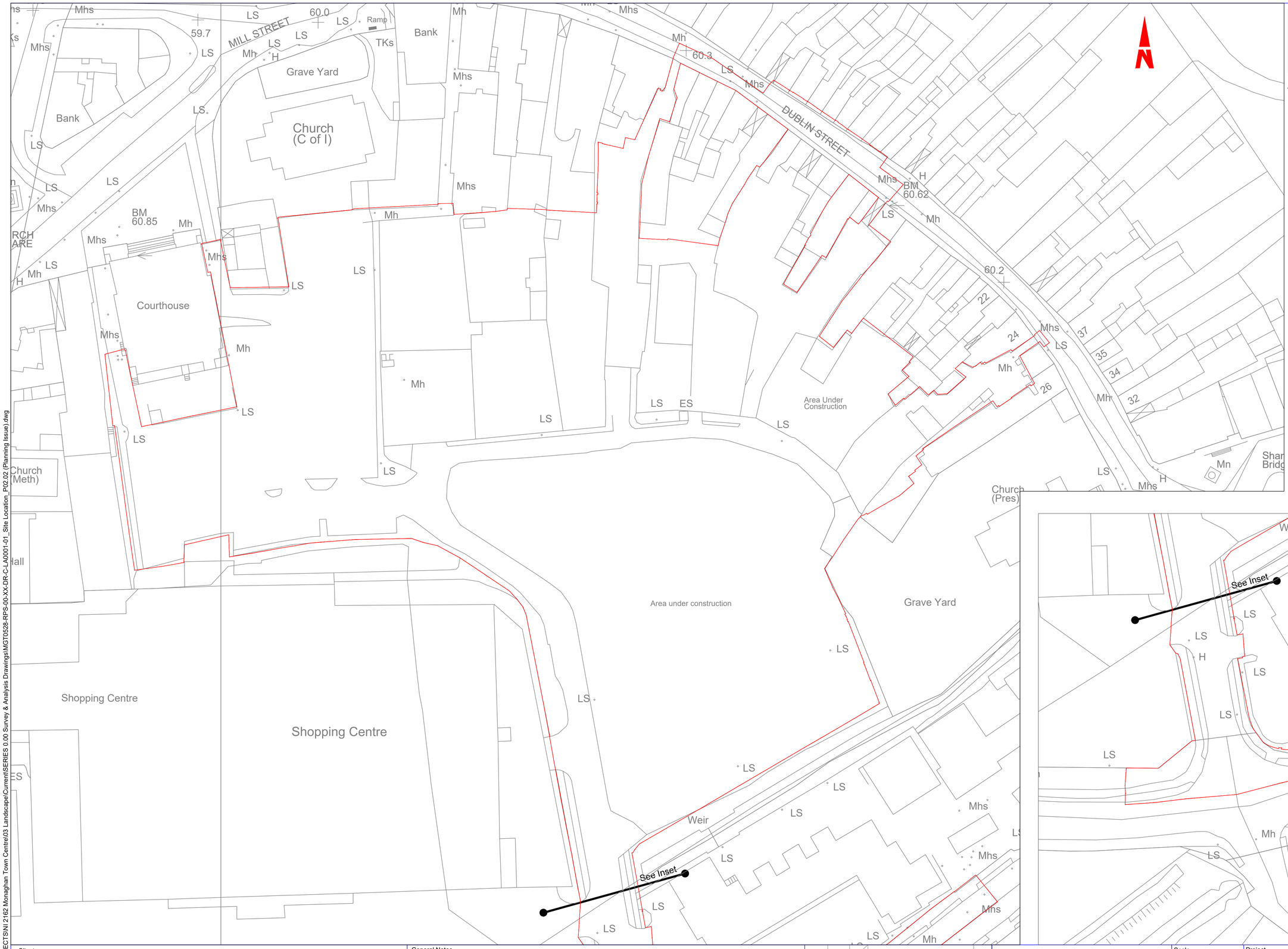
12 FINAL COMMENT

The Contractor is required to develop and implement this Preliminary Construction Environmental Management Plan (PCEMP) 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 PCEMP.

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

Annex A
Project Drawings



LEGEND

Site Boundary

Note

The site boundary illustrated on this drawing has been produced through a combined use of Vector mapping and Topographical Survey information, with site extents defined by known site features such as walls or building lines. Refer to Chapter 2 of the EIAR for further information

Client

Monaghan County Council

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(v) All Levels refer to Ordnance Survey Datum, Malin Head.

Rev	Date	Drn Chk	Amendment / Issue	App
P02.02	Aug.'22	BA AMcF	PLANNING ISSUE	RH
P02.01	Dec.'21	BA AMcF	Issued for Review	-

Model File Identifier: -

Scale: 1:500 @ A1, 1:1000 @ A3

Created on: February 2020

Sheets: 01 of 01

Project: MONAGHAN TOWN - DUBLIN STREET REGENERATION PROJECT

Title: Site Location

File Identifier: MGT0528-RPS-00-XX-DR-C-LA0001 - 01

Status: S3

Rev: P02.02

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LEGEND

- Site Boundary
- Approximate extent of Northern Standard building interface with proposed scheme (to be retained)
- Existing wall sections to be retained
- Proposed Semi-mature tree planting in tree pits (Refer Detail T on Dwg MGT0528KP1003)
- Proposed Semi-mature tree planting in soft landscape areas (Refer Detail S on Dwg MGT0528KP1003)
- Proposed tree planting within raised planters
- Proposed location for raised planter. Final location to be agreed with Client. (Refer Detail Z on Dwg MGT0258KP1003)
- Proposed areas of Turf
- Natural Stone Paving (Granite) (Refer Detail A, Detail B on Dwg MGT0528KP1003)
- Natural Stone Paving Medium unit size (Granite) to trafficked areas and pedestrian crossings (Refer Detail C on Dwg MGT0528KP1003)
- Natural Stone Paving Medium unit size (Granite) to parking bays (Refer Detail G on Dwg MGT0528KP1003)
- Pre Cast Concrete 'Granite Aggregate' Paving Units to Footway. (Refer Detail E on Dwg MGT0528KP1003)
- Aquaflow Block paving to parking spaces. (Refer Detail AE on Dwg MGT0528KP1003).
- Cycle lane surfacing (Refer Detail F on Dwg MGT0528KP1003)
- Surfacing to road and parking bays
- Surfaced raised table / junction treatment
- Concrete base to ESB Substations and oil tank storage facility
- Stone surfacing to future development plots
- Stepped access with handrails (Refer Detail AF and Detail AG on Dwg MGT0528KP1003)
- Natural stone kerbs (Granite); 125mm show. (Refer Detail A and Detail J on Dwg MGT0528KP1003)
- Natural stone 'Flush Trim' (granite) units in paved areas (Refer Detail D on Dwg MGT0528KP1003)
- Natural stone 'Dropped' kerbs (granite) with 6mm show (Refer Detail K on Dwg MGT0528KP1003)
- Natural stone (Granite) Dished Drainage channel (Refer Detail H and Detail I on Dwg MGT0528KP1003)
- Natural stone (Granite) Edging (Refer Detail F and Detail T on Dwg MGT0528KP1003)
- Tactile Paving (Buff) to uncontrolled pedestrian crossings. (Refer Detail K and Detail L on DWG MGT0528KP1003)
- Tactile Paving (Buff) to cycle lanes
- Tactile Guidance Paving (Grey) to pedestrian areas. (Refer Detail M and Detail N on DWG MGT0528KP1003)
- Tactile Paving (Buff Corduroy) to top and bottom of steps. (Refer Detail AF on DWG MGT0528KP1003)
- Proposed sections of stone faced walling (Refer Detail AB on Dwg MGT0528KP1003)
- Fencing to future development plots. (Refer Detail AC on Dwg MGT0528KP1003).
- Proposed 1.2m high railings to reform boundary. (Refer Detail AJ on Dwg MGT0528KP1003).
- Proposed sections of timber post and rail fencing (Refer Detail AH on Dwg MGT0528KP1003).
- Proposed sections of 1.8m vertical timber board fencing (Refer Detail AI on Dwg MGT0528KP1003)
- PP — Location for pop-up power supply unit.
- Cr — Cycle Stands (Refer illustration Y on Dwg MGT0528KP1003).
- S — Location for bench seating (Refer Illustration X on Dwg MGT0528KP1003)
- Lb — Location for Litter Bin (Refer Illustration W on Dwg MGT0528KP1003)
- B — Location for Bollards (Refer Illustration AA on Dwg MGT0528KP1003)
- Ecp — Proposed location for EV charging point
- Proposed location for street lighting columns (Refer Detail AD on Dwg MGT0528-RPS-00-XX-M2-C-KP1003)
- Proposed location for Inground Illumination bar (Refer Detail V on Dwg MGT0528KP1003)
- +58.296 — Proposed levels

Client: Monaghan County Council

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Rev	Date	Drn	Chk	Amendment / Issue	App
P02.07	Aug.'22	SA	AMcF	PLANNING ISSUE	RH

Model File Identifier: N/A

Scale	Project
1:500 @ A1 1:1000 @ A3	MONAGHAN TOWN - DUBLIN STREET REGENERATION PROJECT
Created on: FEBRUARY 2020	Title: GENERAL ARRANGEMENTS (Overall Layout)
Sheets: 01 of 05	

File Identifier	Drawing No.	Status	Rev
MGT0528-RPS-00-XX-M2-C-GA1001	GA1001	S3	P02.07

Q:\Projects\ALL RPSES PROJECTS\NI 2162 Monaghan Town Centre\03 Landscape\Current\SERIES 1.00 General Arrangement Plans\MGT0528-RPS-00-XX-M2-C-GA1001_General Arrangement (Planning Issue)_P02.07.dwg

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Annex 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 Monaghan County Council***	*0/1/2*	*Comment*
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* ***(Annex C)*** *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 PCEMP/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 inspection schedule

Annex B1
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:

Annex C
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

Annex D
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	Appointed Contractor to Complete during Works
Concrete	Appointed Contractor to Complete during Works
Masonry	Appointed Contractor to Complete during Works
Wood	Appointed Contractor to Complete during Works
Packaging	Appointed Contractor to Complete during Works
Hazardous Materials	Appointed Contractor to Complete during Works
Other Waste Materials	Appointed Contractor to Complete during Works
TOTAL Arisings	Appointed Contractor to Complete during Works

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

- C & D Waste will arise on the Project mainly from excavation and unavoidable construction waste/material surpluses/damaged materials.
- 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.
- Excavated soils will be carefully stored in segregated piles on the site for subsequent re-use/removed from site for direct beneficial use elsewhere.
- 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.
- 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.
- Packaging will be source segregated for recycling or return to suppliers.
- Hazardous wastes will be identified, removed and kept separate from other C & D Waste materials in order to avoid further contamination.
- 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	*Appointed Contractor to Complete during Works*			
General Fill/Hard-core				
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

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

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

c. **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?

- [ ] 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?

Annex E
Construction Method Statement

A Construction Method Statement (CMS) is a key tool for delivering environmental management during the construction phases of a project. 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 CMS is to:

- record environmental risks and identify how they would be managed during the construction period;
- provide a means of identifying environmental commitments, objectives and targets;
- provide a means of monitoring and reporting performance against the objectives and targets;
- provide a framework to ensure that all parties are aware of their responsibilities;
- establish a checklist of control procedures which can then be integrated into an overall environmental management protocol;
- 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;
- provide detailed environmental mitigation measures for reducing the potential for environmental impacts during pre-construction and construction; and,
- highlights that some activities may require consents or licences.

Common Working Methods and Pollution Control

The following mitigation will be employed as best practice construction measures:

- EPA's advice on pollution prevention guidance will be followed.
- The period of time that the stockpiles and ground are exposed will be kept to a minimum where possible and ideally the minor earthworks and disturbance shall be reinstated as soon as possible.
- Pollution spill kits will be on site and any soils contaminated with fuel or oil will be removed to a suitable landfill site. All site staff will be trained in the use of spill kits.
- Regular inspections of machinery onsite - Check construction vehicles/machinery leaks and supply spillage contingency kits and adequately maintain vehicles/machinery.
- Any temporary waste generated during construction for welfare facilities (e.g. portaloos) will be removed by a registered waste carrier to a licenced disposal site.

Ensure that all personnel involved in earthworks which could pollute the water environment are aware of their statutory responsibly not to cause water pollution or damage habitats. All such persons should be aware, and should make their employees aware, of the likely causes and consequences of environmental pollution and should be familiar with any control measures and emergency procedures to be deployed.

A suitable buffer between location of any refuelling, storage of oil/fuel, concrete mixing and washing areas and any watercourses or surface drains present on site or adjacent to site is defined. Other important aspects that will be adhered too are:

1. Regular inspections of machinery onsite.
2. Emergency spill procedures in place.

3. A suitable buffer between location for storage of excavated spoil and construction materials and onsite watercourses.

Site Specific - Overview of Proposed Work Activities

An overview of the work activities involved in the proposed development is provided below.

- Site Offices / Staff Welfare Units and Storage Compound to be established – will include security / perimeter (board) fencing.
- Site Clearance
- Topsoil/earth stripping and site levelling / earth moving
- Construction of new landscaped areas
- Foundation trenching
- Topsoil import
- Establishment of foundations for landscape features
- Electricity supply
- Importation of building materials by HGV – anticipated to be blocks / bricks, pipe work, sand, cement, concrete
- Storage of landscape materials – note some materials are likely to be used immediately, with no requirement for onsite storage
- Landscaping and Signage - Planting of site with species noted in landscape plan
- Any site compound will be located in an area well away from sensitive environmental areas.

Note that it will be a key element of all earthworks management to ensure that the risk of pollution to any watercourse is minimised.

At this stage it is not known what plant and machinery would be used for the construction activities involved in the development of this site. The choice of plant and machinery will be made by the appointed contractor, but is likely to include at least the following:

- Excavators
- HGV / dumper trucks / skip lorries
- Pneumatic drills / hammers (hand held)
- Generators
- Works vans and 4WD vehicles

Method statements are widely used in construction as a means of controlling specific health and safety risks that have been identified (usually following the preparation of a risk assessment), such as lifting operations, demolition or dismantling, working at height, installing equipment, the use of plant, and so on.

A method statement helps manage the work and ensures that the necessary precautions have been communicated to those involved. The process of preparing a written method statement provides evidence that:

1. Significant health and safety risks have been identified.
2. The co-operation of workers has been ensured.
3. Safe, co-ordinated systems of work have been put in place.
4. Workers have been involved in the process.

Method statements are not a definitive requirement, however they are identified by the Health and Safety Authority (HSA) as an effective means of assessing risks, managing risks, collecting workers' views and briefing workers.

The format in which method statements are prepared, reviewed and used should be set out at the outset of a project, perhaps within the **Project Execution Plan (PEP),** ensuring not only that the method statement is produced by a competent person, but that it is peer-reviewed as part of the **quality assurance (QA) system** prior to its use.

This method statements is written by a competent person who is familiar with the process being described and may need to be agreed between the client, principal contractor and contractor. The HSA suggests that those preparing method statements should consider:

1. Is there a safer way of doing this task?
2. Will workers actually implement the controls as planned?
3. Do controls make the job difficult or inconvenient?
4. Are there small changes that will improve the intended method?
5. How will controls work in adverse conditions?
6. Will workers require additional briefing or instructions?

The contents of a method statement will vary with the work process being described, however, it may contain:

7. Details of the organisation in control of the activity.
8. Details of the individual responsible for the activity.
9. A description of the activity.
10. A description of how the work will be managed.
11. The location of the activity, its boundaries, means of access and how it is segregated from other activities.
12. Plant and equipment required.
13. The procedure for changing the proposed method of work if necessary.
14. A step by step description of the activities to be undertaken.
15. Precautions necessary to protect workers, and other people that could be affected, including personal protective equipment and ventilation requirements.
16. Training procedures.
17. The need for specially-trained operators for certain activities.
18. Emergency procedures, including the location of emergency equipment.
19. The handling and storage of materials and pollution prevention procedures.
20. Temporary works designs.
21. The method for safeguarding existing structures.

This method statement incorporates those recommendations.

General mitigation and control measures to be employed (as appropriate)

Pollution Prevention

It is important to understand how activities could affect the environment and cause pollution. Pollution linkages and pathway are shown below:

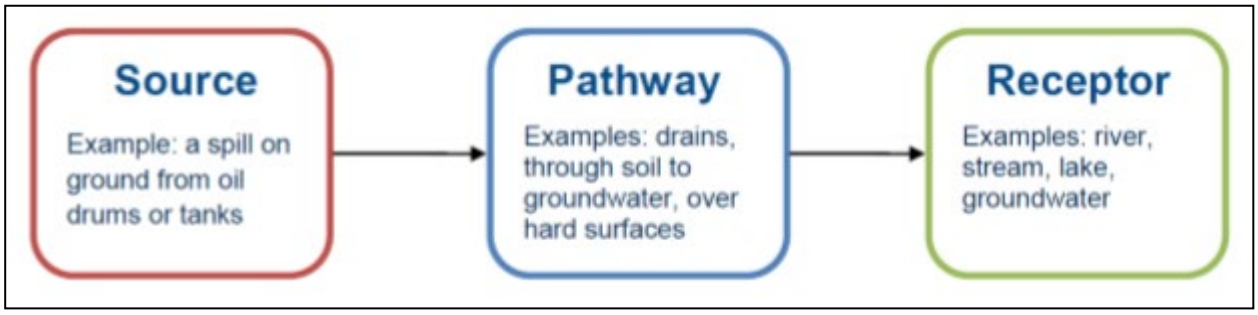


Figure E.1 - Example of a pollution linkage using the source > pathway > receptor model

The site and activities will only cause a risk to the environment or people if all three parts of the pollutant linkage present i.e. a source, a pathway and a receptor. Any surface water drains go directly to a watercourse and therefore should only carry clean uncontaminated rainwater.

A. Silt Pollution

This CMS recognises - Exposed ground and stockpiles: Planning for intense and also prolonged wet weather is considered in the project and employment of relevant pollution mitigation measures including:

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. seeding or covering stockpiles;
4. Using geotextile silt fencing at the toe of the slope, to reduce the movement of silt;
5. if applicable, collect run-off in lagoons and allow suspended solids to settle before disposal;
6. divert clean water away from the area of construction work in order to minimise the volume of contaminated water.

This CMS recognises - On-site working: The movement and maintenance of plant on site can generate silt and oil contaminated water, or introduce non-native species from other sites. Sources of silt (e.g. plant and wheel washing, site roads, river crossings) carry a high risk of causing pollution. **Plant and wheel washing** - To reduce the pollution risk, make sure that you consider all relevant measures, including:

1. plant and wheel washing is carried out in a designated area of hard standing at least **10 metres** from any watercourse or surface water drain.

Silt causes lasting damage to river life such as fish, insects and plants and can also build up to cause flooding. Water containing silt should never be pumped or allowed to flow directly into a river, stream or surface water drain. Silty water can arise from dewatering excavations, exposed ground, stockpiles, plant and wheel washing. The mitigation measures set out in this document will help insure siltation episodes are highly unlikely.

B. Disposal of Contaminated Water

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. It is essential to minimise the volume of clean water that becomes contaminated, by diverting clean water away from working areas. The choice of method for the treatment and disposal of contaminated water will depend on:

- the volume of water

- the area of land available for storage, treatment or discharge
- the amount and type of silt
- the presence of other substances in the water
- the conditions of any consent or authorisation.

Discharge to sewer during construction - Discharges to foul sewer will require the permission of the local water and sewerage provider.

Tanker off site during construction - If no other disposal routes are available then contaminated water can be collected by tanker for authorised disposal off-site. This may be a costly option and must be discussed with your environmental regulator at the scoping stage of your project. You must comply with your Duty of Care obligations and obtain Waste Transfer Notes for any waste leaving site.

C. Concrete, cement and grout

Concrete, cement and grouts are very alkaline and corrosive and can cause serious pollution to water. Concrete, cement and grout mixing and washing areas should:

- be sited on an impermeable designated area;
- be sited at least 10 metres from any watercourse or surface water drain to minimise the risk of run off entering the water environment;
- have settlement and re-circulation systems for water reuse, to minimise the risk of pollution and reduce water usage;
- have a contained area for washing out and cleaning of concrete batching plant or ready mix lorries;
- collect wash waters that cannot be reused and, where necessary;
- discharge to the foul sewer (you must have permission from the local water and sewerage provider for this), or contain wash water for authorised disposal off site.

D. Oils & Chemicals

Storage Fuel, oil and chemical storage - must 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. Detailed guidelines concerning above ground oil storage tanks are available (GPP2). Leaking or empty drums must be removed from the site immediately and disposed of via a registered waste disposal contractor.

Security - All valves and trigger guns should be protected from vandalism and unauthorised interference and should be turned off and securely locked when not in use. Any tanks or drums should be stored in a secure container or compound, which should be kept locked when not in use. Bowsers should be stored within site security compounds.

Refuelling - The risk of spilling fuel is at its greatest during refuelling of plant. Where possible, refuel mobile plant in a designated area, preferably on an impermeable surface well away from any drains or watercourses. Keep a spill kit available and use a bunded bowser. Never leave a vehicle unattended during refuelling or jam open a delivery valve. Check hoses and valves regularly for signs of wear, and ensure that they are turned off and securely locked when not in use. Diesel pumps and similar equipment should be placed on drip trays to collect minor spillages or leaks. These should be checked regularly and any accumulated oil removed for appropriate disposal.

INCIDENT RESPONSE - You should immediately report any environmental incidents by calling the Incident Hotline for EPA

0800 80 70 60

Annex F
Pollution Prevention Plan

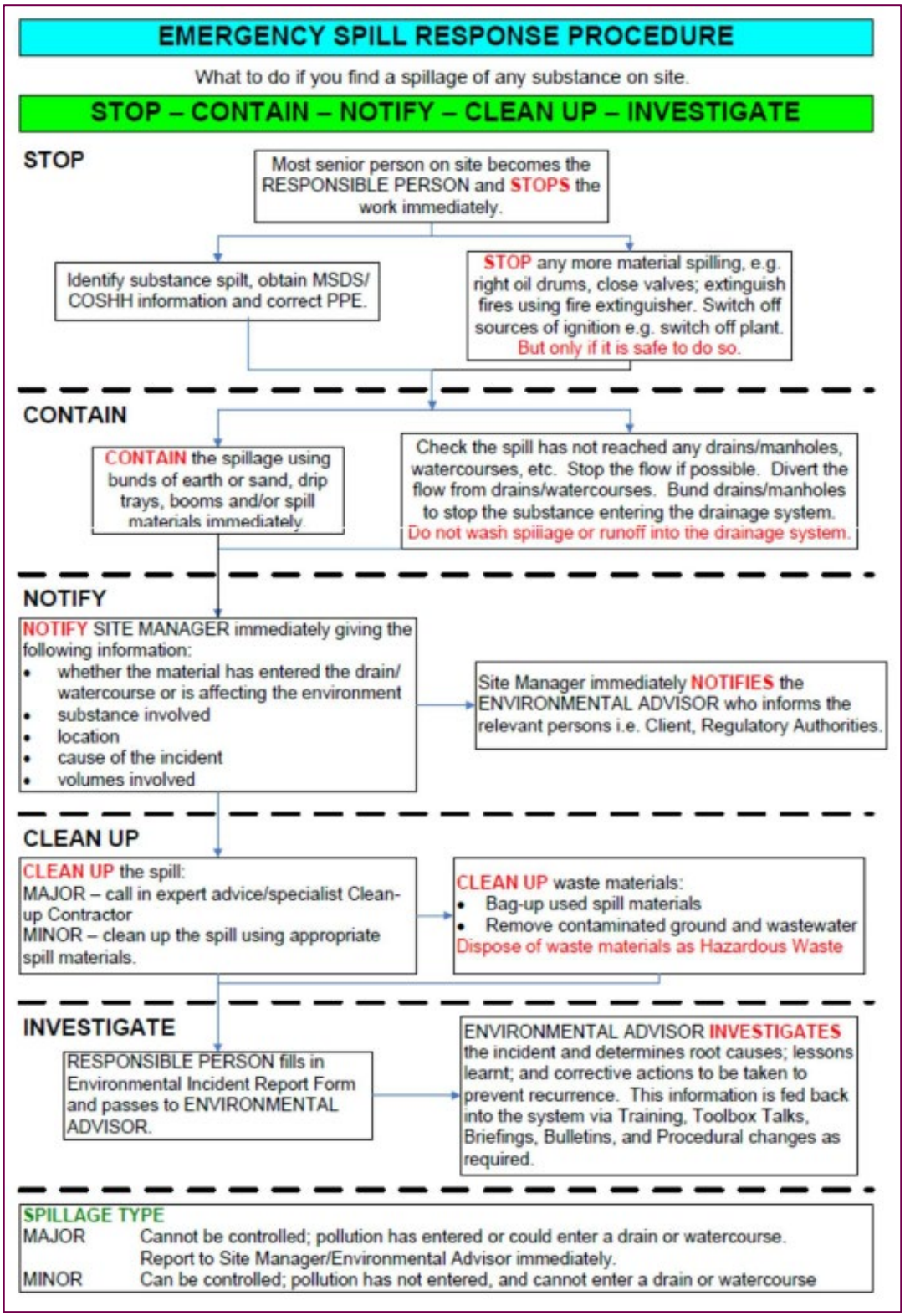


Figure F.1: Emergency Spill Response Procedure

Exclusion Zones & Materials

The contractor will:

- **dedicate specific areas for oil storage and refuelling, separated by a minimum of 10m from any existing waterbodies within or adjacent to the proposed development site and comply with legislation, including providing bunds sized to contain 110% of fuel storage capacity.**
- **The contractor 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.**
- **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.**

The exclusion zone is a 10m distance banding or buffer from any existing watercourse within or adjacent to the proposed development site. **NO** material shall be stored in the exclusion zone area for the duration of the construction works. **There shall be no cement, concrete, grout, fuels/ oil/ hydrocarbons stored in the exclusion zone**.

Ensure that control measures are adequately sized and correctly installed. Control measures will be consistent with the guidance outlined in this PCEMP:

- **adherence to the exclusion zone (exclusion zone marked out on site to prevent storage of any material)**
- **Kerb line at edge of existing footprint to prevent overland flow to the watercourse,**
- **Spill kits located on site.**

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 F.2 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 your environmental regulator (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.

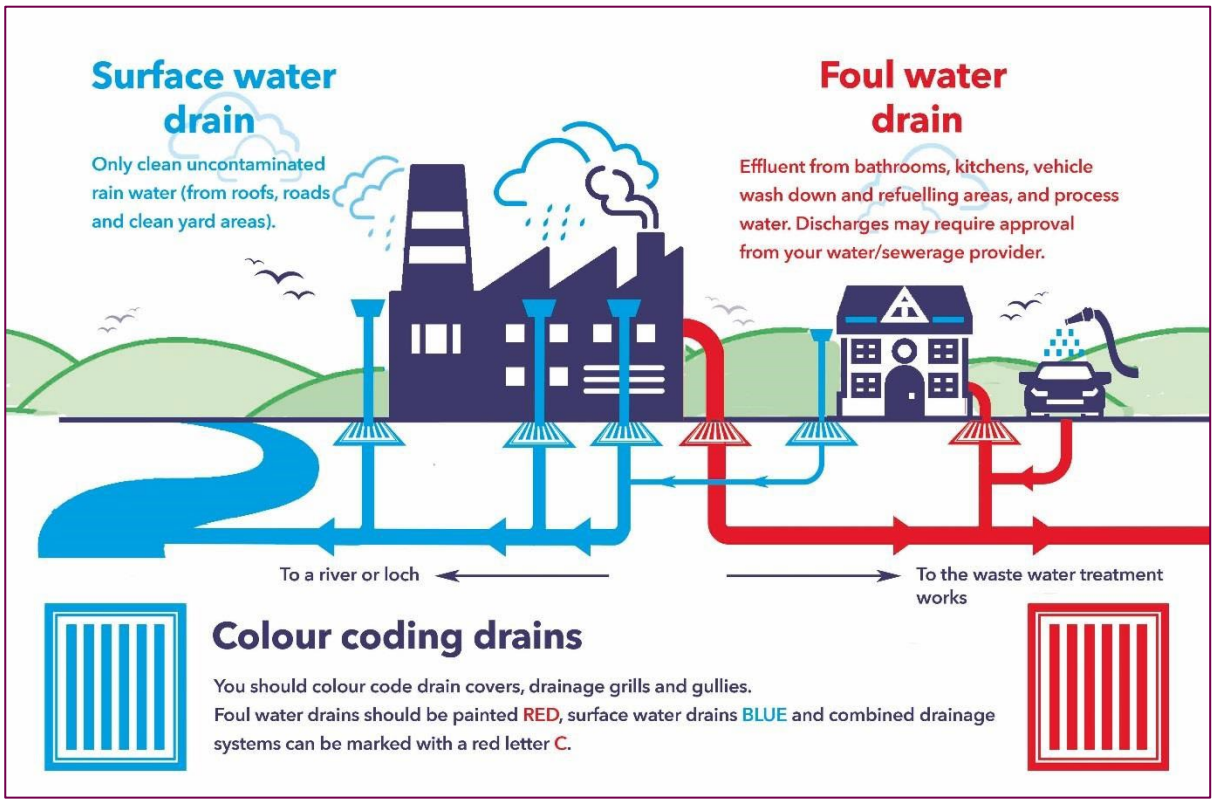


Figure F.3: Surface water and foul water drainage.

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 Urban 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.

12.6 More information on drainage

- Technical Guidance Document H - Drainage and Waste Water Disposal - https://www.gov.ie/en/publication/16910-technical-guidance-document-h-drainage-and-waste-water-disposal/
- Irish Water

  https://www.water.ie/contact/

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 F.4: 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 F.5: 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 the EPA on **1890 33 55 99** **(24 hours, 7 days a week)** – your environmental regulator can advise you on what to do, and can help to inform any other agencies that might be required.

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

More information on the storage of materials can be found in the EPA's IPC Guidance Note on *Storage and Transfer of Materials for Scheduled Activities.*

https://www.epa.ie/publications/licensing--permitting/industrial/ied/IPC_Guidance_note_Materials_storage.pdf

Section 4

4.1 Minimising your waste (Annex D 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.

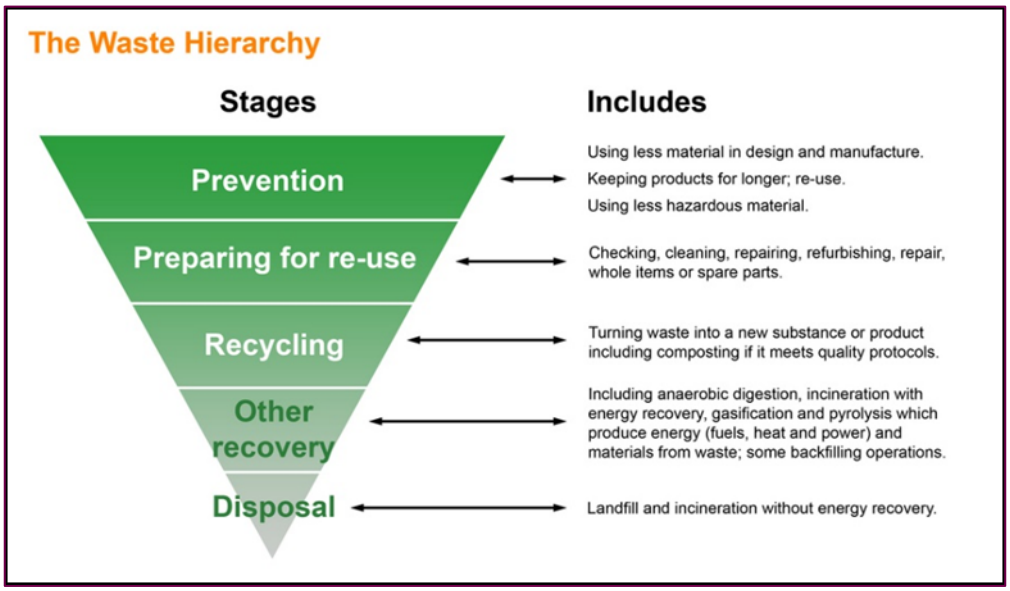


Figure F.6: The Waste Hierarchy

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

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' 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

For information on waste management visit: https://repak.ie

Repak is an environmental not-for-profit organisation, with a purpose to lead the recycling and sustainability of Ireland's packaging waste; advocate for a new circular economy; and educate businesses and consumers on reducing and recycling packaging waste.

Check if a waste carrier is licensed:

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.



Figure F.7: A spill kit

5.7 If you have an incident

If you have a pollution incident:

Contact the EPA hotline

1890 33 55 99

(24 hours a day, 7 days a week)

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/our-services/compliance--enforcement/industry-and-waste-management/incidents/

Flood maps and guidance

Office of Public Works (OPW) and Flood Relief:

https://www.floodinfo.ie/

Fire and Rescue contact information

Health and Safety Authority: Fire

https://www.hsa.ie/eng/Topics/Fire/

Annex G
Environmental Emergency 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 hotline (1890 33 55 99)**

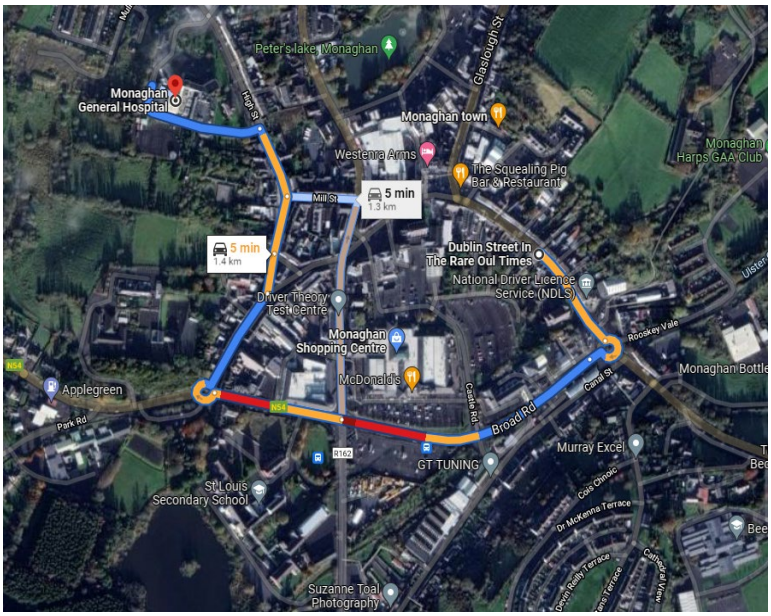
It will be important to incorporate the names and telephone numbers of others you need to inform (includes alerting people out of hours) and who should contact them within the spillage response plan.

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 / 112
Nearest hospital – Accident & Emergency Dept.	Monaghan General Hospital Address: Monaghan General Hospital, Mullaghmonaghan, Monaghan  Phone: +353 47 81811
Environmental Protection Agency Hotline	**1890 33 55 99** (Free 24 hr Emergency Hotline)

Contractor Contacts: (Out of Hours)	
Construction Director	*Contractor to complete for final version*
Construction Manager/Site Manager	*Contractor to complete for final version*
Environmental Manager	*Contractor to complete for final version*

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

END

Appendix

2b

Preliminary DCWMP

SOUTH DUBLIN STREET & BACKLANDS REGENERATION PROJECT

Preliminary Demolition, Construction and Waste Management Plan (pDCWMP)

NI2162
Preliminary Construction and Demolition Waste Management Plan

August 2022

rpsgroup.com

Document status

Version	Purpose of document	Authored by	Reviewed by	Approved by	Review date
F01	Draft for EIAR				Aug 2022

Approval for issue

August 2022

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Prepared by:

RPS

Prepared for:

Monaghan County Council

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Appendix A European & Irish Waste Legislation

1 INTRODUCTION

1.1 Purpose of this Plan

RPS have been commissioned by Monaghan County Council (MCC, the Client) to prepare a Preliminary Construction and Demolition Waste Management Plan (CDWMP) for the proposed development as part of the South Dublin Street and Backlands Regeneration scheme.

This scheme is the first phase of a regeneration plan for South Dublin Street and its backlands, and funding has been secured to progress these works. This plan is part of a wider project being undertaken by the Council to regenerate the wider Dublin Street area and its surrounding lands, and work is currently underway to progress detailed regeneration proposals for this wider project. These proposals will be the subject of planning applications in the future.

The plan presented herein is outline/preliminary in nature as it has been prepared at a stage when exact quantities and volumes of waste material have not yet been determined.

1.2 Site Location

The application site is located in the central core of Monaghan town centre, Co. Monaghan. The site boundary is shown below in Figure 1.1 below.

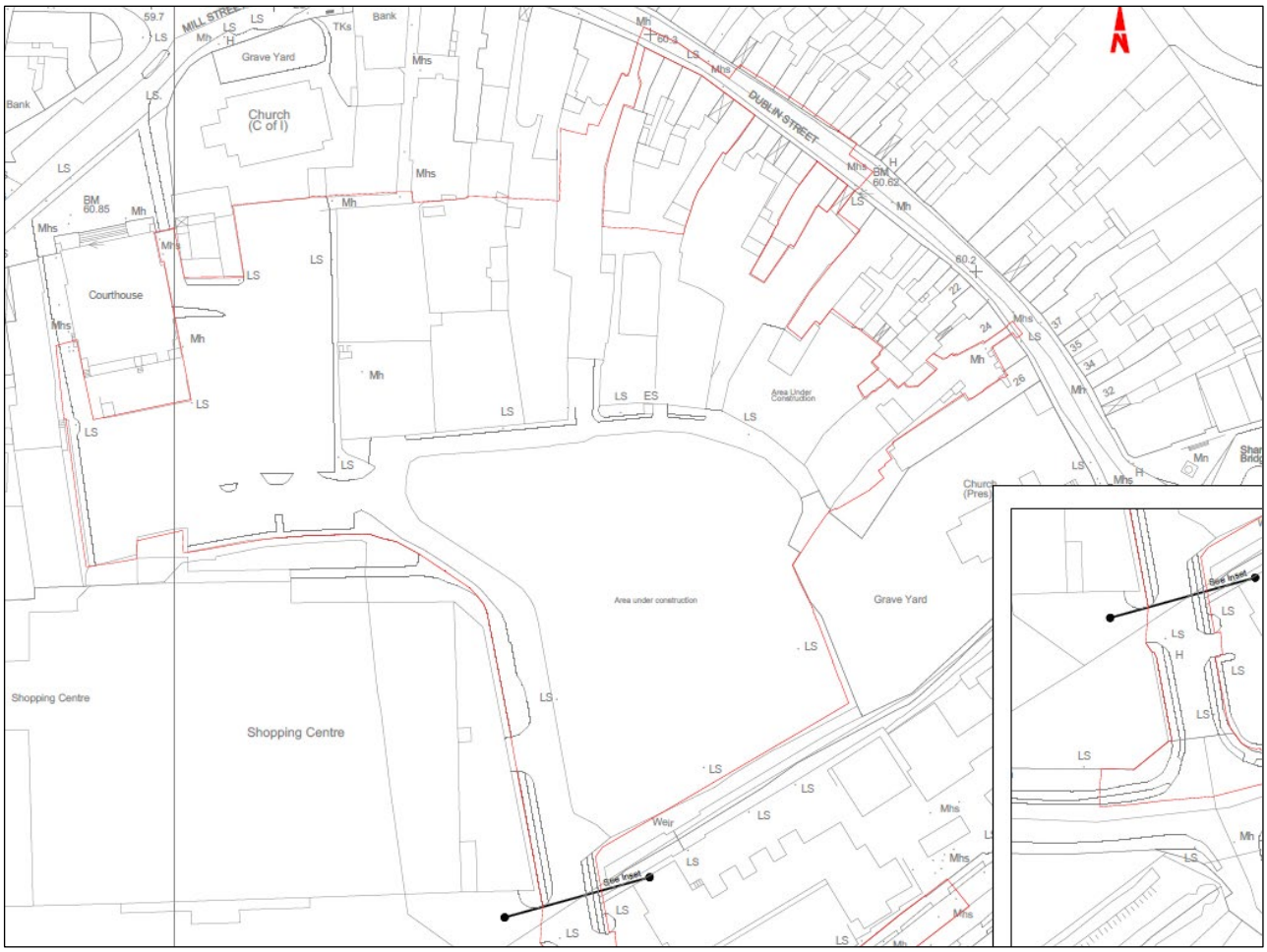


Figure 1.1: Location of Proposed Development & Site Boundary

The site is located south / south west of The Diamond and the main arterial route, Dublin Street, which flows through the town centre, and due north of Broad Road. It adjoins community, ecclesiastical, retail and commercial buildings to the north east and west along The Diamond and Dublin Street.

The Shambles River defines part of the southern boundary, with existing car parking to the south/east, and a large shopping complex (Monaghan Shopping Centre) and car parking to the south/west.

The site currently comprises:

- several retail /commercial buildings (both vacant and in-use);
- backland areas comprising vacant / derelict land and properties, storage areas, and rear access points;
- extensive areas of existing car parking;
- roads/road infrastructure;
- pedestrian alleyways; and,
- amenity green space.

2 PRELIMINARY CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT PLAN IN CONTEXT

2.1 General

This plan has been prepared with a view to outlining the procedures to be adopted on site with respect to waste management for all waste streams of demolition and construction produced at the proposed construction site for the relevant phase of the project.

The Principle Contractor (when appointed) will be obliged to prepare a detailed Construction and Demolition Waste Management Plan (CDWMP) as part of the construction project, the Contractors CDWMP will be based on the principles and procedures outlined in this preliminary CDWMP.

This preliminary plan takes due consideration of the Connacht Ulster Regional Waste Management Plan 2015 – 2021 with respect to its principles of prevention and re-use. As Lead Authority for the Connacht Ulster Waste Region, Mayo County Council's responsibilities include the preparation of the Connacht Ulster Regional Waste Management Plan, which was published in May 2015, the coordination of the implementation of the plan over the plan period, 2015 – 2021, and monitoring the implementation of the new plan. The plan is adopted by Monaghan County Council.

The general principles of the waste hierarchy (as set out below in Figure 2.1) have been applied in the production of this plan.

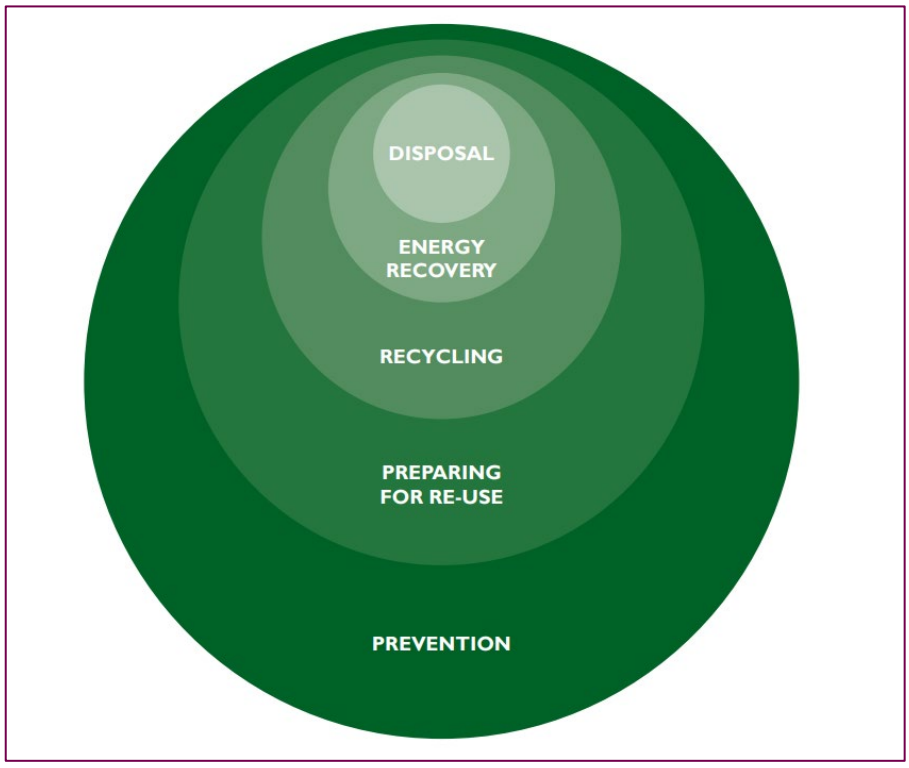


Figure 2.1: Waste Management Hierarchy

Main themes covered by this preliminary plan include waste management procedures such as; waste arisings, waste segregation, prevention of waste generation through material management, waste storage and waste actions as well as site management procedures including roles & responsibilities, waste contractors, waste traceability/disposal and record keeping.

2.2 Preliminary CDWMP Objectives

The main objectives of this preliminary CDWMP are as follows:

- to ensure that a framework exists in the project to enable and audit the implementation of Irish Waste Management legislation;

- to ensure that a framework exists in the project to enable the auditing of the Irish Waste Management legislation;
- to promote an assimilated approach to waste management throughout the project;
- to set out responsibilities in regard to waste management throughout the project; and,
- to provide a framework for the designers and the Principal Contractor that they will build upon and implement within their CDWMP.

2.3 Legislative Background

2.3.1 European

Waste framework legislation establishes the legal structure for the prevention and management of waste. Legislation also governs reporting on general waste, waste treatment and waste capacity as sets out mandatory waste targets which can be targets for diversion, collection or treatment. The European Commission has prepared waste framework legislation to govern the broad approach and principles for meeting waste across all member states. The principal European framework legislation is:

- European Directive (2008/98/EC) on Waste (Waste Framework Directive);
- Council Decision (200/532/EC) establishing a list of wastes; and,
- Regulation (1013/2006) on the shipments of waste.

2.3.2 Irish Waste Management Law

The Principal Contractor will be required to ensure that Irish Waste Management Law is adhered to in relation to the transport and disposal of wastes. This includes adherence to the Environmental Protection Agency Act 1992, the Waste Management Acts 1996 – 2011. Compliance with the Waste Management (Movement of Hazardous Waste) Regulations for transport of hazardous wastes by road will also be required for asbestos containing materials or contaminated soil waste which may arise from the site.

The Waste Management Acts provide for a general duty on everyone not to hold, transport, recover or dispose of waste in a manner that causes or is likely to cause environmental pollution. The Waste Management Act defines waste as something the holder of it discards, intends to discard or is required to discard.

Article 27 of the European Communities (Waste Directive) Regulations, 2011 allows an economic operator to decide, under certain circumstances, that a material is a by-product and not a waste. Decisions made by economic operators under article 27 must be notified to the EPA. After consultation with the economic operator and the relevant local authority, the EPA may determine whether the notified material is waste.

Appendix A details the linkages between European & Irish Waste Legislation.

2.4 Reference Documents

This document has been prepared with reference to the following guidance documents:

- Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects, Department of Environment Heritage and Local Government (DoEHLG) July 2006;
- Construction Industry Research and Information Association (CIRIA) document SP133 Waste Minimisation in Construction; and
- TII guidelines including Guidelines for the Management of Waste from National Roads Construction Projects (Revision 1, 12 November 2014).

On commencement of the project the appointed contractor will be responsible for the management of wastes during the course of the project. The waste material considered within this Outline (or Preliminary) CDWMP covers the waste generated by the proposed project.

2.5 Preliminary CDWMP Requirement

A CDWMP is required as there may be potential for the project to exceed the thresholds set out in the Department of the Environment Heritage and Local Government (DoEHLG) publication 'Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects', which are set out as follows:

1. New residential development of 10 houses or more;
2. New developments other than (1) above, including institutional, educational, health and other public facilities, with an aggregate floor area in excess of 1,250 m^2;
3. Demolition/renovation/refurbishment projects generating in excess of 100m^3 in volume, of C&D waste; and,
4. Civil Engineering projects producing in excess of 500m^3 of waste, excluding waste materials used for development works on the site.

3 PROJECT DESCRIPTION

3.1 Nature and Extent of the Proposed Development

3.1.1 Dublin Street and Backlands Regeneration Plan

In 2018, the Council commissioned a further study to evolve the regeneration vision for the Dublin Street areas, and consolidate the conceptual proposals for the two LAAP[1] areas and beyond. The vision for the wider Dublin Street area aims to consolidate the urban structure, to create new legible streets, connections and new public spaces throughout the existing historic town centre, to establish a new Backland neighbourhood. This will provide an attractive place where people will wish to live, work and visit.

The overall regeneration framework for Dublin Street envisages extensive town centre development (office, retail, commercial, community) and associated infrastructure improvements in this wider region over the next 10 years. The proposed development is the initial phase of works to facilitate and stimulate regeneration and redevelopment within this town centre location. These proposals are outlined in the County Development Plan 2019 – 2025

3.1.2 South Dublin Street and Backlands

The vision for the Dublin Street area in the short term is to plan for the upgrading of existing public spaces, streets, spaces and footpaths – and to utilise and create new connections with new streets and spaces which enhance the urban structure, and quality of the public realm of the Dublin Street quarter as development sites come on-stream. This new high-quality public realm (footpaths, street furniture, wayfinding, signage, landscaping etc.) will set the standard for new developments and where existing structures are reused and adapted.

The Council has secured funding from the Urban Regeneration and Development Fund (URDF) to progress the short term streets, spaces and public realm enhancement proposals within the Dublin Street South area. Work is underway on the detailed design of the regeneration concept for South Dublin Street and Backlands, and it is anticipated that a planning application will be submitted to An Bord Pleanála later this year to regularise the proposals. A detailed description of these works is outlined in Section 3.1.3.

Funding has also been secured to develop the conceptual detail for regeneration proposals throughout the North East Dublin Street area, which is the subject of a Local Area Action Plan, and supported by the objectives of the Monaghan County Development Plan 2019-2025.

Similar to the South Dublin Street & Backland Regeneration Plan, it is anticipated that the initial phase of work will comprise public realm works similar to those outlined in Section 3.1.3 The detailed design of the works proposed in the North East Dublin Street project is likely to commence in 2022, with a planning application submitted in 2022/2023 for the initial works.

3.1.3 Description of the Works

The proposed development works, to be the subject of a planning application, aspire to meet the short term objectives of improving the physical and spatial quality of the streets and spaces in the Dublin Street (South) Regeneration Plan area. The aim is to create new connections with new streets and spaces which enhance the urban structure, and quality of the public realm of the Dublin Street quarter. It is hoped that this will act as a stimulus for attracting future new development into the area, or a redevelopment of certain areas.

The new high quality public realm proposals for footpaths, street furniture, wayfinding, signage, landscaping, new public spaces, and new streets will set the standard for all new developments and where existing

[1] A Local Area Action Plan (LAAP) for the lands to the north east of Dublin Street, Roosky, is identified in the Plan as a strategic framework to promote growth and development of the town centre in a coordinated manner.
The Plan also identifies indicative New Road Proposals, as potential new links to help relieve traffic congestion, facilitate new development, and provide alternatives routes around the town. A number of these links are within and adjacent to the Dublin Street LAAP area.
The Dublin Street Regeneration Plan has been prepared as a Local Area Action Plan (LAAP) for the lands to the south of Dublin Street, to provide strategic guidance on a coordinated approach to future redevelopment in this area. It promotes and encourages the redevelopment of brownfield and derelict sites to consolidate the town centre.

structures are reused and adapted. The proposed development works that will be the subject of a planning application will comprise the following enabling works:

- The demolition of buildings and structures, including street frontage buildings No's 8-11 Dublin Street and associated outbuildings and structures; the building to the rear of No.24 Dublin Street; partial removal of the rear section of the Northern Standard building fronting the Lower Courthouse car park; storage sheds, walls, and fencing.
- No.10 Dublin Street is one of these properties, and it was previously on the Record of Protected Structures (RPS) for County Monaghan. This was primarily for historical reasons as it was the birthplace of Charles Gavan Duffy who was a notable writer, Irish nationalist and Australian politician.
- New building façades/side elevations to No's 7 and 12-13 Dublin Street, likely to be a masonry wall with piers finished in render (for structural stability) to facilitate creation of the new junction onto Dublin Street;
- Creation of a new urban space, comprising a street, junction and extended footpaths to connect Dublin Street through to its backland areas, opening up new areas for development and enhancing the pedestrian linkages throughout this area. This area is intended as a multi-use space and is capable of being temporarily cordoned off for use as an event space, for a market, pop-up commercial/retail uses, or occasional festival events. The creation of this new space creates a new setting and enables new opportunities for future infill development and reuse/ adaptation of existing underutilised buildings on either side of the new space, creating opportunities for new commercial and residential activity. It is proposed that this area will be known as Charles Gavan Duffy Place.
- Creation of new streets:
  - New street connecting Charles Gavan Duffy Place to the Courthouse, to be known as Church Walk;
  - Realignment of an existing road to create a promenade, and to be known as The Mall;
  - Realignment of an existing road, to be known as Farney Road;
- Creation of new urban civic spaces, streets, junctions, pedestrian pavements, steps, and cycle routes.
- Construction of new public realm comprising new surfaces, kerbing, street furniture, public street and feature lighting, soft landscape planting, cycle parking and signage.
- Clearance, regrading and creation of two potential development areas with supporting embankments, hardcore surfacing and boundary fencing.
- New boundary treatments comprising walls, railings and fencing.
- Alterations to the existing car parking layouts within the Courthouse car park and Lower Courthouse car park, and a reduction in long stay parking spaces.
- Upgrading and installation of new utility services, CCTV, and a new ESB sub-station.
- All associated site development works.
- Construction works including excavation, cut / fill, re-grading of land, and construction of retaining structures, to accommodate level changes, throughout the study area.
- It is estimated that the proposed work will take between 12 - 24 months to complete on site.

A concept plan of the proposed development is illustrated in Figure 3.1.

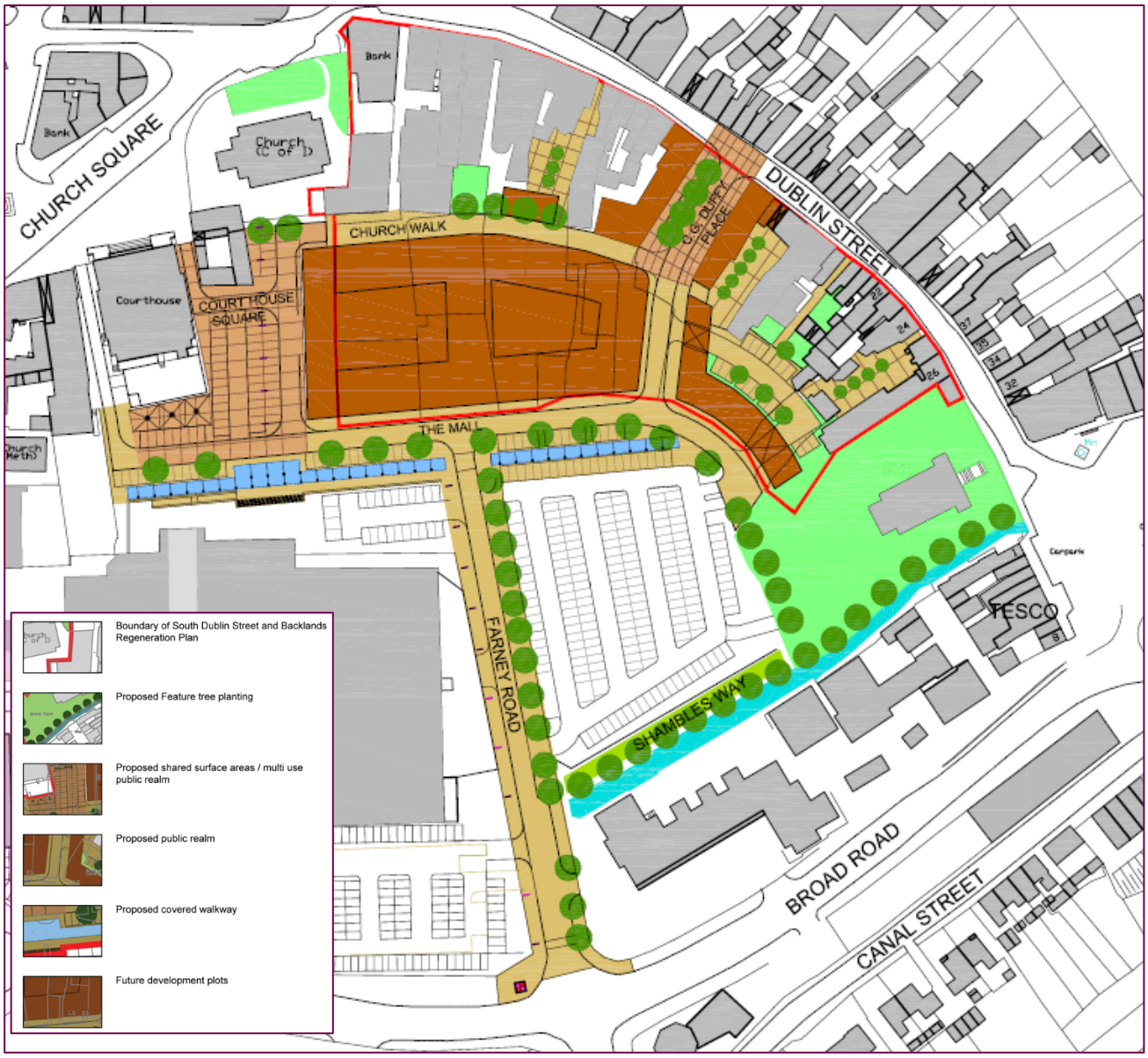


Figure 3.1: South Dublin Street & Backlands Regeneration Concept

4 ROLES AND RESPONSIBILITIES

4.1 Principal Contractor

The role of the Principal Contractor is to appoint a competent demolition contractor, competent and authorised waste management contractors and to appoint a Waste Manager. The Principal Contractor is responsible for the demolition/construction phase progression from outline and implementation of the construction and demolition site waste management plan.

The Principal Contractor is directly responsible to the Client for the successful execution of the project. The principal duties and responsibilities of this position will include:

- To report to the Client on the on-going performance of the CDWMP;
- To discharge his/her responsibilities as outlined in the CDWMP; and,
- Ensuring that the requirements of the CDWMP are developed and are implemented and adhered to with respect to waste requirements;
- To ensure that advice, guidance and instruction on all CDWMP matters are provided to all their managers, employees, construction contractors and visitors on site;
- liaison with statutory and non-statutory bodies and third parties with a waste/recycling interest in the development;
- Monitoring and completing the waste register (in conjunction with the waste manager) and ensuring the correct waste management procedures are implemented;
- Ensuring correct procedures are followed in the event of environmental incidents (in conjunction with appropriate environmental specialist);
- To support and augment the Waste Manger & Design Team through the provision of adequate resources and facilities in the implementation of the CDWMP.

4.2 Waste Manager

The Waste Manager will be responsible for, but not limited to, the following activities:

- Ensure the objectives of the outline construction and demolition waste management plan and the site waste management plan area implemented;
- Responsible for waste characterisation of waste streams;
- Responsible for document control;
- Responsible for ensuring duty of care is implemented;
- Responsible for site operative waste management training;
- Responsible for audits, and;
- Responsible for corrective action execution.

4.3 Site Supervisors

Site Supervisors are required to:

- Promote a Health & Safety culture on site, to read, understand and implement the CDWMP;
- Know the broad requirements of the relevant law in waste matters and take whatever action is necessary to achieve compliance;
- Ensure that waste management are taken into account when considering Contractors' construction methods and materials at all stages;
- Be aware of any potential waste risks relating to the site, plant or materials to be used on the premises and bring these to the notice of the appropriate management;

- 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;
- Where appropriate, ensure Contractors method statements include correct waste disposal methods;
- Be aware of any potential environmental risks relating to the Contractors and bring these to the notice of the appropriate management; and,
- Ensure materials/waste register is completed as appropriate.

4.4 Sub-Contractors

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

- Comply with the CDWMP and with the Principal Contractor's Site Waste Management Plan.
- To co-operate fully with the Principal Contractor and the Waste Manager in the implementation and development of the CDWMP at the site;
- To conduct all their activities in a manner consistent with regulatory and best environmental/waste management practice; and,
- Adhere fully to the requirements of the site waste rules.

4.5 Team Structure & Distribution List

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

A distribution list for the CDWMP 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 CDWMP for implementation.

The distribution list will be established prior to commencement of construction by the appointed/principal contractor. Prior to commencement of construction (including demolition), all roles and responsibilities should be confirmed in the CDWMP as updated. Table 4.1 below shows a template for project roles and responsibilities and can act as a template for the distribution list for the CDWMP.

Table 4.1: Role, Company, Named Contact & Contact Details[2]

ROLE	COMPANY	NAMED CONTACT	CONTACT DETAILS
Monaghan County Council contact	Monaghan County Council	TBC	TBC
Principal Contractor	TBC	TBC	TBC
Waste Manager	TBC	TBC	TBC
Site Supervisors	TBC	TBC	TBC
Sub-Contractors	TBC	TBC	TBC
Health & Safety Representative	TBC	TBC	TBC
Other specialists as required (e.g. geotechnical, drainage/civil engineer)	TBC	TBC	TBC

The Principal Contractor as appointed has ultimate responsibility for the successful waste performance of the proposed development through appointment and management of subcontractors and specialists.

[2] *The Appointed Contractor will complete this table for the Final version for the CDWMP.*

5 PROPOSED APPROACH

5.1 Site Set-Up & Management

5.1.1 General Approach

The works associated with the proposed development will involve the following main elements (please refer to section 3.1.3 for further details):

- Demolition of 4 properties along Dublin Street (No's 8-12) & all associated outbuildings and structures.
- New building façades to No's 7 and 13 Dublin Street and associated retaining structures (likely masonry piers), to facilitate creation the new junction onto Dublin Street;
- Creation of new streets and civic spaces:
- Creation of new junction and street (Gavan Duffy Place) including paving, kerbing, boundary walls, street lighting, and furniture, street trees and associated drainage.
- High quality public realm:
  - New pavements, high quality surfaces and kerbing
  - Resurfacing of existing pavements
  - New railings, bollards and pop-up power supply
  - Bicycle parking
  - Street furniture including bins and seats
  - Traffic calming ramps, pedestrian crossings
  - New trees and vegetation
  - Signage
  - New / replacement street lighting and CCTV
  - New utility services /upgrading of existing services;
  - Drainage improvements, including watermains, foul, storm and water drainage;
- General construction works including excavation, cut / fill, re-grading of land to accommodate level changes.

5.1.2 Construction Compound

A construction compound will be created for the storage of plant, materials and equipment and the establishment of site offices and welfare facilities. Segregated storage facilities for waste will be located within the secured compound area.

5.1.3 Bunded Fuel Storage

Bunded fuel containers will also be sited within the secured compound area. On completion of the works all construction materials will be removed from the compounds and landscaping completed.

5.1.4 Designated Waste Storage area

The construction site will be provided with a designated waste storage area to be identified by the Principal Contractor. This area will securely house designated skips and bins and other necessary facilities for the storage and separation of site sourced waste material. Steps will be taken to ensure the area will be secure from vandalism, vermin and pests and that it will be environmentally hygienic.

5.2 Waste Minimisation

The following waste minimisation measures will be implemented during the course of the construction works;

1. Facilitate recycling and appropriate disposal by on site segregation of all waste materials generated during construction into appropriate categories, including:
    - Top soil, subsoil, gravel hard-core;
    - Concrete, bricks, tile, ceramics, plasterboard;
    - Asphalt, tar and tar products;
    - Metals; and,
    - Dry Recyclables e.g. cardboard, plastic, timber
2. All waste assessed by the Waste Manager as 'not suitable for reuse' will be stored in skips or other suitable receptacles in a designated area of the site, to prevent cross contamination between waste streams;
3. Wherever possible, leftover materials (e.g. timer off cuts) and any suitable demolition materials will be reused on-site.
4. Uncontaminated excavation material (top-soil, sub soil, etc) will be segregated, stockpile and re-used on site in preference to importation of clean fill, where possible; and
5. Where possible, the Waste Manager will ensure that all waste leaving site will be covered.

5.2.1 Re-Use, Recycle, Recovery and Management of Waste

It is required that a duty of care in relation to the disposal of waste is executed. Facilities that accept wastes for recovery and disposal require a waste management licence from the Environmental Protection Agency (EPA). The local authorities operate a permit system for certain waste disposal and recovery activities which do not require a licence from the EPA.

The collection of waste on a commercial basis requires a waste collection permit from the National Waste Collection Permit Office. The National Waste Collection Permit Office (NWCPO) maintains a register for waste facility permits and certificates of registration issued by local authorities. It will be the responsibility of the Waste Co-ordinator to obtain a copy of the waste collectors NWCPO permit and a copy of the waste management licence for the final disposal destination.

This NWCPO permit states which wastes the waste carrier has permission to carry. Various conditions may also be attached to the waste collection permit, e.g. the lighting at night of skips in public places or only allowing the collector to work in certain geographic areas. All relevant records shall be maintained and licences checked for validity and applicability to dates of operation and wastes.

The EU Waste Code System is used for the consistent identification, classification and reporting of all wastes generated in the EU and forms the basis of both national and international waste reporting obligations. Accordingly, it is reflected in EPA licences and in permits, in waste movement/tracking systems and in official documents such as the EPA's annual National Waste Reports.

Waste generated on this construction site will be identified as hazardous, non-hazardous or inert and segregated according to its category as described in the European Waste Catalogue (EWC Codes).

Table 5.1 below lists some typical construction and demolition waste codes. This will require designated storage areas for waste to be established for eventual reuse / recycling / disposal at appropriate licensed facilities.

Table 5.1: EWC Waste Codes

Waste	EWC Code
Concrete, bricks, tiles, ceramics	17 01 01-03 & 07
Wood, glass and plastic	17 02 01-03
Bituminous mixtures, coal tar and tarred products	17 03 02
Metals (including their alloys)	17 04 01-07

Soil and stones	17 05 04
Gypsum-based construction material	17 08 02
Insulation Material and asbestos containing construction materials	17 06 01 & 03-05
Paper and cardboard	20 01 01
Mixed C&D waste	17 09 04
Green waste	20 02 01
Electrical and electronic components	20 01 35 & 36
Batteries and accumulators	20 01 33 & 34
Liquid fuels	13 07 01-03
Chemicals (solvents, pesticides, paints, adhesives, detergents etc.)	20 01 13, 19, 27-30

Suitably sized and secure containers for each waste stream will be provided by the Principal Contractor and monitored by the Waste Co-ordinator/Manager. These will be clearly identifiable by colour and signage.

The number and size of the containers required for segregation will be agreed with waste collectors prior to commencement and reviewed during the course of the project. The principle of segregation of wastes at source is fundamental and results in managed waste streams which in turn lead to cost savings and environmental benefits. In addition the diversion of waste from landfill will create savings in the avoidance of landfill tax levy.

Waste may only be treated or disposed of at appropriately licensed facilities. The appointed contractor will be required to keep records of all waste movements. Every waste movement off site will require a waste transfer triplicate docket form with one copy to be retained on site, a copy for the transporter and a copy for the receiving facility.

The contractor will also be required to carry out spot checks on waste collectors and disposal sites. These records will be forwarded to the client on completion of the works for inclusion within the Safety File. The Waste Co-ordinator is obliged to ensure that all vehicles transferring waste for a particular haulier are listed on the NWCPO licence. For this reason it is good practice that a daily list of lorries entering and leaving the site and their registrations are recorded.

In order to prevent and minimise the generation of wastes, the contractor will be required to ensure that materials are ordered so that the timing of deliveries and storage of same is not conducive to the creation of unnecessary waste.

The contractor will be required to in conjunction with the Works Programme, show estimated delivery dates and quantities for each specific material associated with each element of the works. The contractor will review the C&D Waste Management Plan at regular site meetings at which the Waste Co-ordinator will report.

6 WASTE MANAGEMENT PROCEDURES

6.1 Waste Hierarchy

Besides the requirements that the off-site handling of waste generated by this project are subject to the required statutory authorisations under the Waste Management Act, there is also a necessity that it conforms to the Waste Hierarchy.

This is a requirement of Article 4 of the Directive on Waste, being transposed as Section 21A of the Waste Management Act. The Waste Hierarchy only applies to material that is defined as “waste”. This means that it does not apply to the proportion of the spoil that is handled on-site in conformity with the statutory exclusions.

The Waste Management Hierarchy will become activated for any material which does not satisfy the exclusions; in this regard the contract documents for the detailed design/construction project will clearly set out the staged approach which the contractor will be required to adhere to through the use of the Waste Hierarchy.

In order of priority, the hierarchy sets out the most desirable approaches to Waste management as comprising:

- (a) Prevention;
- (b) Preparing for re-use;
- (c) Recycling;
- (d) Other recovery (including energy recovery); and,
- (e) Disposal.

6.2 Waste Arisings

Given the nature of the project it is envisaged that the main waste types will be demolition wastes and general construction wastes arising from building, public realm, urban fabric and road construction. There will be non-hazardous and inert wastes such as concrete, wood, steel, blocks, bricks, plasterboard, plastics, packaging etc. and some hazardous wastes e.g. asbestos containing materials, oils, paints and adhesives.

Subject to waste acceptance classification analysis the topsoil /subsoils at the site may be classed as inert, hazardous or non-hazardous. There will be small amounts of green waste.

The volume of waste generated from demolition will be more difficult to segregate than waste generated from the construction phase, as many of the building materials will be bonded together or integrated i.e. plasterboard on timber ceiling joists, steel embedded in concrete etc.

Table 6.1 below shows the typical breakdown of C&D waste types produced on a typical site based on data from the EPA National Waste Reports 15 and the Galway Mayo Institute of Technology 16 research Paper.

Table 6.1: Typical Breakdown of Wastes Derived from C & D Sites in Ireland

Waste Types	Percentage
Mixed Construction and Demolition	33%
Timber	28%
Plasterboard	10%
Metals	8%
Concrete	6%
Other	15%
Total	*100%*

Source: Environmental Protection Agency (EPA), National Waste Database Reports 1998 – 2012. EPA and Galway-Mayo Institute of Technology (GMIT), EPA Research Report 146 – A Review of Design and Construction Waste Management Practices in Selected Case Studies – Lessons Learned (2015).

The appointed demolition contractor will be required to prepare a detailed demolition management plan and prepare estimates of all demolition wastes. The Principal Contractor will prepare the Construction Waste Management Plan including estimates of waste streams on completion of the construction drawings.

Table 6.2: Estimated Quantities of Bulk Wastes from Demolition[3]

Waste Types	Assumptions	Volume (m3)	Conversion Factor	Metric Tonnes	%age of Total Waste Volume %	Disposal Route
Timber						Recovery
Building Stone						Recovery
Slates						Recovery
Soils			**TBC**			Recovery for inert, landfill for non-hazardous hazardous
Concrete, brick ceramic and tiles						Recovery/ Recycle
Glass						Recycle
Total						

The above table does not calculate waste volumes of metal, plasterboard or green wastes. It is thought that the quantities of these arising will be much lower than the bulk waste streams above, with the exception of glass. This table will be completed for the detailed DCWMP estimates are not know at this early stage of the project.

6.3 Waste Handling

During the construction phase of the proposed project the appointed contractor will have responsibility for the development and management of appropriate waste handling procedures in accordance with the relevant legislation. This will involve the identification and segregation of waste arisings encountered into their appropriate categories and designating waste storage areas[4] within the proposed project for the storage of waste prior to transport for recovery/disposal at suitably licensed/permitted facilities.

[3] *This will be detailed in the final CDWMP.*

[4] *This preliminary report refers to a potential waste compound/waste storage areas for the project – as the potential waste compound/waste storage areas may not be on the site of waste production this may require authorisation from MCC Environmental Department for storage of waste. This should be detailed in the final CDWMP.*

An overview of the methods envisaged to handle the expected waste arisings are outlined in the following sections.

6.4 Hazardous Waste Management

There are currently no known hotspots where hazardous waste arisings have been identified within the site. However localised areas of contamination may be identified during the excavation process. Hazardous waste may also be encountered in the following site clearance/ demolition works. Other hazardous waste arisings that are likely to arise during the construction phase include:

- Vehicle batteries;
- Containers with residues of resins, latex, plasticizers, glues, adhesives, wood preservatives;
- Mineral oils or oily substances; and
- Wastewater from site facilities.

All hazardous waste encountered will be removed from site by a specialist waste contractor with a waste collection permit.

Hazardous waste facilities are licenced by the EPA. The WMC will ensure that the hazardous waste contractor provides a copy of the licence for the facility to which the hazardous waste is being brought.

Consignment notes (C1 Forms) track and monitor the movement of hazardous waste within the State. C1 Forms will be completed for every consignment of hazardous waste other than the movement of waste within the premises where it is produced, stored, treated or deposited.

The export of hazardous waste requires completion of a TFS Form or "transfrontier shipment". The local authority issues and monitors Transfrontier Movement of Waste Forms which are used to control and track movements and disposal/recovery of certain categories of waste outside the State. The specialist waste disposal company, employed by the contractor, will arrange for the correct completion of these forms. The WMC will ensure that copies of these forms are completed in conjunction with the waste contractor and are kept for the duration of the project.

6.4.1 Asbestos[5]

It should be noted that prior to demolition the Principal Contractor is obliged by the Safety, Health and Welfare at Work (Exposure to Asbestos) Regulations 2006 (S.I. No. 386 of 2006) and (Amendment) Regulation 2010 (S.I. No. 589/2010) and Safety, Health and Welfare at Work (Construction) Regulations 2013 (S.I. No. 291 of 2013), to identify all asbestos containing materials within the buildings.

This asbestos survey report provides an assessment of the likely volume of asbestos waste which will need to be disposed of separately. This should be removed by a specialist contractor and disposed of as hazardous waste. All waste consignment paperwork associated with this needs to be retained on file.

6.5 Waste Segregation

Within the site, facilities will be available for waste segregation; these will include labelled bins and skips for the various waste streams identified for the site. Putrescible food waste from the site canteen/site office will be placed in specially designated brown wheelie bins for composting. Light packaging, non-biodegradable waste from canteens and offices on site as well as litter will be stored on site in wheelie bins for onward disposal by a licensed contractor.

Recyclable waste will be stored on site in skips for collection by a licensed contractor approved by Monaghan County Council.

[5] Asbestos surveys will form part of the detailed design stage requirements and therefore relevant asbestos reports will be provided in the information package to tendering contractors for the construction stage.

6.6 Storage of Waste

The site will be provided with a dedicated bin and waste sorting and storage area to be identified by the appointed contractor. This area will provide for the storage of recyclable waste and waste for disposal in appropriate receptacles.

The waste storage area will generally be used to store the recyclable material for collection by the waste contractors.

Any hazardous waste arising should be stored in a secure area to minimise the likelihood of interference by vandals. All hazardous waste should be covered and clearly marked as hazardous waste. They should be away from working areas and areas where vehicles could accidently strike them. The standing time on site from generation of the hazardous waste to removal off site should be kept to a minimum.

Liquid wastes should be kept in clearly marked bunded containers.

Waste storage areas shall be selected so that they are set back from watercourses, ecological sensitive areas, areas of extreme vulnerability, and away from potential floodplain areas and areas containing invasive species. They shall also be selected to ensure that it is accessible from roads that can cater for predicted volumes of site traffic and has connectivity to a main sewer for treatment of wastewater.

Storage of any waste will be located greater than 100m from a watercourse. Stockpiles within 200m of a watercourse will be covered.

6.7 Waste Action

The principal wastes to be generated at the site are identified in Table 6.3 below along with the proposed waste management actions. It may be found following the initial construction period that there are additional waste sources and waste streams. This table will therefore be reviewed as the project proceeds. Specific methods of managing particular waste streams are outlined below:

Table 6.3: Waste Type & Appropriate Action

Waste Type	Action
Excavated Soil (Clay, Sands, Gravels)	Excavated soils will be dug and loaded onto dumper trucks and stored for re-use elsewhere on the site where possible and free from contaminants e.g. trench / foundation excavation material will be reused as fill in landscape areas.
Concrete	Waste fresh concrete may result from the pouring of foundations, concrete surround to pipes, kerbs and arising from concrete pours etc. Where possible this surplus material will be returned to supplier for re-use. There will be no washing out of concrete lorries permitted on site. Concrete from the demolition of excavation of foundations will be removed off site for disposal.
Metals	Residual metal waste will be source segregated for collection and recycling by licenced contractors. It is not thought that quantities of this will be great given the nature of the buildings to be demolished.
Timber	Timber waste will be segregated and stored in weather protective containers for collection and reuse / recycling by licenced contractors. It is important that all nails in waste timber are removed or hammered down.
Blocks and Bricks	Designated storage and stockpile locations will be set up on site to minimise breakages. Broken bricks and blocks will be re-used where possible on site in

	appropriate locations. Residual masonry wastes will be source segregated and stored in designated containers for subsequent collection and crushing / recycling by licenced contractors.
Glass	Glass breakages are inevitable on a construction site however, it is intended to minimise such breakages by ordering materials just in time and creating safe designated storage areas for same.
Packaging	Packaging is a source of major waste and can if uncontrolled lead to contamination of other waste streams. It is therefore proposed to segregate packaging waste immediately after unwrapping. Where possible materials with minimum or recycled packaging will be purchased or returned to supplier. Otherwise packaging waste will be segregated and stored in containers for eventual recycling / disposal by licenced contractors.
Plasterboard, Gypsum etc.	Such material will be segregated at source for eventual disposal by licenced contractors.
Food Waste	Food waste arising from site staff can create hygiene problems if not properly disposed of and therefore in accordance with Safety, Health and Welfare (Construction) Regulations designated areas for consumption of food will be set up within the site compound. Separate bins e.g. brown for foodstuffs, green for recyclables and black for remainder, will be provided at these locations. These bins will be collected by licenced waste contractors.
Paints, Oils, Adhesives etc. (Hazardous)	Oils, paints, adhesives and chemicals will be kept in separate contained storage areas which will be bunded. Waste oils, oil filters, paints, adhesives and chemicals will be sent to appropriately licensed facilities for disposal. Fuel and oils for machinery will be stored in double skinned containers or within bunds with sufficient capacity to contain spillage. All of the above containers will be clearly labelled and secured against unauthorised access.
Asbestos Containing Materials (Hazardous)	Due to the requirement for demolition of the existing buildings on the site, it is likely that some hazardous waste in the form of asbestos containing material (ACM) or contaminated soils will be present on site. A pre-construction and demolition asbestos survey will be carried out in advance of demolition works on site to identify the presence or likely presence of any ACM. All ACM will be treated as hazardous waste and removed by a licenced contractor for disposal at licenced facilities. **Please also see section 6.4.1 Asbestos.**
Contaminated Soils (Hazardous)	If contaminated soils are present then appropriate handling, storage, transportation and disposal will be required. Prior to removal of such waste, the contractor will prepare a plan for the management of this waste stream. Specific method statements detailing the necessary mitigation measures required during excavation, handling, transportation and disposal of the encountered hazardous wastes will be prepared. Every attempt to minimise contamination of surrounding material will be made to reduce the volume of waste involved.
Electrical	Electrical waste including fluorescent tubes, electronic equipment, batteries etc. will be stored in segregated areas for Recycling / Recovery by licensed WEEE contractors. Office Waste Office waste from the contractor's on site facilities such as paper and light packaging will be stored for Reuse / Recycle by licensed contractors.

Office Waste	Office waste from the contractor's on site facilities such as paper and light packaging will be stored for Reuse / Recycle by licensed contractors

The management of the site will ensure that all staff and visitors are aware that waste should be managed in such a way as to have minimal impact on the environment and on the health and safety of all associated with the proposed development and the waste actions outlined above will be communicated as part of site inductions.

6.8 Waste Removal

6.8.1 General Approach

Any removal of waste material from the site shall be done so in accordance with the relevant legislation. It shall undergo a comprehensive waste assessment and classification by a suitably qualified person, in accordance with the relevant legislation and shall be disposed of/treated in a suitably licensed facility.

Waste arisings generated will only be treated at facilities that are authorised to carry out the appropriate waste treatment activity for the specific waste stream. Records of all waste movements and associated documentation shall be maintained on-site such as waste facility authorisation number, expiry date, class of waste accepted, treatment methods for each waste stream accepted i.e., backfilling, crushing, screening, etc.

Where waste generated is not reusable on-site, samples will be taken and waste acceptance criteria (WAC) laboratory testing will be undertaken on the excavated material. The results of the laboratory testing will be used to determine whether a waste as inert, non-hazardous or hazardous. Authorised waste facilities will be contacted to establish what their waste acceptance criteria requirements are. The excavated waste from the proposed project will be compared with the facility waste acceptance criteria, and sent to the waste facilities which are authorised to accept the material in line with the waste acceptance criteria. Where practical, the closest suitable facilities to the proposed project will be selected to reduce impacts associated with vehicle movement such as air emissions.

6.8.1.1 Implications of Brexit and use of Waste Facilities in Northern Ireland

All environmental protections that are currently in place in Northern Ireland (NI), will continue to exist at the end of the transition period and therefore current waste permits and licences will apply and continue to operate. The UK will remain party to the Basel Convention and will be a member of the Organisation for Economic Co-operation and Development (OECD). The regulatory agencies across the UK, including the Northern Ireland Environment Agency (NIEA) will continue to implement the international rules contained in these agreements.

The current waste shipment regulations and procedures still apply. As a result of EU Exit and the implementation of the Northern Ireland Protocol, there may be changes to border controls which could have future impacts on the waste supply chain. Protection of the environment and human health will though remain foremost.

Waste Controls between NI and EU: *Movements of waste between NI and EU Countries will continue without interruption as NI will continue to comply with EC Regulation 1013/2006 on Shipments of Waste under the Northern Ireland Protocol so operators can continue to move waste under their present processes without any changes being required.*

6.8.2 Exclusion from the legislation for excavated material refused at a construction site

The Waste Framework Directive contains a number of exclusions which make clear that certain materials are not subject to its requirements. A key exclusion affecting construction projects such as this development is set down in Article 2(1)(c).

This states that the requirements of the EU legislation do not apply to: uncontaminated soil and other naturally occurring material excavated in the course of construction activities where it is certain that the material will be used for the purposes of construction in its natural state on the site from which it was excavated.

This provision is repeated in the Waste Management Act, as Section 3(1)(c).

Should materials generated by construction activities fall within this provision, they are not then subject to the other requirements of the EU or national waste legislation. This means that, for example, such materials are not defined as “waste”, do not need to be handled by duly authorised waste collectors and do not need to pass to disposal or recovery facilities that are subject to waste licences or other equivalent form of statutory authorisation.

By-product notifications (under Article 27 of the EC Waste Directive Regulations 2011) provide an opportunity for reuse of surplus clean soil & stone material arising from construction activity. This applies to locations other than authorised recovery facilities e.g. quarries operating under planning permission, GAA clubs or other developments such as road schemes requiring earthworks and importation of clean soil & stone. By-product status means that the material is approved for use at a location that falls outside of the reach of waste legislation.

As outlined in Article 27, Part 3 of EC Waste Directive Regulations 2011, a substance or object, resulting from a production process, the primary aim of which is not the production of that item, may be regarded as not being waste but as being a by-product only if the following conditions are met:

a) Further use of the substance or object is certain;
b) The substance or object can be used directly without any further processing other than normal industrial practice;
c) The substance or object is produced as an integral part of a production process; and
d) Further use is lawful in that the substance or object fulfils all relevant product, environmental and health protection requirements for the specific use and will not lead to overall adverse environmental or human health impacts.

If the appointed contractor proposes to crush or reuse waste material on site during the construction phase – the appointed contractor would require waste authorisation from MCC Environmental Department. Similarly if the appointed contractor where to reuse crushed material on site (for example filling/capping layer of a road), the appointed contractor would also require authorisation. The reuse option, where appropriate, can bring significant economic benefits.

7 SITE MANAGEMENT PROCEDURES

7.1 General

In order to emphasise to staff and visitors the importance of waste management within the proposed site it is intended that this outline C&D Waste Management Plan will be finalised by the appointed contractor and circulated to all sub-contractors employed on the works. A register of those contractors that have signed up to this for the works will be maintained. Signing up to this register will be mandatory.

7.2 Training

Copies of the Construction & Demolition Waste Management Plan[6] will be made available to all personnel on site. All site personnel and sub-contractors will be instructed about the objectives of the CDWMP and the measures to achieve same. They will be trained in how to implement the above measures and their responsibilities during site induction and reminders during tool box talks. Topics to be covered will include;

- Distinguish re-usable materials from materials suitable for recycling;
- Ensure maximum segregation at source;
- Co-operate with site manager on best locations for stockpiling;
- Separate materials for recovery;
- Appropriate protection/coverage of waste areas e.g. covered skips, double wrapped asbestos containing materials (by appropriately trained staff).

Site notices will be erected throughout the site identifying waste storage areas and reinforcing waste hierarchy message.

7.3 Waste Contractors

It will be required that all waste contractors involved in the site will be in adherence with the legislation referred to in this preliminary plan.

To this end the Principal Contractor will ensure that all contractors engaged to collect and dispose of waste will be licensed contractors approved by Monaghan County Council.

This will include those who collect recyclable material, general waste, hazardous waste and miscellaneous waste. It will be the policy to verify that all contractors are licensed and are approved by Monaghan County Council.

7.4 Record Keeping Procedures

The contractor shall develop a record keeping system that will ensure that details of all arising's including movement and treatment of C&D waste are recorded. All materials being transferred from the site, whether for recycling or disposal, shall be subject to a documented tracking system which can be verified and validated.

7.5 Waste Auditing Protocols

Waste auditing protocols shall be the responsibility of the WMC who shall carry out auditing in accordance with an Audit Plan for the project to be included in the developed Construction and Demolition Waste Management Plan.

The audit will cover the following elements:

- A systematic study of all waste management practices which have been adopted on-site;
- Special attention will be dedicated to obvious opportunities for waste reduction, but all areas and stages within the project will be reviewed;

[6] *Training should be incorporated into the CDWMP and cover the bullet points listed. Training helps to ensure that all workers are aware of their responsibilities in relation to waste, waste segregation and recycling.*

- Details of raw material inputs and the quantity, type and composition of all waste from the site will be identified;
- The audit findings will highlight corrective actions that may be taken in relation to management policies or site practices in order to bring about further waste reductions; and
- A tracking system shall be stipulated to determine the success or failure of corrective actions.

Regular summary audit reports outlining types, quantities of waste arisings and their final treatment method shall be sent to the Principal Contractor.

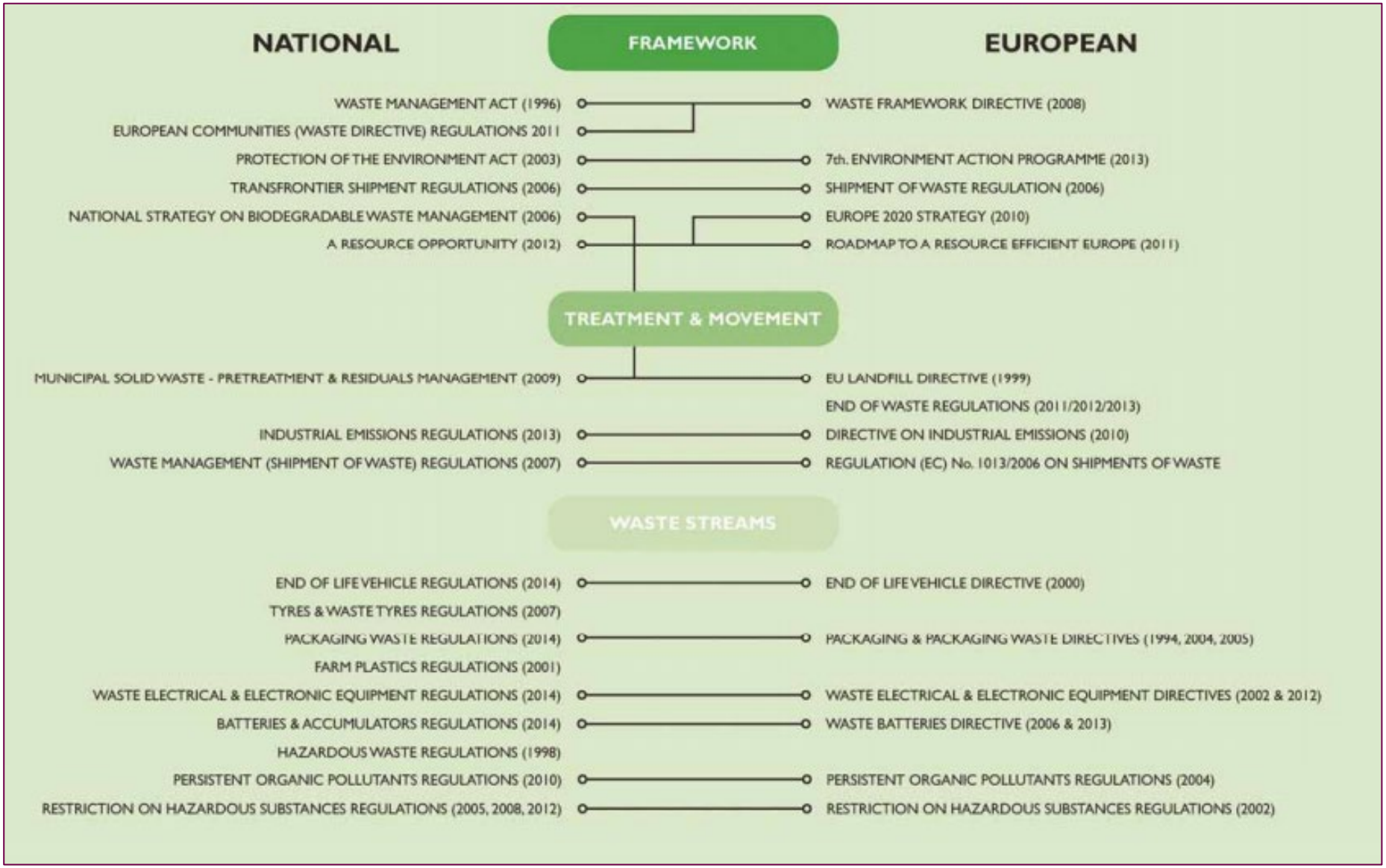
8 REFERENCES

S.I. No. 126 of 2011; European Communities (Waste Directive) Regulations: Statutory Office (2011).

Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects, Department of Environment Heritage and Local Government (DoEHLG) July 2006.

Construction Industry Research and Information Association (CIRIA) document SP133 Waste Minimisation in Construction.

Appendix A
European & Irish Waste Legislation


NATIONAL
FRAMEWORK
EUROPEAN
WASTE MANAGEMENT ACT (1996)
EUROPEAN COMMUNITIES (WASTE DIRECTIVE) REGULATIONS 2011
WASTE FRAMEWORK DIRECTIVE (2008)
PROTECTION OF THE ENVIRONMENT ACT (2003)
7th. ENVIRONMENT ACTION PROGRAMME (2013)
TRANSFRONTIER SHIPMENT REGULATIONS (2006)
SHIPMENT OF WASTE REGULATION (2006)
NATIONAL STRATEGY ON BIODEGRADABLE WASTE MANAGEMENT (2006)
EUROPE 2020 STRATEGY (2010)
A RESOURCE OPPORTUNITY (2012)
ROADMAP TO A RESOURCE EFFICIENT EUROPE (2011)
TREATMENT & MOVEMENT
MUNICIPAL SOLID WASTE - PRETREATMENT & RESIDUALS MANAGEMENT (2009)
EU LANDFILL DIRECTIVE (1999)
END OF WASTE REGULATIONS (2011/2012/2013)
INDUSTRIAL EMISSIONS REGULATIONS (2013)
DIRECTIVE ON INDUSTRIAL EMISSIONS (2010)
WASTE MANAGEMENT (SHIPMENT OF WASTE) REGULATIONS (2007)
REGULATION (EC) No. 1013/2006 ON SHIPMENTS OF WASTE
WASTE STREAMS
END OF LIFE VEHICLE REGULATIONS (2014)
END OF LIFE VEHICLE DIRECTIVE (2000)
TYRES & WASTE TYRES REGULATIONS (2007)
PACKAGING WASTE REGULATIONS (2014)
PACKAGING & PACKAGING WASTE DIRECTIVES (1994, 2004, 2005)
FARM PLASTICS REGULATIONS (2001)
WASTE ELECTRICAL & ELECTRONIC EQUIPMENT REGULATIONS (2014)
WASTE ELECTRICAL & ELECTRONIC EQUIPMENT DIRECTIVES (2002 & 2012)
BATTERIES & ACCUMULATORS REGULATIONS (2014)
WASTE BATTERIES DIRECTIVE (2006 & 2013)
HAZARDOUS WASTE REGULATIONS (1998)
PERSISTENT ORGANIC POLLUTANTS REGULATIONS (2010)
PERSISTENT ORGANIC POLLUTANTS REGULATIONS (2004)
RESTRICTION ON HAZARDOUS SUBSTANCES REGULATIONS (2005, 2008, 2012)
RESTRICTION ON HAZARDOUS SUBSTANCES REGULATIONS (2002)

Appendix

2c

Conditions Survey Report

CONDITIONS SURVEY REPORT

South Dublin Street and Backlands Regeneration Scheme

MGT0528 South Dublin Street
Regeneration Project
P02
27 August 2020

rpsgroup.com

Document status

Version	Purpose of document	Authored by	Reviewed by	Approved by	Review date
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Approval for issue

Des Keane	Des Keane	28 August 2020

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Prepared by:

RPS

Padraic Mac Giolla Bhride
Project Engineer

Lyrr 2, IDA Business & Technology Park, Mervue
Galway, H91 H9CK

T +353 91 400 200
E padraic.macgiollabhride@rpsgroup.com

Prepared for:

Monaghan County Council

Noel Finnegan
A/ Senior Executive Engineer

Corporate Assets Dept
Monaghan County Council

T +353 47 30500
E nfinnegan@monaghancoco.ie

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Appendix A – Survey Photographs

1 INTRODUCTION

1.1 Background

RPS Consulting Engineers have been engaged by Monaghan County Council to provide design and construction management services for the “South Dublin Street and Backlands Regeneration Scheme” Public Realm Improvement Project. This project is progressed through the Urban Regeneration and Development Fund under Project Ireland 2040.

The proposed Dublin Street regeneration scheme area is located to the southeast of the town core, extending from The Diamond to the northwest, south eastwards along Dublin Street, and is defined to the southeast by the Presbyterian Church to the south at Old Cross Square. The regeneration scheme area is defined by the terraces of dwellings to Dublin Street to the north east, and the long rear gardens to the south. Monaghan County Council have the following long term vision to enhance the physical and special quality of Dublin street:

“Dublin Street together with its backlands offers a unique opportunity to create a new and viable town centre quarter, with the potential to accommodate additional shopping, office, cultural, residential and new employment zone. It offers the opportunity to address the weaknesses of the area and to maximise its strengths; to enhance pedestrian and vehicular movement, to enhance the existing built heritage; to integrate with the historic streetscape in a manner that is both contemporary and forward looking while complimenting the built heritage; to create an integrated and commercially robust, viable proposal, and a vibrant and sustainable new urban quarter in Monaghan.”

The terraces facing Dublin Street are interspersed with laneways through archways and gaps between terraces to the courtyards, backlands and gardens to the rear. The existing structures facing Dublin Street comprise two and three storey structures, generally of two and three bays in width. Typically, there are long rear annexes extending into the depths of the plots. To the south east the backlands are characterised by small courtyards created by two storey outhouses positioned parallel to the principal structure. The lands slope down from The Diamond to the north, eastwards to Old Cross Square to the south east, and also down from Dublin Street southwards toward the public surface car park to the rear.

Based on the project parameters as set out above, several interventions are required within the proposed works area. To assess the adequacy of the existing structures and the possible implications of the of proposed alterations on the structures, RPS were engaged to carry out a visual assessment and survey of all properties within and on the boundary of the areas where work is proposed.

1.2 Structural Assessment Survey

Pádraic Mac Giolla Bhríde of RPS Consulting Engineers visited Monaghan on 23rd June 2020 to carry out a visual structural assessment survey.

1.2.1 Scope of survey

The primary objectives of the assessment were to carry out a structural assessment survey, including a visual and photographic survey and to prepare a written Structural Assessment Survey Report setting out, at a minimum in accordance with the Project Brief:

• *Having regard to the proposed new junction (Gavin Duffy Place) onto Dublin Street, the appointed Consultants shall carry out a preliminary structural assessment of all the buildings/properties proposed for demolition to create the new junction and in particular the adjoining properties remaining in-situ each side of the proposed junction. The Consultants shall carry out preliminary design proposals for stabilisation of the adjoining proper-ties each side of the new junction with adequate retaining structures having regard to the overall urban design associated with the Regeneration Project;*

• *The Consultants shall inspect all the structures (bridges/ culverts/ retaining walls/ cellars/manholes etc. or any other relevant structures) located within/on the proposed new streets and spaces, and following such inspection, shall identify those structures requiring a structural assessment to ensure that they can safely accommodate the proposed project infrastructure;*

To achieve the above the survey consisted of the following;

- Photographs of external structural elevations affected by the proposed works in sufficient detail to identify structural integrity and to provide proposals of structural requirements,
- Identification of structural requirements, propping or specialist works required during the construction phase or prior to the commencement of construction work,
- Provide commentary and recommendations from a structural engineering perspective on the impacts of the proposed works on existing structure and provide proposals of structural requirements for bracing following construction works.

1.2.2 Limitations

Limitations of the report are as follows:

- The survey comprised visual assessment and photographic documentation of accessible elevations of structures within the proposed works area. Any structures, or parts of structures which were covered or inaccessible were not inspected and therefore their condition is not documented in this report. These buildings are not deemed to be critical to completing this survey as they are primarily storage buildings, which appear to be constructed after the primary structures at these lands and are therefore considered to have no structural bearing on buildings to be retained following demolition works. Whilst this assumption is deemed to be suitable for this assessment, these buildings should be inspected, and their structural requirements surveyed as this project progresses and prior to the construction of the scheme.
- The scope of works did not encompass mechanical testing or operation specifics of the existing systems.
- The survey was limited to a visual structural assessment only. No levels assessment of the floor was undertaken.

2 SURVEY

The survey was carried out on 23rd June 2020. The survey encompassed the area enclosed in the red line as shown in **Figure 1** below.

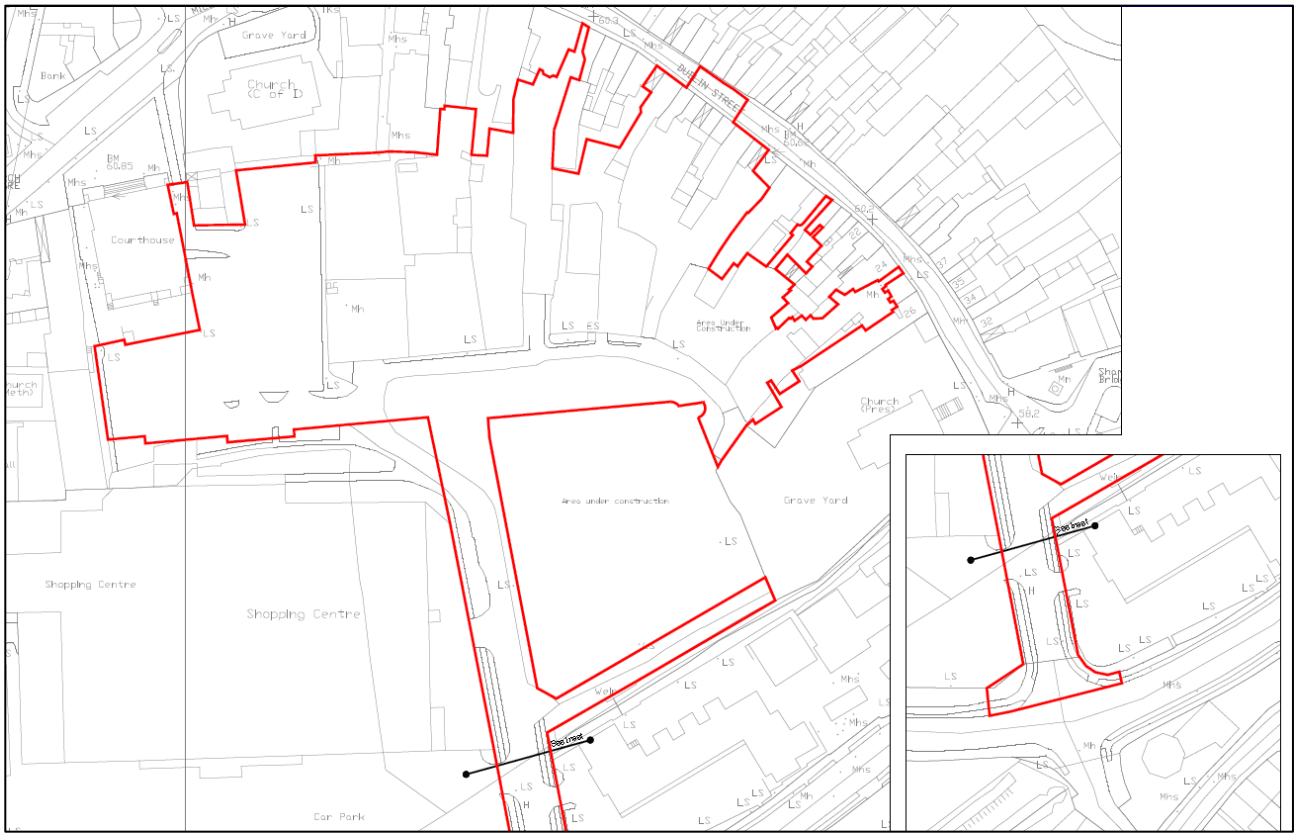


Figure 1 Proposed Works area / Survey area

The survey findings are presented in the report as follows:

- In **Section 3**, interventions required to accommodate the works are listed, emphasis is placed on interventions requiring demolition works.
- In **Section 4**, structural and cosmetic cracking and other defects identified during the survey are presented, these are to be read in line with the photographs and descriptions presented in **Appendix A.**
- In **Section 5**, the conclusions of the report are presented with recommendations of any further investigations presented.

Three maps were used to outline the survey area, as can be seen in **Appendix A**. The main areas focussed within the survey are as follows:

- Appendix A Image 1 – Dublin Street and associated backlands
- Appendix A Image 2 – Plots to rear of Dublin Street
- Appendix A Image 3 – Walk to red line boundary

The noticeable defects identified to structures facing proposed areas for urban realm improvement on Dublin Street, Monaghan Town can be grouped as follows:

a. Cracking around windows and doorways,

b. Cracking and damage to boundary walls,

c. Cracking and deterioration to render and stone / block work,

d. Deterioration of windowsills.

From the initial external survey, it is not clear what structural condition the current structures are in. Further investigation is required to establish the structural integrity of the existing properties to allow informed design assumptions to be made, i.e. internal survey and detailed opening up works within the subject properties. Therefore, recommendations for methods of retention following demolitions would be premature. Recommendations on requirements for additional investigations and intrusive works are listed in **Section 6** below.

2.1 Description of Assessment areas

The works area is located in the Monaghan town centre, in particular Dublin Street and backlands. Dublin Street is lined with historic buildings with several recent extensions and new builds to the rear of the main street. Dublin Street was well established by the early 19th Century with the majority of buildings constructed in this time. As described in **Section 1** above, the existing structures comprise of two and three storey buildings, typically merchant's townhouses of varying size and prominence with ground floor commercial units and residences above. **Figures 2** and **3** below highlight little change in the way of development on Dublin Street in the past 100 years.

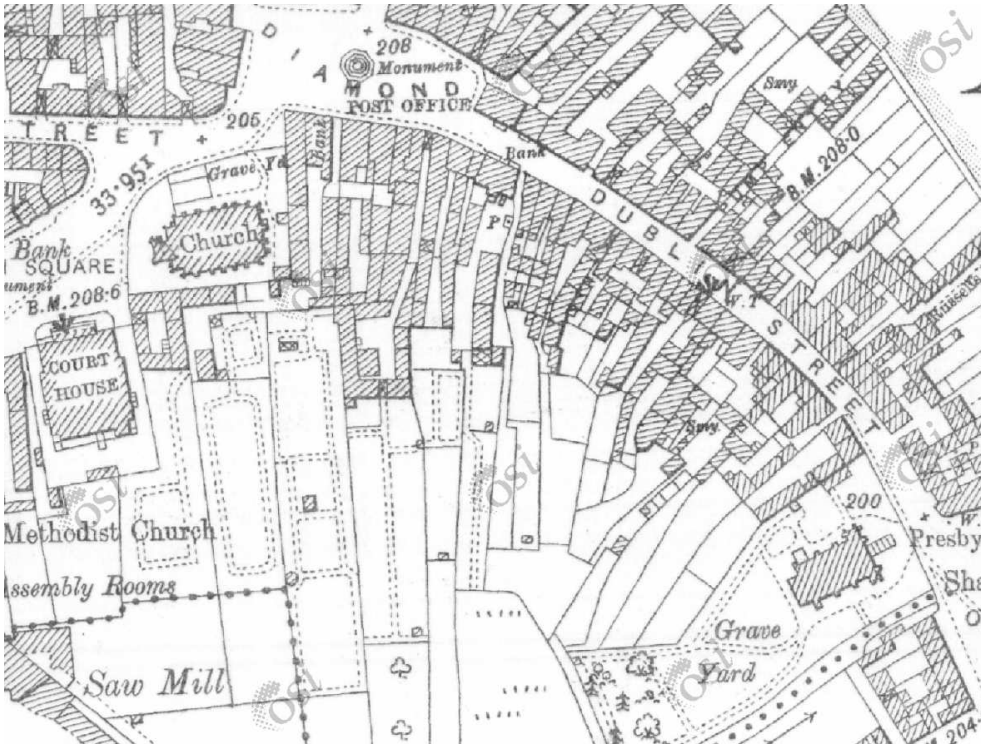


Figure 2 Historic Map – 25 inch (1888 – 1913)

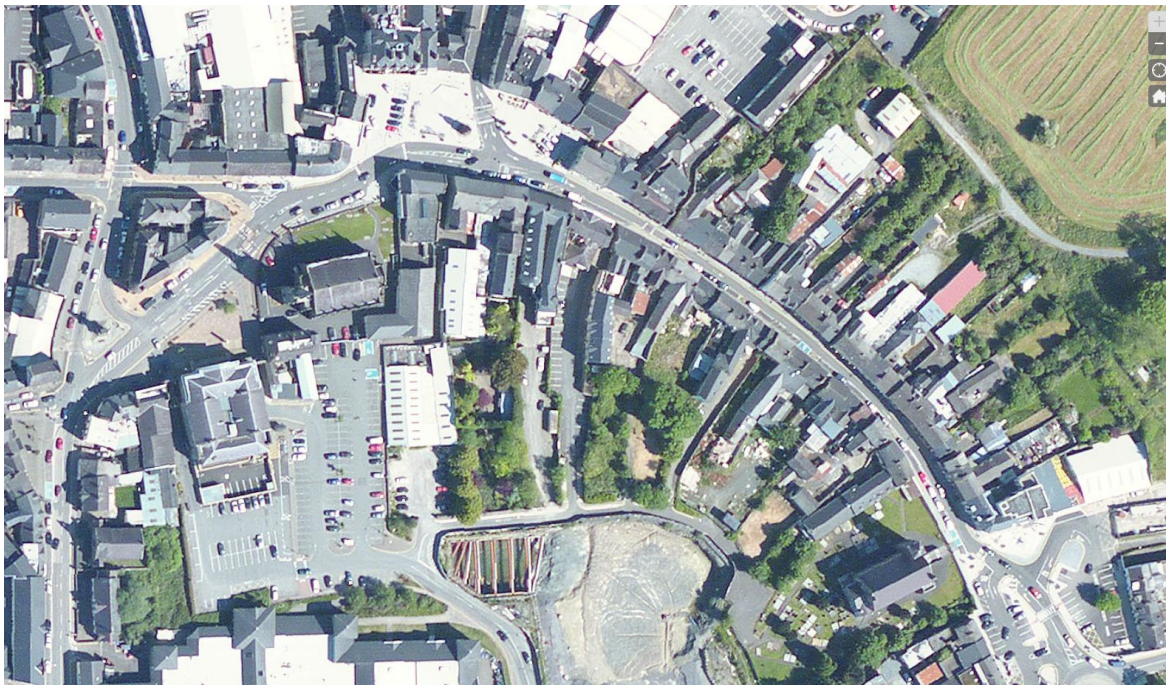


Figure 3 Digital Globe 2011 – 2013

3 INTERVENTIONS

To accommodate the proposed works, there are a number of interventions which require an initial visual survey and structural assessment. The proposed works/interventions are shown in **Figures 4** and **5** below. See underneath a summary of interventions:

- New street and public space to connect Dublin Street to the backland area – forming Gavan Duffy Place. This intervention requires the removal of several buildings on Dublin Street.
- A mews lane subdividing the longer rear plots to the backlands area – forming Church Walk.
- A new street to the rear to enhance pedestrian access between the existing shopping centre and Dublin Street – forming The Mall.
- Realigned road proposed from Broad Road to The Mall with public realm improvements and urban landmarks.
- New major public space to the side of the courthouse (existing carpark redefined) – forming Court House Square.
- A new linear building within the backlands area between The Mall and Church Walk.

3.1.1 Interventions requiring demolitions

To develop the new street and public space to connect Dublin Street to the backland area, several buildings on Dublin Street will need to be removed. The buildings in black text below neighbour proposed demolitions (No. 7 & 12). The buildings to be demolished are listed below in red (No.8-12):

- No.7: Monaghan Boot Co.
- No.8: The Vacant Building
- No.9: Best 4 You Building
- No.10: Existing GD Building & entry
- No.11: Instanbul Kebab House Building
- No.12: Mr. Malik Kebabs

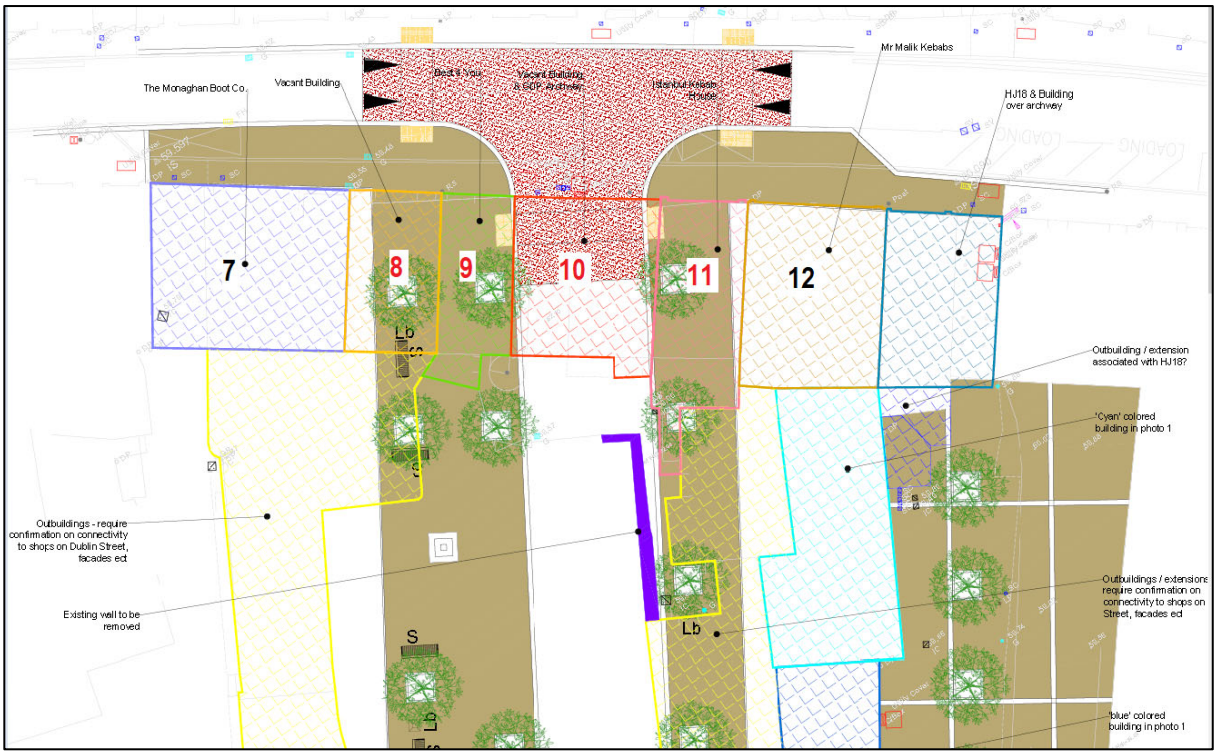
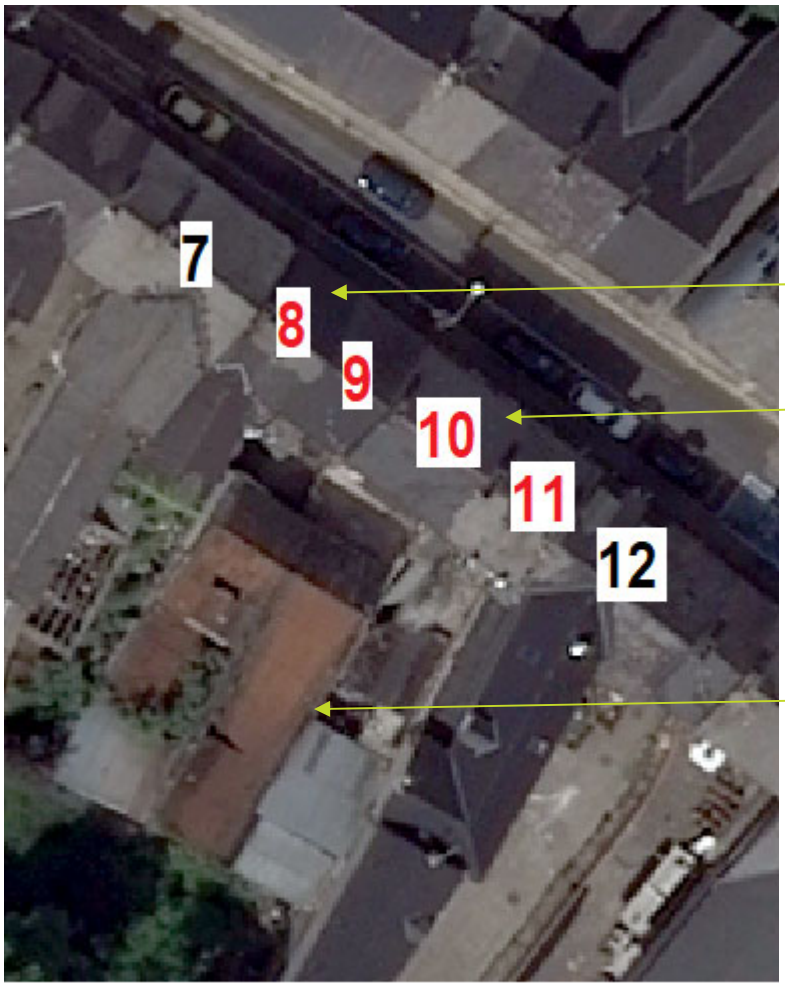


Figure 4 Building Removals

RPS carried out a non-invasive photographic inspection of the buildings. The aerial view below shows the extent of the buildings sharing party walls.



From aerial view, building 7 and 8 outbuildings/extensions.

Extension to rear of vacant building to be removed. Need to confirm makeup of party wall through further investigation.

Image from 2008

Buildings to rear of 8 / 9 /10 have since been demolished.

Now a brown field site. Overgrown.

Figure 5 Aerial View of Dublin Street

3.1.1.1 Building No. 8 – Vacant Building



Figure 6 - Area to be removed outlined in red

The vacant building is a two storey terraced building facing onto Dublin Street, the property is estimated to have been constructed in the early 19th century. The property has frontage of approximately 4m and an overall depth of approximately 10m.

The vacant building is to be demolished as part of the proposed work, leaving the Monaghan Boot Co building as the prominent façade facing the proposed works area.

Front Elevation:

- The Vacant Building (No.8) is a two storey building which shares a party wall with Monaghan Boot Co. (No.7) to the north west and Best 4 You (No.9) to the south east.
- The front elevations show the buildings share party walls.
- No evidence available as to the makeup of the building's foundations.
- Upon visual inspection, there is no evidence of the thickness and makeup of the party wall
- There is a chimney at the apex of the adjoining roof of the vacant building and Monaghan Boot Co. It is expected that this chimney is associated with the vacant building. The chimney is of brick construction with flashings well dressed. Within the roof space, the brick work of the chimney will be inspected.
- The roof construction is believed to be of traditional cut timber

Rear Elevation

- To the rear, vacant building (No.8) is has a two storey extension. Monaghan Boot Co. (No.7) has a two storey modern extension which extends to an old stone wall which is to be removed as a part of the proposed works.
- Both building extensions appear to be sharing a party wall.
- No evidence available as to the makeup of the building's foundations.
- Upon visual inspection, there is no evidence of the thickness and makeup of the party wall.
- There is a chimney at the apex of the adjoining roof. The roof construction is believed to be of traditional cut timber.

3.1.1.2 Building No. 12. Istanbul Kebab



Figure 7 - Area to be removed outlined in red

The property is a three storey terraced building facing onto Dublin Street, the property is estimated to have been constructed in the early 19th century. The property has frontage of approximately 4m and an overall depth of approximately 12m with several single storey outbuildings adding 8m in length.

Istanbul Kebabs is to be demolished as part of the proposed work, leaving the Mr. Malik Kebab building as the prominent façade facing the proposed works area.

Front elevation:

- Istanbul Kebab (No.11) is a 3 storey building which shares a party wall with Mr. Malik Kebab (No12) to the south east and Gavin Duffy place (No.10) to the north west.
- The front elevations of the building show the buildings share a party wall.
- No evidence available as to the makeup of the building's foundations.
- Upon visual inspection, there is no evidence of the thickness and makeup of the party wall.
- There is a chimney within the Istanbul kebabs building.
- The roof construction is believed to be of traditional cut timber.

Rear Elevation.

- To the rear, Istanbul Kebab (No.11) has a stairway to access the first floor accommodation. There are several single storey outbuildings which are used for storage purposes.
- The outbuildings back onto buildings constructed to the rear of Mr. Malik Kebabs (See **Figure 4** showing blue and cyan building). It appears that removal will not impact on existing construction (to be confirmed)
- No evidence available as to the makeup of the building's foundations.

3.1.2 Interventions elsewhere with red line boundary:

3.1.2.1 Sherry Bar and Carn Hackneys

Several other areas required visual structural assessment due to the interventions at the interface of the proposed works and the existing buildings. Several laneways penetrating Dublin Road to backlands associated with the proposed works have been photographed.





Figure 8 & Figure 9 Alley Between Sherry's Bar and Carn Hackneys

3.1.2.1.1 Sherry's Bar

- Sherry's Bar is a 3 storey building
- Interventions within the alleyway will be shallow in nature, pavement and associated subsurface build-up should not impact the buildings structural integrity. Photographic evidence was captured to ascertain the existing condition of the gable wall which is of a mixture of stone and brick construction. The wall is in good condition.

3.1.2.1.2 Carns Hackneys

- Carns Hackneys is a 2 storey building
- Interventions within the alleyway will be shallow in nature, pavement and associated subsurface build-up should not impact the buildings structural integrity. Photographic evidence was captured to ascertain the existing condition of the gable wall which is of stone construction. The wall is in good condition.

3.1.2.2 Dublin Street in the rare oul times and dwelling.





Figure 10 & Figure 11 Alley Between Dublin in the rare oul times and vacant building

Dublin Street in the rare oul times

- Dublin street in the rare oul times is a 3 storey building
- Interventions within the alleyway will be shallow in nature, pavement and associated subsurface build-up should not impact the buildings structural integrity. Photographic evidence was captured to ascertain the existing condition of the gable wall, construction type is unknown as the wall has been plastered. The main gable wall appears to be in good condition.
- The property extends to the rear. The rear of the building is in poor condition with vegetation growing from the windows and rainwater goods damaged leading to discolouring on the walls.

3.1.2.2.1 Dwelling

- The dwelling to the south of the alleyway is 3 storey building with a single storey extension to the rear.
- Interventions within the alleyway will be shallow in nature, pavement and associated subsurface build-up should not impact the buildings structural integrity. Photographic evidence was captured to ascertain the existing condition of the gable wall which is of a mixture of stone and brick construction. The main gable wall appears to be in good condition.

3.1.2.3 HJ18 and vacant building





Figure 12 & Figure 13 Alley under archway HJ18

3.1.2.3.1 Vacant building

- The vacant building to the south of the alley is a 4 storey building.
- Interventions within the alleyway will be shallow in nature, pavement and associated subsurface build-up should not impact the buildings structural integrity. Photographic evidence was captured to ascertain the existing condition of the ground floor section of the gable wall within the alley and at third floor level where the building rises over the neighbouring property to the north. The construction type at ground level is unknown as the wall has been plastered. The higher section is also plastered, however, the chimney is of brickwork construction. The main gable wall condition cannot be determined due to plasterwork
- The rear of the property is in poor condition, showing signs of dereliction.

3.1.2.3.2 HJ18 building

- The HJ18 building above the alley is a 3 storey building, two floors over an archway and two-storey section of the building to the north. The buildings are connected at first floor level.

- Interventions within the alleyway will be shallow in nature, pavement and associated subsurface build-up should not impact the buildings structural integrity. Photographic evidence was captured to ascertain the existing condition of the ground floor section of the gable wall within the alley and at second floor level where the building staggers in height. The construction type at ground level is unknown as the wall has been plastered. The higher section is also plastered, however, the chimney is of brickwork construction.
- The building backs onto an open alleyway and two residential buildings (cyan and blue buildings).

3.1.2.4 Council building and Cheveux Salon



Figure 14 & Figure 15 Alley between Council Offices and Cheveux hair studio

3.1.2.4.1 Cheveux Salon

- The Cheveux Salon to the south of the alley is a 2 storey building.
- Interventions within the alleyway will be shallow in nature, pavement and associated subsurface build-up should not impact the buildings structural integrity. Photographic evidence was captured to ascertain the existing condition gable wall which is a mix of stone and brick construction. The wall is in good condition.
- To the rear of the property, there is a single storey extension and a standalone casino.

3.1.2.4.2 Council building

- The council building to the north of the alley is a 2 storey building with a converted attic space accommodating a third floor.
- Interventions within the alleyway will be shallow in nature, pavement and associated subsurface build-up should not impact the buildings structural integrity. Photographic evidence was captured to ascertain the existing condition gable wall which is currently plastered. The wall appears in good condition.
- To the rear of the building is a modern extension.

3.1.2.5 Stone wall to rear of casino





Figure 16 & Figure 17 Old stone wall to the rear of casino

- The old stone wall to the rear of the casino is to be removed to accommodate the proposed works. The wall is not connected to the casino and can be removed.

4 CRACKING AND DEFECTS TO BUILDINGS

The survey of structural elevations facing the proposed works identified cracking and defects as presented in the following table and photos. Additional photographs are provided in **Appendix A**.

Table 4-1 Cracking and Defects to Buildings

Location	Details of Defects	Monitoring / propping required	Full internal survey required
Vacant building.	Horizontal cracks around door. Vertical crack over window at first floor	No.	Internal survey required to determine connection to Monaghan Boot Co. and connections to rear buildings
Rear of vacant building	Extension to rear of vacant building in poor condition – derelict. Roof bowing	No.	Internal survey may be required ot determine connection to buildings to the rear of Monaghan Boot Co and best4you building.
Best4you	Horizontal cracking at interface of Best4You and vacant building	No	Internal survey required to determine connection to vacant building and connections to rear buildings
Rear of Best4You	Settlement cracks over first floor window. Plaster spalling. Cracks over door	No	Internal survey required to determine connection to vacant building and connections to rear buildings
GDP archway	Horizontal and vertical cracking around windows	No	Internal survey may be required to determine connection to Istanbul kebab house and connections to rear buildings
HJ18 building	Cracks at windows	No	Internal survey may be required to determine connection to Mr Malik kebab house and connections to rear buildings
Cyan building to rear of Mr Malik Kebab	Cracks at windows Crack at vent to ground floor Paving dropping Overgrown vegetation. Plaster spalling	No	Internal survey may be required to determine connection to Mr Malik kebab house
Blue building to rear of cyan building.	Horizontal and vertical cracks around windows and doors	No	Internal survey may be required to determine connection to Cyan Building
Casino building	Horizontal and vertical cracks around windows and doors.	No	No internal survey required. Area faces proposed works
Rear of Monaghan Spice building	Vertical crack in wall	No	No internal survey required. Area faces proposed works
Rear of Rare oul times building	Cracks around windows	No	No
Buildings to rear of Sherry's Bar	Stone building – poor construction. Roof bowing	No.	Internal survey may be required to determine structural condition if remediation proposed
The Northern Standard	Portal frame building with infill blockwork Horizontal and vertical cracks throughout. Northern wall acts as retention for a car park.	No	Internal survey may be required to determine structural condition if removal / remediation proposed
Buildings to rear of Monaghan Boot Co.	Possible asbestos sheeting on roof.	No	Asbestos survey recommended.

Several structural defects are evident on external structures, walls, pavements etc, within the proposed works area. These are listed in the survey log in **Appendix A.**

5 FAÇADE RETENTION / STABILIATION

To avoid unplanned structural collapse during construction, the contractor must achieve structural stability as demolition progresses. As demolition proceeds in the vicinity of facades that are to be retained, methods of support such as temporary or if required, permanent structures should be installed to ensure that stability is maintained. Stabilisation works may also be an option following the demolition of adjoining buildings.

Detailed opening up works, and structural calculations informed by the works will establish whether the facades are the be temporarily/permanently retained by support structures or if stabilisation can be incorporated through the remaining structures.

5.1 Façade Retention Systems

The gable walls should be considered for restraint against outward movement. A facade retention system may be required on the gable ends of Monaghan Boot Co. and Mr. Malik Kebabs. Each of these gables can be supported by independent systems e.g. support scaffolding or raking shores to fully support the facade.

The façade is usually restrained by clamping to both of its faces, with connections to the temporary retention structure being made through openings. This is a simple and reliable method that minimises risk of damage to the façade fabric.

Three systems of façade retention are shown below, a support scaffold system, a timber raking shore system and variations of steel framed systems.

5.1.1 Support Scaffold System

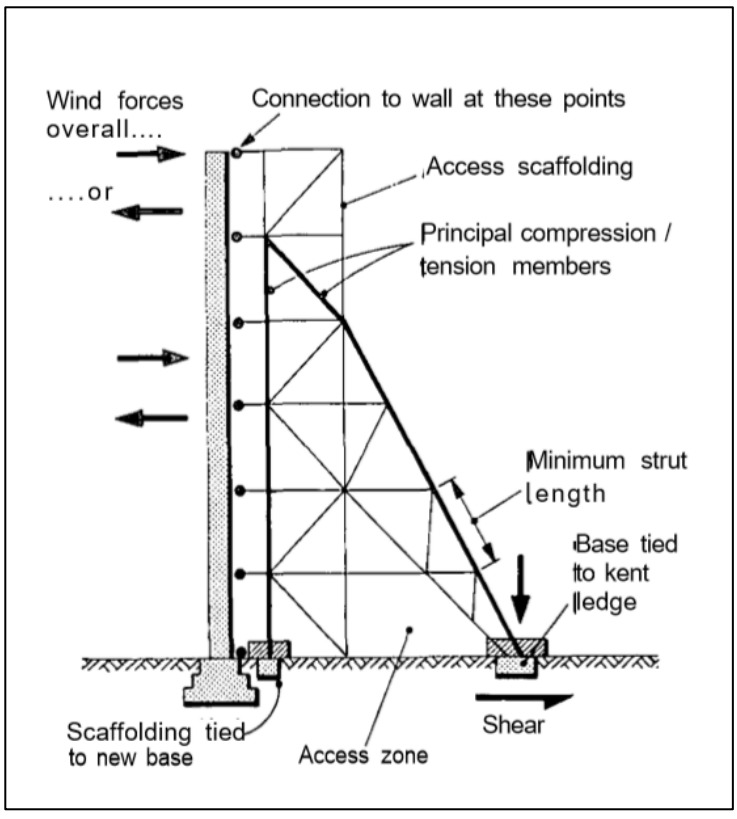


Figure 18 - Support Scaffolding System

Figure 18 shows a typical scaffolding support system used for façades of medium height.

5.1.2 Raking Shore System

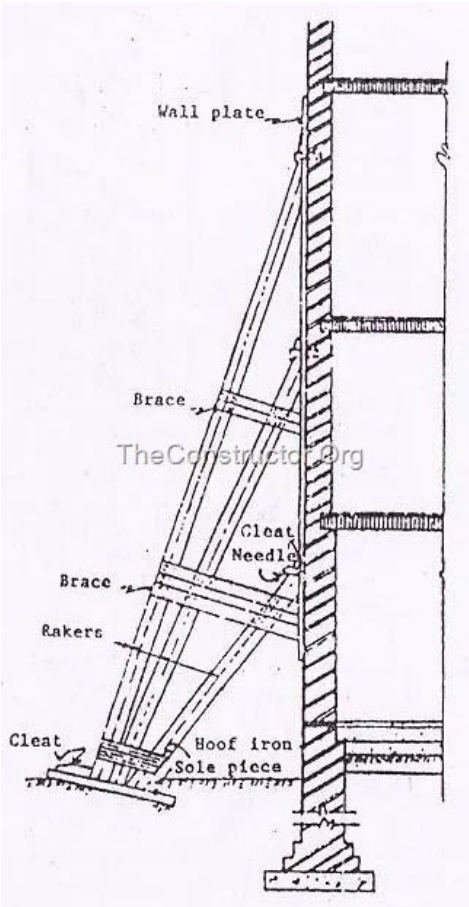


Figure 19 - Timber Raking Support Sketch



Figure 20 - Timber Raking Support Image

Figure 19 & 20 shows raking timber supports (in this instance serving as shores to a party wall exposed by demolition of the adjoining property).

Figure 21 below shows an external composite steel framed system, with portal frame that allows access at pavement level. This solution would likely require large foundations to transmit loadings to the ground and also to resist overturning due to wind loading. Figure 22 & 23 shows variations of steel framed systems with no pedestrian access.

5.1.3 Steel framed system.

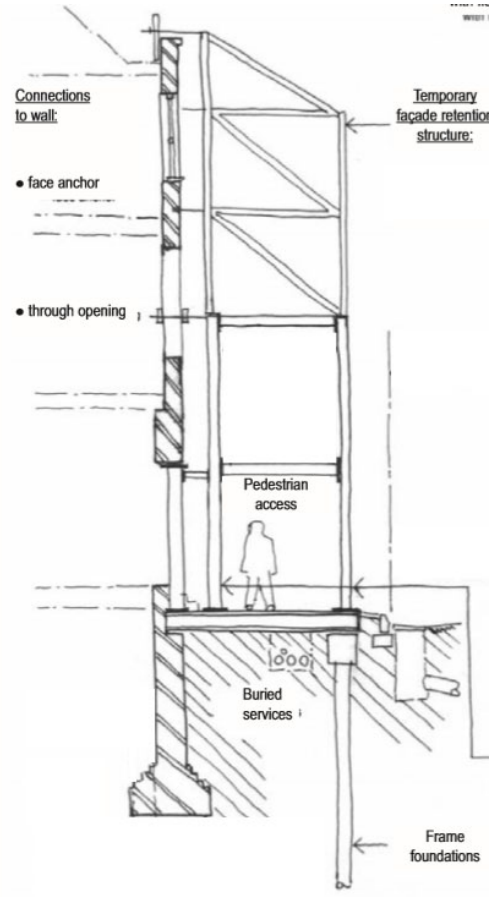
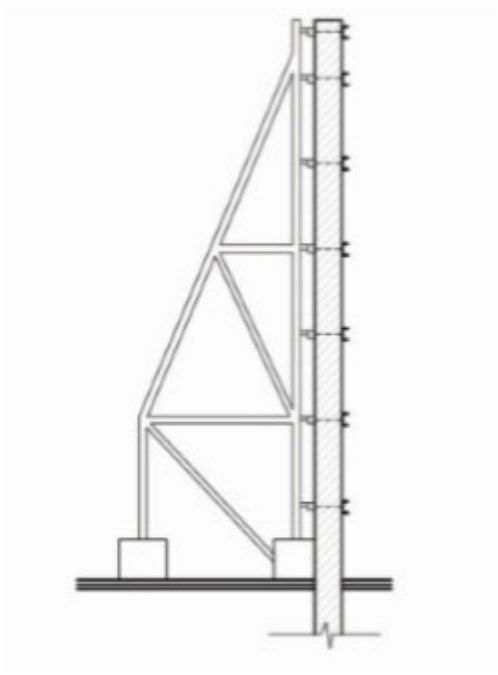


Figure 21 - External composite system, with portal frame that allows access at pavement level



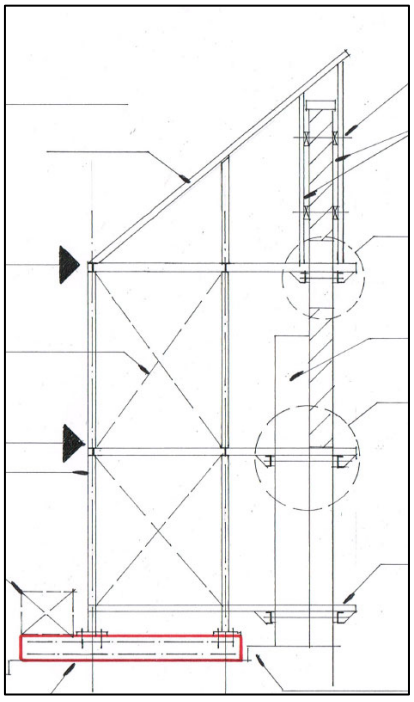


Figure 22 & Figure 23 - Variations of Steel Bracing Systems

5.2 façade Stabilisation system:

If the structure has adequate stability to support itself without the use of bracing systems following demolition, other factors should be accounted for. A reduction in lateral support of the walls due to demolitions may result in movement of the structure, in this case likely outward movement. Façade stabilisation can counter movement using proprietary systems such as the use of grouted anchors. The use of façade stabilisation systems is dependent on the internal arrangement of the existing building, ensuring adequate support members are available to resist movement.



Figure 24 - External Stone Wall



Figure 25 - Internal Stabilisation

The example above shows anchors installed through the gable wall and into the parallel joists at first floor level. Holes were drilled through the wall and the first three joists. The anchors were then inserted before being pumped full of grout, expanding them to fill all spaces in the wall and the gaps between the joists to provide a solid anchorage. Once again, and as evident above, a façade stabilisation system is dependent on the internal arrangement of the existing structure, ensuring adequate support members are available to resist movement.

5.3 Masonry Wall with piers

The existing walls may not have adequate stability to counteract lateral loading applied following the removal of existing buildings. To counteract this. an external masonry wall with masonry piers can be constructed to provide lateral support to an existing wall. The proposed single leaf wall can act independently of the existing wall to provide protection from lateral wind loads. This option can be developed further in detailed design stage. See sketched cross section of the masonry wall below:

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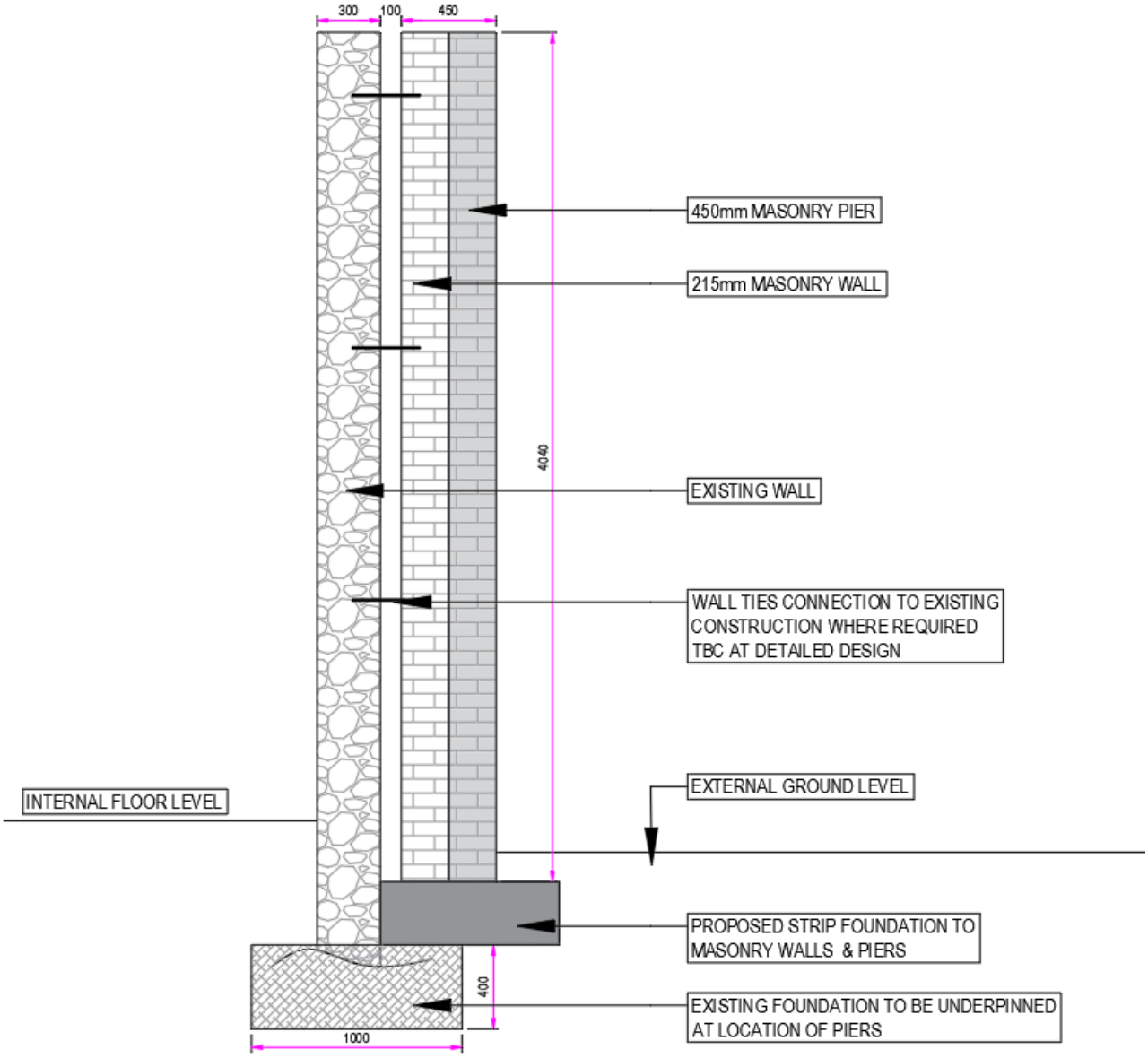


Figure 26 - Masonry Wall Gable Support

6 CONSLUSIONS AND RECOMMENDATION FOR FURTHER INVESTIGATION

Following a visual inspection and a photographic survey of the properties within the areas proposed for enhancement (within the red line boundary), the extent of the noticeable defects to buildings within these areas can be summarised as;

- Cracking around windows and doorways,
- Cracking and damage to boundary walls,
- Cracking and deterioration to render and stone / block work,
- Deterioration of windowsills.

It is recommended that should future construction works be undertaken in the vicinities of these areas that continuous monitoring of the existing defects should also be undertaken to ensure that further deterioration does not occur.

6.1 Further Investigation.

Several buildings are to be demolished as a part of the proposed works. The terraced nature of the buildings on Dublin Street requires interventions at building facades, in particular the gable ends of Mr Malik Kebabs and Monaghan Boot Co.

Prior to demolitions, it is recommended that the condition and stability of existing substructure and superstructure be ascertained, and load-bearing walls identified through further investigations. Further investigations may indicate that no propping/stabilisation is required, however this cannot be determined at this preliminary stage of the project. Therefore, detailed opening up works will be required.

Opening-up is relatively quick, informative and may not be overly disruptive, though consideration should be given to whether prior consent, such as listed building consent, need to be obtained. Care should be taken to ensure any opening up is made good following investigation. The following elements are to be considered when carrying out detailed opening up works:

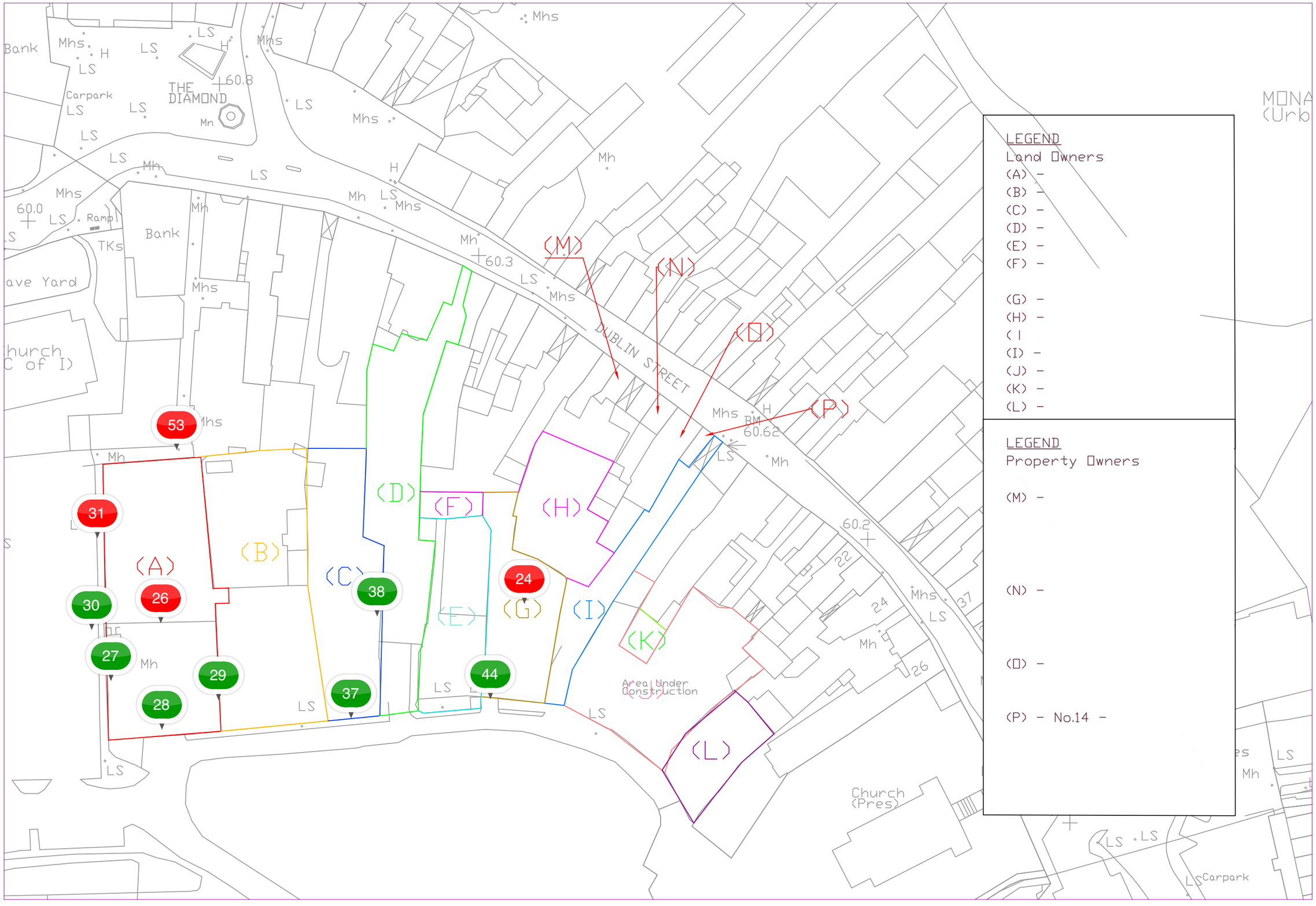
- Evidence of make-up of substructure
- Properties of internal and external superstructure
  - Internal and party walls
  - Intermediate floors
  - Roof structure
  - Chimney
- confirm construction methods - e.g. solid walls, cavity construction, or stone-filled cavities.
- The structural condition of walls which are to remain, including the walls of any adjoining property, will be established.

At design stage, the possible effect on the remaining structure following the removal of buttressing walls should be considered with particular regard to wind loading. Consideration should be given to possible local instability, including buckling failure, of the wall due to removal of parts of the structure providing bracing, such as walls, floors or roofs.

Consideration should also be given to dangerous materials such as asbestos. Asbestos may likely be encountered during the proposed works and it is recommended that a full asbestos survey be carried out on buildings that are likely to be demolished/removed

Appendix A

Dublin Street and Backlands photographic survey


LEGEND
Land Owners
(A) -
(B) -
(C) -
(D) -
(E) -
(F) -
(G) -
(H) -
(I
(I) -
(J) -
(K) -
(L) -
LEGEND
Property Owners
(M) -
(N) -
(□) -
(P) - No.14 -
DUBLIN STREET
THE DIAMOND
Bank
Carpark
Ramp
TKs
Church (C of I)
Church (Pres)
Area Under Construction
(A)
(B)
(C)
(D)
(E)
(F)
(G)
(H)
(I)
(K)
(L)
(M)
(N)
(□)
(P)
53
31
30
26
27
28
29
38
37
44
24
60.8
60.0
60.3
60.62
60.2
BM

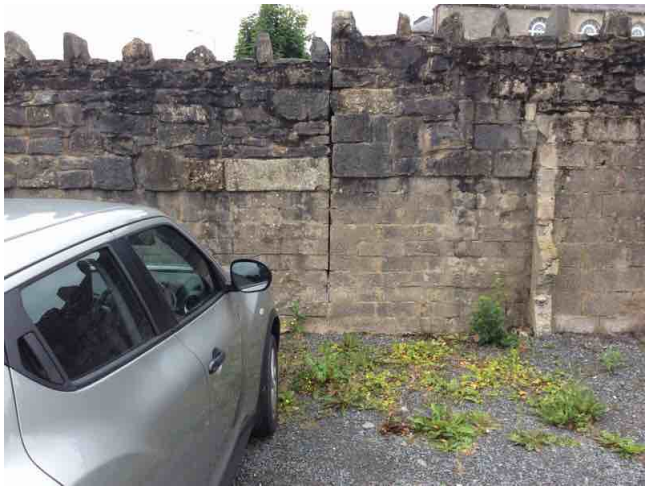
General Observation

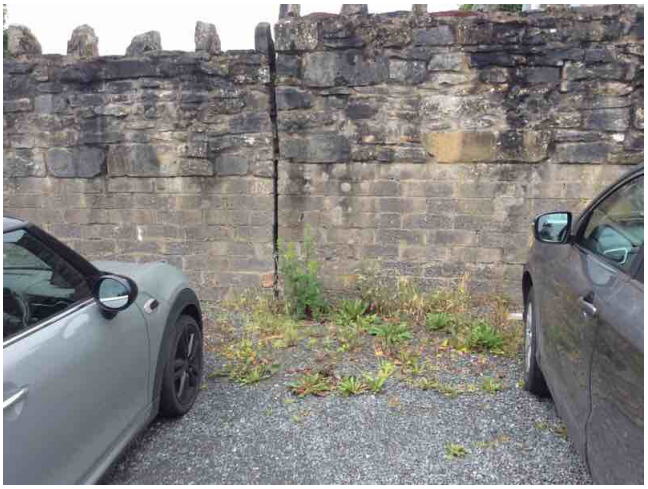
27 23/06/2020

Retaining wall between plot a and car park.

Block wall retention with stone wall over











28 23/06/2020

Wall. Plot A





29 23/06/2020

Plot A

Japanese knotweed around area

Vertical Crack in wall









30 23/06/2020





37 23/06/2020

Entrance to plot c



38 23/06/2020

Area to rear overgrown



44 23/06/2020

Gate at G



Infrastructure

53 23/06/2020

Building to rear of plot A. Horizontal cracking along face









Structural Observation

24 23/06/2020

Building to rear of Monaghan boot co.

Buildings built next to old stone wall - to be removed


















DUBLIN ST.

26 23/06/2020

Plot A the northern standard.
Portal frame, infill blockwork.
External facade in poor condition
Several horizontal and vertical cracks at open and blockwork coursing.
Japanese knotweed around site



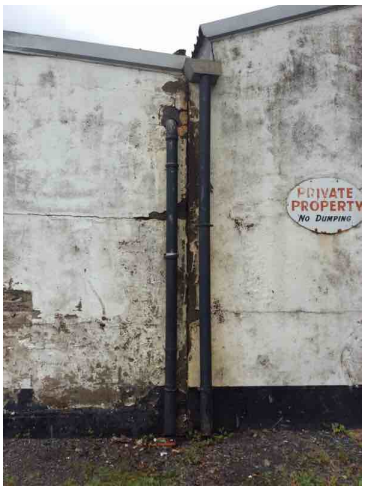
















31 23/06/2020

Northern standard rear wall and building to rear

Cracking at interface





General Observation

32 23/06/2020

Building to rear of church. Adjoining proposed works area










33 23/06/2020

Wall to rear of cafe





34 23/06/2020

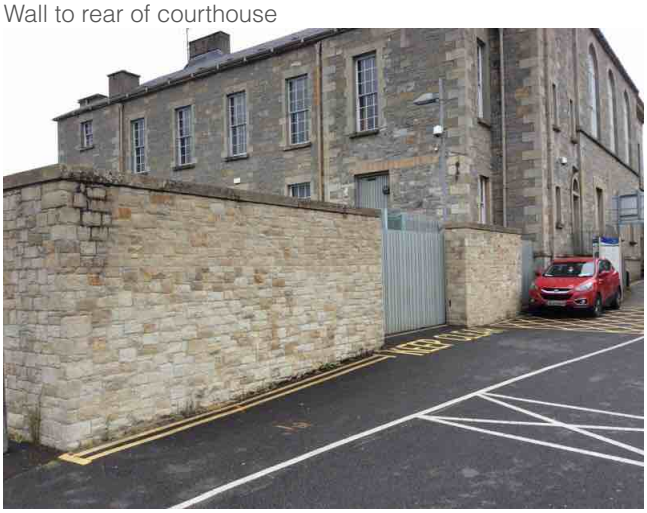







35 23/06/2020

Wall to rear of courthouse

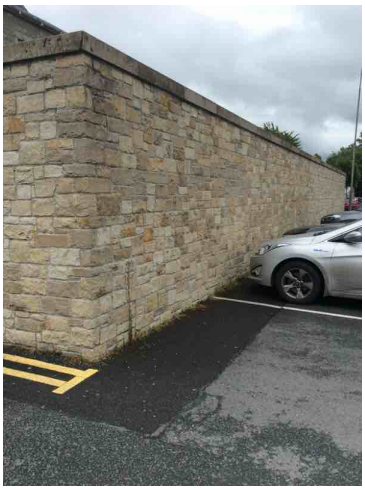




36 23/06/2020

Wall to rear of courthouse





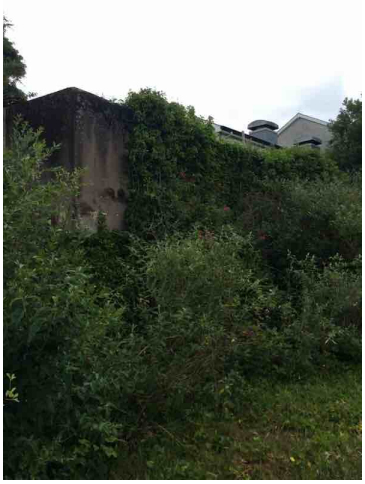
40 23/06/2020

Entrance to plot C



42 23/06/2020

Plot J. Overgrown





43 23/06/2020

Area overgrown to rear of peaky blinders public house





45 23/06/2020

Front and rear of rare auld times building











47 23/06/2020

Alleyway behind Sherry's







48 23/06/2020

Alley behind Sherry's and lavery home furnishings.











49 23/06/2020

No access to rear of lavery's furniture



52 23/06/2020

Archway to rear of courthouse





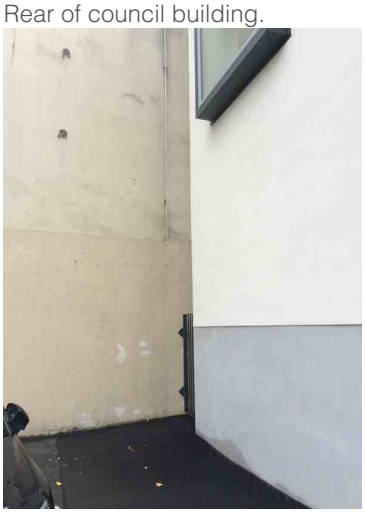
54 23/06/2020

Building to rear of plot A



58 23/06/2020

Rear of council building.





59 23/06/2020

Bin store wall connects to existing block wall. Crack on block wall due to connection of new wall

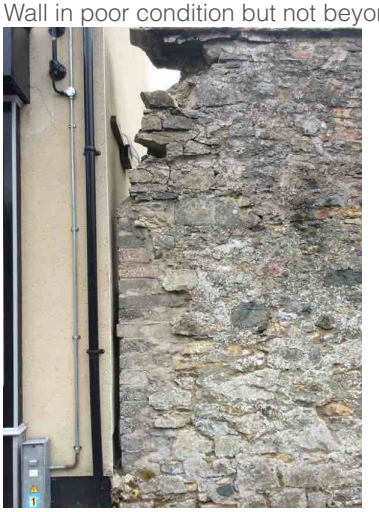


60 23/06/2020

Wall to rear of casino.

No connection to casino

Wall in poor condition but not beyond repair






61 23/06/2020

Old stone wall to rear of casino.

No connection to building




62 23/06/2020

Buildings to rear of Monaghan boot co. Building.

Recent extension. No info on Monaghan coco planning website. Possible asbestos sheeting on roof.

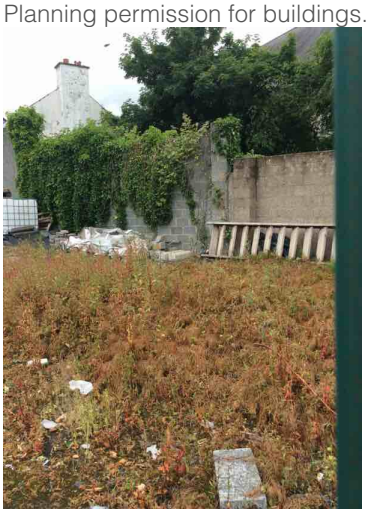


63 23/06/2020

Plot L

Rear of building. Stone building

Planning permission for buildings. Check Monaghancoco site











66 23/06/2020

Refer to observation 13



67 23/06/2020













68 23/06/2020

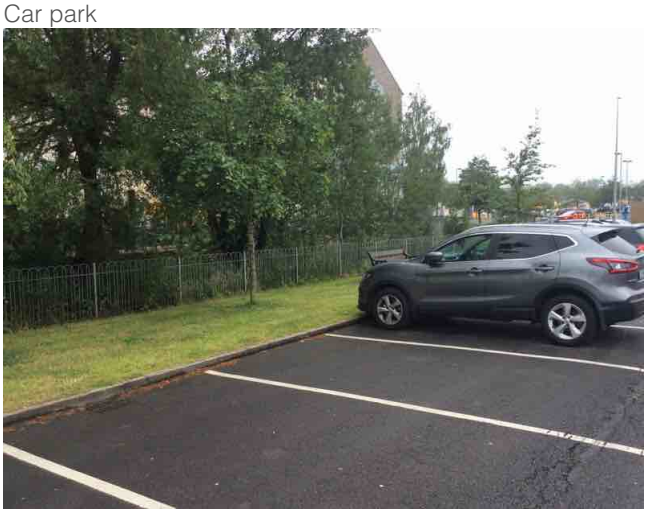
Car park / rear of church.





69 23/06/2020

Car park







70 23/06/2020

Junction of plot L and church





71 23/06/2020

Car park facing fenced wall. Plot I



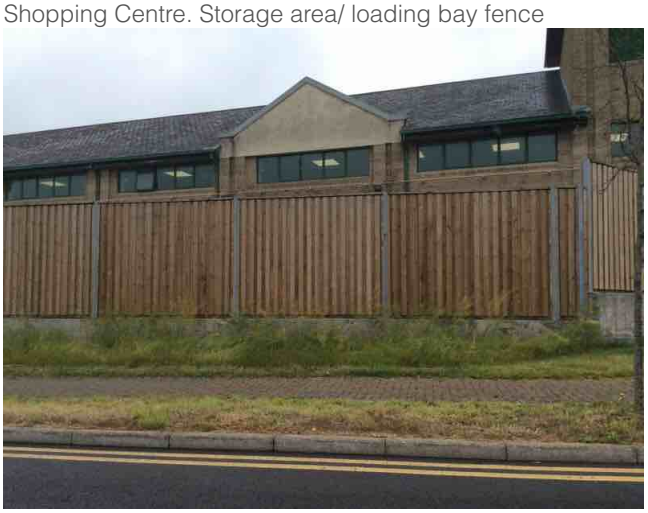
72 23/06/2020

Rear of shopping Centre



73 23/06/2020

Shopping Centre. Storage area/ loading bay fence







74 23/06/2020

Car park





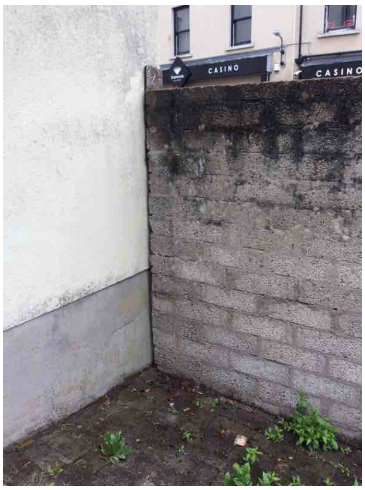


Structural Observation

39 23/06/2020

Rear of Monaghan spice building. Vertical Crack in wall



41 23/06/2020

Rear of Monaghan spice

Old stone and rubble wall, damaged but not beyond repair.

Vegetation overgrown - possible Japanese knotweed.







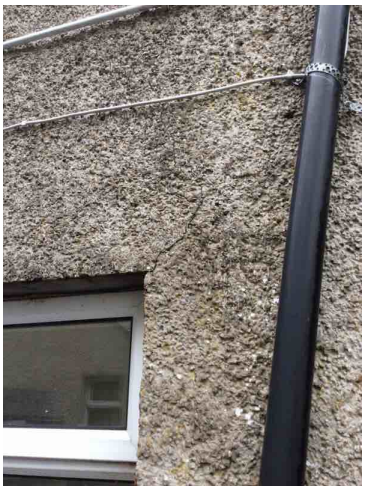


46 23/06/2020

Rear of rare old times building
Building in poor condition

Stone wall damaged but not beyond repair



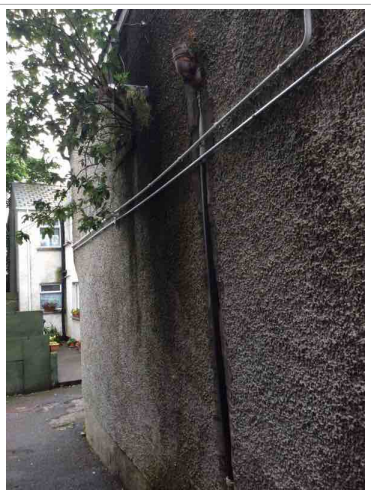









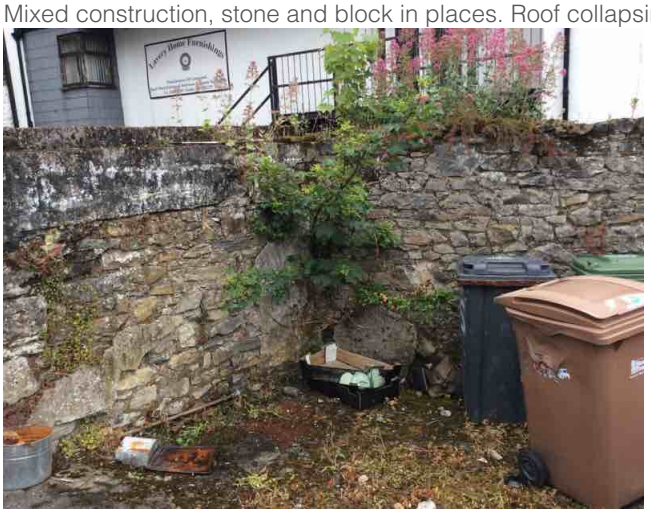


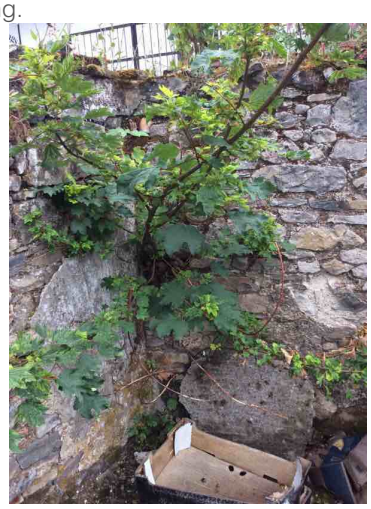



50 23/06/2020

Outbuildings to the rear of Sherry's in poor condition

Mixed construction, stone and block in places. Roof collapsing.
















51 23/06/2020

Dublin road side of plot L.

Stone building in poor condition, mixed construction.. Appears to be used for storage





55 23/06/2020

Alleyway between cheveux and council building.

Pavement dropping in Centre.








56 23/06/2020

Rear of cheveux building

Additional height added to building following construction.





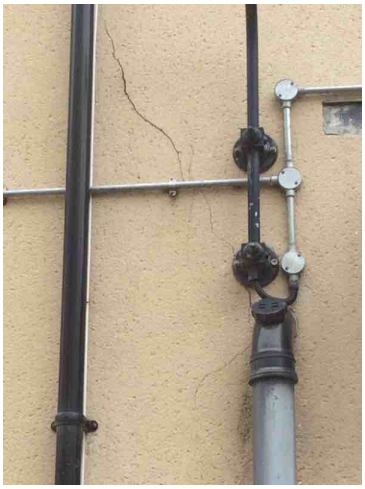


57 23/06/2020

Casino. Cracking in facade, mainly at lintel locations
















CASINO
CASINO
Diamonds
CASINO


CASINO
Diamonds
CASINO



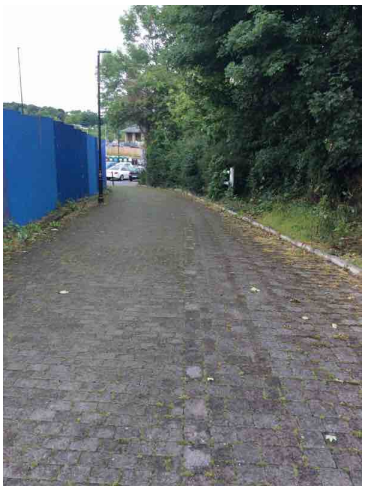


General Observation

9 23/06/2020

Services in alleyway



10 23/06/2020

building to rear. See planning application.
No access inside hoarding. Overgrown.
Buildings interface to proposals








19 23/06/2020

No structural observations





20 23/06/2020

Roof ridge drooping









21 23/06/2020



















22 23/06/2020




65 23/06/2020







Structural Observation

1 23/06/2020

Gable wall - render damaged at corner bead

No connection to rear wall.

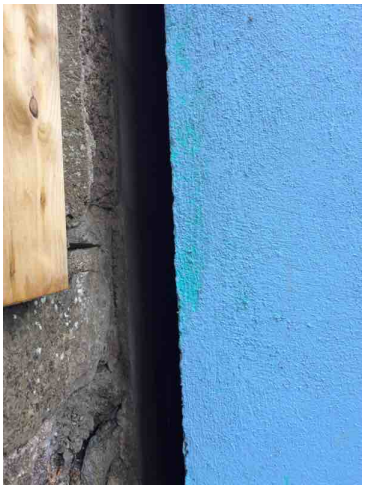




2 23/06/2020

Some longitudinal cracking. Plaster associated with coursing. Visual only

Building not connected to rear boundary wall





3 23/06/2020

Several cracks on front elevation.

Settlement cracks. Most prominent at first and sf levels around windows. Vertical and horizontal cracking

Crack at gf at window.










4 23/06/2020

Crack from vent to ground. Minor.
Render coming away at corner bead.
Paving dropping @ cyan building
Extension from cyan building, overgrown bushes
Cyan building connects to my. Malik kebabs (at rear)

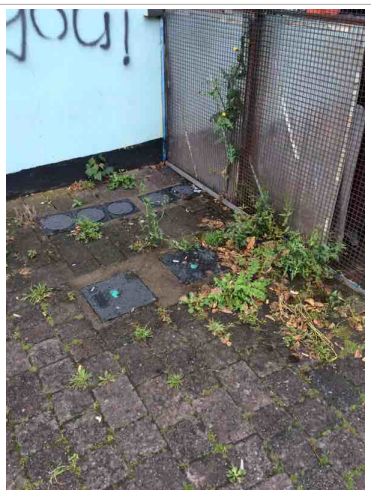








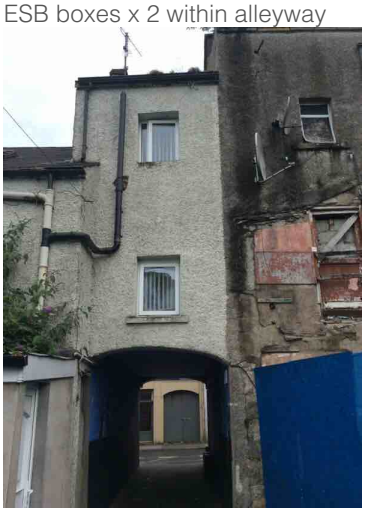




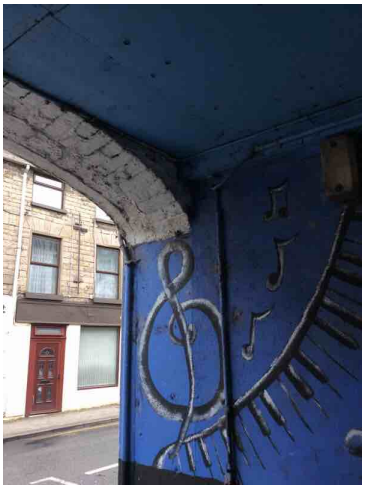
5 23/06/2020

Archway supported by buildings either side
No cracks along interface
Timber ply under arch. Could not determine make up of floor

ESB boxes x 2 within alleyway











6 23/06/2020

Services within alleyway
Surface or storm (MH not opened)

ESB boxes and MH





7 23/06/2020

Additional floor built onto existing building.
Foundations may not be adequate
Building in poor condition. Needs further investigation



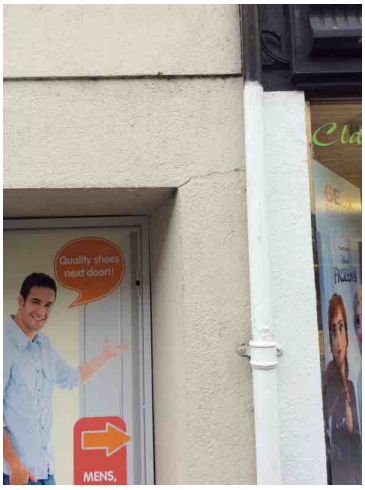


12 ⊕ 23/06/2020

Vacant building and Monaghan boot co. May share party wall
Area requires further investigation. Possible opening up works
Vacant building - horizontal crack over door.













13 23/06/2020

Front elevation over arch.

Cracking at window.

Arch in good condition. Walls in good condition. MDF sheets form roof under arch













14 23/06/2020





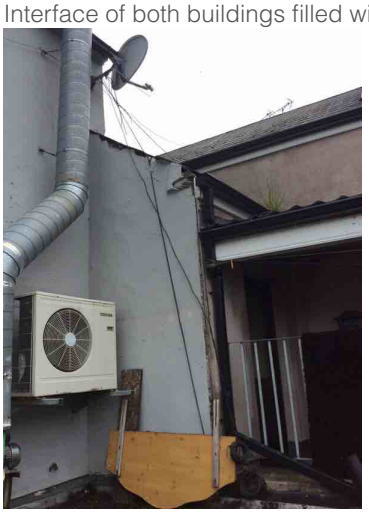
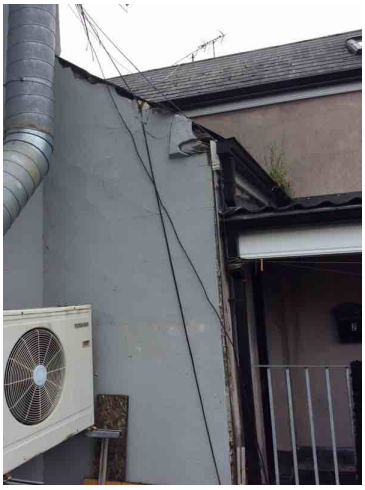
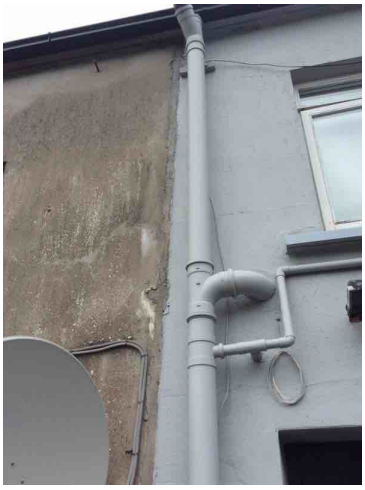




15 23/06/2020

Unclear where access leads, Istanbul kebab house or vacant building

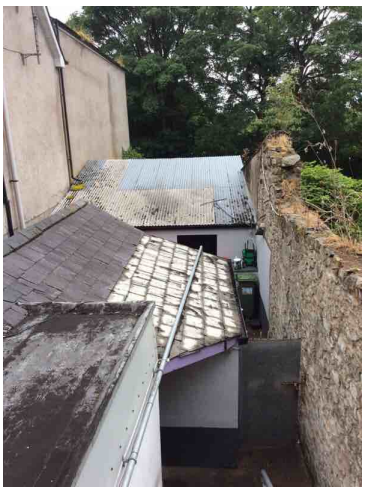
Interface of both buildings filled with mortar


16 23/06/2020

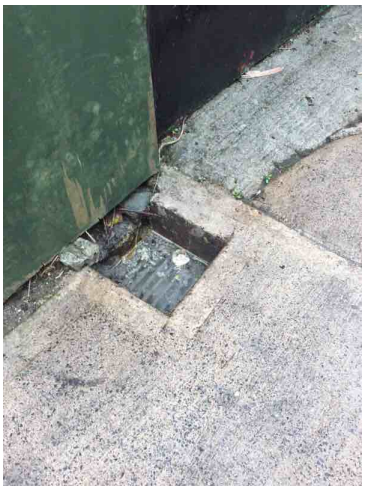
Wall to be removed and adjoining structures demolished.





17 23/06/2020

Rear of GDP archway.
Several buildings adjoin at rear.
Further internal investigation required to determine internal arrangement. To left, rear entrance of sew n sew first floor. Rear Access to best 4 you ground floor
Vacant building and roof back onto best 4 you building









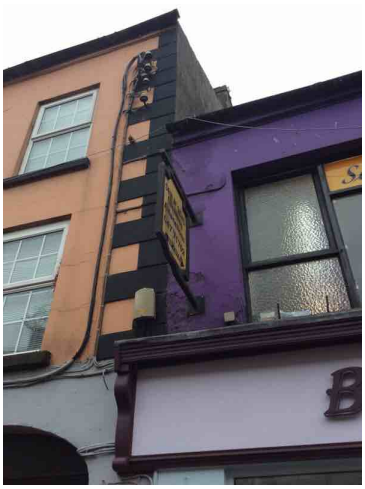


18 23/06/2020

Horizontal cracking at interface of best4you and vacant building



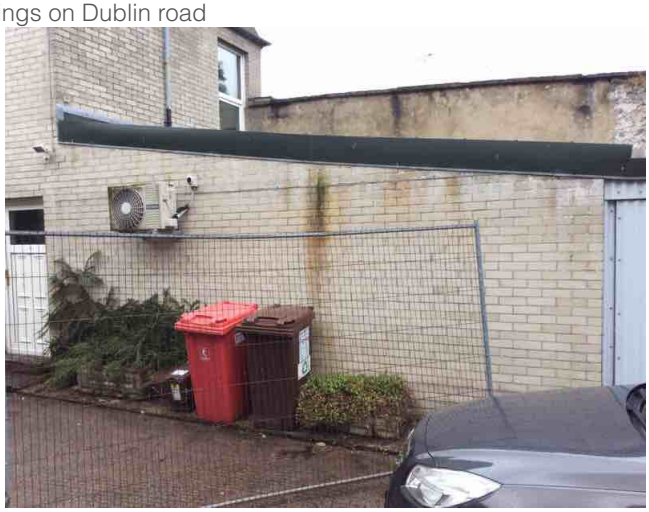




23 23/06/2020

New building. Check planning to see how it connects to buildings on Dublin road







25 23/06/2020

Possible asbestos sheeting on roof

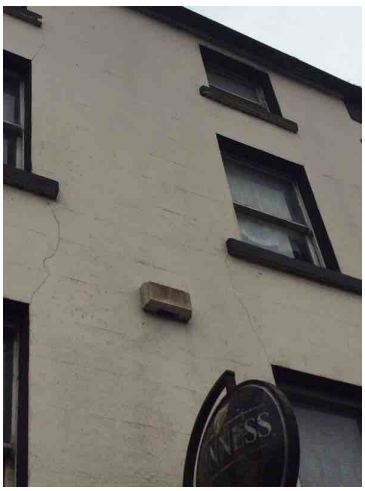


64 23/06/2020

Vertical and horizontal cracks to front elevation.

At lintel locations.



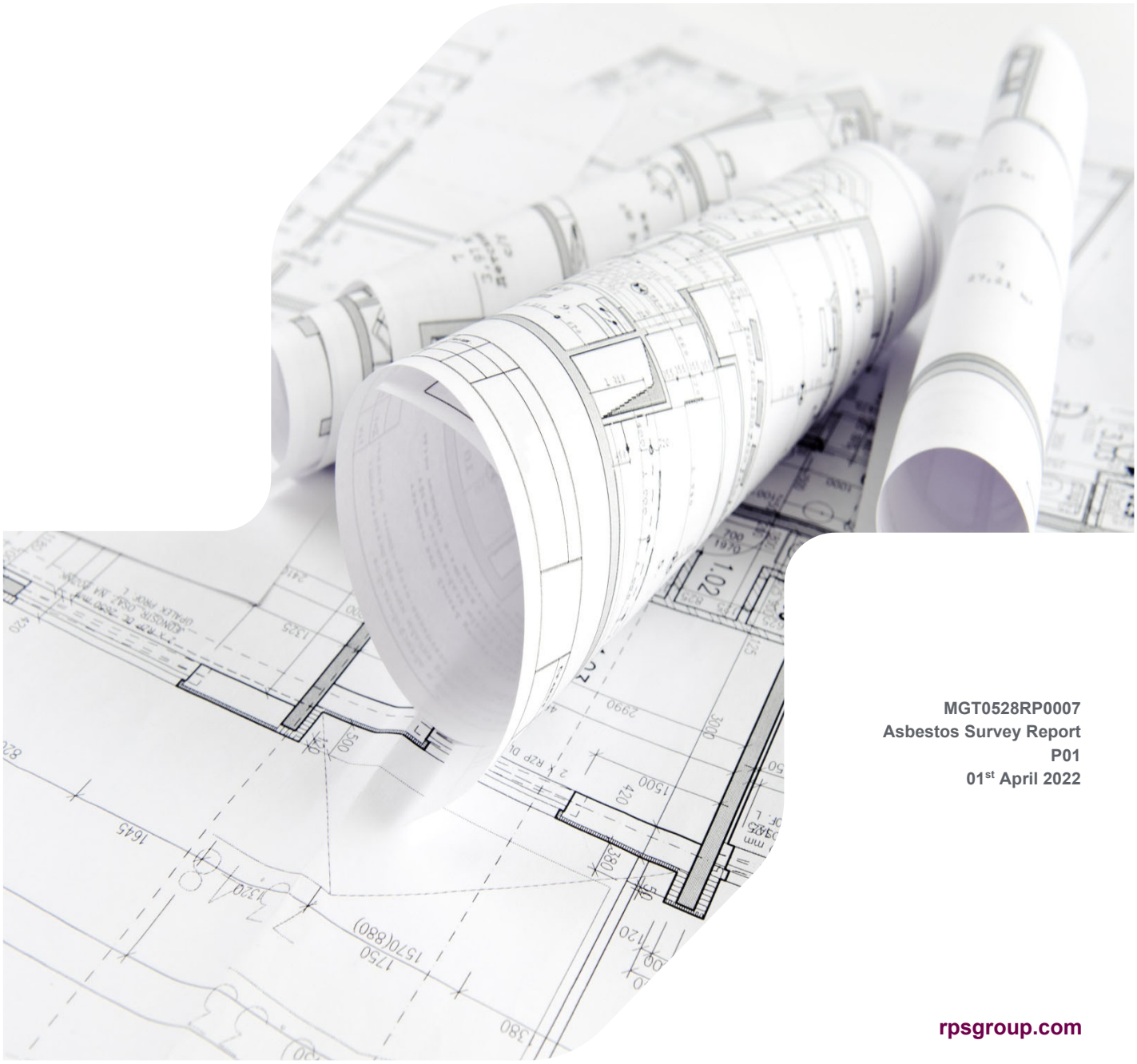

Appendix

2d

Dublin Street Asbestos Survey Report

MONAGHAN TOWN – DUBLIN STREET REGENERATION PROJECT

Demolition Asbestos Survey at No. 8 – 11 Dublin Street



MGT0528RP0007
Asbestos Survey Report
P01
01st April 2022

rpsgroup.com

Document status

Version	Purpose of document	Authored by	Reviewed by	Approved by	Review date
P01	Issued for information	DK	PMGB	DK	01/04/2022

Approval for issue

Des Keane	Des Keane	1 April 2022

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Prepared by:

RPS

Prepared for:

Monaghan County Council

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1 INTROUCTION

As part of the Dublin Street Regeneration Street Project, it is proposed to demolish existing unit no. 8-11 on Dublin Street. The buildings consist of thick external walls constructed with a mixture of masonry stone and brick. Timber stud partitions form internal living spaces on ground and first floor. Timber floor joists, spanning between the external masonry walls, support the first and roof space flooring. The roof spans between front and rear exterior walls and consists of natural stone slate on timber sheeting supported by timber rafters and purlins. RPS was commissioned to carry out a demolition asbestos survey of all accessible parts of the units and outbuildings.

Figure 1.1 below shows the north elevation of units from Dublin Street. Refer to the plan and various photos in **Appendix B** for the survey extent and sample locations.



Figure 1-1 Buildings to be demolished outlined red

2 METHODOLOGY

Analysis of asbestos fibres in bulk materials is carried out at SCOPUS laboratories. SCOPUS is accredited to UKAS and meets the requirements of International Standard BS EN ISO/IEC 17025 for the analysis of asbestos fibres in bulk materials.

The survey was conducted in line with the UK Health and Safety Authority HSG264 guidelines for refurbishment and demolition surveys, and involved locating and describing, as far as reasonably practicable any ACMs in the area surveyed.

The surveyor conducted a systematic inspection of the nominated areas. Where access for sampling purposes was not possible, a visual assessment has been made if possible. For similar / repetitive elements, a representative bulk sampling protocol has been adopted following visual examination and assessment.

Bulk samples are obtained using fibre suppressant techniques in order to minimise respirable fibre release. The bulk samples are returned to the laboratory for analysis using plane and polarised light microscopy and dispersion staining techniques as defined in UK HSE Guidelines.

Results from the survey are outlined in **Section 3**.

Throughout the report the following terms and abbreviations may be used:

ACM	Asbestos containing material.
NAD	No asbestos detected.
MMMF	This describes any machine made mineral fibre, fibreglass, Rockwool, ceramic fibres and other such material.
AIB	Asbestos Insulating Board.
A/C	Asbestos Cement
Chrysotile	Commonly known as white asbestos.
Amosite	Commonly known as brown asbestos.
Crocidolite	Commonly known as blue asbestos.
Amphibole	Generic name for all asbestos types, excluding Chrysotile.
BOHS	British Occupational Hygiene Society

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3 ASBESTOS SURVEY FINDINGS

The buildings surveyed and location of materials sampled are shown below in **Figure 3.1**. Photos of all areas are provided in **Appendix B**.

The Certificate of Analysis for the samples taken on site is included in **Appendix A**.

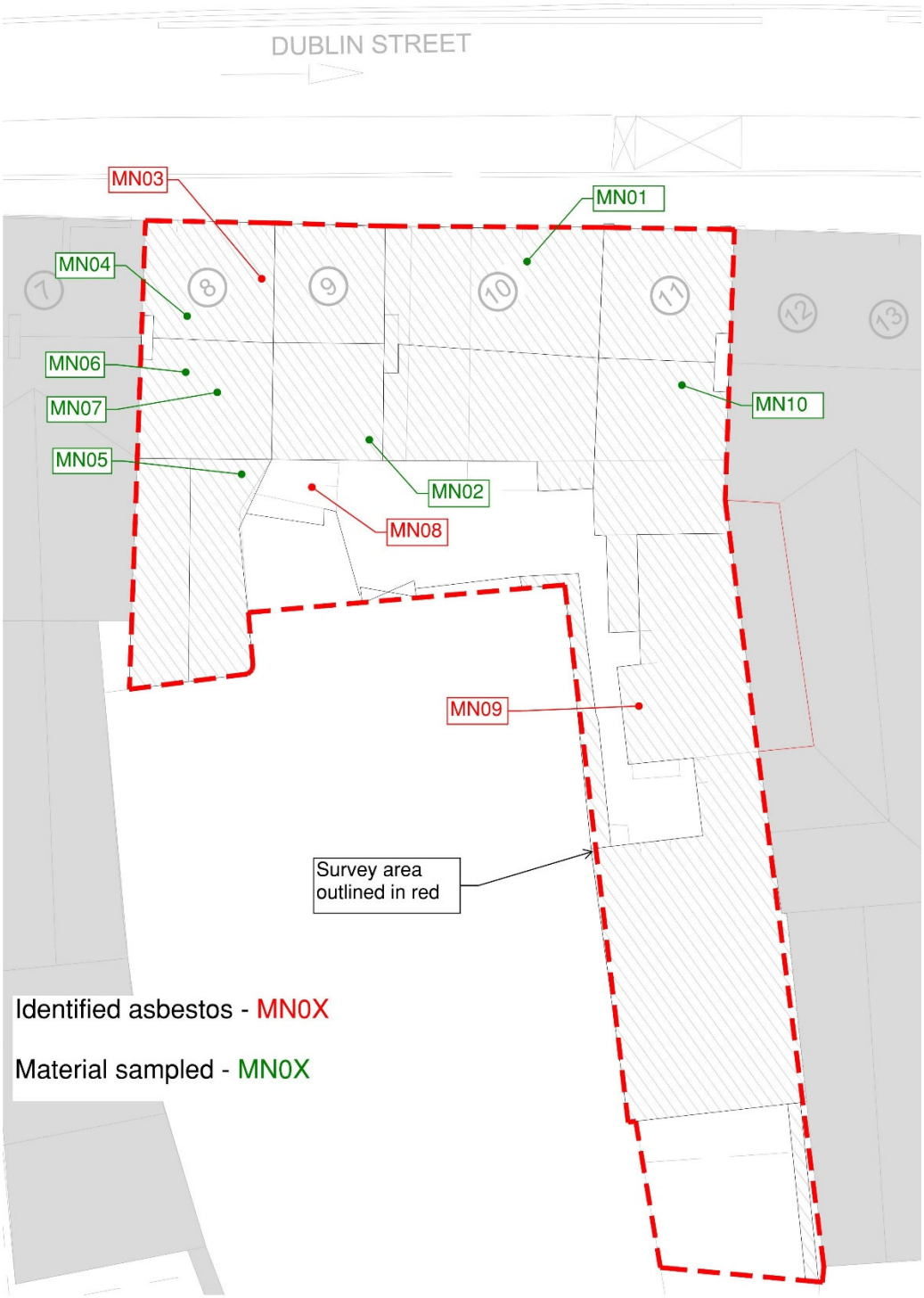


Figure 3-1 Outline of survey area and sample locations

Section 3.1 below provides information on the buildings surveyed and **Section 3.2** provides information on ACMs found on site.

3.1 Description of buildings

Below is a summary of the findings recorded on site.

3.1.1 Unit no. 8

Unit no. 8 is currently in derelict condition. Access was available to the ground, first and roof space within the unit however this access was only possible to the front half of the property. The extension to the rear was inaccessible at ground floor and unsafe to access at first floor.

The original structure consists of thick external walls constructed with a mixture of masonry stone and brick. Timber stud partitions form internal living spaces on ground and first floor. Timber floor joists, spanning between the external masonry walls, support the first and roof space flooring. The roof spans between front and rear exterior walls and consists of natural stone slate on timber sheeting supported by timber rafters and purlins.

From anecdotal evidence, it is understood the original no. 8 unit was constructed first and then no. 7 was constructed adjacent. An extension to the rear of no. 8 was constructed but it is not known if this was constructed before or after the adjacent section of no. 7. Regardless of which came first, the existing party wall must be retained.

The survey to the party wall was conducted from within no. 8. Access within no. 7 is only envisaged at roof level during the proposed works. From within the roof space of no. 8, the roof build up to no. 7 appears to be consistent with no. 8. The areas affected by the proposed works, the party wall and roof overlap, could be effectively assessed from with no. 8.

From an asbestos surveying perspective, five samples were taken on site and one was found to contain asbestos. See **Section 3.2** below for more details. The asbestos was found in the following areas:

- Thermoplastic tiles and adhesive

3.1.2 Unit no. 9

This unit is currently operating as a clothes shop on ground floor and a sewing business on first floor. Access was available to the ground, first and roof space with the unit.

The structure composition is consistent with no. 8. The structure consists of thick external walls constructed with a mixture of masonry stone and brick. Timber stud partitions form internal living spaces on ground and first floor. Timber floor joists, spanning between the external masonry walls, support the first and roof space flooring. The roof spans between front and rear exterior walls and consists of natural stone slate on timber sheeting supported by timber rafters and purlins.

From an asbestos surveying perspective, two samples were taken on site and both were found to contain asbestos. See **Section 3.2** below for more details. The asbestos was found in the following areas:

- Sink pad below the sink on the first floor.
- Roof tiles to the rear single storey and on the main roof.

3.1.3 Unit no. 10

This unit is currently vacant at ground floor level. The apartment units at first and second floor levels are currently occupied. Access was available to the ground, first, second and roof space within the building.

The structure composition is consistent with no. 8 and 9. The structure consists of thick external walls constructed with a mixture of masonry stone and brick. Timber stud partitions form internal living spaces on ground and first floor. Timber floor joists, spanning between the external masonry walls, support the first and roof space flooring. The roof spans between front and rear exterior walls and consists of natural stone slate on timber sheeting supported by timber rafters and purlins.

From an asbestos surveying perspective, one sample was taken and no ACM was found.

3.1.4 Unit no. 11

Unit No. 11 & 12 were assessed together as they share a party wall that will be retained during the demolition works.

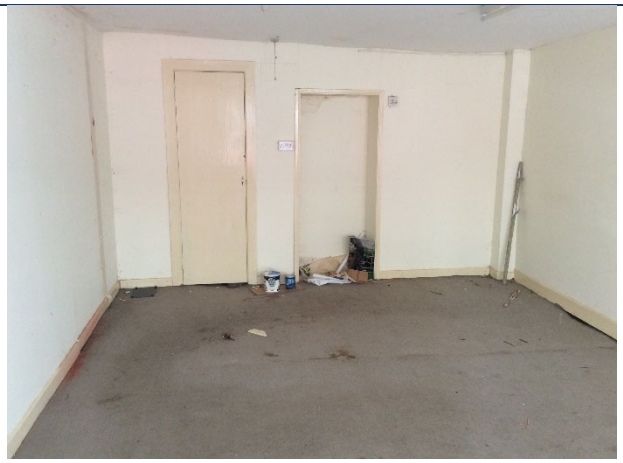
The ground floor of unit of no. 11 is a takeaway kebab restaurant. Due to the internal finishes on the walls, it was not possible to review the structure. The first and second floor contain an apartment. From a review of this apartment and the roof space, the structure was found to be consistent with no. 8, 9 & 10. There are extensions to the rear of this property. It is important to note that these appear to have been constructed after the adjoining property to the rear of no. 12. These extensions can therefore be demolished without affecting the structural integrity of building to the rear of no. 12/13.

From an asbestos surveying perspective, two samples were taken on site and both were found to contain asbestos. See **Section 3.2** below for more details. The asbestos was found in the following areas:

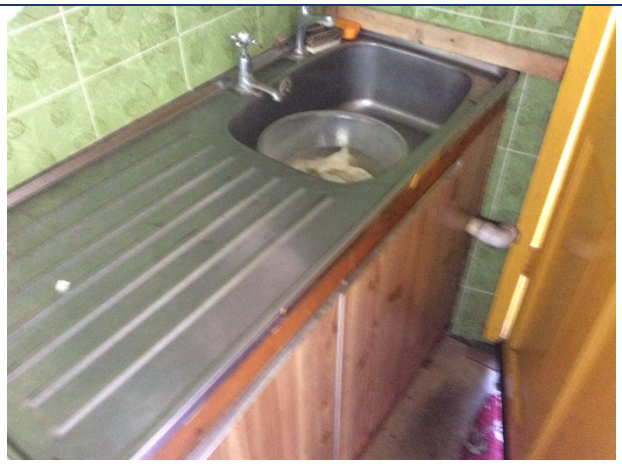
- Roof tiles to the rear single storey.

3.2 Details of sampled materials

3.2.1 Sample Ref. MN01

Location of Material	Building Unit No. 10	**Laboratory Ref. / Site Ref.**	S001 MN01
Similar material	N/A		
Asbestos Identified	NAD		
Product Type	Adhesive glue on ground floor lino		
Action	No action required.		
Photo			

3.2.2 Sample Ref. MN02

Location of Material	Building Unit No. 9	**Laboratory Ref. / Site Ref.**	S002 MN02
Similar material	N/A		
Asbestos Identified	Yes - chrysotile		
Product Type	Bituminous sink pad on first floor		
Action	This material must be removed prior to works causing disturbance.		
Photo			

3.2.3 Sample Ref. MN03

Location of Material	Building Unit No. 8	**Laboratory Ref. / Site Ref.**	S003 MN03
Similar material	All areas where thermoplastic tiles and adhesive are found in the building		
Asbestos Identified	Yes – chrysotile in the tile and adhesive		
Product Type	Thermoplastic floor tiles and adhesive in hallway		
Action	These materials must be removed prior to works causing disturbance.		
Photo			

3.2.4 Sample Ref. MN04

Location of Material	Building Unit No. 8	**Laboratory Ref. / Site Ref.**	S004 MN04
Similar material	N/A		
Asbestos Identified	NAD		
Product Type	Adhesive glue on ground floor lino		
Action	No action required.		
Photo			

3.2.5 Sample Ref. MN05

Location of Material	Building Unit No. 8	**Laboratory Ref. / Site Ref.**	S005 MN05
Similar material	N/A		
Asbestos Identified	NAD		
Product Type	Roof slate and felt		
Action	No action required.		
Photo			

3.2.6 Sample Ref. MN06

Location of Material	Building Unit No. 8	**Laboratory Ref. / Site Ref.**	S006 MN06
Similar material	N/A		
Asbestos Identified	NAD		
Product Type	Roof ceiling build up		
Action	No action required.		
Photo			

3.2.7 Sample Ref. MN07

Location of Material	Building Unit No. 8	**Laboratory Ref. / Site Ref.**	S007 MN07
Similar material	N/A		
Asbestos Identified	NAD		
Product Type	First floor ceiling – textured coating		
Action	No action required.		
Photo			

3.2.8 Sample Ref. MN08

Location of Material	Building Unit No. 9	**Laboratory Ref. / Site Ref.**	S008 MN08
Similar material	Similar tiles are visible on the main roofs of no. 8 and no. 9. Tendering asbestos removal contractors are expected to visit the site to assess the quantity of tiles on the roofs to be removed.		
Asbestos Identified	Yes – chrysotile		
Product Type	Roof tiles to rear single storey extension - cement		
Action	These materials must be removed prior to works causing disturbance.		
Photo			





3.2.9 Sample Ref. MN09

Location of Material	Building Unit No. 11	**Laboratory Ref. / Site Ref.**	S009 MN09
Similar material	N/A		
Asbestos Identified	Yes – chrysotile		
Product Type	Roof tile to rear single storey extension - cement		
Action	These materials must be removed prior to works causing disturbance.		
Photo			

3.2.10 Sample Ref. MN10

Location of Material	Building Unit No. 11	**Laboratory Ref. / Site Ref.**	S010 MN10
Similar material	N/A		
Asbestos Identified	NAD		
Product Type	Ceiling tile in ground floor shop unit – insulating board		
Action	No action required.		
Photo			

4 CONCLUSION

On Monday 24th May 2021, RPS carried out a demolition asbestos survey, on behalf of Monaghan County Council, at No. 8, 9, 10 & 11, Dublin Street, Monaghan. The objective of the survey was to locate and describe, as far as reasonably practicable, accessible asbestos containing materials (ACMs) in the buildings to be demolished.

After carrying out a demolition asbestos survey of the accessible parts of the buildings, RPS took ten samples. The samples were sent to a SCOPUS laboratory for testing and four samples were found to contain asbestos.

An outline of the buildings to be demolished is provided in **Figure 3.1** showing the survey area and the location of samples taken on site. Asbestos containing materials discovered are as follows:

- Laboratory ref. S002; Site ref. MN02 – Bituminous sink pad on first floor.
- Laboratory ref. S003; Site ref. MN03 – Thermoplastic floor tiles and adhesive in hallway.
- Laboratory ref. S008; Site ref. MN08 – Roof tile to rear single storey extension.
- Laboratory ref. S009; Site ref. MN09 – Roof tile to rear single storey extension.

The survey was conducted in line with the UK Health and Safety Authority HSG264 guidelines for refurbishment and demolition surveys, and involved locating and describing, as far as reasonably practicable any ACMs in the area surveyed. Every effort has been taken to identify asbestos containing materials within the buildings surveyed. It should be noted that additional asbestos containing materials may be concealed or buried on site. RPS do not accept responsibility for any omissions or areas of the building not addressed in the report.

If any suspect materials are observed by the contractor as part of any future works, the Contractor/ Project Manager should cease works immediately and contact the Client.

Appendix A

Certificate of Analysis

SCOPUS
Asbestos Compliance

UKAS TESTING
10483

Suite 5, Milner House, Milner Way, Ossett, West Yorkshire WF5 9JE
Company Registration No: 11250668 | VAT No: 293902284

Certificate of Bulk Analysis

Customer: RPS Group **Customer Address:** London HSED Asbestos, 20 Farringdon Street, London, EC4A 4AB **Site Address:** Dublin Street, Monaghan Town, Co. Monaghan **Client Reference:** FYAB80755	**Project Number:** P-14008 **Samples Received On:** 15/06/2021 **Samples Taken By:** Client **No of Samples:** 10 **Date of Analysis:** 18/06/2021

Sample No.	Client Sample No.	Sample Location	Sample Details	Asbestos Type(s) Present	Analysts Name
S001	MN01	Building Ref No.10	Adhesive glue below ground floor lino - Bituminous Product	NAD	Sai Annapureddy
S002	MN02	Building Ref No.9	Sink pad on first floor - Bituminous Product	Chrysotile	Sai Annapureddy
S003	MN03	Building Ref No.8	Floor in Hallway - Thermoplastic Tiles and Adhesive	Chrysotile in Tile & Adhesive	Sai Annapureddy
S004	MN04	Building Ref No.8	Adhesive glue below lino throughout ground floor - Bituminous Product	NAD	Sai Annapureddy
S005	MN05	Building Ref No.8	Roof slate and felt - Bituminous Product	NAD	Sai Annapureddy
S006	MN06	Building Ref No.8	Roof ceiling build up - Paper Product	NAD	Sai Annapureddy
S007	MN07	Building Ref No.8	First floor ceiling - Textured Coating	NAD	Sai Annapureddy
S008	MN08	Building Ref No.9	Roof tile to rear single storey section - Cement	Chrysotile	Sai Annapureddy
S009	MN09	Building Ref No.11	Roof tile to rear single storey - Cement	Chrysotile	Sai Annapureddy
S010	MN10	Building Ref No.11	Ceiling tile in ground floor shop unit - Insulating Board	NAD	Sai Annapureddy

Key: NAD = No Asbestos Detected

Authorised Signatory:	A. S. V. Krishna Reddy	Name/Position:	Sai Annapureddy/Quality Manager	Date of Issue:	18/06/2021

Suite 5, Milner House, Milner Way, Ossett, West Yorkshire WF5 9JE
Company Registration No: 11250668 | VAT No: 293902284

Statement of Certification

This is to certify that analysis has been carried out to determine the presence of asbestos fibres using Polarised Light Microscopy and Dispersion Staining Techniques. The method used is UKAS accredited and in accordance with Scopus Asbestos Compliance in house current method/procedure and the HSG 248 Asbestos: The analysts guide for sampling analysis and clearance procedures - appendix 2, 'Asbestos in bulk materials: Sampling and identification by polarised light microscopy (PLM). The samples were analysed as received.

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When the Test Certificate indicates sample(s) taken by the customer, the following disclaimers apply: Scopus Asbestos Compliance cannot accept responsibility for the accuracy of the information provided by the customer or whether samples(s) taken were representative of the material sampled. Scopus Asbestos Compliance is not responsible for sampling techniques carried out by individual(s) not directly employed within the Company.

Appendix B

Site Notes and Photos

The Monaghan Boot Co.
Vacant Building
Best 4 You
Vacant Building & GDP Archway
Istanbul Kebab House
Mr Malik Kebabs
HJ18 & Building over archway

.\Images\1. Alleyway between 14 and 15 Dublin St.1 Cropped.jpg

PHOTO 1
View looking towards Dublin Street from alleyway to rear of HJ18

7
8
9
10
11
12/ 13
14

Existing wall to be removed

R4.00
R4.00

LOADING
LOADING

Top of Wall=59.54
Top of Wall=59.83

T:\MGT0528_Monaghan CoCo_Stn Dublin Street Regen\6.x Project Directories\6.8 Structures\6.8.2 - Des K site visit 24.05.2021\Site layout drawing\MGT0528-RPS-00-XX-DR-C-LA1-0003_Building Removals _P01.03.dwg

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Client

Comhairle Contae Mhuineacháin
Monaghan County Council

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(v) All Levels refer to Ordnance Survey Datum, Malin Head.

Rev	Date	Drn / Chk	Amendment / Issue	App
P01.03	Apr.'21	SA / -	Issued for Information/ Comment	-
P01.02	Jul.'20	SA / -	Issued for Information / Comment	-
P01.01	Jun.'20	SA / -	Issued for Information / Comment	-

Model File Identifier: -

Scale	1:100 @ A1 1:200 @ A3
Created on	June 2020
Sheets	01 of 01
Project	MONAGHAN TOWN - DUBLIN STREET REGENERATION PROJECT
Title	Impacts on Buildings and other Infrastructure
File Identifier	MGT0528-RPS-00-XX-DR-C-LA0003 - SK01
Status	DRAFT
Rev	P01.03

Site Survey Photographic Record

1 04/08/2021

Structures and buildings to the rear of No. 7 to be retained.






2 04/08/2021

Photos to the rear of No. 8, 9 & 10.

The first photo, to the rear of No. 8, shows where the party wall between No. 7 & 8 ends. The new gable wall facade will be constructed down to this point.











3 04/08/2021

Photos of ground floor within No. 8. Lighting was poor during the survey at ground floor level.





4 04/08/2021

Photos at first floor level. These show the poor condition of the internal areas.









5 04/08/2021

Internal photos of the rear extension to No. 8. It was unsafe to walk this area due to the poor condition of the first floor and the roof overhead.

This area was inaccessible at ground floor level as the door was blocked.





6 04/08/2021

Photos taken within the roof space of No. 8.

Although No. 8 is in very poor condition, the primary structural walls and the roof over the original dwelling footprint are in a stable condition.

In the photos below you can see the masonry party wall between No 7 & 8. This will be retained as an inner leaf and a new block wall, acting as an outer leaf, will be constructed outside it. This will provide structural stability and weather proofing to No. 7.

It was at this location that the connectivity between the roof of No. 7 & 8 was examined. It appears that the roof is continuous over the party wall.





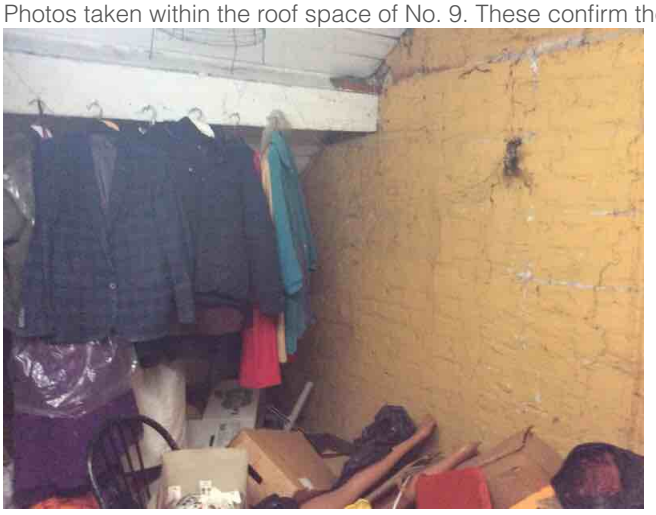






7 04/08/2021

Photos taken within the roof space of No. 9. These confirm the structural make up of No. 9 is similar to No. 8.







9 04/08/2021

The photos below show the exposed stone masonry walls in the alleyway. This is a good example of the stone masonry used in the external structural walls for these dwellings.





10 04/08/2021

Photos taken within the roof space of No. 10. These confirm the structural make up of No. 10 is similar to No. 8 & 9.







11 04/08/2021

The photos below show the condition of the party wall between No 11 & 12. The roof and primary wall construction appears to be similar to dwellings 7-10.

Similar to No. 7, this wall will be retained as an inner leaf and a new block wall, acting as an outer leaf, will be constructed outside it. This will provide structural stability and weather proofing to No. 7.

No. 11 is a taller building than No. 12 therefore the party wall and chimney above No. 12 roof level will be broken down to form a new gable wall detail at roof level for No. 12.






12 04/08/2021

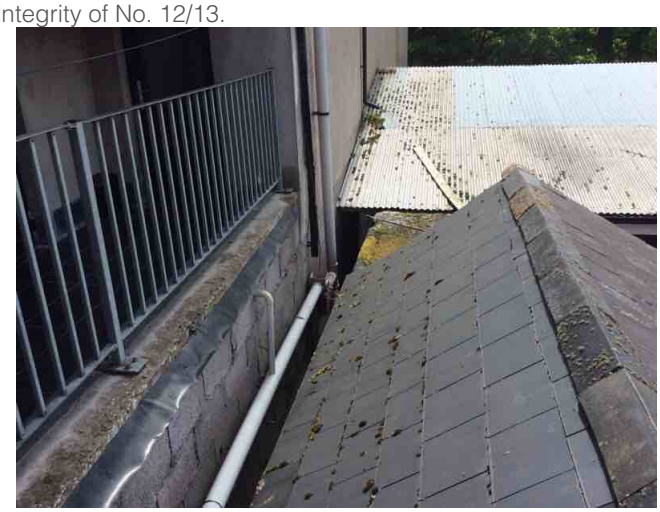
Photo to the rear of No. 11 showing the height difference between No. 11 & 12.



13 04/08/2021

The extensions and outbuildings to the rear of No. 11 appear to have been constructed after No. 12/13. From a review on site, demolition of these buildings should not affect the structural integrity of No. 12/13.





15 04/08/2021

Photos to the rear of No. 11.

In the photos, the separation between the property of No. 11 and No. 12/13 is evident.









16 04/08/2021

The roof of No. 7 & 8 merge over the party wall. Demolition of No. 8 will require remedial works to the roof of No. 7 as the existing roof will have to tie into a new gable wall detail.



17 04/08/2021

Photo to the front No. 11 showing the height difference between No. 11 & 12.

From a review of the internal layouts, the chimney serves No. 11 only so partial demolition of same will not be an issue.



Asbestos Containing Material Confirmed

8 04/08/2021

These roof tiles were found to contain asbestos.





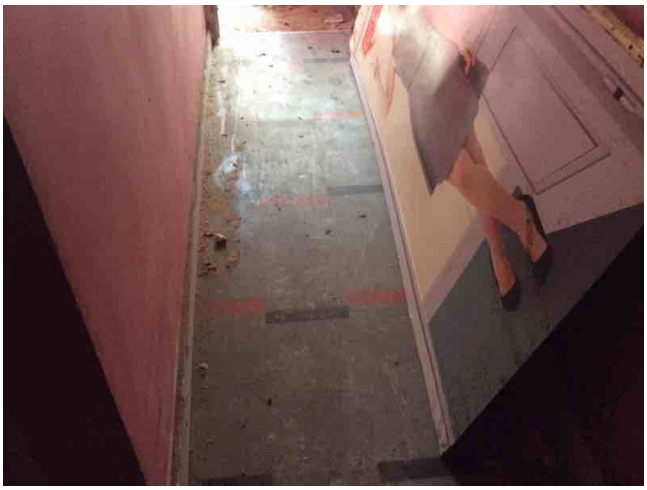
14 04/08/2021

These roof tiles were found to contain asbestos.



18 04/08/2021

These floor tiles and adhesive were found to contain asbestos.



19 04/08/2021

Roof tiles on No. 8 & 9 match roof tiles that were found to contain asbestos.

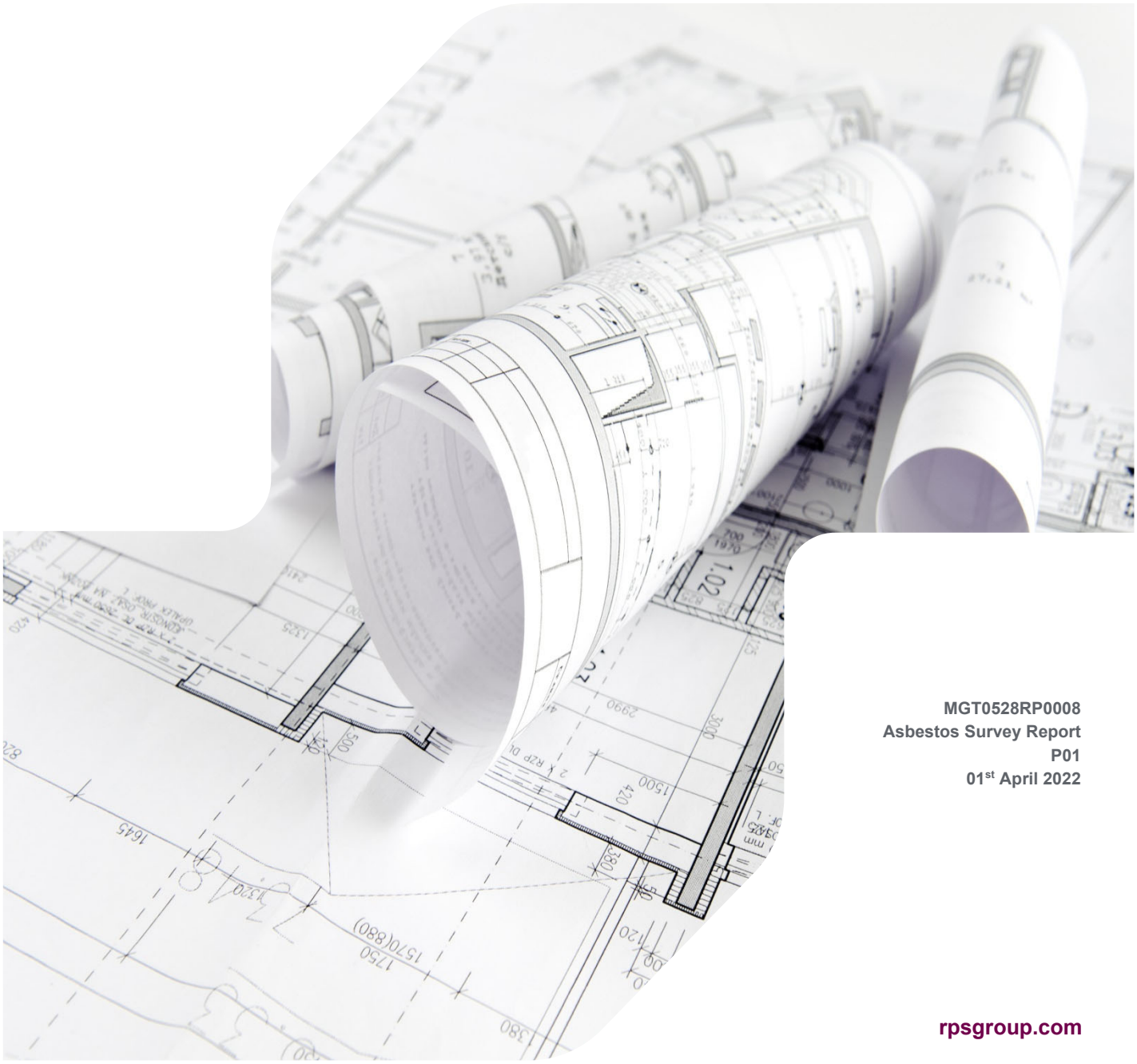
Appendix

2e

Northern Standard Asbestos Survey Report

MONAGHAN TOWN – DUBLIN STREET REGENERATION PROJECT

Demolition Asbestos Survey at Northern Standard Building



MGT0528RP0008
Asbestos Survey Report
P01
01st April 2022

rpsgroup.com

Document status

Version	Purpose of document	Authored by	Reviewed by	Approved by	Review date
P01	Issued for information	DK	PMGB	DK	01.04.2022

Approval for issue

Des Keane	Des Keane	1 April 2022

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Prepared by:

RPS

Prepared for:

Monaghan County Council

Dublin | Cork | Galway | Sligo
rpsgroup.com

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1 INTROUCTION

As part of the Dublin Street Regeneration Street Project, it is proposed to demolish part of the existing Northern Standard building located off Dublin Street. RPS was commissioned to carry out a demolition asbestos survey of all accessible parts of the building to be demolished.

Figure 1-1 and **Figure 1-2** below show the south elevation and plan of the survey area respectfully.



Figure 1-1 South elevation of building to be demolished

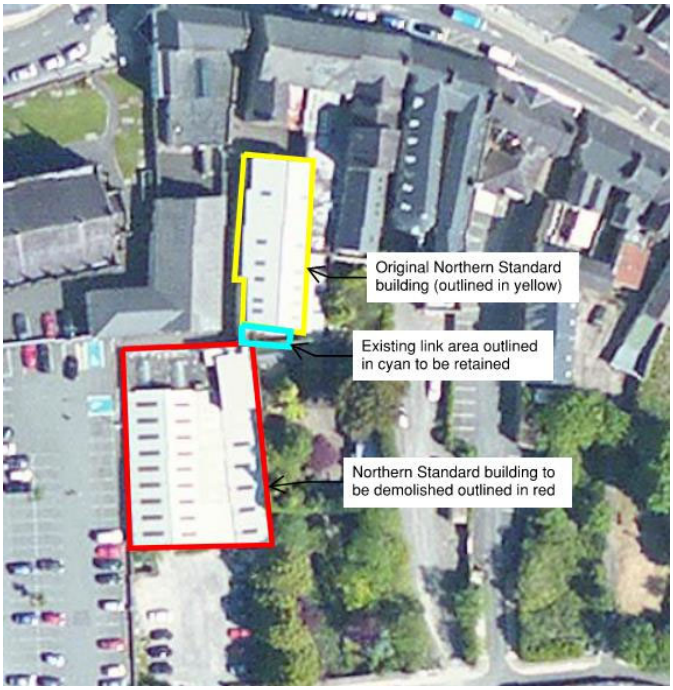


Figure 1-2 Plan of survey extent

2 METHODOLOGY

Analysis of asbestos fibres in bulk materials is carried out at an Asbestos Building Surveys laboratory. Asbestos Building Surveys is accredited to UKAS and meets the requirements of International Standard BS EN ISO/IEC 17025 for the analysis of asbestos fibres in bulk materials.

The survey was conducted in line with the UK Health and Safety Authority HSG264 guidelines for refurbishment and demolition surveys, and involved locating and describing, as far as reasonably practicable any ACMs in the area surveyed.

The surveyor conducted a systematic inspection of the nominated areas. Where access for sampling purposes was not possible, a visual assessment has been made if possible. For similar / repetitive elements, a representative bulk sampling protocol has been adopted following visual examination and assessment.

Bulk samples are obtained using fibre suppressant techniques in order to minimise respirable fibre release. The bulk samples are returned to the laboratory for analysis using plane and polarised light microscopy and dispersion staining techniques as defined in UK HSE Guidelines.

Results from the survey are outlined in **Section 3**.

Throughout the report the following terms and abbreviations may be used:

ACM	Asbestos containing material.
NAD	No asbestos detected.
MMMF	This describes any machine made mineral fibre, fibreglass, Rockwool, ceramic fibres and other such material.
AIB	Asbestos Insulating Board.
A/C	Asbestos Cement
Chrysotile	Commonly known as white asbestos.
Amosite	Commonly known as brown asbestos.
Crocidolite	Commonly known as blue asbestos.
Amphibole	Generic name for all asbestos types, excluding Chrysotile.
BOHS	British Occupational Hygiene Society

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3 ASBESTOS SURVEY FINDINGS

The layout of the building surveyed is shown below in **Figure 3.1**. Generic photos of all areas are provided in **Appendix B** while photos of the sampled materials are provided in **Section 3.2**, along with a description.

The Certificate of Analysis for the samples taken on site is included in **Appendix A**.

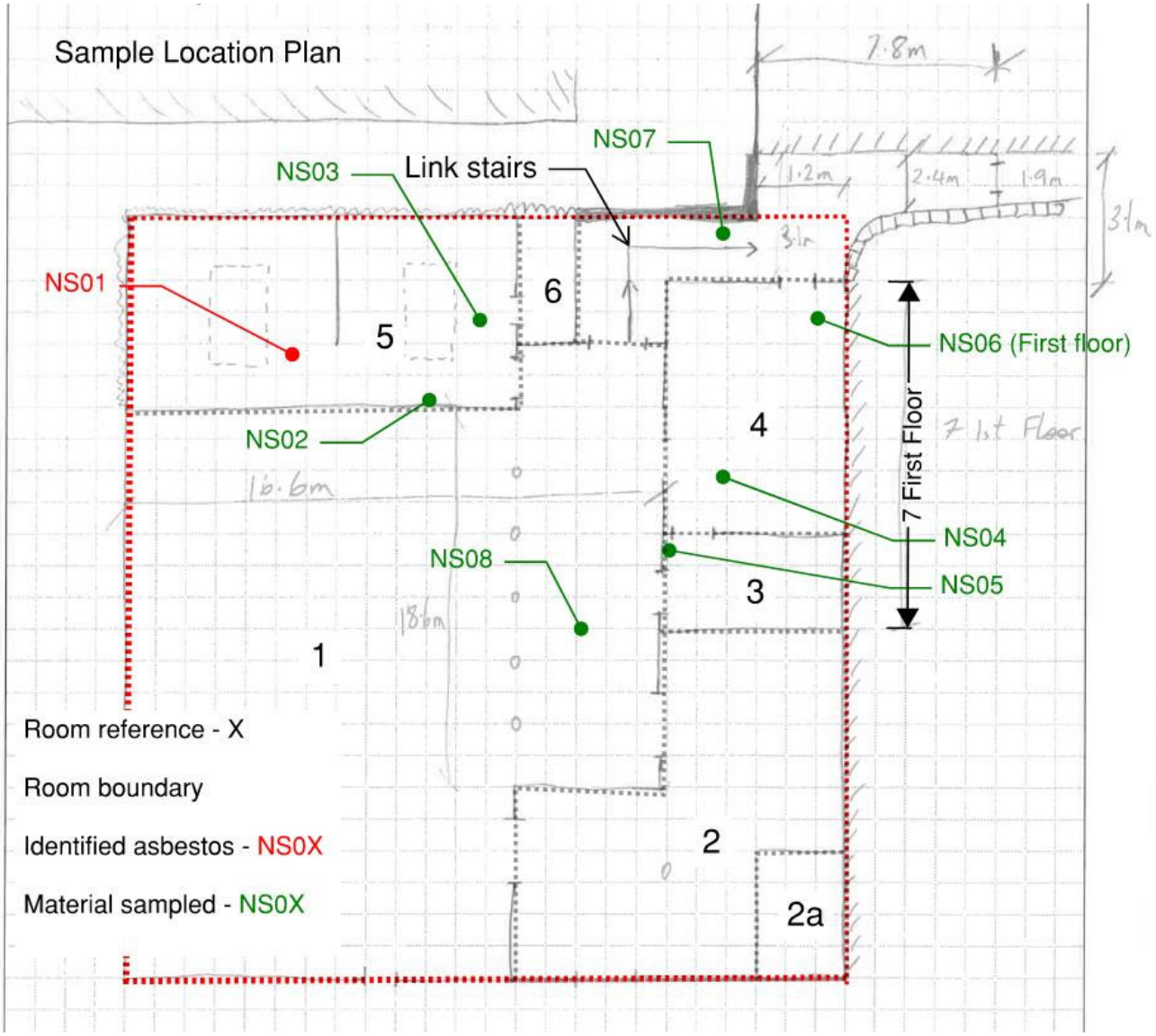


Figure 3-1 Outline of survey area and sample locations

3.1 Description of buildings

Access to all areas of the Northern Standard building was facilitated by the property owner. Below is a description of the findings which should be read in conjunction with the photos in **Appendix B**.

Area 1 is open plan and contains printing machinery throughout. The structure consists of concrete ground floor slab, a steel frame with a lightweight steel truss supporting a corrugated sheeted roof and masonry wall panels on the external elevations. The external wall along the west elevation is currently retaining as the footpath level rises to the north.

There is a lean-to extension to the east of Area 1. It is unclear if it was constructed as part of Area 1 or if it was subsequently added. The structural composition is similar to the rest of Area 1 but the roof finish is supported by steel rafters as opposed to a truss.

Area 2, 3 & 4 is another lean-to section built up to a masonry stone boundary wall. A lightweight metal deck roof is supported on steel purlins and beams which are supported on the masonry stone walls each side.

Areas 5 & 6 appears to be another addition to the original Area 1 and is an office area. Steel beams support the roof build up and there are masonry wall panels on external elevations. All walls and the roof are enclosed with plasterboard finishes. Similar to Area 1, the west and north external wall is retaining as the footpath level is approximately 3.5m above floor level.

There is a stairs link that leads up to the link area between the two Northern Standard buildings. At the top of the stairs, there is a single door access to the first-floor area in Area 7.

The link area appears to be an original external pathway that was enclosed to provide an internal link between the two Northern Standard buildings. This area will be retained with the change of an existing internal external door to an external door.

3.2 Details of sampled materials

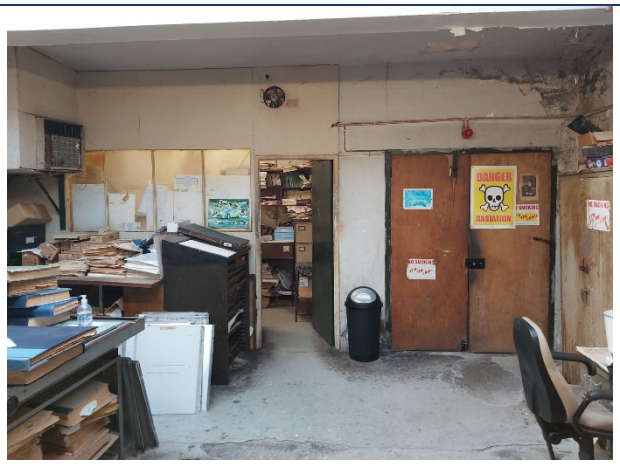
3.2.1 Sample Ref. NS01

Location of Material	Ground floor in Area 5	**Laboratory Ref. / Site Ref.**	ID01 NS01
Similar material	N/A		
Asbestos Identified	Chrysotile		
Product Type	Adhesive glue on concrete floor below the grey floor tiles.		
Action	This material must be removed prior to works causing disturbance.		
Photo			

3.2.2 Sample Ref. NS02

Location of Material	Area 5 Coating to walls and ceilings	**Laboratory Ref. / Site Ref.**	ID02 NS02
Similar material	N/A		
Asbestos Identified	NAD		
Product Type	Coating to walls and ceilings - Cement product		
Action	No action required.		
Photo			

3.2.3 Sample Ref. NS03

Location of Material	Ground floor in Area 5	**Laboratory Ref. / Site Ref.**	ID03 NS03
Similar material	N/A		
Asbestos Identified	NAD		
Product Type	Vinyl floor finish and adhesive		
Action	No action required.		
Photo			

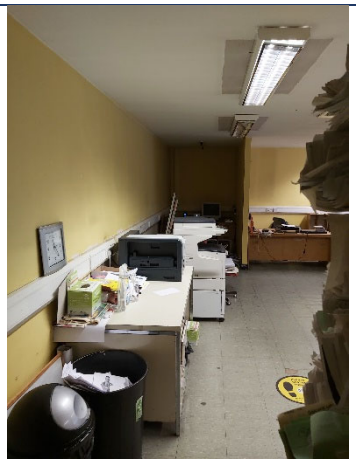
3.2.4 Sample Ref. NS04

Location of Material	Ground floor in Area 3 & 4	**Laboratory Ref. / Site Ref.**	ID04 NS04
Similar material	N/A		
Asbestos Identified	NAD		
Product Type	Vinyl floor finish and adhesive		
Action	No action required.		
Photo			

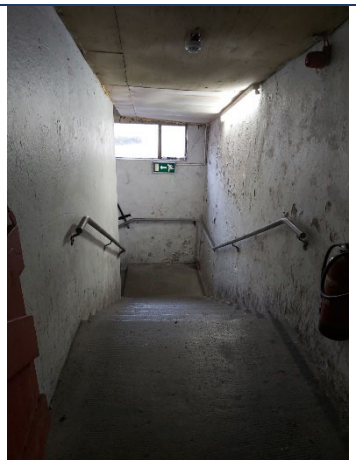
3.2.5 Sample Ref. NS05

Location of Material	Areas 1 - 4	**Laboratory Ref. / Site Ref.**	ID05 NS05
Similar material	N/A		
Asbestos Identified	NAD		
Product Type	Wall coating / finish		
Action	No action required.		
Photo			

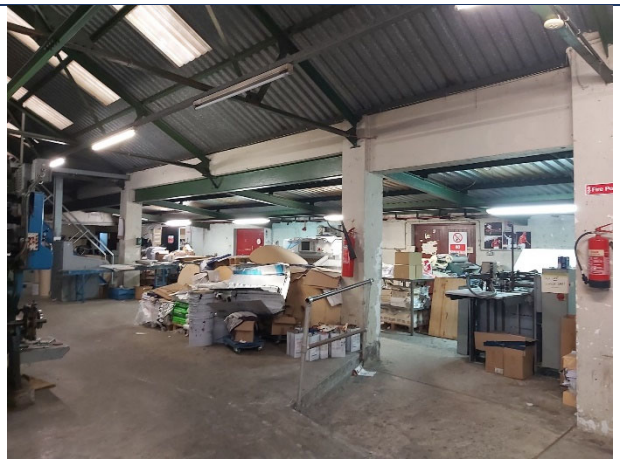
3.2.6 Sample Ref. NS06

Location of Material	Area 7 – First Floor	**Laboratory Ref. / Site Ref.**	ID06 NS06
Similar material	N/A		
Asbestos Identified	NAD		
Product Type	Thermoplastic floor tiles and adhesive		
Action	No action required.		
Photo			

3.2.7 Sample Ref. NS07

Location of Material	Link stairs	**Laboratory Ref. / Site Ref.**	ID07 NS07
Similar material	N/A		
Asbestos Identified	NAD		
Product Type	Ceiling panels – cement product		
Action	No action required.		
Photo			

3.2.8 Sample Ref. NS08

Location of Material	Area 1	**Laboratory Ref. / Site Ref.**	ID08 NS08
Similar material	N/A		
Asbestos Identified	NAD		
Product Type	Adhesive from what appears to be removed floor tiles or floor finish.		
Action	No action required.		
Photo			

4 CONCLUSION

On Monday 15th November 2021, RPS carried out a demolition asbestos survey, on behalf of Monaghan County Council, at Northern Standard, Dublin Street, Monaghan. The objective of the survey was to locate and describe, as far as reasonably practicable, accessible asbestos containing materials (ACMs) in the building to be demolished.

After carrying out a demolition asbestos survey of the accessible parts of the buildings, RPS took eight samples. The samples were sent to an Asbestos Building Surveys laboratory for testing and one sample was not found to contain asbestos.

A floor plan of building to be demolished is provided in **Figure 3.1** showing the survey area and the location of samples taken on site. One sample was found to contain asbestos as follows:

- Laboratory ref. ID01; Site ref. NS01 – Adhesive glue on concrete floor below the grey floor tiles.

The survey was conducted in line with the UK Health and Safety Authority HSG264 guidelines for refurbishment and demolition surveys, and involved locating and describing, as far as reasonably practicable any ACMs in the area surveyed. Every effort has been taken to identify asbestos containing materials within the buildings surveyed. It should be noted that additional asbestos containing materials may be concealed or buried on site. RPS do not accept responsibility for any omissions or areas of the building not addressed in the report.

If any suspect materials are observed by the contractor as part of any future works, the Contractor/ Project Manager should cease works immediately and contact the Client.

Appendix A

Certificate of Analysis

ASBESTOS BUILDING SURVEYS

UKAS TESTING 6232

Certificate of Analysis for Bulk Identification

02 February 2022

Karl Munster
RPS Consultants
20 Farringdon Street
London
EC4A 4AB

Samples Taken:	31 January 2022
Submitted By:	Client
Date Certificate Produced:	02 February 2022
Analysed By:	Fiona Stirton
Date Analysed:	02/02/2022

Re A-16604 - Suspected asbestos from Northern Standard, The Diamond, Monaghan, Ireland

Samples analysed using in-house procedure, QP14 Procedure for Analysis of Bulk Materials for Asbestos, referencing HSG 248. Where digitally signed, printed copies are uncontrolled. Certificate may not be reproduced without written approval of Asbestos Building Surveys Ltd. Asbestos Building Surveys Ltd will not accept responsibility for errors arising from sampling or transport by third party and accepts responsibility only for analysis results of samples received to laboratory. Results apply to sample as received.
Results relate only to the items tested.

Key: *Crocidolite (Blue Asbestos), Amosite (Brown Asbestos), Chrysotile (White Asbestos) NAD (No Asbestos Detected) Other Asbestos Amphiboles: Fibrous Actinolite, Fibrous Tremolite, Fibrous Anthophyllite.*
"*": Opinions and interpretations expressed herein and Analytical Results identified by "*" are outside the scope of UKAS accreditation.

Sample Number	Sample Location	Material	Result	Notes
ID01	NS01 - Ground Floor in Area 5 Floor Tiles and Adhesive in Area 5	Thermoplastic Floor Tiles/ Adhesive	Chrysotile	In Bitumen Only
ID02	NS02 - Walls and Ceiling throughout Area 5 Surface Finish / Coating	Cement Product	NAD	
ID03	NS03 - Ground Floor in Area 5 Floor Finish and Adhesive	Vinyl Flooring with Adhesive	NAD	
ID04	NS04 - Ground Floor in Area 3 & 4 Floor Finish and Adhesive	Vinyl Flooring with Adhesive	NAD	
ID05	NS05 - Walls in Areas 1 - 4, Sample taken in Area 3 Surface Finish / Coating	Cement Product	NAD	
ID06	NS06 - First Floor Area 7 Floor Tiles and Adhesive	Thermoplastic Floor Tiles/ Adhesive	NAD	
ID07	NS07 - Link Stairs Ceiling Panels	Cement Product	NAD	
ID08	NS08 - Ground Floor in Area 1 Remaining Adhesive from what appears to be removed Floor Tiles or Finish	Vinyl Flooring with Adhesive	NAD	

ASBESTOS BUILDING SURVEYS

UKAS TESTING 6232

Certificate of Analysis for Bulk Identification

02 February 2022

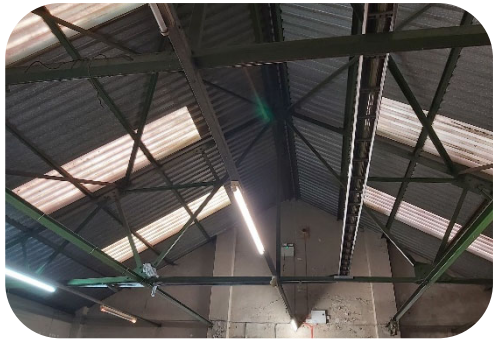
Authorised By: Fiona Stirton

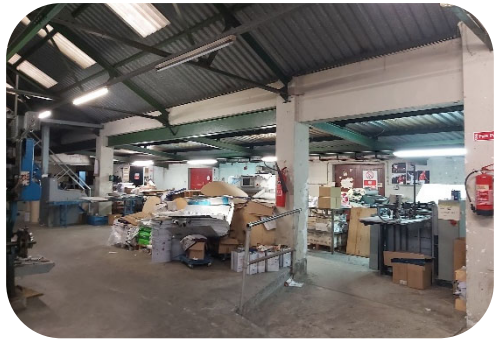
Signature: 

Appendix B

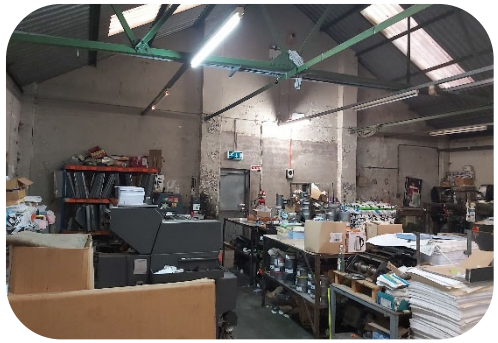
Site Photos

Area 1 – Main printing area









Area 1 – Print machines and boiler

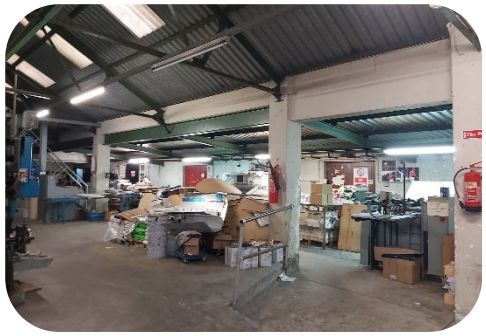


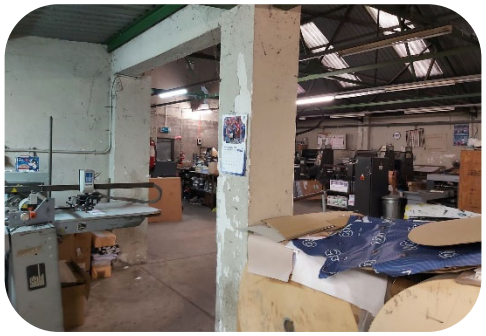






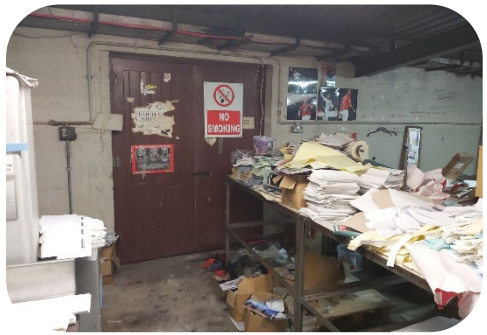
Area 1 – Lean to off main floor area

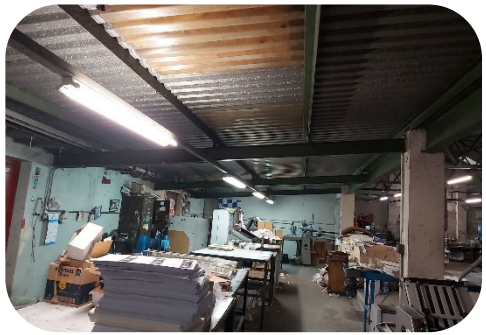


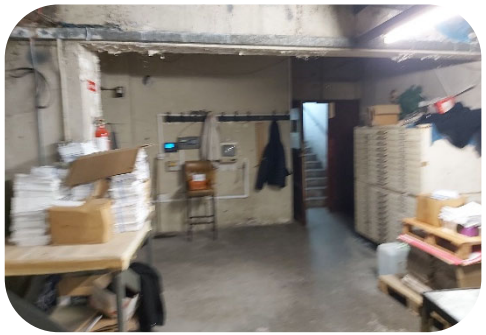




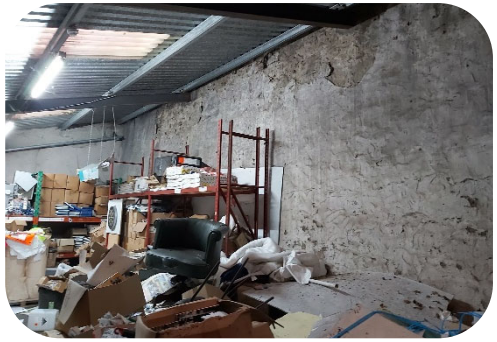


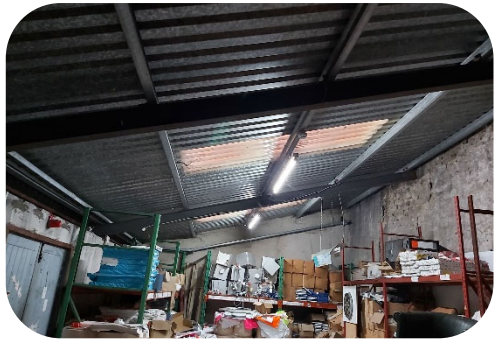






Area 2 – Lean to along boundary wall

















Area 2a – Store Room







Area 3 & 4 – Ground floor print room

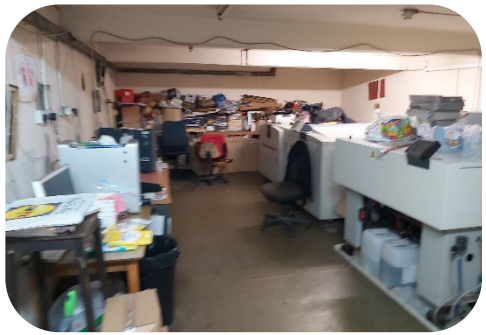














Area 5 & 6 – Office Area





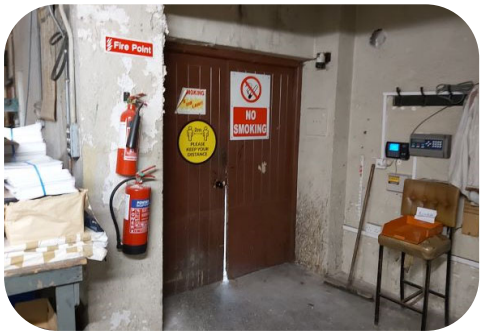






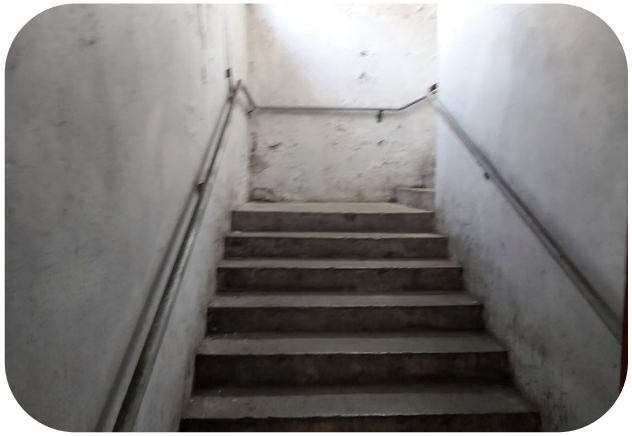






Stair Link





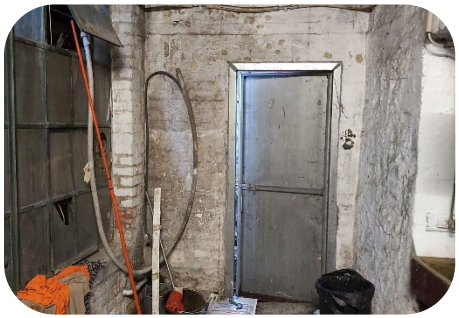








Link area between two Northern Standard buildings















Area 7 – First floor office





External public walkway to west and north elevation. Roof over Area 5 & 6.









South elevation











Appendix

2f

Outdoor Lighting Report

DATE: 24 June 2021

DESIGNER: Michael Walker

PROJECT No: 21-0147-1C

PROJECT NAME: Monaghan CC Dublin Street

Lighting Class C2 [20lux Eav, 40%Uo]

Outdoor Lighting Report

Please note that this proposed lighting scheme is a lighting solution that has been designed with informationprovided by the client. The solution does not include site, installation engineering or any risk assessment considerations.

PREPARED BY:

DW Windsor Lighting
Pindar Road
Hoddesdon
Hertfordshire
EN110DX

Layout Report

General Data

Dimensions in Metres Angles in Degrees

Calculation Grids

ID	Grid Name	X	Y	X' Length	Y' Length	X' Spacing	Y' Spacing
1	Road 01	667236.42	833468.53	24.85	167.50	1.46	1.50
2	Area 2	667206.53	833620.42	156.73	147.65	1.49	1.49
3	Parking 1	667250.19	833534.45	85.07	111.30	1.49	1.48
4	Parking 2	667091.18	833612.03	115.42	118.40	1.50	1.50

Luminaires



Luminaire A Data

Supplier	D W Windsor
Type	Sephora Pendant-16LED- 3k- A1 800mA U MSUG 42 0148 0000 100
Lamp(s)	16 x 3k LED
Lamp Flux (klm)	15.60
File Name	Sephora Pendant-16LED- 3k- A1_800mA U MSUG 42 0148 0000 100.ies
Maintenance Factor	0.92
Imax70,80,90(cd/klm)	442.4, 91.9, 0.0
No. in Project	16



Luminaire B Data

Supplier	D W Windsor
Type	Sephora Pendant-16LED- 3k- C3 800mA U MSUG 42 0148 0000 100
Lamp(s)	16 x 3k LED
Lamp Flux (klm)	15.88
File Name	Sephora Pendant-16LED- 3k- C3_800mA UMSUG 42 0148 0000 100.ies
Maintenance Factor	0.92
Imax70,80,90(cd/klm)	248.4, 8.8, 0.0
No. in Project	13



Luminaire C Data

Supplier	D W Windsor
Type	Sephora Pendant-16LED- 3k- A1 450mA U MSUG 42 0081 0000 100
Lamp(s)	16 x 3k LED
Lamp Flux (klm)	7.62
File Name	Sephora Pendant-16LED- 3k- A1_450mA U MSUG 42 0081 0000 100.ies
Maintenance Factor	0.92
Imax70,80,90(cd/klm)	442.4, 91.9, 0.0
No. in Project	15



Luminaire D Data

Supplier	D W Windsor
Type	Sephora Pendant-16LED- 3k- B1 400mA U MSUG 42 0071 0000 100
Lamp(s)	16 x 3k LED
Lamp Flux (klm)	6.67
File Name	Sephora Pendant-16LED- 3k- B1_400mA U MSUG 42 0071 0000 100.ies
Maintenance Factor	0.84
Imax70,80,90(cd/klm)	386.5, 4.3, 0.0
No. in Project	8

Layout

ID	Type	X	Y	Height	Angle	Tilt	Cant	Out-reach	Target X	Target Y	Target Z
1	A	667243.25	833487.06	10.00	11.00	0.00	0.00	1.50			
2	A	667238.28	833511.51	10.00	11.00	0.00	0.00	1.50			
3	A	667232.27	833543.05	10.00	8.00	0.00	0.00	1.50			
4	A	667226.52	833574.36	10.00	10.00	0.00	0.00	1.50			
5	A	667220.66	833605.78	10.00	9.00	0.00	0.00	1.50			
6	A	667207.62	833617.64	10.00	54.00	0.00	0.00	1.50			
7	A	667231.50	833637.85	10.00	189.00	0.00	0.00	1.50			

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Layout Continued

ID	Type	X	Y	Height	Angle	Tilt	Cant	Out-reach	Target X	Target Y	Target Z
8	A	667208.09	833652.21	10.00	274.00	0.00	0.00	1.50			
9	A	667245.83	833655.79	10.00	274.00	0.00	0.00	1.50			
10	A	667277.56	833646.84	10.00	85.00	0.00	0.00	1.50			
11	A	667297.56	833636.42	10.00	16.00	0.00	0.00	1.50			
12	A	667273.39	833677.73	10.00	352.00	0.00	0.00	1.50			
13	B	667178.69	833634.00	10.00	94.00	0.00	0.00	1.50			
14	B	667149.92	833631.09	10.00	95.00	0.00	0.00	1.50			
15	B	667118.75	833627.87	10.00	94.00	0.00	0.00	1.50			
16	B	667160.85	833651.00	10.00	0.00	0.00	0.00	1.50			
17	A	667179.68	833678.07	10.00	184.00	0.00	0.00	1.50			
18	A	667116.80	833655.92	10.00	281.00	0.00	0.00	1.50			
19	A	667142.46	833666.20	10.00	0.00	0.00	0.00	1.50			
20	B	667174.79	833699.96	10.00	179.00	0.00	0.00	1.50			
21	C	667138.87	833697.21	8.00	189.00	0.00	0.00	1.00			
22	C	667247.75	833700.16	8.00	84.00	0.00	0.00	1.00			
23	C	667199.90	833713.73	8.00	269.00	0.00	0.00	1.00			
24	C	667224.30	833702.28	8.00	84.00	0.00	0.00	1.00			
25	C	667270.13	833697.17	8.00	75.00	0.00	0.00	1.00			
26	C	667240.60	833725.89	8.00	1.00	0.00	0.00	1.00			
27	D	667253.18	833740.83	6.00	337.00	0.00	0.00	1.00			
28	D	667260.53	833754.73	6.00	345.00	0.00	0.00	1.00			
29	D	667317.01	833678.77	6.00	322.00	0.00	0.00	1.00			
30	D	667333.59	833698.54	6.00	317.00	0.00	0.00	1.00			
31	D	667321.50	833647.69	6.00	309.00	0.00	0.00	1.00			
32	C	667277.58	833714.12	8.00	329.00	0.00	0.00	1.00			
33	C	667286.67	833728.17	8.00	329.00	0.00	0.00	1.00			
34	C	667293.06	833738.06	8.00	52.00	0.00	0.00	1.00			
35	C	667314.04	833722.51	8.00	62.00	0.00	0.00	1.00			
36	C	667316.62	833702.10	8.00	148.00	0.00	0.00	1.00			
37	C	667304.49	833686.31	8.00	148.00	0.00	0.00	1.00			
38	D	667306.70	833673.34	6.00	52.00	0.00	0.00	1.00			
39	D	667321.47	833658.73	6.00	44.00	0.00	0.00	1.00			
40	C	667340.30	833662.63	8.00	212.00	0.00	0.00	1.00			
41	C	667352.80	833671.12	8.00	220.00	0.00	0.00	1.00			
42	B	667159.86	833684.59	10.00	2.00	0.00	0.00	1.50			
43	B	667280.97	833629.36	10.00	190.00	0.00	0.00	1.50			

815813509

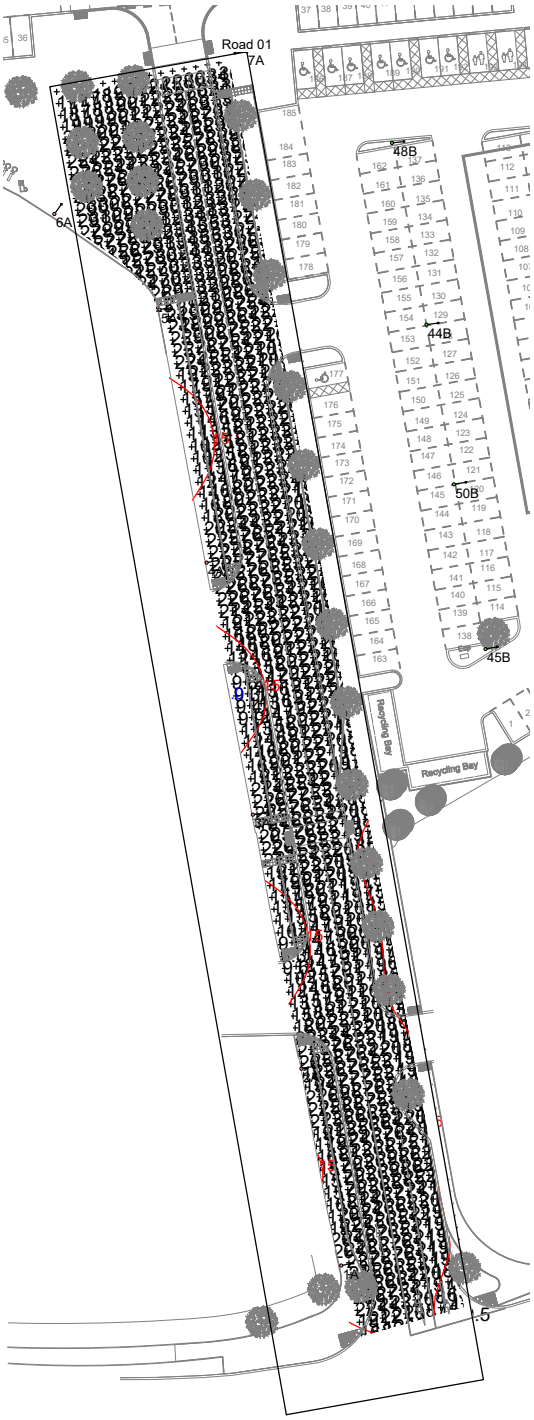
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46	B	667288.90	833581.07	10.00	104.00	0.00	0.00	1.50			
47	B	667302.50	833607.59	10.00	190.00	0.00	0.00	1.50			
48	B	667249.54	833626.46	10.00	7.00	0.00	0.00	1.50			
49	A	667304.37	833581.00	10.00	111.00	0.00	0.00	1.50			
50	B	667257.23	833584.07	10.00	10.00	0.00	0.00	1.50			
51	D	667358.56	833679.59	6.00	303.00	0.00	0.00	1.00			
52	C	667300.42	833713.60	8.00	146.00	0.00	0.00	1.00			

tel: 01992 474600 email: applications@dwwindsor.co.uk

Horizontal Illuminance (lux)

Road 01



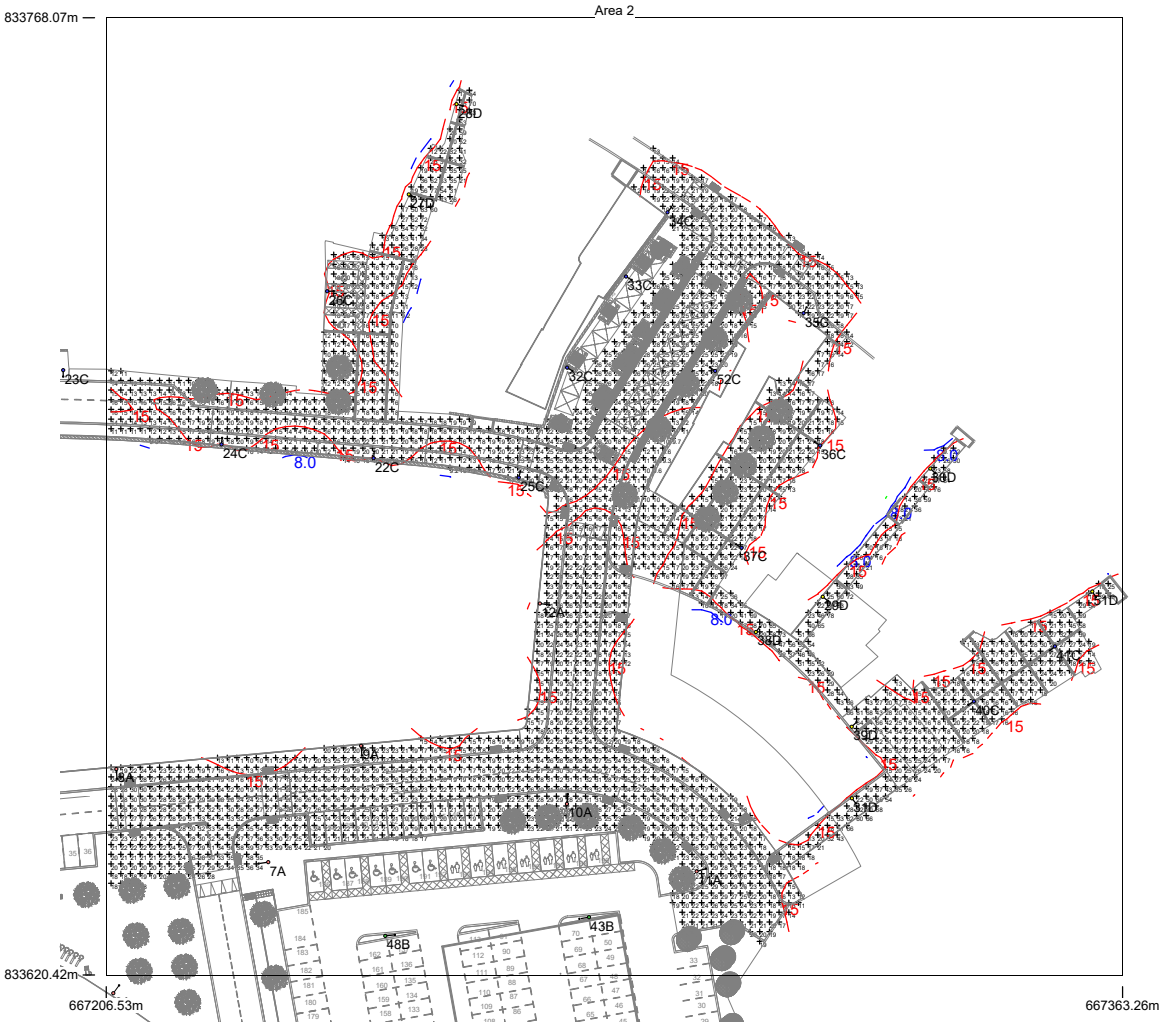
Results

Eav	22.03
Emin	9.31
Emax	36.13
Emin/Emax	0.26
Emin/Eav	0.42

815813509

Horizontal Illuminance (lux)

Area 2



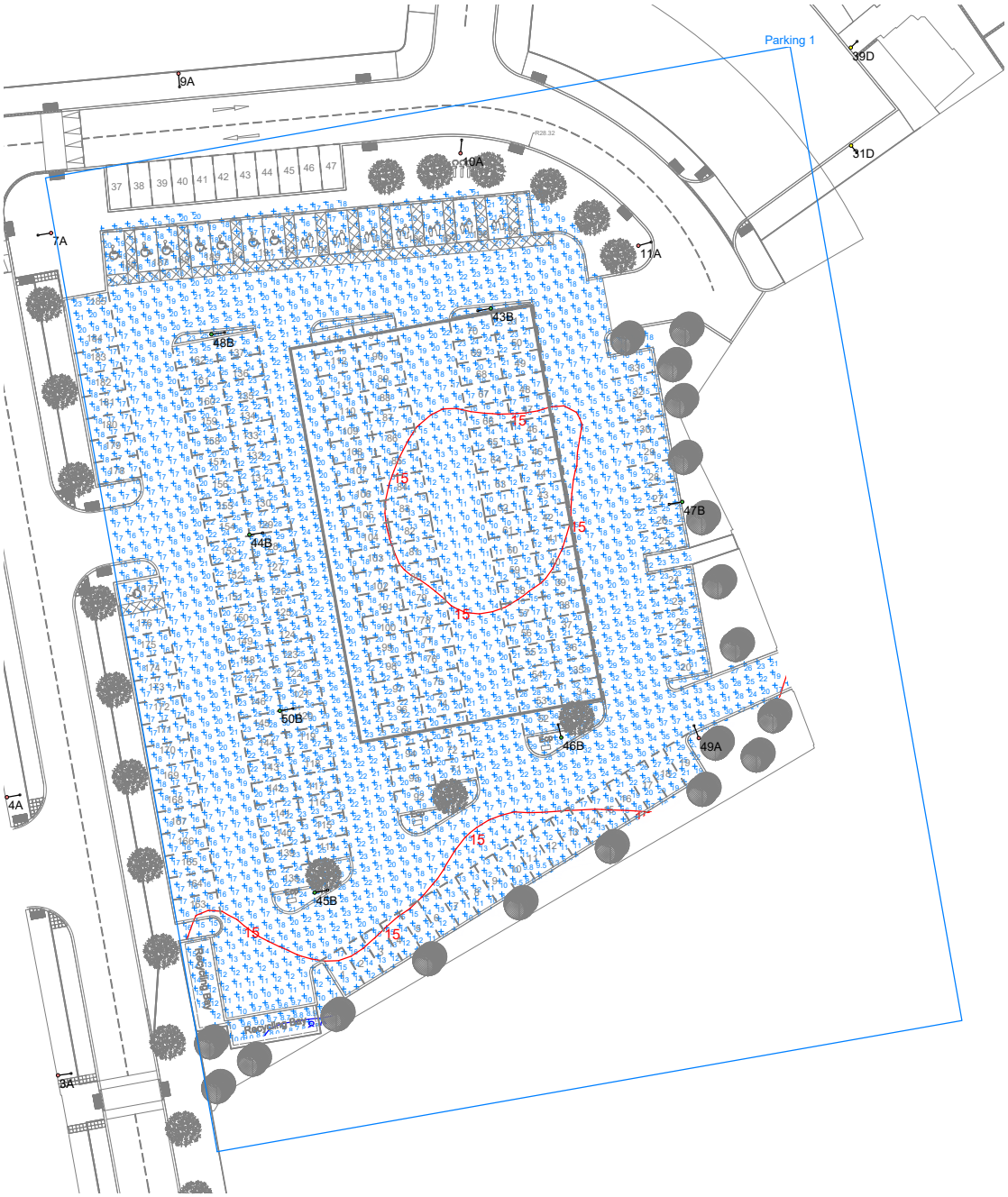
Results

Eav	21.76
Emin	9.13
Emax	85.12
Emin/Emax	0.11
Emin/Eav	0.42

815813509

Horizontal Illuminance (lux)

Parking 1



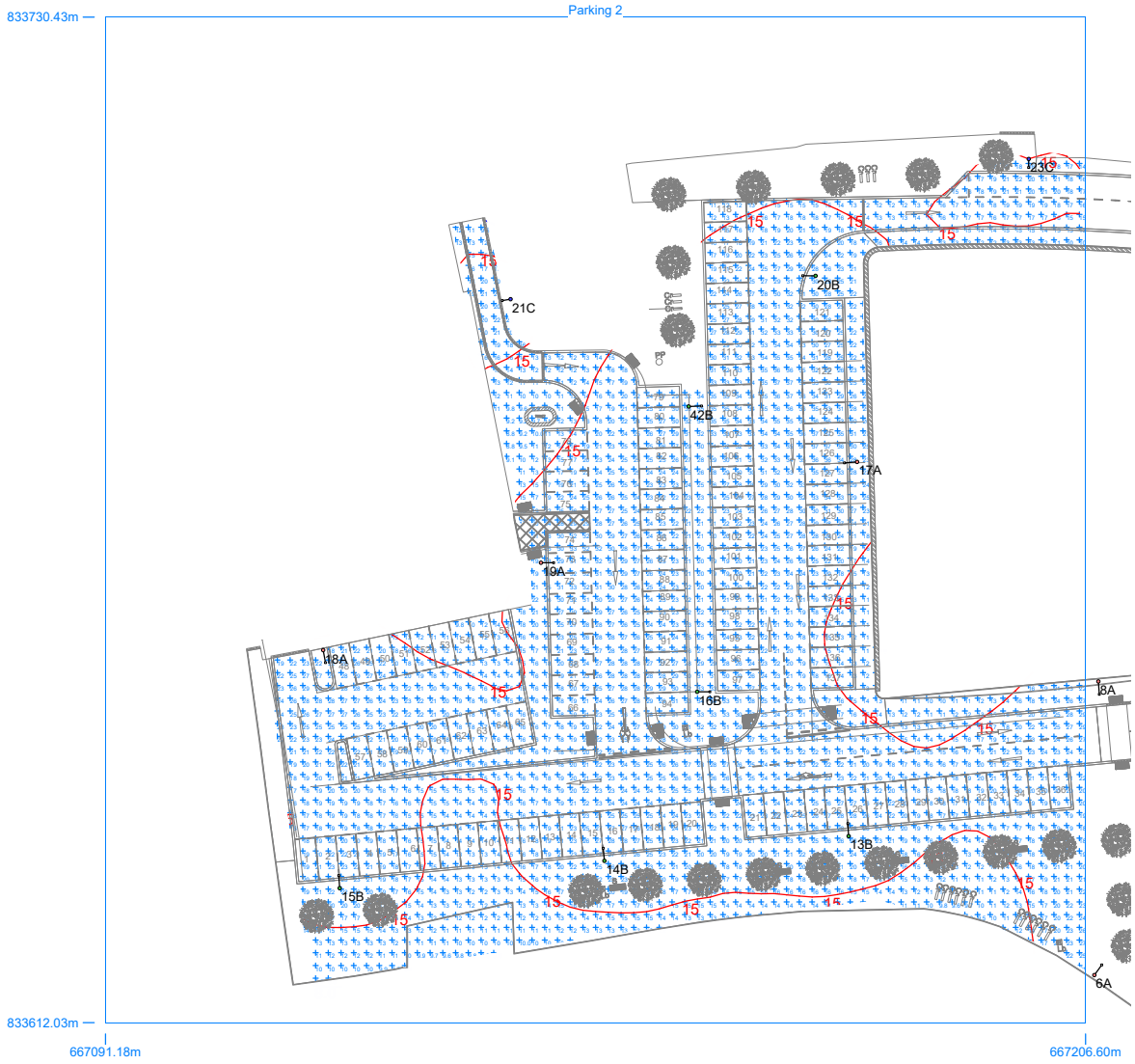
Results

Eav	19.40
Emin	7.78
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Horizontal Illuminance (lux)

Parking 2



Results

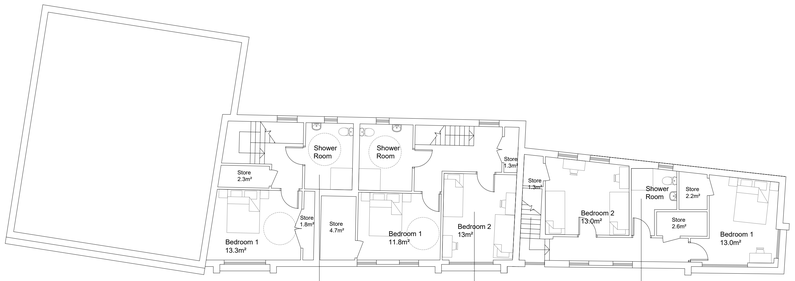
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Emin/Eav	0.42

815813509

Appendix

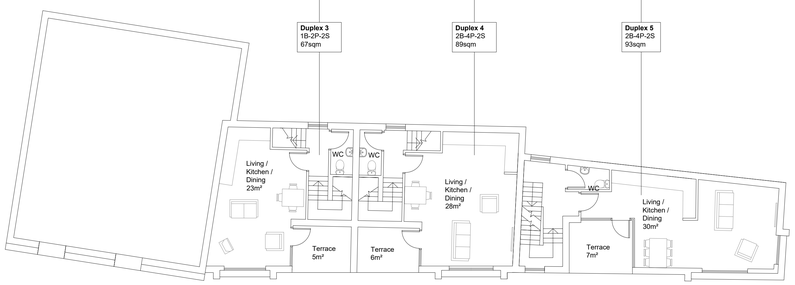
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CGDP Frontage Development Proposals



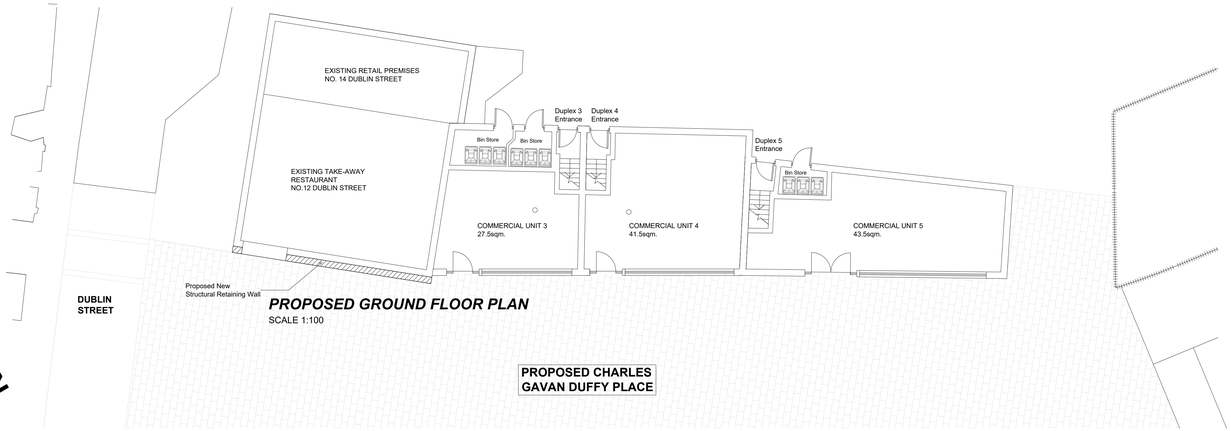
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SCALE 1:100



PROPOSED FIRST FLOOR PLAN

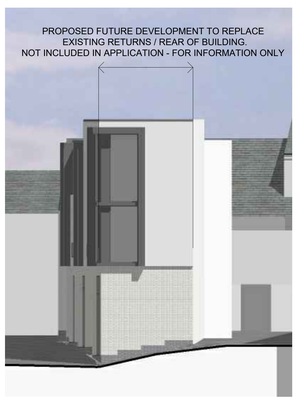
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PROPOSED GROUND FLOOR PLAN

SCALE 1:100

PROPOSED CHARLES GAVAN DUFFY PLACE



PROPOSED SOUTH ELEVATION

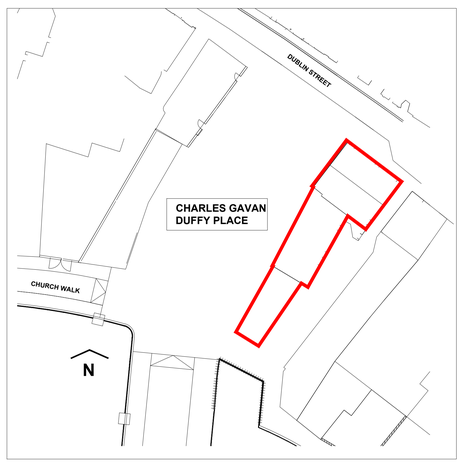
SCALE 1:100



PROPOSED WEST ELEVATION

SCALE 1:100

PROPOSED DEVELOPMENT TO THE EAST EDGE OF CHARLES GAVAN DUFFY PLACE



NOTES

1. All measurements shown are in metres, and all levels are to ordnance datum unless otherwise indicated

2. All Coordinates are to Irish Grid, unless otherwise noted.

Rev	Issue Date	Description	App
-	-	-	-

Status	PLANNING
Client	Monaghan County Council
Project	Dublin Street South
Drawing	Development to East Edge of CGDP Proposed Floor Plans & Elevation
Scale	1:100 @ A0

McAdam
ENHANCING LOCAL COMMUNITIES

Contact Details: 1c Montgomery House, 478 Castlereagh Road, Belfast, BT5 6BQ
T: 028 9040 2000
E: admin@mcadamdesign.co.uk
www.mcadamdesign.co.uk

Drawn	moc	Checked	eh	Approved	moc
Date	23/11/23	Date	23/11/23	Date	23/11/23

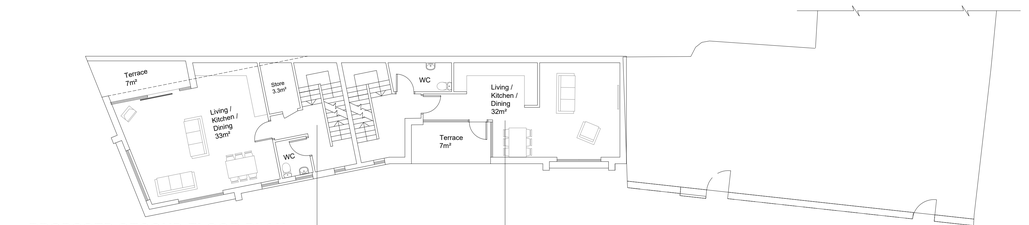
Project Number	Drawing Number	Revision
A2156	200-102	-

All dimensions are in metres. Figured dimensions to be taken in preference to scale dimensions. Dimensions to be checked on site. © 2021 McAdam Design Ltd.

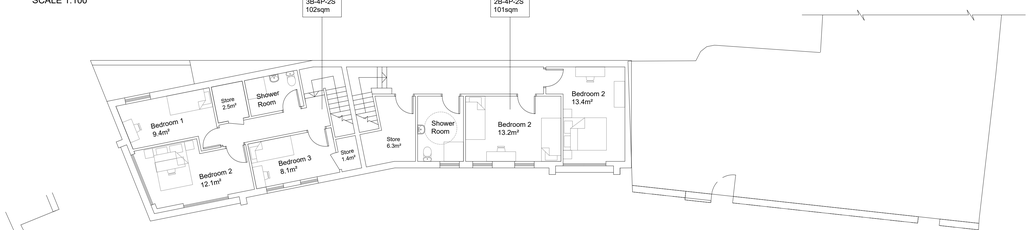
NOTES

1. All measurements shown are in metres, and all levels are to ordnance datum unless otherwise indicated

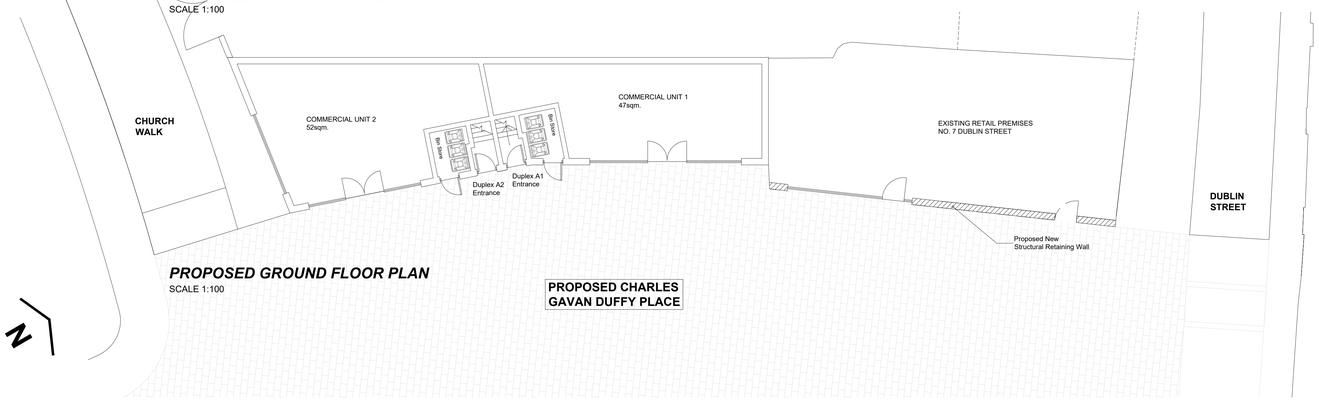
2. All Coordinates are to Irish Grid, unless otherwise noted.



PROPOSED SECOND FLOOR PLAN
SCALE 1:100



PROPOSED FIRST FLOOR PLAN
SCALE 1:100



PROPOSED GROUND FLOOR PLAN
SCALE 1:100

PROPOSED CHARLES GAVAN DUFFY PLACE



PROPOSED SOUTH ELEVATION
SCALE 1:100



PROPOSED EAST ELEVATION
SCALE 1:100

PROPOSED DEVELOPMENT TO THE WEST EDGE OF CHARLES GAVAN DUFFY PLACE



Rev	Issue Date	Description	App
-	-	-	-

Status	PLANNING
Client	Monaghan County Council
Project	Dublin Street South
Drawing	Development to West Edge of CGDP Proposed Floor Plans & Elevation
Scale	1:100 @ A0

McAdam
ENHANCING LOCAL COMMUNITIES

Contact Details: 1c Montgomery House, 478 Castlereagh Road, Belfast, BT5 6BQ
T: 028 9040 2000
E: admin@mcadamdesign.co.uk
www.mcadamdesign.co.uk

Drawn	Checked	Approved
moc	eh	moc
Date 23/11/23	Date 23/11/23	Date 23/11/23

Project Number	Drawing Number	Revision
A2156	200-101	-

All dimensions are in metres. Figured dimensions to be taken in preference to scale dimensions. Dimensions to be checked on site. © 2021 McAdam Design Ltd.

Appendix

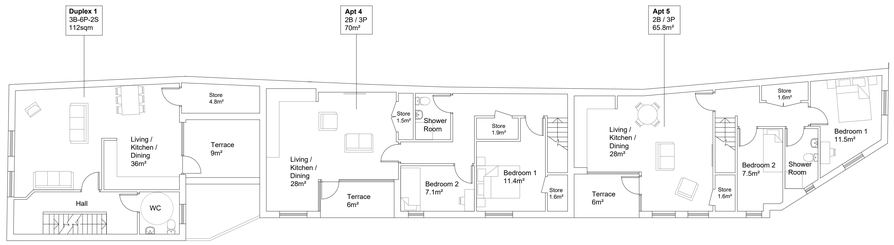
2h

Housing Proposals



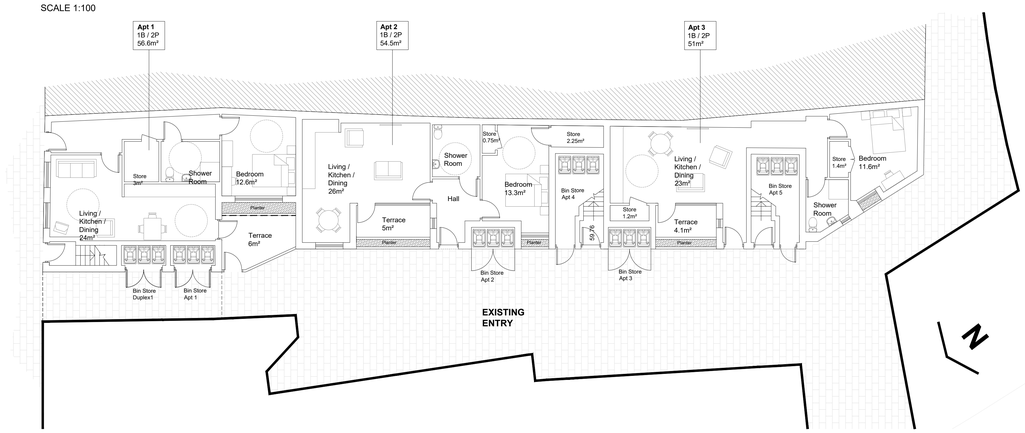
PROPOSED SECOND FLOOR PLAN

SCALE 1:100



PROPOSED FIRST FLOOR PLAN

SCALE 1:100



PROPOSED GROUND FLOOR PLAN

SCALE 1:100

SCHEDULE OF AREAS

Duplex 1	3B-6P-2S	
	Width (m)	Area (m²)
Bedroom 1	2.80	11.40
Bedroom 2	2.80	11.70
Bedroom 3	3.56	13.00
Total Storage Area		9.60
Total Kitchen / Living / Dining Area		36.00
Gross Internal Area		112.00

Apartment 1	1B-2P-1S	
	Width (m)	Area (m²)
Bedroom 1	3.40	14.6
Total Storage Area		3.00
Total Kitchen / Living / Dining Area		24.00
Gross Internal Area		58.60

Apartment 2	1B-2P-1S	
	Width (m)	Area (m²)
Bedroom 1	3.08	13.30
Total Storage Area		3.00
Total Kitchen / Living / Dining Area		26.00
Gross Internal Area		54.50

Apartment 3	1B-2P-1S	
	Width (m)	Area (m²)
Bedroom 1	2.97	12.30
Total Storage Area		2.6 (-13%)
Total Kitchen / Living / Dining Area		23.00
Gross Internal Area		51.00

Apartment 4	2B-3P-1S	
	Width (m)	Area (m²)
Bedroom 1	2.10	7.10
Bedroom 2	3.17	11.40
Total Storage Area		5.00
Total Kitchen / Living / Dining Area		28.00
Gross Internal Area		70.00

Apartment 5	2B-3P-1S	
	Width (m)	Area (m²)
Bedroom 1	2.80	11.50
Bedroom 2	2.10	7.50
Total Storage Area		3.2 (-36%)
Total Kitchen / Living / Dining Area		29.00
Gross Internal Area		85.80



PROPOSED SOUTH ELEVATION

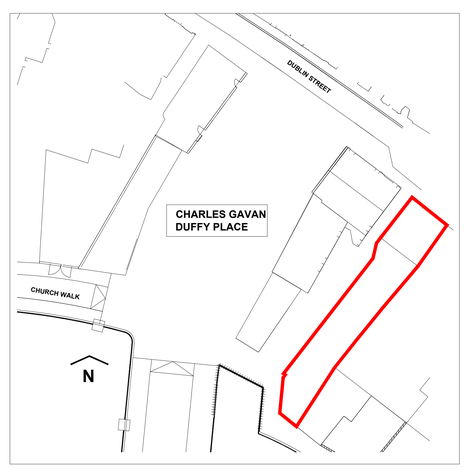
SCALE 1:100



PROPOSED WEST ELEVATION

SCALE 1:100

PROPOSED HOUSING DEVELOPMENT SITE



N
W E
S

NOTES

1. All measurements shown are in metres, and all levels are to ordnance datum unless otherwise indicated

2. All Coordinates are to Irish Grid, unless otherwise noted.

Rev	Issue Date	Description	App

Status PLANNING

Client Monaghan County Council

Project Dublin Street South

Drawing Housing Development Site
Proposed Floor Plans & Elevations

Scale 1:100 @ A0

McAdam
ENHANCING LOCAL COMMUNITIES

Contact Details
1c Montgomery House
478 Castlereagh Road
Belfast, BT5 6BQ
T: 028 9040 2000
E: admin@mcadamdesign.co.uk
www.mcadamdesign.co.uk

Drawn	Checked	Approved
moc	eh	moc
Date 23/11/23	Date 23/11/23	Date 23/11/23

Project Number	Drawing Number	Revision
A2156	200-103	-

All dimensions are in metres. Figured dimensions to be taken in preference to scale dimensions. Dimensions to be checked on site. © 2021 McAdam Design Ltd.



Proposed Elevation

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Appendix

2i

Design Statements

McAdam
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SOUTH DUBLIN STREET & BACKLANDS REGENERATION PROJECT

A2180

Design Statement - Architecture

PREPARED BY	CHECKED BY	APPROVED BY	ISSUE	DATE
MOC	KOS	CC	Rev1	30/11/23

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1.2 Statement of Authority 4
2 DESIGN STATEMENT 5
2.1 Monaghan County Development Plan 2019-2025 5
2.2 Proposed Development to the West edge of CGDP 6
2.3 Proposed Development to the East edge of CGDP 8

1 INTRODUCTION

1.1 Project Brief

McAdam Design were appointed by Monaghan County Council (MCC), to assist in addressing the issues raised in the Further Information (FI) request from An Bord Pleanála (ABP) in relation to the submitted planning application for the Regeneration Scheme, and the five associated submissions.
McAdam has provided architectural design services, and developed the high quality photomontages and visuals which describe the scheme.

Our work undertaken includes:

a) Review of the ABP FI request in conjunction with the 5 no. submissions from the specified prescribed bodies/third parties, with particular regard to architectural heritage issues raised.
b) Development and preparation of design proposals and high-quality architectural images for a new pedestrian square in Gavan Duffy Place
c) Update the current design proposals for the 3 existing alleyway connections from Dublin Street to the new scheme area. The design for these existing alleyways needs to incorporate new high-quality public realm (paving, street furniture, wayfinding, signage, landscaping) to create enlivened spaces and provide opportunities for new frontage developments and encourage the reuse and adaption of existing building in these locations.
d) Development and preparation of active frontage design proposals for the 3no. properties fronting onto the new pedestrian square in Gavan Duffy Place having regard to the matters raised in the ABP FI request.
e) Development and preparation of design proposals for housing units in existing alleyway

To address items b) & c) above we have collaborated with Optimised Environments Ltd (OPEN) who have provided Public Realm design expertise.

OPEN have produced a separate Design Statement relating to the Public Realm design aspects of the scheme.

1.2 Statement of Authority

McAdam Design is a multi-disciplinary design practice who have recently celebrated 60 years in existence. Our in-house Architectural department stands as a leading provider of urban development and design services in Northern Ireland, with experience in Ireland and the UK.

Project Lead

Michael O'Connor BA(Hons) Dip.Arch DAAS, is a Technical Director (Architect) at McAdam with over 20 years' experience as a Chartered Architect. Michael has extensive experience in urban design projects including: masterplanning; mixed use regeneration projects; urban infill and residential projects.

Proposed view of Gavan Duffy Place



2 DESIGN STATEMENT

2.1 Monaghan County Development Plan 2019-2025

The Proposed new development along the east and west edges of Charles Gavan Duffy Place (CGDP) has been designed in accordance with the principles set out in the Dublin Street Regeneration Plan (DSRP). The Monaghan County Development Plan 2019-2025 states that "it is an objective ..... that all new development in the Dublin Street regeneration area and its associated backlands has regard to this plan." The key relevant principles of the DSRP include:

- Development should *complement and integrate* with the existing context. Integrate with the historic streetscape in a manner that is both contemporary and forward looking while complimenting the built heritage.
- Complimentary Contemporary Expression - High Quality Development – appropriate contemporary expression to compliment and act as an appropriate backdrop to existing historic structures.
- Living over the shop - with careful planning the upper floor levels have the potential to create attractive accommodation that would activate the street and provide passive surveillance. In this regard uses such as office, and smaller apartment dwellings may be appropriate.
- Active ground floor uses, fronting onto CGDP.
- Provide positive interaction between spaces and the built form, e.g building frontages, windows and entrances should face onto and overlook the street and public spaces.
- The urban form should contribute to the consolidation of the fine grain urban structures and the pattern of street blocks and buildings in the area. New developments should promote legibility in terms of the articulation of street level and roof top, the distinction of public and private areas, and primary circulation and entrances. Ensure that the height and massing of proposed new development does not impact negatively on the sustainable conservation of protected structures and the social and historic heritage of the town.
- Promote a *design led approach* to the redevelopment of infill and new development sites.

- Ensure that development delivers quality, attractive urban environments and a high level of amenity for commercial and residential developments. Promote building design that are sympathetic to and enhance the established built heritage and street patterns. Provide a new interpretation of the development of Monaghan town centre, while reinforcing its unique qualities and providing it with a new distinct identity.
- Provide for the use of high-quality materials which are durable and require a low level of maintenance, use of local or indigenous materials. Promote new design which is clearly modern and embrace recent construction methods.

2.2 Proposed Development to the West edge of CGDP

Fine urban grain structures – terrace frontage made up of 4 distinct components:

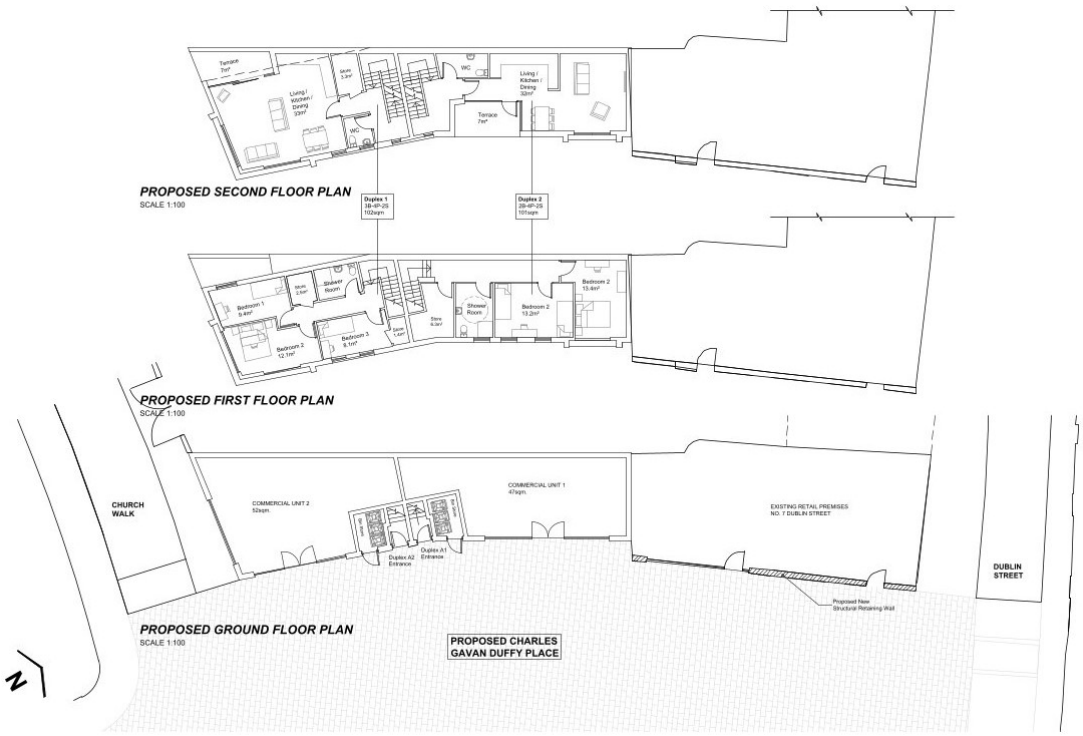
1. Gable of No.7 Dublin Street - 2 Storeys- new retaining gable will be constructed when the adjacent building is demolished. A single door at ground floor provides own door access to the residential apartment on the first floor, complimented by a first floor window. New gable façade rendered in complimentary tone to brickwork front façade.
2. Return to No.7 - 2½ Storeys - Façade and roof structure redeveloped with new:
    - 2 storey brick façade with shopfront 'punched opening' and new window to existing first floor apartment.
    - Flat roof structure with vertical face clad in pre-patinated standing seam zinc panels to replace existing slate pitched roof.
3. New 3 Storey infill to replace existing 2 storey return structure set back from adjacent above to follow ownership boundary – brick façade to ground and first floors with shopfront 'punched opening'. 2nd floor clad in pre-patinated standing seam zinc panels. Flat roof structure
4. New 3 Storey corner infill to replace existing single storey shed structure at different angle to adjacent above –ground floor brick façade with dual aspect with shopfront 'punched openings'. 2 storey rendered façade to 1st and 2nd floors. Flat roof structure

Scale & Massing

The terrace transitions from 2 storey height at Dublin St to 3 storey height at Church Walk. The parapet / ridge height increases from north to south. This helps to articulate the façade of the terrace and enhance the development scale at the southern corner with Church Walk to provide a 'book end' to the terrace composition and act as a gateway to the new urban space.

Active Frontage and 'over the shop' Living

- 3 No. ground floor commercial units for shops, café, professional services will provide an active frontage to west side of CGDP.
- 2 No. high quality duplex residential units above the commercial units will activate the street and provide passive surveillance.



Proposed Plans of Commercial and Residential Units

Character & Identity

The new development is designed to provide a *complimentary contemporary expression* to the existing built heritage and to provide CGDP with a new unique identity as follows:

- Use of layered, well-proportioned, rectilinear forms in complimentary textures and tones
- 2 storey glazed elements framed with projecting aluminium powder coated band.
- Asymmetrical arrangement of openings
- Punched openings with deep reveals
- Private external amenity space recessed into façade.

Material Palette

Selection of high-quality durable materials with a palette of complimentary light neutral tones including:

- Light grey smooth wirecut clay facing brick.
- Mid-grey powder coated aluminium windows and shopfronts.
- Light toned render
- Mid grey pre-patinated zinc standing seam cladding.
- External doors in warm toned vertical hardwood strips



Proposed Elevations – Complimentary Contemporary Expression

2.3 Proposed Development to the East edge of CGDP

The design approach to the eastern edge of CGDP is identical to the western albeit the terrace frontage is made up of 3 distinct components instead of 4.

In essence the new CGDP will be 'book ended' to Dublin Street by new retaining walled gables to the existing buildings either side of the new 'opening' and to the new Church Walk by 3 storey contemporary 'gateway' developments with rendered upper floors, punched openings and expansive double height corner glazed elements.



Proposed Elevations to East Edge of CGDP

BELFAST
478 Castlereagh Road
Belfast
BT5 6BQ
Northern Ireland

T +44 (0) 28 9040 2000

admin@mcadamdesign.co.uk

Dublin Street South & Backlands Regeneration Project

Design Statement: Public Realm

1. Statement of Authority

Optimised Environments Limited (OPEN | SLR) is a landscape-led multi-disciplinary practice with specialisms in public realm and landscape design. We have extensive experience in the design and delivery of urban projects comparable to Dublin Street South across the UK and Ireland, taking projects through from the definition of briefs to completion on site. We are passionate about the positive impact quality public space can make on the people who interact with it, and have developed expertise in developing an understanding of a place and developing proposals that are appropriate to enhancing a place.

The landscape proposals for Dublin Street South have been developed by Ben Palmer MA(Hons) CMLI, a Director at OPEN | SLR. Ben has over 20 years' experience as a Chartered Landscape Architect (CMLI) in the design and delivery of significant public realm and landscape, particularly projects focused on the regeneration or enhancement of urban places.

2. Public Realm Introduction

In combination with the architectural proposals, the public realm associated with Dublin Street South will provide a high quality environment that will raise the overall profile of the area and provide a legible, attractive, safe and engaging place for all to use and enjoy. A hierarchy of streets, alleyways and spaces form the foundation of the new urban structure proposed south of Dublin Street. Alterations to the adjoining streets will provide new connections to and from Dublin Street, enhancing the permeability of the area and providing a legible network of connections and spaces for pedestrian movements, seamlessly integrating into the existing urban fabric of Monaghan's Town Centre. The long term aspiration is for this new high quality setting to be a catalyst to encourage new development within the town centre, enriching the quality of the urban area.



Visualisation showing proposals for Charles Gavan Duffy Place.

The new public realm will be realised through a high quality palette of materials and street furniture, coordinating with recently delivered areas within Monaghan's Town Centre, including 'Diamond Square'. This approach ensures consistency, with areas combining to form a cohesive public realm identity for Monaghan.

New streets, alleyways and spaces are described below.

3. Charles Gavan Duffy Place

Charles Gavan Duffy Place will be a new fully pedestrianised public space connecting Dublin Street through to its 'backland' areas, opening up new sites for development and enhancing pedestrian linkages throughout this area. The new public space is formed by the demolition of existing structures fronting Dublin Street and their associated 'backland' areas. The proposals focus on fully pedestrianised high quality public realm, encouraging activity, social interaction and providing connections into a new reimagined urban place. New building frontages to the north and south provide a strong urban form, bringing animated edges and natural surveillance to the new space.



Spaces for encouraging dwell and activity.

Charles Gavan Duffy Place will benefit from a southerly orientation and will increase light onto Dublin Street. This area is intended as a multi-use space that can host events, open-air markets, pop-up commercial/retail uses, or occasional festivals. Vehicular access will be restricted to deliveries to commercial premises and waste collection for residential and commercial units. The proposed space creates a new setting and enables new opportunities for future infill development and reuse / adaptation of existing underutilised buildings on either side of the new space, creating opportunities for new commercial and residential activity. The Dublin Street Regeneration Plan 2017 suggested this area might be known as 'Charles Gavan Duffy Place'. It is proposed that this space will be dedicated to Charles Gavan Duffy, in recognition of his historical connections to this area, with aspirations to provide an appropriate high quality 'totem' information sign commemorating Charles Gavan Duffy.



The edges of Charles Gavan Duffy Place are designed to accommodate 'spill out' from adjacent ground floor uses.

Charles Gavan Duffy Place will be defined through warm toned natural stone paving, using a variety of surface textures and unit sizes to add detail and interest. This warmer toned paving will complement the surfaces used within the streets and alleyways, but will be unique within the area, marking Charles Gavan Duffy Place as an important space for Monaghan. Mature tree planting, raised planters and seating elements provide spatial definition, introducing edges for people to sit against and creating zones along the edges for café / bar spill out. The raised planters will contain a range of mulitstem trees, shrubs, ornamental grasses, perennials, and bulbs to provide seasonal colour and variety, and to enhance biodiversity. Lighting is provided throughout including 'catenary' lighting strung between carefully placed columns. This assists in creating a welcoming environment after dark and creates a human scale 'ceiling' within Charles Gavan Duffy Place.





Catenary lighting in Charles Gavan Duffy Place enhancing the environment after dark and providing a unique space within Monaghan's Town Centre.



A view of Charles Gavan Duffy Place looking towards Dublin Street.

4. Alleyways

The alleyways will be enhanced through high quality surfacing material, new lighting, and street furniture. These routes are an important historical piece of Monaghan's urban character and will be made to feel more welcoming through the new public realm treatment. Where appropriate signage, interpretation and artwork will be used to promote the alleyways and add a layer of vibrancy. Alongside these treatments, the alleyways will also accommodate functional aspects including access, parking, and deliveries associated with both the residential and commercial uses. The proposed landscape materials will coordinate with other recently completed spaces within Monaghan's Town Centre, with silver grey granite providing a light toned surface to these narrow spaces. Where the alleyways widen, spaces will be defined using complementary paving laid in small units. These will coordinate with Charles Gavan Duffy Place, providing a visual connection between the alleyways and the main space within the Dublin Street South proposals. Lighting will enhance safety and legibility within the alleyways, and the public realm proposals will ensure eye level views and clear site lines where possible. Where it can be accommodated, soft landscape and tree planting will be introduced using compact, upright forms of tree with light textured canopies.



Alleyway as a setting and access for new residential development.

5. Streets

The streets within Dublin Street South provide the framework for future development of the plots, and coordinate with the alleyways and Charles Gavan Duffy Place to create a cohesive environment for people to navigate. The streets will generally have silver grey granite footways, granite kerbs and asphalt roads. Some of the key streets will have a granite carriageway and lower upstand kerbs to promote pedestrian priority while still maintaining legibility for all. Semi-mature tree planting, seating elements, cycle racks and bins provide a functional and inclusive environment for all to navigate.



The interface between Charles Gavan Duffy Place and Dublin Street. The materials for Dublin Street are ultimately proposed to coordinate with the wider Town Centre. The warm toned paving of Charles Gavan Duffy Place will push out into Dublin Street to clearly mark its thresholds and promote it as a new urban space.



Simple but quality treatments to new streets within the Dublin Street South area.

6. Materiality

The materiality of the public realm will complement the architectural proposals and provide a high quality, legible and robust environment that integrates with the wider Town Centre. It will provide a contemporary urban realm that is also sensitive to the historic context, referencing recently used materials in adjacent areas such as 'Diamond Square'. The following outlines the key proposed material palette for Dublin Street South's public realm.

6.1. Hard Landscape

Charles Gavan Duffy Place Feature Paving: Warm toned natural stone, typically sandstone. To be cut in several unit sizes and to be finished with different surface textures to provide further detail and interest to the paving layout within Charles Gavan Duffy Place. The warm toned paving will be supplemented with feature bands to provide visual structure within the space.

Primary paving to Alleyways and Streets: Silver Grey natural stone, typically granite. To coordinate with recently installed town centre paving to create a cohesive public realm character for Monaghan's Town Centre. Smaller cut units to be used within the alleyways, and larger 'slabs' used within primary streets. Surface textures to be used to add interest and detail, particularly within the alleyways. Warmer toned natural stone setts will also be used within key areas of the alleyways to define spaces. In some areas of Sublin Street South, the carriageway will be laid in natural stone setts to emphasise a pedestrian priority environment.

Precast Paving to Streets: Streets within the wider Dublin Street South project area are proposed as quality precast paving units with a natural stone aggregate top surface. These will coordinate with the Primary Streets.

6.2. Soft Landscape

Street Tree Planting in Hard Landscape: Mature and Semi-Mature standard tree planting located within hard landscape areas. Size dependent on location, with larger specimens generally being used within key spaces such as Charles Gavan Duffy Place. To include proprietary tree pit and tree grille coordinating with adjacent paving. Trees to have clear stem to 2.5m to allow eye level views. Species to include:

- Pin Oak (Quercus palustris)
- Cypress Oak (Quercus robur 'Fastigiata')
- Lime (Tilia cordata 'Greenspire')
- Hornbeam (Carpinus betulus 'Frans Fontaine') and
- Cherry (Prunus 'Sunset Boulevard')

Street Tree Planting in Soft Landscape: Semi-Mature standard tree planting located within soft landscape areas. Trees to have clear stem to 2.5m to allow eye level views. Species to include:

- Rowan (Sorbus Spp)
- Lime (Tilia x euchlora)
- Cherry (Prunus Spp.) or Maple (Acer campestre 'Streetwise')

Multi-stem Tree Planting in Raised Planters: 3.5 – 4.0m tall multi-stem specimen trees with between 5 – 7 natural stems. Species to include:

- Birch (Betula pendula)
- Snowy Mespil (Amelanchier Lamarkii)
- Japanese Maple (Acer sp.)
- Cherry (Prunus sp.)

Shrub Planting: A mixture of specimen / evergreen shrubs, ornamental grasses, perennial species and bulb planting to provide year-round visual interest and a biodiverse species mix.

6.2. Street Furniture

Raised Planters: Precast and Weathering Steel raised planters with integrated seating. Notionally 600mm in height.

Benches: Linear seating elements with timber tops. Armrests and backrests to be included on 50% of the overall length.

Individual Seats: Reconstituted stone individual seats with a polished finish. To include backrests and arranged in clusters.

Cycle Stands: Stainless Steel 'Sheffield' type racks with visibility strips and tapping rail.

Litter Bins: Litter bins coordinating with others installed in the Town Centre.

Appendix

3a

An Bord Pleanála Scoping Opinion

Our Case Number: ABP-309071-21

Your Reference: Monaghan County Council

An Bord Pleanála

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



Date: 8th June 2021

Re: Environmental Impact Assessment Scoping Request
South Dublin Street & Backlands, Monaghan Town Centre, Co. Monaghan

Dear Sir / Madam,

In response to your request please now be advised that the following constitutes the Board's written opinion on the information to be contained in the Environmental Impact Assessment Report to be prepared in respect of the above-mentioned proposed development.

1. The Proposed Development – to include information on the site, design, size and other relevant features of the proposed development. The description of the project should make specific reference to demolition works that may be required as part of or to facilitate the development. In the case of the subject development, the description of development should include its context with regard to other permitted and proposed developments on the overall site and the extent of any demolition works required. The proposed development should be described in scaled drawings, photographs and photomontages.

2. The Existing Environment - The existing environment and the impacts of the development are explained by reference to its possible impact on the following environmental factors:

- Population, and Human Health,
- Biodiversity with particular attention to species and habitats protected under the Habitats and Birds Directive,

Teil **Tel** (01) 858 8100
Glao Áitiúil **LoCall** 1890 275 175
Facs **Fax** (01) 872 2684
Láithreán Gréasáin **Website** www.pleanala.ie
Ríomhphost **Email** bord@pleanala.ie

64 Sráid Maoilbhríde
Baile Átha Cliath 1
D01 V902

64 Marlborough Street
Dublin 1
D01 V902

- Land, Soil, Water, Air and Climate,
- Material Assets, Cultural Heritage and the landscape,
- The interaction between the above factors

In terms of the receiving environment, the EIAR shall include all areas that would be impacted upon, directly or indirectly, by the proposed development. The information contained in the EIAR should therefore be based on comprehensive surveys of the area and have regard to updated data bases which may exist in terms of architectural heritage and ecology. The EIAR should accurately describe the receiving environment in terms of geology, geomorphology and hydrology, as well as a physical description of the site proposed for development

3. The Likely Significant Effects of the Proposed Development - Impacts should address direct, indirect, secondary, cumulative, short, medium and long-term, permanent, temporary, positive and negative effects as well as impact interactions. None of the topics outlined above (Population and Human Health etc.) should be omitted, although their level of detail may differ depending on the likelihood of impacts. In accordance with the requirements of Article 94 of the Planning and Development Regulations, 2001 (as amended), the EIAR shall contain a reference list detailing the sources used for the impact descriptions and assessments used in the EIAR. The EIAR should also contain a list of experts who contributed to the development of the report, identifying for each expert, the part of the EIAR for which he / she is responsible, his / her experience or expertise and any additional information considered relevant to demonstrate the persons competence in the preparation of the EIAR. An assessment of the impact of the proposed development is required, with an assessment of the cumulative impact of existing and permitted developments in the vicinity. The assessment of cumulative impacts in the EIAR should also have regard, as far as is practicable, to the likely effects arising from future phases of the South Dublin Street and Backlands Regeneration Plan and the adjoining areas covered by the Local Area Action Plan for Lands to North East of Dublin Street Plan.

Further to the above, details of the environmental impacts of the development during the demolition, excavation, construction and operational phases of the development should also be described and assessed by reference to baseline information which should be collated and presented within the EIAR. The environmental impact of the aforementioned phases, including in particular noise and vibration impacts arising from the demolition works and construction phase impacts in terms of materials storage and containment within the site should also be

Teil **Tel** (01) 858 8100
Glao Áitiúil **LoCall** 1890 275 175
Facs **Fax** (01) 872 2684
Láithreán Gréasáin **Website** www.pleanala.ie
Ríomhphost **Email** bord@pleanala.ie

64 Sráid Maoilbhríde
Baile Átha Cliath 1
D01 V902

64 Marlborough Street
Dublin 1
D01 V902

described and assessed. The EIAR will be required to provide information regarding the nature, quantities and source of materials to be used in the overall development. Information will also be required on volumes and nature of waste materials likely to be generated in the demolition phase and proposed means for disposal of same. The EIAR should also provide an assessment of the expected effects arising from the vulnerability of the project to major accidents and disasters that are relevant to the project. These risks should be considered in the context of the factors of the environment.

4. The Measures to Mitigate Adverse Impacts - The EIAR shall give a description of the features of the proposed development and measures envisaged to avoid, prevent, reduce and, if possible, offset likely significant adverse effects on the environment. Where adverse impacts are likely to result, appropriate mitigation measures shall be identified where necessary – and shall clearly indicate where and with whom responsibility for the implementation of the mitigation measures lies. The EIAR shall also provide information relating to the monitoring of the impacts of the development on the environment.

5. The Consideration of Alternatives: The consideration of alternatives, in terms of location and design, as well as proposed uses, should also be addressed in the EIAR and should comprise a description of the reasonable alternatives relevant to the proposed development which were studied and the reason for the option chosen having regard to the effects on the environment. In undertaking this assessment of alternatives, the following should be borne in mind:

- It is not a requirement to revisit issues considered in the formulation of policy that has been the subject of SEA.
- Alternatives should be relevant to the project and its specific characteristics.
- The assessment of alternatives should include a description of the current state of the environment without implementing the project, i.e. the Do-Nothing scenario. This assessment should be the starting point for the consideration of impacts in the EIAR.
- In the assessment of alternatives, the level of detail provided should be reasonable and commensurate with the project.

Teil **Tel** (01) 858 8100
Glao Áitiúil **LoCall** 1890 275 175
Facs **Fax** (01) 872 2684
Láithreán Gréasáin **Website** www.pleanala.ie
Ríomhphost **Email** bord@pleanala.ie

64 Sráid Maoilbhríde
Baile Átha Cliath 1
D01 V902

64 Marlborough Street
Dublin 1
D01 V902

6. A Non-Technical Summary - The EIAR must contain a non-technical summary of the detailed information contained within the EIAR. The language of this summary shall be non-technical in nature and should provide clear details of the environmental effects the development will have, as well as all significant effects and mitigation measures proposed. The description of the development in this summary should clearly explain and describe all aspects of the proposed development such that the EIAR is accessible in terms of public understanding of the process and to facilitate full public participation and consultation in the process.
In terms of specific environmental topics, the development is likely to impact upon, the EIAR should, in particular, address the following matters:

- Population, and Human Health
- Biodiversity (for example fauna and flora),
- Land (for example land take), Soil (incl. organic matter, erosion, compaction, sealing), Water (for example hydro morphological changes, quantity and quality), Air and Climate (incl. greenhouse gas emissions, impacts relevant to adaptation),
- Material Assets, Cultural Heritage, (incl. architectural and archaeological aspects) and Landscape.
- Interactions between the above factors.

An outline of the specific issues considered relevant to the EIAR under these headings is given in the following sections:

7. Population, and Human Health

- As identified in the submitted Scoping Report, the scope of human health and the consideration of associated impacts extends to the assessment of those environmental factors which might lead to effects on human health (incl. noise, vibration, transport, air quality, amenity, water quality & flood risk).
- Given the nature of the existing site the EIAR should specifically address the likely effects on the health and safety of surrounding populations during all phases of the development, including demolition, excavation, construction and operational phases.

Teil **Tel** (01) 858 8100
Glao Áitiúil **LoCall** 1890 275 175
Facs **Fax** (01) 872 2684
Láithreán Gréasáin **Website** www.pleanala.ie
Ríomhphost **Email** bord@pleanala.ie

64 Sráid Maoilbhríde
Baile Átha Cliath 1
D01 V902

64 Marlborough Street
Dublin 1
D01 V902

- An assessment of the impact of the proposed development on the availability of local recreational facilities and overall level of amenity and the potential impacts arising for population and human health should be addressed in the EIAR.

8. Biodiversity

- Given the brownfield nature of the site, and its location within an urban setting, the EIAR should provide a clear baseline assessment of the existing receiving environment and the impact of the development on the ecology of the receiving environment.
- The EIAR should address any potential for disturbance arising from the construction activity and particularly any works required to remove any existing structures and hard surfaces. In particular, the potential for disturbance to any species using the adjoining river channel (Shambles River) or banks to this watercourse should be assessed.
- The site is not located within or close to a European site, however there are several sites in the wider area that may have an aquatic or mobile connection to the site. The proximity of the site to the Shambles River which has an ultimate downstream aquatic connection to the Lough Neagh and Lough Beg SPA (NI) is noted. The Slieve Beagh SPA and Slieve Beagh-Mullaghfad-Lisnaskea SPA (NI) are located to the W of the site and there may be a potential connection for mobile species.
- There is therefore a need to carry out Screening for Appropriate Assessment under the Habitats Directive and further assessment if necessary. The results of such assessments will inform the Biodiversity section of the EIAR. It is noted that the level of detail submitted with regard to the relationship with the Lough Neagh and Lough Beg SAC (NI) via downstream watercourses is not very clear. The appropriate assessment will need to focus on the potential impacts arising on the European sites arising from the operational and particularly the construction phases of the development.
- The scope and nature of the surveys, including aquatic surveys, as outlined in the submitted EIA Scoping Report (Sections 5 & 7) should be reviewed with the NPWS section of the Department of Housing, Local Government and Heritage, and work should comply with best practice for seasonality and scope, and the comments of the Development Applications Unit on these issues should be sought.

Teil **Tel** (01) 858 8100
Glao Áitiúil **LoCall** 1890 275 175
Facs **Fax** (01) 872 2684
Láithreán Gréasáin **Website** www.pleanala.ie
Ríomhphost **Email** bord@pleanala.ie

64 Sráid Maoilbhríde
Baile Átha Cliath 1
D01 V902

64 Marlborough Street
Dublin 1
D01 V902

- The EIAR should address the potential for the enhancement of the biodiversity of the site arising from the development and the measures undertaken to maximise these impacts, particularly along the Shambles River.
- The presence of Japanese Knotweed was noted on and around the site and the EIAR should contain an Invasive Species Management Plan to address the removal of this species and other invasive species (if present) and the subsequent treatment of the affected areas.

9. Land, Soil, Water, Air and Climate

Land and Soil

- The EIAR should provide information relating to the amount and description of materials disturbed or excavated on the site and proposals for the storage, reuse and disposal of material excavated or otherwise generated during the demolition and construction phases of development. Particular attention should be paid to the identification, removal and management of any contaminated soil.
- The impact of excavations required as part of the development should describe, assess and mitigate the potential impact of the proposed development on existing sub surface services that may be present on the site.
- An assessment of the impact of such excavations or other ground disturbances on surface waters should be provided.
- Provide details of the types and nature of materials imported to the site during construction together with construction methods to be employed and measures to prevent the importation of invasive species.
- Mitigation measures to prevent or minimize emissions from the site during demolition and construction phases, should also be provided.

Water

- The impact of materials to be excavated and/or stored on the site will require to be considered in terms of the potential impact on surface and ground waters in the area of the site, in particular impacts on the adjoining Shambles River. Changes to the existing hard surface will lead to alterations in surface water drainage patterns and the existing

on-site surface water drainage system should be clarified as part of the EIAR and application documentation, and the impacts of the proposed development on these existing drainage networks should be clearly set out.

- There is an indication that the site is prone to flooding given its proximity to the River Shambles watercourse and a number of historic flood events have been recorded in the area. The EIAR should assess potential flooding impacts and risks in accordance with the document "The Planning System and Flood Risk Management – Guidelines for Planning Authorities" published by the OPW in November 2009.
- Also, with regard to flooding, the EIAR should detail how sustainable drainage methods are proposed to be incorporated into the design and the impact of the development on existing surface water discharges from the site to the local drainage network.
- The EIAR should provide information relating to the coordinated provision of physical infrastructure and services, in terms of the cumulative impact of any other proposals contained in the local area action plans for the surrounding area (incl. other phases of the South Dublin Street & Backlands Regeneration Plan and the Lands to North East of Dublin Street LAA Plan).
- Assessments regarding flood risk and drainage should detail and make provision for the accommodation of climate change impacts.

Air and Climate

- Impacts on **air**, it is considered that this will be potentially relevant during the demolition phase of development. The EIAR should therefore provide appropriate and up-to-date baseline data and describe any mitigation measures deemed necessary to minimise adverse impacts on air quality in the vicinity of the site and to mitigate dust and airborne pollution.
- Impacts on **climate** and greenhouse gas emissions, it is considered that this will be relevant during the construction and operational phase of development. The EIAR should therefore provide appropriate and up-to-date baseline data and describe any mitigation measures deemed necessary to minimise greenhouse gas emissions.

Teil **Tel** (01) 858 8100
Glao Áitiúil **LoCall** 1890 275 175
Facs **Fax** (01) 872 2684
Láithreán Gréasáin **Website** www.pleanala.ie
Ríomhphost **Email** bord@pleanala.ie

64 Sráid Maoilbhríde
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D01 V902

64 Marlborough Street
Dublin 1
D01 V902

10. Material Assets, Cultural Heritage and Landscape

Material Assets:

- Given the town centre location of the site, a description of the ***traffic impacts*** resulting from the proposed development shall be provided. The EIAR should address traffic generated by the development, during demolition, construction and operational phases, and should include information on the volume and type of traffic (including details of any unusually heavy, high or wide loads) likely to be generated during these phases of the development and the impact on main junctions in the vicinity of the site, notably the junctions along New Road/Broad Road to the S.
- The EIAR should consider the environmental effects of such heavy traffic and should clearly provide details regarding proposed routes to and from the site, in particular during the demolition and construction phases of the development.
- In considering traffic-related issues, the EIAR should address any cumulative issues which may/will arise in the overall development of lands covered by the local action area plans (South Dublin Street & Backlands Regeneration Plan and the Lands to North East of Dublin Street Plan) and should have regard to other major developments in the vicinity of the site.
- The development shall be described in terms of its permeability with surrounding areas and the traffic arrangements which will facilitate such permeability, including pedestrian and cycle traffic.

Cultural Heritage:

Archaeology:

- The entire site and adjoining lands are located within the Monaghan Town Centre Zone of Archaeological Importance, there are several Recorded Sites and Monuments in the study area including two Sites of Archaeological Importance within the site boundaries (to the side & rear of Court House/St Patricks Church and The Diamond/Church Square).
- Given the nature and location of the subject site, it is likely that development on site would have potential impacts on the archaeological heritage of the area. It is recommended that this issue be specifically investigated, and the results presented in the EIAR. The EIAR should assess the impact of the proposed development and

potential cumulative impacts with other developments on the archaeological heritage of the area (incl. other phases of the South Dublin Street & Backlands Regeneration Plan and the LAAP for the Lands to North East of Dublin Street Plan).

- Baseline archaeological data should be provided for the site including location, extent and nature of any existing archaeological finds. Proposed mitigation measures to be undertaken, where such archaeological remains will be affected, shall be described.
- It is recommended that prior to finalization and submission of the EIAR that the National Monument Section of the Department of Culture Heritage and the Gaeltacht would be consulted with regard to extent and methodology of archaeological investigations at the site appropriate to inform the EIAR.

Built heritage:

- The site is partly located within and adjacent to three ***Architectural Conservation Areas*** (Dublin Street, The Diamond & Church Square). The EIAR should assess the impact of the proposed development and potential cumulative impacts with other developments on the lands on the character of the ACAs (incl. other phases of the South Dublin Street & Backlands Regeneration Plan and the LAAP for the Lands to North East of Dublin Street Plan).
- The impact of the proposed development on the character and setting of ***Protected Structures and NIAH Structures***, and other similar structures located within and adjacent to the site should be included in the EIAR. Such structures include buildings at the Diamond (incl. the Courthouse & St. Patrick's Church) and along Dublin Street (incl. the First Presbyterian Church & no.10 Dublin Street [birthplace of Gavan Duffy]).
- The EIAR should assess the impact of the proposed development and potential cumulative impacts with other developments on the character and setting of Protected Structures and NIAH Structures (incl. other phases of the South Dublin Street & Backlands Regeneration Plan and the LAAP for the Lands to North East of Dublin Street Plan).
- Consideration should also be given to structures of architectural merit which are at a remove from the site, but which may be affected due to works associated with the proposed development. Structures of architectural merit should include those buildings

Teil **Tel** (01) 858 8100
Glao Áitiúil **LoCall** 1890 275 175
Facs **Fax** (01) 872 2684
Láithreán Gréasáin **Website** www.pleanala.ie
Ríomhphost **Email** bord@pleanala.ie

64 Sráid Maoilbhríde
Baile Átha Cliath 1
D01 V902

64 Marlborough Street
Dublin 1
D01 V902

which contribute to the character of the area and which may or may not be included in the RPS and NIAH for Monaghan.

- It is recommended that prior to finalization and submission of the EIAR that the Built Heritage Section of the Department of Culture Heritage and the Gaeltacht would be consulted.

Landscape:

- The EIAR should include description of the proposed planning and landscaping of the site, both hard and soft to include materials, levels and plant species. This information should be augmented by a detailed landscaping and planting plan for the development.
- An assessment of the proposed development on the receiving urban landscape will be required to be undertaken as part of the EIAR. This assessment should address existing visually prominent and functional features in the urban landscape and should provide an assessment of the visual impact of the development as it relates to the surrounding heritage areas including the ACAs, Protected Structures and NIAH Structures at Church Street, The Diamond and Dublin Street.
- The landscape section of the EIAR should include a series of photomontages or other forms of visual aid, and the views should be taken to and from the surrounding locations including the surrounding streets (incl. the ACAs, Protected Structures & NIAH Structures at Church Street, The Diamond and Dublin Street), and other identified sensitive receptors.

11. Interactions between the above factors

The EIAR should include detailed consideration between the above factors were considered relevant.

Attached for your information is a copy of the Board Direction and the Inspector's report, along with a copy of the 1 submission received on this case.

Yours faithfully,

Sarah Kerley
Executive Officer
Direct Line: 01-8737287

Teil	**Tel**	(01) 858 8100
Glao Áitiúil	**LoCall**	1890 275 175
Facs	**Fax**	(01) 872 2684
Láithreán Gréasáin	**Website**	www.pleanala.ie
Ríomhphost	**Email**	bord@pleanala.ie

64 Sráid Maoilbhríde
Baile Átha Cliath 1
D01 V902

64 Marlborough Street
Dublin 1
D01 V902

An Bord Pleanála

Inspector's Report
ABP-309071-21

Development	Public Realm Scheme in Monaghan Town Centre.
Location	South Dublin Street & Backlands, Monaghan Town.
Planning Authority	Monaghan County Council.
Planning Authority Reg. Ref.	
Applicant(s)	Monaghan County Council.
Type of Application	EIA Scoping request under Article 95 of the Planning and Development Regulations, 2001 as amended.
Date of Site Inspections	23rd April 2021
Inspector	Karla Mc Bride

1.0 Site Location and Description

1.1. The site is located in Monaghan Town Centre, mainly to the rear of The Diamond and Dublin Street, and to the fore of Monaghan Shopping Centre. The surrounding area is characterised by a mix of retail, commercial, community, institutional and ecclesiastical buildings. The site comprises lands at 8-14 South Dublin Street, and lands to the rear of 1-9 The Diamond and 1-26 Dublin Street, incorporating the Courthouse and Lower Courthouse car parks at Castle Street.

1.2 The site is bound to the NW by the buildings at Church Square and The Diamond (incl. the Court House & St. Patrick's Church) and NE by the 2 and 3-storey commercial buildings along Dublin Street; to the SW by the shopping centre and SE by a car park with the Shambles River beyond; to the E by the First Presbyterian Church and graveyard; and to the W by the buildings along Dawson Street. Vehicular access is currently off New Road/Broad Road to the S and The Diamond to the NW. There a number of pedestrian access points to the site off Dublin Street.

1.3 The c.2.11ha site comprises several commercial buildings and backland areas encompassing vacant land, derelict structures, storage areas and rear access points, along with car parks, roads, footpaths, alleyways and incidental green spaces.

1.4 The site lies within a Zone of Archaeological Importance and it contains Sites of Archaeological Importance. It is proximate to three Architectural Conservation Areas, and several of the buildings in the vicinity are Protected Structures and/or listed in the National Inventory of Architectural Heritage (NIAH). There are a number of sensitive natural heritage sites in the wider area including Slieve Beagh SPA to the NW along with and several NHA designated lakes, bogs and woodlands, and Lough Neagh and Lough Beg SPA to the far NE in Northern Ireland.

1.5 Photographs and maps in Appendix 1 describe the site and environs in more detail.

2.0 Proposed Development

2.1 The site forms part of the lands covered by the South Dublin Street and Backlands Regeneration Plan and the Council has secured funding from the Urban Regeneration and Development Fund to progress the works.

2.2 The proposed Public Realm Scheme would comprise:

- Demolition of 4 x properties (8-12 Dublin St.) and associated outbuildings.
- New structural masonry walls.
- Creation of new streets, junctions, civic spaces & pedestrian pavements
- Reduction in long stay car parking.
- Public realm improvements (incl. paving, street furniture & landscaping).
- Ancillary works (inc. utility & drainage improvements, regrading of land & retaining structures).
- Associated site works (incl. construction & access).

Note: A property on Dublin Street will be removed from the Record of Protected Structures (under S.55 of the P&D Act).

2.2. The EIA Scoping Report submitted with the scoping request concluded that the proposed development met the thresholds that trigger a mandatory requirement for EIA and EIAR. A Screening for AA report also concluded that the project is likely to have an effect on a European site and that an NIS was required.

3.0 Article 95(2) Planning & Development Regulations, 2001 as amended by Article 24 of the 2006 Regulations

3.1 In accordance with Article 95(2) of the Planning and Development Regulations, 2001 (as amended) the Board requested submissions or observations from the following prescribed bodies:

- Department of Communications, Climate Action and Environment,
- Department of Culture, Heritage and the Gaeltacht (DAU),
- Department of Housing, Planning and Local Government,
- Eastern and Midlands Regional Assembly,
- Environmental Protection Agency,
- An Chomhairle Ealaion,
- The Heritage Council,

- An Taisce, and
- Failte Ireland.

3.2 The following responses were received: -

An Taisce: raised concerns about the demolition of no.10 Dublin Street which has cultural heritage significance as the 1816 birthplace of Charles Gavan Duffy. Duffy was one of the leaders of the Young Ireland Movement, founder & editor of the Nation newspaper and 8th Premier of Victoria.

4.0 Legislative Context

4.1 The Planning Authority carried out a Screening Report for the proposed development which concluded that it met the thresholds that trigger a mandatory requirement for Environmental Impact Assessment (EIA) and is proposing the preparation and submission of an Environmental Impact Assessment Report (EIAR).

4.2. Planning and Development Act, 2000 (as amended) and Planning and Development Regulations, 2001 (as amended).

4.2.1. The formal Scoping Request from Monaghan County Council on the information to be contained within the EIAR was submitted under Article 95 of the Planning and Development Regulations, 2001(as amended) for a development proposed under Section 175 of the Planning and Development Act, 2000 (as amended).

4.2.2. ***Section 173(3) (a)*** of the Act states as follows:

"Where a person is required by or under this Act to submit an environmental impact statement to the Board, he or she may, before submitting the statement, request the Board to provide him or her with its opinion as to the information that should be contained in such statement, and the Board shall on receipt of such a request provide such opinion in writing."

4.2.3. ***Article 95*** of the Regulations (as amended by Article 24 of the 2006 Planning & Development Regulations) deals with the procedures for Scoping Requests, and provides details of the level of information to be submitted in order for the Board to provide a written opinion pursuant to the request.

4.2.4. ***Article 117*** of the Regulations relates to Local Authority Development and provides that before making an application for approval to the Board under section 175(3) of the Act, a local authority may, in accordance with article 95, request the Board to provide a written opinion on the information to be contained in the EIAR.

4.2.5. ***Schedule 6*** of the *Planning and Development Regulations, 2001*, sets out the information required to be contained within an EIAR. The EIAR must contain the information specified in section 1 and the information specified in section 2 to the extent that the information is relevant to the nature of the development in question and to the environmental features likely to be affected.

4.2.6. In providing such a *'written opinion on the information to be contained in the EIS'*, it is considered appropriate to have regard to the following Guidelines:

4.3. EPA Guidelines on the Information to be contained in Environmental Impact Statements, 2002 and EPA Draft Guidelines on the information to be contained in Environmental Impact Assessment Reports (EIAR), 2017.

4.3.1. Section 1.4 of the ***2002 Guidelines*** deals with scoping and provides that the scoping process identifies the issues and emphasizes those that are likely to be important during EIA and eliminates those that are not. The Guidelines provide that scoping must be focused on issues and impacts which are environmentally based, are likely to occur, and are significant and adverse.

4.3.2. Section 3.0 of the ***2017 Draft Guidelines*** relates to scoping and includes 3.3.4 Key Scoping Criteria, 3.3.5 Consideration of Other Assessments and 3.3.6 Selection of Headings Under Which to Arrange Issues. Section 3.3.4 states that all parties should be aware of the need to keep the EIAR as tightly focussed as possible and that scoping is usually guided by criteria including the use of 'Likely' and 'Significant' as the principal criteria for determining what should be addressed. Any issues that do not pass this test should be omitted (scoped out) from further assessment.

4.3.3. Section 3.3.6 of the guidelines identifies the headings under which to arrange issues and states that the prescribed environmental factors must all be addressed in an EIAR. As they are a necessary simplification of the relevant components of the environment, each factor is typically explored by examining a series of headings

and/or topics relevant to that factor, as indicated by the examples included in Annex IV of the Directive. These headings and topics are generally identified during the scoping process. Some typical headings and topics and their arrangement within an EIAR are shown below.

Annex IV(4) of amended Directive *'A description of the factors specified in Article 3(1) likely to be significantly affected by the project: population, human health, biodiversity (for example fauna and flora), land (for example land take), soil (for example organic matter, erosion, compaction, sealing), water (for example hydro morphological changes, quantity and quality), air, climate (for example greenhouse gas emissions, impacts relevant to adaptation), material assets, cultural heritage, including architectural and archaeological aspects, and landscape.'*

4.4. EPA 'ADVICE NOTES ON CURRENT PRACTICE (in the preparation of Environmental Impact Statements)', 2003

4.4.1. These Advice Notes are designed to accompany the *Guidelines on the Information to be contained in Environmental Impact Statements*, also published by the EPA. The Advice Notes contain greater detail on many of the topics covered by the Guidelines and offer guidance on current practice for the structure and content of Environmental Impact Statements. The Advice Notes are divided into five sections, each providing detailed guidance on specific aspects to be considered in the preparation of an EIS.

5.0 Planning History

There is an extensive planning history relating to the surrounding town centre area however there are no recent planning applications of note for the development of the site and environs.

6.0 Policy Context

6.1. Monaghan County Development Plan, 2019-2025

Zoning objectives: located within Town Centre zone.

Specific Objectives: covered by Local Area Action Plans (N & S of Dublin Street)

Archaeological Heritage:

- Zone of Archaeological Importance
  - 12 Recorded Sites & Monuments in Study Area
- Sites of Archaeological Importance within site:
  - E of Court House/S of St. Patrick's Church
  - S of The Diamond/Church Square

Built Heritage:

- Adjacent to & bordering 3 x Architectural Conservation Areas:
  - Dublin Street
  - The Diamond
  - Church Square
- Several Protected Structures in vicinity including:
  - 1 & 8 The Diamond
  - 1, 10 & 24 Dublin Street
- Several NIAH structures in vicinity including:
  - The Courthouse
  - St. Patricks Church
  - First Presbyterian Church
  - Birthplace of Gavan Duffy (10 Dublin St.)

6.2. South Dublin Street & Backland Regeneration Plan

This plan seeks to provide guidance on the regeneration options for the future development of the area. It seeks to provide a range of civic spaces to support and animate the area, enhance the existing public realm on Dublin Street, with design for improved pedestrian use, and appropriate accommodation for vehicular access, services and parking, and to prioritise the design and implementation of a scheme to upgrade the public realm of the backlands are including a walkway along the River Shambles.

6.3. Natural Heritage Designations

There are several sensitive sites in the wider area including NHA designated lakes, bogs and woods. The closest European sites are listed below:

European site	Separation distance
Slieve Beagh SPA	c.10km NW
Maheraveely Marl Loughs SAC	c.12km W
Slieve Beagh-Mullaghfad-Lisnaskea SPA (NI)	c.15km NW
Slieve Beagh SAC (NI)	c.15km NW
Lough Neagh & Lough Beg SPA (NI)	c.39km N (straight line) c.58km N (aquatic)

7.0 Scoping Opinion

7.1. General Requirements

7.1.1. Schedule 6 of the *Planning and Development Regulations, 2001 (as amended)*, sets out the information required to be contained within an EIAR. The EIAR must contain the information specified in section 1 and the information specified in section 2 to the extent that the information is relevant to the nature of the development in question and to the environmental features likely to be affected.

7.1.2. In terms of the requirements of Schedule 6, and to assist assessment and increase clarity, the Environmental Impact Assessment Report (EIAR) should be systematically organized to provide sections describing the following:

The Proposed Development - to include information on the site, design, size and other relevant features of the proposed development. The description of the project should make specific reference to demolition works that may be required as part of or to facilitate the development. In the case of the subject development, the description of development should include its context with regard to other permitted and proposed developments on the overall site and the extent of any demolition works required. The proposed development should be described in scaled drawings, photographs and photomontages.

The Existing Environment - The existing environment and the impacts of the development are explained by reference to its possible impact on the following environmental factors: -

- Population, and Human Health,
- Biodiversity with particular attention to species and habitats protected under the Habitats and Birds Directive.
- Land, Soil, Water, Air and Climate,
- Material Assets, Cultural Heritage and the landscape,
- The interaction between the above factors

In terms of the receiving environment, the EIAR shall include all areas that would be impacted upon, directly or indirectly, by the proposed development. The information contained in the EIAR should therefore be based on comprehensive surveys of the area and have regard to updated data bases which may exist in terms of architectural heritage and ecology. The EIAR should accurately describe the receiving environment in terms of geology, geomorphology and hydrology, as well as a physical description of the site proposed for development.

The Likely Significant Effects of the Proposed Development - Impacts should address direct, indirect, secondary, cumulative, short, medium and long-term, permanent, temporary, positive and negative effects as well as impact interactions. None of the topics outlined above (Population and Human Health etc.) should be omitted, although their level of detail may differ depending on the likelihood of impacts.

In accordance with the requirements of Article 94 of the Planning and Development Regulations, 2001 (as amended), the EIAR shall contain a reference list detailing the sources used for the impact descriptions and assessments used in the EIAR.

The EIAR should also contain a list of experts who contributed to the development of the report, identifying for each expert, the part of the EIAR for which he / she is responsible, his / her experience or expertise and any additional information considered relevant to demonstrate the persons competence in the preparation of the EIAR.

An assessment of the impact of the proposed development is required, with an assessment of the cumulative impact of existing and permitted developments in the vicinity. The assessment of cumulative impacts in the EIAR should also have regard, as far as is practicable, to the likely effects arising from future phases of the South Dublin Street and Backlands Regeneration Plan and the adjoining areas covered by the Local Area Action Plan for Lands to North East of Dublin Street Plan.

Further to the above, details of the environmental impacts of the development during the demolition, excavation, construction and operational phases of the development should also be described and assessed by reference to baseline information which should be collated and presented within the EIAR. The environmental impact of the

aforementioned phases, including in particular noise and vibration impacts arising from the demolition works and construction phase impacts in terms of materials storage and containment within the site should also be described and assessed.

The EIAR will be required to provide information regarding the nature, quantities and source of materials to be used in the overall development. Information will also be required on volumes and nature of waste materials likely to be generated in the demolition phase and proposed means for disposal of same.

The EIAR should also provide an assessment of the expected effects arising from the vulnerability of the project to major accidents and disasters that are relevant to the project. These risks should be considered in the context of the factors of the environment.

The Measures to Mitigate Adverse Impacts - The EIAR shall give a description of the features of the proposed development and measures envisaged to avoid, prevent, reduce and, if possible, offset likely significant adverse effects on the environment. Where adverse impacts are likely to result, appropriate mitigation measures shall be identified where necessary – and shall clearly indicate where and with whom responsibility for the implementation of the mitigation measures lies. The EIAR shall also provide information relating to the monitoring of the impacts of the development on the environment.

The Consideration of Alternatives: The consideration of alternatives, in terms of location and design, as well as proposed uses, should also be addressed in the EIAR and should comprise a description of the reasonable alternatives relevant to the proposed development which were studied and the reason for the option chosen having regard to the effects on the environment. In undertaking this assessment of alternatives, the following should be borne in mind:

- It is not a requirement to revisit issues considered in the formulation of policy that has been the subject of SEA.
- Alternatives should be relevant to the project and its specific characteristics.

- The assessment of alternatives should include a description of the current state of the environment without implementing the project, i.e. the Do-Nothing scenario. This assessment should be the starting point for the consideration of impacts in the EIAR.
- In the assessment of alternatives, the level of detail provided should be reasonable and commensurate with the project.

A Non-Technical Summary - The EIAR must contain a non-technical summary of the detailed information contained within the EIAR. The language of this summary shall be non-technical in nature and should provide clear details of the environmental effects the development will have, as well as all significant effects and mitigation measures proposed. The description of the development in this summary should clearly explain and describe all aspects of the proposed development such that the EIAR is accessible in terms of public understanding of the process and to facilitate full public participation and consultation in the process.

In terms of specific environmental topics, the development is likely to impact upon, the EIAR should, in particular, address the following matters:

- Population, and Human Health
- Biodiversity (for example fauna and flora),
- Land (for example land take), Soil (incl. organic matter, erosion, compaction, sealing), Water (for example hydro morphological changes, quantity and quality), Air and Climate (incl. greenhouse gas emissions, impacts relevant to adaptation),
- Material Assets, Cultural Heritage, (incl. architectural and archaeological aspects) and Landscape.
- Interactions between the above factors.

An outline of the specific issues considered relevant to the EIAR under these headings is given in the following sections:

7.1.3. **Population, and Human Health**

- As identified in the submitted Scoping Report, the scope of human health and the consideration of associated impacts extends to the assessment of those environmental factors which might lead to effects on human health (incl. noise, vibration, transport, air quality, amenity, water quality & flood risk).

- Given the nature of the existing site the EIAR should specifically address the likely effects on the health and safety of surrounding populations during all phases of the development, including demolition, excavation, construction and operational phases.

- An assessment of the impact of the proposed development on the availability of local recreational facilities and overall level of amenity and the potential impacts arising for population and human health should be addressed in the EIAR.

7.1.4. **Biodiversity**

- Given the brownfield nature of the site, and its location within an urban setting, the EIAR should provide a clear baseline assessment of the existing receiving environment and the impact of the development on the ecology of the receiving environment.

  - The EIAR should address any potential for disturbance arising from the construction activity and particularly any works required to remove any existing structures and hard surfaces. In particular, the potential for disturbance to any species using the adjoining river channel (Shambles River) or banks to this watercourse should be assessed.
  - The site is not located within or close to a European site, however there are several sites in the wider area that may have an aquatic or mobile connection to the site. The proximity of the site to the Shambles River which has an ultimate downstream aquatic connection to the Lough Neagh and Lough Beg SPA (NI) is noted. The Slieve Beagh SPA and Slieve Beagh-Mullaghfad-Lisnaskea SPA (NI) are located to the W of the site and there may be a potential connection for mobile species.

- There is therefore a need to carry out Screening for Appropriate Assessment under the Habitats Directive and further assessment if necessary. The results of such assessments will inform the Biodiversity section of the EIAR. It is noted that the level of detail submitted with regard to the relationship with the Lough Neagh and Lough Beg SAC (NI) via downstream watercourses is not very clear. The appropriate assessment will need to focus on the potential impacts arising on the European sites arising from the operational and particularly the construction phases of the development.
- The scope and nature of the surveys, including aquatic surveys, as outlined in the submitted EIA Scoping Report (Sections 5 & 7) should be reviewed with the NPWS section of the Department of Housing, Local Government and Heritage, and work should comply with best practice for seasonality and scope, and the comments of the Development Applications Unit on these issues should be sought.
- The EIAR should address the potential for the enhancement of the biodiversity of the site arising from the development and the measures undertaken to maximise these impacts, particularly along the Shambles River.
- The presence of Japanese Knotweed was noted on and around the site and the EIAR should contain an Invasive Species Management Plan to address the removal of this species and other invasive species (if present) and the subsequent treatment of the affected areas.

7.1.5. **Land, Soil, Water, Air and Climate**

Land and Soil:

- The EIAR should provide information relating to the amount and description of materials disturbed or excavated on the site and proposals for the storage, reuse and disposal of material excavated or otherwise generated during the demolition and construction phases of development. Particular attention should be paid to the identification, removal and management of any contaminated soil.

- The impact of excavations required as part of the development should describe, assess and mitigate the potential impact of the proposed development on existing sub surface services that may be present on the site.
- An assessment of the impact of such excavations or other ground disturbances on surface waters should be provided.
- Provide details of the types and nature of materials imported to the site during construction together with construction methods to be employed and measures to prevent the importation of invasive species.
- Mitigation measures to prevent or minimize emissions from the site during demolition and construction phases, should also be provided.

Water:

- The impact of materials to be excavated and/or stored on the site will require to be considered in terms of the potential impact on surface and ground waters in the area of the site, in particular impacts on the adjoining Shambles River. Changes to the existing hard surface will lead to alterations in surface water drainage patterns and the existing on-site surface water drainage system should be clarified as part of the EIAR and application documentation, and the impacts of the proposed development on these existing drainage networks should be clearly set out.
- There is an indication that the site is prone to flooding given its proximity to the River Shambles watercourse and a number of historic flood events have been recorded in the area. The EIAR should assess potential flooding impacts and risks in accordance with the document "The Planning System and Flood Risk Management – Guidelines for Planning Authorities" published by the OPW in November 2009.
- Also, with regard to flooding, the EIAR should detail how sustainable drainage methods are proposed to be incorporated into the design and the impact of the development on existing surface water discharges from the site to the local drainage network.

- The EIAR should provide information relating to the coordinated provision of physical infrastructure and services, in terms of the cumulative impact of any other proposals contained in the local area action plans for the surrounding area (incl. other phases of the South Dublin Street & Backlands Regeneration Plan and the Lands to North East of Dublin Street LAA Plan).
- Assessments regarding flood risk and drainage should detail and make provision for the accommodation of climate change impacts.

Air and Climate:

- Impacts on ***air***, it is considered that this will be potentially relevant during the demolition phase of development. The EIAR should therefore provide appropriate and up-to-date baseline data and describe any mitigation measures deemed necessary to minimise adverse impacts on air quality in the vicinity of the site and to mitigate dust and airborne pollution.
- Impacts on ***climate*** and greenhouse gas emissions, it is considered that this will be relevant during the construction and operational phase of development. The EIAR should therefore provide appropriate and up-to-date baseline data and describe any mitigation measures deemed necessary to minimise greenhouse gas emissions.

7.1.6. **Material Assets, Cultural Heritage and Landscape**

Material Assets:

- Given the town centre location of the site, a description of the ***traffic impacts*** resulting from the proposed development shall be provided. The EIAR should address traffic generated by the development, during demolition, construction and operational phases, and should include information on the volume and type of traffic (including details of any unusually heavy, high or wide loads) likely to be generated during these phases of the development and the impact on main junctions in the vicinity of the site, notably the junctions along New Road/Broad Road to the S.

- The EIAR should consider the environmental effects of such heavy traffic and should clearly provide details regarding proposed routes to and from the site, in particular during the demolition and construction phases of the development.
- In considering traffic-related issues, the EIAR should address any cumulative issues which may/will arise in the overall development of lands covered by the local action area plans (South Dublin Street & Backlands Regeneration Plan and the Lands to North East of Dublin Street Plan) and should have regard to other major developments in the vicinity of the site.
- The development shall be described in terms of its permeability with surrounding areas and the traffic arrangements which will facilitate such permeability, including pedestrian and cycle traffic.

Cultural Heritage:

Archaeology

- The entire site and adjoining lands are located within the Monaghan Town Centre Zone of Archaeological Importance, there are several Recorded Sites and Monuments in the study area including two Sites of Archaeological Importance within the site boundaries (to the side & rear of Court House/St Patricks Church and The Diamond/Church Square).
- Given the nature and location of the subject site, it is likely that development on site would have potential impacts on the archaeological heritage of the area. It is recommended that this issue be specifically investigated, and the results presented in the EIAR. The EIAR should assess the impact of the proposed development and potential cumulative impacts with other developments on the archaeological heritage of the area (incl. other phases of the South Dublin Street & Backlands Regeneration Plan and the LAAP for the Lands to North East of Dublin Street Plan).
- Baseline archaeological data should be provided for the site including location, extent and nature of any existing archaeological finds. Proposed mitigation measures to be undertaken, where such archaeological remains will be affected, shall be described.

- It is recommended that prior to finalization and submission of the EIAR that the National Monument Section of the Department of Culture Heritage and the Gaeltacht would be consulted with regard to extent and methodology of archaeological investigations at the site appropriate to inform the EIAR.

Built heritage

- The site is partly located within and adjacent to three ***Architectural Conservation Areas*** (Dublin Street, The Diamond & Church Square). The EIAR should assess the impact of the proposed development and potential cumulative impacts with other developments on the lands on the character of the ACAs (incl. other phases of the South Dublin Street & Backlands Regeneration Plan and the LAAP for the Lands to North East of Dublin Street Plan).
- The impact of the proposed development on the character and setting of ***Protected Structures and NIAH Structures***, and other similar structures located within and adjacent to the site should be included in the EIAR. Such structures include buildings at the Diamond (incl. the Courthouse & St. Patrick's Church) and along Dublin Street (incl. the First Presbyterian Church & no.10 Dublin Street [birthplace of Gavan Duffy]).
- The EIAR should assess the impact of the proposed development and potential cumulative impacts with other developments on the character and setting of Protected Structures and NIAH Structures (incl. other phases of the South Dublin Street & Backlands Regeneration Plan and the LAAP for the Lands to North East of Dublin Street Plan).
- Consideration should also be given to structures of architectural merit which are at a remove from the site, but which may be affected due to works associated with the proposed development. Structures of architectural merit should include those buildings which contribute to the character of the area and which may or may not be included in the RPS and NIAH for Monaghan.
- It is recommended that prior to finalization and submission of the EIAR that the Built Heritage Section of the Department of Culture Heritage and the Gaeltacht would be consulted.

Landscape:

- The EIAR should include description of the proposed planning and landscaping of the site, both hard and soft to include materials, levels and plant species. This information should be augmented by a detailed landscaping and planting plan for the development.
- An assessment of the proposed development on the receiving urban landscape will be required to be undertaken as part of the EIAR. This assessment should address existing visually prominent and functional features in the urban landscape and should provide an assessment of the visual impact of the development as it relates to the surrounding heritage areas including the ACAs, Protected Structures and NIAH Structures at Church Street, The Diamond and Dublin Street.
- The landscape section of the EIAR should include a series of photomontages or other forms of visual aid, and the views should be taken to and from the surrounding locations including the surrounding streets (incl. the ACAs, Protected Structures & NIAH Structures at Church Street, The Diamond and Dublin Street), and other identified sensitive receptors.

7.1.7. **Interactions between the above factors**

The EIAR should include detailed consideration between the above factors were considered relevant.

8.0 Conclusion

8.1. I consider that the above written opinion provides appropriate scoping for the EIAR to be prepared in relation to the proposed development, in accordance with the requirements of Section 173 of the Planning and Development Act, 2000 and Articles 95 and 177 of the Planning and Development Regulations, 2001.

I recommend that Monaghan County Council be furnished with a copy of this written opinion, and also copies of the submissions received under Article 95(2) of the Planning and Development Regulations, 2001, as amended.

Karla Mc Bride

Karla Mc Bride
Planning Inspector
28th April 2021

An Bord Pleanála

Board Direction
BD-008330-21
ABP-309071-21

At a meeting held on 27/05/2021, the Board considered the scoping report of the Inspector, and the documents and submissions on file generally.

The Board agreed that the Inspector's written opinion provides an appropriate scoping for the Environmental Impact Assessment Report to be prepared in respect of the proposed development and directed that Monaghan County Council be furnished with a copy of this written opinion together with a copy of all submissions received under Article 95(2) of the Planning and Development Regulations 2001, as amended.

Board Member: _____ **Date:** 27/05/2021

Dave Walsh

An Taisce
The National Trust for Ireland

An Bord Pleanala.

3rd March 2021.

RE CO MONAGHAN

EIA SCOPING FOR PROPOSED DEVELOPMENT AT DUBLIN ST MONAGHAN INCLUDING PROPOSED DEMOLITION OF 1816 CHARLES GAVIN DUFFY BIRTHPLACE AT NO 10 DUBLIN ST

Thank you for notice on EIA scoping on the above and request for raising of relevant considerations.

There is major EIA sensitivity issue in relation to **Cultural Heritage** as the proposed development involves the demolition of the 1816 birthplace of Charles Gavin Duffy. With Thomas Davis, William Smith O Brien, Thomas Francis Meagher and John Mitchell he was one of the main leaders in the Young Ireland movement of the 1840s and Co founder with Davis and first editor of the Nation newspaper

He went on to be a significant figure in the history of Australia becoming premier of Victoria where he played a major rile in land reform

He died in France and his body was brought back for burial in Glasnevin cemetery beside that of Daniel O Connell in 1903

Attached is his Wikipedia entry

Ian Lumley

Charles Gavan Duffy

From Wikipedia, the free encyclopedia
Jump to navigationJump to search
For the Canadian judge and politician, see C. Gavan Duffy.

For his grandson, a judge of the Supreme Court of Victoria, see Charles Leonard Gavan Duffy.

The Right Honourable

Sir Charles Gavan Duffy

KCMG, PC



Duffy in 1880

8th Premier of Victoria

In office

19 June 1871 – 10 June 1872

Monarch	Queen Victoria
Preceded by	Sir James McCulloch

Succeeded by	James Francis
Personal details	
Born	12 April 1816 Monaghan Town, County Monaghan, Ireland
Died	9 February 1903 (aged 86) Nice, France
Nationality	Irish, Australian
Spouse(s)	Emily McLaughlin, Susan Hughes, Louise Hall
Profession	Politician

Sir Charles Gavan Duffy, KCMG, PC (12 April 1816 – 9 February 1903), was an Irish nationalist, journalist, poet and politician; a Young Irelander who, following emigration to Australia, was to become the 8th Premier of Victoria and one of the commanding figures in Victorian political history.

The suburb of Duffy in the Australian Capital Territory is named after him.

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Ireland[edit]

Early life and career[edit]

Duffy was born at No. 10 Dublin Street in Monaghan Town, County Monaghan, Ireland, the son of a Catholic shopkeeper.[1][2] He was educated in Belfast at St Malachy's College and in the collegiate department of the Royal Belfast Academical Institution (RBAI, usually known as 'Inst'), where he studied logic, rhetoric and *belles-lettres*.

One day when Duffy was aged 18, Charles Hamilton Teeling, a United Irish veteran of the 1798 rising, walked into his mother's house (his father had died when he was 10). Teeling was establishing a journal in Belfast and asked Duffy to accompany him on a round of calls to promote it in Monaghan. Inspired by Teeling's recollections of '98, Duffy began contributing to the journal, *The Northern Herald*.[3]

In Belfast, Duffy went on to edit the *The Vindicator*, an O'Connellite journal launched by Thomas O'Hagan (later the first Catholic to become Lord Chancellor of Ireland in centuries). At the same time, he began studying law at the King's Inns in Dublin.

Duffy was admitted to the Irish Bar in 1845. But before then he established himself in literary circles as the editor of *Ballad Poetry of Ireland*[4] (1843),[5] and in political circles as editor of a new Dublin weekly, *The Nation*.

The Nation[edit]

In 1842, Duffy co-founded *The Nation* with Thomas Osborne Davis, and John Blake Dillon.[6] Contributors were notable for including nationally minded Protestants: in addition to Davis, Jane Wilde, Margaret Callan, John Mitchel, John Edward Pigot and William Smith O'Brien. All were members or supporters of Daniel O'Connell's Repeal Association, dedicated to a restoration of an Irish parliament through a reversal of the 1800 Acts of Union.

When he had first followed O'Connell, Duffy concedes that he had "burned with the desire to set up again the Celtic race and the catholic church".[7] But in *The Nation* (which repeatedly invoked memory of the United Irishmen) Duffy committed himself to a "nationality" that would embrace as easily "the stranger who is within our gates" as "the Irishman of a hundred generations."[8] This expansive, ecumenical, view of the opinion-forming tasks of the paper brought him into conflict with the clericalism of the broader movement.

At issue with O'Connell[edit]

O'Connell's paper, *The Pilot*, did not hesitate to identify religion as The "positive and unmistakable" mark of distinction between Irish and English.[9] As leader of the Catholic Association, O'Connell had fought to secure not only Catholic entry to Parliament but also

the prerogatives and independence of the Catholic Church. It was, he maintained, "a national Church" and should the people "rally" to him, they would "have a nation for that Church".[10] O'Connell, at least privately, was of the view that "Protestantism would not survive the Repeal ten years". He assured Dr Paul Cullen (the future Cardinal and Catholic Primate of Ireland) that once an Irish parliament had swept aside Ascendancy privilege, "the great mass of the Protestant community would with little delay melt into the overwhelming majority of the Irish nation".[11]

In 1845, the Dublin Castle administration proposed to educate Catholics and Protestants together in a non-denominational system of higher education. *The Nation* welcomed the proposition, but O'Connell, claiming that there had been "unanimous and unequivocal condemnation" from the bishops", opposed. Disregarding Thomas Davis's plea that "reasons for separate education are reasons for [a] separate life", and declaring himself content to take a stand "for Old Ireland", O'Connell rejected the "godless" colleges.[12][13]

For Duffy there was a further, less liberal basis, for his disaffection: O'Connell's repeated denunciations of a "vile union" in the United States "of republicanism and slavery", and his appeal to Irish Americans to join in the abolitionist struggle.[14] Duffy believed the time was not right "for gratuitous interference in American affairs". Not least because of the desire for American support and funding, it was a common view.[15]

Young Ireland[edit]



Charles Gavan Duffy circa 1845

Main articles: Young Irelander Rebellion of 1848, Young Ireland, and The Nation (Irish newspaper)

Following Davis's sudden death in 1845, Duffy appointed Mitchel deputy editor. Against the background of increasingly violent peasant resistance to evictions and of the onset of famine, Mitchell brought a more militant tone. When the conservative *Standard* observed that the new Irish railways could be used to transport troops to quickly curb agrarian unrest, Mitchel

responded that the tracks could be turned into pikes and trains ambushed. O'Connell publicly distanced himself from *The Nation*—it appeared to some setting Duffy, as the editor, up for prosecution.[16] When the courts failed to convict, O'Connell pressed the issue, seemingly intent on effecting a break with those he referred to disdainfully as "Young Irelanders"—a reference to Giuseppe Mazzini's anti-clerical and insurrectionist Young Italy.

In 1847 the Repeal Association tabled resolutions declaring that under no circumstances was a nation justified in asserting its liberties by force of arms. The Young Irelanders had not advocated physical force,[17] but in response to the "Peace Resolutions" Meagher argued that if Repeal could not be carried by moral persuasion and peaceful means, a resort to arms would be a no less honourable course.[18] O'Connell's son John forced the decision: the resolution was carried on the threat of the O'Connells themselves quitting the Association.

Duffy and the other Young Ireland dissidents associated with his paper withdrew and formed themselves as the Irish Confederation.

In the desperate circumstances of the Great Famine and in the face of martial-law measures that, following O'Connell's death, a number of Repeal Association MPs had approved in Westminster, Duffy conceded the case taking "the no less honourable course". With Mitchel he was arrested, leaving it to Meagher, O'Brien and Dillon to raise the standard of revolt—a republican tricolour with which Meagher had returned from revolutionary Paris, its colours intended to symbolise the reconciliation of Catholic (green) and Protestant (orange). But with the rural priesthood against them and the body of their support confined to the garrisoned towns, their efforts issued in a small demonstration that broke up after its first armed encounter, the Battle of Ballingarry. Their death sentences for treason commuted, the leaders were transported to Van Diemen's Land (Tasmania). Duffy alone escaped. Defended by Isaac Butt he was freed after his fifth trial.

On his release, Duffy toured famine-stricken Ireland with the renowned Scottish writer Thomas Carlyle. Duffy had invited Carlyle, a staunch Calvinist and Unionist, in the vain hope that he might help sway establishment opinion in favour of humane and practical relief. Increasingly he was convinced that agrarian reform was the nation's existential issue and one that could form the basis for a non-sectarian national movement. In 1842 he had already allied himself with James Godkin[19] who had abandoned a bible mission to campaign for the rights of the Catholic tenants he had been tasked with herding into the Protestant fold.[20]

The League of North and South[edit]

Uniting activists across the sectarian and constitutional divide, in 1852 the Irish Tenant Right League helped return Duffy (for New Ross) and 49 other tenant-rights MPs to Westminster.[21] In November 1852, Lord Derby's short-lived Conservative government introduced a land bill to compensate Irish tenants on eviction for improvements they had made to the land. The bill passed in the House of Commons in 1853 and 1854, but failed win consent of the landed grandees in the House of Lords.[22]

What Duffy optimistically hailed as the "League of North and South" unravelled. In the Catholic South, Archbishop Cullen approved the Catholic MPs breaking their pledge of

independent opposition and accepting positions in a new Whig administration.[23][24] In the Protestant North William Sharman Crawford and other League candidates had their meetings broken up by Orange "bludgeon men".[25]

In 1855 the cause of the Irish tenants, and indeed of Ireland generally, seemed to Duffy more hopeless than ever. Broken in health and spirit, he published in 1855 a farewell address to his constituency, declaring that he had resolved to retire from parliament, as it was no longer possible to accomplish the task for which he had solicited their votes.[26]

An "Irish Mazzini"[edit]

To the cause of tenant rights Cullen was sympathetic,[27] but of Duffy he was deeply suspicious. Following O'Connell he described Duffy as an "Irish Mazzini"—condemnation from a man who had witnessed the Church's humiliation under Mazzini's Roman Republic in 1849. Duffy in turn accused the Church under Cullen of pursuing a "Roman policy" in Ireland "hostile to its nationality."[28]

Until O'Connell's death, Duffy suggested that Rome had "believed in the possibility of an Independent Catholic State" in Ireland, but that since O'Connell's death could "only see the possibility of a Red Republic". The Curia had, as a result, returned to "her design of treating Ireland as an entrenched camp of Catholicity in the heart of the British Empire, capable of leavening the whole." Ireland for this purpose had to be"thoroughly imperialised, loyalised, welded into England."[28]

Cullen has been described as the man who "borrowed the British Empire." Under his leadership the Irish church developed an "Hiberno-Roman" mission that was ultimately extended through Britain to the entire English-speaking world.[29] But Cullen's biographers would argue that Duffy travestied Cullen and his church's complex and nuanced relationship to Irish nationalism.[30]—perhaps as much as Cullen caricatured Duffy's separatism.

Marriage[edit]

In 1842, he married Emily McLaughlin, who died in 1845. He married Susan Hughes in 1846, with whom he had six children.[22]

Australia[edit]

Emigration and new political career[edit]

The cause of the Irish tenants, and indeed of Ireland generally, seemed to Duffy more hopeless than ever. Broken in health and spirit, he published in 1855 a farewell address to his constituency, declaring that he had resolved to retire from parliament, as it was no longer possible to accomplish the task for which he had solicited their votes. In 1856 he emigrated with his family to Australia.[26] After being feted in Sydney and Melbourne, he settled in the newly formed Colony of Victoria.[31] Duffy was followed to Melbourne by Margaret Callan. Her daughter was later to marry Duffy's eldest son by his first marriage, John Gavan Duffy.

Duffy initially practised law in Melbourne, but a public appeal was soon held to enable him to buy the freehold property necessary to stand for the colonial Parliament. He was immediately elected to the Legislative Assembly for Villiers and Heytesbury in the Western District in 1856. A *Melbourne Punch* cartoon depicted Duffy entering Parliament as a bog Irishman carrying a shillelagh atop the parliamentary benches (*Punch*, 4 December 1856, p. 141).[32] He later represented Dalhousie and then North Gippsland.

Duffy's Land Act[edit]

Duffy stood on a platform of land reform. With the collapse of the Victorian Government's Haines Ministry, during 1857, another Irish Catholic, John O'Shanassy, unexpectedly became Premier. Duffy was his deputy as well as Commissioner for Public Works, President of the Board of Land and Works, and Commissioner for Crown Lands and Survey. Irish Catholics serving as Cabinet Ministers was hitherto unknown in the British Empire and the Melbourne's Protestant establishment was ill-prepared "to countenance so startling a novelty".[33]

Duffy's Land Act was passed in 1862. Like the Nicholson Act of 1860 which it modified, the Duffy Act provided, in specified areas, for new and extended pastoral licences. It was an effort to break the land-holding monopoly of the so-called "squatter" class. However, the bill had been amended into ineffectiveness by the Legislative Council so that it was easy for the Squatters to employ dummies and extend their control. Duffy's attempts to correct the legislation were defeated. Historian Don Garden commented that "Unfortunately Duffy's dreams were on a higher plane than his practical skills as a legislator and the morals of those opposed to him."[34]

In 1858–59, *Melbourne Punch* cartoons linked Duffy and O'Shanassy with images of the French Revolution to undermine their Ministry. One famous *Punch* image, "Citizens John and Charles", depicted the pair as French revolutionaries holding the skull and cross bone flag of the so-called *Victorian Republic*.[35] The O'Shanassy Ministry was defeated at the 1859 election and a new government formed.

Premier of Victoria[edit]

In 1871 Duffy led the opposition to Premier Sir James McCulloch's plan to introduce a land tax, on the grounds that it unfairly penalised small farmers. When McCulloch's government was defeated on this issue, Duffy became Premier and Chief Secretary (June 1871 to June 1872). Victoria's finances were in a poor state and he was forced to introduce a tariff bill to provide government revenue, despite his adherence to British free trade principles.

An Irish Catholic Premier was very unpopular with the Protestant majority in the colony, and Duffy was accused of favouring Catholics in government appointments, an example being the appointment of John Cashel Hoey, who had been his successor as editor of The Nation, to a position in London. In June 1872 his government was defeated in the Assembly on a confidence motion allegedly motivated by sectarianism. He was succeeded as premier by the conservative James Francis and later resigned the leadership of the liberal party in favour of Graham Berry.[22]

Speakership and retirement[edit]



Grave of Charles Gavan Duffy, Glasnevin, Dublin.

When Berry became Premier in 1877 he made Duffy Speaker of the Legislative Assembly, a post he held without much enthusiasm until 1880. Thereafter he quit politics and retired to southern France where he wrote his memoirs: *The League of North and South, 1850–54* (1886) and *My Life in Two Hemispheres* (1898).

In exile in France, Duffy was an enthusiastic supporter of the Melbourne Celtic Club, which aimed to promote Irish Home Rule and Irish culture.[36] His sons also became members of the club.

In recognition of his services to Victoria, he was knighted in 1873 and made KCMG in 1877. He married for a third time in Paris in 1881, to Louise Hall, and they had four more children.[22]

Notable children[edit]

- John Gavan Duffy was a Victorian politician between 1874 and 1904.

- Sir Frank Gavan Duffy, was Chief Justice of the High Court of Australia 1931–35.[37]
- Louise Gavan Duffy (1884-1969) was the joint secretary of the nationalist women's organization, Cumann na mBan, and was an Irish republican present at the 1916 Easter Rising and an Irish language enthusiast who founded an Irish language school, Scoil Bhride (St Bridget)'s Girls School in Earlsfort Terrace, Dublin.[38]
- George Gavan Duffy, was an Irish politician and a signatory to the Anglo-Irish Treaty in 1921. From 1936 onward he was a justice on the Irish High Court, becoming its president from 1946 until his death in 1951. One year before his death, he heard the *Tilson Case*, in which he applied the *ne temere* decree to the letter as de Valera's 1937 Irish Constitution gave the Roman Catholic Church in Ireland a "special position".[39]

Additionally, a grandson, Charles Leonard Gavan Duffy, was a judge on the Supreme Court of Victoria, Australia.[40]

Death[edit]

Sir Charles Gavan Duffy died in Nice, France in 1903, aged 86.[22]

Works[edit]

Texts on Wikisource:

- *My Life in Two Hemispheres* (1898)[41]

Notes[edit]

1. ^ *"Birthplace of Charles Gavin Duffy, Dublin Street, ROOSKY, Monaghan, MONAGHAN". Buildings of Ireland.*
2. ^ *The Northern Standard*, Monaghan, p. 1, Thursday, 14 January 2021.
3. ^ *Ó Cathaoir., Breandán (7 February 2003). "An Irishman's Diary". The Irish Times. Retrieved 27 August 2020.*
4. ^ *Duffy, Charles Gavan (21 February 1845). "The ballad poetry of Ireland". Dublin.*
5. ^ *Duffy, Charles Gavan (1845). The Ballad Poetry of Ireland. Dublin: J. Duffy.*
6. ^ *Young Ireland*, T.F. O'Sullivan, The Kerryman Ltd. 1945, p. 6
7. ^ Moody, p 38.
8. ^ *Bardon, Jonathan (2008). A History of Ireland in 250 Episodes. Dublin: Gill & Macmillan. p. 367.*
9. ^ *Beckett, J.C. (1966). The Making of Modern Ireland, 1603-1923. London: Faber & Faber. p. 332. ISBN 0571092675.*
10. ^ Quoted in *Boyce, D. George. (1995). Nationalism in Ireland(Third ed.). London: Routledge. p. 146. ISBN 9780415127769.*
11. ^ O'Connell to Cullen, 9 May 1842. Maurice O'Connell (ed.) *The Correspondence of Daniel O'Connell.* Shannon: Irish University Press, 8 vols.), vol. vii, p. 158
12. ^ *Macken, Ultan (2008). The Story of Daniel O'Connell. Cork: Mercier Press. p. 120. ISBN 9781856355964.*
13. ^ *Mulvey, Helen (2003). Thomas Davis and Ireland: A Biographical Study. Washington DC: The Catholic University of America Press. p. 180. ISBN 0813213037.*
14. ^ *Jenkins, Lee (Autumn 1999). "Beyond the Pale: Frederick Douglass in Cork" (PDF). The Irish Review (24): 92.*

15. ^ *Kinealy, Christine. "The Irish Abolitionist: Daniel O'Connell". irishamerica.com. Irish America. Retrieved 24 August 2020.*
16. ^ *McCullagh, John. "Irish Confederation formed". newryjournal.co.uk/. Newry Journal. Retrieved 27 August 2020.*
17. ^ Doheny, Michael (1951). *The Felon's Track.* Dublin: M. H. Gill & Son. p. 105
18. ^ O'Sullivan, T. F. (1945). *Young Ireland.* The Kerryman Ltd. pp. 195-6
19. ^ Smith, G.B., 'Godkin, James (1806–1879)', rev. C. A. Creffield, *Oxford Dictionary of National Biography* (Oxford University Press, 2004)
20. ^ Smith, G.B., 'Godkin, James (1806–1879)', rev. C. A. Creffield, Oxford Dictionary of National Biography, Oxford University Press, 2004)
21. ^ *Duffy, Charles Gavan (1886). The League of North and South. London: Chapman & Hall.*
22. ^ Jump up to:[a] [b] [c] [d] [e] *Anton, Brigitte; O'Brien, R. B. (2008). "Duffy, Sir Charles Gavan". Oxford Dictionary of National Biography.*
23. ^ *McCaffrey, Lawrence (1976). The Irish Catholic Diaspora in America. Washington DC: The Catholic University of America Press. p. 145. ISBN 9780813208961.*
24. ^ See also *Whyte, John Henry (1958). The Independent Irish Party 1850-9. Oxford University Press. p. 139.*
25. ^ *Bew, Paul (2007). Ireland: The Politics of Enmity 1789-2006. Oxford: Oxford University Press. pp. 238–239. ISBN 9780198205555.*
26. ^ Jump up to:[a] [b] This article incorporates text from a publication now in the public domain: *O'Brien, Richard Barry (1912). "Duffy, Charles Gavan". Dictionary of National Biography (2nd supplement). London: Smith, Elder & Co.*
27. ^ *Barr, Colin. "Cullen, Paul". cambridge.org. Dictionary of Irish Biography. Retrieved 27 August 2020.*
28. ^ Jump up to:[a] [b] *Good, James Winder (1920). Irish Unionism. London: Fischer Unwin. p. 113.*
29. ^ *Colin Barr (2008). ""Imperium in imperio": Irish episcopal imperialism in the nineteenth century". English Historical Review. cxxiii (502): 611–50. doi:10.1093/ehr/cen161.*
30. ^ Dáire Keogh and Albert McDonnell (eds) (2011), *Cardinal Paul Cullen and his World*, Dublin: Four Courts Press. ISBN 9781846822353
31. ^ Dictionary of Irish National Biography
32. ^ *"THE USAGES OF THE IMPERIAL PARLIAMENT". 4 December 1856. p. 5 – via Trove.*
33. ^ McCaughey, *Victoria's Colonial Governors*, p. 75
34. ^ George Gavan Duffy papers, historyireland.com; accessed 6 March 2016.
35. ^ *Punch*, 7 January 1859, p. 5
36. ^ D.J. O'Hearn, *Erin go bragh – Advance Australia Fair: a hundred years of growing*, Melbourne: Celtic Club, 1990, p. 67.
37. ^ *Balmford, Peter (2004). "Duffy, Sir Frank Gavan". Oxford Dictionary of National Biography.*
38. ^ *Kotsonouris, Mary (2004). "Duffy, George Gavan". Oxford Dictionary of National Biography.*
39. ^ Irish Law Times Report vol. 86 (1952), pp. 49–73.
40. ^ *Francis, Charles (1981). "Biography - Sir Charles Leonard Gavan Duffy". Australian Dictionary of Biography. Retrieved 1 October 2018.*
41. ^ *"Review: My Life in Two Hemispheres by Charles Gavan Duffy". The Saturday Review of Politics, Literature, Science and Art. 85: 209–210. 12 February 1898.*

References[edit]

- Browne, Geoff, *A Biographical Register of the Victorian Parliament, 1900–84*, Government Printer, Melbourne, 1985.
- Duffy, Charles Gavan. *Four Years of Irish History 1845–1849*, Robertson, Melbourne, 1883. (autobiography and recollections)
- Garden, Don. *Victoria: A History*, Thomas Nelson, Melbourne, 1984.

- Keatinge, Patrick, 'The Formative Years of the Irish Diplomatic Service', *Éire-Ireland*, 6, 3 (Autumn 1971), pp. 57–71.
- McCarthy, Justin. *History of Our Own Times*, Vols 1–4, 1895.
- McCaughey, Davis. et al. *Victoria's Colonial Governors 1839–1900*, Melbourne University Press, Carlton, 1993.
- O'Brien, Antony. *Shenanigans on the Ovens Goldfields: the 1859 election*, Artillery Publishing, Hartwell, 2005, (p. xi & Ch.2)
- Thompson, Kathleen and Serle, Geoffrey. *A Biographical Register of the Victorian Parliament, 1856–1900*, Australian National University Press, Canberra, 1972.
- Wright, Raymond. *A People's Counsel. A History of the Parliament of Victoria, 1856–1990*, Oxford University Press, Melbourne, 1992.

Further reading[edit]

- The Politics of Irish Literature: from Thomas Davis to W.B. Yeats, Malcolm Brown, Allen & Unwin, 1973.
- John Mitchel, A Cause Too Many, Aidan Hegarty, Camlane Press.
- Thomas Davis, The Thinker and Teacher, Arthur Griffith, M.H. Gill & Son 1922.
- Brigadier-General Thomas Francis Meagher His Political and Military Career,Capt. W. F. Lyons, Burns Oates & Washbourne Limited 1869
- Young Ireland and 1848, Dennis Gwynn, Cork University Press 1949.
- Daniel O'Connell The Irish Liberator, Dennis Gwynn, Hutchinson & Co, Ltd.
- O'Connell Davis and the Colleges Bill, Dennis Gwynn, Cork University Press 1948.
- Smith O'Brien And The "Secession", Dennis Gwynn,Cork University Press
- Meagher of The Sword, Edited By Arthur Griffith, M. H. Gill & Son, Ltd. 1916.
- Young Irelander Abroad The Diary of Charles Hart, Edited by Brendan O'Cathaoir, University Press.
- John Mitchel First Felon for Ireland, Edited By Brian O'Higgins, Brian O'Higgins 1947.
- Rossa's Recollections 1838 to 1898, Intro by Sean O'Luing, The Lyons Press 2004.
- Labour in Ireland, James Connolly, Fleet Street 1910.
- The Re-Conquest of Ireland, James Connolly, Fleet Street 1915.
- John Mitchel Noted Irish Lives, Louis J. Walsh, The Talbot Press Ltd 1934.
- Thomas Davis: Essays and Poems, Centenary Memoir, M. H Gill, M.H. Gill & Son, Ltd MCMXLV.
- Life of John Martin, P. A. Sillard, James Duffy & Co., Ltd 1901.
- Life of John Mitchel, P. A. Sillard, James Duffy and Co., Ltd 1908.
- John Mitchel, P. S. O'Hegarty, Maunsel & Company, Ltd 1917.
- The Fenians in Context Irish Politics & Society 1848–82, R. V. Comerford, Wolfhound Press 1998
- William Smith O'Brien and the Young Ireland Rebellion of 1848, Robert Sloan, Four Courts Press 2000
- Irish Mitchel, Seamus MacCall, Thomas Nelson and Sons Ltd 1938.

- Ireland Her Own, T. A. Jackson, Lawrence & Wishart Ltd 1976.
- Life and Times of Daniel O'Connell, T. C. Luby, Cameron & Ferguson.
- Young Ireland, T. F. O'Sullivan, The Kerryman Ltd. 1945.
- Irish Rebel John Devoy and America's Fight for Irish Freedom, Terry Golway, St. Martin's Griffin 1998.
- Paddy's Lament Ireland 1846–1847 Prelude to Hatred, Thomas Gallagher, Poolbeg 1994.
- The Great Shame, Thomas Keneally, Anchor Books 1999.
- James Fintan Lalor, Thomas, P. O'Neill, Golden Publications 2003.
- Charles Gavan Duffy: Conversations With Carlyle (1892), with Introduction, Stray Thoughts on Young Ireland, by Brendan Clifford, Athol Books, Belfast, ISBN 0850341140. (Pg. 32 Titled, Foster's account of Young Ireland.)
- Envoi, Taking Leave of Roy Foster, by Brendan Clifford and Julianne Herlihy, Aubane Historical Society, Cork.
- The Falcon Family, or, Young Ireland, by M. W. Savage, London, 1845. (An Gorta Mor)*Quinnipiac University*

External links[edit]

- Media related to Charles Gavan Duffy at Wikimedia Commons
- Works related to Charles Gavan Duffy at Wikisource
- Works by Charles Gavan Duffy at Project Gutenberg
- Works by or about Charles Gavan Duffy at Internet Archive
- Poetry of Ireland, with references to Duffy
- Early Life in Monaghan by Charles Gavan Duffy

Political offices		
Preceded by **James McCulloch**	**Premier of Victoria** 1871–1872	Succeeded by **James Francis**

show

Appendix

3b

Department of Housing Local Government & Heritage Correspondence

An Roinn Tithíochta,
Rialtais Áitiúil agus Oidhreachta
Department of Housing,
Local Government and Heritage

Your Ref: ABP- JA18.314501-22
Our Ref: 177AE South Dublin Street Regen
(Please quote in all related correspondence)

15 May, 2023

Mr Cathal Flynn
Directorate of Economic Development, Planning & Capital Projects
Monaghan County Council,
County Offices,
The Glen,
Monaghan, H18 YT50

By email: CFlynn@monaghancoco.ie

Application by Monaghan County Council for the South Dublin Street and Backlands Regeneration Project at properties at 7- 13 Dublin Street, lands to the rear of 1-9 The Diamond and 1-26 Dublin Street, incorporating sections of the Northern Standard property, the Courthouse car park, Lower Courthouse car park, Castle Road, and N54 Macartan (Broad) Road, Roosky and Tirkeenan, Monaghan Town Centre, Monaghan.

A chara

The Department refers to the above referenced planning application, our response to An Bord Pleneála (ABP) and also to the referral back to Monaghan County Council for further engagement with this Department.

It is noted that the proposed development covers an area of approximately 2.72ha and comprises urban regeneration and public realm proposals, as part of the South Dublin Street and Backlands Regeneration Project.

Having engaged with Monaghan County Council the Department now has a clearer understanding of the nature, purpose and extent of the development and of the nature of the existing vernacular built environment.

The proposed area of development resides within the Zone of Archaeological Significance and the National Monuments Service Zone of Notification for the historic town of Monaghan. The Department's previous comments and observations in that regard stand, i.e., that the potential of this area to contain significant archaeological deposits subsurface is considered moderate to low.

Regarding the impacted built heritage and taking account of the clarifications provided by Monaghan County Council officials as to the vernacular nature of the impacted buildings, the extensive and intrusive interventions made over the decades, and irreversible loss of original fabric, detail and aspect, the Department are now inclined to set aside earlier observations.

The commitments by Monaghan County Council to ensure the consistency of this development with the proposal that gave rise to a successful application for funding from the Historic Towns Initiative (€247,952 for conservation works on Dublin St.) are noted

The historical urban mapping referenced previously describes the enclosed space and curved line of Dublin Street connecting the central historic spaces of the Diamond and the Old Cross Square. The mapping includes the elements that are part of the setting and character of this place including the scale and rhythm of the street-fronted buildings and arched entrances linking to the long burgage/building plots to the rear.

In this context, the Department now note that the proposed intervention will work to retain historic urban legibility curves while creating a portal to a vibrant town civic space, with appropriate recognition of the historic and cultural backdrop. It is now understand that this pedestrian priority interconnection draws on the historic precedent of pedestrian archways routes in the town. It nods too to the Town Centre First Policy established by the Department of Housing, Local Government & Heritage that sets out the importance of cultural heritage (archaeological, built, and natural) for well-being and sense of place.

The Department is supportive of heritage-led regeneration that meets the ambitions of the Housing for All and Town Centre First policies, which are underpinned by the UN Sustainable Development Goals (SDG's). Sustainable development requires careful consideration of the use of cultural assets for societal well-being, climate action and community resilience. In that context, we note the primacy in this development of civic space and the repurposing commitments.

Is mise le meas**,**

Joanne Lyons
Development Applications Unit
Administration

Appendix

3c

Stage 1 Approval Confirmation

An Roinn Tithíochta,
Rialtais Áitiúil agus Oidhreachta
Department of Housing,
Local Government and Heritage

22nd November 2023

Olga McConnon,
Acting Director of Housing,
Monaghan County Council,
Council Offices,
The Glen, Monaghan.

Dept. Ref: N18-2-242

Re: 6 Apts @ 15 Dublin St, Monaghan Town

Stage 1 Approval

Dear Olga,

Thank you for the recent proposal seeking a Stage 1 approval for the above named project.

Following an assessment by the Department, a Stage 1 approval is hereby confirmed with an all-in budget of **€2,215,837** (incl. VAT). This approval is subject to Monaghan County Council complying with the requirements listed below and in the budget notes in Appendix 1

- With next Stage submission the Local Authority providing a Tender Report for Procurement of Consultants including details of fee agreement

- Monaghan Co. Co. carrying out extensive survey works to identify and having absolute understanding of the works/risks required to demolish the existing building and constructing a new building in its place in addition to verifying the budget requirements. There are concerns as to the buildability, as the property above the arch is excluded from the property purchase and does not form part of the application, this will require significant structural interventions and agreements with neighbouring property owners/commercial leaseholders.

- Monaghan Co. Co. providing a detailed cost plan as part of the Stage 2 submission informed by a detailed survey/investigations and resultant scope of works.

As a Stage 1 approval is now deemed to be in order your Stage 2 submission is due into the Department by **14 February, 2024** per Circular 2/2018 relating to "New Timelines for the Preparation and Assessment of Local Authority Social Housing Capital Projects (the 4 stage approval process).

Oifigí an Rialtais, Sráid an tSrutháin, Béal an Átha, Maigh Eo, F26 E8N6
Government Offices, Brook Street, Ballina, Mayo, F26 E8N6
T +353 9624209 | aishling.o'hanlon@housing.gov.ie
www.housing.gov.ie

Yours sincerely,



_____

Aishling O'Hanlon,
Social Housing Capital Investment Unit 1,

Cc: Samantha Boyle, Lorcan Maccinna, Michelle Mulligan (MCC)
Patrick Dowling, Alan Heatly (DHLG&H)

Appendix 1

Stage 1 Approved Budget for 6 Homes @ 15 Dublin St, Monaghan Town

	Stage 1 Submission €	Stage 1 Recommended Budget €	Notes
Construction Estimate [ex Abnormal] (incl VAT)	1,380,700.00	1,450,000	
Abnormal Costs (incl. VAT)	300,000.00	300,000	
Total Construction Estimate (incl VAT)	**1,680,700.00**	**1,750,000**	Note 1
Cost of Site	150,000.00	150,000	Note 2
Technical Fees / Salaries	210,000.00	230,000	Note 3
Contract Monitoring & Management	21,000.00	15,419	Note 4
Site Investigations / Surveys	25,000.00	25,000	Note 5
Utilities [ESB, gas, water etc.]	30,000.00	30,000	Note 5
Other Costs			
Public Art	14,000.00	15,418	Note 6
LA Administration	30,000.00	N/A	Note 7
Total ALL IN COST €	**2,160,700.00**	**2,215,837**	

Note 1
Recommended budget for Construction works.

Note 2
Allowance for site purchase costs as per LA submitted amount. Further details to be provided as part of the Stage 2 Submission including vouched documentation including agreements and fee receipts etc.

Note 3
Recommended allowance for Design Team Fees. Tender reports to be provided in respect appointments and procurement to adhere to the requirements of the CWMF.

Note 4
Recommended budget for LA Contract Monitoring and Management (where full external design team is provided) in accordance with Circular 23/2018.

Note 5
Provisional allowance made, subject to receipt of vouched documentation in due course.

Note 6
Allowance for Art Budget has been based upon the provisions in alignment with Per Cent for Art Scheme. Please confirm the Art Project that was commissioned and when claiming for same provide vouched documentation.

Note 7
LA Admin Fee has ceased.

Appendix

4a

Baseline Noise Monitoring Survey

APPENDIX 4.A
Baseline Noise Monitoring Survey

SUMMARY OF BASELINE NOISE MONITORING SURVEY

RPS was commissioned by Monaghan County Council to undertake a Noise and Vibration Impact Assessment (NVIA) of lands within Monaghan town centre and the proposals for redevelopment of this site, as described within Chapter 2 Project Description of this EIAR. A baseline noise monitoring survey was undertaken in relation to this proposal.

Figure 4.A.1 below shows the noise monitoring locations (NML) where the baseline noise monitoring survey was undertaken.

Figure 4.A.1: Noise Monitoring Locations



As the proposed development site is an open area it is not possible to set up and leave noise monitoring equipment operating unattended for an extended period of time. Therefore, to be representative of existing noise sources RPS have undertaken attended noise monitoring for both daytime and night-time at 4 locations as detailed in Figure 4.A.1 above.

The details of the baseline noise monitoring survey including a description of the noise monitoring location, date, time and sound level meter used are summarised in Table 4.A.1 below.

Table 4.A.1: Summary of Baseline Noise Monitoring Survey

Noise Monitoring Location	Description of Noise Monitoring Location	Date	Time	Sound Level Meter
NML 1	To the northern boundary of the proposed redevelopment site along Dublin Street	19/05/2021	06:00 – 07:00	Norsonic 140
		19/05/2021	07:45 – 10:45	
NML 2	To the east of the proposed redevelopment site at Old Cross Square and Rooskey Vale.	19/05/2021	05:40 – 06:55	Rion NL-52
		19/05/2021	11:10 – 14:10	
NML 3	To the south of the proposed redevelopment site at Castle Road	26/05/2021	05:40 – 06:55	Rion NL-52
		26/05/2021	07:10 – 10:10	
NML 4	To the west of the proposed redevelopment site at Dawson Street.	26/05/2021	06:00 – 07:00	Norsonic 140
		26/05/2021	07:00 – 10:00	

The specification and calibration certificates of the Sound Level Meter's used can be found in section 1.2 below.

1.1 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. All noise measurements were made at a height of 1.2 – 1.5m above ground level.

The following parameters were recorded during each noise monitoring period:

- 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 conducive to the measurement of existing noise climate during the attended and unattended surveys being predominately dry and with wind speeds remaining below 5 m/s.

Noise monitoring will be completed in accordance with guidance included in:

- BS 7445:2003, The Description and Measurement of Environmental Noise - Part 1: Guide to Quantities and Procedures; and
- Environmental Protection Agency (EPA) Office of Environmental Enforcement (OEE) - Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4) (2016).

1.2 Sound Level Meter Specifications and Calibration Certificates

The calibration certificates and sound level meter specifications from the noise survey equipment are detailed in Table 4.A.2, Table 4.A.3, Figure 4.A.2, and Figure 4.A.3 below.

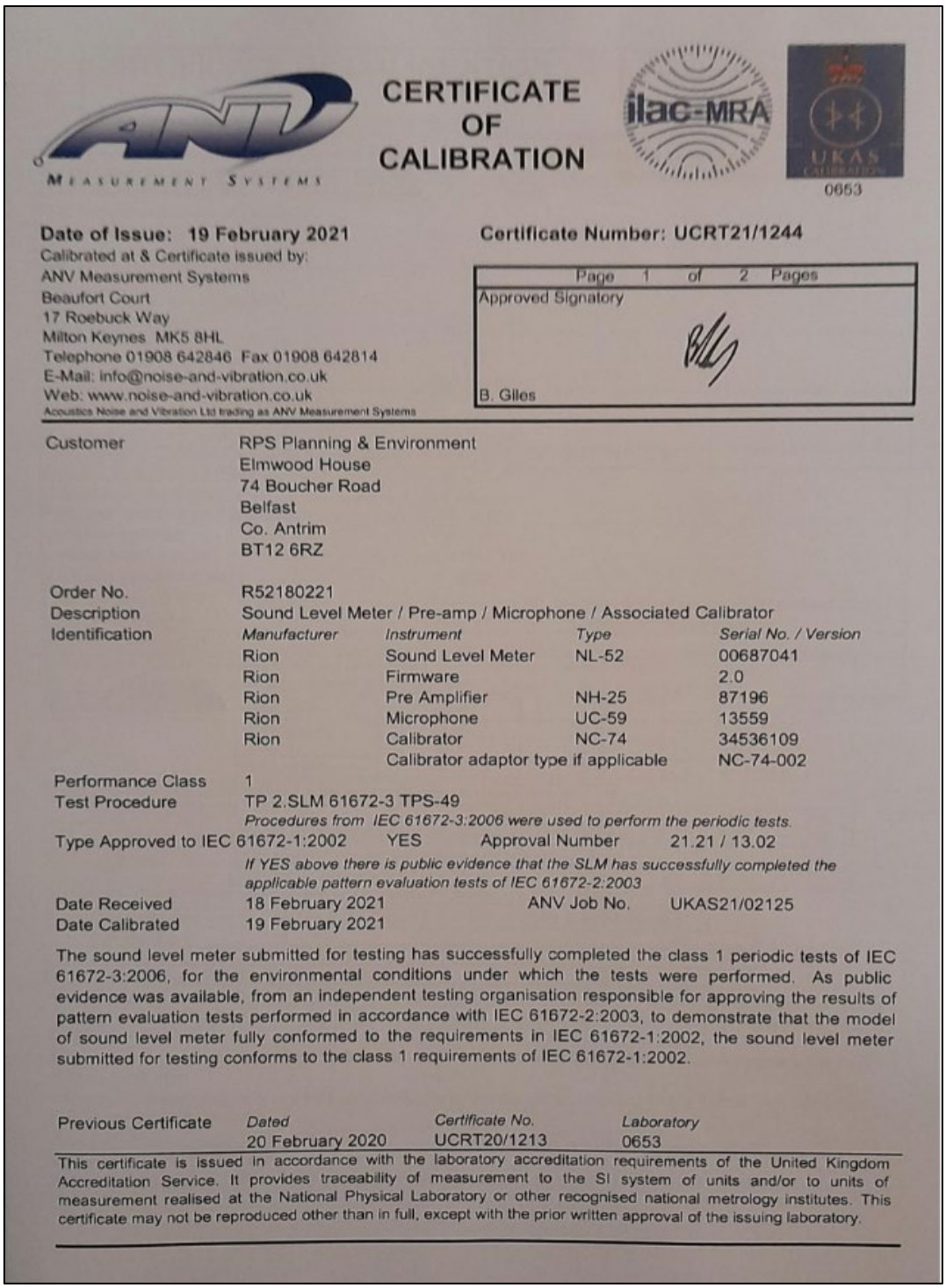
Table 4.A.2: Noise Instrument Record for Rion NL-52

Equipment	Model / Type	Serial Number	Calibration Certificate Number	Last Calibration Date
Sound Level Meter	Rion NL-52	00687041	UCRT20/1213	20/02/2020
Preamplifier	Rion NH-25	87196	UCRT20/1213	20/02/2020
Microphone	Rion UC-59	13559	UCRT20/1213	20/02/2020

Table 4.A.3: Noise Instrument Record for Norsonic 140: Used at NML 1 and NML 4

Equipment	Model / Type	Serial Number	Calibration Certificate Number	Last Calibration Date
Sound Level Meter	Norsonic 140	1402992	U33023	03/10/2019
Preamplifier	Norsonic 1209	12364	33023	03/10/2019
Microphone	GRAS 40AF	102675	33022	03/10/2019

Figure 4.A.2: Calibration Certificate of Rion NL-52: Used at NML 2 and NML 3



ANV MEASUREMENT SYSTEMS

CERTIFICATE OF CALIBRATION

0653

Date of Issue: 19 February 2021

Certificate Number: UCRT21/1244

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

B. Giles

Customer	RPS Planning & Environment Elmwood House 74 Boucher Road Belfast Co. Antrim BT12 6RZ
Order No.	R52180221
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

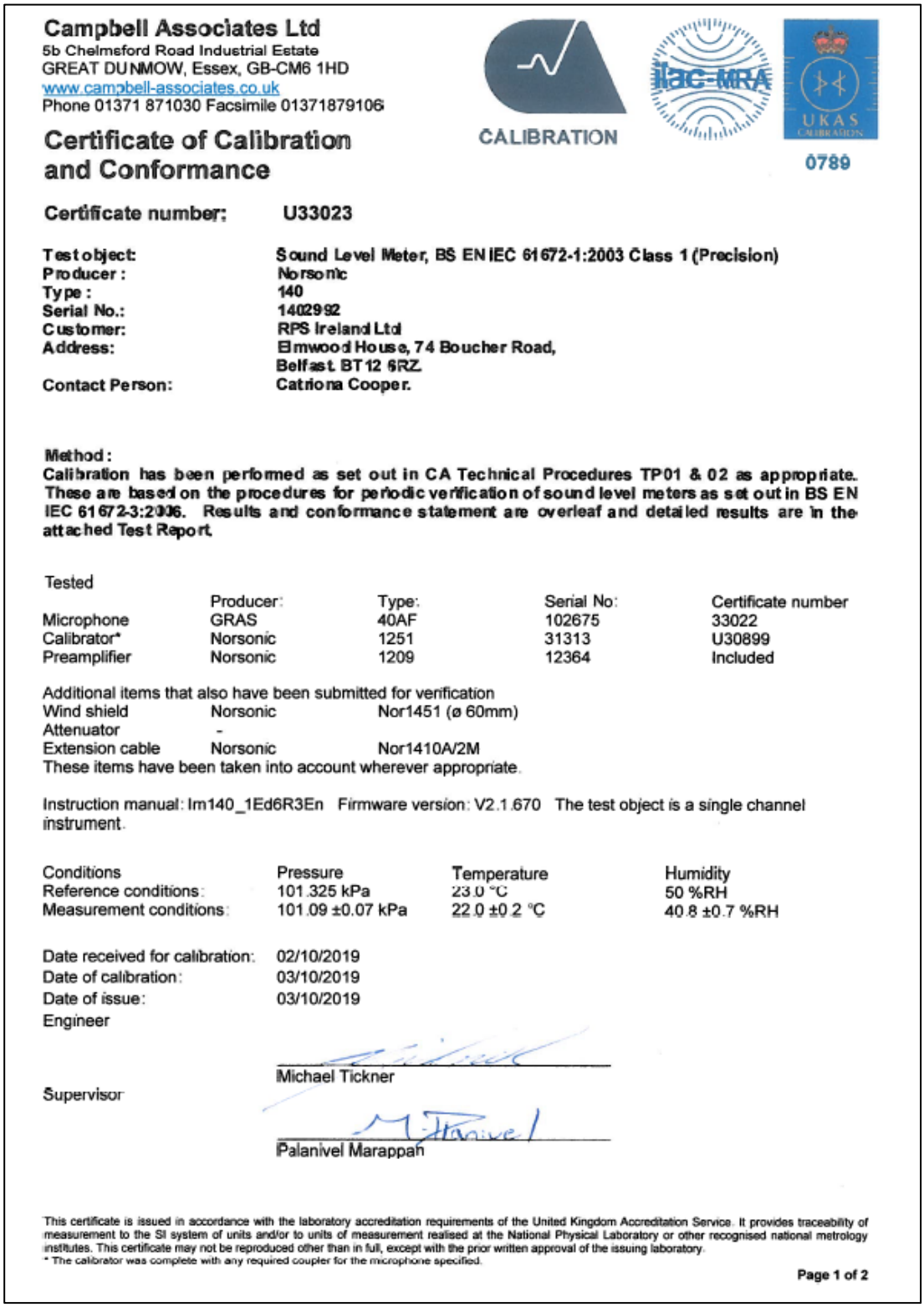
Performance Class 1
Test Procedure TP 2.SLM 61672-3 TPS-49
Procedures from IEC 61672-3:2006 were used to perform the periodic tests.
Type Approved to IEC 61672-1:2002 YES Approval Number 21.21 / 13.02
If YES above there is public evidence that the SLM has successfully completed the applicable pattern evaluation tests of IEC 61672-2:2003
Date Received 18 February 2021 ANV Job No. UKAS21/02125
Date Calibrated 19 February 2021

The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3:2006, for the environmental conditions under which the tests were performed. As public evidence was available, from an independent testing organisation responsible for approving the results of pattern evaluation tests performed in accordance with IEC 61672-2:2003, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2002, the sound level meter submitted for testing conforms to the class 1 requirements of IEC 61672-1:2002.

Previous Certificate	*Dated*	*Certificate No.*	*Laboratory*
	20 February 2020	UCRT20/1213	0653

This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service. It provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

Figure 4.A.3: Calibration Certificate of Norsonic 140



Campbell Associates Ltd
5b Chelmsford Road Industrial Estate
GREAT DUNMOW, Essex, GB-CM6 1HD
www.campbell-associates.co.uk
Phone 01371 871030 Facsimile 01371879106

CALIBRATION

0789

Certificate of Calibration and Conformance

Certificate number: U33023

Test object:	**Sound Level Meter, BS EN IEC 61672-1:2003 Class 1 (Precision)**
Producer :	**Norsonic**
Type :	**140**
Serial No.:	**1402992**
Customer:	**RPS Ireland Ltd**
Address:	**Elmwood House, 74 Boucher Road, Belfast. BT12 6RZ.**
Contact Person:	**Catriona Cooper.**

Method:
Calibration has been performed as set out in CA Technical Procedures TP01 & 02 as appropriate. These are based on the procedures for periodic verification of sound level meters as set out in BS EN IEC 61672-3:2006. Results and conformance statement are overleaf and detailed results are in the attached Test Report.

Tested

	Producer:	Type:	Serial No:	Certificate number
Microphone	GRAS	40AF	102675	33022
Calibrator*	Norsonic	1251	31313	U30899
Preamplifier	Norsonic	1209	12364	Included

Additional items that also have been submitted for verification

Wind shield	Norsonic	Nor1451 (ø 60mm)
Attenuator	-	
Extension cable	Norsonic	Nor1410A/2M

These items have been taken into account wherever appropriate.

Instruction manual: Im140_1Ed6R3En Firmware version: V2.1.670 The test object is a single channel instrument.

Conditions	Pressure	Temperature	Humidity
Reference conditions:	101.325 kPa	23.0 °C	50 %RH
Measurement conditions:	101.09 ±0.07 kPa	22.0 ±0.2 °C	40.8 ±0.7 %RH

Date received for calibration: 02/10/2019
Date of calibration: 03/10/2019
Date of issue: 03/10/2019
Engineer

Michael Tickner

Supervisor

Palanivel Marappan

This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service. It provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.
* The calibrator was complete with any required coupler for the microphone specified.

Page 1 of 2

2 NOISE MONITORING LOCATION 1

NML1 was located close to residential properties, within the north side of the proposed redevelopment site along Dublin Street. A number of buildings next to these existing residential properties on Dublin Street will be demolished. The baseline environment at these residential properties closest to proposed demolition and construction should be reflected in NML1.

2.1 NML 1 Night time Measurements

The results of the night time noise monitoring survey at NML1 is shown below in Table 4.A.4.

Table 4.A.3: Night time Noise Monitoring Results at NML1 dB (19/05/2021)

Date	Time	L_{Aeq}	L_{Amax}	L_{Amin}	L_{A10}	L_{A90}
19/05/2021	06:00	64.4	88.5	31.7	60.1	37.2
19/05/2021	06:15	57.6	81.2	35.6	59.4	38.7
19/05/2021	06:30	73.9	103.7	36.2	68.8	39.7
19/05/2021	06:45	62.1	81.2	37.1	64.4	40.6

The dominant noise source during the night time noise monitoring survey at NML1 was road traffic noise from cars and HGV's passing on Dublin Street.

2.2 NML 1 Daytime Measurements

The results of the daytime noise monitoring survey at NML1 are shown below in Table 4A.5.

Table 4.A.4: Daytime Noise Monitoring Results at NML1 dB (19/05/2021)

Date	Time	L_{Aeq}	L_{Amax}	L_{Amin}	L_{A10}	L_{A90}
19/05/2021	07:45	66.5	87.6	40.5	70.3	44.3
19/05/2021	08:00	66.8	85.9	39.4	69.7	46.4
19/05/2021	08:15	71.2	95.8	38.8	73.6	48.9
19/05/2021	08:30	69.6	90.3	42.0	71.7	50.6
19/05/2021	08:45	66.4	85.7	41.0	70.3	49.6
19/05/2021	09:00	64.2	81.8	40.0	68.4	46.8
19/05/2021	09:15	67.4	87.8	41.3	70.0	48.6
19/05/2021	09:30	64.4	85.8	38.6	67.3	43.9
19/05/2021	09:45	65.8	86.0	42.3	68.4	48.4
19/05/2021	10:00	64.8	83.2	40.6	67.2	47.7
19/05/2021	10:15	66.3	87.2	40.1	67.4	45.5
19/05/2021	10:30	65.7	90.4	41.8	67.4	47.6

The dominant noise source during the daytime noise monitoring survey at NML1 was road traffic noise from cars and HGV's passing on Dublin Street.

A photograph of the noise equipment set up at NML1 is shown in photograph 4A.1 below.

Photograph 4A.1: Photograph of Noise Monitoring Location 1



3 NOISE MONITORING LOCATION 2

NML2 was located close to residential properties at Old Cross Square and Rooskey Vale, to the eastern boundary of the proposed redevelopment site.

3.1 NML 2 Night time Measurements

The results of the night time noise monitoring survey at NML2 is shown below in Table 4.A.5.

Table 4.A.5: Night time Noise Monitoring Results at NML2 dB (19/05/2021)

Date	Time	L_{Aeq}	L_{Amax}	L_{Amin}	L_{A10}	L_{A90}
19/05/2021	05:40	72.6	101.2	48.0	75.9	55.7
19/05/2021	05:55	71.0	85.6	44.7	75.5	56.4
19/05/2021	06:10	70.6	90.2	44.7	74.2	52.5
19/05/2021	06:25	73.2	93.4	47.6	77.6	58.3
19/05/2021	06:40	75.2	98.9	53.3	78.8	65.1

The dominant noise source during the night time noise monitoring survey at NML2 was road traffic noise from cars and HGV's passing on Old Square Road and Broad Road.

3.2 NML 2 Daytime Measurements

The results of the daytime noise monitoring survey at NML2 are shown below in Table 4A.7.

Table 4.A.6: Daytime Noise Monitoring Results at NML2 dB (19/05/2021)

Date	Time	L_{Aeq}	L_{Amax}	L_{Amin}	L_{A10}	L_{A90}
19/05/2021	11:10	76.0	91.5	60.3	78.8	68.1
19/05/2021	11:25	76.3	95.5	60.2	78.3	68.3
19/05/2021	11:40	76.0	94.3	57.0	79.2	68.5
19/05/2021	11:55	76.9	96.3	59.7	80.5	69.1
19/05/2021	12:10	76.9	99.7	60.7	79.5	68.8
19/05/2021	12:25	75.1	91.4	63.4	78.0	69.1
19/05/2021	12:40	76.1	94.5	61.9	78.9	69.0
19/05/2021	12:55	76.1	91.5	64.1	79.5	70.0
19/05/2021	13:10	77.8	102.5	63.3	79.8	68.7
19/05/2021	13:25	77.1	100.5	63.4	80.3	68.3
19/05/2021	13:40	76.1	100.7	61.7	79.0	67.9
19/05/2021	13:55	75.7	91.2	61.6	79.0	68.1

The dominant noise source during the daytime noise monitoring survey at NML2 was road traffic noise from cars and HGV's passing on Dublin Street. A lawnmower was audible at approximately 11:55hrs at a nearby residential property. Noise from schoolchildren passing was audible from approximately 13:00hrs to 13:30hrs.

A photograph of the noise equipment set up at NML2 is shown in photograph 4A.2 below.

Photograph 4A.2: Photograph of Noise Monitoring Location 2



4 NOISE MONITORING LOCATION 3

NML3 was located at to the southern boundary of the proposed redevelopment site at Castle Road. This location is representative of the existing residential properties on Broad Road and Canal Street. These are the closest residential properties to the operational phase of the proposed road realignment.

4.1 NML 3 Night time Measurements

The results of the night time noise monitoring survey at NML3 is shown below in Table 4.A.7.

Table 4.A.7: Night time Noise Monitoring Results at NML3 dB (26/05/2021)

Date	Time	L_{Aeq}	L_{Amax}	L_{Amin}	L_{A10}	L_{A90}
26/05/2021	05:40	60.7	78.7	40.3	64.9	47.9
26/05/2021	05:55	59.7	77.3	37.7	62.9	44.8
26/05/2021	06:10	58.2	77.6	39.1	62.2	45.5
26/05/2021	06:25	60.8	84.2	38.0	62.1	46.6
26/05/2021	06:40	62.4	82.3	42.1	64.0	49.6

The dominant noise source during the night time noise monitoring survey at NML3 was road traffic noise from cars and HGV's passing on Castle Road and Canal Street.

4.2 NML 3 Daytime Measurements

The results of the daytime noise monitoring survey at NML3 are shown below in Table 4.A.8.

Table 4.A.8: Daytime Noise Monitoring Results at NML3 dB (26/05/2021)

Date	Time	L_{Aeq}	L_{Amax}	L_{Amin}	L_{A10}	L_{A90}
26/05/2021	07:10	62.8	83.6	43.6	64.5	49.2
26/05/2021	07:25	63.8	85.7	44.8	65.8	51.7
26/05/2021	07:40	66.6	89.7	47.5	70.3	55.1
26/05/2021	07:55	65.2	89.4	49.7	66.1	55.2
26/05/2021	08:10	64.4	81.8	49.2	67.5	55.2
26/05/2021	08:25	65.3	83.6	50.6	68.0	56.4
26/05/2021	08:40	63.8	88.1	50.5	66.3	55.7
26/05/2021	08:55	66.3	92.5	48.6	66.2	54.6
26/05/2021	09:10	63.4	84.5	49.6	65.5	55.0
26/05/2021	09:25	63.8	83.6	49.0	65.9	55.3
26/05/2021	09:40	65.0	84.7	45.8	66.5	54.1
26/05/2021	09:55	64.7	87.1	44.7	65.7	54.0

The dominant noise source during the daytime noise monitoring survey at NML3 was road traffic noise from cars and HGV's passing on Castle Road and Canal Street.

A photograph of the noise equipment set up at NML3 is shown in photograph 4A.3 below.

Photograph 4A.3: Photograph of Noise Monitoring Location 3



5 NOISE MONITORING LOCATION 4

NML4 was located close to residential properties along Dawson Street to the western boundary of the proposed redevelopment site.

5.1 NML 4 Night time Measurements

The results of the night time noise monitoring survey at NML4 is shown below in Table 4.A.9.

Table 4.A.9: Night time Noise Monitoring Results at NML4 dB (26/05/2021)

Date	Time	L_{Aeq}	L_{Amax}	L_{Amin}	L_{A10}	L_{A90}
26/05/2021	06:00	58.7	77.0	37.4	61.8	41.3
26/05/2021	06:15	60.1	81.3	37.9	62.3	42.3
26/05/2021	06:30	62.3	78.6	40.0	66.6	45.4
26/05/2021	06:45	65.4	85.8	40.7	69.0	49.2

The dominant noise source during the night time noise monitoring survey at NML4 was road traffic noise from cars and HGV's passing on Market Street and Dawson Street.

5.2 NML 4 Daytime Measurements

The results of the daytime noise monitoring survey at NML4 are shown below in Table 4.A.10.

Table 4.A.10: Daytime Noise Monitoring Results at NML4 dB (26/05/2021)

Date	Time	L_{Aeq}	L_{Amax}	L_{Amin}	L_{A10}	L_{A90}
26/05/2021	07:00	64.8	83.7	43.4	69.0	49.5
26/05/2021	07:15	65.7	82.0	42.5	69.0	52.2
26/05/2021	07:30	64.9	80.6	43.9	68.6	52.6
26/05/2021	07:45	65.6	80.2	46.3	69.2	54.2
26/05/2021	08:00	66.4	81.6	49.1	70.1	55.1
26/05/2021	08:15	66.9	85.7	51.6	69.6	58.4
26/05/2021	08:30	66	79.3	50.5	68.9	57.5
26/05/2021	08:45	66.7	85.9	53.3	68.9	58.4
26/05/2021	09:00	67.4	87.3	51.9	69.6	58.7
26/05/2021	09:15	65.8	87.3	47.2	67.8	55.2
26/05/2021	09:30	67.2	88.4	47.4	68.1	56.5
26/05/2021	09:45	65.3	82.9	50.5	68.0	57.7

The dominant noise source during the daytime noise monitoring survey at NML4 was road traffic noise from cars and HGV's passing on Market Street and Dawson Street.

A photograph of the noise equipment set up at NML4 is shown in photograph 4A.4 below.

Photograph 4A.4: Photograph of Noise Monitoring Location 4



Appendix

4b

Construction Noise Assessment

APPENDIX 4.B

Construction Noise Assessment

Table 4.B.1: Construction Noise Receptors and BS 5228 ABC Category

Construction Receptor ID	Residential	Sensitivty	Representative Noise Monitoring Location	BS5228 ABC Category (daytime) dB	NRA Guideline dB
1	No	Medium	4	70	70
2	No	Medium	4	70	70
3	No	Medium	4	70	70
4	No	Medium	4	70	70
5	No	Medium	4	70	70
6	No	Medium	4	70	70
7	No	Medium	3	70	70
8	Yes	High	1	70	70
9	Yes	High	1	70	70
10	Yes	High	1	70	70
11	Yes	High	1	70	70
12	Yes	High	1	70	70
13	Yes	High	1	70	70
14	Yes	High	2	70	70
15	Yes	High	2	70	70
16	Yes	High	2	70	70
17	Yes	High	2	70	70
18	Yes	High	2	70	70
19	Yes	High	2	70	70
20	Yes	High	2	70	70
21	Yes	High	2	70	70
22	Yes	High	2	70	70
23	Yes	High	2	70	70
24	Yes	High	2	70	70
25	Yes	High	2	70	70
26	Yes	High	2	70	70
27	Yes	High	2	70	70
28	Yes	High	2	70	70
29	Yes	High	2	70	70
30	Yes	High	2	70	70
31	Yes	High	2	70	70
32	Yes	High	2	70	70
33	Yes	High	2	70	70
34	Yes	High	2	70	70

Construction Receptor ID	Residential	Sensitivty	Representative Noise Monitoring Location	BS5228 ABC Category (daytime) dB	NRA Guideline dB
35	Yes	High	2	70	70
36	Yes	High	2	70	70
37	Yes	High	3	70	70
38	Yes	High	3	70	70
39	Yes	High	3	70	70
40	Yes	High	3	70	70
41	Yes	High	3	70	70
42	Yes	High	3	70	70
43	Yes	High	3	70	70
44	Yes	High	3	70	70
45	Yes	High	3	70	70
46	Yes	High	3	70	70
47	Yes	High	3	70	70
48	Yes	High	3	70	70
49	Yes	High	3	70	70
50	Yes	High	3	70	70
51	Yes	High	3	70	70
52	Yes	High	3	70	70
53	Yes	High	3	70	70
54	Yes	High	3	70	70
55	Yes	High	3	70	70
56	Yes	High	3	70	70
57	Yes	High	3	70	70
58	Yes	High	3	70	70
59	Yes	High	3	70	70
60	Yes	High	3	70	70
61	Yes	High	3	70	70
62	Yes	High	3	70	70
63	Yes	High	3	70	70
64	Yes	High	3	70	70
65	Yes	High	3	70	70
66	Yes	High	3	70	70
67	Yes	High	3	70	70
68	Yes	High	3	70	70
69	Yes	High	3	70	70

Construction Receptor ID	Residential	Sensitivty	Representative Noise Monitoring Location	BS5228 ABC Category (daytime) dB	NRA Guideline dB
70	Yes	High	4	70	70
71	Yes	High	4	70	70
72	Yes	High	4	70	70
73	Yes	High	4	70	70
74	Yes	High	4	70	70
75	Yes	High	4	70	70
76	Yes	High	4	70	70
77	Yes	High	4	70	70
78	Yes	High	4	70	70
79	Yes	High	4	70	70
80	Yes	High	4	70	70
81	Yes	High	4	70	70
82	Yes	High	4	70	70
83	Yes	High	4	70	70
84	Yes	High	4	70	70
85	Yes	High	4	70	70
86	Yes	High	4	70	70
87	Yes	High	4	70	70
88	Yes	High	4	70	70
89	Yes	High	4	70	70
90	Yes	High	4	70	70
91	Yes	High	1	70	70
92	Yes	High	1	70	70
93	Yes	High	1	70	70
94	Yes	High	1	70	70
95	Yes	High	1	70	70
96	Yes	High	1	70	70
97	Yes	High	1	70	70
98	Yes	High	1	70	70
99	Yes	High	1	70	70
100	Yes	High	1	70	70

Table 4.B.2: Distance from Construction Noise Receptors to Construction Phase Boundaries

Construction Receptor ID	Site Boundary (m)	Demolition (m)				Road Construction and Road Surfacing (m)
		Area 1	Area 2	Area 3	Area 4	
1	24	37	190	131	188	47
2	36	119	350	227	251	39
3	195	278	105	387	410	200
4	338	412	483	518	554	341
5	442	528	445	636	655	449
6	293	384	599	478	480	307
7	331	500	477	455	395	333
8	8	98	284	14	97	49
9	2	104	321	10	86	45
10	1	113	336	9	74	43
11	8	122	360	14	66	45
12	11	130	274	23	59	50
13	11	169	262	82	45	78
14	157	312	248	206	192	223
15	150	307	240	203	184	214
16	164	321	236	219	196	225
17	170	328	326	228	201	228
18	167	324	223	229	195	221
19	184	342	224	247	212	238
20	95	246	73	167	115	136
21	105	253	67	179	123	140
22	75	203	294	141	81	88
23	141	281	279	213	155	166
24	146	286	271	218	160	171
25	153	293	276	225	167	178
26	160	299	256	232	173	184
27	167	307	260	239	181	191
28	139	278	169	219	158	163
29	147	287	166	227	167	172
30	200	345	136	290	230	224
31	231	376	164	321	261	249
32	388	528	157	461	403	413
33	217	370	207	325	264	221
34	100	248	207	205	145	136

Construction Receptor ID	Site Boundary (m)	Demolition (m)				Road Construction and Road Surfacing (m)
		Area 1	Area 2	Area 3	Area 4	
35	96	244	209	206	147	124
36	96	244	201	210	152	115
37	96	244	193	212	154	111
38	46	188	181	175	127	62
39	33	175	160	163	116	63
40	31	172	64	167	123	52
41	28	169	63	170	129	41
42	28	170	212	175	136	32
43	15	173	168	185	148	19
44	94	249	244	222	166	100
45	88	249	245	225	169	94
46	72	249	254	232	179	77
47	66	248	202	233	181	70
48	60	252	270	243	192	62
49	55	254	262	250	201	54
50	56	258	256	255	207	55
51	58	261	328	261	213	55
52	62	267	287	269	222	58
53	65	270	262	274	228	60
54	73	278	258	286	242	66
55	123	327	255	323	271	119
56	169	372	253	365	312	165
57	200	403	295	391	337	197
58	106	311	315	326	283	99
59	118	324	249	342	300	113
60	140	346	226	368	327	135
61	234	439	225	448	400	227
62	279	480	235	465	408	276
63	332	533	240	515	458	328
64	350	555	257	552	499	344
65	289	494	269	497	447	282
66	361	567	253	583	537	357
67	357	562	121	590	549	354
68	476	659	180	714	684	477
69	300	465	167	530	509	304
70	508	588	168	698	723	512

Construction Receptor ID	Site Boundary (m)	Demolition (m)				Road Construction and Road Surfacing (m)
		Area 1	Area 2	Area 3	Area 4	
71	451	529	168	639	666	454
72	180	256	172	366	395	183
73	162	216	179	317	365	166
74	140	191	660	292	341	144
75	140	187	601	287	338	144
76	138	184	371	284	336	145
77	138	182	447	280	334	148
78	70	101	398	192	252	111
79	79	102	499	186	250	111
80	67	78	474	153	219	86
81	190	227	556	315	378	212
82	207	246	525	337	398	224
83	259	292	492	372	440	286
84	264	286	580	351	424	294
85	344	373	696	445	516	374
86	334	353	508	406	483	360
87	328	342	346	389	467	349
88	460	488	581	557	630	488
89	459	482	315	541	617	490
90	467	486	347	535	614	494
91	334	378	356	357	438	383
92	109	178	433	118	192	153
93	105	179	548	113	185	149
94	100	179	342	108	177	144
95	120	210	404	128	183	163
96	132	222	390	140	193	175
97	140	230	536	149	201	183
98	148	236	537	156	210	191
99	147	232	390	155	213	190
100	148	230	80	156	217	192

Table 4.B.3: Construction Noise Predictions

Construction Receptor ID	BS5228 CategoryC/NR A Guideline	Clearing Site (dB)	Demolition (dB)				Ground Excavation (dB)	Road Construction and Road Surfacing (dB)	Paving and Public Realm (dB)
			Area 1	Area 2	Area 3	Area 4			
1	70	76.4	82.3	68.2	71.5	68.3	75.8	64.6	75.0
2	70	72.8	72.3	62.9	66.7	65.8	72.2	66.1	71.5
3	70	58.2	64.9	73.4	62.0	61.6	57.6	52.0	56.8
4	70	53.4	61.5	60.1	59.5	58.9	52.8	47.3	52.0
5	70	51.1	59.4	60.8	57.7	57.5	50.5	45.0	49.7
6	70	54.6	62.1	58.3	60.2	60.2	54.1	48.3	53.3
7	70	53.6	59.8	60.2	60.6	61.9	53.0	47.6	52.2
8	70	86.2	74.0	64.7	90.8	74.1	85.6	64.1	84.8
9	70	98.5	73.5	63.7	93.5	75.1	98.0	64.9	97.2
10	70	109.2	72.8	63.3	94.3	76.4	108.6	65.3	107.9
11	70	86.3	72.1	62.7	90.8	77.5	85.7	64.9	84.9
12	70	82.9	71.5	65.1	86.5	78.4	82.4	64.1	81.6
13	70	82.7	69.2	65.4	75.6	80.7	82.2	60.1	81.4
14	70	60.0	63.9	65.9	67.5	68.1	59.5	51.0	58.7
15	70	60.4	64.1	66.2	67.6	68.5	59.9	51.4	59.1
16	70	59.7	63.7	66.3	67.0	67.9	59.1	51.0	58.3
17	70	59.4	63.5	63.5	66.6	67.8	58.8	50.8	58.0
18	70	59.5	63.6	66.8	66.6	68.0	59.0	51.1	58.2
19	70	58.6	63.1	66.8	66.0	67.3	58.1	50.5	57.3
20	70	64.4	66.0	76.5	69.4	72.6	63.9	55.3	63.1
21	70	63.5	65.8	77.3	68.8	72.0	62.9	55.1	62.2
22	70	66.5	67.7	64.4	70.8	75.7	65.9	59.2	65.1
23	70	61.0	64.8	64.9	67.2	70.0	60.4	53.6	59.7
24	70	60.7	64.7	65.1	67.0	69.7	60.1	53.3	59.3
25	70	60.2	64.5	65.0	66.7	69.4	59.7	53.0	58.9
26	70	59.9	64.3	65.6	66.5	69.0	59.3	52.7	58.5
27	70	59.5	64.1	65.5	66.2	68.7	58.9	52.4	58.2
28	70	61.1	64.9	69.2	67.0	69.8	60.5	53.7	59.7
29	70	60.6	64.7	69.4	66.7	69.4	60.1	53.3	59.3
30	70	58.0	63.1	71.1	64.6	66.6	57.4	51.0	56.6
31	70	56.7	62.3	69.5	63.7	65.5	56.1	50.1	55.4
32	70	52.2	59.3	69.9	60.5	61.7	51.6	45.7	50.9
33	70	57.2	62.4	67.5	63.6	65.4	56.7	51.1	55.9

Construction Receptor ID	BS5228 CategoryC/NR A Guideline	Clearing Site (dB)	Demolition (dB)				Ground Excavation (dB)	Road Construction and Road Surfacing (dB)	Paving and Public Realm (dB)
			Area 1	Area 2	Area 3	Area 4			
34	70	64.0	65.9	67.5	67.6	70.6	63.4	55.3	62.6
35	70	64.3	66.1	67.4	67.5	70.5	63.8	56.2	63.0
36	70	64.3	66.0	67.7	67.4	70.2	63.7	56.8	63.0
37	70	64.3	66.1	68.1	67.3	70.1	63.7	57.1	63.0
38	70	70.7	68.3	68.7	68.9	71.7	70.2	62.1	69.4
39	70	73.7	69.0	69.7	69.6	72.5	73.1	62.0	72.3
40	70	74.1	69.1	77.7	69.4	72.0	73.6	63.7	72.8
41	70	75.0	69.2	77.8	69.2	71.6	74.4	65.7	73.7
42	70	75.0	69.2	67.3	68.9	71.1	74.5	67.9	73.7
43	70	80.3	69.1	69.3	68.5	70.4	79.7	72.3	78.9
44	70	64.5	65.9	66.1	66.9	69.4	64.0	58.0	63.2
45	70	65.1	65.9	66.0	66.8	69.3	64.5	58.6	63.7
46	70	66.8	65.9	65.7	66.5	68.8	66.2	60.3	65.4
47	70	67.5	65.9	67.7	66.4	68.7	67.0	61.1	66.2
48	70	68.4	65.8	65.2	66.1	68.1	67.9	62.2	67.1
49	70	69.2	65.7	65.4	65.8	67.7	68.6	63.3	67.8
50	70	69.0	65.6	65.6	65.7	67.5	68.4	63.3	67.6
51	70	68.7	65.5	63.5	65.5	67.2	68.1	63.2	67.3
52	70	68.1	65.3	64.7	65.2	66.9	67.6	62.8	66.8
53	70	67.7	65.2	65.4	65.0	66.6	67.1	62.5	66.3
54	70	66.7	64.9	65.6	64.7	66.1	66.2	61.6	65.4
55	70	62.1	63.5	65.7	63.6	65.1	61.6	56.5	60.8
56	70	59.4	62.4	65.7	62.6	63.9	58.9	53.7	58.1
57	70	57.9	61.7	64.4	62.0	63.3	57.4	52.1	56.6
58	70	63.5	64.0	63.8	63.5	64.8	62.9	58.1	62.1
59	70	62.5	63.6	65.9	63.1	64.3	62.0	57.0	61.2
60	70	61.1	63.0	66.7	62.5	63.5	60.5	55.4	59.7
61	70	56.6	61.0	66.7	60.8	61.8	56.0	50.9	55.2
62	70	55.0	60.2	66.4	60.5	61.6	54.5	49.2	53.7
63	70	53.5	59.3	66.2	59.6	60.6	53.0	47.7	52.2
64	70	53.1	58.9	65.6	59.0	59.9	52.5	47.3	51.7
65	70	54.8	59.9	65.2	59.9	60.8	54.2	49.0	53.4
66	70	52.8	58.7	65.7	58.5	59.2	52.2	47.0	51.5
67	70	52.9	58.8	72.1	58.4	59.0	52.4	47.0	51.6

Construction Receptor ID	BS5228 CategoryC/NR A Guideline	Clearing Site (dB)	Demolition (dB)				Ground Excavation (dB)	Road Construction and Road Surfacing (dB)	Paving and Public Realm (dB)
			Area 1	Area 2	Area 3	Area 4			
68	70	50.4	57.4	68.7	56.7	57.1	49.8	44.4	49.1
69	70	54.4	60.4	69.4	59.3	59.7	53.9	48.4	53.1
70	70	49.8	58.4	69.3	56.9	56.6	49.3	43.8	48.5
71	70	50.9	59.3	69.3	57.7	57.3	50.3	44.9	49.5
72	70	58.9	65.7	69.1	62.5	61.9	58.3	52.8	57.5
73	70	59.8	67.1	68.8	63.8	62.6	59.2	53.6	58.4
74	70	61.0	68.2	57.4	64.5	63.1	60.5	54.9	59.7
75	70	61.0	68.4	58.2	64.6	63.2	60.5	54.9	59.7
76	70	61.1	68.5	62.4	64.8	63.3	60.6	54.8	59.8
77	70	61.2	68.6	60.8	64.8	63.3	60.6	54.6	59.9
78	70	67.1	73.7	61.8	68.1	65.8	66.5	57.1	65.8
79	70	66.0	73.6	59.9	68.4	65.9	65.4	57.1	64.6
80	70	67.5	76.0	60.3	70.1	67.0	67.0	59.3	66.2
81	70	58.4	66.7	58.9	63.8	62.3	57.9	51.5	57.1
82	70	57.7	66.0	59.4	63.2	61.8	57.1	51.0	56.3
83	70	55.7	64.5	60.0	62.4	60.9	55.1	48.9	54.3
84	70	55.5	64.7	58.5	62.9	61.3	55.0	48.6	54.2
85	70	53.2	62.4	57.0	60.8	59.6	52.7	46.6	51.9
86	70	53.5	62.9	59.7	61.6	60.1	52.9	46.9	52.1
87	70	53.7	63.1	63.0	62.0	60.4	53.1	47.1	52.3
88	70	50.7	60.0	58.5	58.9	57.8	50.2	44.2	49.4
89	70	50.7	60.1	63.8	59.1	58.0	50.2	44.2	49.4
90	70	50.6	60.1	63.0	59.2	58.0	50.0	44.1	49.2
91	70	53.5	62.3	62.8	62.8	61.0	52.9	46.4	52.1
92	70	63.2	68.8	61.1	72.4	68.1	62.6	54.3	61.9
93	70	63.5	68.8	59.0	72.8	68.5	63.0	54.6	62.2
94	70	64.0	68.7	63.1	73.1	68.9	63.4	54.8	62.6
95	70	62.4	67.4	61.7	71.6	68.6	61.8	53.8	61.1
96	70	61.6	66.9	62.0	70.9	68.1	61.0	53.2	60.2
97	70	61.0	66.6	59.2	70.4	67.7	60.5	52.7	59.7
98	70	60.6	66.3	59.2	69.9	67.4	60.0	52.4	59.2
99	70	60.6	66.5	62.0	70.0	67.2	60.1	52.4	59.3
100	70	60.6	66.6	75.8	69.9	67.1	60.0	52.4	59.2

Figure 4.B.1: Construction Noise Receptors, Locations of Proposed Construction Activity and Construction Buffer (500m)

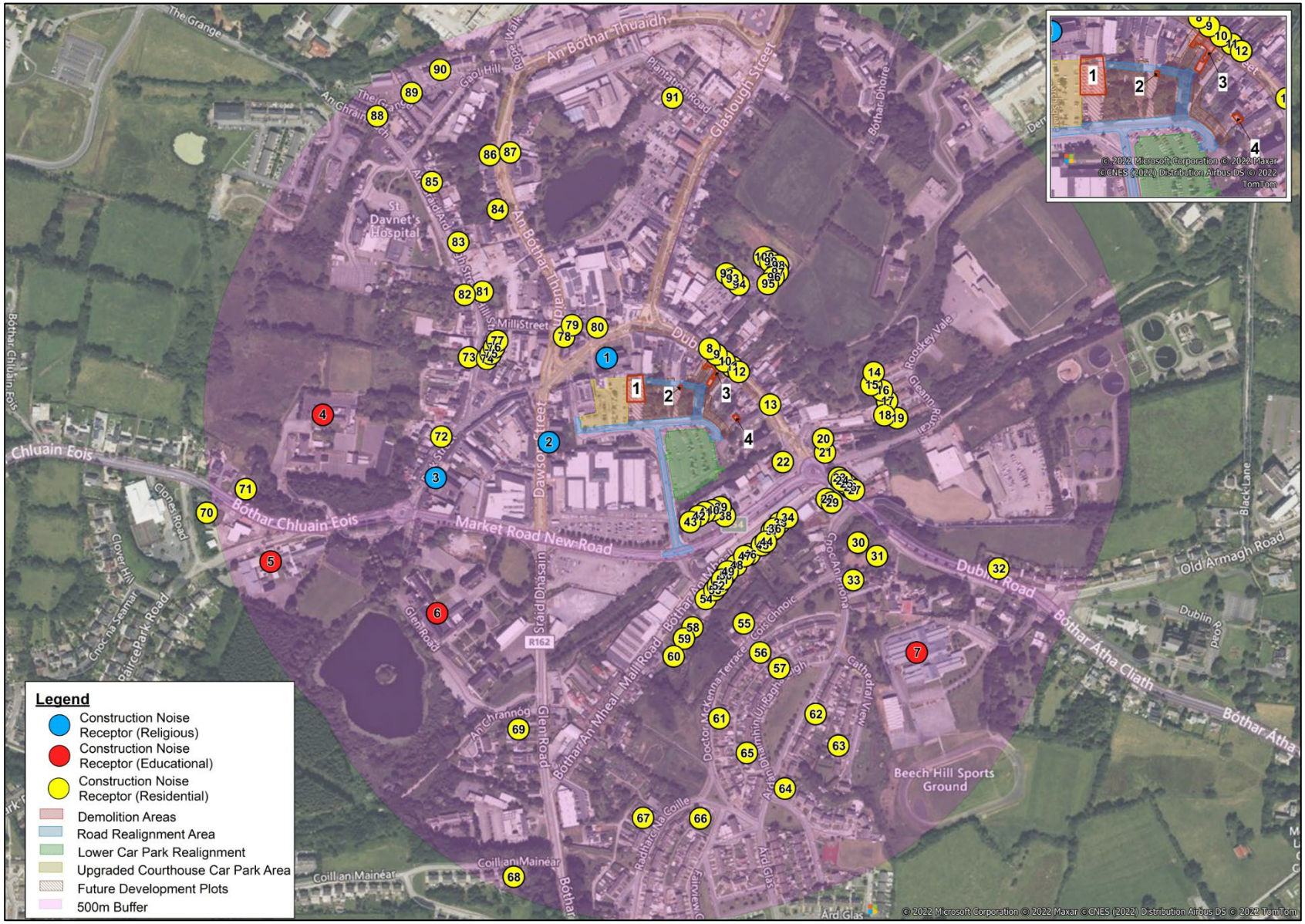
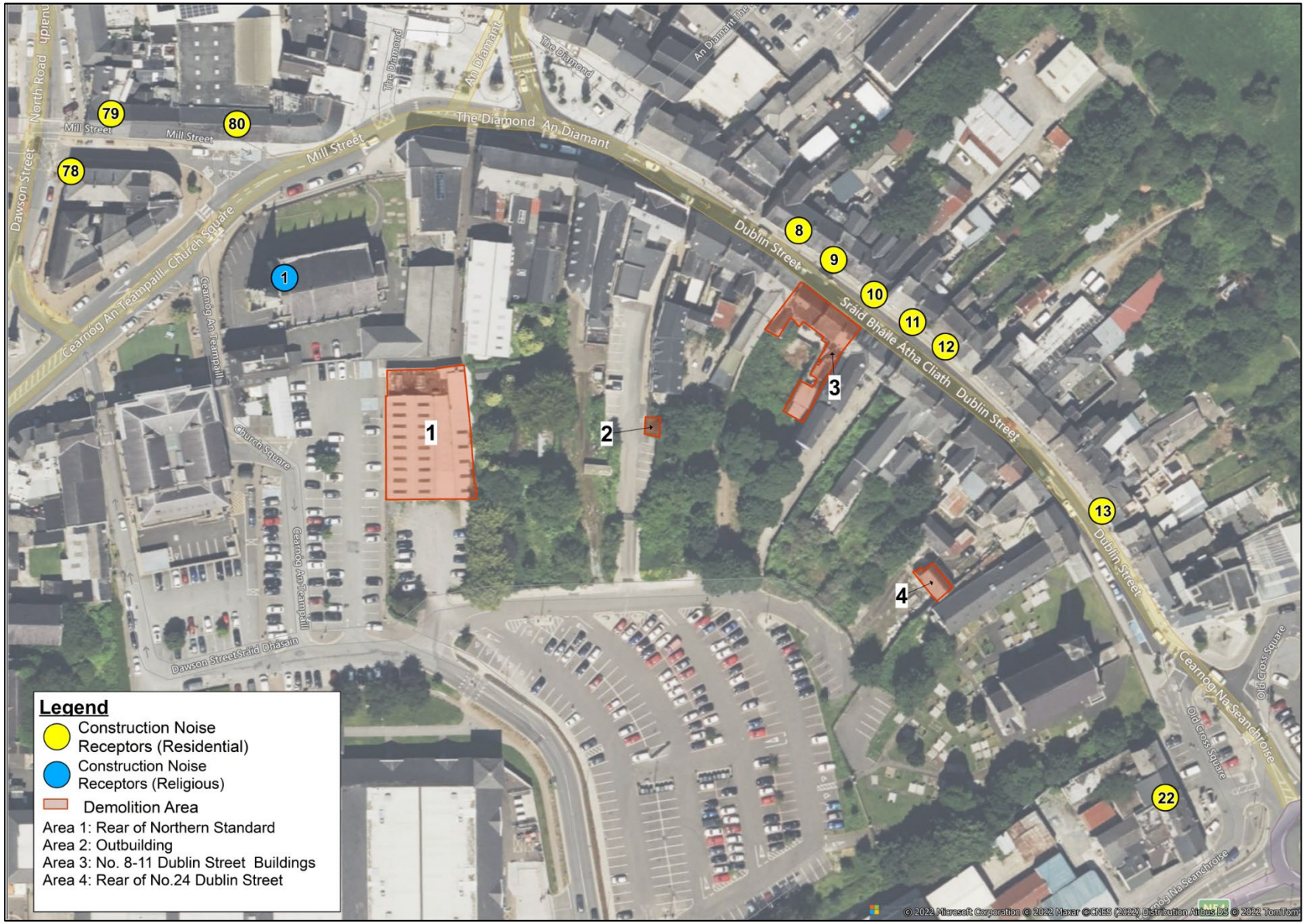


Figure 4.B.2: Demolition Areas and Construction Noise Receptors



Appendix

7a

Monaghan Public Realm Preliminary Risk Assessment Final March 2021

MONAGHAN PUBLIC REALM

Preliminary Risk Assessment (Desk Study) Report

IBR1284
Monaghan Public Realm
Preliminary Risk
Assessment (Desk Study)
Report
Final
22 March 2021

rpsgroup.com

Document status

Version	Purpose of document	Authored by	Reviewed by	Approved by	Review date
Final	Preliminary Risk Assessment (Desk Study)	J. Fullerton, Project Scientist	J. McGrath, Associate	J. McGrath, Associate	22/03/2021

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Joseph McGrath 22 March 2021

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Prepared by:

RPS

Josh Fullerton

Graduate Scientist

Elmwood House, 74 Boucher Road, Belfast, Northern Ireland, BT12 6RZ

T 028 9066 7914

E josh.fullerton@rpsgroup.com

Prepared for:

Monaghan County Council

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Appendix A Historical Maps
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1 INTRODUCTION

1.1 Project description

RPS was appointed by Monaghan County Council to undertake a Preliminary Risk Assessment (Desk Study) Report in for the proposed development of a large scale public realm scheme in Monaghan town centre.

This report describes the research and assessments undertaken to assess the site ground conditions and the potential for any ground contamination that may have arisen from the site's present and historical uses.

RPS Consulting Engineers have been engaged by Monaghan County Council (MCC) to provide design and construction management services for the "South Dublin Street and Backlands Regeneration Scheme" Public Realm Improvement Project. This scheme is Phase 1 of a wider regeneration masterplan for the Dublin Street area of Monaghan Town. This project is progressed through the Urban Regeneration and Development Fund under Project Ireland 2040.

The proposed Dublin Street regeneration scheme area is located to the southeast of the town core, extending from The Diamond to the northwest, south eastwards along Dublin Street, and is defined to the southeast by the Presbyterian Church to the south at Old Cross Square. The regeneration scheme area is defined by the terraces of dwellings to Dublin Street to the north east, and the long rear gardens to the south. Monaghan County Council have the following long term vision to enhance the physical and special quality of Dublin Street.

"Dublin Street together with its backlands offers a unique opportunity to create a new and viable town centre quarter, with the potential to accommodate additional shopping, office, cultural, residential and new employment zone. It offers the opportunity to address the weaknesses of the area and to maximise its strengths; to enhance pedestrian and vehicular movement, to enhance the existing built heritage; to integrate with the historic streetscape in a manner that is both contemporary and forward looking while complimenting the built heritage; to create an integrated and commercially robust, viable proposal, and a vibrant and sustainable new urban quarter in Monaghan."

The study area (site) (Figure 2.2) has a mixture of both private and publicly developed lands with some lands undeveloped in private ownership. The site comprises of car park in the south marked by River Shambles as boundary, courthouse car park in the northwest, private and/or public property in the north and northeast.

1.2 Report Objectives and Scope

The objectives of this report are as follows:

- Collate desk study information regarding the site and surrounds to allow the identification of potential contaminant sources, potential pathways and potential receptors in accordance with Land contamination risk management (LCRM). This will form the basis of the Preliminary Risk Assessment and production of a Conceptual Site Model (CSM).
- Collation of existing geo-environmental data to facilitate a risk assessment with regard to potential risks to human health and environmental risks.
- Assessment of the above to determine if intrusive investigation and further assessment will be necessary.

1.3 Previous studies

Three geotechnical studies have been conducted in the past and are summarised below:

- By Glover Site Investigation Ltd (Report No. 04-663), ground investigation points (BH1 to BH7) have been conducted in the southern car park in December 2004. This investigation data is not available but it is referenced in later ground investigations.

- By Glover Site Investigation Ltd (Report No. 05-021), a bedrock probe survey was conducted which consisted of 16 nos. of dynamic cone tests in the southern car park in January 2005.

- By Priority Geotechnical Ltd in October 2009 (Report No. PC7089) consisting of a significant number of ground investigation points covering a large area. This study was conducted to facilitate civil works for Monaghan town. Only 1 no. of rotary open hole (BH10), 2 nos. cable percussion borehole (BH1032 and BH1033), 4 nos. rotary cored boreholes (BHR13, BHR14, BHR21 and BHR22), 7 nos. trial pits (TP24, TP25, TP25A, TP26, TP41, TP43 and TP44) are relevant to this study area. However all of these ground investigation points are located on the periphery of the site.

Two hydrogeological assessments were carried out for the southern car park area:

- By Malone O'Regan Environmental Services Ltd in January 2007 (Report: RT-NN-1257/02).

- By Webber Associates (Doc. No. 1200, Job No. 705) in July 2007, consisting of 6 nos. rotary drilled boreholes (B1, C, D, E, F and G) whose exact locations are unknown. This was a reassessment carried out following the assessment by Malone O'Regan.

- A Flood Risk Assessment for River Shambles was carried out for the site by Doran Consulting in July 2

1.4 Sources of Information

Sources of information used in the production of this report include:

- Internet based aerial photography
- Ordnance Survey Ireland mapviewer
- (http://maps.osi.ie/publicviewer/#V2,719558,734710,9,7)
- Geological Survey Ireland Spatial Resources Map Viewer – Department of Communications, Climate Action and Environment (http://dcenr.maps.arcgis.com/apps/MapSeries/index.html?appid=a30af518e87a4c0ab2fbde2aaac3c228)
- http://www.epa.ie/radiation/radonmap/
- Environmental Protection Agency Radon Map (http://www.epa.ie/radiation/radonmap/)
- Geological Survey of Ireland Geotechnical Data Viewer (http://spatial.dcenr.gov.ie/GeologicalSurvey/GeoTechnicalViewer/index.html)
- Environmental Protection Agency map viewer (https://gis.epa.ie/EPAMaps/)
- Reports from previous studies and ground investigations as mentioned in Section 1.3
- Land and Soil EPA maps (Geohive maps)
- Topolographical Drawing : MGT0528-RPS-00-XX-M3-C-XP0002
- Drainage Drawing : MGT0528-RPS-00-XX-DR-C-DR001
- General Arrangement Drawing : MGT0528-RPS-00-XX-DR-C-GA001
- Utilities Drawing : MGT0528-RPS-00-XX-DR-C-UT0001

1.5 Guidance

The following guidance documents have been used in the production of this report;

- Land contamination risk management (LCRM) - How to assess and manage the risks from land contamination. Environment Agency, October 2020.
- Redeveloping Land Affected by Contamination – A developers Guide to Planning Considerations and Environmental Responsibilities. DAERA, April 2019.

1.6 Risk Assessment

1. Underpinning the guidance within LCRM is a source-pathway-receptor methodology, which is used to identify Significant Pollutant Linkages (SPLs). The following definitions apply:-
2.

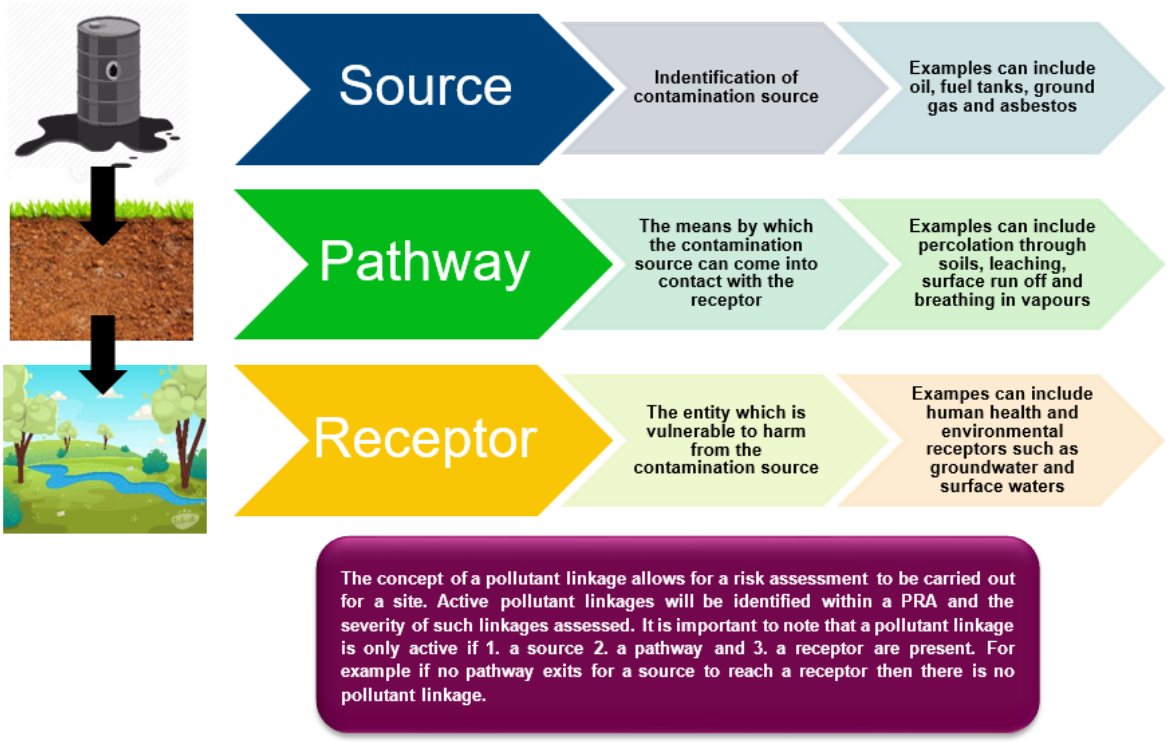
- **Source**: a contaminant or pollutant that is in, on or under the land and that has the potential to cause harm or pollution;
- **Pathway**: a route by which a receptor is or could be affected by a contaminant

- **Receptor**: something that could be adversely affected by a contaminant, for example a person, controlled waters, an organism, an ecosystem, or Part 2A receptors such as buildings, crops or animals

3. An important thread throughout the overall process of risk assessment is the need to formulate and develop a conceptual model for the site, which supports the identification and assessment of pollutant linkages. Development of the conceptual model forms the main part of the preliminary risk assessment, and the model is subsequently refined or revised as more information and understanding is obtained through the risk assessment process. A risk is present only when a source-pathway-receptor linkage is present and active. Without a pollutant linkage, there is not a risk, even if a contaminant is present.

1.7 Pollutant Linkage Diagram

Figure 1.1 Pollutant Linkage Diagram



1.8 Limitations

This report is for the use of Monaghan County Council only and should not be relied upon by other parties unless specifically advised by RPS in writing. Furthermore, new information, design changes, changed practices or new legislation may necessitate revised interpretation of the report after its date of submission.

This report has been prepared by RPS on the basis of the available information received during the study period. Although every reasonable effort has been made to obtain all relevant information, all potential contaminants, environmental constraints or liabilities associated with the site may not necessarily have been revealed. A robust site walkover survey would have been beneficial to identify any onsite and offsite contamination sources such as fuel tanks. This was not possible due to Coronavirus restrictions imposed by the Irish Government on limiting travel across the Northern Ireland Republic of Ireland border.

2 SITE DESCRIPTION

2.1 Site Location

As shown in Figure 2.1, the site is located within the central core of Monaghan Town centre in the Republic of Ireland, approximately 6.90km from the Northern Ireland border.

The site is located at Irish grid reference 267304 Easting, 333645 Northing.

Figure 2.1 Site Location

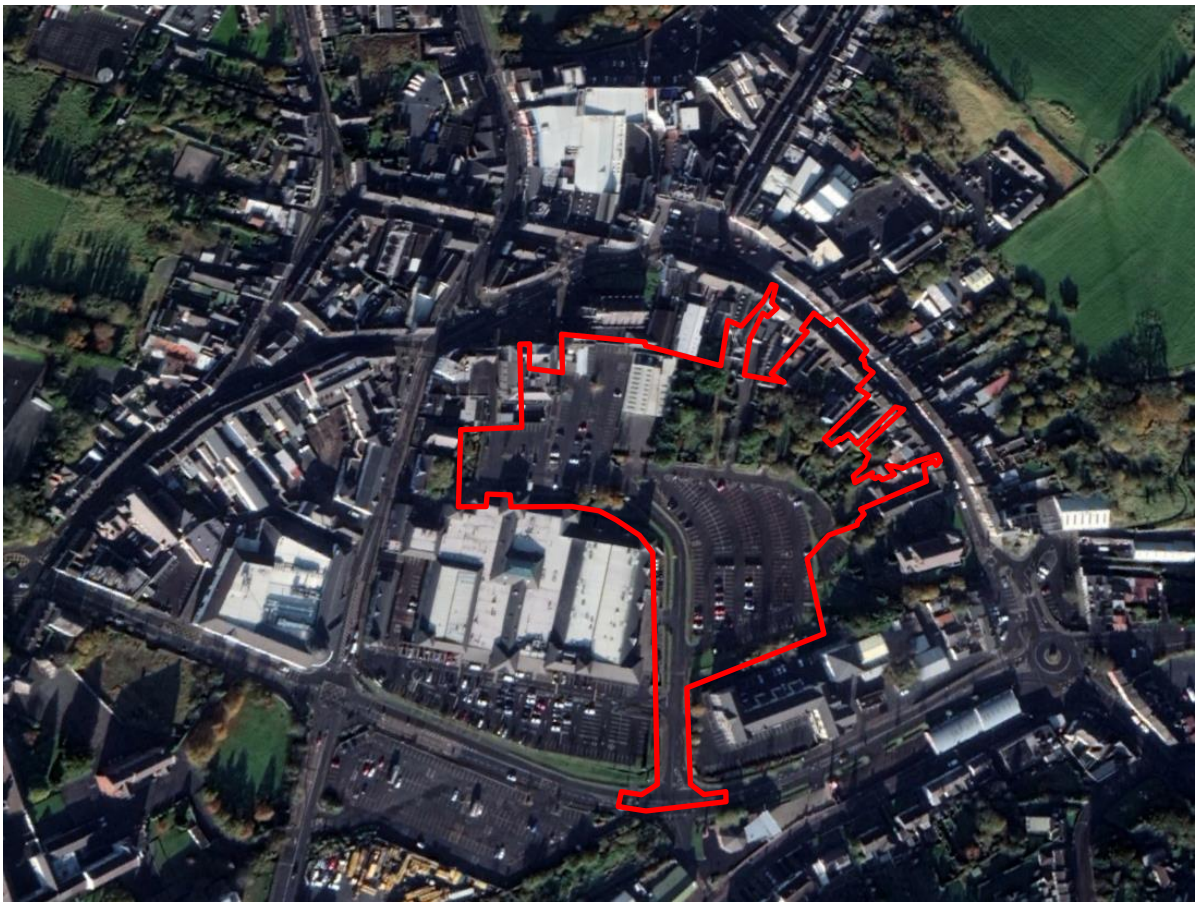


2.2 Study Area

The existing site layout is shown in Figure 2.2. A site walkover was completed at the site by RPS personnel by the planning team (as such there was not a primary focus of this survey on contaminated land) in June 2020.

The proposed Dublin Street regeneration scheme area is located to the southeast of the town core, extending from The Diamond to the northwest, south eastwards along Dublin Street, and is defined to the southeast by the Presbyterian Church to the south at Old Cross Square. The regeneration scheme area is defined by the terraces of dwellings to Dublin Street to the north east, and the long rear gardens to the south. Monaghan County Council have the following long term vision to enhance the physical and special quality of Dublin Street.

Figure 2.2 Existing Site Layout



2.2.1 Current Site Use

The site currently comprises several retail /commercial buildings (both vacant and in-use) and backland areas comprising vacant / derelict land and properties, storage areas, and rear access points. It also contains extensive areas of existing car parking, roads/road infrastructure, pedestrian alleyways, and incidental green space.

2.2.2 Ground Cover

Ground cover within the site is surfaced primarily in hardstanding. Portions of the application site are landscaped with trees and low level vegetation.

2.2.3 Localised site topography

Topography

The ground slopes from north towards south. The site has four topographical areas and are as follows:

a. Courthouse parking area – located at the northwest part of the site, the land slopes from approximately from 60mOD in the north to 56mOD to the south of this car park.

b. Structure with open space – located in the northern part of the site and adjacent to the courthouse carpark, the land is relatively flat with approximate level of 56mOD in southern half of area. The ground falls from 60mOD in the north to 55.5mOD in the south of this region.

c. Southern car park – located to the south of the site, the ground gently rolls from approximately 55.5mOD in the north to approximately 53mOD in the south of this region.

d. North east region – this is region is quite flat with ground level approximately 56.5mOD

The ground suddenly drops between the courthouse car park and the structure with open space region.

2.2.4 Contamination Sources

There are no indications of contamination in the published data or ground investigations. Possible sources of contamination on this site include coal tar in bitumen and hydrocarbon runoff. These are unlikely to affect the design.

2.2.5 Application Site Details

Table 2.1 Application Site Details

Site Address	Grid Reference	Approximate Site Area
Monaghan Urban ED, Monaghan Municipal District, County Monaghan, H18 WK60, Republic of Ireland.	267304 Easting, 333645 Northing.	c.2 Hectares

2.3 Surrounding Land-use

The pertinent surrounding land uses of the site are listed in Table 2.2.

Table 2.2 Surrounding Land Uses

Boundary	Surrounding Land Uses of the Proposed Development
North	Lands to the north comprise mixed use commercial and residential properties.
East	Various commercial premises make up the land use top the east of the site. There is extensive green space to the east and Monaghan GAA club. A waste water treatment facility is also located to the east at c.330m.
South	Lands to the south comprise mixed use commercial and residential properties.
West	Commercial developments such as Tesco and Monaghan Shopping Centre occupy the land use to the west of the site. A large carpark can be seen to the east of the site.

2.4 Proposed Development

This Preliminary Risk Assessment has been prepared for the proposed development which focuses on a major public realm scheme within Monaghan town centre, which includes demolition of four buildings and associated outbuildings and structures, creation of a new street and civic space (Gavan Duffy Place), and public realm improvements throughout South Dublin Street including new paving, lighting, drainage, and all other associated works.

3 SITE HISTORY

3.1 Historical Development of the Site

A review of available historical ordnance survey maps was undertaken to ascertain the development history of the site. Table 3.1 provides a summary of potentially contaminating activities during the history of the site and its surrounding area; snapshots of the maps are included in Appendix A.

Table 3.1 Historical Site and Surrounding Area Development

Date	Site History	Surrounding Land Use History
1829-41	The site is occupied with a number of buildings and infrastructure, the street network is existent in this epoch with Dublin Street, Dawson Street and Male Road. Monaghan is a well-established townland in this period.	A quarry can be seen to the east of the site at c.130m and an Infirmary on mapping at c.100m. Monaghan Lake is annotated to the north of the site. A large jail (Gaol) is present to the west of Monaghan Town at c.280m. A brewery is annotated to the south west of the site at c.300m.
1897-1913	As above but Monaghan has experienced further growth and expansion in various infrastructure within the site locations.	A gas works is present to the east at approximately 250m of the site and a Saw Mill to the west at a distance of approximately 150m. The jail is now annotated as Monaghan County Infirmary. A grave yard dis present on historical mapping approximately 50m west of Old Cross Square to the south of Dublin Street.
1829-41	As above	As above
Google Earth 2001 - 2020	The site does not experience any significant changes during this period.	The surrounding area experiences minor alternation and new builds.

4 SITE GEOLOGY AND HYDROGEOLOGY

A desk study of published material held on the Geological Survey Ireland Spatial Resources (online portal) was undertaken to provide an initial overview of ground conditions at the site. The following describes the findings of this preliminary research.

4.1 Solid Geology

The geology of the area is characterised by carboniferous limestone. This is observed from the Geological Survey of Ireland (GSI), 1:100,000 mapping (Figure 4.1) and from the descriptions available from the boreholes for the site. .

Figure 4.1 Solid Geology (taken from GSI)



4.2 Drift Geology

Review of the quaternary sediments map for the area shows that the scheme is majority made up of made ground and partly from till derived from limestone on the north eastern side of the site. Quaternary sediments mapping for the study area are presented in Figure 4.2.

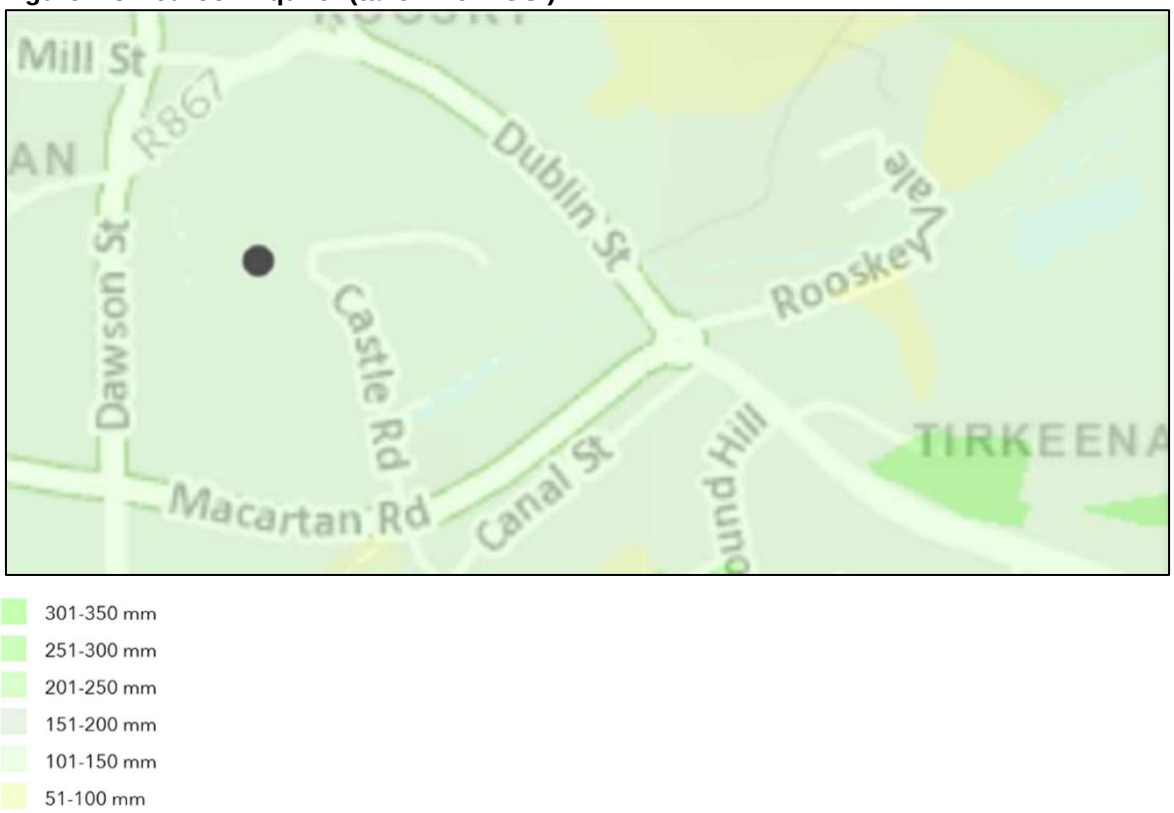
Figure 4.2 Drift Geology (taken from GSI)



4.3 Hydrogeology

The GSI map for groundwater recharge for the site (Figure 4.3), sets a value of 151 to 200mm. The site specific hydrology study conducted indicate a 1 in 100 year flow of 5.4m3/s for a catchment area of 2km2. The predicted flood level is 53.4mOD which indicates that the southern part of the site can get inundated.

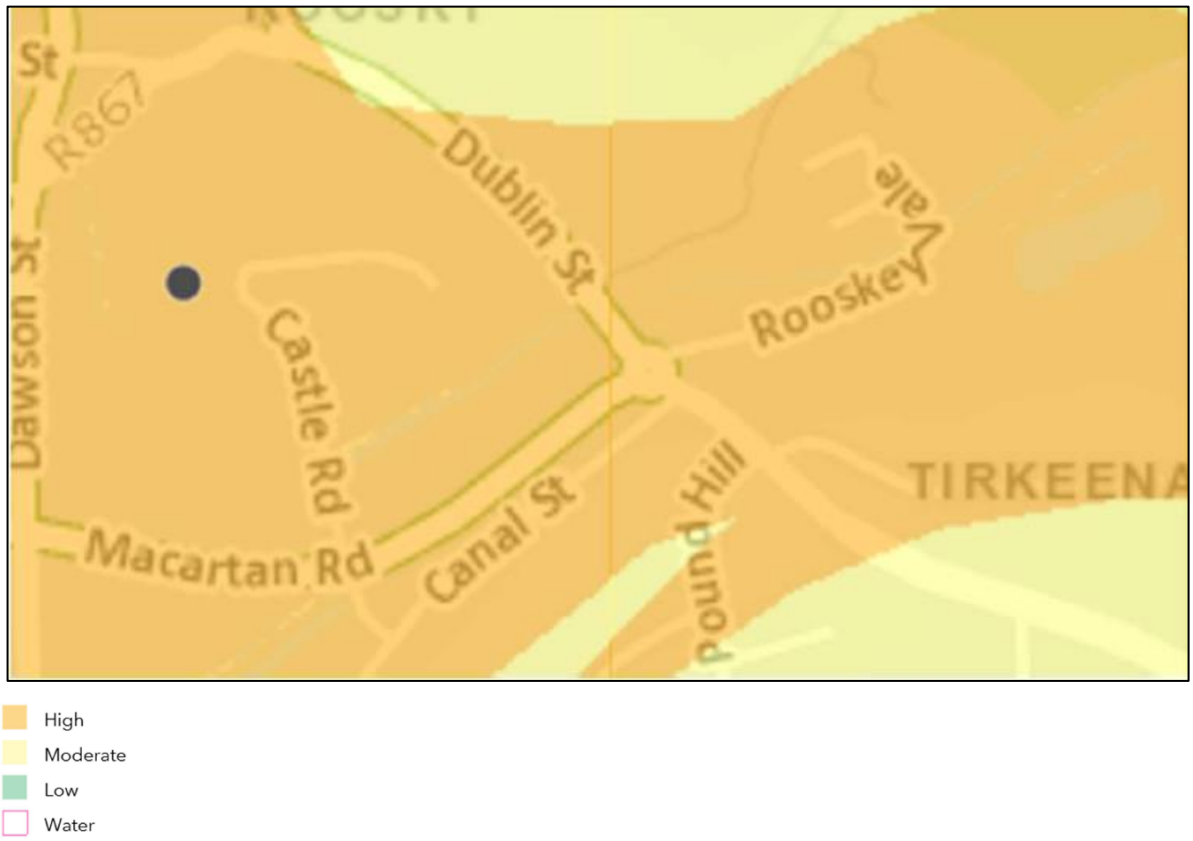
Figure 4.3 Bedrock Aquifer (taken from GSI)



4.4 Groundwater Vulnerability

According to the GSI map for groundwater vulnerability (Figure 4.4), the site has “high” vulnerability indicating that the natural groundwater may be easily contaminated by human activities.

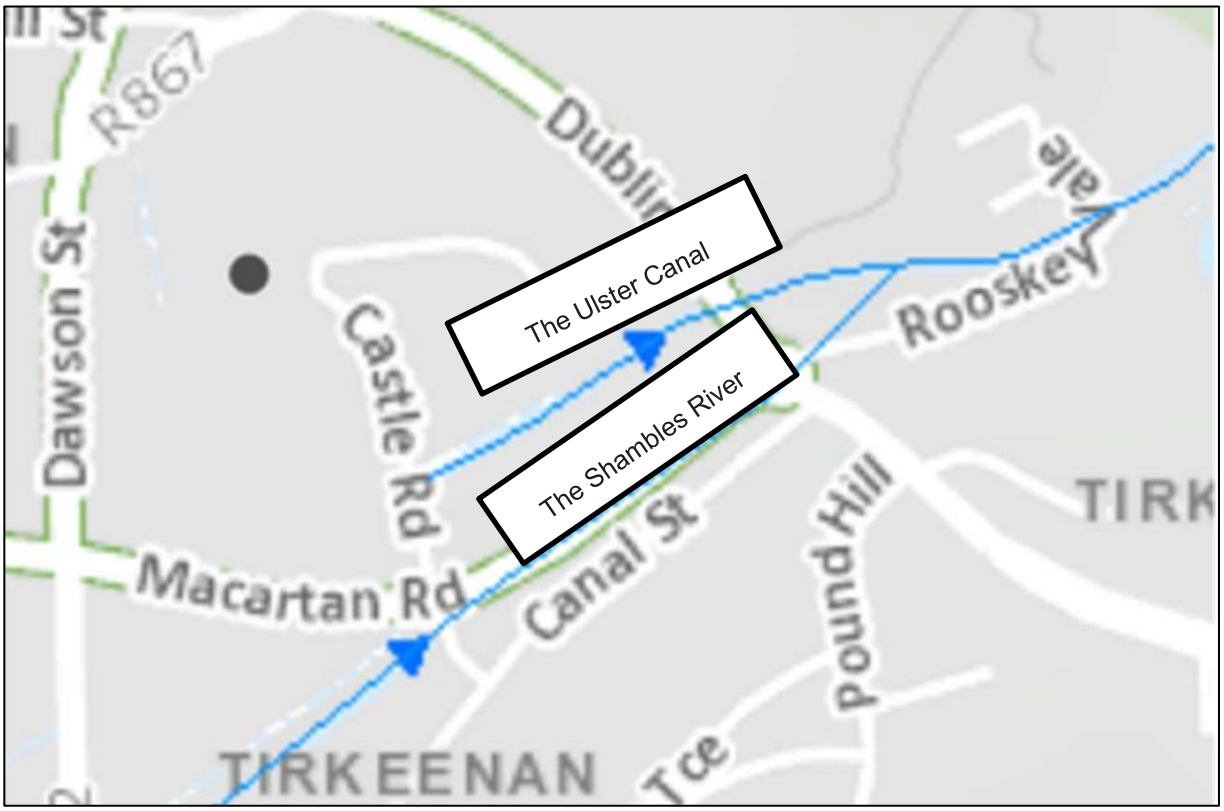
Figure 4.4 Groundwater Vulnerability (taken from GSI)



4.5 Surface Water Hydrology

To the south of the site flows the culverted Shambles River in an easterly direction is located as seen in Figure 4.5. The Ulster Canal is located just north of this to the south of the large Tesco carpark.

Figure 4.5 Surface Water Features (Mapping by GSI)



5 PREVIOUS SITE ASSESSMENT

As previously referenced in section 1.3 of this report a number of previous assessments have been undertaken in the vicinity of the site, these will be used to gain an understanding of the ground conditions. All reports are contained in Appendix B for further consultation.

5.1 Glover Site Investigation Ltd - Dynamic cone tests in the southern car park in January 2005.

5.1.1 Ground Conditions

The following descriptions are based on ground investigations in the southern car park. 17 no. Dynamic Cone Penetrometer tests (DCPs) have been carried out in the southern car park region. Blow count of < 5/100 mm has been found to occur between 0 to 3.5m BGL to a depth of 0.7 to 10m BGL. This indicates that made ground is between 0 to 3.5m thick followed by Peat and/or organic Silt and Clay.

1. Made ground - From the available borehole logs of the southern car park, along the Dublin road and Castle road, the Made ground is described as a combination of Bitmac, Hardcore and Spalls, and Stiff, very gravelly fine sandy Clay or Medium dense Gravel with cobbles and boulders. The thickness of Made ground is between 1.0m to 2.35m, according to the borehole logs.

2. Topsoil - Topsoil is described in the ground investigation logs as peaty of approximately 0.5m thick.

3. Peat - Peat is noted in the southern car park. It is described as very soft dark brown silty and fibrous. It is overlain by Made ground and underlain by Marl. The thickness as per the available borehole logs is between 2.0m to 3.5m. The SPT N value is between 1 and 2.

4. Marl - Very soft to soft marl is described in the borehole logs as fine sandy Clay and whiteish grey Silt with shell fragments. The thickness of this layers varies between 1.0m to 3.6m. It is found between 1.0m to 3.5m BGL. The SPT N value is 2 to 7.

5. Glacial Till - Described as stiff gravelly sandy Clay with thickness varying between 0.6m to 5.9m. The SPT N value ranges from 19 to refusal.

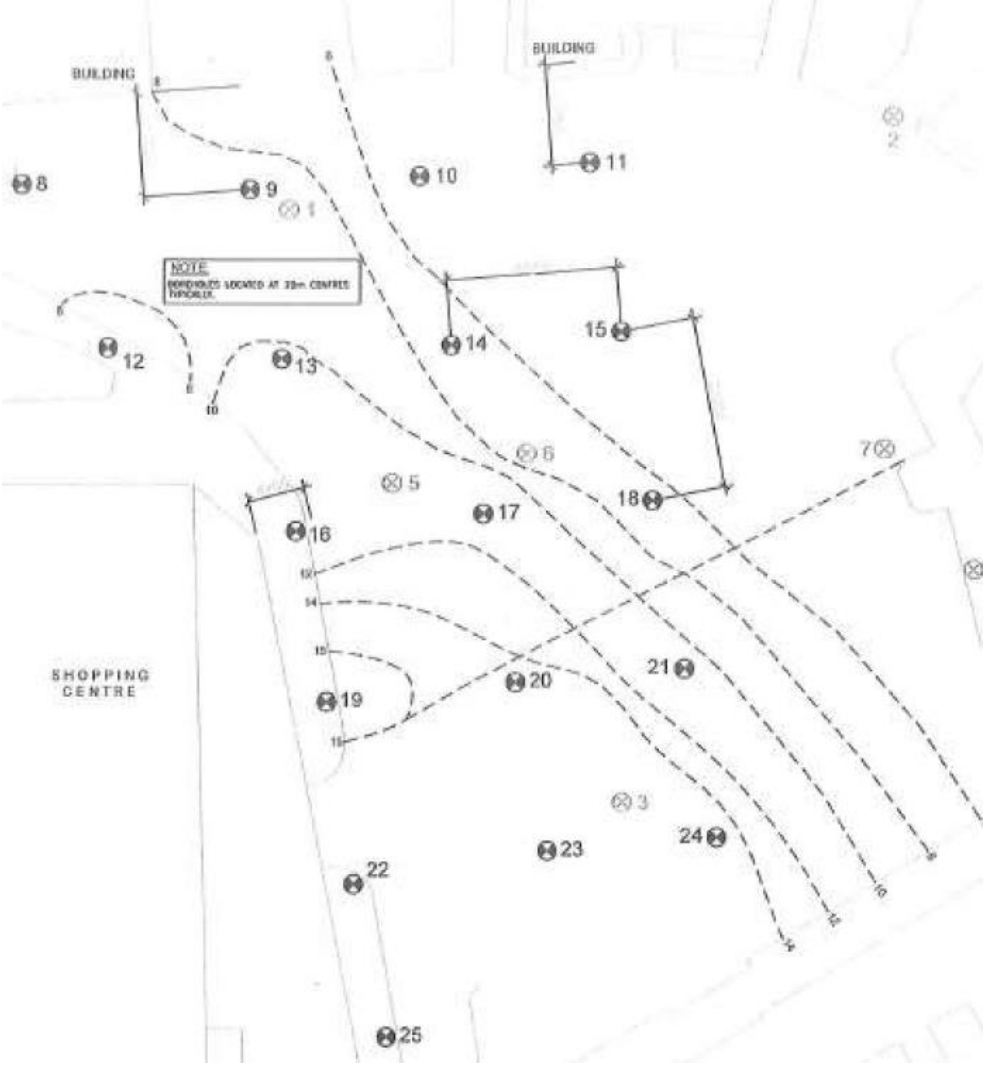
6. Gravel - Described as loose to medium dense silty sandy Gravel with thickness varying between 2.5m to 4.0m. The SPT N value ranges between 6 to 34.

7. Bedrock - Bedrock is defined in the borehole logs as moderately strong fine grained carboniferous Limestone. The depth of rockhead ranges from 2.5m BGL to 14.5m BGL. Greater depths to rockhead are observed towards the south.

According to earlier studies carried out to establish the bedrock levels in the southern car park, the rockhead depth contours indicate shallower depths in the northeast and greater depths towards the southwest (Figure 5.1)

8. Groundwater - Groundwater was encountered in all the boreholes in the southern car park. The depth varied between 1.0m to 3.5m BGL, with greater depths in the north.

Figure 5.1 Bedrock level contours (Glover Site Investigation Limited)



5.2 Monaghan Town Collection Network, Priority Geotechnical Drilling Report, 2009.

5.2.1 Scope of works

In July 2007, T.J. O' Connor & Associates, Consulting Engineers commissioned Priority Geotechnical, PGL on behalf of their Client, Monaghan County Council, to carry out a ground investigation for the proposed Monaghan Town, Collection Network. The purpose of the geotechnical ground investigation was to obtain sufficient geotechnical information for the design of the proposed civil works. The investigation, which was specified by T.J. O' Connor, Consulting Engineers, initially comprised, as per the Tender Bill of Quantities, of seventy (70) number rotary open hole boreholes, sixty (65) number rotary cored boreholes, one hundred and eighty nine (189) number trial pit excavations and twenty three (23) number slit trenches, all associated sampling, in-situ testing, laboratory work and factual reporting. The scope of the works was subsequently extended to include for cable percussion boreholes. This investigation was carried out in accordance with the contract specification and relevant standards. The initial and additional fieldwork was carried out from August 2007 to June 2008. This full report is contained within Appendix C.

The ground investigation locations most relevant to the Monaghan public realm scheme are as follows;

- BH10, BH13, BH14, BHR21 BHR22, BH1032 and BH1033.

The general stratigraphic sequence of ground conditions encountered at these exploratory borehole is as follows;

Table 5.1 Borehole stratigraphy summary

Borehole	Range of thickness	Stratum encountered
BH10	0.1m to 9.0m	PEAT
BH13	0.1m to 20m	Slightly sandy slightly gravelly CLAY
BH14	0.1m to 2.5m	Made ground: Clause-804, tarmacadam, concrete and block paving.
BHR21	0.1m to 20m	Slightly sandy slightly gravelly CLAY

Borehole	Range of thickness	Stratum encountered
BHR22	0.1m to 2.5m	Made ground: Clause-804, tarmacadam, concrete and block paving.
BH1032	0.1m to 2.5m	Made ground: Clause-804, tarmacadam, concrete and block paving.
BH1033	0.1m to 2.5m	Made ground: Clause-804, tarmacadam, concrete and block paving.

- TP025, TP025A, TP026, TP041, TP042, TP043 and TP044

The general stratigraphic sequence of ground conditions encountered at these locations is as follows;

Table 5.2 Trial pit stratigraphy summary

Borehole	Range of thickness	Stratum encountered
TP024	0.1 to 2.5m	Made ground: Clause-804, tarmacadam, concrete and block paving.
TP025	0.3m to 3.358m	Made ground (Fill): Slightly sandy slightly gravelly CLAY/SILT, silty very gravelly SAND and very silty very sandy GRAVEL with plastic, concrete, brick and tarmacadam
TP025A	0.3m to 3.358m	Made ground (Fill): Slightly sandy slightly gravelly CLAY/SILT, silty very gravelly SAND and very silty very sandy GRAVEL with plastic, concrete, brick and tarmacadam
TP026	0.3m to 3.358m	Made ground (Fill): Slightly sandy slightly gravelly CLAY/SILT, silty very gravelly SAND and very silty very sandy GRAVEL with plastic, concrete, brick and tarmacadam
TP041	0.3m to 3.358m	Made ground (Fill): Slightly sandy slightly gravelly CLAY/SILT, silty very gravelly SAND and very silty

Borehole	Range of thickness	Stratum encountered
		very sandy GRAVEL with plastic, concrete, brick and tarmacadam
TP042	0.1m to 9.0m	PEAT
TP043	0.3m to 3.358m	Made ground (Fill): Slightly sandy slightly gravelly CLAY/SILT, silty very gravelly SAND and very silty very sandy GRAVEL with plastic, concrete, brick and tarmacadam
TP044	0.3m to 3.358m	Made ground (Fill): Slightly sandy slightly gravelly CLAY/SILT, silty very gravelly SAND and very silty very sandy GRAVEL with plastic, concrete, brick and tarmacadam

5.2.2 Fieldwork

The fieldwork was carried out in general accordance with BS 5930 (1999) Code of Practice for Site Investigation and Part 9 of BS 1377 (1990), Method of Tests for Soil for Civil Engineering Purposes, in situ Tests. Dando 2000, cable percussive rigs were used to advance the boreholes through overburden deposits using 200mm diameter casing. Rotary boreholes were advanced using a Deltabase 520 rig, a Soil Mech PSM 8G rig and a Hill Twister Core Drill rig through overburden deposits using Symmetrex 131, nominal 150mm diameter casing in open-hole drilling and through rock using double lined core barrel, at nominal diameter 76mm. A compressed air-mist flush was used for rotary drilling. Trial pit and slit trench excavations were excavated using both a JCB and a mini digger, as detailed on the logs. The exploration locations were selected by T.J. O'Connor & Associates, and set out on site from existing features and the co-ordinates provided. The exploratory locations were surveyed using Trimble V8 GPS equipment to the Ordinance Survey national grid system of co-ordinates and elevations to Malin Head datum.

5.2.3 Ground conditions encountered

The overall study area throughout Monaghan was generally characterised by slightly sandy, slightly gravelly CLAY/SILT, very clayey/silty very gravelly SAND, very clayey/silty SAND and GRAVEL, very sandy very silty GRAVEL and PEAT to depths up to 20.0m below existing ground level (bgl). Topsoil was on average 350mm thick.

Madeground/ Fill was encountered and described as slightly sandy slightly gravelly CLAY/SILT, silty very gravelly SAND and very silty very sandy GRAVEL, with pieces of concrete, brick, tarmacadam and plastic, to a maximum depth of 3.0m bgl being between 150mm and 2500mm thickness. Tarmacadam surfacing was on average 165mm thick ranging between 15mm and 500mm thickness. The Cl 804 sub-base was on average 360mm thick ranging from 100mm thick to 1000mm thickness. Concrete was encountered at a number of locations being 265mm thickness on average, ranging from100mm to 800mm in thickness.

Based on the SPT N Values the PEAT was very soft to soft with N values of 1 to 8. The cohesive CLAY and SILT deposits were very soft to stiff with N values of 3 to 58. Based on the SPT N values, the granular deposits are described as being loose to very dense, with N values 2 to 52. At location BH53 soft to firm SILT was found to under-lay PEAT to depth from 2.7m to 9.0m bgl. BH54 soft to firm CLAY was encountered from ground level to 6.3m bgl. BH59 soft to firm CLAY was encountered from ground level to 5.9m bgl. Soft SILT was encountered at BHR35 from 1.3m to 5.8m bgl.

LIMESTONE was encountered throughout the site at depths of between 1.3m to 18.4m bgl, which was described as moderately weak to very strong having Point Load indices of 0.18MPa and 21.25MPa. Fossiliferous MARL was encountered in BHR08 at 14.32m to 17.5m bgl. At location BHR01 SPT, N values within the LIMESTONE indicated soft CLAY infill materials. Solid Core Recovery of 0% to 7% indicated highly weathered rock. BH02 indicated similar anomalies with PEAT being encountered within the rock and N values of 0 to 8 being recorded indicating infill or highly weathered rock in the upper zone.

MUDSTONE was encountered at BHR31 inter-bedded with SANDSTONE from 6.1m to 10.0m. MUDSTONE was found to underlie the LIMESTONE at BHR37, BHR38 at a depth of 11.76m to 13.48m bgl. The MUDSTONE was described as weak to moderately weak, non-intact.

SANDSTONE was encountered at BHR17 and BHR64, BHR65 at a depth of 2.6m to 13.1m bgl. The SANDSTONE was described as strong to very strong. GREYWACKE was encountered at BHR58 to BHR62 at a depth of 2.5m to 8.5m bgl. The GREYWACKE was described as moderately weak to strong.

5.2.4 Groundwater

Groundwater was encountered during both trial pit excavation and cable tool boring at a number of locations. Groundwater was typically encountered between 1.5m bgl and 5.0m bgl in boreholes and between 2.0m bgl to 3.0m bgl in trial pit excavations. Forty two (42) number 50mm diameter standpipe installations where constructed and are identified in section 5.1 of the Monaghan Town Collection Network, Priority Geotechnical Drilling Report, 2009.

The groundwater strikes detail the level at which groundwater was encountered and that level to which it rose after a 20minute period. This may not reflect the static groundwater level. The standpipe

installations should be monitored to determine static groundwater level. It should also be appreciated that seasonal fluctuations in groundwater level may occur.

5.3 Proposed Mixed Use Development, Rooskey, Monaghan Town, Co. Monaghan, Hydrogeology Assessment, by Webber Associates 2007.

5.3.1 Background to assessment

Monaghan County Council is redeveloping the Lower Courthouse Carpark, Monaghan Town as a mixed use development. Part of this development includes a three tier basement excavation. This full report is contained in Appendix C.

5.3.2 Site assessment

Several site investigations and ground and groundwater assessments have been carried out at the site, the findings of such reports indicated that very high permeabilities for both overburden and rock. On this basis, substantial groundwater entry into the basement excavation was predicted which would make it difficult if not impossible to construct the basement.

In order to fully assess this problem further, a supplementary site investigation was designed by WA and carried out by Irish Geotechnical Services Ltd. (IGSL) in May 2007. The purpose of the site investigation was to assess the ground and groundwater conditions specifically for basement design and excavation. The investigation included the following;

- 1 number cable percussion borehole;
- 6 number rotary drilled boreholes;
- 6 number standpipe piezometer installations;
- 6 number variable head permeability tests;
- 8 number Packer Permeability tests; and
- 1 number pump test.

Rock cores were retained for logging and laboratory testing.

5.3.3 Ground conditions

The site investigations indicate that two different stratigraphic profiles are present on site. In the northern section of the site, rockhead is typically found about 5m below ground level. This is overlain by Glacial Till. Surface level is about 55 MoD.

The southern section of the site is differentiated by a sudden drop in rockhead level to approximately 15m below ground level. This section of the site has been uplifted by 3m as it was once marshland. This made ground overlies a thick layer of peat over Glacial Till, surface level is about 53 MoD.

Summaries of both of these northern and southern portion profiles of the site are summarised in tables 5.1 and 5.2 below.

Table 5.3 Summary of ground conditions in northern section of the site

Stratum	Description	Depth top base		Thickness	
		Min	Max	Min	Max
Made Ground	Tarmacadam and fill (cobbles and boulders)	1.5	3	1.5	3
Peat	Fibrous – found in one borehole	3.5	3.5	2	2
Glacial Clay	Silty sandy clay	3.4	5.6	0.4	2.6
Glacial Gravels	Silty sandy gravels	4	6	1	4.1
Limestone	Moderate to highly weathered, fractured clay infill	4.5*	6.4*	Base not seen	Base not seen

Table 5.4 Summary of ground conditions in southern section of the site

Stratum	Description	Depth top base		Thickness	
		Min	Max	Min	Max
Made Ground	Tarmacadam and fill (cobbles and boulders)	3.2	4.5	3.2	4.5
Peat	Fibrous – found in one borehole	7.6	11.2	4.4	6.7
Glacial Clay	Silty sandy clay	9	13.5	1.4	2.5
Glacial Gravels	Silty sandy gravels	10	17.7	1	4.2
Limestone	Moderate to highly weathered, fractured clay infill	12.5*	17.7*	Base not seen	Base not seen

* Rockhead

5.3.4 Groundwater

Groundwater was encountered in all exploratory boreholes. Water strikes were typically encountered between 1.7m and 4.2m below ground level.

Standpipe piezometers were installed in six boreholes. A summary pf levels are tabulated below in table 5.3.

Table 5.5 Summary of piezometer levels

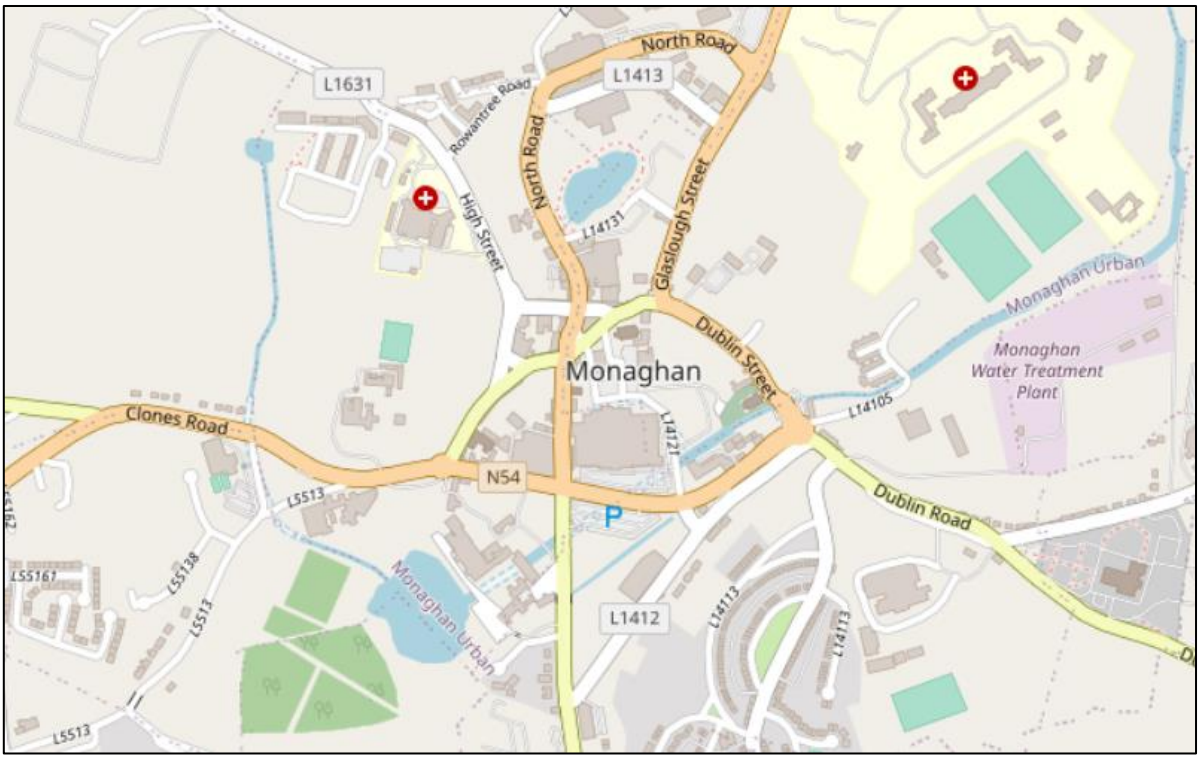
Borehole	Surface Levels (MoD)	Depth to water (m bgl)
B1	55.2	2.5
C	55.6	2.8
D	55.5	2.6
E	55.6	2.8
F	53.2	1.2*
G	53.2	0.6*

*Results not available at time of writing report, highest recorded strike instead

6 LICENSES AND PERMITS

A search was undertaken on the Environmental Protection Agency map viewer to investigate if any Industrial Emission licences (IELs) and Integrated Pollution Control (IPC) sites which are present surrounding the site. As seen from Figure 6.1 below no IELs or IPCs are present.

Figure 6.1 Industrial Emission licences (IELs) and Integrated Pollution Control (IPC)



7 OVERVIEW OF POTENTIAL CONTAMINATION

7.1 Introduction

The nature of potential contamination that may have arisen from the past activities on and surrounding the site is considered below.

7.2 On Site Sources

7.2.1 Current Land Use

Current on site land use contamination sources are limited but a possible source may include made ground beneath the site, of unknown nature and quantity. Made ground underlying the site would have the potential to generate elevated concentrations of ground borne gases such as Methane and/or Carbon dioxide and the depletion of Oxygen levels. Due to the end use of the site being an outdoor public realm the likelihood of ground gas impacting any receptors is low as the majority of the site will be covered in hardstanding breaking the pathway. In areas of the public realm that will be soft landscaped ground gas is still unlikely to be a risk given no new buildings are proposed.

Other sources of contamination may be associated with any fuel storage tanks on site used to heat both commercial and residential properties, however these have not been identified from this desk study. Fuel tanks (if present) may have the potential to contaminate sub soils and groundwater bodies beneath the site and wider site area. Given the sites end use and the majority of the site being covered in hardstanding an exposure pathway to human health will be broken. The likelihood of hydrocarbon contamination associated with any fuel tanks impacting human health or groundwater/surface waters is deemed to be minimal. Surface waters such as the Shambles River is culverted and the likelihood of contaminated groundwater intrusion is minimised due to this. The Ulster Canal is also likely lined in the form of impermeable material such as natural clays or stone.

7.2.2 Previous Land Use – Historical Development

Review of historical mapping shows the site has experienced development over time. The street network around Monaghan such as South Dublin Street and The Diamond to the northwest have been occupied by infrastructure developments such as commercial properties. Such activities once occupying the site footprint are not associated with an overly contaminative nature, any contamination if present in the past will have likely degraded and diluted overtime and the chance of this impacting the application site today is minimal.

7.2.3 Radon Gas

As demonstrated on the Environmental Protection Agency (EPA) Radon Map, the site falls within a 10km grid square with less than one per cent of the homes estimated to be above the Reference Level.

7.3 Off site sources

7.3.1 Surrounding Land Uses – Current

The surrounding land use comprises predominantly commercial retail properties along the public realm scheme area. Current offsite contamination sources are limited but may be associated with any fuel tanks in the site vicinity and the waste water treatment works to the east of the site at c.330m. An Applegreen petrol filling station is located approximately 450m west of the site boundary, this has the potential to be a source of contamination however given the substantial distance from the site the risk here is relatively low. A second petrol filling station approximately 20m south west, this is however downgradient from the site and should not impact the application site.

Given the sites end use and the majority of the site being covered in hardstanding the likelihood of hydrocarbon contamination associated with any fuel tanks impacting human health receptors or groundwater/surface waters is deemed to be minimal.

7.3.2 Surrounding Land Uses – Historical

Potentially contaminating activities have historically been present in the area surrounding the site.

It is evident from a consultation with available historical maps, in the period of 1829-41 a quarry can be seen to the east of the site at c.130m and an Infirmary on mapping at c.100m. Monaghan Lake is annotated to the north of the site. A large jail (Gaol) is present to the west of Monaghan Town at c.280m. A brewery is annotated to the south west of the site at c.300m.

From 1897-1913 A gas works is present to the east at approximately 250m of the site and a Saw Mill to the west at a distance of approximately 150m. The jail is now annotated as Monaghan County Infirmary. A grave yard is present on historical mapping approximately 50m west of Old Cross Square to the south of Dublin Street.

It is noted that none of the above off site potential contamination sources have survived to the current day. Any contamination associated with these former industries if present in the past will have likely degraded and diluted overtime and the chance of this impacting the application site today is minimal.

8 CONCEPTUAL SITE MODEL AND RISK ASSESSMENT

8.1 Conceptual Site Model

Risk estimation involves detailed evaluation of source - pathway - receptor scenarios to determine whether a linkage exists between any sources of contamination and potential receptors. A risk exists where a receptor is exposed to a source of contamination, via a pathway. If any element of the source-pathway-target linkage is absent, then no risk is present.

In order to consider potential risks at the site, a conceptual site model was developed, to examine the potential source - pathway - receptor linkages that may exist on the site. The conceptual model and the risk assessment for the site are illustrated in Table 7.1.

Table 7.8.1 Risk Assessment & Site Conceptual Model

Source	Potential Pathway(s)	Potential Receptor(s)	Relevant Source – Pathway – Receptor Linkage	Further Investigation Required
On site sources				
Soil gas: Made Ground or highly organic soils may contain high organic content that is degrading and producing Methane, Carbon dioxide and depleted Oxygen gases.	Migration along cracks in foundations and service trenches Breaking ground surface to facilitate works.	Humans in the form of current and future site users.	Made Ground or highly organic soils underlying the study area could contain high organic content that can degrade and produce Methane, Carbon Dioxide and depleted oxygen gases. However, as no buildings are proposed as part of the public realm upgrades, no receptor will exist for ground gas ingress.	No
Possible fuel storage tank/s.	Direct contact, ingestion and inhalation of vapours. Subsurface infiltration, leaching from sub-soils and groundwater flow.	Humans in form of future site users, site workers, landscaping and maintenance workers. Shallow groundwater, bedrock aquifer and The Shambles River/Ulster Canal.	Fuel tanks (if present) may have the potential to contaminate sub soils and groundwater bodies beneath the site and wider site area. Given the sites end use and the majority of the site being covered in hardstanding an exposure pathway to human health will be broken. As a result the likelihood of hydrocarbon contamination associated with any fuel tanks impacting human health or groundwater/surface waters is deemed to be minimal.	No
Off site sources				
Possible fuel storage tank/s.	Direct contact, ingestion and inhalation of vapours. Subsurface infiltration, leaching from sub-soils and groundwater flow.	Humans in form of future site users, site workers, landscaping and maintenance workers. Shallow groundwater, bedrock aquifer and The Shambles River/Ulster Canal.	Fuel tanks (if present) may have the potential to contaminate sub soils and groundwater bodies beneath the site and wider site area. Given the sites end use and the majority of the site being covered in hardstanding an exposure pathway to human health will be broken. As a result the likelihood of hydrocarbon contamination associated with any fuel tanks impacting human health or groundwater/surface waters is deemed to be minimal.	No

9 CONCLUSIONS AND RECOMMENDATIONS

9.1 Conclusions

The desk study has highlighted that no significant pollutant linkages are considered to be present within the study area. The proposed public realm upgrade involves minor alterations to the existing area. Upon completion, paving and or hardstanding will cover the site negating any potential risk to human health.

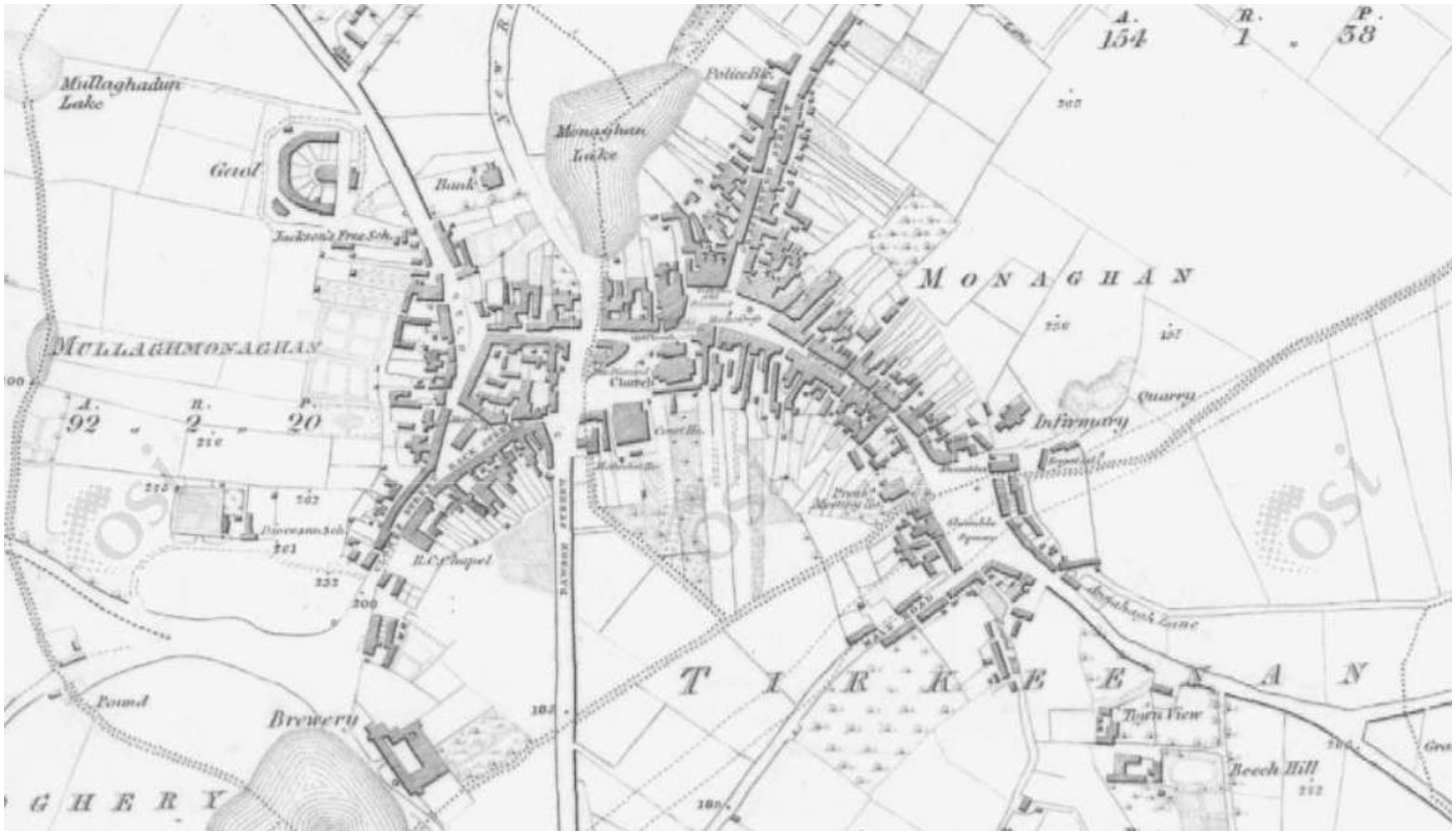
9.2 Recommendations

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.

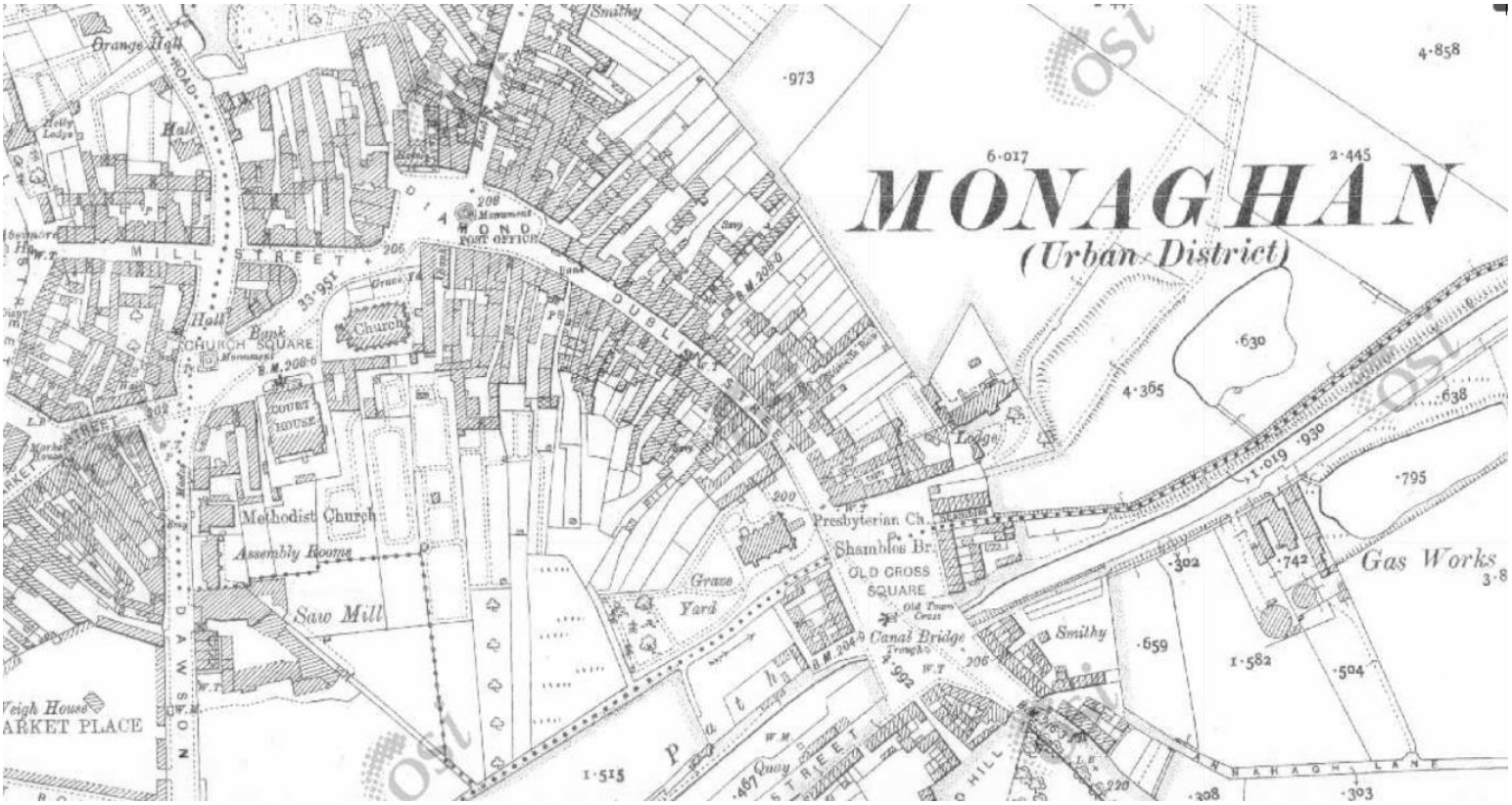
Appendix A

Historical Maps

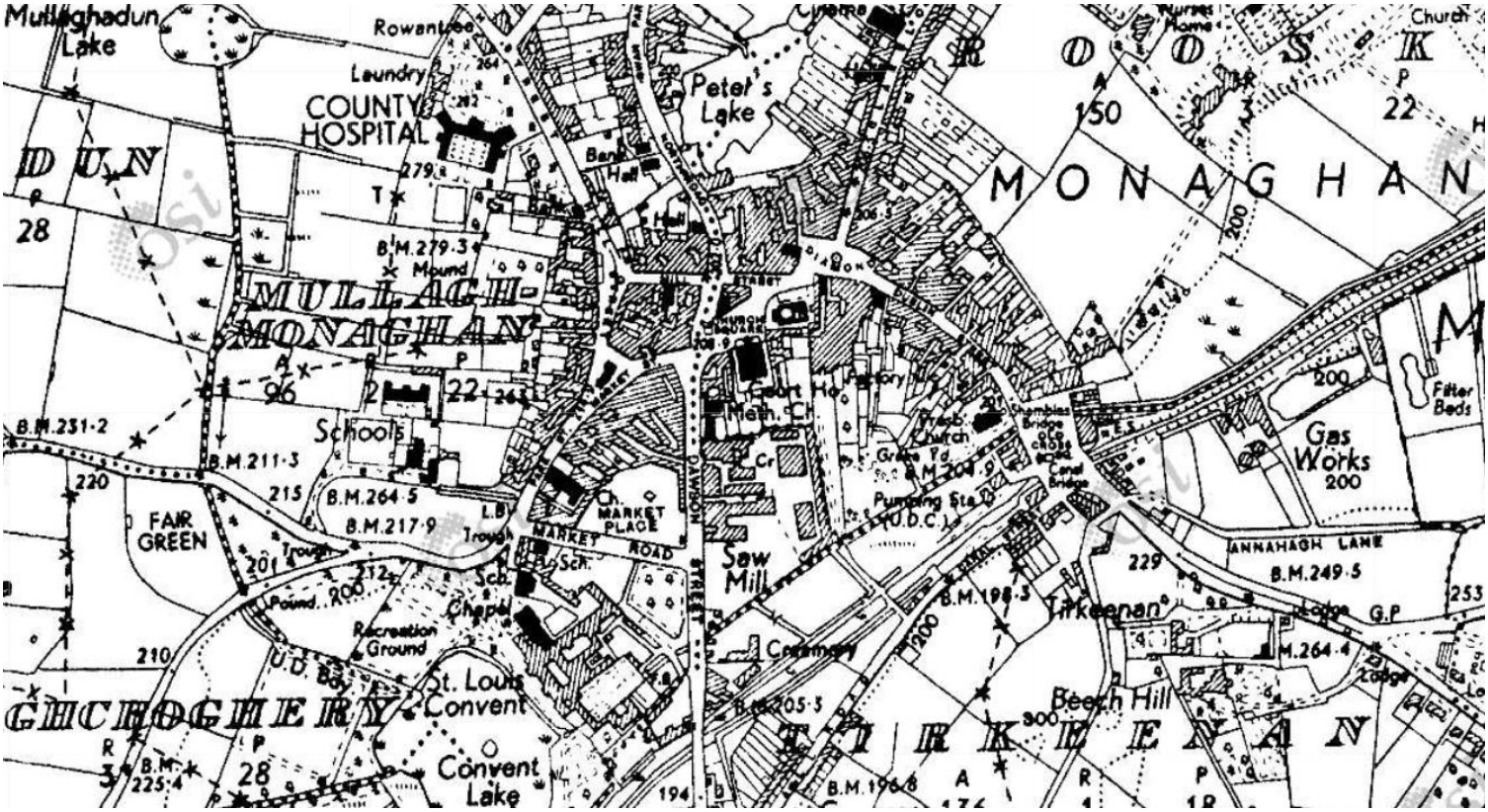
OSI Historical map, 1829-1841



OSI Historical map, 1897-1913



OSI Historical map, 1913



Appendix B

Previous Assessment Reports

Monaghan Mixed Use Development Monaghan Town

Bedrock Probe Survey

Report No: 05-021

Client :P Clarke & Sons Ltd

Engineer: Malone O'Regan

January 2005

Monaghan Mixed Use Development
Monaghan Town

Bedrock Probe Survey

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3 DESCRIPTION OF FIELD WORK 2

4 BRIEF GEOLOGY OF THE SITE 3

Appendices

Appendix 1 Borehole Location Plan

Appendix 2 Borehole Probe Logs

Appendix 3 Plot Of Bedrock Against Existing Ground Level

Appendix 4 Plot of Bedrock Against Assumed Datum Level

Appendix 5 Geological Map Of The Site

Appendix 6 Site Location Plan

Monaghan Mixed Use Development
Monaghan Town

Bedrock Probe Survey

1 AUTHORITY

On the instructions of Malone O'Regan, Consulting Engineers, acting on behalf of the Client, P. Clarke & Sons Ltd, a site investigation was undertaken at the above site to establish the bedrock levels with regard to the proposed retail development in the present car park at Monaghan Mixed Use Retail Development in the centre of Monaghan Town in County Monaghan. Please also refer to Glover's earlier report (No. 04-663) dated December 2004.

2 SCOPE

The investigation was to include the drilling of probe boreholes and the preparation of a report on the findings.

3 DESCRIPTION OF FIELD WORK

Eighteen boreholes were drilled by means of three tracked Competitor 130 Drilling Rigs using dynamic cone penetration tests.

The boreholes were drilled during a night possession the car park on the night of Friday 14th January 2005.

The dynamic cone tests were carried out using dynamic super heavy techniques.

The logs of number of blows per 100mm of penetration plotted against depth, are displayed in Appendix 2. The results of bedrock in seven earlier boreholes carried out on the site are also included.

All of the above works were carried out to BS 5930 the Code of Practice for Site Investigation.

4 BRIEF GEOLOGY OF THE SITE

The geological map of the area shows the bedrock to be the Carboniferous Limestone Formations and the quaternary geological map gives the drift as alluvial deposits underlain by fluvio glacial gravels which are in turn overlain by glacial till (boulder clay).

Appendix 1

Borehole Location Plan

Appendix 2

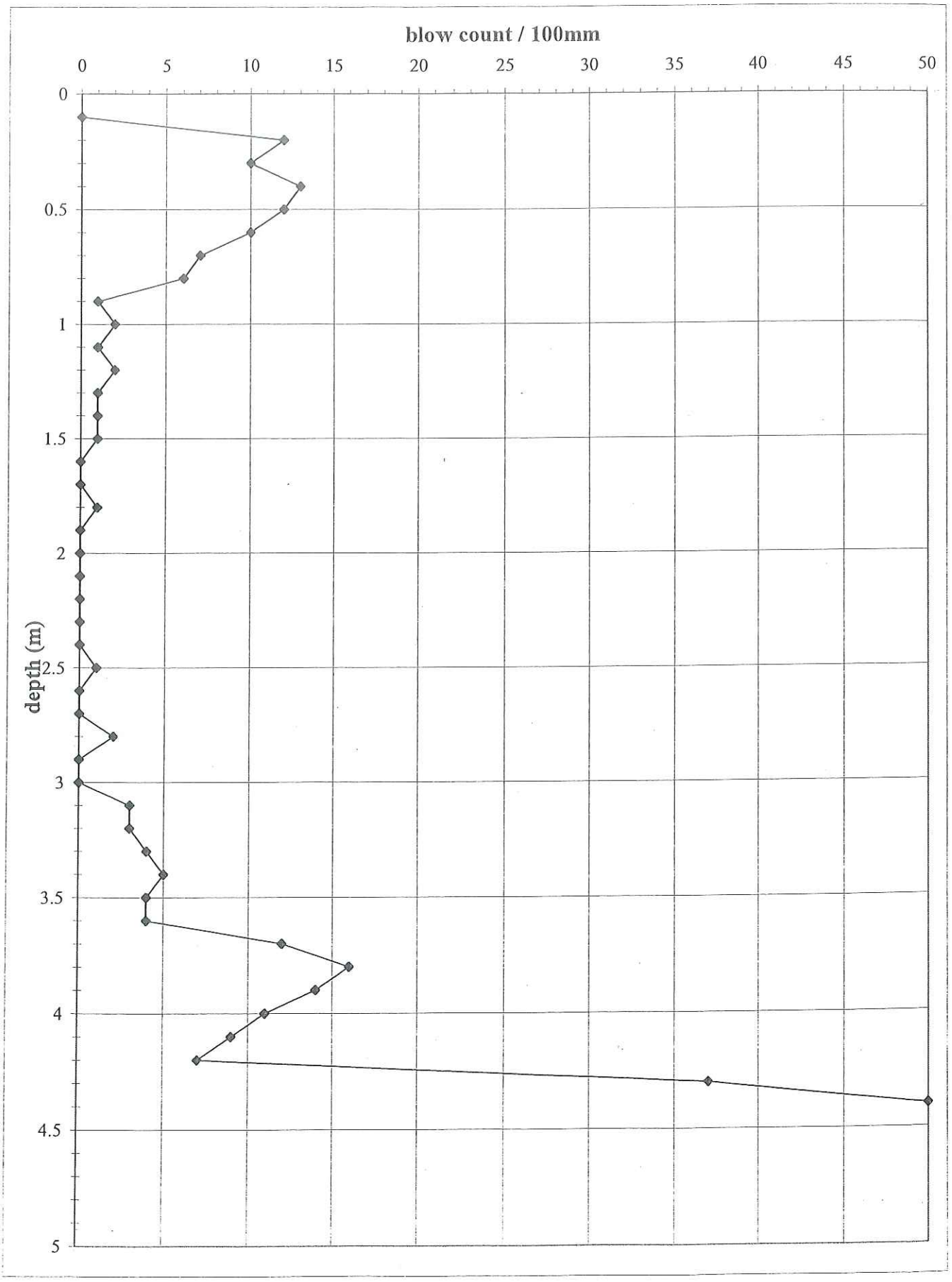
Borehole Probe Logs

Glover Site Investigations Ltd.

Dynamic Probing (super heavy) DPSH (Clause 3.2 of BS1377 : Part 9 : 1990)

Project: Monaghan MixedUse - Development **Report No:** 05-021

Probe Number: 10 **Date:** 14th Jan 05

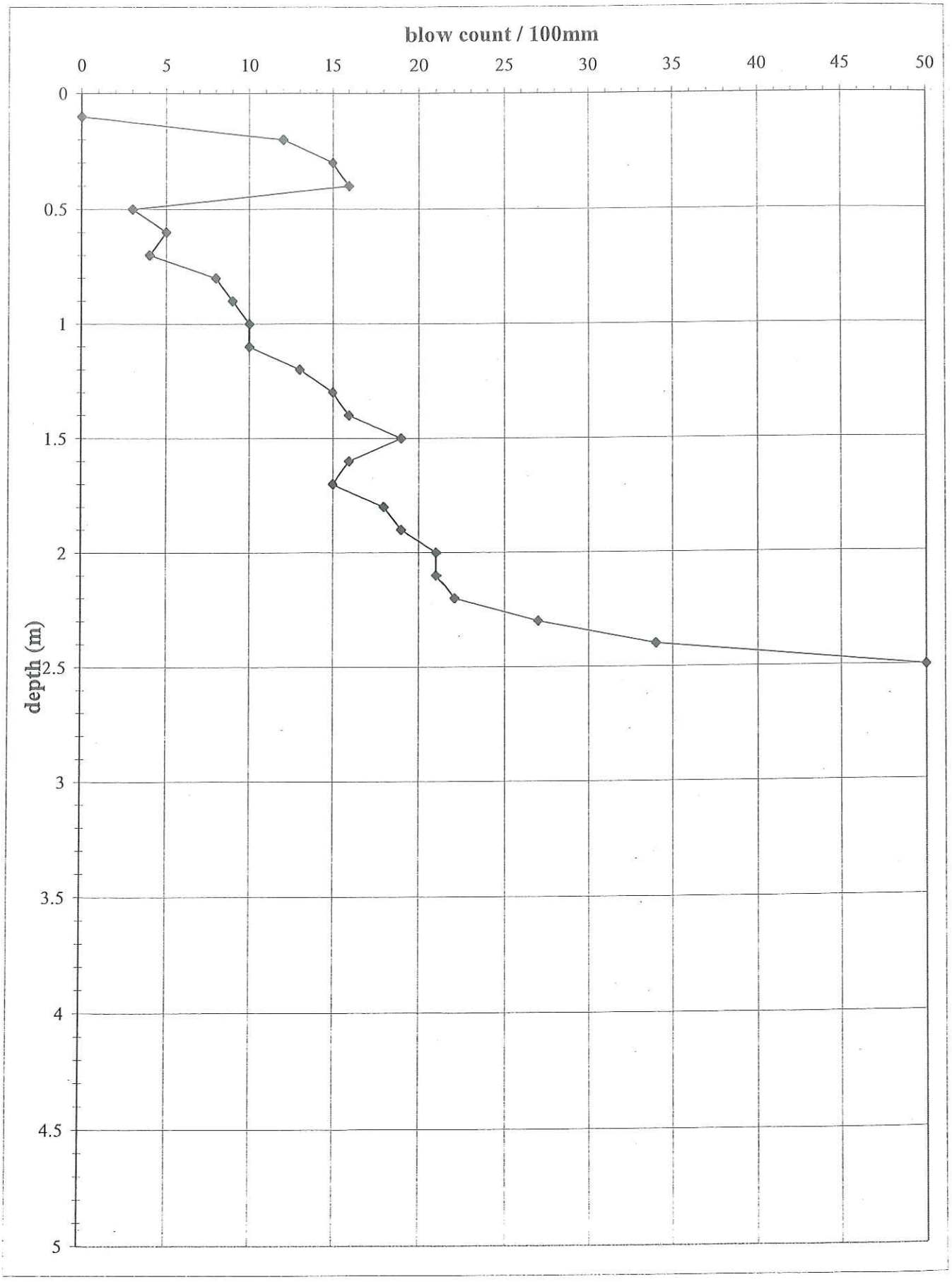


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Project: Monaghan MixedUse - Development **Report No:** 05-021

Probe Number: 11 **Date:** 14th Jan 05

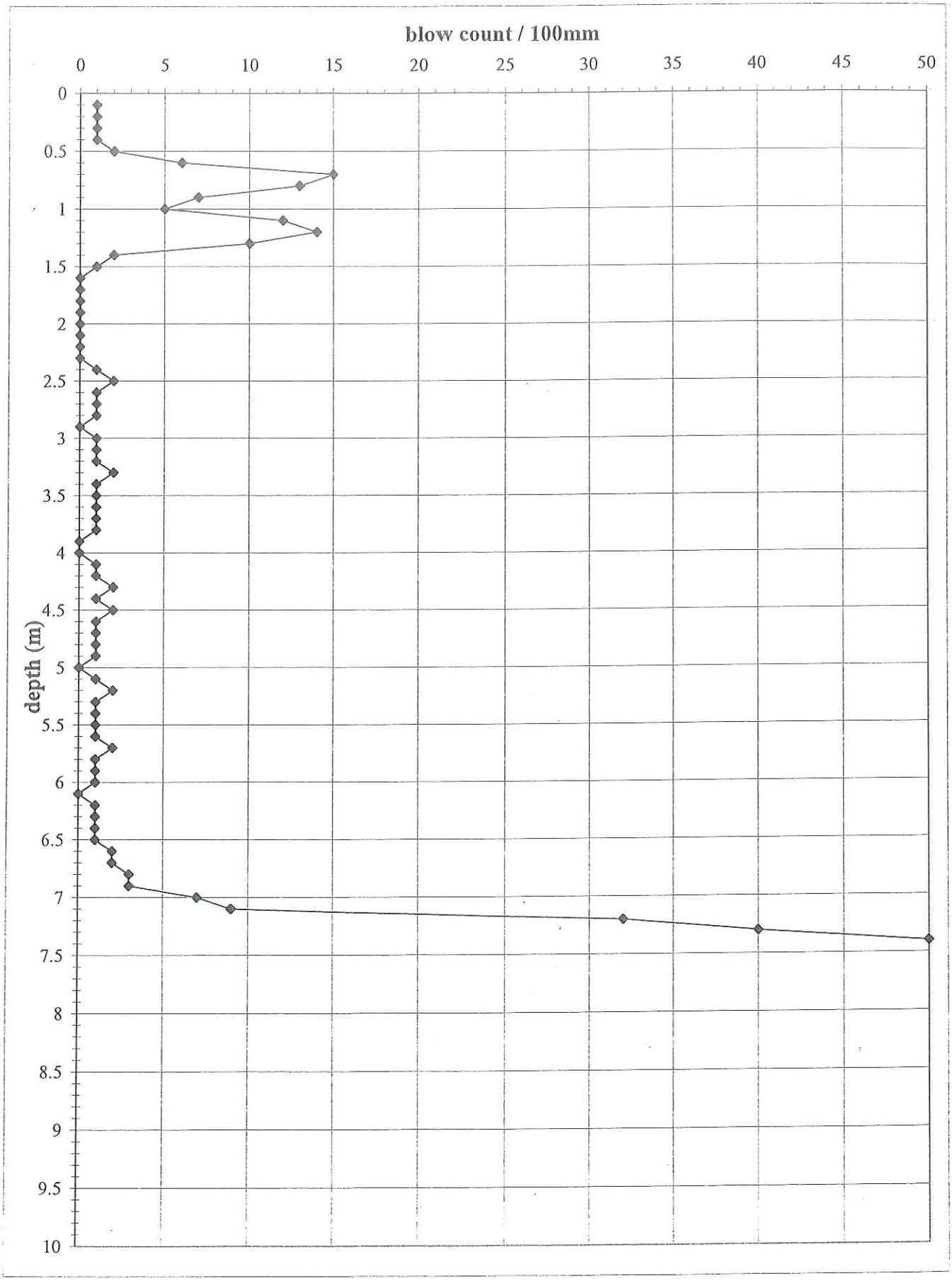


Glover Site Investigations Ltd.

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Project: Monaghan MixedUse - Development **Report No:** 05-021

Probe Number: 12 **Date:** 14th Jan 05

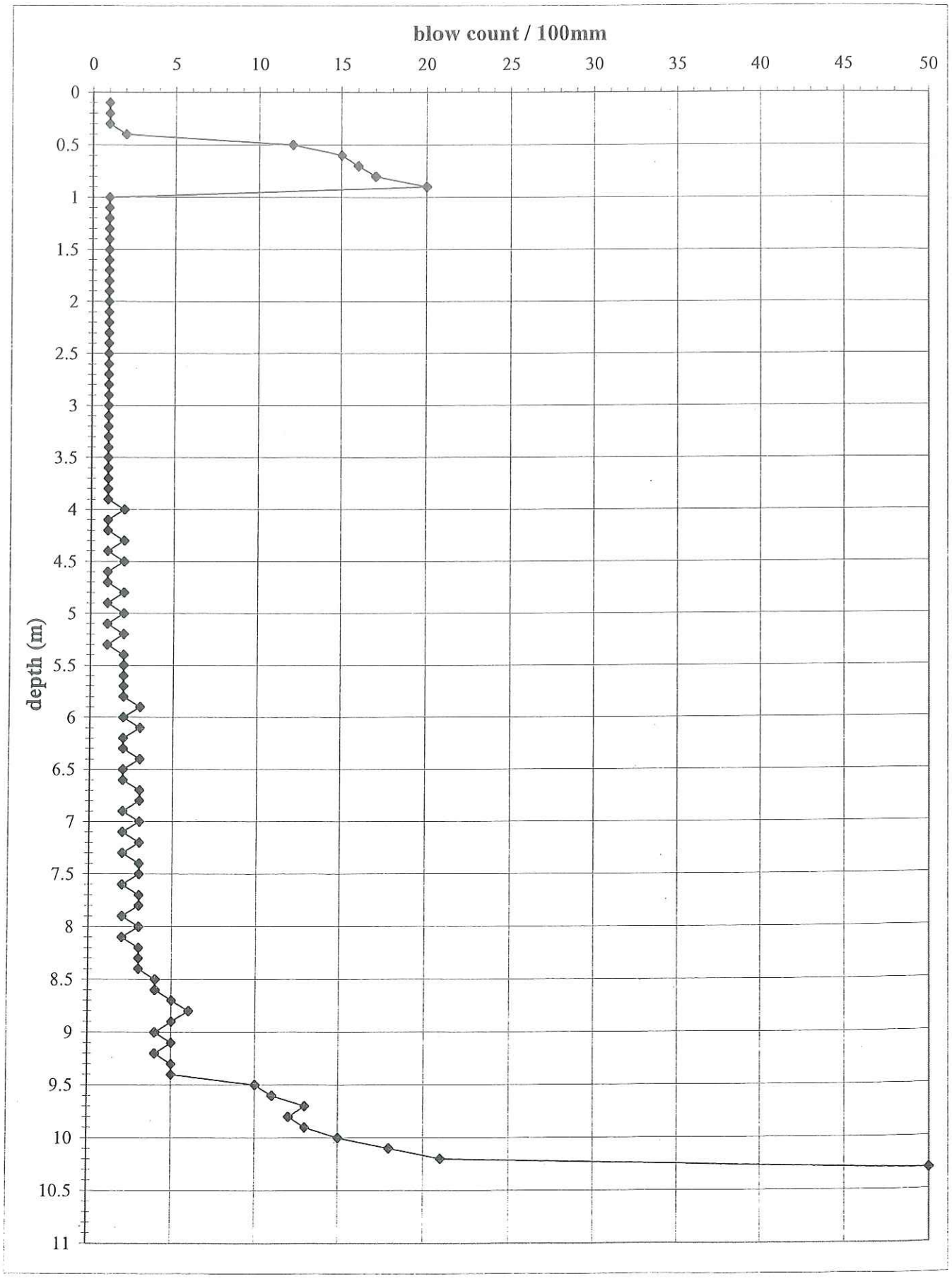


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Project: Monaghan MixedUse - Development **Report No:** 05-021

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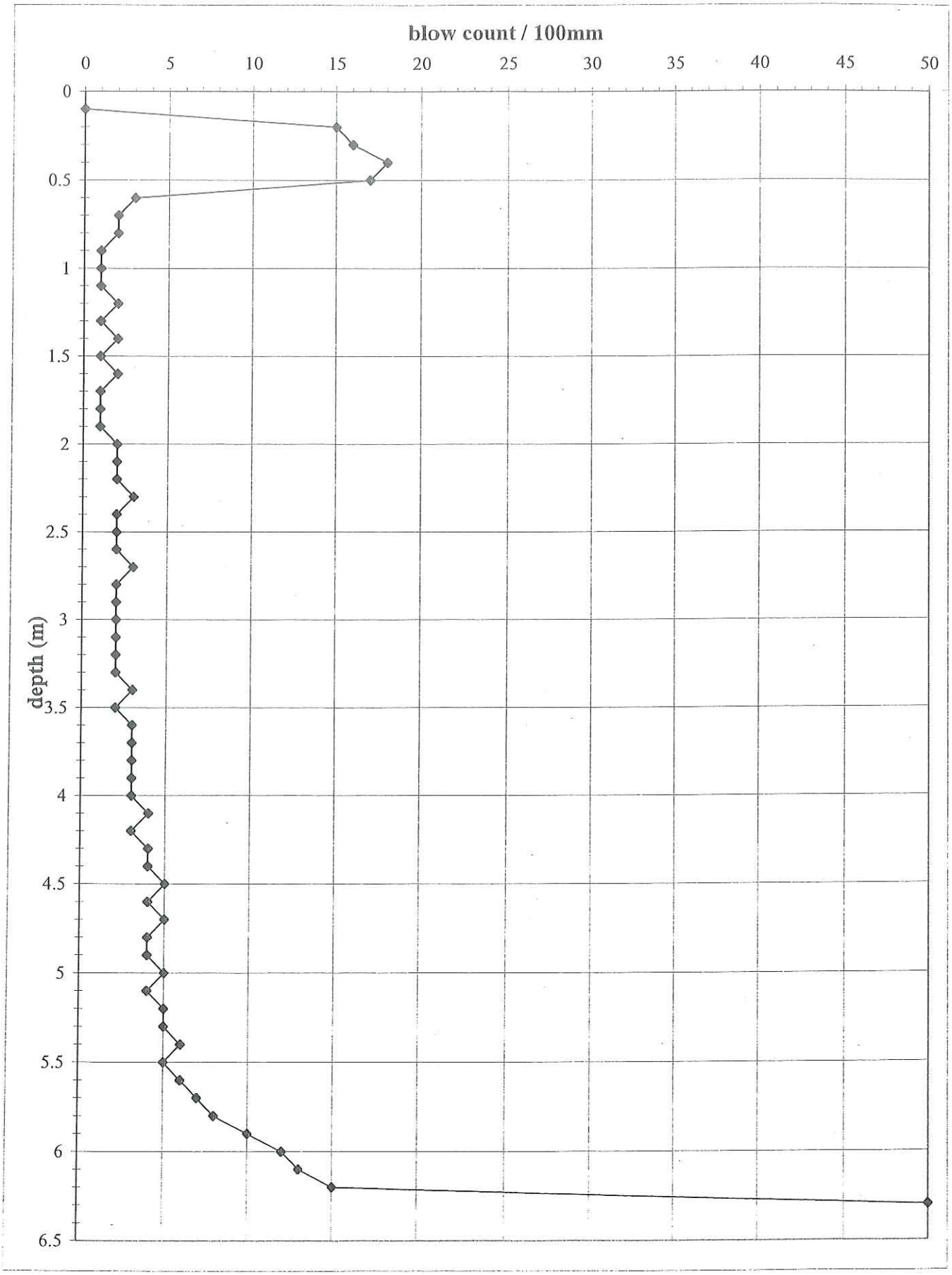


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Project: Monaghan MixedUse - Development **Report No:** 05-021

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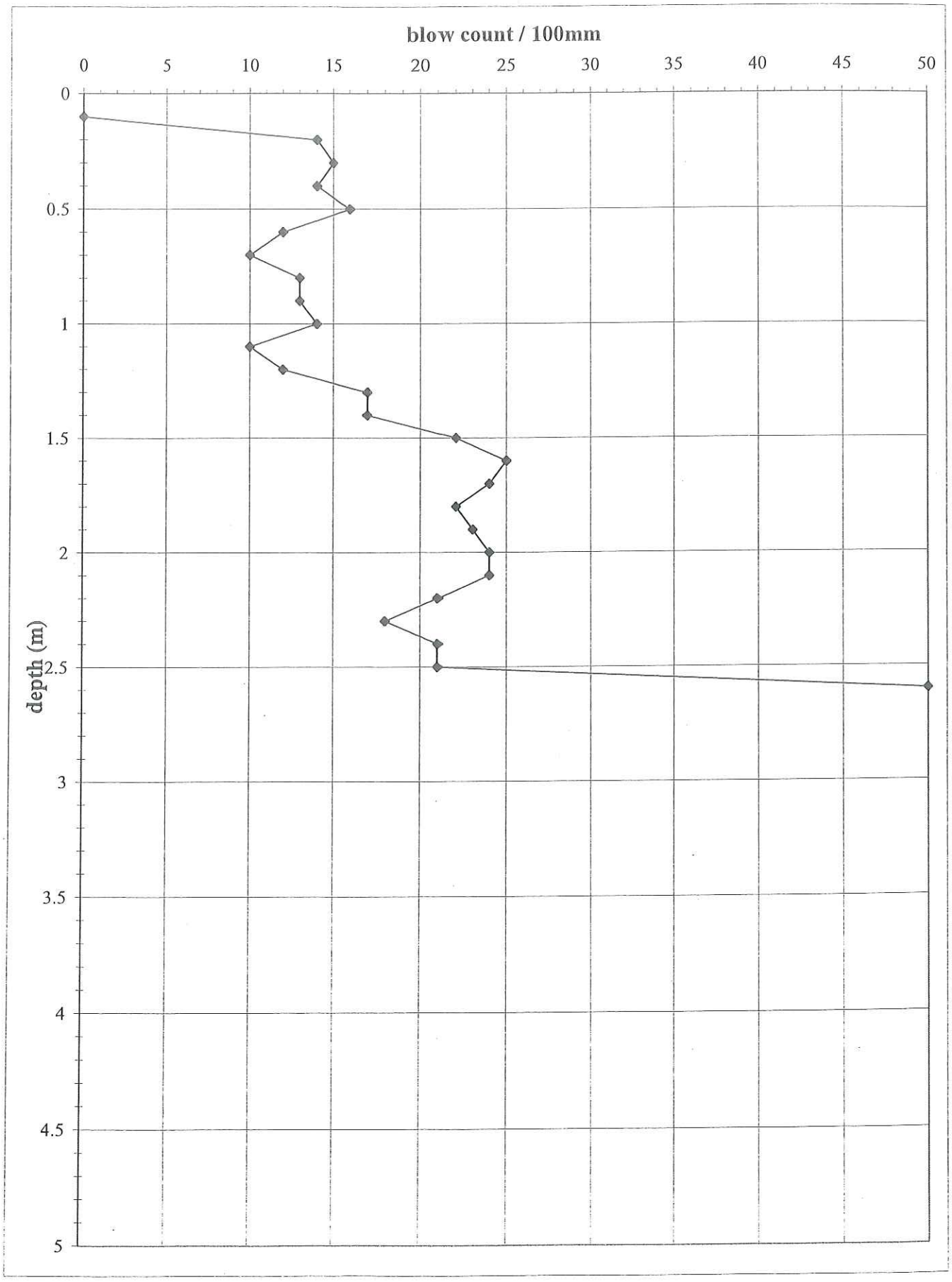


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Project: Monaghan MixedUse - Development **Report No:** 05-021

Probe Number: 15 **Date:** 14th Jan 05

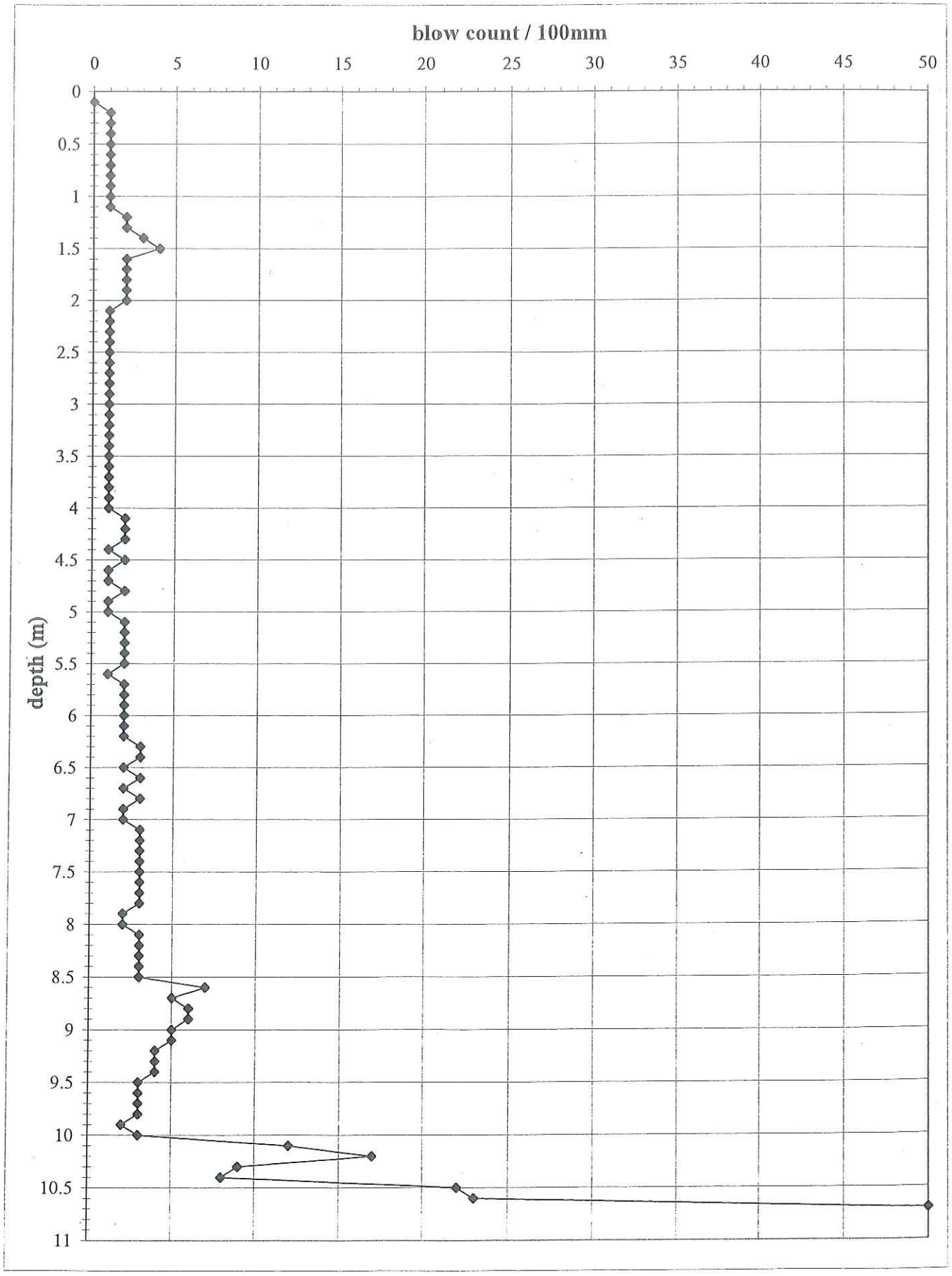


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Dynamic Probing (super heavy) DPSH (Clause 3.2 of BS1377 : Part 9 : 1990)

Project: Monaghan MixedUse - Development **Report No:** 05-021

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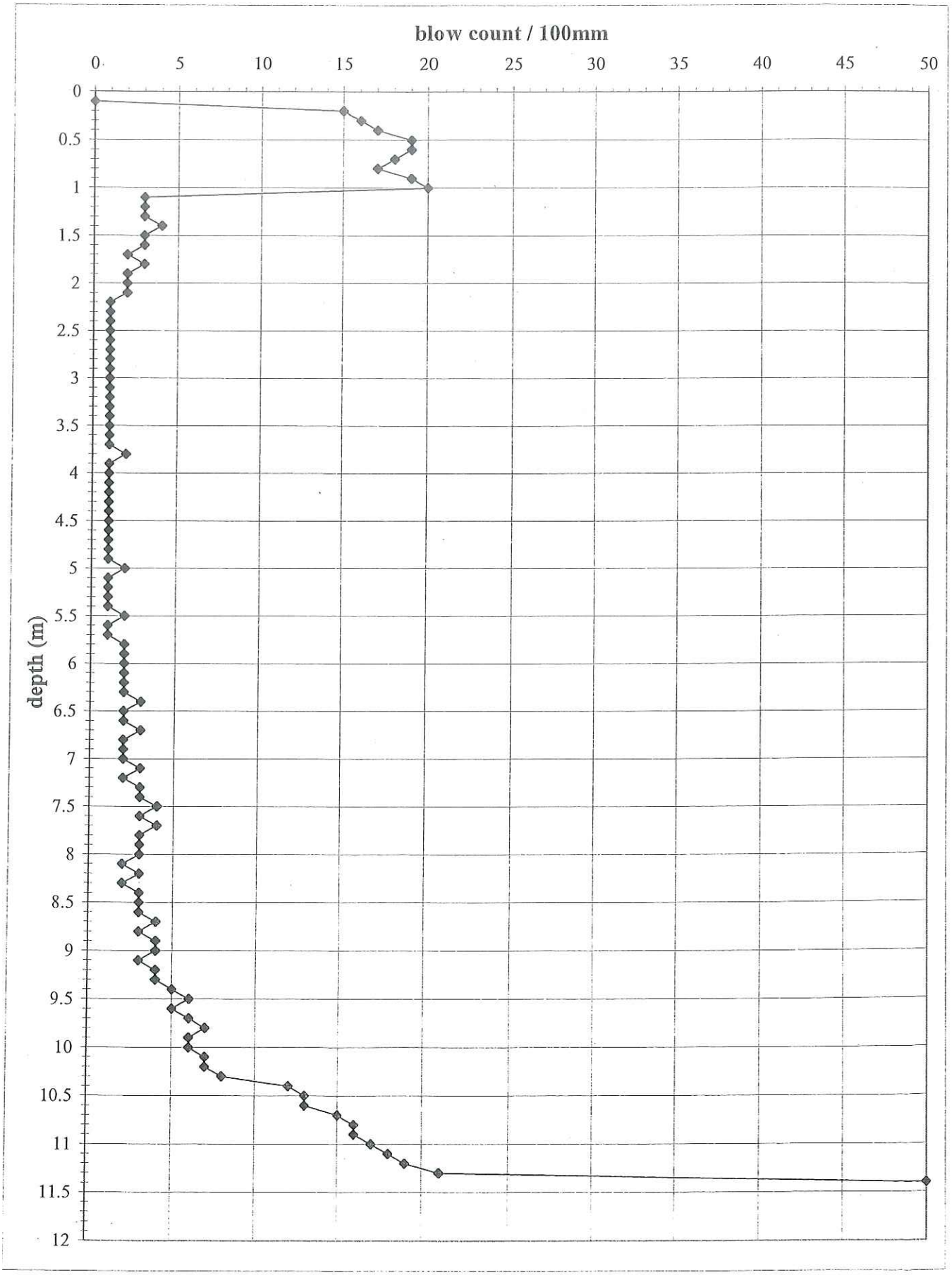


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Project: Monaghan MixedUse - Development **Report No:** 05-021

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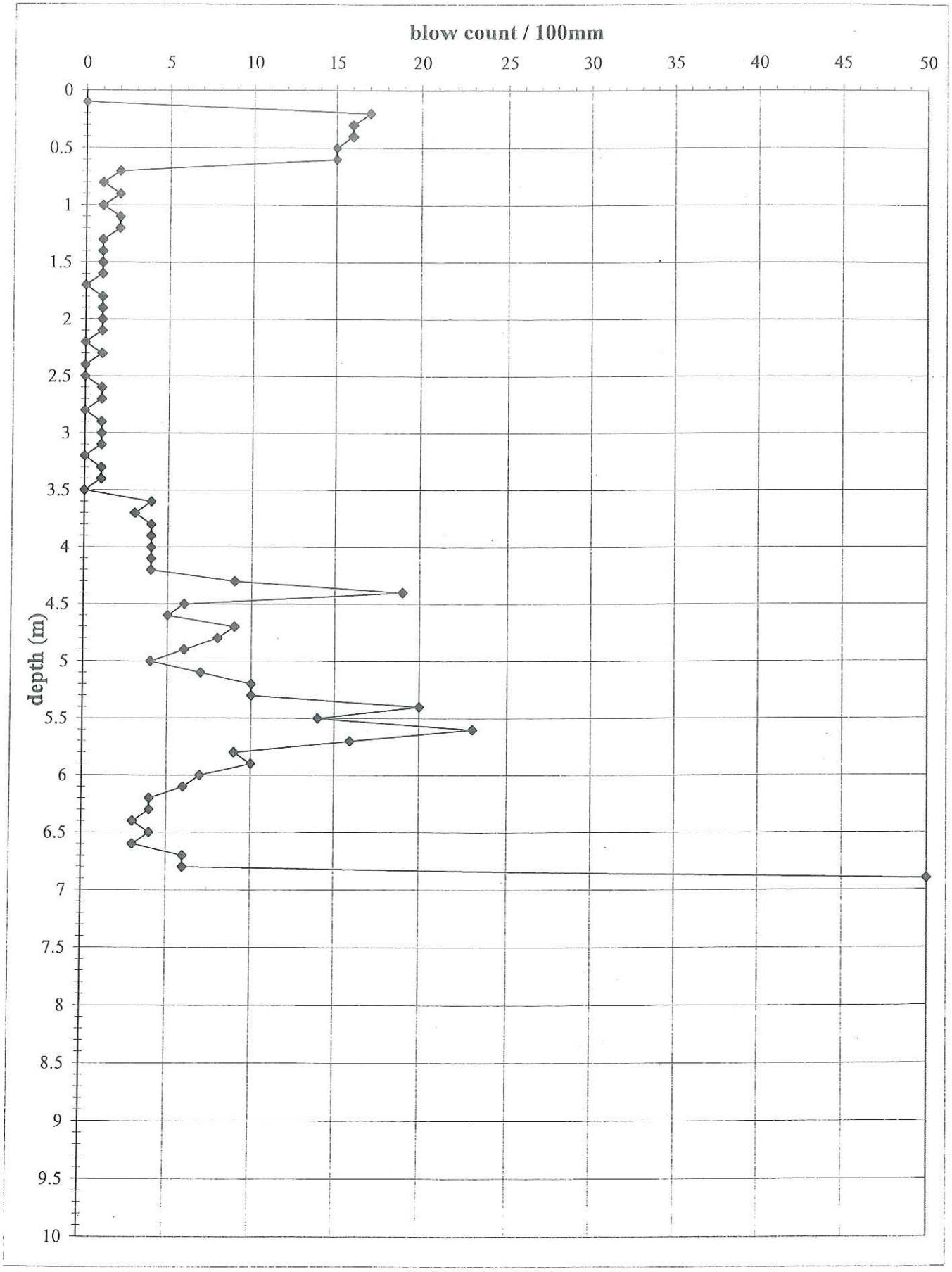


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Project: Monaghan MixedUse - Development **Report No:** 05-021

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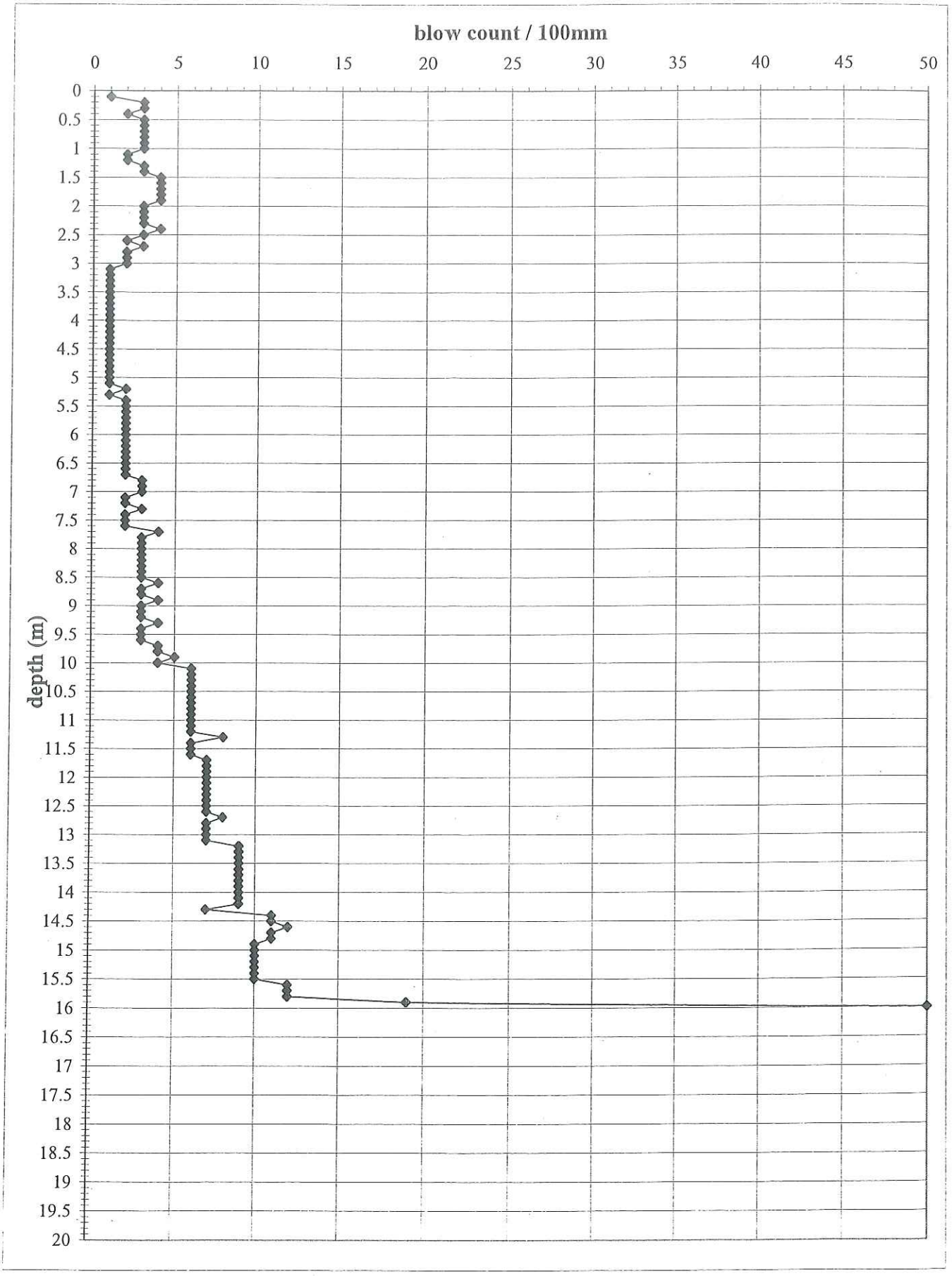


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Dynamic Probing (super heavy) DPSH (Clause 3.2 of BS1377 : Part 9 : 1990)

Project: Monaghan MixedUse - Development **Report No:** 05-021

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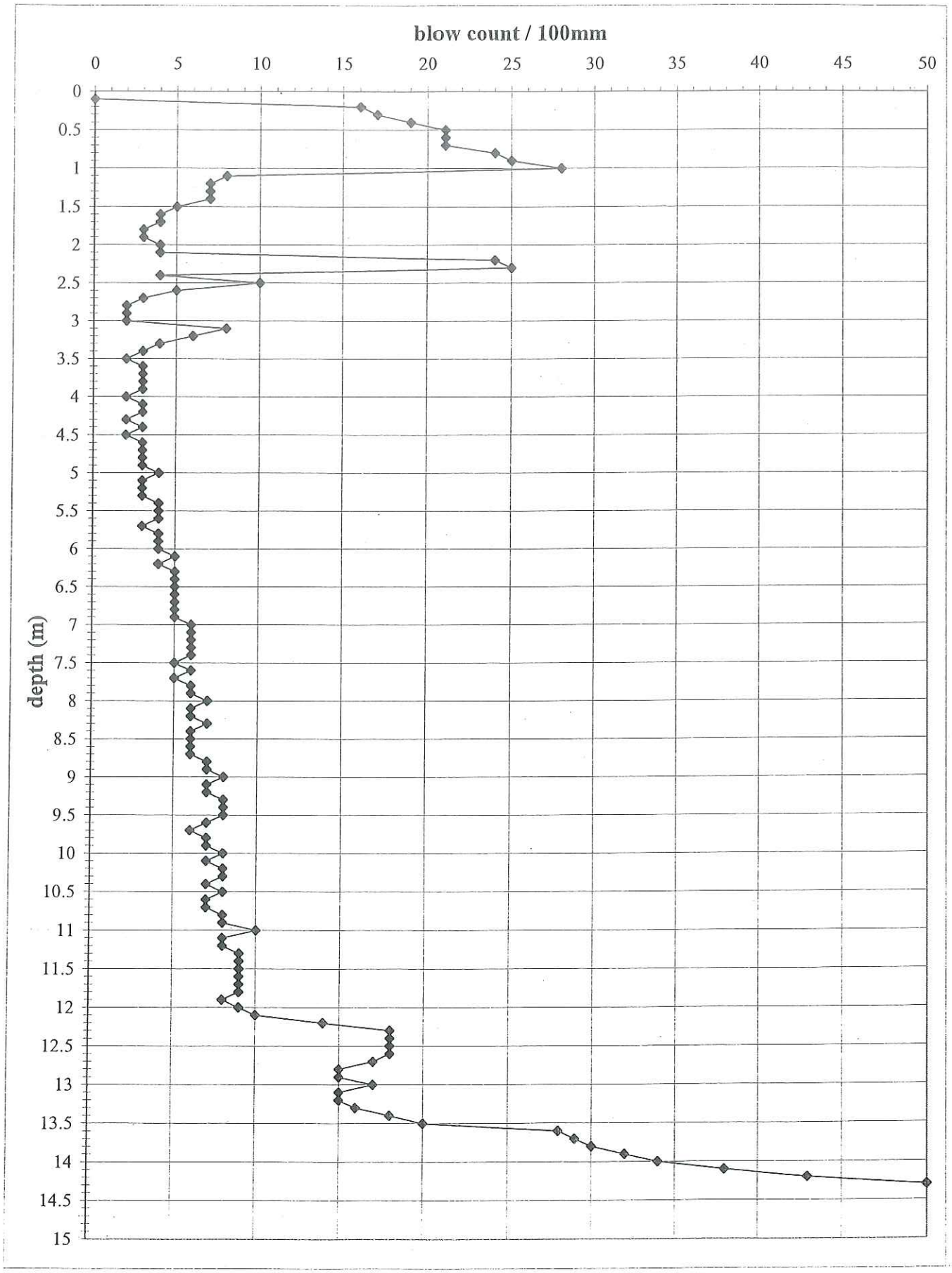


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Project: Monaghan MixedUse - Development **Report No:** 05-021

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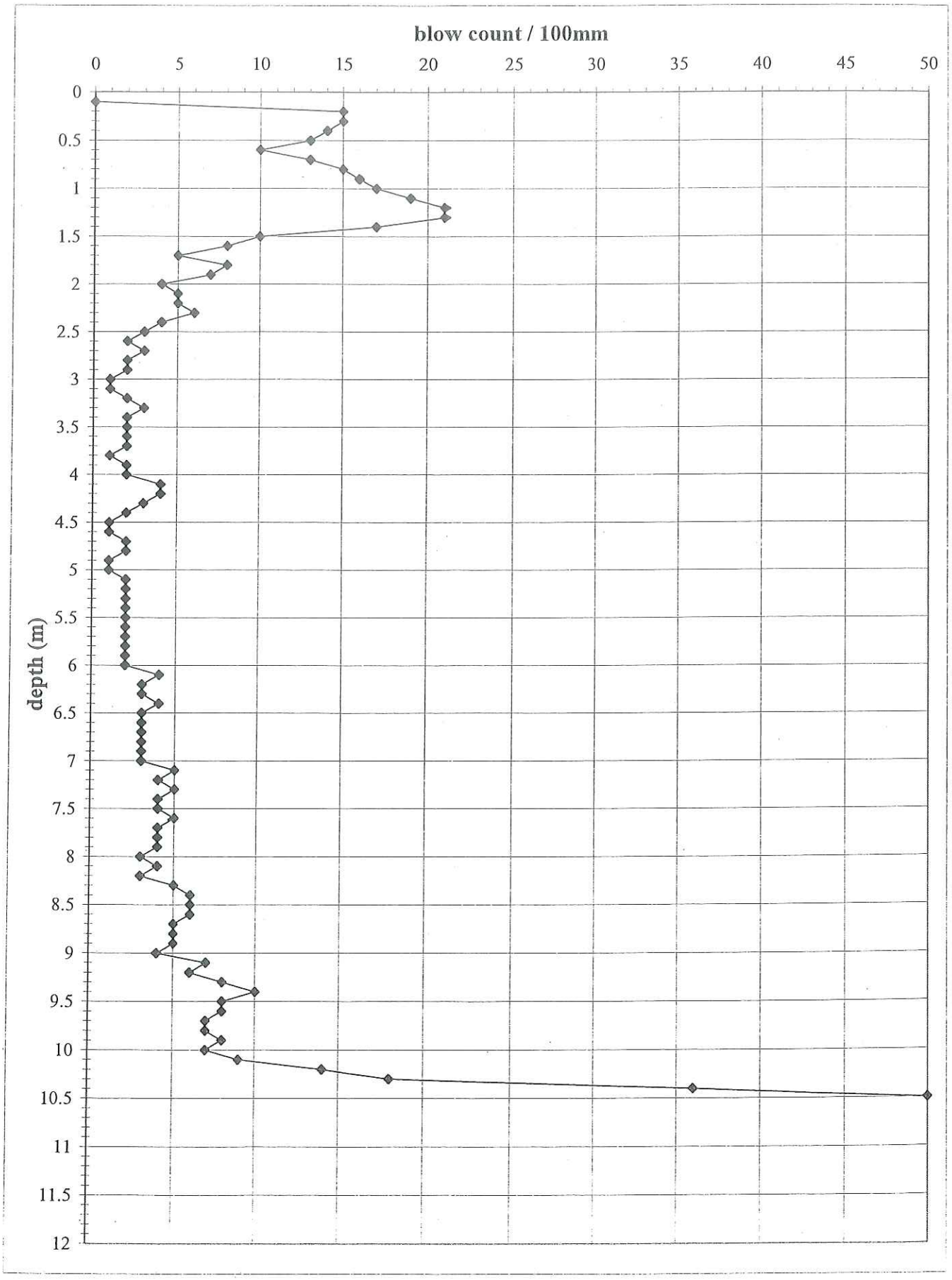


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Project: Monaghan MixedUse - Development **Report No:** 05-021

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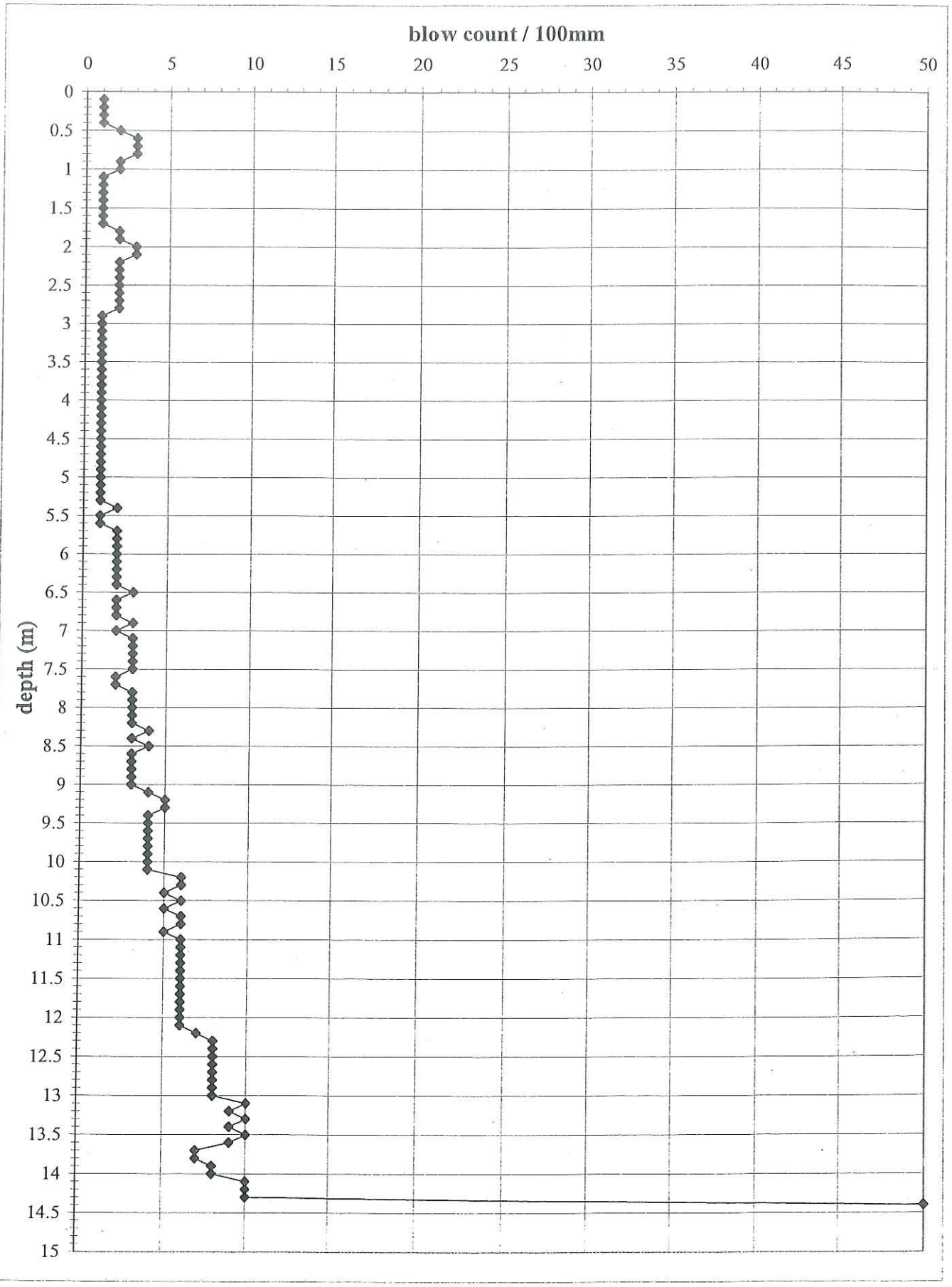


Glover Site Investigations Ltd.

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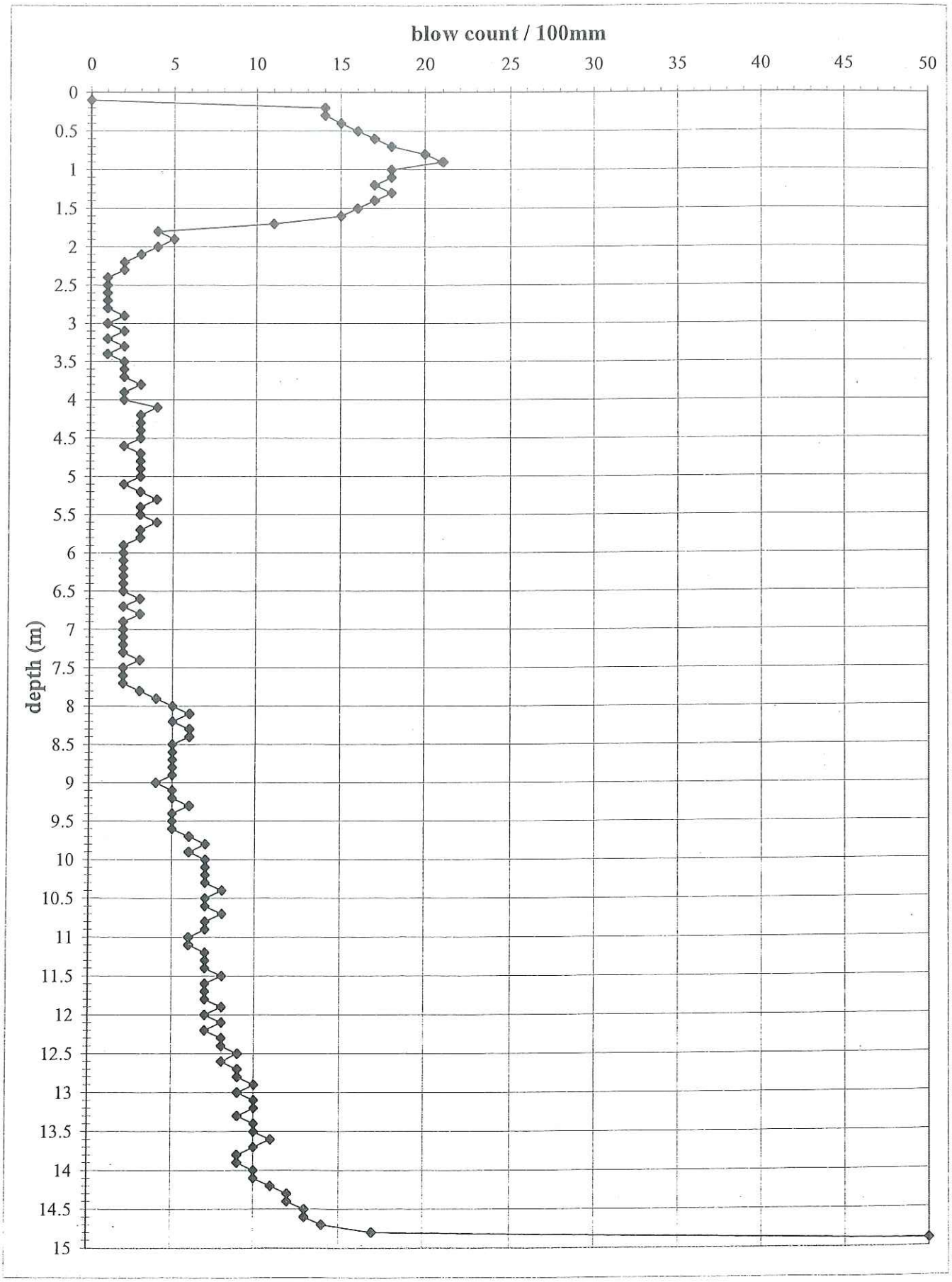


Glover Site Investigations Ltd.

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Project: Monaghan MixedUse - Development **Report No:** 05-021

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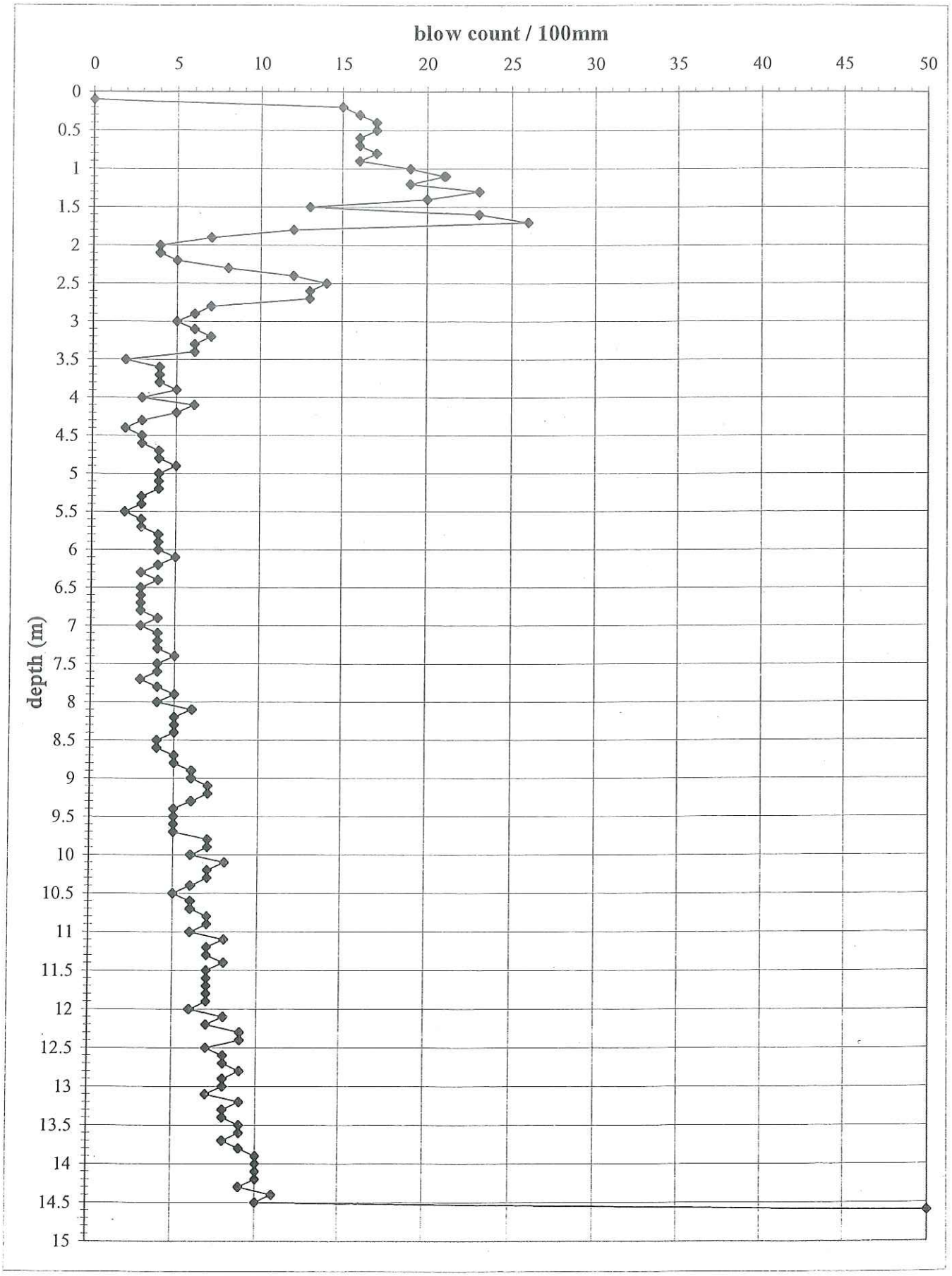


Glover Site Investigations Ltd.

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Project: Monaghan MixedUse - Development **Report No:** 05-021

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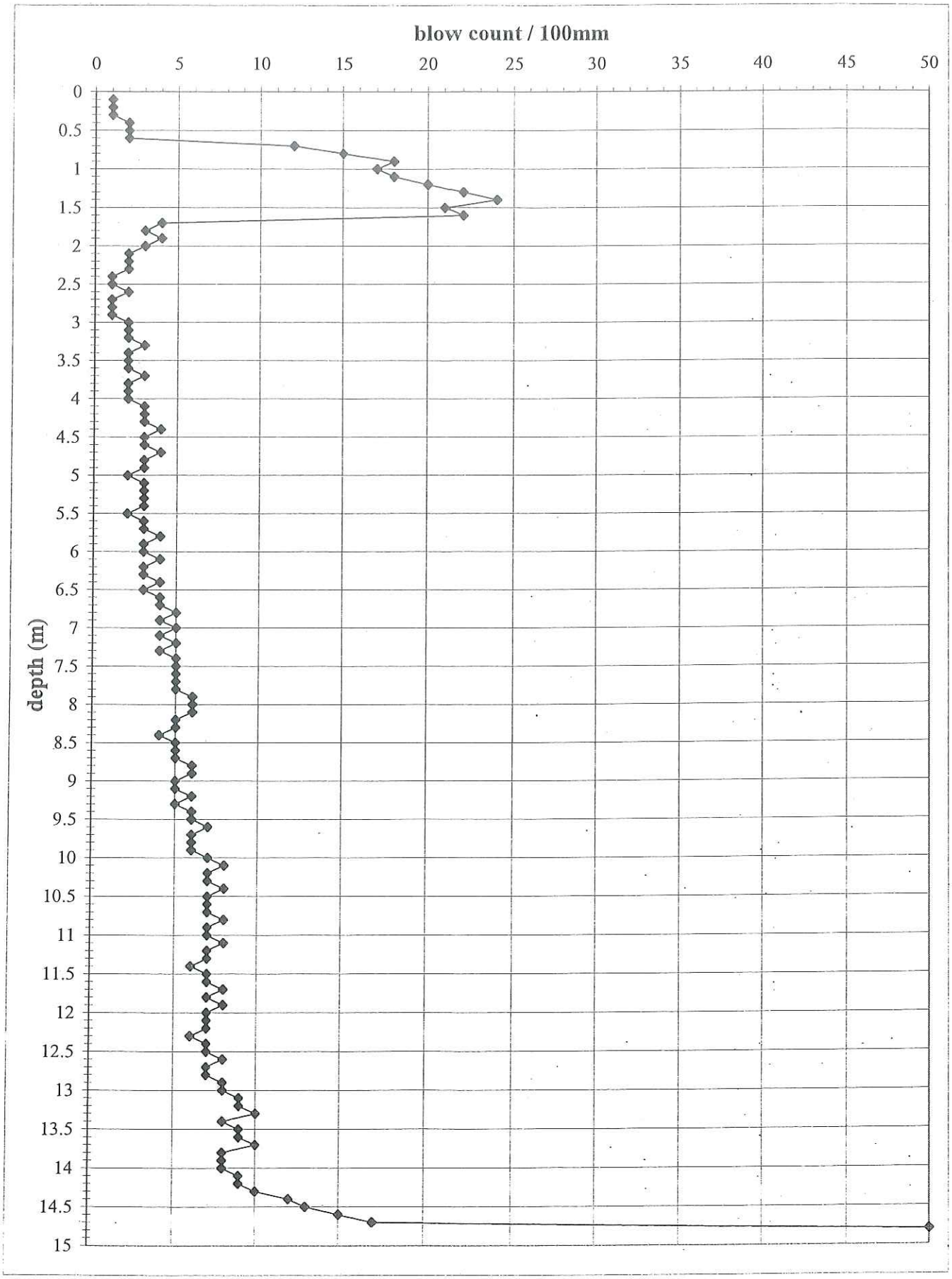


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Dynamic Probing (super heavy) DPSH (Clause 3.2 of BS1377 : Part 9 : 1990)

Project: Monaghan MixedUse - Development **Report No:** 05-021

Probe Number: 25 **Date:** 14th Jan 05



Glover Site Investigations Ltd

Site	Number
MIXED USE DEVELOPMENT, MONAGHAN TOWN	BH1

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
COMPETITOR 130 RIG	125mm to 10.00m			04-411
	Location	**Dates**	**Engineer**	**Sheet**
	AS PLAN	18/08/04	ALBERT FRY ASSOCIATES	1/2

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					0.18	BITMAC		
					(0.32)	HARDCORE		
0.50-0.95 0.50	SPT N=15 J		3,4/3,4,4,4		0.50	MADE GROUND: Stiff very friable grey and black very gravelly fine sandy CLAY containing pieces of brick and containing roots and rootlets		
					(0.35)			
1.00-1.45	SPT N=10		4,5/4,3,2,1		0.85	Grey sandy angular HARDCORE and SPALLS		
					(0.55)			
1.50-1.95 1.50	SPT N=2 J		1/1,,1		1.40	Very soft dark brown silty PEAT containing roots and stems		
					(0.50)			
2.00-2.45 2.00	SPT N=1 J		1/,,1		1.90	Very soft (wet) dark brown silty and fibrous PEAT		
2.50-2.95 2.50	SPT N=1 J		1/1		(1.60)			
3.00-3.45 3.00	SPT N=1 J		1/,,1					
3.50 3.50-3.95	J SPT N=2		Water Struck(1) at 3.50m. 1/1,,1		3.50	Very soft whiteish grey and light grey organic SILT containing rootlets		▽1
4.00	J							
4.50-4.95 4.50	SPT N=2 J		1/1,,1					
5.00-5.45 5.00	SPT N=2 J		1/1,,,1		(2.80)			
5.50-5.95 5.50	SPT N=2 J		1/1,,1					
6.00-6.45 6.00	SPT N=11 J		1/1,2,3,5					
					6.30	Medium dense (saturated) brown silty sandy fine to coarse GRAVEL		
7.00-7.45 7.00	SPT N=15 J		3,4/3,4,4,4					
					(2.50)			
8.00-8.45 8.00	SPT N=16 J		3,3/3,4,5,4					
					8.80	Stiff brown gravelly sandy CLAY with occasional cobbles and boulders		
9.00-9.45 9.00	SPT N=19 J		4,4/4,5,5,5		(0.90)			
9.80-9.83 9.80	SPT 0*/30 J		/50 18/08/04		9.70 10.00	Moderately strong grey fine grained CARBONIFEROUS LIMESTONE		

Remarks

Scale (approx)	Logged By
1:50	DC/HD

Figure No. 04-411.BH1

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Glover Site Investigations Ltd

Site	Number
MIXED USE DEVELOPMENT, MONAGHAN TOWN	BH1

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
COMPETITOR 130 RIG	125mm to 10.00m			04-411
	Location	**Dates**	**Engineer**	**Sheet**
	AS PLAN	18/08/04	ALBERT FRY ASSOCIATES	2/2

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
10.00-10.02	SPT 0*/20		/50					

Remarks

Scale (approx)	Logged By
1:50	DC/HD

Figure No. 04-411.BH1

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Site	Number
MIXED USE DEVELOPMENT, MONAGHAN TOWN	BH2

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
COMPETITOR 130 RIG	125mm to 3.80m			04-411
	Location	**Dates**	**Engineer**	**Sheet**
	AS PLAN	18/08/04	ALBERT FRY ASSOCIATES	1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					0.10	BITMAC HARDCORE		
0.50-0.95	SPT N=19		7,6/5,5,4,5					
1.00-1.45	SPT N=27		3,4/5,7,8,7		(1.40)			
					1.50	MADE GROUND: Stiff friable dark grey brown gravelly slightly organic fine sandy CLAY containing roots and rootlets and pieces of brick and slate		
1.60	J				(0.60)			
2.00-2.45	SPT N=5		2,3/2,1,1,1		2.10	Soft dark grey gravelly sandy CLAY containing occasional small pieces of brick		
2.50	J				(0.80)			
			Water Struck(1) at 2.90m.		2.90	Stiff brown gravelly sandy CLAY with some cobbles and boulders		▽1
2.90-2.87	SPT 0*/30		/10,13,18,18		(0.60)			
3.50-3.52	SPT 0*/20		/50		3.50	Moderately strong grey fine grained CARBONIFEROUS LIMESTONE		
3.60-3.61	SPT 0*/10		/50		(0.30)			
3.70-3.72	SPT 0*/20		/50 18/08/04		3.80			
3.80-3.81	SPT 0*/10		/50			Complete at 3.80m		

Remarks

Scale (approx)	Logged By
1:50	DC/HD

Figure No. 04-411.BH2

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Glover Site Investigations Ltd

Site	Number
MIXED USE DEVELOPMENT, MONAGHAN TOWN	BH3

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
COMPETITOR 130 RIG	125mm to 14.70m			04-411
	Location	**Dates**	**Engineer**	**Sheet**
	AS PLAN	18/08/04	ALBERT FRY ASSOCIATES	1/2

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					0.05	BITMAC		
						Grey HARDCORE		
0.50-0.95 0.50	SPT N=17 J		3,4/4,5,4,4		(1.05)			
			Water Struck(1) at 0.90m.					▽1
1.00-1.45 1.00	SPT N=18 J		4,4/4,5,4,5		1.10	Grey sandy HARDCORE		
					(0.60)			
1.50-1.95 1.50	SPT N=12 J		4,4/3,2,4,3		1.70			
					(0.35)	MADE GROUND: Medium dense dark grey and grey clayey sandy angular fine to coarse GRAVEL		
2.00-2.45 2.00	SPT N=31 J		4,4/3,2,12,14		2.05			
					(0.30)	MADE GROUND: Firm friable dark grey and black gravelly very sandy CLAY containing pieces of slate and rootlets		
					2.35			
						Medium dense (saturated) purple brown slightly silty sandy angular fine to coarse GRAVEL		
2.70-3.15 2.70	SPT N=34 J		5,5/6,13,9,6					
3.50-3.95 3.50	SPT N=21 J		9,4/4,5,6,6					
4.00-4.45 4.00	SPT N=21 J		3,4/5,5,6,5					
5.00-5.45 5.00	SPT N=20 J		4,4/4,5,6,5					
					(6.25)			
6.00-6.45 6.00	SPT N=22 J		5,5/5,6,5,6					
7.00-7.45 7.00	SPT N=26 J		5,5/5,8,7,6					
8.00-8.45 8.00	SPT N=29 J		5,6/6,7,8,8					
					8.60	Stiff brown gravelly sandy CLAY with some cobbles and boulders		
9.00-9.45 9.00	SPT N=30 J		7,6/7,8,8,7					
					(1.40)			
10.00-10.45	SPT N=32		5,6/7,8,8,9		10.00			

Remarks
Installed 19mm dia standpipe to 5.00m.

Scale (approx)	Logged By
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Figure No.
04-411.BH3

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Site	Number
MIXED USE DEVELOPMENT, MONAGHAN TOWN	BH3

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
COMPETITOR 130 RIG	125mm to 14.70m			04-411
	Location	**Dates**	**Engineer**	**Sheet**
	AS PLAN	18/08/04	ALBERT FRY ASSOCIATES	2/2

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
10.00	J					Stiff brown gravelly sandy CLAY with some cobbles		
11.00-11.45	SPT N=33		6,7/7,8,10,8					
11.00	J							
12.00-12.45	SPT N=35		7,7/7,8,10,10					
12.00	J				(4.40)			
13.00-13.45	SPT N=33		7,8/7,8,9,9					
13.00	J							
14.00-14.45	SPT N=40		8,9/9,10,11,11,10					
14.40	J				14.40	Moderately strong grey fine grained CARBONIFEROUS LIMESTONE		
14.50-14.52	SPT 0*/20		/50		(0.30)			
			18/08/04		14.70			
14.70-14.71	SPT 0*/10		/50			Complete at 14.70m		

Remarks	Scale (approx)	Logged By
	1:50	DC/HD
	Figure No.	04-411.BH3

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Site: MIXED USE DEVELOPMENT, MONAGHAN TOWN			Number: BH4
Excavation Method: COMPETITOR 130 RIG	Dimensions: 125mm to 5.90m	Ground Level (mOD):	Client:	Job Number: 04-411
	Location: AS PLAN	Dates: 18/08/04	Engineer: ALBERT FRY ASSOCIATES	Sheet: 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.50)	Peaty TOPSOIL		
0.50-0.95 0.50	SPT N=11 J		3,4/3,4,2,2		0.50	Crushed red brick and mortar		
					(0.40) 0.90	Soft friable dark grey organic fine sandy CLAY		
1.00-1.45 1.00	SPT N=3 J		1,1/1,1,,1		(0.20) 1.10	Very soft friable dark grey peaty CLAY		
1.50-1.95 1.50	SPT N=2 J		1,1/1,,1		(1.00)			
2.00-2.45 2.00	SPT N=2 J		1/1,,1		2.10	Very soft whiteish grey organic SILT and fine sandy SILT containing shell fragments and layers of grey sandy silty fine sand		
2.50-2.95 2.50	SPT N=2 J		1/1,,1		(1.10)			
3.00-3.45 3.00	SPT N=12 J		1/2,3,4,3		3.20	Loose grey sandy fine to coarse subrounded GRAVEL		
4.00-4.45 4.00	SPT N=18 J		4,5/4,4,5,5		(2.40)			
5.00-5.45 5.00	SPT N=27 J		5,5/6,7,8,6					
5.60-5.62 5.80-5.81	SPT 0*/20 SPT 0*/10		/50 /50 18/08/04		5.60 (0.30) 5.90	Moderately strong grey fine grained CARBONIFEROUS LIMESTONE		
5.90-5.91	SPT 0*/10		/50			Complete at 5.90m		

Remarks

Scale (approx)	Logged By
1:50	DC/HD

Figure No. 04-411.BH4

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Glover Site Investigations Ltd

Site	Borehole Number
MIXED USE DEVELOPMENT IN MONAGHAN TOWN, CO. MONAGHAN	BH5

Boring Method	Casing Diameter	Ground Level (mOD)	Client	Job Number
COMPETITOR 130 RIG	125mm cased to 11.70m		P. CLARKE & SONS LTD	04-663
	Location	**Dates**	**Engineer**	**Sheet**
	AS PLAN	10/12/04		1/2

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
						0.10	BITMAC		
0.50	B					(1.30)	MADE GROUND: Dense grey sandy fine to coarse subrounded GRAVEL with some cobbles and boulders (FILL)		
1.50-1.95 1.50	SPT N=5 J			2,1/1,1,2,1		1.40	Very soft grey slightly sandy organic CLAY		
2.00-2.45 2.00	SPT N=6 J			2,1/2,1,2,1					▽2
				Water Struck(1) at 2.60m.					▽1
3.00-3.45 3.00	SPT N=3 J			1/1,1,,1		(3.60)			
4.00-4.45 4.00	SPT N=3 J			1/1,1,,1					
5.00	J			Water Struck(2) at 5.00m, rose to 2.10m in 10 mins.		5.00	Loose brown silty sandy fine to coarse GRAVEL		▽2
5.00-5.45	SPT N=6			1,2/1,2,1,2		(1.50)			
6.50-6.95 6.50	SPT N=13 J			2,3/3,3,3,4		6.50	Medium dense brown silty sandy fine to coarse subrounded GRAVEL		
8.00-8.45 8.00	SPT N=14 J			3,3/3,4,3,4		(2.60)			
9.10	J					9.10	Stiff brown gravelly sandy CLAY with some cobbles and boulders		
9.50-9.95 9.50	SPT N=40 J			6,7/9,9,10,12		(0.90)			
						10.00			

Remarks

Scale (approx)	Logged By
1:50	DC/HD

Figure No. 04-663.BH1

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Site	Borehole Number
MIXED USE DEVELOPMENT IN MONAGHAN TOWN, CO. MONAGHAN	BH5

Boring Method	Casing Diameter	Ground Level (mOD)	Client	Job Number
COMPETITOR 130 RIG	125mm cased to 11.70m		P. CLARKE & SONS LTD	04-663
	Location	**Dates**	**Engineer**	**Sheet**
	AS PLAN	10/12/04		2/2

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
						(1.60)	Stiff brown gravelly sandy CLAY with some cobbles and boulders		
11.00-11.45 11.00	SPT N=52 J			10,12/12,13,13,14					
11.60-11.62 11.60 11.70-11.71	SPT 0*/0 50/20 J SPT 0*/0 50/10			/50 10/12/04 /50		11.60 11.70	Moderately strong grey fine grained CARBONIFEROUS LIMESTONE Complete at 11.70m		

Remarks

Scale (approx)	Logged By
1:50	DC/HD

Figure No. 04-663.BH1

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Site	Borehole Number
MIXED USE DEVELOPMENT IN MONAGHAN TOWN, CO. MONAGHAN	BH6

Boring Method	Casing Diameter	Ground Level (mOD)	Client	Job Number
COMPETITOR 130 RIG	125mm cased to 7.00m		P. CLARKE & SONS LTD	04-663
	Location AS PLAN	**Dates** 10/12/04	**Engineer**	**Sheet** 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
						0.10	BITMAC		
0.30	B						MADE GROUND: Dense grey sandy fine to coarse GRAVEL (FILL)		
						(1.00)			
1.10	J					1.10	Very soft grey and grey brown organic fine sandy CLAY		
1.50-1.95 1.50	SPT N=4 J			1,2/1,1,1,1					
2.00-2.45 2.00	SPT N=5 J			3,2/1,2,1,1 Water Struck(1) at 2.20m.					▽1
						(3.20)			▽2
3.00-3.45 3.00	SPT N=7 J			2,1/2,2,2,1					
				Water Struck(2) at 4.30m, rose to 2.60m in 10 mins.		4.30	Medium dense brown silty sandy fine to coarse GRAVEL		▽2
4.50 4.50-4.95	J SPT N=14			3,3/3,4,3,4					
						(1.80)			
6.00-6.45 6.00	SPT N=32 J			3,3/6,7,9,10		6.10	Stiff brown gravelly sandy CLAY with some cobbles and boulders		
						(0.80)			
6.90-6.92 6.90 7.00-7.01	SPT 0*/0 50/20 J SPT 0*/0 50/10			/50 10/12/04 /50		6.90 7.00	Moderately strong grey fine grained CARBONIFEROUS LIMESTONE Complete at 7.00m		

Remarks

Scale (approx)	Logged By
1:50	DC/HD

Figure No. 04-663.BH6

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Glover Site Investigations Ltd

Site	Borehole Number
MIXED USE DEVELOPMENT IN MONAGHAN TOWN, CO. MONAGHAN	BH7

Boring Method	Casing Diameter	Ground Level (mOD)	Client	Job Number
COMPETITOR 130 RIG	125mm cased to 2.70m		P. CLARKE & SONS LTD	04-663
	Location AS PLAN	**Dates** 10/12/04	**Engineer**	**Sheet** 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
						0.10	BITMAC		
0.30	J					(0.90)	MADE GROUND: Dense grey sandy fine to coarse subrounded GRAVEL with some cobbles (FILL)		
1.00-1.45 1.00	SPT N=5 J			1,2/1,2,1,1		1.00 (0.60)	Soft grey slightly organic sandy CLAY		
				Seepage(1) at 1.60m.		1.60	Stiff grey gravelly sandy CLAY with some cobbles and boulders		▽1
2.00-2.45 2.00	SPT N=41 J			6,8/8,9,12,12		(1.00)			
2.60-2.62 2.60	SPT 0*/0 50/20 J			/50 10/12/04		2.60	Moderately strong grey fine grained LIMESTONE		
2.70-2.71	SPT 0*/0 50/10			/50		2.70	Complete at 2.70m		

Remarks
Two attempts at this borehole.

Scale (approx)	Logged By
1:50	DC/HD

Figure No. 04-663.BH7

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Appendix 3

Plot of Bedrock Against Existing Ground Level

Appendix 4

Plot of Bedrock Against Assumed Datum Level

Appendix 5

Geological Map Of The Site

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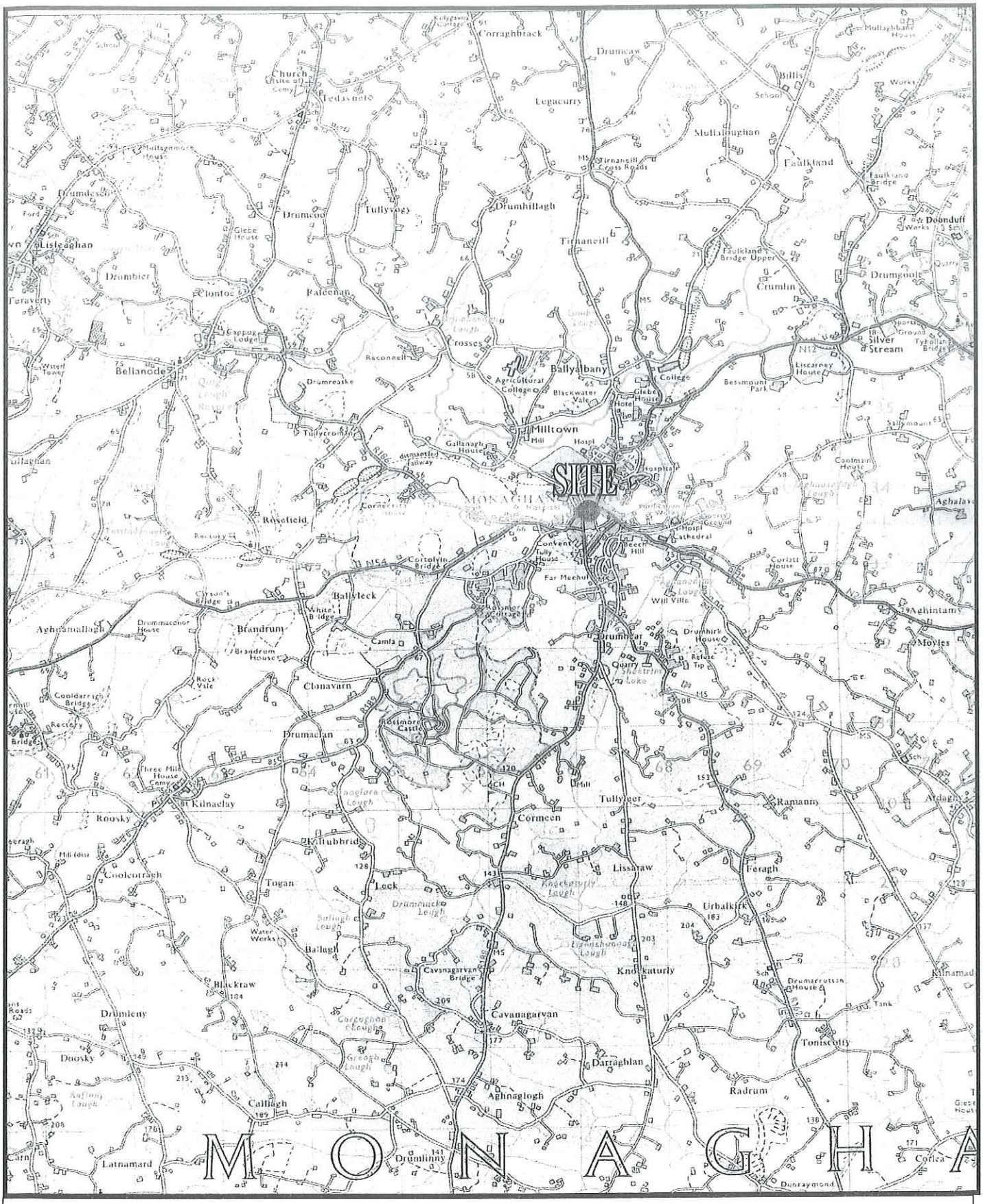
CLARKE

GEOLOGY LOCATION PLAN
MONAGHAN MIXED USE DEVELOPMENT
MONAGHAN
CILENT: P CLARKE & SONS
REPORT NO: 05-021 JANUARY 2005

GLOVER SITE INVESTIGATIONS LIMITED

Appendix 6

Site Location Plan



SITE LOCATION PLAN
MONAGHAN MIXED USE DEVELOPMENT
MONAGHAN
CILENT: P CLARKE & SONS
REPORT NO: 05-021 JANUARY 2005

CLARKE

GLOVER SITE INVESTIGATIONS LIMITED

PRIORITY GEOTECHNICAL LIMITED
Unit 12, Owenacurra Business Park,, Midleton, Co. Cork
Tel: (021) 4631600 Fax (021)4638690
Email: geotechnical@priority.ie

MONAGHAN TOWN COLLECTION NETWORK

REPORT ON GROUND INVESTIGATION

FACTUAL

REPORT NO. PC7089

Client: Monaghan County Council,
County Offices,
The Glen,
Monaghan,
Co. Monaghan

Engineer: T J O Connor & Associates,
Consulting Engineers,
Corrig House,
Corrig Road,
Sandyford,
Dublin 18

PRIORITY GEOTECHNICAL LIMITED
Unit 12, Owenacurra Business Park,, Midleton, Co. Cork
Tel: (021) 4631600 Fax (021)4638690
Email: geotechnical@priority.ie

MONAGHAN TOWN COLLECTION NETWORK

REPORT ON GROUND INVESTIGATION

FACTUAL

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VOL. 1

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County Offices,
The Glen,
Monaghan,
Co. Monaghan

Engineer: T J O Connor & Associates,
Consulting Engineers,
Corrig House,
Corrig Road,
Sandyford,
Dublin 18

REPORT CONTROL SHEET

Client	Monaghan County Council					
Employer's Representative	T.J O'Connor & Associates, Consulting Engineers					
Project Name	Monaghan Town Collection Network					
Report Name	Monaghan Town Collection Network Ground Investigation Factual Report					
Project Number	PC7089					
This Report Comprises of	RCS	TOC	Text	No. of Appendice	Drawings	Electronic data
	1	1	29	4	21	*.pdf, *.dwg

Revision	Status	Author(s)	Approved By	Issue Date
D01	Draft	GH	FNC	12.03.2008
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VOL . 2

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APPENDIX D **EXPLORATION LOCATION PLANS**

1 INTRODUCTION

1.1 SCOPE OF WORKS

In July 2007, T.J. O' Connor & Associates, Consulting Engineers commissioned Priority Geotechnical, PGL on behalf of their Client, Monaghan County Council, to carry out a ground investigation for the proposed Monaghan Town, Collection Network. The purpose of the geotechnical ground investigation was to obtain sufficient geotechnical information for the design of the proposed civil works.

The investigation, which was specified by T.J. O' Connor, Consulting Engineers, initially comprised, as per the Tender Bill of Quantities, of seventy (70) number rotary open hole boreholes, sixty (65) number rotary cored boreholes, one hundred and eighty nine (189) number trial pit excavations and twenty three (23) number slit trenches, all associated sampling, *in-situ* testing, laboratory work and factual reporting.

The scope of the works was subsequently extended to include for cable percussion boreholes. The final scope of works as completed is detailed in section 3.2.

This investigation was carried out in accordance with the contract specification and relevant standards. The initial and additional fieldwork was carried out from August 2007 to June 2008.

1.2 REPORTING

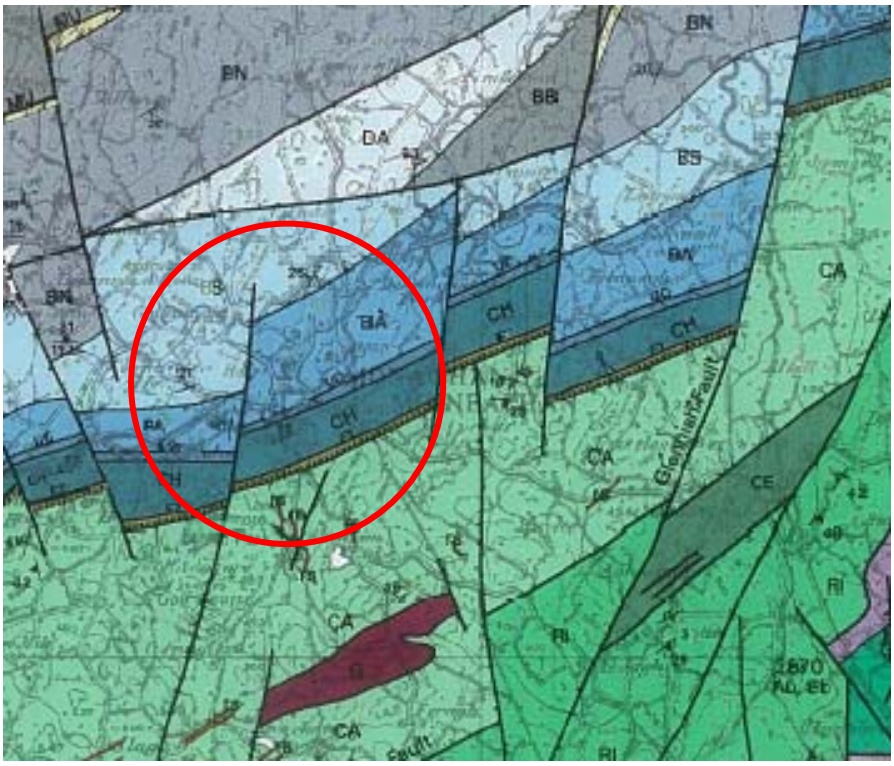
This report, PC7089-Rp-F02, presents the factual records of the completed fieldworks with respect to the ground investigation contract for Monaghan Town, Collection Network.

2 THE SITE

2.1 SITE GEOLOGY

The site was located in Monaghan Town and the surrounding townlands, in Co. Monaghan being primarily on public roads and streets and Greenfield areas.

The Geological Survey of Ireland, 1:100,000 mapping (Sheets 8) indicated that the geology of the area is characterised by the Ballyshannon Formation (BS), the Ballysteen Formation (BA), the Ulster Canal Formation (UC), the Cooldaragh Formation (CH), the Fearnaght Formation (FT) and the Coronea Formation (CA. The Ballyshannon Formation was described as crinoidal LIMESTONE and silty SHALE. The Ballysteen Formation was described as dark muddy LIMESTONE and SHALE. The Ulster Canal Formation was described as calcareous SANDSTONE, SHALE and MICRITE. The Cooldaragh Formation was described as pale brown-grey flaggy, silty MUDSTONE. The Fearnaght Formation was described as pale CONGLOMERATE and red SANDSTONE. The Coronea Formation was described as TURBIDITE, red SHALE and minor volcanics.



3 FIELDWORK

3.1 GENERAL

The fieldwork was carried out in general accordance with BS 5930 (1999) Code of Practice for Site Investigation and Part 9 of BS 1377 (1990), Method of Tests for Soil for Civil Engineering Purposes, *in situ* Tests. Dando 2000, cable percussive rigs were used to advance the boreholes through overburden deposits using 200mm diameter casing. Rotary boreholes were advanced using a Deltabase 520 rig, a Soil Mech PSM 8G rig and a Hill Twister Core Drill rig through overburden deposits using Symmetrex 131, nominal 150mm diameter casing in open-hole drilling and through rock using double lined core barrel, at nominal diameter 76mm. A compressed air-mist flush was used for rotary drilling. Trial pit and slit trench excavations were excavated using both a JCB and a mini digger, as detailed on the logs.

The exploration locations were selected by T.J. O'Connor & Associates, and set out on site from existing features and the co-ordinates provided. The exploratory locations were surveyed using Trimble V8 GPS equipment to the Ordinance Survey national grid system of co-ordinates and elevations to Malin Head datum.

The exploratory locations are shown on the Exploration Location Plans (drawing references: PC7089-SI-A to PC7089-SI-C, PC7089-SI-01 to PC7089-SI-18) presented in **APPENDIX D** of this report.

3.2 EXPLORATORY HOLES

The exploratory holes as completed during the ground investigation are detailed in the following table:

SUMMARY OF EXPLORATORY WORK UNDERTAKEN

Type	Quantity	Depth Range	Remarks
Cable Tool Boreholes[1]	80No.	0.5 to 7.5m	BH1000-BH1003A, BH1004, BH1004A-BH1006A, BH1007-BH1019A, BH1020, BH1020A, BH1021-BH1025A, BH1026-BH1030A, BH1031-BH1049A, BH1050-BH1051A, BH1052, BH1052A, BH1053-BH1059A, BH1060-BH1063A, BH1065, BH1065A and BH1066-BH1068.
Rotary Open Hole Boreholes	68	1.2m to 21.5m	BH01-BH05, BH07, BH13, BH15-BH31, BH33-BH70 including BH11A
Rotary Open Hole and Rotary Cored Boreholes	2	7.8m to 13.3m	BH06 and BH14
Rotary Cored Boreholes	66	1.3m to 20.1m	BHR01- BHR65 including BHR05A and BH06
Trial Pits	196	0.6m to 4.1m	TP001-TP189 and TP01A, TP008A, TP25A, TP29A, TP37A, TP45A and TP50A
Slit Trenches	26	1.2m to 2.4m	ST01-ST09, ST10.1, ST10.2, ST11-ST14, ST15.1, ST15.2, ST16-ST23 and ST01A

The exploratory records are presented in **APPENDIX A** and **APPENDIX C** and should be read in conjunction with the key sheets included. The records provide descriptions, in accordance with BS 5930 (1999), of the materials encountered and details of the samples taken, together with any observations made during the investigation.

[1] The green ID points, presented on the location plans, **APPENDIX D**, represented the additional cable tool borehole, BH1000.

3.3 GROUNDWATER MONITORING

Groundwater was recorded when encountered (strike) during rotary and cable tool boring, trial pit and slit trench excavations over a period of 20minutes, noting any changes that may occur. The groundwater recorded during the investigation is summarised in Section 5.1 and presented graphically on the logs in **APPENDIX A**.

Standpipes were constructed under instruction.

3.4 IN-SITU TESTING

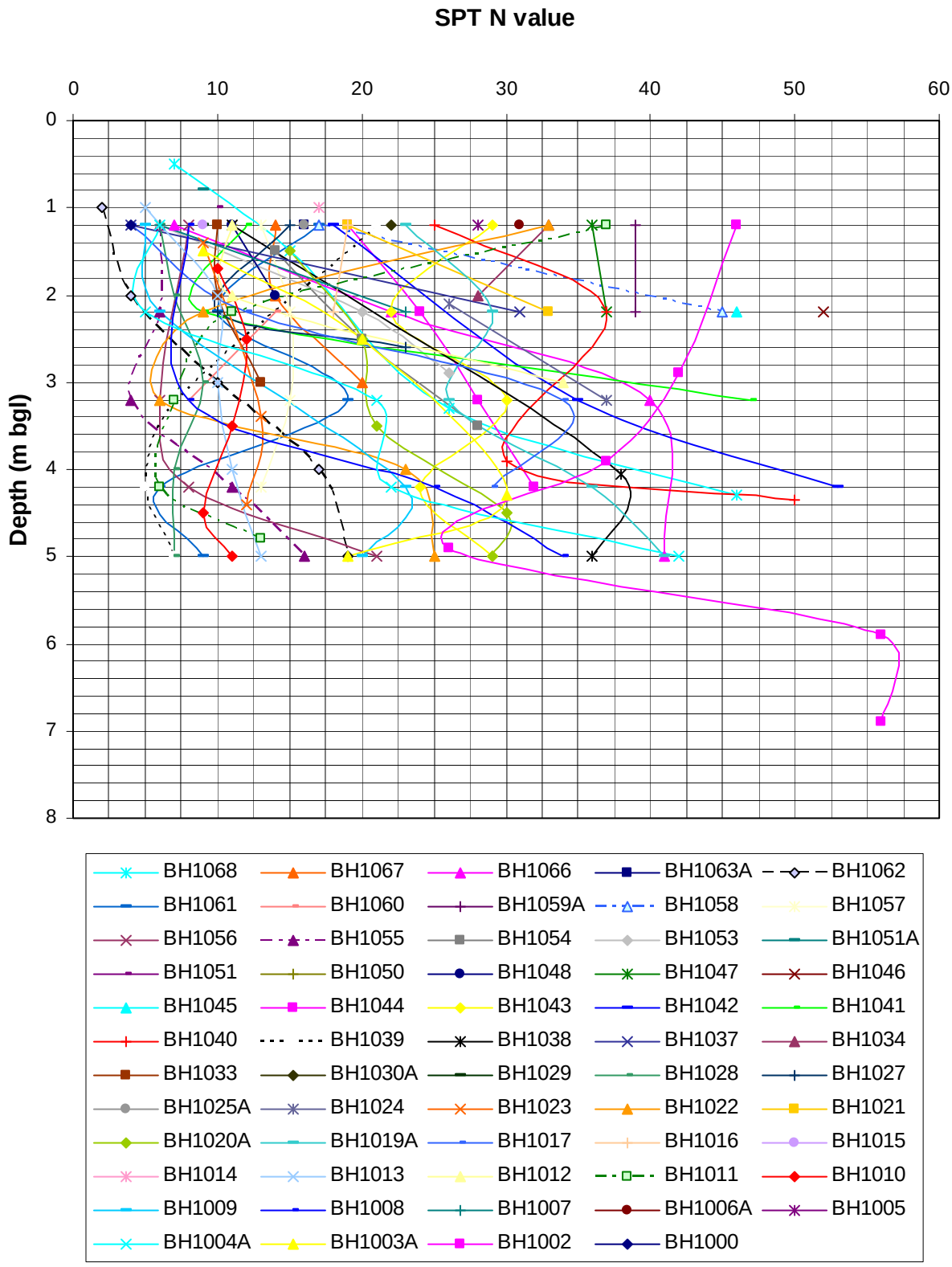
Standard Penetration Tests, N values[2], were carried out in the both cable tool and rotary boreholes typically at 1.0m intervals.

SUMMARY OF IN-SITU TESTING

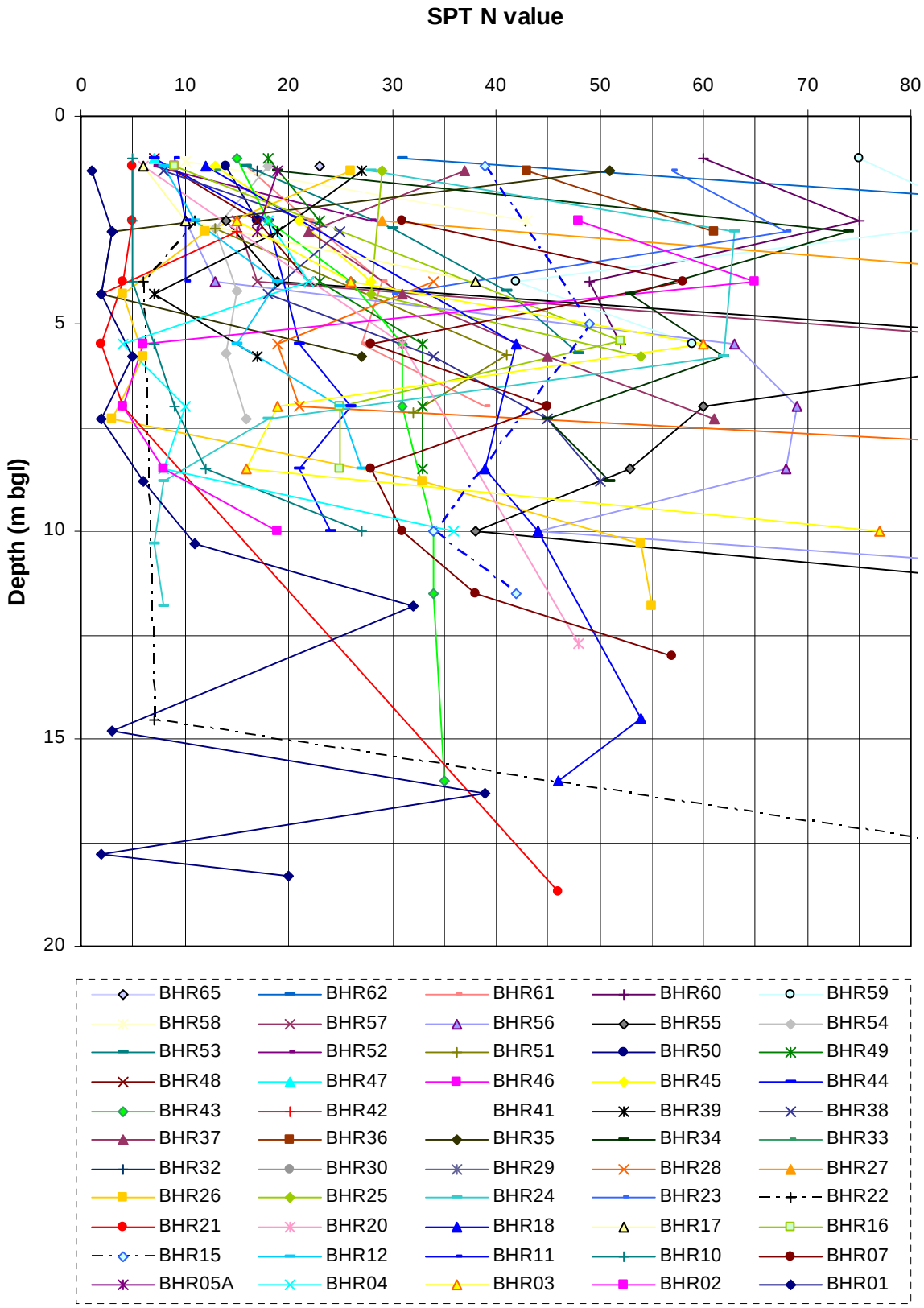
Type	No.	Remarks
Standard Penetration Test, N value	1202	N values ranging from N=0 to N=161 1067No SPT(C) and 135No. SPT (S)

[2] Where the SPT test did not allow for a full penetration of 300mm over four sets of 75mm intervals the progress was recorded and the test deemed a refusal as indicated on the logs.

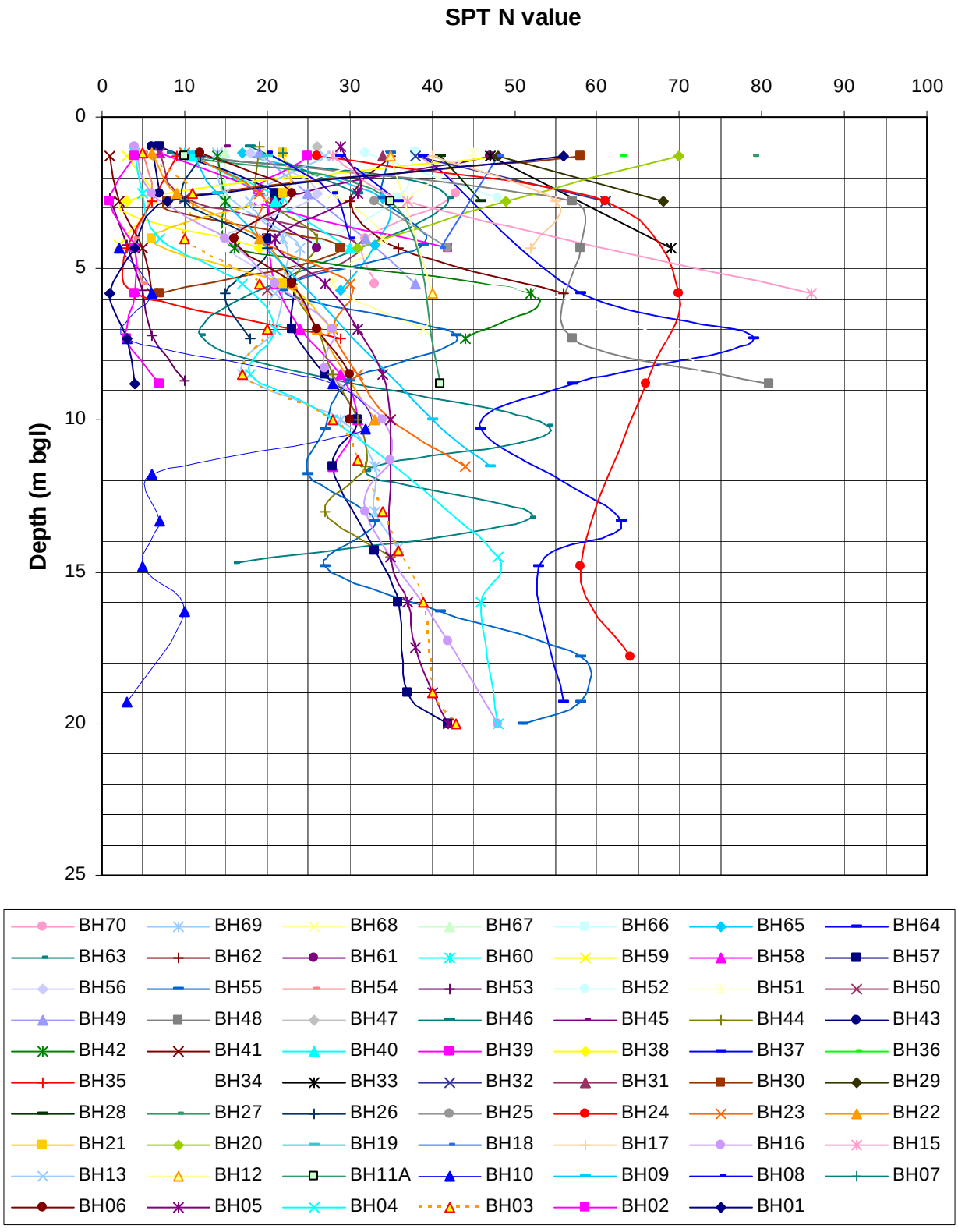
The distribution of Standard Penetration Test, SPT N values with depth is presented graphically below for cable tool boreholes (BH1000).



The distribution of Standard Penetration Test, SPT N values with depth is presented graphically below for rotary boreholes (BHR).



The distribution of Standard Penetration Test, SPT N values with depth is presented graphically below for rotary (open-hole) boreholes (BH).



4 LABORATORY TESTING

All samples were transported to Priority Geotechnical's laboratory in Midleton, Co. Cork, examined and prepared for scheduled testing. The following tests were scheduled by AGL on behalf of T.J.O'Connor & Associates. Subsequent scheduling of the additional cable tool boreholes was undertaken by PGL and approved by T.J. O'Connor & Associates.

Testing was carried out by PGL in accordance with BS1377 (1990), Methods of test for soils for civil engineering purposes.

The laboratory test results are presented in **APPENDIX B**. A summary of tests undertaken are detailed below.

4.1 SOIL

SUMMARY OF LABORATORY TESTING UNDERTAKEN

SOILS		
Type	**No.**	**Remarks**
Natural Moisture Content	275	Range 4.4% to 732%
Atterberg Limit	129	Liquid Limit 13% to 365% Plastic Limit 15% to 251% including NP non-plastic soils Plasticity Index 6 to 171
Particle Size Distribution	150	Including hydrometer analysis on fine soils 128 no.
pH SO_4 Loss On Ignition	30 30 10	pH 6.23 to 9.03 SO_4 0.01g/l to 0.668g/l 5.58% to 85.01%

4.2 ROCK

SUMMARY OF LABORATORY TESTING UNDERTAKEN

ROCK		
Type	**No.**	**Remarks**
Point Load Index , Is_{50}	338	Range 0.18MPa to 21.25MPa

5 GROUND CONDITIONS

The site was generally characterised by slightly sandy, slightly gravelly CLAY/SILT, very clayey/silty very gravelly SAND, very clayey/silty SAND and GRAVEL, very sandy very silty GRAVEL and PEAT to depths up to 20.0m below existing ground level (bgl). Topsoil was on average 350mm thick.

Madeground/ Fill was encountered and described as slightly sandy slightly gravelly CLAY/SILT, silty very gravelly SAND and very silty very sandy GRAVEL, with pieces of concrete, brick, tarmacadam and plastic, to a maximum depth of 3.0m bgl being between 150mm and 2500mm thickness. Tarmacadam surfacing was on average 165mm thick ranging between 15mm and 500mm thickness. The Cl 804 sub-base was on average 360mm thick ranging from 100mm thick to 1000mm thickness. Concrete was encountered at a number of locations being 265mm thickness on average, ranging from100mm to 800mm in thickness.

Based on the SPT N Values the PEAT was very soft to soft with N values of 1 to 8. The cohesive CLAY and SILT deposits were very soft to stiff with N values of 3 to 58. Based on the SPT N values, the granular deposits are described as being loose to very dense, with N values 2 to 52. At location BH53 soft to firm SILT was found to under-lay PEAT to depth from 2.7m to 9.0m bgl. BH54 soft to firm CLAY was encountered from ground level to 6.3m bgl. BH59 soft to firm CLAY was encountered from ground level to 5.9m bgl. Soft SILT was encountered at BHR35 from 1.3m to 5.8m bgl.

LIMESTONE was encountered throughout the site at depths of between 1.3m to 18.4m bgl, which was described as moderately weak to very strong having Point Load indices of 0.18MPa and 21.25MPa. Fossiliferous MARL was encountered in BHR08 at 14.32m to 17.5m bgl. At location BHR01 SPT, N values within the LIMESTONE indicated soft CLAY infill materials. Solid Core Recovery of 0% to 7% indicated highly weathered rock. BH02 indicated similar anomalies with PEAT being encountered within the rock and N values of 0 to 8 being recorded indicating infill or highly weathered rock in the upper zone.

MUDSTONE was encountered at BHR31 inter-bedded with SANDSTONE from 6.1m to 10.0m. MUDSTONE was found to underlie the LIMESTONE at BHR37, BHR38 at a depth of 11.76m to 13.48m bgl. The MUDSTONE was described as weak to moderately weak, non-intact.

SANDSTONE was encountered at BHR17 and BHR64, BHR65 at a depth of 2.6m to 13.1m bgl. The SANDSTONE was described as strong to very strong. GREYWACKE was encountered at BHR58 to BHR62 at a depth of 2.5m to 8.5m bgl. The GREYWACKE was described as moderately weak to strong.

The ground conditions are summarised in the following table:

SUMMARY OF GROUND CONDITIONS

Stratum Encountered	Range of Thicknesses, m	Locations
Topsoil	0.02m to 0.6m	BH1003A, BH1007, BH1015, BH1039, BH1040, BH1044, BH1050, BH1052, BH1052A, BH1057, BH1062, BH1063A, BH1065, BH1065A, BH1066, BH1068, BH13, BH24, BH34, BH36 - BH38, BHR20, BHR23, BHR26, BHR37 - BHR39, BHR58, TP035, TP041, TP042, TP048, TP050, TP050A, TP051 - TP055, TP057, TP063 - TP072, TP081, TP085, TP086, TP088 - TP090, TP094 - TP100, TP107, TP112 - TP116, TP128, TP132, TP141 - TP144, TP149, TP150, TP153 - TP158, TP160 - TP171, TP176, TP178 - TP182 and TP185 - TP189.
Madeground (Fill): Slightly sandy slightly gravelly CLAY/SILT, silty very gravelly SAND and very silty very sandy GRAVEL with plastic, concrete, brick and tarmacadam.	0.3m to 3.358m	BH1002, BH1003, BH1003A, BH1004, BH1004A, BH1006, BH1006A, BH1011, BH1016, BH1021, BH1022, BH1023, BH1024, BH1025, BH1025A, BH1026, BH1027, BH1030, BH1030A, BH1031, BH1035, BH1037, BH1038, BH1039, BH1041, BH1043, BH1045, BH1046, BH1047, BH1049, BH1049A, BH1052, BH1058, BH1059, BH1059A, BH1060, BH03, BH04, BH05, BH09, BH11A, BH13, BH35, BH38, BH50, BH58, BH65, BH69, BHR43, BHR47, BHR48, BHR54, ST01, ST04, ST08, ST09, ST10.1, ST11, ST16, ST17, ST22, TP005, TP008, TP008A, TP009, TP010, TP011, TP012, TP013, TP014, TP015, TP019, TP023, TP025, TP025A, TP026, TP028, TP035, TP037A, TP039, TP041, TP043, TP044, TP048, TP053, TP056, TP057, TP058, TP059, TP060, TP061, TP071, TP073, TP081, TP088, TP090, TP091, TP092, TP105, TP106, TP108, TP117, TP119, TP123, TP129, TP130, TP131, TP133, TP134, TP139, TP146, TP147, TP148, TP149, TP150, TP151, TP152, TP159 and TP184.

Stratum Encountered	Range of Thicknesses, m	Locations
Madeground: Clause-804, tarmacadam, concrete and block paving.	0.1m to 2.5m	BH1001, BH1002, BH1005, BH1006A, BH1008, BH1009, BH1011, BH1017, BH1018, BH1019A, BH1020A, BH1021, BH1027, BH1028, BH1029, BH1031, BH1032, BH1033, BH1040, BH1041, BH1043, BH1047, BH1048, BH1049A, BH1053, BH1054, BH1055, BH1056, BH1061, BH06, BH07, BH09, BH11, BH12, BH14, BH15, BH34, BH35, BH40, BH42, BH45, BH47, BH49, BH67, BHR01, BHR02, BHR03, BHR04, BHR05, BHR06, BHR08, BHR09, BHR11, BHR12, BHR14, BHR15, BHR18, BHR19, BHR20, BHR22, BHR23, BHR32, BHR34, BHR43, BHR44, BHR46, BHR47, BHR49, BHR50, BHR64, ST01, ST01A, ST02, ST03, ST04, ST05, ST06, ST07, ST08, ST09, ST10.1, ST10.2, ST11, ST12, ST13, ST14, ST15.1, ST15.2, ST16, ST17, ST18, ST19, ST20, ST21, ST22, ST23, TP001, TP001A, TP002, TP003, TP004, TP006, TP007, TP008, TP008A, TP009, TP010, TP011, TP012, TP013, TP014, TP015, TP016, TP018, TP019, TP020, TP021, TP022, TP023, TP024, TP025, TP025A, TP026, TP027, TP028, TP029A, TP030, TP031, TP032, TP033, TP034, TP036, TP037, TP037A, TP038, TP039, TP040, TP042, TP043, TP044, TP045, TP045A, TP046, TP047, TP049, TP050A, TP061, TP064, TP065, TP075, TP076, TP077, TP078, TP079, TP080, TP081, TP082, TP083, TP084, TP087, TP088, TP095, TP103, TP104, TP105, TP106, TP108, TP109, TP110, TP111, TP117, TP118, TP119, TP120, TP121, TP122, TP123,TP124, TP125, TP126, TP127, TP129, TP131, TP134, TP135, TP136, TP137, TP138, TP145, TP148, TP150, TP172, TP173, TP174, TP175, TP177, TP183 and TP184.
Slightly sandy slightly gravelly CLAY	0.1m to 20m	BH1000, BH1002, BH1004A, BH1004, BH1007, BH1013, BH1014, BH1016, BH1019A, BH1020A, BH1021, BH1023, BH1025, BH1025A, BH1027, BH1030A, BH1033, BH1034, BH1037, BH1038, BH1040, BH1041, BH1044, BH1051, BH1059A, BH1061, BH1062, BH1068, BH01, BH03, BH04, BH06 - BH09, BH11, BH11A, BH12, BH13, BH15 - BH17, BH19, BH21 - BH27, BH29 - BH42, BH44 - BH50, BH54 - BH59, BH61 - BH70, BHR01 - BHR03, BHR05, BHR05A, BHR06 - BHR08, BHR11, BHR12, BHR16 - BHR21, BHR23 - BHR26, BHR28, BHR30, BHR32, BHR34 - BHR39, BHR41 - BHR45, BHR47 - BHR50, BHR52 - BHR54, BHR56, BHR58 - BHR62, BHR65, ST01 - ST03, ST08, ST10.2, ST13, ST15.1, ST15.2, ST17, ST19, ST20, TP005, TP009, TP013 - TP015, TP017, TP018, TP020, TP021,TP023, TP024, TP029, TP029A, TP030 - TP034, TP036, TP040, TP042, TP046 - TP048, TP050 - TP052, TP054, TP060, TP062, TP063, TP067, TP069 - TP071, TP073 - TP080, TP083, TP085 - TP087, TP091 - TP102, TP104, TP106, TP109 - TP112, TP115, TP116, TP118, TP119, TP121, TP123, TP124, TP126 - TP128, TP130 - TP137, TP139, TP143 - TP146, TP148, TP150, TP152 - TP161, TP163 - TP165, TP168, TP172, TP174 - TP176, TP178, TP180, TP181, TP185, TP187 and TP188.
Slightly sandy slightly gravelly SILT/CLAY	0.2m to 11.5m	BH52, BHR10, ST05 - ST07, ST13, TP015, TP050A, TP055, TP096, TP138, TP162 and TP171.

Stratum Encountered	Range of Thicknesses, m	Locations
Slightly sandy slightly gravelly SILT	0.1m to 11.5m	BH1003A, BH1005, BH1008, BH1009, BH1011, BH1012, BH1013, BH1015, BH1016, BH1017, BH1018, BH1020A, BH1021, BH1024, BH1027, BH1028, BH1029, BH1031, BH1032, BH1034, BH1035, BH1036, BH1037, BH1041, BH1042, BH1043, BH1044, BH1046, BH1047, BH1048, BH1049A, BH1050, BH1051A, BH1052A, BH1053, BH1054, BH1055, BH1056, BH1059, BH1063A, BH1065A, BH1066, BH1067, BH12, BH53, BHR04, BHR14, BHR26, BHR35, BHR37 - BHR39, BHR46, ST07, ST12, ST15.2, TP002, TP005, TP045A, TP048, TP049, TP050A, TP053, TP056, TP066, TP069, TP072, TP077, TP079, TP081, TP082, TP085, TP089, TP095, TP102, TP103, TP113, TP114, TP143, TP144, TP146, TP149, TP150, TP153, TP158, TP159, TP162, TP163, TP167 - TP179
Slightly sandy slightly gravelly organic SILT	0.3m to 4.1m	BH1008, BH1009, BH1010, BH1011, BH1013, BH1015, BH1033, BH1055, BH1056 and BH1066.
PEAT	0.1m to 9.0m	BH1028, BH1039, BH1055, BH1056, BH01, BH02 - BH04, BH10, BH16, BH30, BH43, BH53, BHR02, BHR22, ST07, ST18, TP004, TP006, TP007, TP016, TP017, TP019, TP042, TP043, TP056, TP064, TP083, TP090, TP092, TP096, TP103, TP104, TP106, TP113 - TP116, TP149, TP150, TP163, TP164, TP167, TP170, TP178, TP179 and TP184.
Very silty very gravelly SAND	0.1m to 10.78m	BH1002, BH1003A, BH1010, BH1016, BH1017, BH1025, BH1027, BH1035, BH1041, BH1047, BH1050, BH1055, BH1057, BH1060, BH02, BH10, BH24, BH50, BH63, BHR01, BHR08, BHR27, BHR46, ST10.2, ST21, ST23, TP007, TP018, TP019, TP030, TP032, TP036, TP038 - TP040, TP067, TP076, TP077, TP090, TP091, TP104, TP107, TP120, TP122, TP124, TP125, TP127, TP129, TP136, TP138, TP140, TP141, TP145, TP147, TP151, TP153, TP156, TP159, TP161, TP162, TP166, TP168 - TP173 and TP177.
Very clayey/silty SAND and GRAVEL	0.45 m to 4.15m	BH1000, BH1012, BH1054, BH14, ST14, ST15.2, ST23, TP022 and TP173.
Very clayey/silty very sandy GRAVEL	0.1m to 10.2m	BH1002, BH1003A, BH1008, BH1010, BH1013, BH1022, BH1024, BH1027, BH1033, BH1034, BH1035, BH1036, BH1041, BH1045, BH1046, BH1047, BH1049, BH1049A, BH1050, BH1051A, BH1053, BH1060, BH1061, BH1062, BH1063A, BH1066, BH1067, BH1068, BH01, BH03, BH08, BH10, BH23, BH49 , BH56, BH70, BHR02 - BHR04, BHR14, BHR17, BHR18, BHR21, BHR22, BHR26, BHR30, BHR31, TP002 , TP003, TP011, TP020 - TP022, TP024, TP033, TP045A, TP046, TP050 - TP053, TP055, TP057 - TP059, TP061 - TP063, TP065, TP066, TP068, TP070 - TP072, TP074, TP076, TP082, TP093, TP112, TP115, TP116, TP126, TP142, TP151, TP152, TP156, TP169 - TP171, TP175 - TP177, TP179 - TP184, TP186 and TP189.
Slightly silty, slightly sandy, gravelly COBBLES	0.9m to 2.86m	BH1042, BH1052A, BH1058 and BH1060.
MUDSTONE	2.1m bgl to 13.48m bgl	BH51, BH52, BHR31, BHR36 – BHR38 and BHR63.

Stratum Encountered	Range of Thicknesses, m	Locations
SILTSTONE	1.2m bgl to 14.8m bgl	BHR17, BHR24, BHR30 and BHR64.
SANDSTONE	2.4m bgl to 13.1m bgl	BHR03, BHR12, BHR16, BHR17, BHR24, BHR31, BHR64 and BHR65.
LIMESTONE	0.9m bgl to 17.8m bgl	BH06, BH60, BH65 - BH67, BHR01 - BHR04, BHR05A, BHR06, BHR09 - BHR11, BHR13, BHR14, BHR16, BHR18, BHR22, BHR23, BHR25 - BHR30, BHR32 - BHR45, BHR47 - BH53, BHR55 - BHR57, TP025A and TP130.
GREYWACKE	2.5m bgl to 8.5m bgl	BHR58 – BHR62.

5.1 GROUNDWATER

Groundwater was encountered during both trial pit excavation and cable tool boring at a number of locations. Groundwater was typically encountered between 1.5m bgl and 5.0m bgl in boreholes and between 2.0m bgl to 3.0m bgl in trial pit excavations. Forty two (42) number 50mm diameter standpipe installations where constructed and are identified in the summary below. Groundwater strike details are provided and presented graphically on the logs presented in **APPENDIX A** and summarised as follows.

The groundwater strikes detail the level at which groundwater was encountered and that level to which it rose after a 20minute period. This may not reflect the static groundwater level. The standpipe installations should be monitored to determine static groundwater level. It should also be appreciated that seasonal fluctuations in groundwater level may occur.

SUMMARY OF GROUNDWATER STRIKE (BH, cable percussion)

Location	Depth of groundwater strike (m bgl)	Rose to (m bgl)	After (minutes)	Comments
BH1000				No groundwater encountered.
BH1001				No groundwater encountered.
BH1002				No groundwater encountered.
BH1003				No groundwater encountered.
BH1003A	3.3	3.25	20	-
BH1004				No groundwater encountered.
BH1004A				No groundwater encountered.
BH1005				No groundwater encountered.
BH1006				No groundwater encountered.
BH1006A				No groundwater encountered.
BH1007				No groundwater encountered.
BH1008				No groundwater encountered.
BH1009				No groundwater encountered.
BH1010	3.2	3	10	-
BH1010	3.2	3	20	-
BH1011				No groundwater encountered.
BH1012	1.5	1.5	20	-
BH1013	3.9	3.8	15	-
BH1013	3.9	3.8	20	-
BH1014				No groundwater encountered.
BH1015				No groundwater encountered.
BH1016	3.8	3.7	20	-
BH1017				No groundwater encountered.
BH1018				No groundwater encountered.
BH1019A				No groundwater encountered.
BH1020				No groundwater encountered.
BH1020A				No groundwater encountered.
BH1021				No groundwater encountered.

Location	Depth of groundwater strike (m bgl)	Rose to (m bgl)	After (minutes)	Comments
BH1022	4	3.6	20	-
BH1023				No groundwater encountered.
BH1024				No groundwater encountered.
BH1025				No groundwater encountered.
BH1025A				No groundwater encountered.
BH1026				No groundwater encountered.
BH1027	2.6	2	20	-
BH1027	4.55	4.35	20	-
BH1028				No groundwater encountered.
BH1029				No groundwater encountered.
BH1030				No groundwater encountered.
BH1030A				No groundwater encountered.
BH1031				No groundwater encountered.
BH1032				No groundwater encountered.
BH1033				No groundwater encountered.
BH1034	1.3	1.2	15	-
BH1034	1.3	1.2	20	-
BH1035	3.2	2.8	5	-
BH1035	3.2	2.8	20	-
BH1036				No groundwater encountered.
BH1037				No groundwater encountered.
BH1038				No groundwater encountered.
BH1039				No groundwater encountered.
BH1040				No groundwater encountered.
BH1041				No groundwater encountered.
BH1042				No groundwater encountered.
BH1043				No groundwater encountered.
BH1044				No groundwater encountered.
BH1045				No groundwater encountered.
BH1046	3	2.9	20	-
BH1047				No groundwater encountered.
BH1048				No groundwater encountered.
BH1049				No groundwater encountered.
BH1049A				No groundwater encountered.
BH1050				No groundwater encountered.
BH1051				No groundwater encountered.
BH1051A	1.2	1.2	20	Slow.
BH1052				No groundwater encountered.
BH1052A				No groundwater encountered.
BH1053				No groundwater encountered.
BH1054				No groundwater encountered.
BH1055				No groundwater encountered.
BH1056				No groundwater encountered.
BH1057				No groundwater encountered.
BH1058				No groundwater encountered.
BH1059				No groundwater encountered.
BH1059A	3.2	3	20	-
BH1060	1.4	1.35	20	-
BH1060	2.5	2	20	-
BH1060	4.2	2.6	20	-
BH1061				No groundwater encountered.
BH1062	1.5	1.3	15	Slow inflow

Location	Depth of groundwater strike (m bgl)	Rose to (m bgl)	After (minutes)	Comments
BH1062	1.5	1.3	20	Slow inflow
BH1063A				No groundwater encountered.
BH1065				No groundwater encountered.
BH1065A				No groundwater encountered.
BH1066				No groundwater encountered.
BH1067	2.4	2.4	20	Slow inflow.
BH1068	2.3	2.2	20	-

SUMMARY OF GROUNDWATER STRIKE (BH, rotary open-hole)

Location	Depth of groundwater strike (m bgl)	Rose to (m bgl)	After (minutes)	Comments
BH01	9	7.3	20	Standpipe installation
BH02				No groundwater encountered. Standpipe installation
BH03				No groundwater encountered.
BH04	2.5	-	-	Standpipe installation
BH05				No groundwater encountered.
BH06				No groundwater encountered.
BH07				No groundwater encountered.
BH08				No groundwater encountered.
BH09				No groundwater encountered.
BH10				No groundwater encountered.
BH11				No groundwater encountered.
BH11A				No groundwater encountered.
BH12				No groundwater encountered.
BH13	6.1	4.3	20	Standpipe installation
BH14				No groundwater encountered.
BH15	4.8	4.1	20	Standpipe installation
BH16	2.5	-	-	Standpipe installation
BH17				No groundwater encountered.
BH18	8.6	6.9	20	Standpipe installation
BH19	5.1	2.9	20	Standpipe installation
BH20	2.2	1.3	20	Standpipe installation
BH21	8.5	-	-	
BH22	4.2	-	-	
BH23				No groundwater encountered.
BH24				No groundwater encountered.
BH25				No groundwater encountered.
BH26				No groundwater encountered.
BH27				No groundwater encountered.
BH28				No groundwater encountered.
BH29	3.9	3.2	20	-
BH30				No groundwater encountered.
BH31				No groundwater encountered.
BH32				No groundwater encountered.
BH33				No groundwater encountered.
BH34				No groundwater encountered.

Location	Depth of groundwater strike (m bgl)	Rose to (m bgl)	After (minutes)	Comments
BH35	1.2	0.9	20	Standpipe installation
BH36				No groundwater encountered.
BH37				No groundwater encountered.
BH38	3.1	2.7	20	Standpipe installation
BH39				No groundwater encountered.
BH40				No groundwater encountered.
BH41				No groundwater encountered.
BH42				No groundwater encountered. Standpipe installation
BH43	2.3	-	-	Standpipe installation
BH44				No groundwater encountered.
BH45	4	-	-	Standpipe installation
BH46	4.5	-	-	-
BH47	2.5	-	-	Standpipe installation
BH48				No groundwater encountered.
BH49				No groundwater encountered. Standpipe installation
BH50				No groundwater encountered. Standpipe installation
BH51	4.2	-	-	-
BH52	4	-	-	Standpipe installation
BH53				No groundwater encountered.
BH54				No groundwater encountered. Standpipe installation
BH55				No groundwater encountered.
BH56				No groundwater encountered.
BH57				No groundwater encountered.
BH58				No groundwater encountered.
BH59				No groundwater encountered. Standpipe installation
BH60				No groundwater encountered.
BH61				No groundwater encountered. Standpipe installation
BH62	6.2	3.8	20	Standpipe installation
BH63	7.2	-	-	-
BH63	11.2	-	-	-
BH63	17	-	-	-
BH64				No groundwater encountered.
BH65	4.2	-	-	Standpipe installation
BH66				No groundwater encountered.
BH67	2.7	-	-	Standpipe installation
BH68	1.8	-	-	-
BH69	0.5	-	-	Standpipe installation
BH70				No groundwater encountered. Standpipe installation

SUMMARY OF GROUNDWATER STRIKE (BHR, rotary cored boreholes)

Location	Depth of groundwater strike (m bgl)	Rose to (m bgl)	After (minutes)	Comments
BHR01				No groundwater encountered.
BHR02				No groundwater encountered.
BHR03				No groundwater encountered.
BHR04				No groundwater encountered.
BHR05				No groundwater encountered.
BHR05A				No groundwater encountered.
BHR06				No groundwater encountered.
BHR07				No groundwater encountered.
BHR08				No groundwater encountered.
BHR09				No groundwater encountered.
BHR10				No groundwater encountered. Standpipe installation
BHR11				No groundwater encountered. Standpipe installation
BHR12				No groundwater encountered.
BHR13				No groundwater encountered.
BHR14				No groundwater encountered.
BHR15				No groundwater encountered.
BHR16				No groundwater encountered.
BHR17				No groundwater encountered. Standpipe installation
BHR18				No groundwater encountered.
BHR19				No groundwater encountered.
BHR20	12	-	-	-
BHR21	2.8	-	-	-
BHR22				No groundwater encountered.
BHR23	3.1	2.8	20	Standpipe installation
BHR24	13.3	6.1		-
BHR24	13.3	3.4	20	Standpipe installation
BHR25				No groundwater encountered.
BHR26	13.3	9.6	5	
	13.3	2.9	20	Standpipe installation
BHR27				No groundwater encountered.
BHR28				No groundwater encountered.
BHR29				No groundwater encountered.
BHR30				No groundwater encountered.
BHR31				No groundwater encountered.
BHR32				No groundwater encountered. Standpipe installation
BHR33				No groundwater encountered.
BHR34				No groundwater encountered.
BHR35				No groundwater encountered.
BHR36				No groundwater encountered.
BHR37				No groundwater encountered. Standpipe installation
BHR38	4	1.3	20	Standpipe installation
BHR39				No groundwater encountered.
BHR40				No groundwater encountered.
BHR41				No groundwater encountered. Standpipe installation
BHR42	5.2	-	-	-

Location	Depth of groundwater strike (m bgl)	Rose to (m bgl)	After (minutes)	Comments
BHR43				No groundwater encountered.
BHR44				No groundwater encountered.
BHR45				No groundwater encountered. Standpipe installation
BHR46				No groundwater encountered.
BHR47				No groundwater encountered.
BHR48				No groundwater encountered.
BHR49				No groundwater encountered.
BHR50				No groundwater encountered.
BHR51				No groundwater encountered. Standpipe installation
BHR52				No groundwater encountered.
BHR53				No groundwater encountered. Standpipe installation
BHR54				No groundwater encountered.
BHR55				No groundwater encountered.
BHR56				No groundwater encountered. Standpipe installation
BHR57				No groundwater encountered.
BHR58				No groundwater encountered.
BHR59				No groundwater encountered.
BHR60				No groundwater encountered.
BHR61	3	-	-	Standpipe installation
BHR62				No groundwater encountered.
BHR63				No groundwater encountered.
BHR64				No groundwater encountered.
BHR65				No groundwater encountered. Standpipe installation

SUMMARY OF GROUNDWATER STRIKE (TP, trial pit excavations)

Location	Depth of groundwater strike (m bgl)	Rose to (m bgl)	Comments
TP001	1.9	-	Inflow at 1.9m.
TP001A	2.1	1.8	Inflow at 2.1m, rose to 1.8m.
TP002			No groundwater encountered.
TP003			No groundwater encountered.
TP004			No groundwater encountered.
TP005	2.6	-	Inflow at 2.6m.
TP006			No groundwater encountered.
TP007	0.7	-	Trickle at 0.7m, odour of diesel noted.
TP008			No groundwater encountered.
TP008A			No groundwater encountered.
TP009	1	-	Seepage between 1.0m and 2.5m.
TP010			No groundwater encountered.
TP011	1.7	-	Seepage at 1.7m. Rose from 2.4m to 2.1m in 20 mins.
TP012			No groundwater encountered.
TP013			No groundwater encountered.
TP014			No groundwater encountered.

Location	Depth of groundwater strike (m bgl)	Rose to (m bgl)	Comments
TP015			No groundwater encountered.
TP016			No groundwater encountered.
TP017			No groundwater encountered.
TP018	2.8	2.65	Inflow at 2.8m, rose to 2.65m after 20 mins.
TP019	2.5	-	Slow inflow at 2.5m.
TP020			No groundwater encountered.
TP021			No groundwater encountered.
TP022			No groundwater encountered.
TP023			No groundwater encountered.
TP024	2.2	-	Slow inflow at 2.2m.
TP025			No groundwater encountered.
TP025A			No groundwater encountered.
TP026			No groundwater encountered.
TP027			No groundwater encountered.
TP028			No groundwater encountered.
TP029			No groundwater encountered.
TP029A			No groundwater encountered.
TP030			No groundwater encountered.
TP031			No groundwater encountered.
TP032			No groundwater encountered.
TP033			No groundwater encountered.
TP034	2.2	-	Slow inflow at 2.2m.
TP035			No groundwater encountered.
TP036			No groundwater encountered.
TP037			No groundwater encountered.
TP037A			No groundwater encountered.
TP038			No groundwater encountered.
TP039			No groundwater encountered.
TP040			No groundwater encountered.
TP041	1.6	-	Inflow at 1.6m.
TP042	2	-	Seepage at 2.0m.
TP043			No groundwater encountered.
TP044			No groundwater encountered.
TP045			No groundwater encountered.
TP045A			No groundwater encountered.
TP046	2.8	2.7	Inflow at 2.8m. Rose to 2.7m in 10 mins, and to 2.6m in 20 mins.
TP046	2.8	2.6	
TP047			No groundwater encountered.
TP048			No groundwater encountered.
TP049			No groundwater encountered.
TP050			No groundwater encountered.
TP050A	2.5	-	Slow inflow at 2.5m after 1 minute.
TP051			No groundwater encountered.
TP052			No groundwater encountered.
TP053	2.2	-	Inflow at 2.2m. Inflow at 4.0m, rose to 3.5 in 10 mins, and to 3.2m in 20 mins.
TP053	4	3.5	
TP053	4	3.2	
TP054			No groundwater encountered.
TP055	0.8	-	Rapid inflow at 0.80m and at 1.3m.

Location	Depth of groundwater strike (m bgl)	Rose to (m bgl)	Comments
TP055	1.3	-	
TP056			No groundwater encountered.
TP057	2.6		Inflow at 2.6m. Rose from 3.2m to 2.7m after 20 mins.
TP057	3.2	2.7	
TP058	2.6	-	Slow inflow at 2.6m.
TP059	1.7	-	Inflow at 1.7m.
TP060	1.9	-	Fast inflow at 1.9m.
TP061			No groundwater encountered.
TP062	2.9	-	Inflow at 2.9m. Rapid inflow at 3.3m, rose to 3.2 in 10 mins, and to 3.1m in 20 mins.
TP062	3.3	3.2	
TP062	3.301	3.1	
TP063	1.3	-	Inflow at 1.3m.
TP064	2.1	-	Slow inflow at 2.1m.
TP065			No groundwater encountered.
TP066			No groundwater encountered.
TP067			No groundwater encountered.
TP068			No groundwater encountered.
TP069	2	-	Slight seepage at 2.0m.
TP070	2.2	-	Inflow at 2.2m.
TP071	2.5	2.1	Inflow at 2.5m, rose to 2.1m in 10 mins.
TP072	2	1.8	Seepage at 2.0m. Rose to 1.8m after 20 mins.
TP073	2.2	-	Fast inflow at 2.2m.
TP074	2.5	-	Slow inflow at 2.5m.
TP075			No groundwater encountered.
TP076	2.95	2.85	Slow inflow at 2.9m. Inflow at 2.95m, rose to 2.85m in 10 mins.
TP076	2.9	-	Slow inflow at 2.9m. Inflow at 2.95m, rose to 2.85m in 10 mins.
TP077	2.7	-	Inflow at 2.7m.
TP078			No groundwater encountered.
TP079			No groundwater encountered.
TP080			No groundwater encountered.
TP081			No groundwater encountered.
TP082			No groundwater encountered.
TP083			No groundwater encountered.
TP084			No groundwater encountered.
TP085	2.2	-	Seepage at 2.2m.
TP086	2.8	-	Moderate inflow at 2.8m.
TP087			No groundwater encountered.
TP088			No groundwater encountered.
TP089			No groundwater encountered.
TP090	2.6	-	Inflow at 2.6m.
TP091	1.8	1.6	Fast inflow at 1.8m. Rose to 1.6m after 20 mins.
TP092			No groundwater encountered.
TP093			No groundwater encountered.
TP094			No groundwater encountered.
TP095	3	-	Very slow inflow at 3.0m.
TP096	1.3	-	Inflow at 1.3m from stone drain. Fast inflow at 3.2m, rose to 2.8m in 20 mins.
TP096	3.2	2.8	

Location	Depth of groundwater strike (m bgl)	Rose to (m bgl)	Comments
TP097			No groundwater encountered.
TP098			No groundwater encountered.
TP099			No groundwater encountered.
TP100			No groundwater encountered.
TP101			No groundwater encountered.
TP102			No groundwater encountered.
TP103			No groundwater encountered.
TP104	2	1.8	Inflow at 2.0, rose to 1.8m in 20 mins.
TP105			No groundwater encountered.
TP106	2	-	Slow inflow at 2.0m.
TP107			No groundwater encountered.
TP108			No groundwater encountered.
TP109			No groundwater encountered.
TP110			No groundwater encountered.
TP111			No groundwater encountered.
TP112	2.1	-	Slow inflow at 2.1m.
TP113	2.6	-	Slow inflow at 2.6m.
TP114	4	-	Seepage at 4.0m.
TP115	2.6	1	Inflow at 2.6m, rose to 1.0m after 20 mins.
TP116	3.3	3.1	Inflow at 3.3m, rose to 1.3m in 15 mins.
TP117			No groundwater encountered.
TP118			No groundwater encountered.
TP119			No groundwater encountered.
TP120			No groundwater encountered.
TP121			No groundwater encountered.
TP122			No groundwater encountered.
TP123			No groundwater encountered.
TP124			No groundwater encountered.
TP125			No groundwater encountered.
TP126	2.7	-	Slow inflow at 2.7m.
TP127			No groundwater encountered.
TP128			No groundwater encountered.
TP129	2.4	2	Steady inflow at 2.4m. Rose to 2.0m after 20 mins.
TP130			No groundwater encountered.
TP131			No groundwater encountered.
TP132	2.4	-	Steady inflow at 2.4m.
TP133	1.5	-	Seepage between 1.5m and 1.25m.
TP134			No groundwater encountered.
TP135			No groundwater encountered.
TP136			No groundwater encountered.
TP137			No groundwater encountered.
TP138	2.3	-	Inflow at 2.3m.
TP139			No groundwater encountered.
TP140	2.1	-	
TP140	2.901	2.65	
TP140	2.9	2.7	Inflow at 2.1m and 2.9m, rose to 2.7m in 10 mins, and to 2.65m in 20 mins.
TP141			No groundwater encountered.
TP142	1.8	-	Inflow at 1.8m. Rose from 3.0m to 2.2m.
TP142	3	2.2	

Location	Depth of groundwater strike (m bgl)	Rose to (m bgl)	Comments
TP143			No groundwater encountered.
TP144	2.8	-	Slow inflow at 2.8m.
TP145	2	-	Inflow at 2.0m.
TP146			No groundwater encountered.
TP147	1.7	-	Inflow at 1.7m.
TP148	1.4	-	Inflow at 1.4m, possibly from nearby drain. Rose from 2.0m to 1.4m after 20 mins.
TP148	2	1.4	
TP149			No groundwater encountered.
TP150			No groundwater encountered.
TP151			No groundwater encountered.
TP152	3.1	-	Moderate seepage at 3.1m.
TP153	3	-	Moderate inflow at 3.0m.
TP154	4.1	-	Slight inflow at 4.1m.
TP155			No groundwater encountered.
TP156	1.9	-	Inflow at 1.9m.
TP157			No groundwater encountered.
TP158	2.1	-	Slight seepage at 2.1m.
TP159			No groundwater encountered.
TP160			No groundwater encountered.
TP161			No groundwater encountered.
TP162	2	-	Moderate inflow at 2.0m.
TP163	2.5	-	Slow inflow at 2.5m.
TP164	3	-	Slow inflow at 3.0m.
TP165	1	-	Slow inflow at 1.0m.
TP166	2	-	Slow inflow at 2.0m.
TP167	3	2.7	Inflow at 3.0m, rose to 2.7m in 10 mins, and to 2.5m in 20 mins.
TP167	3.001	3.5	
TP168	2.4	-	Inflow at 2.4m.
TP169	1.8	-	Inflow at 1.8m.
TP170	1.9	-	Inflow at 1.9m. Rose from 2.0m to 1.90m in 10 mins, and to 1.85m in 20 mins.
TP170	2.001	1.95	
TP171			No groundwater encountered.
TP172			No groundwater encountered.
TP173			No groundwater encountered.
TP174			No groundwater encountered.
TP175			No groundwater encountered.
TP176			No groundwater encountered.
TP177			No groundwater encountered.
TP178	2.4	2.2	Inflow at 2.4m, rose to 2.2m in 10 mins, and to 2.1m in 20 mins.
TP178	2.401	2.1	
TP178	1.8	-	Inflow at 1.8m. Rose from 2.4m to 2.2m in 10 mins; and to 2.1m in 20 mins.
TP179			No groundwater encountered.
TP180	1.7	-	Inflow at 1.7m. Rose from 3.0m to 2.6m in 10 mins; and to 2.3m in 20 mins.
TP180	3	2.6	
TP180	3	2.3	

Location	Depth of groundwater strike (m bgl)	Rose to (m bgl)	Comments
TP181			No groundwater encountered.
TP182	1.5	-	Inflow at 1.5m. Rose from 2.0m to 1.9m in 10 mins, and to 1.85m in 20 mins.
TP182	2	1.9	
TP182	2	1.85	
TP183			No groundwater encountered.
TP184			No groundwater encountered.
TP185			No groundwater encountered.
TP186	1.3	-	Inflow at 1.3m. Rose from 1.5m to 1.4 in 10 mins, and to 1.3m in 20 mins.
TP186	1.501	1.3	
TP186	1.5	1.4	
TP187			No groundwater encountered.
TP188			No groundwater encountered.
TP189	1.4	-	Inflow at 1.4m. Rose from 2.3m to 2.2m in 10 mins.
TP189	2.3	2.2	

SUMMARY OF GROUNDWATER STRIKE (ST, excavations)

Location	Depth of excavation, m	Comments
ST01	1.6	No groundwater encountered.
ST01A	2	No groundwater encountered.
ST02	1.5	No groundwater encountered.
ST03	1.2	No groundwater encountered.
ST04	1.2	No groundwater encountered.
ST05	2	No groundwater encountered.
ST06	1.85	No groundwater encountered.
ST07	2	No groundwater encountered.
ST08	1.4	No groundwater encountered.
ST09	1.5	No groundwater encountered.
ST10.1	1.5	No groundwater encountered.
ST10.2	1.9	No groundwater encountered.
ST11	1.2	No groundwater encountered.
ST12	1.8	No groundwater encountered.
ST13	2	No groundwater encountered.
ST14	2	No groundwater encountered.
ST15.1	2	No groundwater encountered.
ST15.2	2.4	No groundwater encountered.
ST16	1.2	No groundwater encountered.
ST17	1.8	No groundwater encountered.
ST18	1.6	No groundwater encountered.
ST19	1.6	No groundwater encountered.
ST20	2	No groundwater encountered.
ST21	1.6	No groundwater encountered.
ST22	1.5	No groundwater encountered.
ST23	2	No groundwater encountered.

GROUNDWATER MONITORING IN STANDPIPE INSTALLATIONS

Location	Groundwater level, m bgl		
	19/12/2007	dd/mm/yyy	dd/mm/yyy
BH01	2.57		
BH02	0.92		
BH04	0.9		
BH13	1.86		
BH15	0.57		
BH16	0.85		
BH18	4.72		
BH19	1.27		
BH20	1.14		
BH35	1		
BH38	1.1		
BH42	2.3		
BH43	0.63		
BH45	damaged		
BH47	1.52		
BH49	2.35		
BH50	0.74		
BH52	-		
BH54	0.54		
BH59	0.74		
BH61	0.85		
BH62	1.3		
BH65	2.14		
BH67	2.51		
BH69	0.46		
BH70	4.29		
BHR10	0.9		
BHR11	0.89		
BHR17	2.2		
BHR23	2.2		
BHR24	**0.2**		
BHR26	2		
BHR32	1.43		
BHR37	dry		
BHR38	-		
BHR41	2.59		
BHR45	2.88		
BHR51	1.48		
BHR53	**5.42**		
BHR56	1.0		
BHR61	0.75		
BHR65	2.4		

- No access to installation

5.2 SLIT TRENCH EXCAVATIONS

Slit trench excavations identified the following services. Detailed logs are presented in **APPENDIX A** and summarised below. Concrete/ lean mix was identified as being cover to utility ducting, typically broadband services. It should be noted that the below summary may not be exhaustive and represents the utilities located at the slit trench locations and may not represent the location of utilities between these exploration locations.

SUMMARY OF UTILITIES ENCOUNTERED

ST Location	Utility Encountered
ST01	150mmm dia. clay, storm water drain, 4No. 100mm dia. green PVC ducts (broadband), 300mm dia. concrete storm water drain
ST01A	4No. 100mm dia. green PVC ducts (broadband), 75mm dia. lead pipe (assumed watermain)
ST02	4No. 100mm dia. green PVC ducts (broadband), 300mm dia. concrete stormwater drain, 300mm dia clay stormwater drain, 125mm dia. CI watermain
ST03	25mm dia. metal pipe, 75mm lead watermain, 4No. 100mm dia. green PVC ducts (broadband), 225mm dia clay stormwater drain, Concrete culvert, 150mm dia. CI/DI watermain, 100mm dia. metal pipe, 75mm dia. ducting (ESB)
ST04	150mm dia. CI watermain, 100mm dia. CI watermain, flagstone culvert, ESB warning tape
ST05	4No. 75mm dia. green PVC ducts (broadband), 2No. 100mm dia. DI/ CI watermain, 75mm watermain, 100mm uPVC foul drain.
ST06	2No. 100mm dia. green PVC ducts (broadband), 100mm dia. steel pipe, 75mm dia. steel watermain, 2No. 100mm PVC ducts, concrete.
ST07	Concrete, 225mm dia. concrete stormwater drain, 225mm clay foul drain, 75mm dia. steel pipe, 4No. 100mm dia. green PVC ducts (broadband),, 100mm dia DI/ CI watermain
ST08	120mm dia. CI pipe, 250mm dia. clay foul drain, 4No. 100mm dia. green PVC ducts (broadband), flagstone drain, stone culvert,
ST09	2No. 100mm dia. PVC ducts (ESB), 25mm dia. lead watermain, 200mm dia. CI gasmain, 150mm dia. DI/ CI watermain, 2No. 100mm dia. green PVC ducts (broadband),
ST10.1	75mm dia. HPPE watermain, 225mm dia. clay stormwater drain

ST Location	Utility Encountered
ST10.2	225mm dia. concrete stormwater drain, 4No. 75mm dia. green PVC ducts (broadband), 10mm dia. DI/ CI watermain, concrete
ST11	300mm dia. concrete stormwater drain, 100mm dia, HDPE watermain, 4No. 100mm dia. green PVC ducts (broadband),
ST12	4No. 100mm dia. green PVC ducts (broadband), 225mm dia. clay stormwater drain, 300mm dia. asbestos concrete foul drain, 150mm dia. steel watermain, 100mm dia. green PVC ducting, 150mm dia. concrete pipe.
ST13	Concrete, 150mm dia. concrete
ST14	No services encountered
ST15.1	300mm dia. concrete stormwater drain,
ST15.2	225mm dia. PVC drain, 4No. 75mm dia. green PVC ducts (broadband), 150mm dia. steel watermain, 225mm dia. concrete stormwater drain
ST16	300mm dia. concrete drain, 4No. 100mm dia. green PVC ducts (broadband), flagstone storm drain, 150mm dia. CI watermain,
ST17	700mm dia. concrete drain, 50mm dia. black PVC duct, 100mm dia. black PVC duct.
ST18	4No. 100mm dia. green PVC ducts (broadband), 4No. 100mm dia. green PVC ducts (broadband),
ST19	35mm dia. steel pipe
ST20	150mm dia. orange PVC drain, 2No. 100mm dia. green PVC ducts (broadband),, 100mm dia. HDPE watermain, 75mm dia. CI watermain.
ST21	75mm dia. steel watermain, 2No. 100mm dia. green PVC ducts (broadband), 100mm dia. HDPE watermain, 225mm dia concrete stormwater drain
ST22	200mm dia. concrete piep (ESB warning tape, timber), 100mm dia. black PVC ducts (ESB), 100mm dia. HDPE watremain, 50mm dia. HDPE watermain, 50mm dia. steel pipe.
ST23	2No. 75mm dia. green PVC ducts (broadband), 100mm dia HDPE watermain, 150mm dia. concrete drain, concrete

6 SUMMARY

1. The site was characterised by glacial deposits of very soft to very stiff slightly sandy, slightly gravelly CLAY/SILT and loose to very dense, very clayey/silty very gravelly SAND, very clayey/silty SAND and GRAVEL and very sandy very silty .

2. Made ground, described as slightly sandy slightly gravelly CLAY/SILT, silty very gravelly SAND and very silty very sandy GRAVEL, with pieces of concrete, brick, tarmacadam and plastic was encountered to a maximum depth of 2.04m bgl.

3. Many cobbles and boulders were encountered within the overburden soil strata.

4. Weak to moderately weak MUDSTONE was encountered at depths of between 2.1m bgl and 13.48m bgl.

5. Rock was found to be of varied lithology and was encountered at variable depths from between 0.9m bgl to 17.8m bgl.

6. SILTSTONE was encountered at depths of between 1.2m bgl and 14.8m bgl. Strong to very strong SANDSTONE was encountered at depths of between 2.4m bgl and 13.1m bgl. Moderately weak to very strong LIMESTONE was encountered at depths of between 0.9m bgl and 17.8m bgl. Moderately weak to strong GREYWACKE was encountered at depths of between 2.5m bgl and 8.5m bgl.

7. Groundwater was typically struck between 1.5m bgl and 4.0m bgl. Seasonal fluctuations may occur.

8. Forty two (42) number standpipe installations were constructed to monitor groundwater levels. Static groundwater levels were recorded as between 0.2m bgl and 5.42m bgl.

9. Slit trench excavation identified a number of utilities as detailed in **APPENDIX A, VOL. 2** and summarised in section 5.2.

10. Laboratory testing was undertaken to determine the classification and engineering characteristics of the soil and rock encountered during this ground investigation.

APPENDIX A.1

EXPLORATORY HOLE RECORDS

Key to Exploratory Hole Records	Key
Cable Tool Boreholes	BH1000-BH1003A, BH1004, BH1004A-BH1006A, BH1007-BH1019A, BH1020, BH1020A, BH1021-BH1025A, BH1026-BH1030A, BH1031-BH1049A, BH1050-BH1051A, BH1052, BH1052A, BH1053-BH1059A, BH1060-BH1063A, BH1065, BH1065A and BH1066-BH1068.
Rotary Open Hole Boreholes	BH01-BH07, BH13-BH31, BH33-BH70 including BH11A
Rotary Cored Boreholes	BHR01- BHR65 including BHR05A

KEY TO SYMBOLS ON EXPLORATORY HOLE RECORDS

All linear dimensions are in metres or millimetres

DESCRIPTIONS

**	Drillers Description
Friable	Easily crumbled

SAMPLES

U( )	Undisturbed 102mm diameter sample, ( ) denotes number of blows to drive sampler
U ( )F, U ( )P	F- not recovered, P - partially recovered
U38	Undisturbed 38mm diameter sample
P(F), (P)	Piston sample, F - not recovered, P - partially recovered
B	Bulk sample - disturbed
D	Jar Sample - disturbed
W	Water Sample
CBR	California Bearing Ratio mould sample
CS	Chemical Sample for Contamination Analysis
SPTLS	Standard Penetration Test S lump sample from split sampler.

CORE RECOVERY AND ROCK QUALITY

TCR	Total Core Recovery (% of Core Run)
SCR	Solid Core Recovery (length of core having at least one full diameter as % of core run)
RQD	Rock Quality Designation (length of solid core greater than 100mm as % of core run)

Where there is insufficient space for the TCR, SCR and RQD, the results may be found in the remarks column

If	Fracture Spacing in mm (Minimum/Average/Maximum) NI - non intact, NR - no recovery
AZCL	Assumed Zone of Core Loss

GROUNDWATER

▽	Groundwater strike
▼	Groundwater level after standing period
Date/Water	Date of shift (day/month)/Depth to water at end of previous shift shown above the date and depth to water at beginning of shift given below the date

INSITU TESTING

S	Standard Penetration Test - split barrel sampler
C	Standard Penetration Test - solid 60° cone
SW	Self Weight Penetration
IVp, HVp (R)	In Situ Vane Test, Hand Vane Test (R) demonstrates remoulded strength
K(F),(C),(R),(P)	Permeability Test
HP	Hand Penetrometer Test

MEASURED PROPERTIES

N	Standard Penetration Test - blows required to drive 300mm after seating drive
x/y	Denotes x blows for y mm within the Standard Penetration Test
x*/y	Denotes x blows for y mm within the seating drive
c_u	Undrained Shear Strength (kN/m^2)
CBR	California Bearing Ratio

ROTARY DRILLING SIZES

Index Letter	Nominal Diameter (mm)	
	Borehole	Core
N	75	54
H	99	76
P	120	92
S	146	113

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Drilled By AK
Logged By SC

Borehole No **BHR01**
Sheet 1 of 3

Project Name:	**Project No.**	**Co-ords:**	**Hole Type**
Monaghan Town Collection Network	PC7089	267115E - 333475N	Rotary
Client: Monaghan County Council	**Dates:** 30/10/2007	**Level:** 53.93 m AOD	**Scale** 1:50

Well / Backfill	Water Strikes	Samples & In Situ Testing: Depth (m)	Type	Results	Casing / Flush	Level (m AOD)	Depth (m)	Stratum Description	Legend
						53.13	0.80	Concrete.	
		1.30	CPT	N=1 (1,2/0,0,1,0) -	1.30	52.73	1.20	Soft, brown / black, slightly sandy, slightly gravelly organic CLAY.	
		2.80	CPT	N=3 (1,0/1,0,2,0) -	2.80			Grey SAND.	
		4.30	CPT	N=2 (0,0/1,0,0,1) -	4.30				
		5.80	CPT	N=5 (2,1/1,2,0,2) -	5.80				
		7.30	CPT	N=2 (0,2/1,0,1,0) -	7.30				
		8.80	CPT	N=6 (2,2/1,2,2,1) -	8.80				

Continued next sheet

Water	Depth (m)	Type	Results	Casing	Level	Depth

Groundwater:

Struck	Rose to	After	Sealed	Comment
-	-	-		No water encountered.

Hole Information:

Hole Depth	Casing Diameter	Casing Depth
11.80m 20.10m	150mm	11.80m

Chiselling:

Depths (m)	Time (hhmm)	Tool
to		

Remarks: Inspection pit dug.

Shift Data:

Groundwater	Shift (dd/mm/yyyy)	Casing depth	Remarks
-	30/10/2007	0.00m	Start of Borehole
-	30/10/2007	11.80m	End of Borehole

Equipment & Methods: Delta Base 520
Compressed air-mist flush.

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Borehole No **BHR01**
Sheet 2 of 3

Project Name:	**Project No.**	**Co-ords:**	**Hole Type**
Monaghan Town Collection Network	PC7089	267115E - 333475N	Rotary
Client: Monaghan County Council	**Dates:** 30/10/2007	**Level:** 53.93 m AOD	**Scale** 1:50

Well / Backfill	Water Strikes	Samples & In Situ Testing: Depth (m)	Type	Results	Casing / Flush	Level (m AOD)	Depth (m)	Stratum Description	Legend
								Grey SAND.	
		10.30	CPT	N=11 (2,3/2,2,3,4) -	10.30				
		11.80	CPT	N=32 (7,8/9,7,8,8) -	11.80	41.95	11.98	Very strong, grey LIMESTONE cobbles. Weathering : Clay smearing on core and fracture surfaces, rounding of fracture edges.	
		11.80-14.80	29	7 17					
		14.80	CPT	N=3 (0,0/0,1,1,1) -	14.80				
		14.80-15.70	13	0 13					
		16.30	CPT	N=39 (1,4/5,11,11,12) -	16.30				
		15.70-17.20	16	4 0					
		17.80	CPT	N=2 (0,0/0,0,1,1) -	17.80				
		17.20-18.50	19	3 18					

Continued next sheet

Water	Depth (m)	TCR	SCR	RQD	Fracture spacing	Casing	Level	Depth

Groundwater:

Struck	Rose to	After	Sealed	Comment
-	-	-		No water encountered.

Hole Information:

Hole Depth	Casing Diameter	Casing Depth
11.80m 20.10m	150mm	11.80m

Chiselling:

Depths (m)	Time (hhmm)	Tool
to		

Remarks: Inspection pit dug.

Shift Data:

Groundwater	Shift (dd/mm/yyyy)	Casing depth	Remarks
-	30/10/2007	0.00m	Start of Borehole
-	30/10/2007	11.80m	End of Borehole

Equipment & Methods: Delta Base 520
Compressed air-mist flush.

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Borehole No **BHR01**

Sheet 3 of 3

Project Name:	**Project No.**	**Co-ords:**	**Hole Type**
Monaghan Town Collection Network	PC7089	267115E - 333475N	Rotary
Client: Monaghan County Council	**Dates:** 30/10/2007	**Level:** 53.93 m AOD	**Scale** 1:50

Well / Backfill	Water Strikes	Rotary Coring: Depth (m)	TCR	SCR	RQD		Casing / Flush	Level (m AOD)	Depth (m)	Stratum Description	Legend
		18.30	CPT	N=20 (0,0/0,6,7,7)		-	18.30			Very strong, grey LIMESTONE cobbles. Weathering : Clay smearing on core and fracture surfaces, rounding of fracture edges.	
		18.50-20.10	9	6	9						
								33.83	20.10	End of Borehole at 20.10 m	

Water	Depth (m)	TCR	SCR	RQD	Fracture spacing	Casing	Level	Depth

Groundwater:

Struck	Rose to	After	Sealed	Comment
-	-	-		No water encountered.

Hole Information:

Hole Depth	Casing Diameter	Casing Depth
11.80m 20.10m	150mm	11.80m

Chiselling:

Depths (m)	Time (hhmm)	Tool
to		

Remarks: Inspection pit dug.

Shift Data:

Groundwater	Shift (dd/mm/yyyy)	Casing depth	Remarks
-	30/10/2007	0.00m	Start of Borehole
-	30/10/2007	11.80m	End of Borehole

Equipment & Methods: Delta Base 520
Compressed air-mist flush.

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Drilled By AK
Logged By SC

Borehole No **BHR17**
Sheet 1 of 1

Project Name:	**Project No.**	**Co-ords:**	**Hole Type**
Monaghan Town Collection Network	PC7089	267743E - 333508N	Rotary
Client: Monaghan County Council	**Dates:** 30/10/2007	**Level:** 60.28 m AOD	**Scale** 1:50

Well / Backfill	Water Strikes	Depth (m)	Type	Results	Casing / Flush	Level (m AOD)	Depth (m)	Stratum Description	Legend
								Driller described CLAY.	
		1.20	CPT	~~N=6 (2,1/1,2,1,2)~~ -	1.20	59.08	1.20	Dark grey GRAVEL of SILTSTONE.	
		1.20-2.50	2	0 0					
		2.50	CPT	~~N=10 (2,2/3,2,2,3)~~ -	2.50	57.78	2.50	Brown, slightly sandy (fine to medium) slightly gravelly (fine to coarse, subangular) CLAY.	
						57.58	2.70	Strong, dark grey, medium-grained SANDSTONE.	
		2.50-4.00	32	13 20					
		4.00	CPT	~~N=38 (3,12/11,10,9,8)~~	4.00	56.28	4.00	AZCL. Driller described CLAY and GRAVEL.	
		4.00-5.50							
		5.50	CPT	~~50 (25 for 60~~mm) -	5.50	54.78	5.50	Brown, slightly sandy (fine to medium), slightly gravelly (fine to coarse, subangular) CLAY.	
						54.61	5.67	Strong, dark grey, medium-grained SANDSTONE. Weathering : Iron staining on fracture surfaces. Clay smearing and infilling on fractue surfaces. Pitting of core surfaces. Fractures : Fractures are predominantly sub-horizontal, dipping between 5 degrees and 25 degrees, with occasional 75 degree fractures.	
		5.50-6.90	100	59 83					
		6.90	CPT	~~50 (25 for 8~~mm) -	6.90				
		6.90-7.90	92	80 88				NImm min 140mm avg 290mm max	
		7.90-8.50	98	60 52					
		8.50	CPT	~~50 (25 for 7~~mm) -	8.50	51.78	8.50	End of Borehole at 8.50 m	

Water	Depth (m)	TCR	SCR	RQD	Fracture spacing	Casing	Level	Depth

Groundwater:

Struck	Rose to	After	Sealed	Comment
-	-	-		No water encountered.

Hole Information:

Hole Depth	Casing Diameter	Casing Depth
8.50m	150mm	8.50m

Chiselling:

Depths (m)	Time (hhmm)	Tool
to		

Remarks: Standpipe installed, response zone is from 4.0m to 1.0m.

Shift Data:

Groundwater	Shift (dd/mm/yyyy)	Casing depth	Remarks
-	30/10/2007	0.00m	Start of Borehole
-	30/10/2007	8.50m	End of Borehole

Equipment & Methods: Delta Base 520
Compressed air-mist flush.

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Borehole No **BHR21**
Sheet 1 of 3

Project Name:	**Project No.**	**Co-ords:**	**Hole Type**
Monaghan Town Collection Network	PC7089	267319E - 333454N	Rotary
Client: Monaghan County Council	**Dates:** 02/11/2007	**Level:** 55.49 m AOD	**Scale** 1:50

Well / Backfill	Water Strikes	Depth (m)	Type	Results	Casing / Flush	Level (m AOD)	Depth (m)	Stratum Description	Legend
								No recovery : Driller reported clayey GRAVEL.	
		1.20	CPT	N=5 (1,1/1,1,2,1) -	1.20	54.29	1.20		
								No recovery : Driller reports CLAY.	
		1.20-2.50	0	0 0					
	▽	2.50	CPT	N=5 (1,1/1,1,1,2) -	2.50				
		2.50-4.00	0	0 0					
		4.00	CPT	N=4 (1,1/1,1,1,1) -	4.00				
		4.00-5.50	0	0 0					
		5.50	CPT	N=2 (1,0/1,0,1,0) -	5.50				
		5.50-7.00	0	0 0					
		7.00	CPT	N=4 (1,2/1,1,1,1) -	7.00				
		7.00-8.50	0	0 0					
		8.50	CPT	N=1 (1,0/0,1,0,0) -	8.50				

Continued next sheet

Water	Depth (m)	TCR	SCR	RQD	Fracture spacing	Casing	Level	Depth

Groundwater:

Struck	Rose to	After	Sealed	Comment
2.80m	-	-	-	-

Hole Information:

Hole Depth	Casing Diameter	Casing Depth
12.70m 20.00m	150mm	12.70m

Chiselling:

Depths (m)	Time (hhmm)	Tool
to		

Remarks: -

Shift Data:

Groundwater	Shift (dd/mm/yyyy)	Casing depth	Remarks
-	02/11/2007	0.00m	Start of Borehole
-	02/11/2007	12.70m	End of Borehole

Equipment & Methods: Delta Base 520
Compressed air-mist flush.

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Fax: 021 4638690
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Borehole No **BHR21**
Sheet 2 of 3

Project Name:	**Project No.**	**Co-ords:**	**Hole Type**
Monaghan Town Collection Network	PC7089	267319E - 333454N	Rotary
Client: Monaghan County Council	**Dates:** 02/11/2007	**Level:** 55.49 m AOD	**Scale** 1:50

Well / Backfill	Water Strikes	Rotary Coring: Depth (m)	TCR	SCR	RQD	Casing / Flush	Level (m AOD)	Depth (m)	Stratum Description	Legend
		8.50-9.80	0	0	0				No recovery : Driller reports CLAY.	
		9.80	CPT	51 (15,10/11,40 for 20mm)		9.80	45.69	9.80	GRAVEL and cobbles of strong, grey LIMESTONE. 9.95m - 10.17m : Cobble 10.21m - 10.37m : Cobble	
		9.80-11.20	39	11	20					
		11.20	CPT	(75 for 17mm)	-	11.20				
		11.20-12.70	43	0	0					
		12.70	CPT	(75 for 22mm)	-	12.70				
		12.70-14.30	91	24	35				13.6m - 14.2m : Cobble	
		14.30	CPT	(75 for 13mm)	-	14.30				
		14.30-15.80	80	23	37				14.69m - 15.3m : Cobble	
		15.80	CPT	50 (15,10 for 10mm/50 for 26mm)		15.80				
		15.80-17.30	53	0	0					
		17.30	CPT	50 (12,13/15,15,20 for 21mm)		17.30				
		17.30-18.30	100	23	26					

Continued next sheet

Water	Depth (m)	TCR	SCR	RQD	Fracture spacing	Casing	Level	Depth

Groundwater:

Struck	Rose to	After	Sealed	Comment
2.80m	-	-	-	-

Hole Information:

Hole Depth	Casing Diameter	Casing Depth
12.70m 20.00m	150mm	12.70m

Chiselling:

Depths (m)	Time (hhmm)	Tool
to		

Remarks: -

Shift Data:

Groundwater	Shift (dd/mm/yyyy)	Casing depth	Remarks
-	02/11/2007	0.00m	Start of Borehole
-	02/11/2007	12.70m	End of Borehole

Equipment & Methods: Delta Base 520
Compressed air-mist flush.

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Borehole No **BHR21**

Sheet 3 of 3

Project Name:	**Project No.**	**Co-ords:**	**Hole Type**
Monaghan Town Collection Network	PC7089	267319E - 333454N	Rotary
Client: Monaghan County Council	**Dates:** 02/11/2007	**Level:** 55.49 m AOD	**Scale** 1:50

Well / Backfill	Water Strikes	Rotary Coring Depth (m)	TCR	SCR	RQD	Casing / Flush	Level (m AOD)	Depth (m)	Stratum Description	Legend
		18.30-18.70	70	18	20				Remaining Detail : 18.04m - 18.30m : 18.04m - 18.3m : Cobble 18.3m - 18.4m : Cobble	
		18.70	CPT	N=46 (11,12/11,10,12,13)		18.70			18.86m - 19.26m : Cobble	
		18.70-20.00	69	15	29					
		20.00	CPT	(75 for 39mm)	-	20.00	35.49	20.00	End of Borehole at 20.00 m	

Water	Depth (m)	TCR	SCR	RQD	Fracture spacing	Casing	Level	Depth

Groundwater:

Struck	Rose to	After	Sealed	Comment
2.80m	-	-	-	-

Hole Information:

Hole Depth	Casing Diameter	Casing Depth
12.70m 20.00m	150mm	12.70m

Chiselling:

Depths (m)	Time (hhmm)	Tool
to		

Remarks: -

Shift Data:

Groundwater	Shift (dd/mm/yyyy)	Casing depth	Remarks
-	02/11/2007	0.00m	Start of Borehole
-	02/11/2007	12.70m	End of Borehole

Equipment & Methods: Delta Base 520
Compressed air-mist flush.

PRIORITY GEOTECHNICAL LIMITED
Unit 12, Owenacurra Business Park,, Midleton, Co. Cork
Tel: (021) 4631600 Fax (021)4638690
Email: geotechnical@priority.ie

MONAGHAN TOWN COLLECTION NETWORK

REPORT ON GROUND INVESTIGATION

FACTUAL

REPORT NO. PC7089

Client: Monaghan County Council,
County Offices,
The Glen,
Monaghan,
Co. Monaghan

Engineer: T J O Connor & Associates,
Consulting Engineers,
Corrig House,
Corrig Road,
Sandyford,
Dublin 18

PRIORITY GEOTECHNICAL LIMITED
Unit 12, Owenacurra Business Park,, Midleton, Co. Cork
Tel: (021) 4631600 Fax (021)4638690
Email: geotechnical@priority.ie

MONAGHAN TOWN COLLECTION NETWORK

REPORT ON GROUND INVESTIGATION

FACTUAL

REPORT NO. PC7089

VOL. 2

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Engineer: T J O Connor & Associates,
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VOL . 2

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APPENDIX B **LABORATORY RESULTS**

APPENDICES

VOL . 3

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APPENDIX D **EXPLORATION LOCATION PLANS**

APPENDIX A.2

EXPLORATORY HOLE RECORDS

Key to Exploratory Hole Records	Key
Trial Pits	TP001-TP189 and TP01A, TP008A, TP25A, TP29A, TP37A, TP45A and TP50A
Slit Trenches	ST01-ST09, ST10.1, ST10.2, ST11-ST14, ST15.1, ST15.2, ST16-ST23 and ST01A

KEY TO SYMBOLS ON EXPLORATORY HOLE RECORDS

All linear dimensions are in metres or millimetres

DESCRIPTIONS

**	Drillers Description
Friable	Easily crumbled

SAMPLES

U( )	Undisturbed 102mm diameter sample, ( ) denotes number of blows to drive sampler
U ( )F, U ( )P	F- not recovered, P - partially recovered
U38	Undisturbed 38mm diameter sample
P(F), (P)	Piston sample, F - not recovered, P - partially recovered
B	Bulk sample - disturbed
D	Jar Sample - disturbed
W	Water Sample
CBR	California Bearing Ratio mould sample
CS	Chemical Sample for Contamination Analysis
SPTLS	Standard Penetration Test S lump sample from split sampler.

CORE RECOVERY AND ROCK QUALITY

TCR	Total Core Recovery (% of Core Run)
SCR	Solid Core Recovery (length of core having at least one full diameter as % of core run)
RQD	Rock Quality Designation (length of solid core greater than 100mm as % of core run)

Where there is insufficient space for the TCR, SCR and RQD, the results may be found in the remarks column

If	Fracture Spacing in mm (Minimum/Average/Maximum) NI - non intact, NR - no recovery
AZCL	Assumed Zone of Core Loss

GROUNDWATER

▽	Groundwater strike
▼	Groundwater level after standing period
Date/Water	Date of shift (day/month)/Depth to water at end of previous shift shown above the date and depth to water at beginning of shift given below the date

INSITU TESTING

S	Standard Penetration Test - split barrel sampler
C	Standard Penetration Test - solid 60° cone
SW	Self Weight Penetration
IVp, HVp (R)	In Situ Vane Test, Hand Vane Test (R) demonstrates remoulded strength
K(F),(C),(R),(P)	Permeability Test
HP	Hand Penetrometer Test

MEASURED PROPERTIES

N	Standard Penetration Test - blows required to drive 300mm after seating drive
x/y	Denotes x blows for y mm within the Standard Penetration Test
x*/y	Denotes x blows for y mm within the seating drive
c_u	Undrained Shear Strength (kN/m^2)
CBR	California Bearing Ratio

ROTARY DRILLING SIZES

Index Letter	Nominal Diameter (mm)	
	Borehole	Core
N	75	54
H	99	76
P	120	92
S	146	113

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Trial Pit No
TP028
Sheet 1 of 1

Project Name:	**Project No.**	**Co-ords:** 267591E - 333512N **Level:** 64.91 m AOD	**Date**
Monaghan Town Collection Network	PC7089		15/10/2007
Location: Monaghan Town		**Dimensions:** 3.50m, Depth 2.10m, 0.90m	**Scale** 1:25
Client: Monaghan County Council			**Logged By** LW

Samples & In Situ Testing				Level (m AOD)	Depth (m)	Stratum Description	Legend
Water	Depth (m)	Type	Results				
						Tarmacadam surfacing.	
				64.61	0.30		
						Clause-804 sub-base.	
				64.41	0.50		
						Possible Fill described as light brown, very silty, very gravelly SAND with occasional cobbles and boulders (0.40m x 0.60m; 1.00m x 0.70m).	
	0.50-1.00	B					
	0.50-1.00	D					
	1.00-2.10	B					
	1.00-2.10	D					
				62.81	2.10	Trial pit completed at 2.10 m	
Water	Depth (m)	Type	Results	Level	Depth		

Stability: Poor.
Plant: JCB.
Backfill: Tar, Cl-804 & leanmix.

Groundwater: No groundwater encountered.

Remarks: Boulders below 0.50m; archeologist indicates that they may be from an old stone wall foundation.

HoleBASE III (Bd 422.00) Standard Trialpit Log v2 dated 27th Nov 03

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Trial Pit No
TP029
Sheet 1 of 1

Project Name:	**Project No.**	**Co-ords:** 267643E - 333466N	**Date**
Monaghan Town Collection Network	PC7089	**Level:** 69.60 m AOD	10/10/2007
Location: Monaghan Town		**Dimensions:** Depth 0.80m; 0.60m × 0.80m	**Scale** 1:25
Client: Monaghan County Council			**Logged By** LW

Samples & In Situ Testing				Level (m AOD)	Depth (m)	Stratum Description	Legend
Water	Depth (m)	Type	Results				
				69.40	0.20	Tarmacadam surfacing.	
						Clause 804 sub-base.	
	0.00-0.80	B		69.20	0.40		
	0.00-0.80	D				Firm/ stiff, brown/ orange, gravellly (fine to medium, angular to sub-angular) CLAY with cobbles and boulders.	
				68.80	0.80	Trial pit completed at 0.80 m	

Water	Depth (m)	Type	Results	Level	Depth

Stability: Moderate.
Plant: JCB.
Backfill: Arisings

Groundwater: No groundwater encountered.

Remarks: Trial pit terminated due to orange, PVC, wavin pipe running along the pit.

HoleB-ASE III (Bid #22.00) Standard Trialpit Log v2 dated 27th Nov 03

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Trial Pit No
TP029A
Sheet 1 of 1

Project Name:	**Project No.**	**Co-ords:** 267643E - 333466N **Level:** 69.60 m AOD	**Date**
Monaghan Town Collection Network	PC7089		10/10/2007
Location: Monaghan Town		**Dimensions:** Depth 2.00m, 3.50m, 0.90m	**Scale** 1:25
Client: Monaghan County Council			**Logged By** LW

Samples & In Situ Testing				Level (m AOD)	Depth (m)	Stratum Description	Legend
Water	Depth (m)	Type	Results				
				69.40	0.20	Tarmacadam surfacing.	
				69.20	0.40	Clause-804 sub-base.	
	0.40-1.00	B				Stiff, grey/ brown, gravelly (fine to medium, angular to sub-angular) CLAY with many cobbles and boulders.	
	0.40-1.00	D					
	1.40	D					
	1.00-2.00	B					
	1.00-2.00	D					
				67.60	2.00	Trial pit completed at 2.00 m	

Water	Depth (m)	Type	Results	Level	Depth

Stability: Moderate.
Plant: JCB.
Backfill: Tar & Cl-804.

Groundwater: No groundwater encountered.

Remarks: -

HoleBASE III (Bid #22.00) Standard Trialpit Log v2 dated 27th Nov 03

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Trial Pit No
TP041
Sheet 1 of 1

Project Name:	**Project No.**	**Co-ords:** 267300E - 333477N **Level:** 54.40 m AOD	**Date**
Monaghan Town Collection Network	PC7089		15/08/2007
Location: Monaghan Town		**Dimensions:** 2.60m (Depth 2.20m, 1.10m)	**Scale** 1:25
Client: Monaghan County Council			**Logged By** AM

Samples & In Situ Testing				Level (m AOD)	Depth (m)	Stratum Description	Legend
Water	Depth (m)	Type	Results				
				54.40	0.00	Firm, brown, slightly gravelly Topsoil with grass.	
	0.50-0.60	B		54.10	0.30	Fill described as firm, brown / grey, gravelly (fine to coarse grained, sub-angular to rounded) CLAY with many cobbles (0.20m x 0.15m) and occasional boulders (0.40m x0.40m).	
	0.50-0.60	D					
▽				53.60	0.80	Fill described as well-compacted, grey, slightly clayey, gravelly (fine to coarse grained, angular to sub-angular) COBBLES (0.20m x 0.20m) with many boulders (0.20m x 0.30m).	
	1.90-2.00	B					
	1.90-2.00	D					
				52.20	2.20	Trial pit completed at 2.20 m	
Water	Depth (m)	Type	Results	Level	Depth		

Stability: Poor below 1.0m.
Plant: JCB.
Backfill: Tar, Cl-804 & arisings.

Groundwater: Inflow at 1.6m.

Remarks: Trial pit terminated due to presence of excess groundwater water and side wall instability.

HoleB-ASE III (Bid #22.00) Standard Trialpit Log v2 dated 27th Nov 03

APPENDIX B

LABORATORY RESULTS

Key to Laboratory Results Key

Natural Moisture Content

Atterberg Limit

Particle Size Distribution

pH

SO_4

Loss on Ignition

Point Load Index

KEY TO SYMBOLS ON LABORATORY TEST RESULTS SHEETS

U	Undisturbed Sample	
P	Piston Sample	
TWS	Thin Wall Sample	
B	Bulk Sample - Disturbed	
D	Jar Sample - Disturbed	
W	Water Sample	
pH	Acidity/Alkalinity Index	
SO_3	% - Total Sulphate Content (acid soluble)	
SO_3	g/ltr - Water Soluble Sulphate (Water or 2:1 Aqueous Soil Extract)	
+	Calcareous Reaction	
Cl	Chloride Content	
PI	Plasticity Index	
<425	% of material in sample passing 425 micron sieve	
LL	Liquid Limit	
PL	Plastic Limit	
MC	Water Content	
NP	Non Plastic	
γ_b	Bulk Density	
γ_d	Dry Density	
Ps	Particle Density	
U/D	Undrained/Drained Triaxial	
U/C	Unconsolidated/Consolidated Triaxial	
T/M	Single Stage/Multistage Triaxial	
100/38	Sample Diameter (mm)	
REM	Remoulded Triaxial Test Specimen	
TST	Triaxial Suction Test	
V	Vane Test	
DSB	Drained Shear Box	
RSB	Residual Shear Box	
RS	Ring Shear	
σ_3	Cell Pressure	
σ_1-σ_3	Deviator Stress	
c	Cohesion	
c_	Effective Cohesion Intercept	
ϕ	Angle of Shearing Resistance - Degrees	
ϕ_	Effective Angle of Shearing Resistance	
εf	Strain at Failure	
*	Failed under 1st Load	
**	Failed under 2nd Load	
#	Untestable	
##	Excessive Strain	
p_o	Effective Overburden Pressure	
m_v	Coefficient of Volume Decrease	
c_v	Coefficient of Consolidation	
Opt	Optimum	
Nat	Natural	
Std	Standard Compaction - 2.5kg Rammer	(¶ CBR)
Hvy	Heavy Compaction - 4.5kg Rammer	(§ CBR)
Vib	Vibratory Compaction	
CBR	California Bearing Ratio	
Sat m.c.	Saturation Moisture Content	
MCV	Moisture Condition Value	

Laboratory Symbols	**Project**	Contract
		Figure

PRIORITY GEOTECHNICAL

Natural Moisture Content/Atterberg Limits Summary

BS 1377 : Part 2 : 1990 : Clause 3

Job Ref

Location: Monaghan Town Collection Network

PC7089

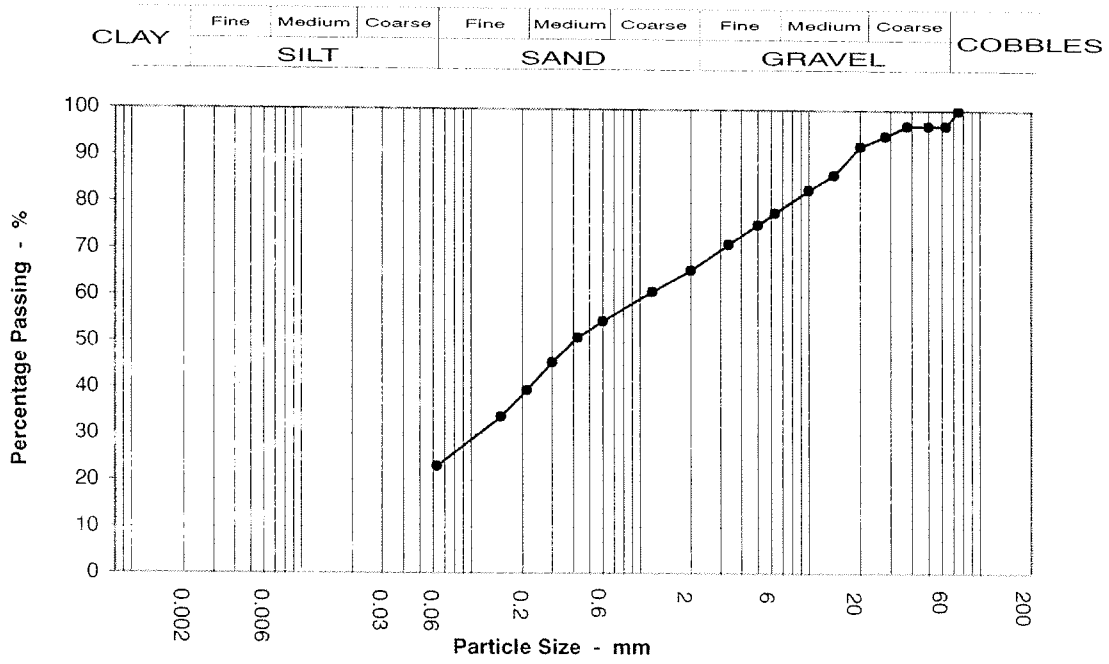
Hole ID	Sample Ref	Depth (m)	Sample Type	Sample Description	MC	LL	PL	PI	% Pass 425
TP025A	B1A	0.6	B	Clayey sandy GRAVEL with many cobbles	14				
TP025A	D4A	1.5	D	Clayey sandy GRAVEL with many cobbles	12				
TP026	1	0.4	B	Slightly gravelly slightly sandy SILT	20	27	NP	NP	62.3
TP026	4	1	D	Slightly gravelly slightly sandy SILT	23				
TP027	1	0.15	B	Silty sandy GRAVEL	13				
TP028	1	0.5	B	Very silty very gravelly SAND with occasional cobbles	15				
TP028	4	1	D	Very silty very gravelly SAND with occasional cobbles	15				
TP030	1	0.6	B	Very silty very gravelly SAND with some cobbles	17				
TP030	3	1.2	B	Gravelly CLAY with cobbles	16	35	19	16	66.7
TP030	6	2	D	Slightly sandy slightly gravelly CLAY with cobbles	11				
TP031	1	0.4	B	Slightly sandy slightly gravelly CLAY with occasional cobbles	32	35	24	11	74.2
TP031	3	1.1	B	Slightly sandy slightly gravelly CLAY with some cobbles	15	31	19	12	73.8
TP031	5	2	B	Slightly sandy slightly gravelly CLAY with many cobbles	26				
TP031	6	2	D	Slightly sandy slightly gravelly CLAY with many cobbles	11				
TP032	1	0.4	B	Very gravelly very clayey SAND	28				
TP032	3	1	B	Slightly sandy slightly gravelly CLAY with cobbles	20	38	22	16	74.3
TP032	6	2	D	Slightly sandy slightly gravelly CLAY with cobbles	17				
TP032	7	2.6	B	Slightly gravelly slightly sandy CLAY with cobbles	19				
TP032	8	2.6	D	Slightly gravelly slightly sandy CLAY with cobbles	13				
TP033	1	0.4	B	Slightly gravely sandy CLAY	27				
TP033	3	0.7	B	Very silty very sandy GRAVEL with many cobbles	23				
TP033	5	2	B	Slightly gravelly slightly sandy CLAY with cobbles	18	36	20	16	76.5

PRIORITY GEOTECHNICAL

PARTICLE SIZE DISTRIBUTION

BS 1377 : Part 2 : 1990 : Clause 9

		Job Ref	**PC7089**
		Borehole / Pit No	TP028
Location	**Monaghan Town Collection Network**	Sample No	1
Soil Description	Very silty very gravelly SAND with occasional cobbles	Depth	0.50 m
		Sample type	B



Seiving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	97		
50	97		
37.5	97		
28	94		
20	92		
14	86		
10	83		
6.3	78		
5	75		
3.35	71		
2	66		
1.18	61		
0.6	55		
0.425	51		
0.3	46		
0.212	39		
0.15	34		
0.063	23		

Test Method	
BS 1377 : Part 2 : 1990	
Sieving	Clause 9.2
Sedimentation	N/A

Sample Proportions	
Cobbles	3.4
Gravel	31.0
Sand	42.6
Silt & Clay	23.0

Grading Analysis	
D100	125.000
D60	1.098
D10	
Uniformity Coefficient	N/A

PRIORITY GEOTECHNICAL

Sulphate Content & pH Value

BS 1377 : Part 3 : 1990 : Clause 5.5 & 9.5

Job Ref

Location: **Monaghan Town Collection Network**

PC7089

Hole ID	Sample Ref	Depth (m)	Sample Type	Sample Description	% < 2.0 mm	pH Value	Sulphate Content as SO3			Sulphate Content as SO4		
							GW g/L	Total Sulphate %	Water Soluble g/L	GW g/L	Total Sulphate %	Water Soluble g/L
BH1067	2	1.20	B	Very sandy very clayey GRAVEL with many cobbles	43.9	7.8			0.022			0.026
BH1067	3	2.00	B	Slightly clayey sandy GRAVEL with some cobbles	12	8.02			0.026			0.031
BH1003 A	4	1.50	B	Very clayey very gravelly SAND with occasional cobbles	69.6	8.53			0.019			0.023
BH1019 A	5	1.00	B	Slightly gravelly slightly sandy CLAY	60.2	8.2			0.073			0.088
TP016	4	1.60	D	PEAT	37.9	6.4			0.104			0.125
TP016	6	2.20	D	CLAY	92.7	8.07			0.073			0.088
TP028	4	1.00	D	Very silty very gravelly SAND with occasional cobbles	66.1	8.63			0.008			0.010
TP136	1	1.10	B	Gravelly very clayey SAND with some cobbles	30.2	7.72			0.056			0.067

Priority Geotechnical Limited

Point Load Test Results

Project: Monaghan Town Collection Network

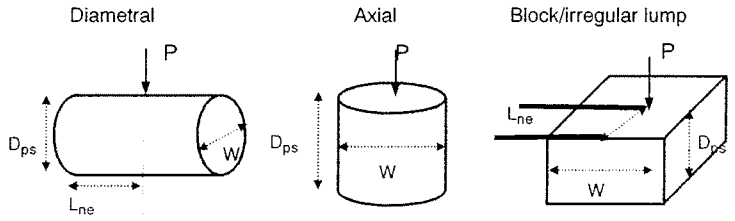
Project No: PC7089

Carried out by: RK

13/02/2008

Test Type
D - Diametral, A - Axial, I - Irregular Lump
Direction (U = unknown or random)
Par - parallel to planes of weakness
Per - perpendicular to planes of weakness
Dimensions
Dps - Distance between platens (platen separation)
Dps' - at failure
Lne - Length from platens to nearest free end
W - Width of shortest dimension perpendicular to load, P

Machine Ram Area, cm^2



Borehole	Sample Top, m BGL	Sample Ref	Sample Type	Sample Base, m BGL	Specimen Ref	Specimen Depth, m BGL	Description	Test Type see ISRM Fig 5 and 8		Failure Valid (Y/N)	Dimensions			Gauge reading, kN	P Failure Load, kN	De equivalent diameter, mm	Is MPa	Is(50) point load index, MPa	Remarks
								Type (D, A, I)	Direction (Par/Per/U)		L mm	Dps, mm	W mm						
BHR1	11.5			11.6		11.5	Limestone	D	Par	Y	30	67	67	11	11.00	67.0	2.45	2.80	Planar smooth
BHR1	14.35			14.55		14.35	Limestone	D	Per	Y	70	67	67	17	17.00	67.0	3.79	4.32	Undulating smooth
BHR1	18.5			18.65		18.5	Limestone	D	Par	Y	40	84	83	18	18.00	83.5	2.58	3.25	Planar smooth
BHR2	2.5			2.64		2.5	Limestone	D	Per	Y	60	67	67	15	15.00	67.0	3.34	3.81	Planar course
BHR2	11.5			11.6		11.5	Limestone	D	U	Y	50	63	63	23	23.00	63.0	5.79	6.43	Undulating rough
BHR2	14.5			14.67		14.5	Limestone	D	Per	Y	50	67	68	2	2.00	67.5	0.44	0.50	Soft rock
BHR2	16.6			17.02		16.6	Limestone	D	Per	Y	110	76	77	16	16.00	76.5	2.73	3.31	Planar coarse
BHR2	18.4			18.55		18.4	Limestone	D	Per	Y	70	68	67	8	8.00	67.5	1.76	2.01	Planar smooth
BHR2	19.85			20		19.85	Limestone	D	Par	Y	80	67	67	14	14.00	67.0	3.12	3.56	Planar smooth
BHR2	19.7			19.83		19.7	Limestone	D	Par	Y	80	67	67	13	13.00	67.0	2.90	3.30	Planar coarse
BHR3	5.5			5.75		5.5	Limestone	D	U	Y	80	76	76	17	17.00	76.0	2.94	3.55	Planar smooth
BHR3	7			7.2		7	Limestone	D	Per	Y	50	67	68	22	22.00	67.5	4.83	5.53	Planar smooth
BHR3	8.98			9.13		8.98	Limestone	D	Per	Y	60	67	68	15	15.00	67.5	3.29	3.77	Planar smooth
BHR3	10.65			10.75		10.65	Limestone	D	Per	Y	20	67	67	9	9.00	67.0	2.00	2.29	Planar coarse
BHR3	11.75			11.9		11.75	Limestone	D	Par	Y	90	67	68	17	17.00	67.5	3.73	4.27	Planar coarse
BHR3	12.23			12.34		12.23	Limestone	D	Par	Y	50	76	76	2	2.00	76.0	0.35	0.42	Soft rock
BHR3	12.5			12.65		12.5	Limestone	D	Par	Y	40	67	67	18.00	18.00	67.0	4.01	4.57	Planar coarse
BHR3	12.65			12.85		12.65	Limestone	D	Per	Y	60	67	67	13	13.00	67.0	2.90	3.30	Planar smooth
BHR3	14.1			14.3		14.1	Limestone	D	Per	Y	90	76	76	10	10.00	76.0	1.73	2.09	Planar smooth
BHR3	14.81			15		14.81	Limestone	D	Per	Y	80	77	76	19	19.00	76.5	3.25	3.93	Planar smooth
BHR4	2.8			3.02		2.8	Limestone	D	Per	Y	90	67	67	7	7.00	67.0	1.56	1.78	Planar smooth
BHR4	10.25			10.42		10.25	Limestone	D	Per	Y	60	67	67	1	1.00	67.0	0.22	0.25	Planar smooth
BHR4	12.03			12.2		12.03	Limestone	D	Par	Y	70	67	67	1	1.00	67.0	0.22	0.25	Planar coarse
BHR4	12.6			12.72		12.6	Limestone	D	Par	Y	40	67	67	2	2.00	67.0	0.45	0.51	Soft rock
BHR4	13.5			13.78		13.5	Limestone	D	Per	Y	110	83	23	23	23.00	43.7	12.05	11.34	Planar smooth
BHR5A	1.45			1.6		1.45	Limestone	D	Par	Y	60	76	76	21	21.00	76.0	3.64	4.39	Planar smooth

Priority Geotechnical Limited

Point Load Test Results

Project: **Monaghan Town Collection Network**

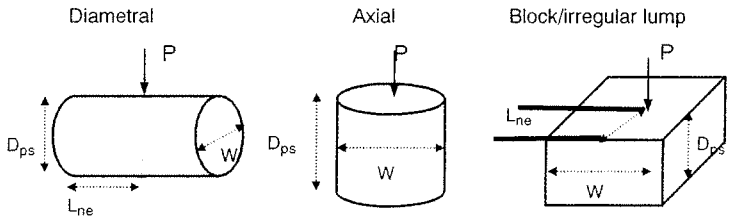
Project No: PC7089

Carried out by: RK

14/02/2008

Test Type
D - Diametral, A - Axial, I - Irregular Lump
Direction (U = unknown or random)
Par - parallel to planes of weakness
Per - perpendicular to planes of weakness
Dimensions
Dps - Distance between platens (platen separation)
Dps' - at failure
Lne - Length from platens to nearest free end
W - Width of shortest dimension perpendicular to load, P

Machine Ram Area, cm^2



Borehole	Sample Top, m BGL	Sample Ref	Sample Type	Sample Base, m BGL	Specimen Ref	Specimen Depth, m BGL	Description	Test Type see ISRM Fig 5 and 8		Failure Valid (Y/N)	Dimensions			Gauge reading, kN	P Failure Load, kN	De equivalent diameter, mm	Is MPa	Is(50) point load index, MPa	Remarks
								Type (D, A, I)	Direction (Par/Per/U)		L mm	Dps, mm	W mm						
BHR16	5.8			6.1		5.8	Limestone	D	Par	Y	80	75	75	28	28.00	75.0	4.98	5.97	Planar coarse
BHR16	10.1			10.28		10.1	Limestone	D	Per	Y	40	84	83	9	9.00	83.5	1.29	1.63	Planar smooth
BHR16	11			11.15		11	Limestone	D	Par	Y	70	83	84	5	5.00	83.5	0.72	0.90	Planar smooth
BHR16	11.82			11.9		11.82	Limestone	D	Per	Y	20	83	83	1	1.00	83.0	0.15	0.18	Soft rock
BHR16	11.9			12.03		11.9	Limestone	D	Par	Y	40	75	75	5	5.00	75.0	0.89	1.07	Planar smooth
BHR16	12.57			12.71		12.57	Limestone	D	Par	Y	60	83	83	10	10.00	83.0	1.45	1.82	Planar smooth
BHR17	2.7			3.06		2.7	Limestone	D	Par	Y	110	84	84	24	24.00	84.0	3.40	4.30	Undulating coarse
BHR17	5.66			5.9		5.66	Limestone	D	Per	Y	90	84	83	13.00	13.00	83.5	1.86	2.35	Undulating coarse
BHR17	6.95			7.08		6.95	Limestone	D	Par	Y	70	84	84	11	11.00	84.0	1.56	1.97	Planar smooth
BHR17	7.9			8.05		7.9	Limestone	D	Per	Y	80	84	85	9	9.00	84.5	1.26	1.60	Planar coarse
BHR18	1.46			1.76		1.76	Limestone	D	Par	Y	90	83	84	32	32.00	83.5	4.59	5.78	Planar smooth
BHR18	2.61			2.89		2.61	Limestone	D	Par	Y	110	84	84	26	26.00	84.0	3.68	4.65	Planar coarse
BHR18	5.92			6.09		5.92	Limestone	D	U	Y	30	84	84	25	25.00	84.0	3.54	4.47	Planar smooth
BHR18	10.4			10.8		10.4	Limestone	D	Per	Y	130	76	75	25	25.00	75.5	4.39	5.28	Planar smooth
BHR18	13			13.28		13	Limestone	D	Per	Y	120	84	83	29	29.00	83.5	4.16	5.24	Planar coarse
BHR18	13.28			13.46		13.28	Limestone	D	Par	Y	60	84	84	29	29.00	84.0	4.11	5.19	Planar smooth
BHR18	16.95			17.13		16.95	Limestone	D	Par	Y	40	84	84	31	31.00	84.0	4.39	5.55	Planar coarse
BHR18	18.65			18.75		18.65	Limestone	D	Par	Y	20	84	84	17	17.00	84.0	2.41	3.04	Undulating coarse
BHR18	19.18			19.27		19.18	Limestone	D	U	Y	20	67	68	13	13.00	67.5	2.85	3.27	Planar smooth
BHR18	18.65			18.75		18.65	Limestone	D	Par	Y	20	84	84	17	17.00	84.0	2.41	3.04	Undulating coarse
BHR18	5.92			6.09		5.92	Limestone	D	U	Y	30	84	84	25	25.00	84.0	3.54	4.47	Planar smooth
BHR19	7.03			7.15		7.03	Limestone	D	Per	Y	40	67	67	16	16.00	67.0	3.56	4.07	Planar smooth
BHR20	1.13			1.2		1.13	Limestone	D	Par	Y	60	67	76	20	20.00	71.4	3.93	4.61	Planar coarse
BHR20	2.91			3.08		2.91	Limestone	D	Per	Y	40	76	76	23	23.00	76.0	3.98	4.81	Planar smooth
BHR20	3.33			3.41		3.33	Limestone	D	Par	Y	20	76	76	16	16.00	76.0	2.77	3.34	Planar smooth
BHR20	8.26			8.42		8.26	Limestone	D	Par	Y	50	75	76	23	23.00	75.5	4.04	4.86	Planar smooth

Priority Geotechnical Limited

Point Load Test Results

Project: **Monaghan Town Collection Network**

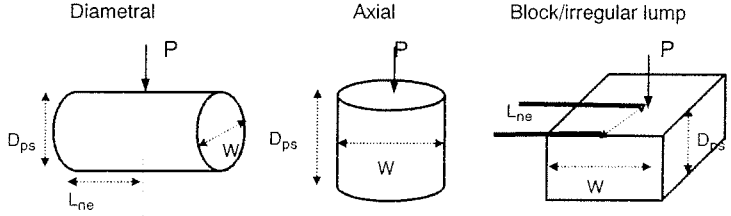
Project No: PC7089

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14/02/2008

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Borehole	Sample Top, m BGL	Sample Ref	Sample Type	Sample Base, m BGL	Specimen Ref	Specimen Depth, m BGL	Description	Test Type see ISRM Fig 5 and 8		Failure Valid (Y/N)	Dimensions			Gauge reading, kN	P Failure Load, kN	De equivalent diameter, mm	Is MPa	Is(50) point load index, MPa	Remarks
								Type (D, A, I)	Direction (Par/Per/U)		L mm	Dps, mm	W mm						
BHR21	9.9			12.12		9.9	Limestone	D	Per	Y	80	75	76	22	22.00	75.5	3.86	4.65	Planar smooth
BHR21	10.2			10.35		10.2	Limestone	D	Par	Y	40	84	84	27	27.00	84.0	3.83	4.83	Planar smooth
BHR21	13.8			13.94		13.8	Limestone	D	Par	Y	60	83	84	3	3.00	83.5	0.43	0.54	Planar smooth
BHR21	15.1			15.28		15.1	Limestone	D	Par	Y	40	84	84	17	17.00	84.0	2.41	3.04	Planar smooth
BHR21	18.04			18.3		18.04	Limestone	D	Per	Y	110	84	83	24	24.00	83.5	3.44	4.34	Planar smooth
BHR21	18.9			19.15		18.9	Limestone	D	Par	Y	110	83	83	15	15.00	83.0	2.18	2.74	Planar smooth
BHR22	14.5			14.76		14.5	Limestone	D	U	Y	80	67	68	18	18.00	67.5	3.95	4.52	Undulating smooth
BHR22	17.5			17.63		17.5	Limestone	D	U	Y	50	67	68	19	19.00	67.5	4.17	4.77	Undulating coarse
BHR22	19.1			19.29		19.1	Limestone	D	U	Y	90	63	63	23	23.00	63.0	5.79	6.43	Undulating smooth
BHR23	5.8			5.93		5.8	Limestone	D	Par	Y	70	67	67	9	9.00	67.0	2.00	2.29	Planar smooth
BHR23	8.2			8.34		8.2	Limestone	D	Par	Y	50	67	67	1	1.00	67.0	0.22	0.25	Soft rock
BHR23	8.64			8.73		8.64	Limestone	D	U	Y	20	67	68	2	2.00	67.5	0.44	0.50	Soft rock
BHR23	9.14			9.24		9.14	Limestone	D	Par	Y	30	76	77	5	5.00	76.5	0.85	1.03	Planar smooth
BHR24	6.7			6.94		6.7	Limestone	D	Per	Y	70	67	67	2	2.00	67.0	0.45	0.51	Soft rock
BHR24	13.53			13.72		13.53	Limestone	D	Per	Y	60	67	68	8	8.00	67.5	1.76	2.01	Planar coarse
BHR24	14.94			15.11		14.94	Limestone	D	Par	Y	70	76	77	2	2.00	76.5	0.34	0.41	Sheared rough
BHR24	16			16.11		16	Limestone	D	Par	Y	30	76	76	3	3.00	76.0	0.52	0.63	Soft rock
BHR25	9.5			9.6		9.5	Limestone	D	Per	Y	30	67	67	3	3.00	67.0	0.67	0.76	Soft rock
BHR25	11.67			11.75		11.67	Limestone	D	Par	Y	20	77	77	4	4.00	77.0	0.67	0.82	Planar smooth
BHR25	12.5			12.6		12.5	Limestone	D	Per	Y	30	77	77	3	3.00	77.0	0.51	0.61	Soft Rock
BHR25	17.8			17.87		17.8	Limestone	D	Par	Y	20	67	67	3	3.00	67.0	0.67	0.76	Planar smooth
BHR26	13.43			13.63		13.43	Limestone	D	Per	Y	70	67	67	8	8.00	67.0	1.78	2.03	Planar smooth
BHR26	14.35			14.64		14.35	Limestone	D	Par	Y	20	68	68	17	17.00	68.0	3.68	4.22	Planar smooth
BHR26	15.48			15.61		15.48	Limestone	D	Per	Y	70	67	67	3	3.00	67.0	0.67	0.76	Planar smooth
BHR27	7			7.08		7	Limestone	D	Per	Y	20	67	67	3	3.00	67.0	0.67	0.76	Sheared rock
BHR27	7.3			7.45		7.3	Limestone	D	Par	Y	50	67	67	3	3.00	67.0	0.67	0.76	Soft rock

PRIORITY GEOTECHNICAL LIMITED
Unit 12, Owenacurra Business Park,, Midleton, Co. Cork
Tel: (021) 4631600 Fax (021)4638690
Email: geotechnical@priority.ie

MONAGHAN TOWN COLLECTION NETWORK

REPORT ON GROUND INVESTIGATION

FACTUAL

REPORT NO. PC7089

Client: Monaghan County Council,
County Offices,
The Glen,
Monaghan,
Co. Monaghan

Engineer: T J O Connor & Associates,
Consulting Engineers,
Corrig House,
Corrig Road,
Sandyford,
Dublin 18

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Dublin 18

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Trial Pits	TP005 TP006 TP007 TP008 TP008A TP015 TP016 TP017 TP018 TP019 TP020 TP021 TP022 TP023 TP024 TP025 TP026 TP027 TP028 TP029 TP029A TP030 TP031 TP032 TP034 TP035 TP036 TP037 TP037A TP038 TP039 TP040 TP043 TP044 TP058 TP059 TP060 TP073 TP074 TP075 TP076 TP077 TP078 TP095 TP096 TP097 TP098 TP134 TP135 TP136 TP138 TP139 TP140 TP141 TP142 TP143 TP144 TP145 TP147 TP158 TP159 TP161 TP163 TP164 TP165 TP166 TP167 TP168 TP171 TP179 TP180 TP181 TP182 TP186 TP187 TP188 and TP189
Slit Trenches	ST01A ST05 ST06 ST07 ST08 ST09 ST10.1 ST10.2 ST12 ST15.1 ST16 ST18 ST20 ST21 ST22 and ST23

Rotary Core Photographic Record

Priority Geotechnical Limited



Rotary Borehole Number:	**BHR1**	**Project**	Monaghan Town Collection Network	
		Project No	PC7089	
		Carried Out for	T. J. O'Connor & Associates, Consulting Engineers	

Rotary Core Photographic Record

Priority Geotechnical Limited





Rotary Borehole Number:	**BHR17**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out for	T. J. O'Connor & Associates, Consulting Engineers

Rotary Core Photographic Record

Priority Geotechnical Limited





Rotary Borehole Number:	**BHR21**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out for	T. J. O'Connor & Associates, Consulting Engineers

Rotary Core Photographic Record

Priority Geotechnical Limited



Rotary Borehole Number:	**BHR21**	**Project**	Monaghan Town Collection Network	
		Project No	PC7089	
		Carried Out for	T. J. O'Connor & Associates, Consulting Engineers	

Trial Pit Photographic Record

Priority Geotechnical Limited





Trial Pit Number: **TP28**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Trial Pit Photographic Record

Priority Geotechnical Limited



Trial Pit Number:	**TP28**	**Project** **Project No** **Carried Out**	Monaghan Town Collection Network PC7089 T. J. O'Connor & Associates, Consulting Engineers

Trial Pit Photographic Record

Priority Geotechnical Limited





Trial Pit Number:	**TP29**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out	T. J. O'Connor & Associates, Consulting Engineers

Trial Pit Photographic Record

Priority Geotechnical Limited



Trial Pit Number: **TP**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Trial Pit Photographic Record

Priority Geotechnical Limited





Trial Pit Number: **TP29A**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Trial Pit Photographic Record

Priority Geotechnical Limited



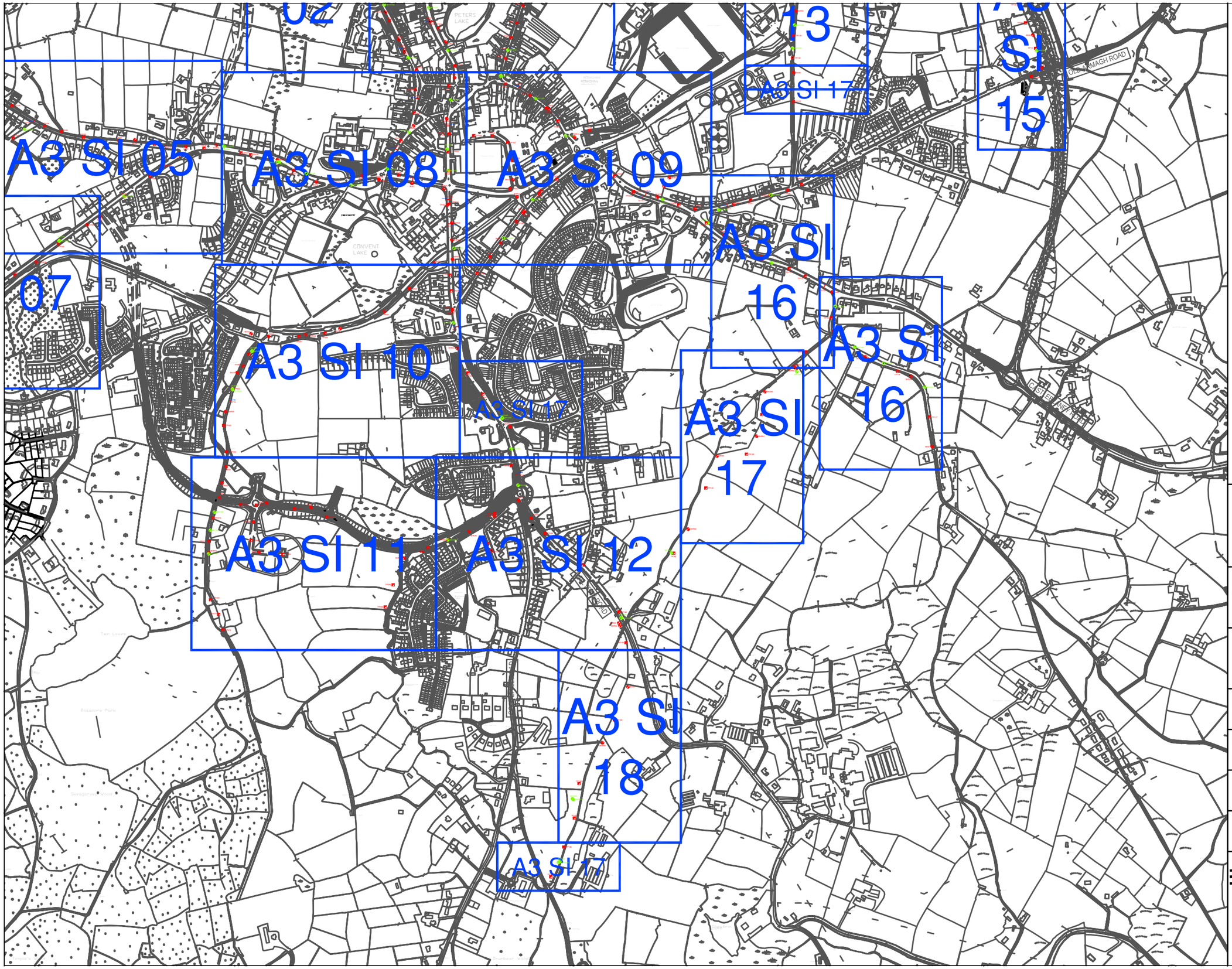


Trial Pit Number:	**TP29A**	**Project** **Project No** **Carried Out**	Monaghan Town Collection Network PC7089 T. J. O'Connor & Associates, Consulting Engineers

APPENDIX D

EXPLORATION LOCATION PLANS

Key to Exploration Location Plans	Key
Exploration Location Plans	PC7089-SI-A to PC7089-SI-C PC7089-SI-01 to PC7089-SI-18



JOB NAME:
MONAGHAN TOWN COLLECTION NETWORK

JOB NUMBER:
PC7089

DRAWING NUMBER:
PC7089–SI–C

DRAWN BY:
Faoiltiarna Nic Chárthaigh

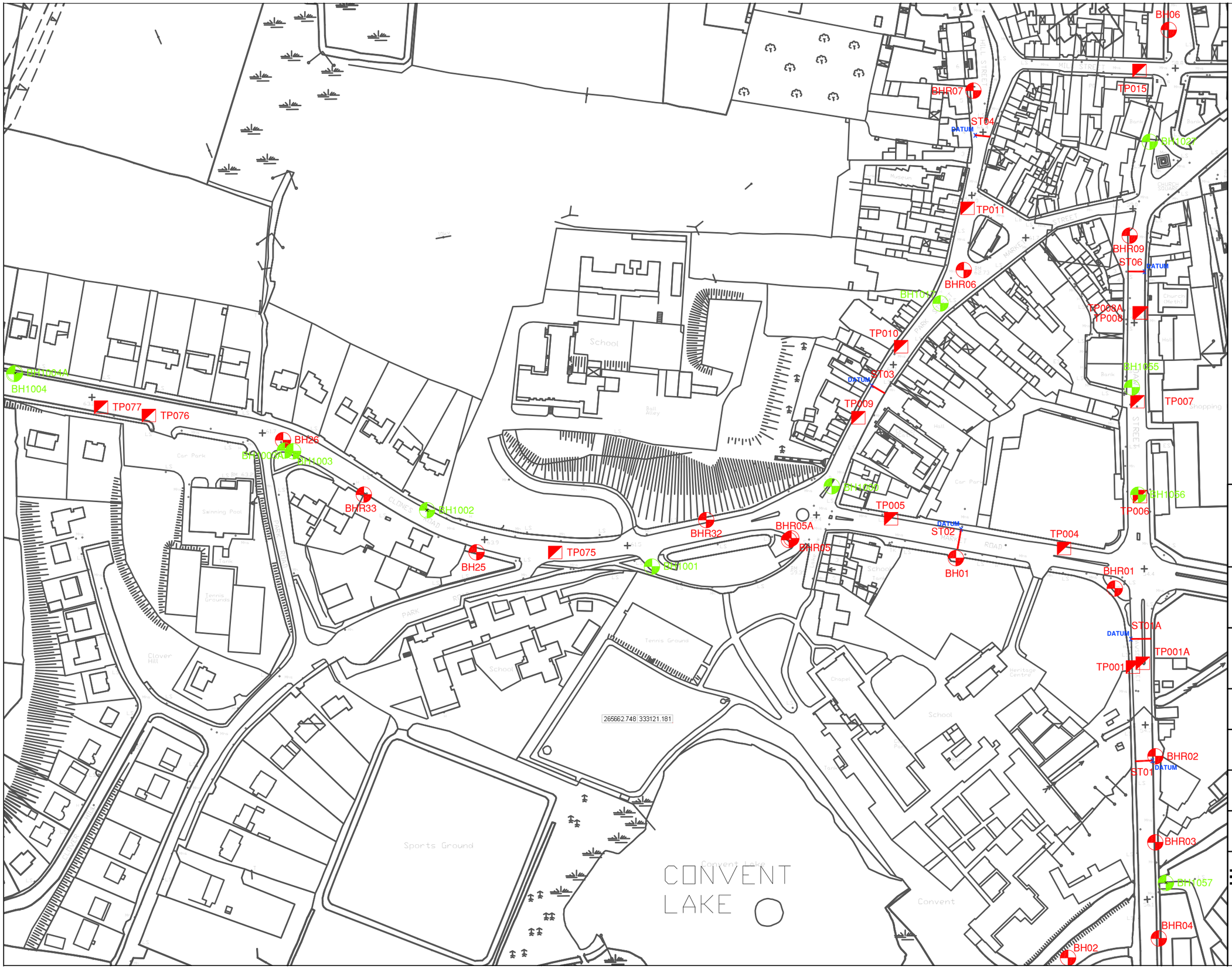
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20/05/2009

SCALE:
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APPROVED:
GH

REVISION:
F03

PRIORITY GEOTECHNICAL



JOB NAME:

MONAGHAN TOWN COLLECTION NETWORK

JOB NUMBER:

PC 7089

DRAWING NUMBER:

PC 7089–SI–08

DRAWN BY:

Faoiltiarna Nic Chárthaigh

DATE:

20/05/2009

SCALE:

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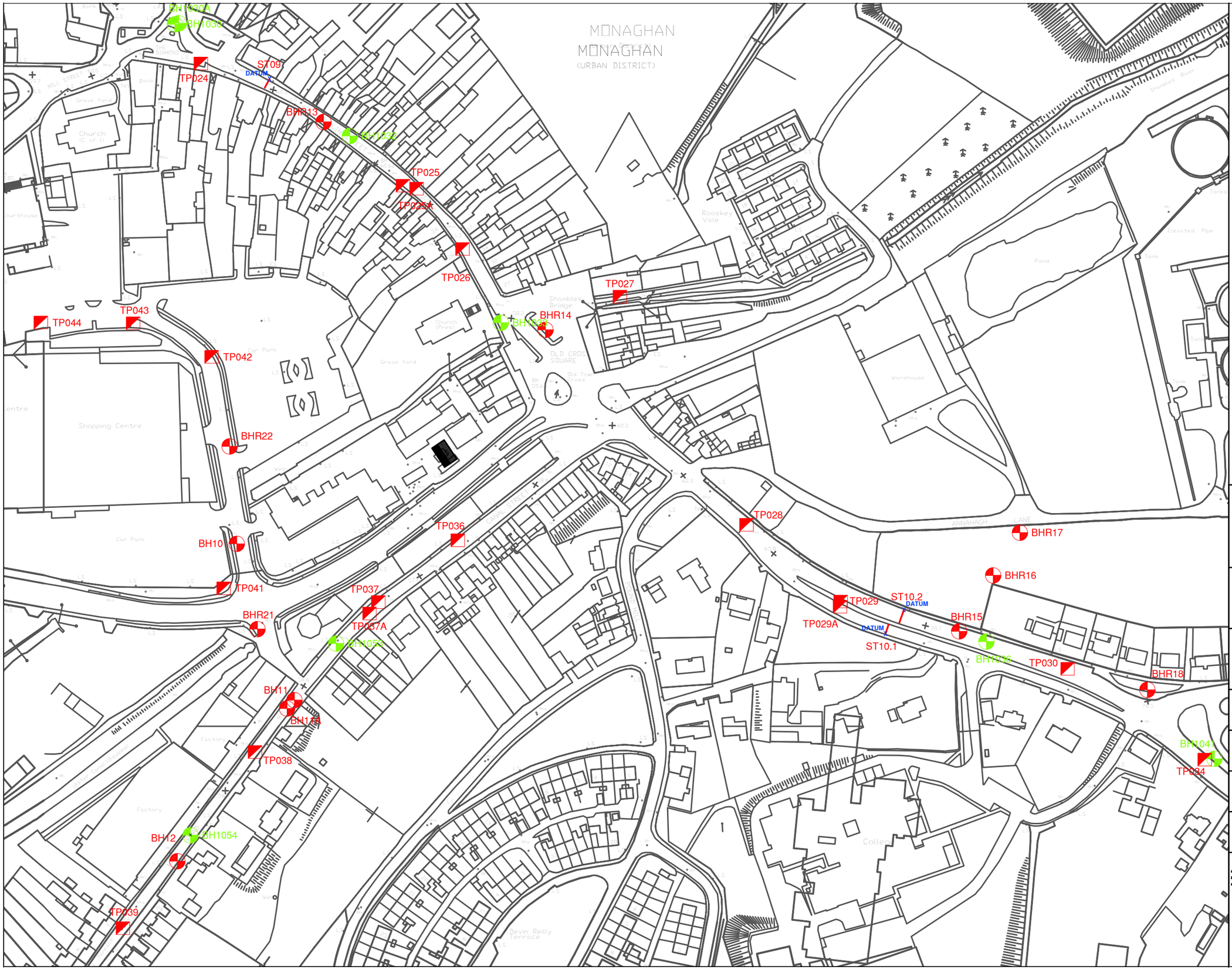
APPROVED:

GH

REVISION:

F03

PRIORITY GEOTECHNICAL



JOB NAME:
MONAGHAN TOWN COLLECTION NETWORK

JOB NUMBER:
PC7089

DRAWING NUMBER:
PC7089-SI-09

DRAWN BY:
Faoiltiarna Nic Chárthaigh

DATE:
20/05/2009

SCALE:
1:2000

APPROVED:
GH

REVISION:
F03

PRIORITY GEOTECHNICAL

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Trial Pits	TP005 TP006 TP007 TP008 TP008A TP015 TP016 TP017 TP018 TP019 TP020 TP021 TP022 TP023 TP024 TP025 TP026 TP027 TP028 TP029 TP029A TP030 TP031 TP032 TP034 TP035 TP036 TP037 TP037A TP038 TP039 TP040 TP043 TP044 TP058 TP059 TP060 TP073 TP074 TP075 TP076 TP077 TP078 TP095 TP096 TP097 TP098 TP134 TP135 TP136 TP138 TP139 TP140 TP141 TP142 TP143 TP144 TP145 TP147 TP158 TP159 TP161 TP163 TP164 TP165 TP166 TP167 TP168 TP171 TP179 TP180 TP181 TP182 TP186 TP187 TP188 and TP189
Slit Trenches	ST01A ST05 ST06 ST07 ST08 ST09 ST10.1 ST10.2 ST12 ST15.1 ST16 ST18 ST20 ST21 ST22 and ST23

Rotary Core Photographic Record

Priority Geotechnical Limited





Rotary Borehole Number:	**BH06**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out for	T. J. O'Connor & Associates, Consulting Engineers

Rotary Core Photographic Record

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Rotary Borehole Number:	**BH14**	**Project**	Monaghan Town Collection Network	
		Project No	PC7089	
		Carried Out for	T. J. O'Connor & Associates, Consulting Engineers	

Rotary Core Photographic Record

Priority Geotechnical Limited



Rotary Borehole Number:	**BHR1**	**Project**	Monaghan Town Collection Network	
		Project No	PC7089	
		Carried Out for	T. J. O'Connor & Associates, Consulting Engineers	

Rotary Core Photographic Record

Priority Geotechnical Limited





Rotary Borehole Number:	**BHR02**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out for	T. J. O'Connor & Associates, Consulting Engineers

Rotary Core Photographic Record

Priority Geotechnical Limited

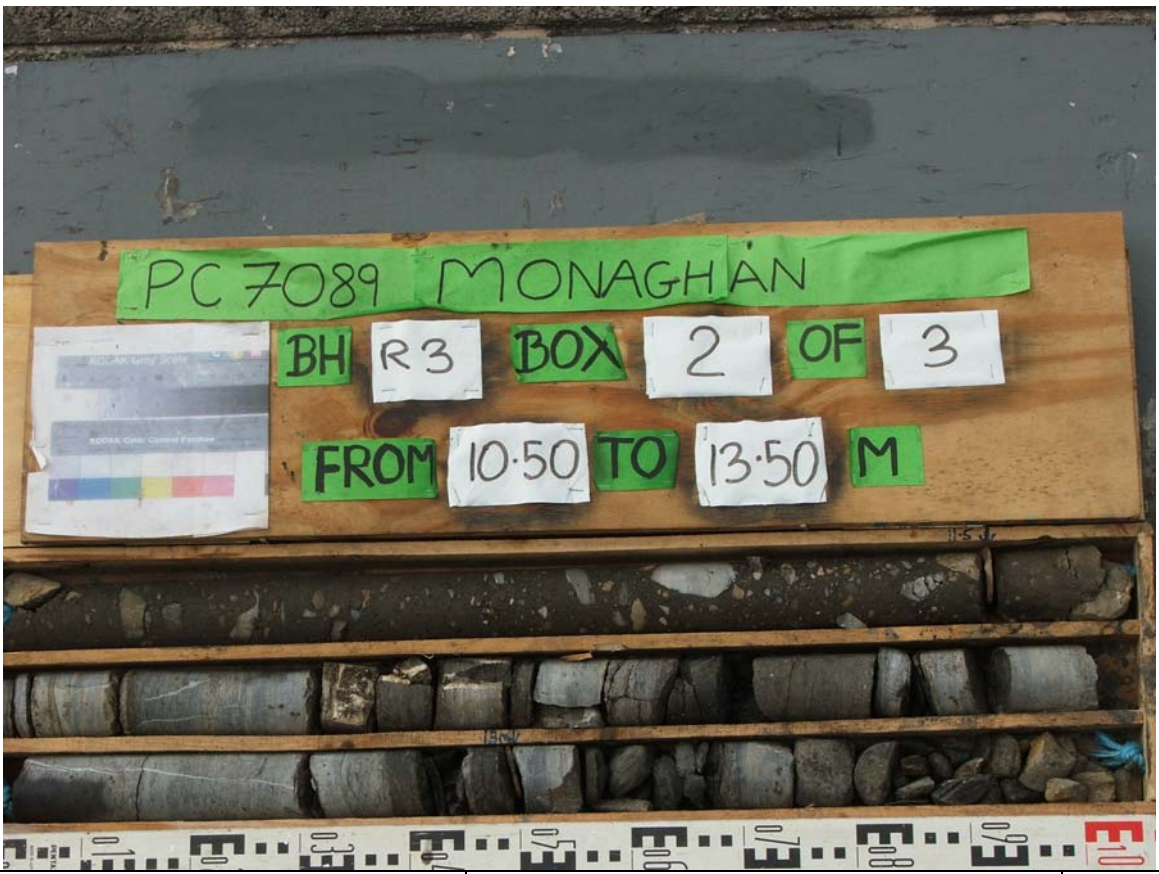


Rotary Borehole Number:	**BHR02**	**Project**	Monaghan Town Collection Network	
		Project No	PC7089	
		Carried Out for	T. J. O'Connor & Associates, Consulting Engineers	

Rotary Core Photographic Record

Priority Geotechnical Limited





Rotary Borehole Number:	**BHR03**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out for	T. J. O'Connor & Associates, Consulting Engineers

Rotary Core Photographic Record

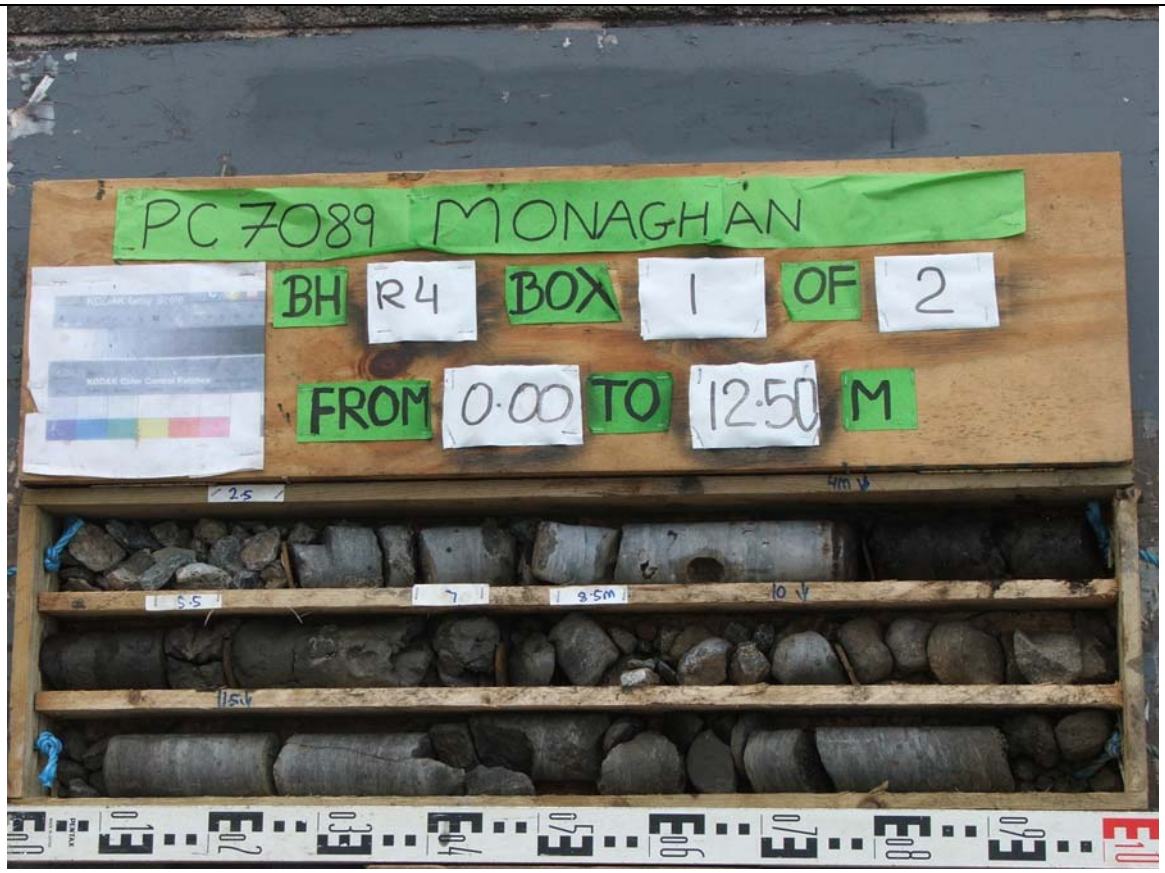
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Rotary Borehole Number:	**BHR03**	**Project**	Monaghan Town Collection Network	
		Project No	PC7089	
		Carried Out for	T. J. O'Connor & Associates, Consulting Engineers	

Rotary Core Photographic Record

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Rotary Borehole Number:	**BHR04**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out for	T. J. O'Connor & Associates, Consulting Engineers

Rotary Core Photographic Record

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Rotary Borehole Number:	**BHR5A**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out for	T. J. O'Connor & Associates, Consulting Engineers

Rotary Core Photographic Record

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Rotary Borehole Number:	**BHR06**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out for	T. J. O'Connor & Associates, Consulting Engineers

Rotary Core Photographic Record

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Rotary Borehole Number:	**BHR06**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out for	T. J. O'Connor & Associates, Consulting Engineers

Rotary Core Photographic Record

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Rotary Borehole Number:	**BHR06**	**Project**	Monaghan Town Collection Network	
		Project No	PC7089	
		Carried Out for	T. J. O'Connor & Associates, Consulting Engineers	

Rotary Core Photographic Record

Priority Geotechnical Limited





Rotary Borehole Number:	**BHR08**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out for	T. J. O'Connor & Associates, Consulting Engineers

Rotary Core Photographic Record

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Rotary Borehole Number:	**BHR09**	**Project** **Project No** **Carried Out for**	Monaghan Town Collection Network PC7089 T. J. O'Connor & Associates, Consulting Engineers

Rotary Core Photographic Record

Priority Geotechnical Limited





Rotary Borehole Number:	**BHR10**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out for	T. J. O'Connor & Associates, Consulting Engineers

Rotary Core Photographic Record

Priority Geotechnical Limited





Rotary Borehole Number:	**BHR11**	**Project**	Monaghan Town Collection Network	
		Project No	PC7089	
		Carried Out for	T. J. O'Connor & Associates, Consulting Engineers	

Rotary Core Photographic Record

Priority Geotechnical Limited





Rotary Borehole Number:	**BHR12**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out for	T. J. O'Connor & Associates, Consulting Engineers

Rotary Core Photographic Record

Priority Geotechnical Limited



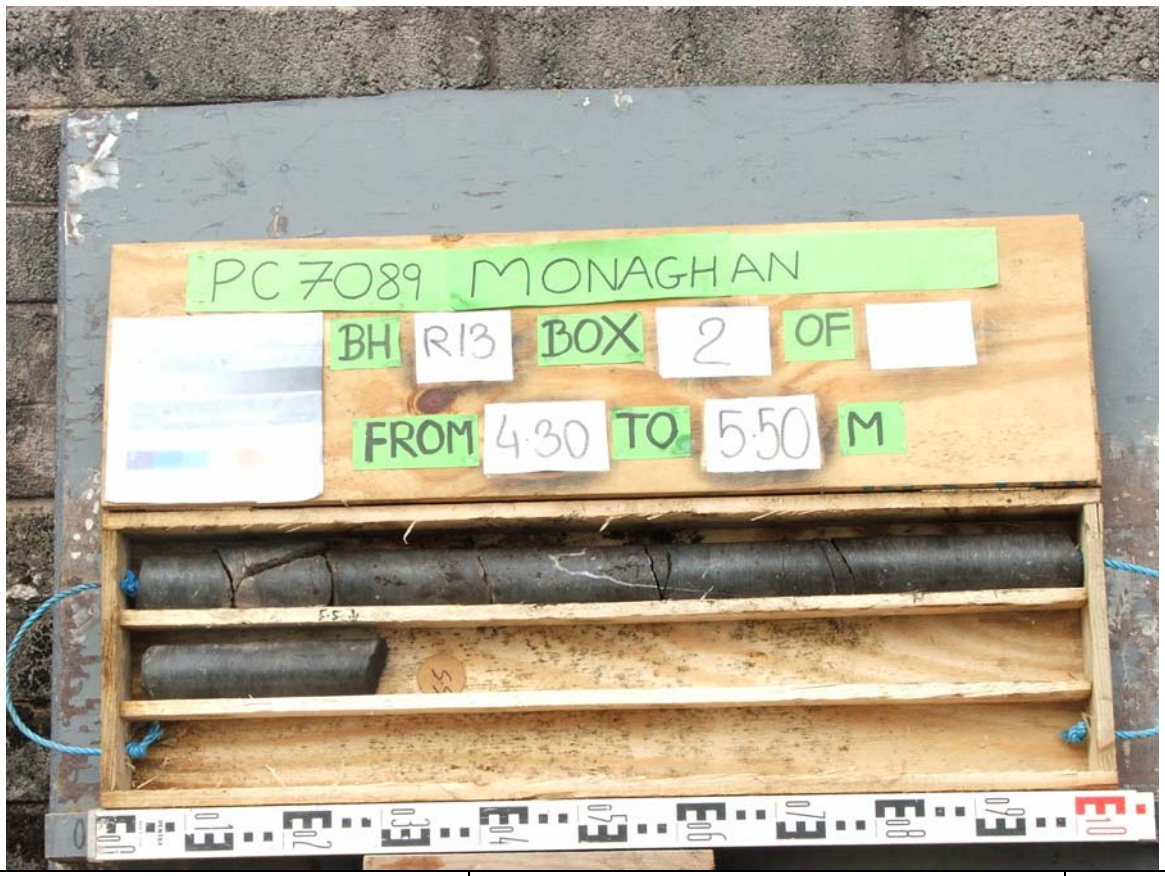


Rotary Borehole Number:	**BHR12**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out for	T. J. O'Connor & Associates, Consulting Engineers

Rotary Core Photographic Record

Priority Geotechnical Limited





Rotary Borehole Number:	**BHR13**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out for	T. J. O'Connor & Associates, Consulting Engineers

Rotary Core Photographic Record

Priority Geotechnical Limited





Rotary Borehole Number:	**BHR14**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out for	T. J. O'Connor & Associates, Consulting Engineers

Rotary Core Photographic Record

Priority Geotechnical Limited





Rotary Borehole Number:	**BHR16**	**Project**	Monaghan Town Collection Network	
		Project No	PC7089	
		Carried Out for	T. J. O'Connor & Associates, Consulting Engineers	

Rotary Core Photographic Record

Priority Geotechnical Limited



Rotary Borehole Number:	**BHR16**	**Project**	Monaghan Town Collection Network	
		Project No	PC7089	
		Carried Out for	T. J. O'Connor & Associates, Consulting Engineers	

Rotary Core Photographic Record

Priority Geotechnical Limited





Rotary Borehole Number:	**BHR17**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out for	T. J. O'Connor & Associates, Consulting Engineers

Rotary Core Photographic Record

Priority Geotechnical Limited





Rotary Borehole Number:	**BHR18**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out for	T. J. O'Connor & Associates, Consulting Engineers

Rotary Core Photographic Record

Priority Geotechnical Limited





Rotary Borehole Number:	**BHR18**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out for	T. J. O'Connor & Associates, Consulting Engineers

Rotary Core Photographic Record

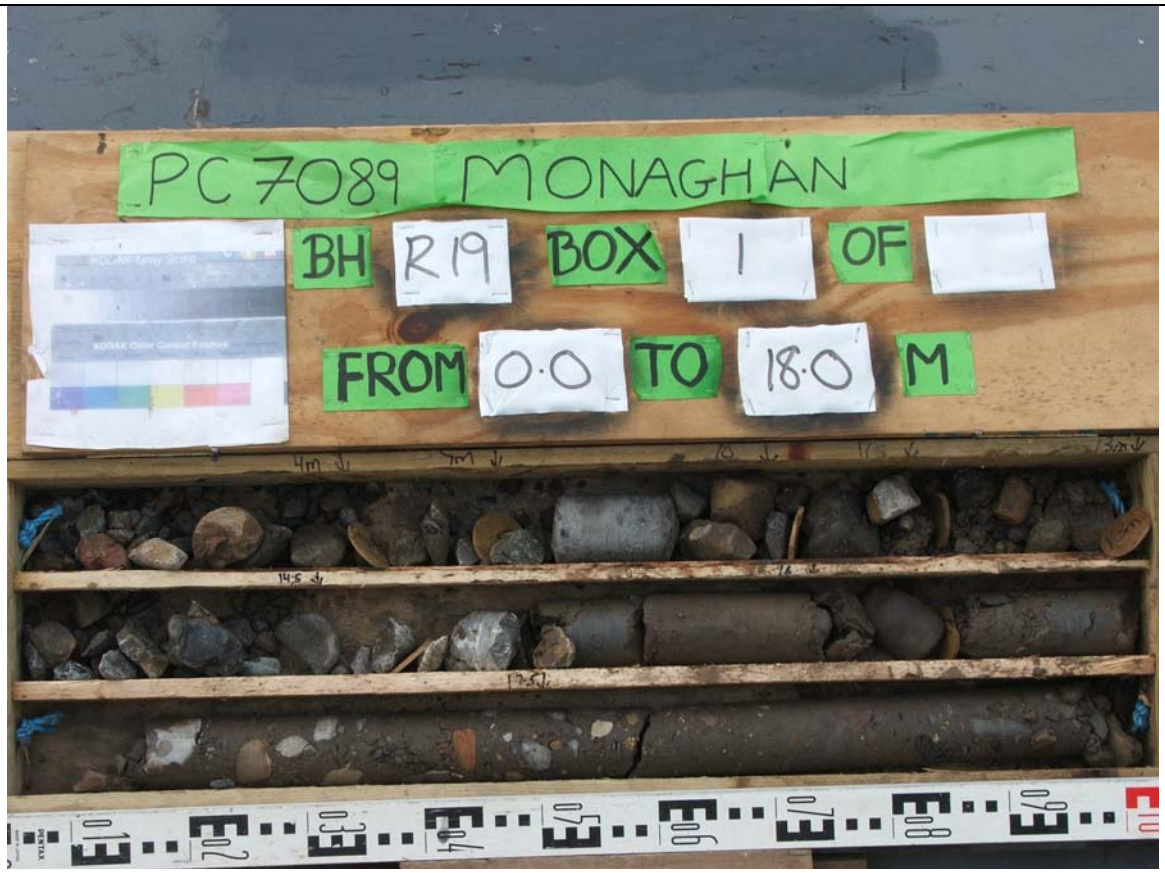
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Rotary Borehole Number:	**BHR18**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out for	T. J. O'Connor & Associates, Consulting Engineers

Rotary Core Photographic Record

Priority Geotechnical Limited





Rotary Borehole Number:	**BHR19**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out for	T. J. O'Connor & Associates, Consulting Engineers

Rotary Core Photographic Record

Priority Geotechnical Limited



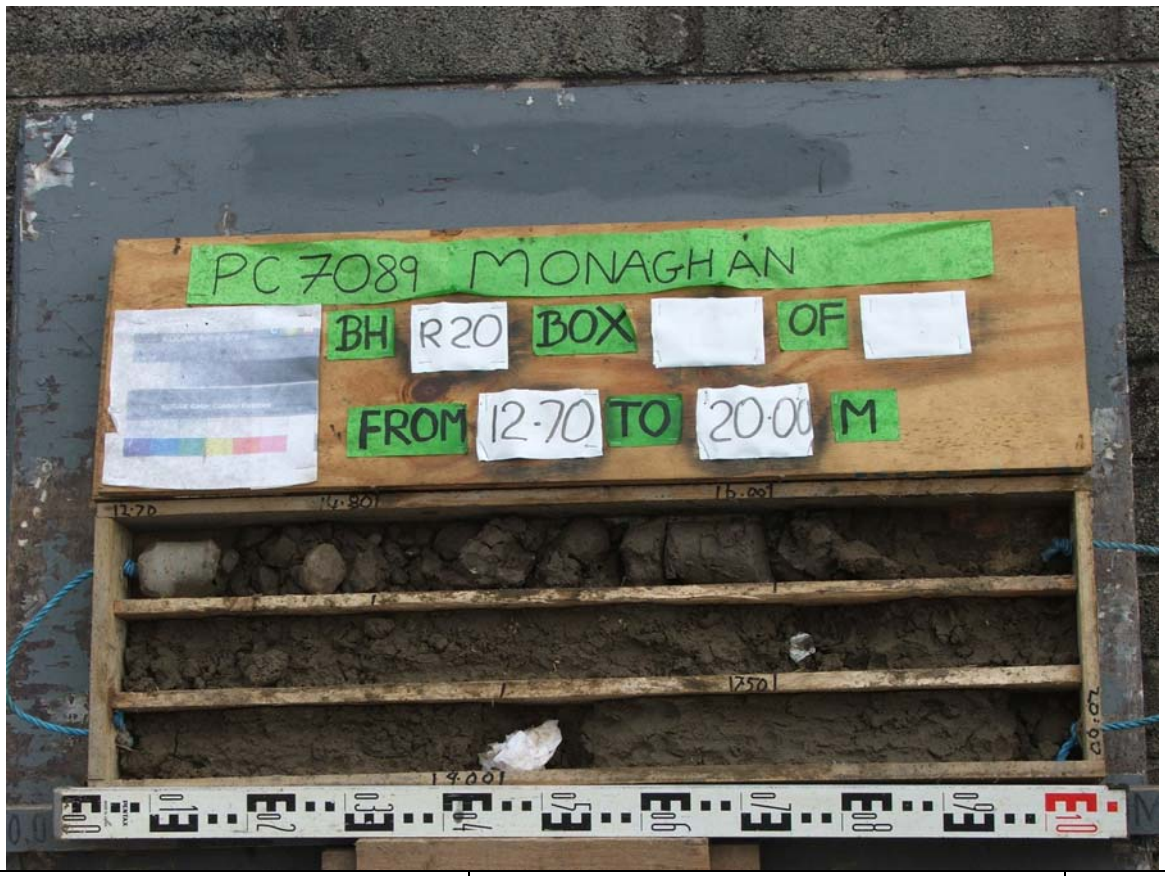


Rotary Borehole Number:	**BHR20**	**Project**	Monaghan Town Collection Network	
		Project No	PC7089	
		Carried Out for	T. J. O'Connor & Associates, Consulting Engineers	

Rotary Core Photographic Record

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Rotary Borehole Number:	**BHR20**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out for	T. J. O'Connor & Associates, Consulting Engineers

Rotary Core Photographic Record

Priority Geotechnical Limited





Rotary Borehole Number:	**BHR21**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out for	T. J. O'Connor & Associates, Consulting Engineers

Rotary Core Photographic Record

Priority Geotechnical Limited



Rotary Borehole Number:	**BHR21**	**Project**	Monaghan Town Collection Network	
		Project No	PC7089	
		Carried Out for	T. J. O'Connor & Associates, Consulting Engineers	

Rotary Core Photographic Record

Priority Geotechnical Limited



Rotary Borehole Number:	**BHR22**	**Project**	Monaghan Town Collection Network	
		Project No	PC7089	
		Carried Out for	T. J. O'Connor & Associates, Consulting Engineers	

Rotary Core Photographic Record

Priority Geotechnical Limited

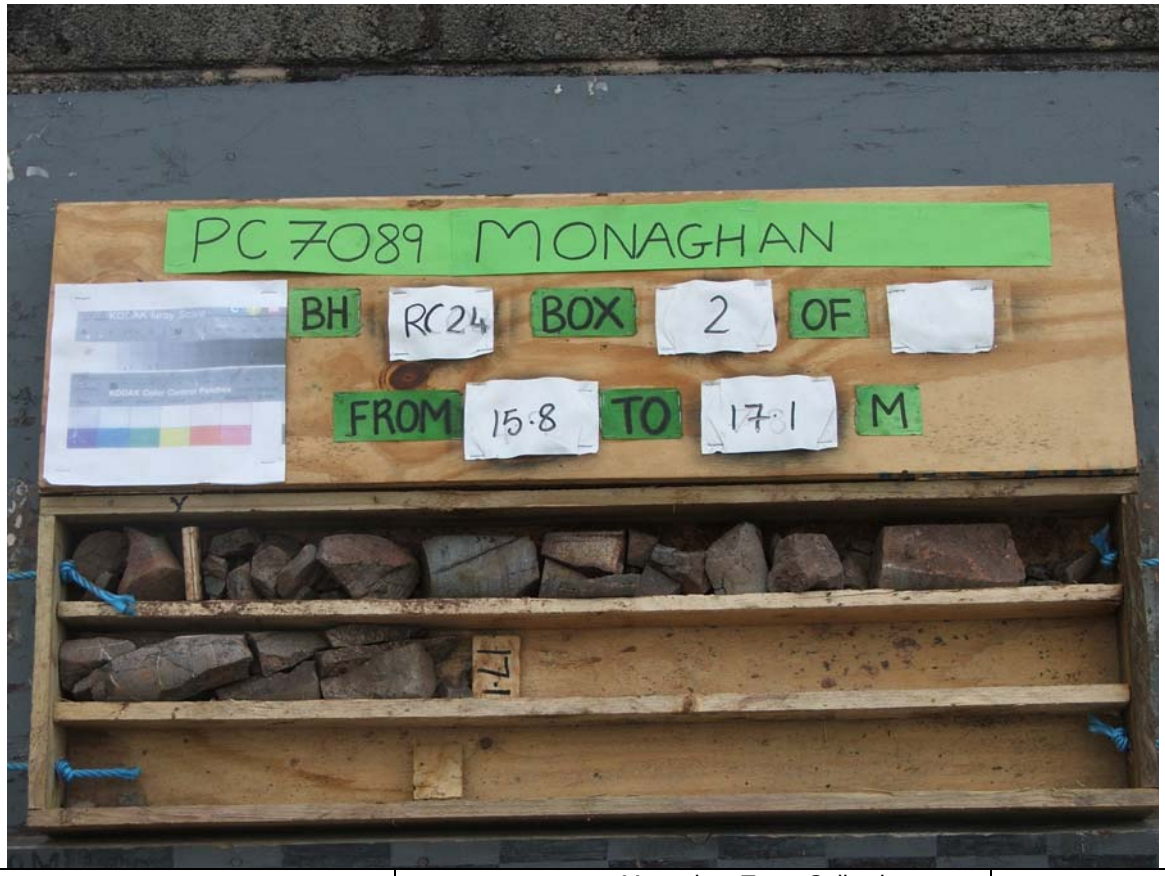


Rotary Borehole Number:	**BHR23**	**Project**	Monaghan Town Collection Network	
		Project No	PC7089	
		Carried Out for	T. J. O'Connor & Associates, Consulting Engineers	

Rotary Core Photographic Record

Priority Geotechnical Limited





Rotary Borehole Number:	**BHR24**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out for	T. J. O'Connor & Associates, Consulting Engineers

Rotary Core Photographic Record

Priority Geotechnical Limited

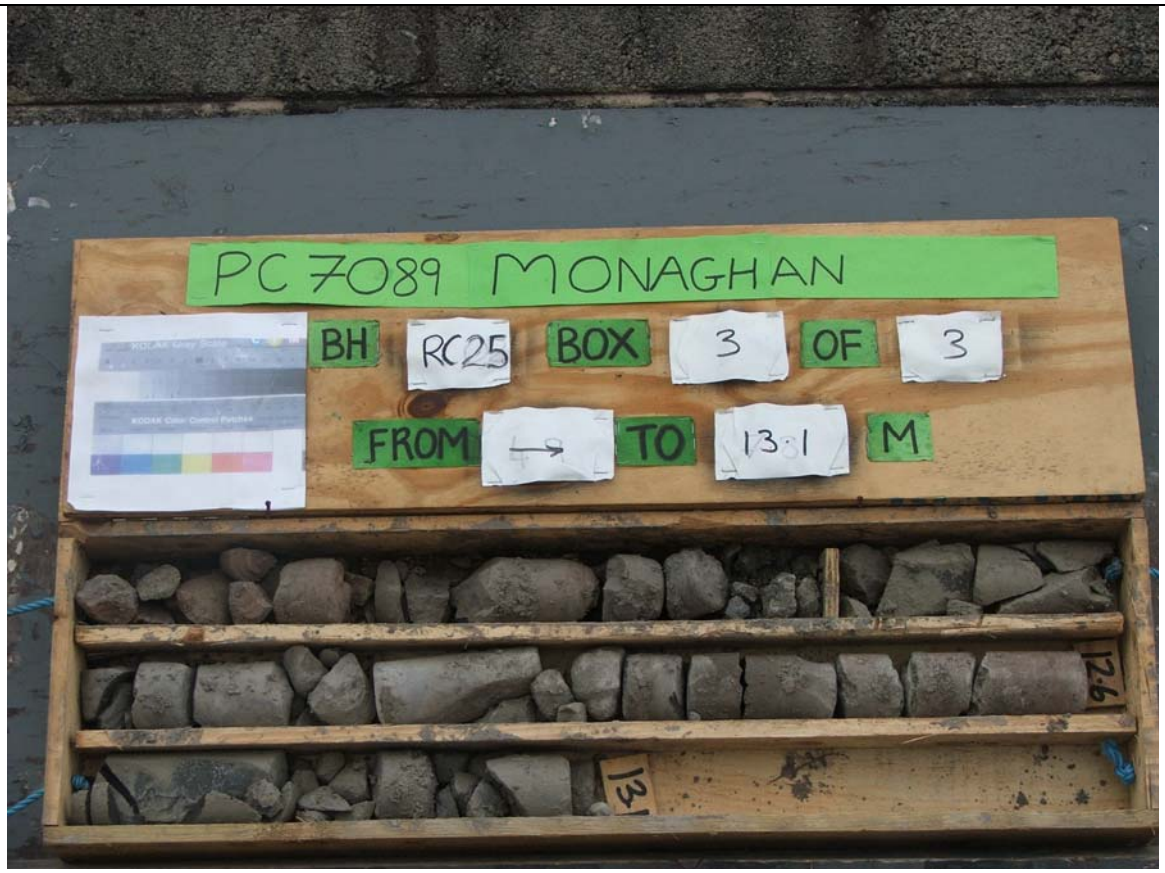




Rotary Borehole Number:	**BHR25**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out for	T. J. O'Connor & Associates, Consulting Engineers

Rotary Core Photographic Record

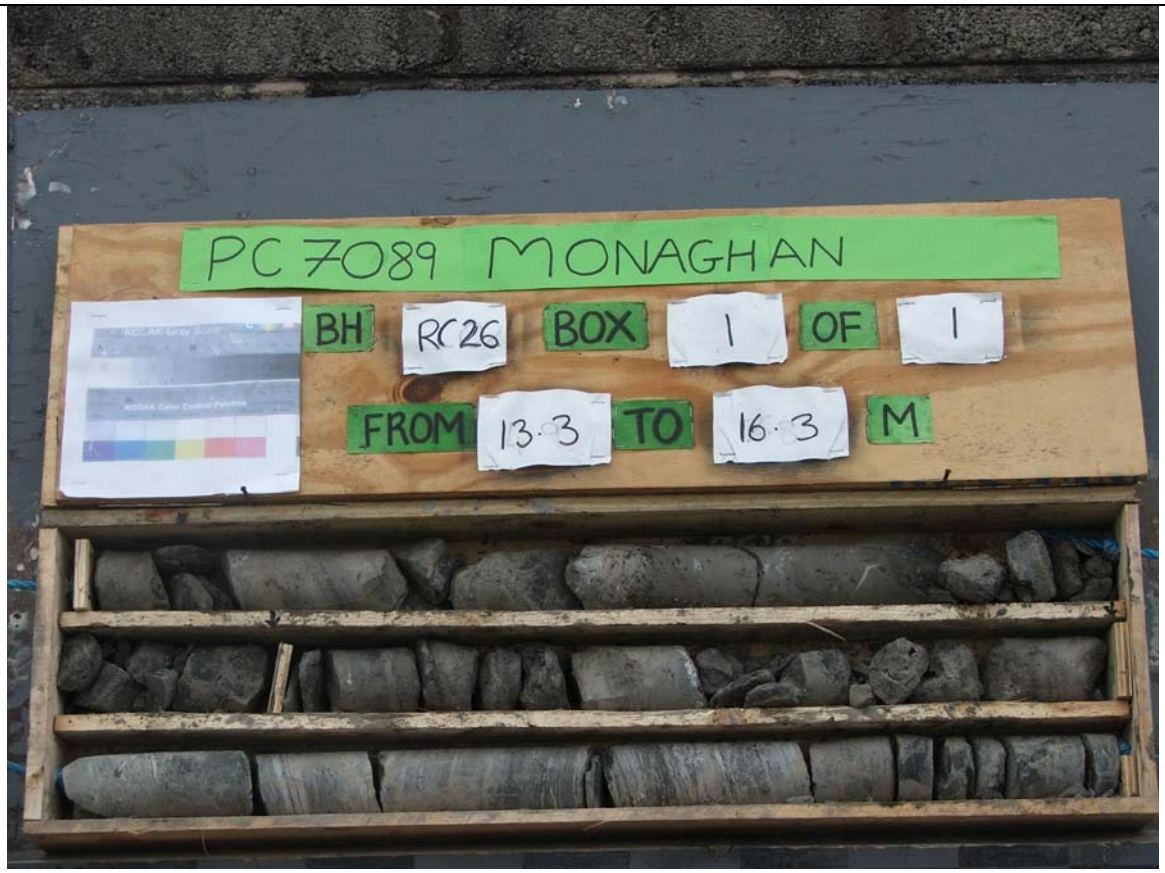
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Rotary Borehole Number:	**BHR25**	**Project**	Monaghan Town Collection Network	
		Project No	PC7089	
		Carried Out for	T. J. O'Connor & Associates, Consulting Engineers	

Rotary Core Photographic Record

Priority Geotechnical Limited



Rotary Borehole Number:	**BHR26**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out for	T. J. O'Connor & Associates, Consulting Engineers

Rotary Core Photographic Record

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Rotary Borehole Number:	**BHR27**	**Project**	Monaghan Town Collection Network	
		Project No	PC7089	
		Carried Out for	T. J. O'Connor & Associates, Consulting Engineers	

Rotary Core Photographic Record

Priority Geotechnical Limited





Rotary Borehole Number:	**BHR28**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out for	T. J. O'Connor & Associates, Consulting Engineers

Rotary Core Photographic Record

Priority Geotechnical Limited



Rotary Borehole Number:	**BHR28**	**Project**	Monaghan Town Collection Network	
		Project No	PC7089	
		Carried Out for	T. J. O'Connor & Associates, Consulting Engineers	

Rotary Core Photographic Record

Priority Geotechnical Limited





Rotary Borehole Number:	**BHR29**	**Project**	Monaghan Town Collection Network	
		Project No	PC7089	
		Carried Out for	T. J. O'Connor & Associates, Consulting Engineers	

Rotary Core Photographic Record

Priority Geotechnical Limited



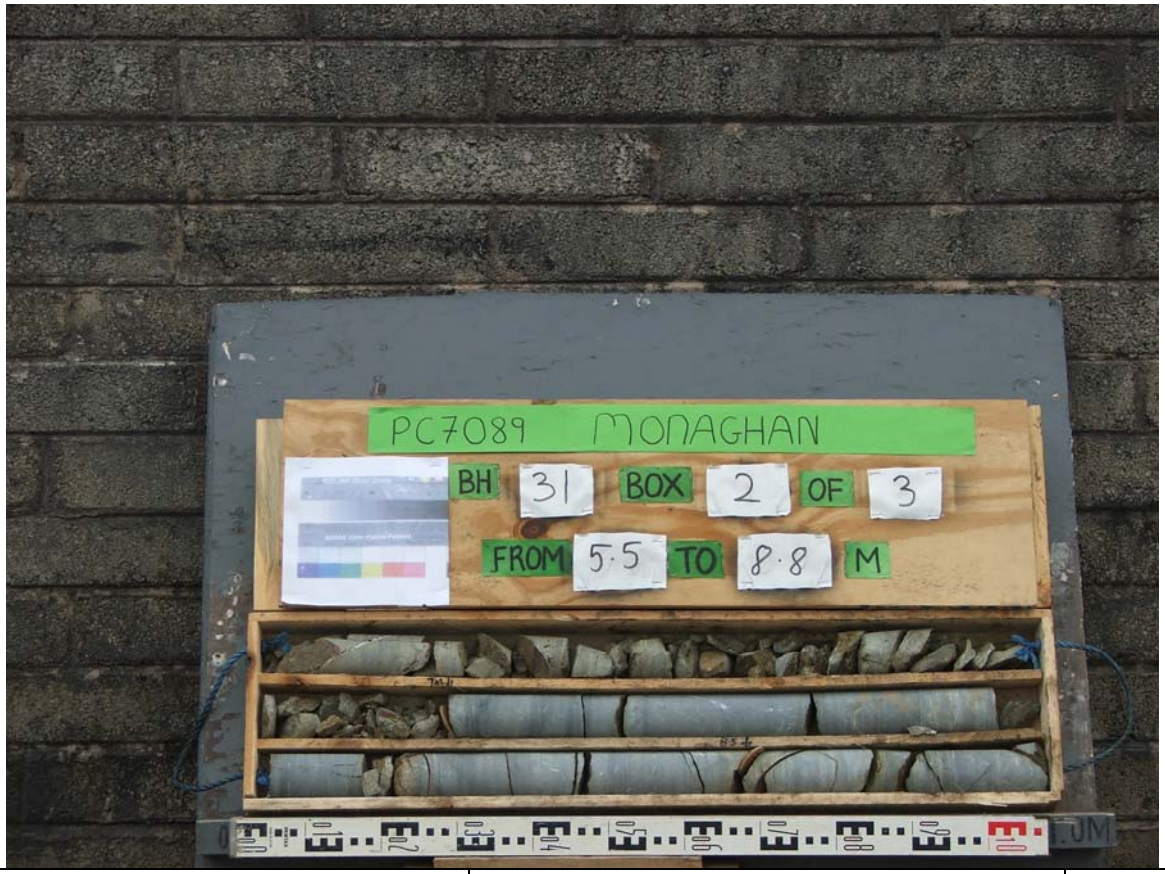


Rotary Borehole Number:	**BHR30**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out for	T. J. O'Connor & Associates, Consulting Engineers

Rotary Core Photographic Record

Priority Geotechnical Limited





Rotary Borehole Number:	**BHR31**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out for	T. J. O'Connor & Associates, Consulting Engineers

Rotary Core Photographic Record

Priority Geotechnical Limited



Rotary Borehole Number:	**BHR31**	**Project**	Monaghan Town Collection Network	
		Project No	PC7089	
		Carried Out for	T. J. O'Connor & Associates, Consulting Engineers	

Rotary Core Photographic Record

Priority Geotechnical Limited





Rotary Borehole Number:	**BHR32**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out for	T. J. O'Connor & Associates, Consulting Engineers

Rotary Core Photographic Record

Priority Geotechnical Limited

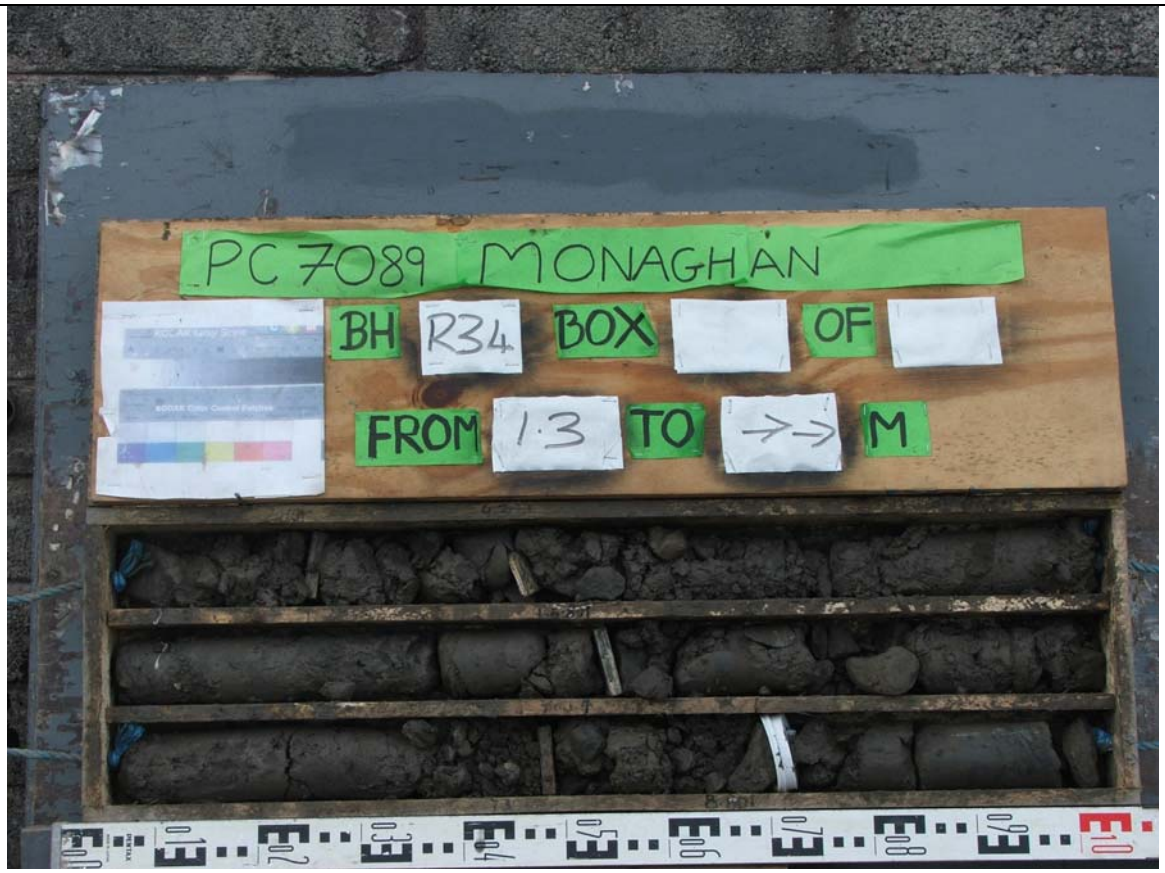




Rotary Borehole Number:	**BHR33**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out for	T. J. O'Connor & Associates, Consulting Engineers

Rotary Core Photographic Record

Priority Geotechnical Limited





Rotary Borehole Number:	**BHR34**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out for	T. J. O'Connor & Associates, Consulting Engineers

Rotary Core Photographic Record

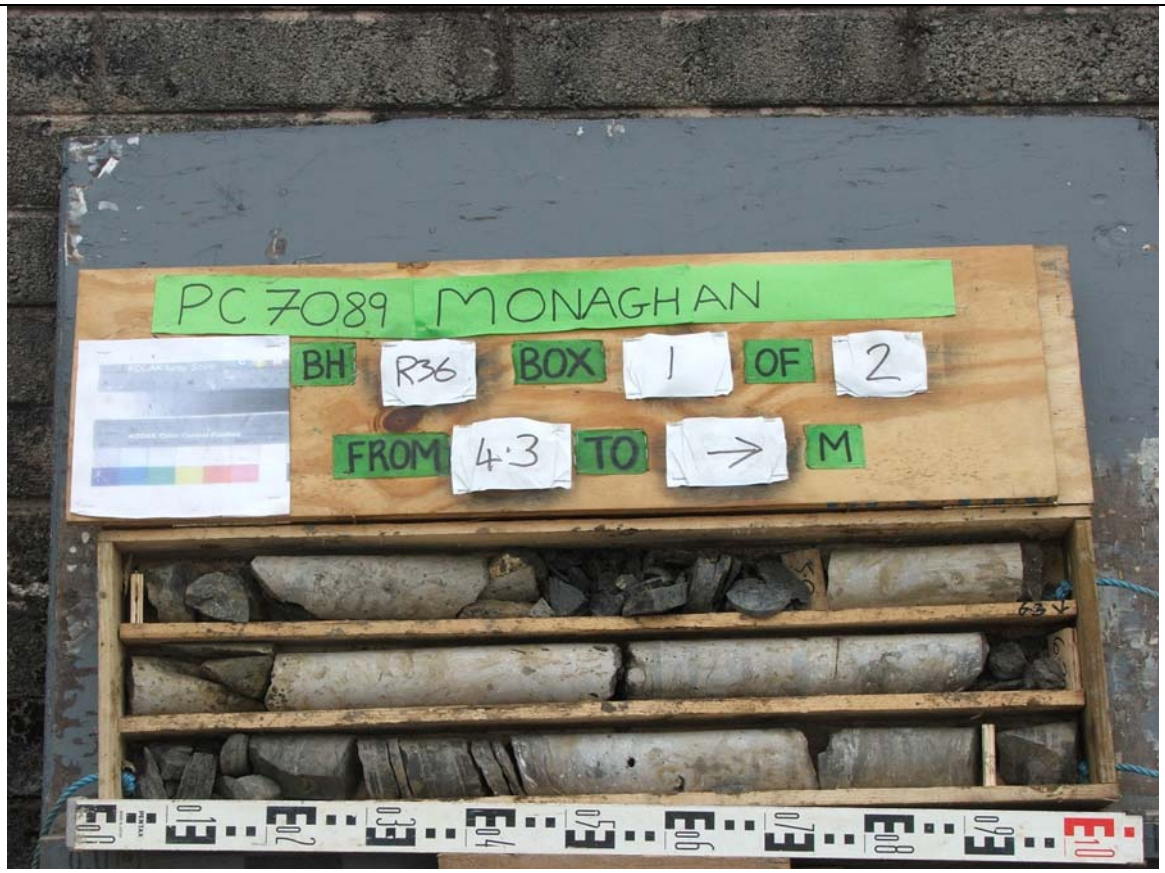
Priority Geotechnical Limited



Rotary Borehole Number:	**BHR35**	**Project**	Monaghan Town Collection Network	
		Project No	PC7089	
		Carried Out for	T. J. O'Connor & Associates, Consulting Engineers	

Rotary Core Photographic Record

Priority Geotechnical Limited





Rotary Borehole Number:	**BHR36**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out for	T. J. O'Connor & Associates, Consulting Engineers

Rotary Core Photographic Record

Priority Geotechnical Limited





Rotary Borehole Number:	**BHR37**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out for	T. J. O'Connor & Associates, Consulting Engineers

Rotary Core Photographic Record

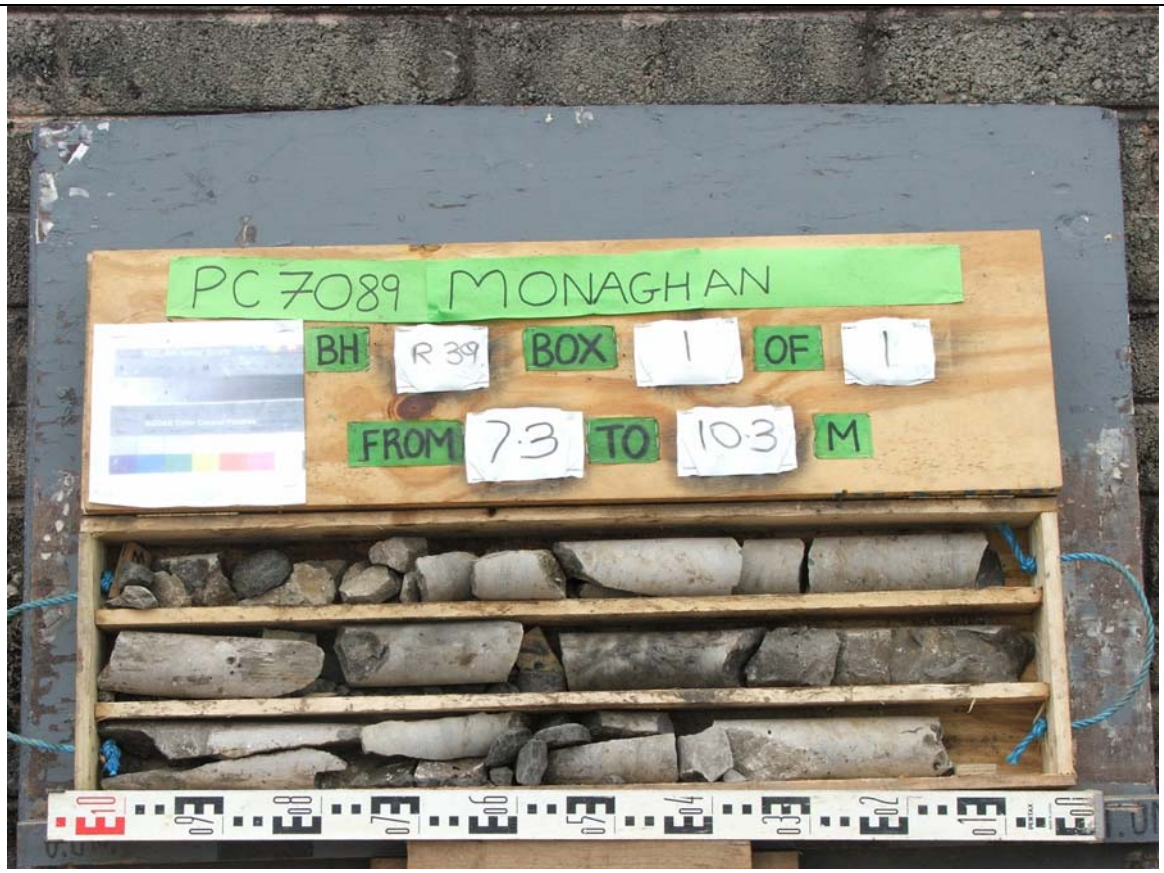
Priority Geotechnical Limited



Rotary Borehole Number:	**BHR38**	**Project**	Monaghan Town Collection Network	
		Project No	PC7089	
		Carried Out for	T. J. O'Connor & Associates, Consulting Engineers	

Rotary Core Photographic Record

Priority Geotechnical Limited



Rotary Borehole Number:	**BHR39**	**Project**	Monaghan Town Collection Network	
		Project No	PC7089	
		Carried Out for	T. J. O'Connor & Associates, Consulting Engineers	

Rotary Core Photographic Record

Priority Geotechnical Limited



Rotary Borehole Number:	**BHR40**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out for	T. J. O'Connor & Associates, Consulting Engineers

Rotary Core Photographic Record

Priority Geotechnical Limited





Rotary Borehole Number:	**BHR41**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out for	T. J. O'Connor & Associates, Consulting Engineers

Rotary Core Photographic Record

Priority Geotechnical Limited





Rotary Borehole Number:	**BHR42**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out for	T. J. O'Connor & Associates, Consulting Engineers

Rotary Core Photographic Record

Priority Geotechnical Limited





Rotary Borehole Number:	**BHR43**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out for	T. J. O'Connor & Associates, Consulting Engineers

Rotary Core Photographic Record

Priority Geotechnical Limited

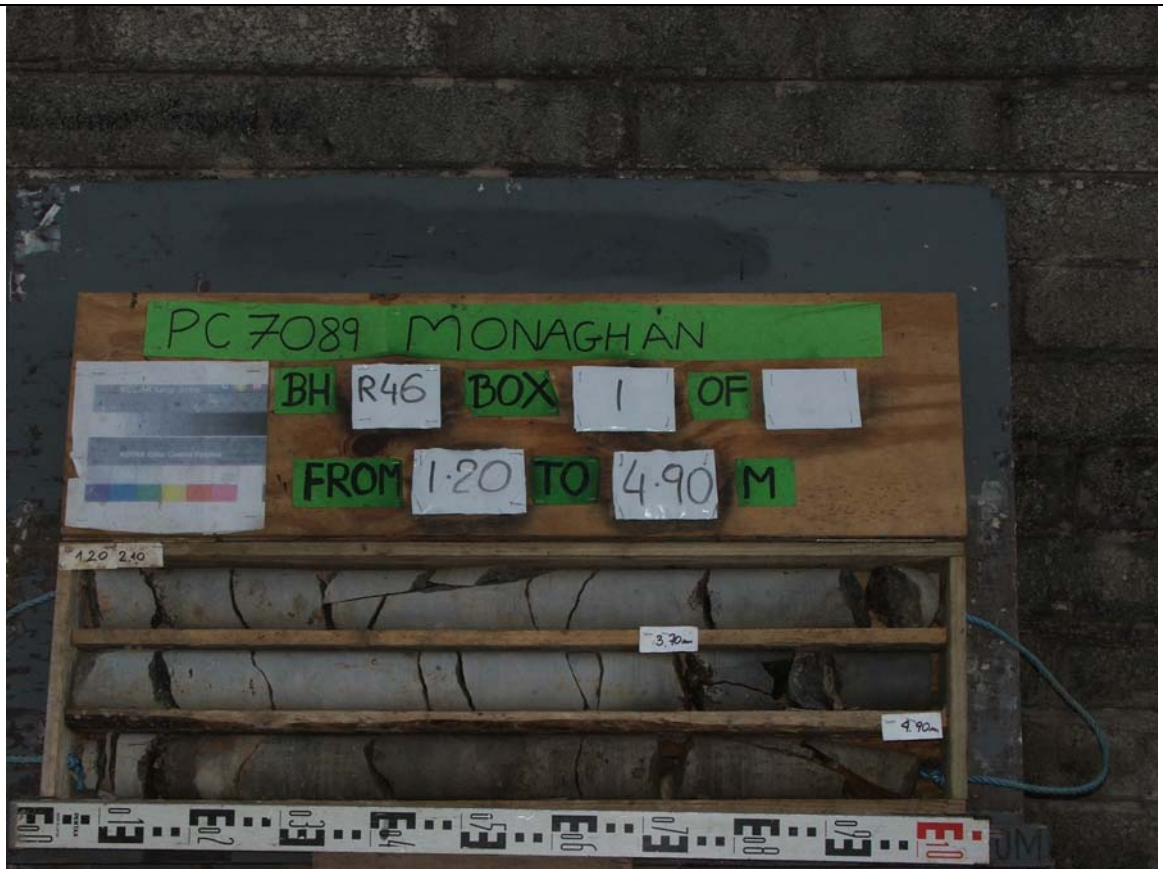




Rotary Borehole Number:	**BHR44**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out for	T. J. O'Connor & Associates, Consulting Engineers

Rotary Core Photographic Record

Priority Geotechnical Limited





Rotary Borehole Number:	**BHR46**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out for	T. J. O'Connor & Associates, Consulting Engineers

Rotary Core Photographic Record

Priority Geotechnical Limited



Rotary Borehole Number:	**BHR48**	**Project**	Monaghan Town Collection Network	
		Project No	PC7089	
		Carried Out for	T. J. O'Connor & Associates, Consulting Engineers	

Rotary Core Photographic Record

Priority Geotechnical Limited



Rotary Borehole Number:	**BHR49**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out for	T. J. O'Connor & Associates, Consulting Engineers

Rotary Core Photographic Record

Priority Geotechnical Limited





Rotary Borehole Number:	**BHR50**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out for	T. J. O'Connor & Associates, Consulting Engineers

Rotary Core Photographic Record

Priority Geotechnical Limited





Rotary Borehole Number:	**BHR51**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out for	T. J. O'Connor & Associates, Consulting Engineers

Rotary Core Photographic Record

Priority Geotechnical Limited





Rotary Borehole Number:	**BHR53**	**Project**	Monaghan Town Collection Network	
		Project No	PC7089	
		Carried Out for	T. J. O'Connor & Associates, Consulting Engineers	

Rotary Core Photographic Record

Priority Geotechnical Limited

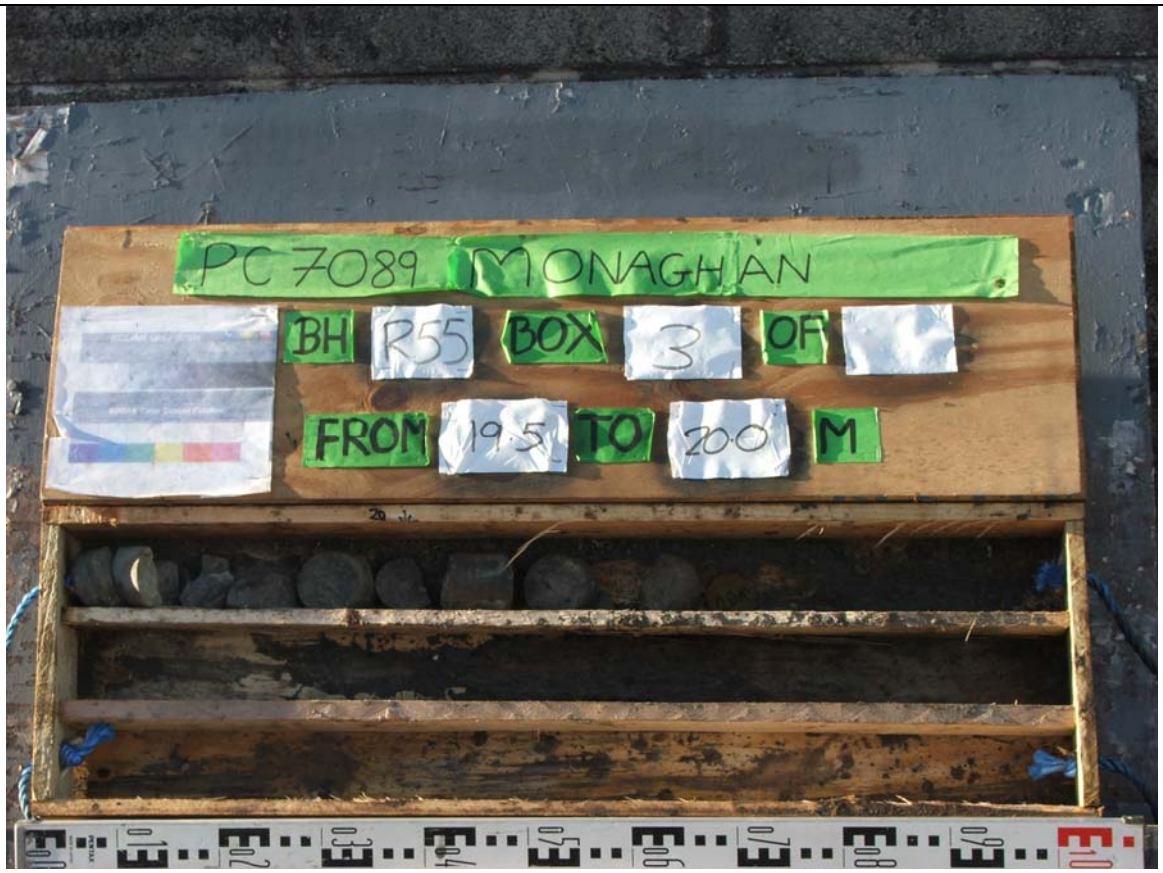




Rotary Borehole Number:	**BHR54**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out for	T. J. O'Connor & Associates, Consulting Engineers

Rotary Core Photographic Record

Priority Geotechnical Limited



Rotary Borehole Number:	**BHR55**	**Project**	Monaghan Town Collection Network	
		Project No	PC7089	
		Carried Out for	T. J. O'Connor & Associates, Consulting Engineers	

Rotary Core Photographic Record

Priority Geotechnical Limited





Rotary Borehole Number:	**BHR56**	**Project**	Monaghan Town Collection Network	
		Project No	PC7089	
		Carried Out for	T. J. O'Connor & Associates, Consulting Engineers	

Rotary Core Photographic Record

Priority Geotechnical Limited

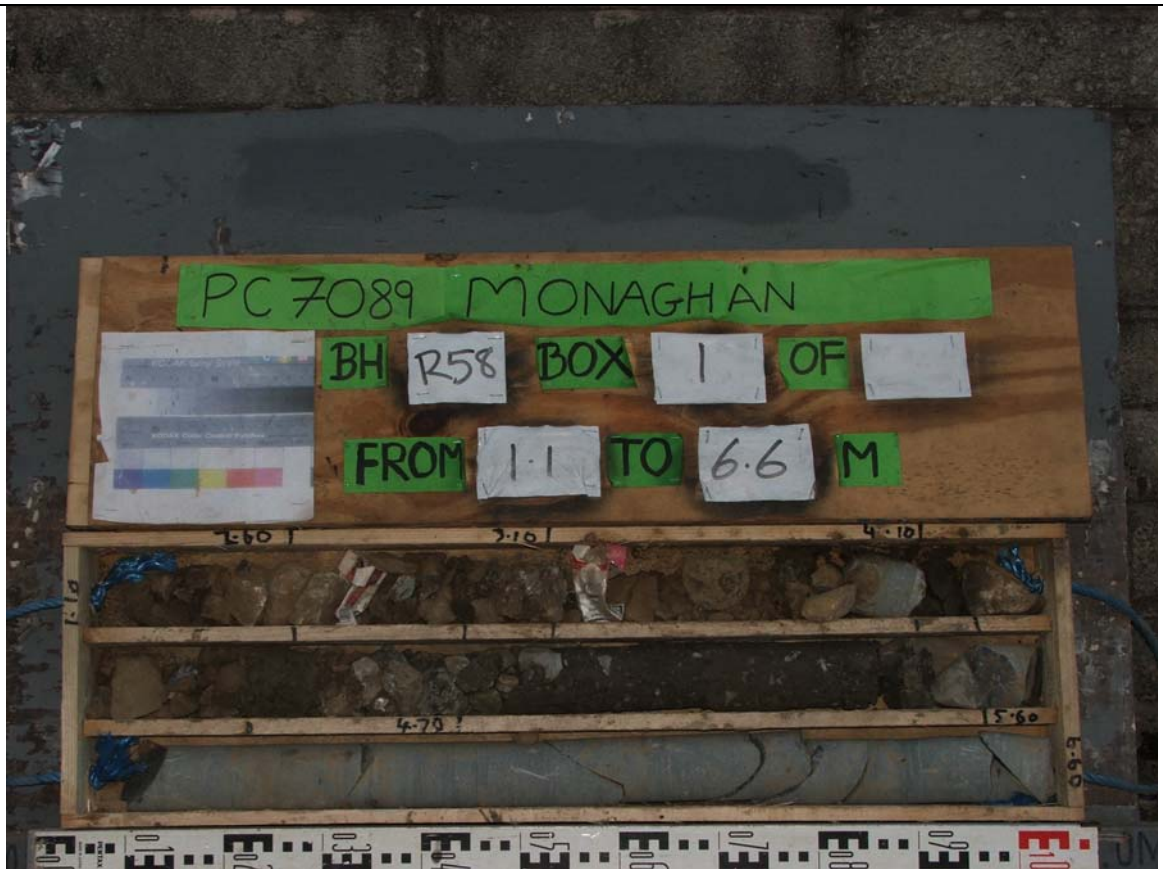




Rotary Borehole Number:	**BHR57**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out for	T. J. O'Connor & Associates, Consulting Engineers

Rotary Core Photographic Record

Priority Geotechnical Limited

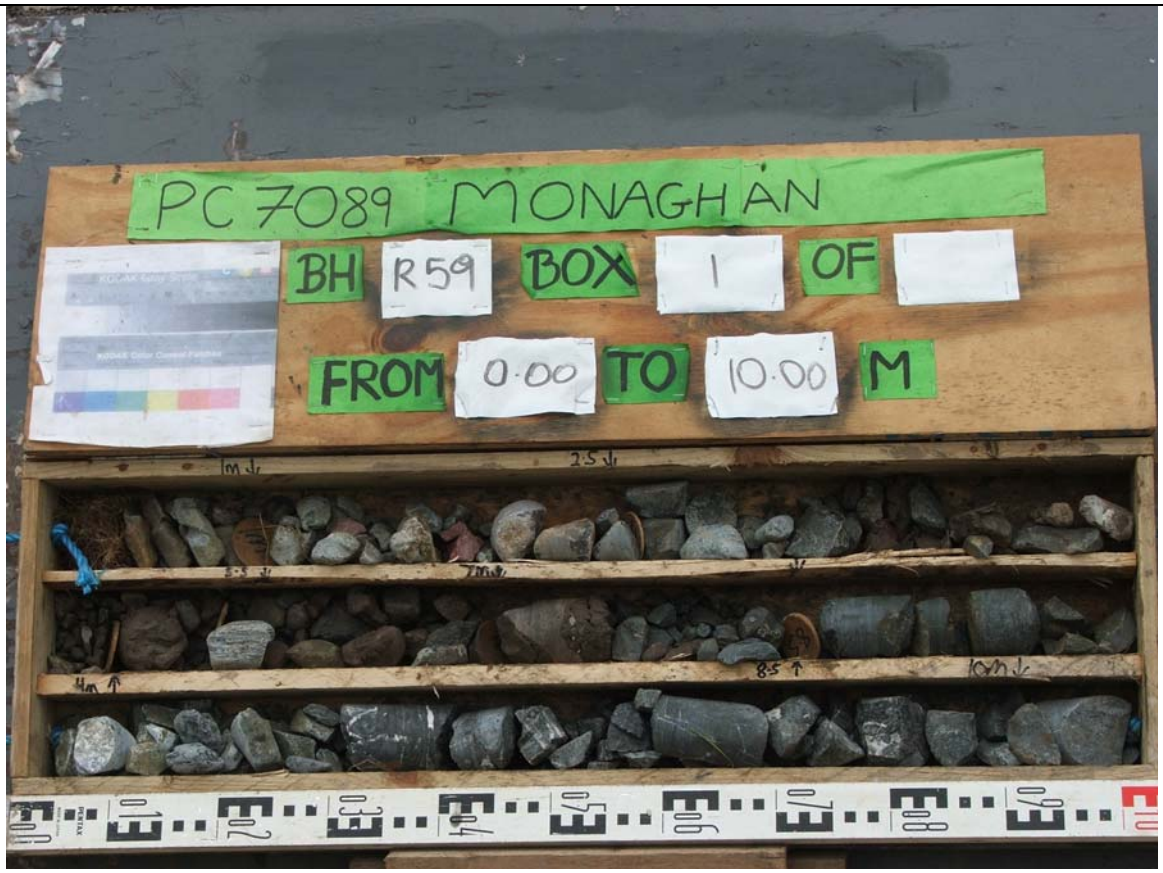




Rotary Borehole Number:	**BHR58**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out for	T. J. O'Connor & Associates, Consulting Engineers

Rotary Core Photographic Record

Priority Geotechnical Limited

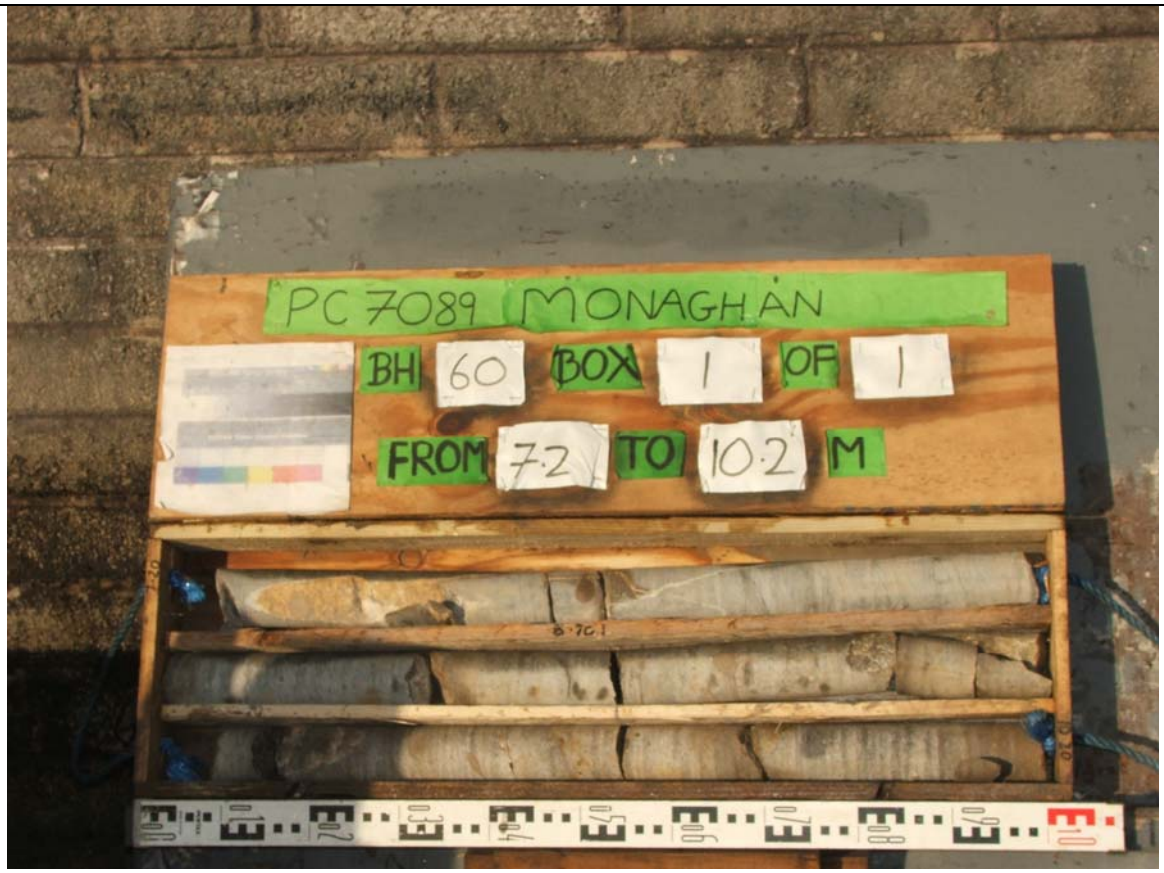




Rotary Borehole Number:	**BHR59**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out for	T. J. O'Connor & Associates, Consulting Engineers

Rotary Core Photographic Record

Priority Geotechnical Limited



Rotary Borehole Number:	**BHR60**	**Project**	Monaghan Town Collection Network	
		Project No	PC7089	
		Carried Out for	T. J. O'Connor & Associates, Consulting Engineers	

Rotary Core Photographic Record

Priority Geotechnical Limited

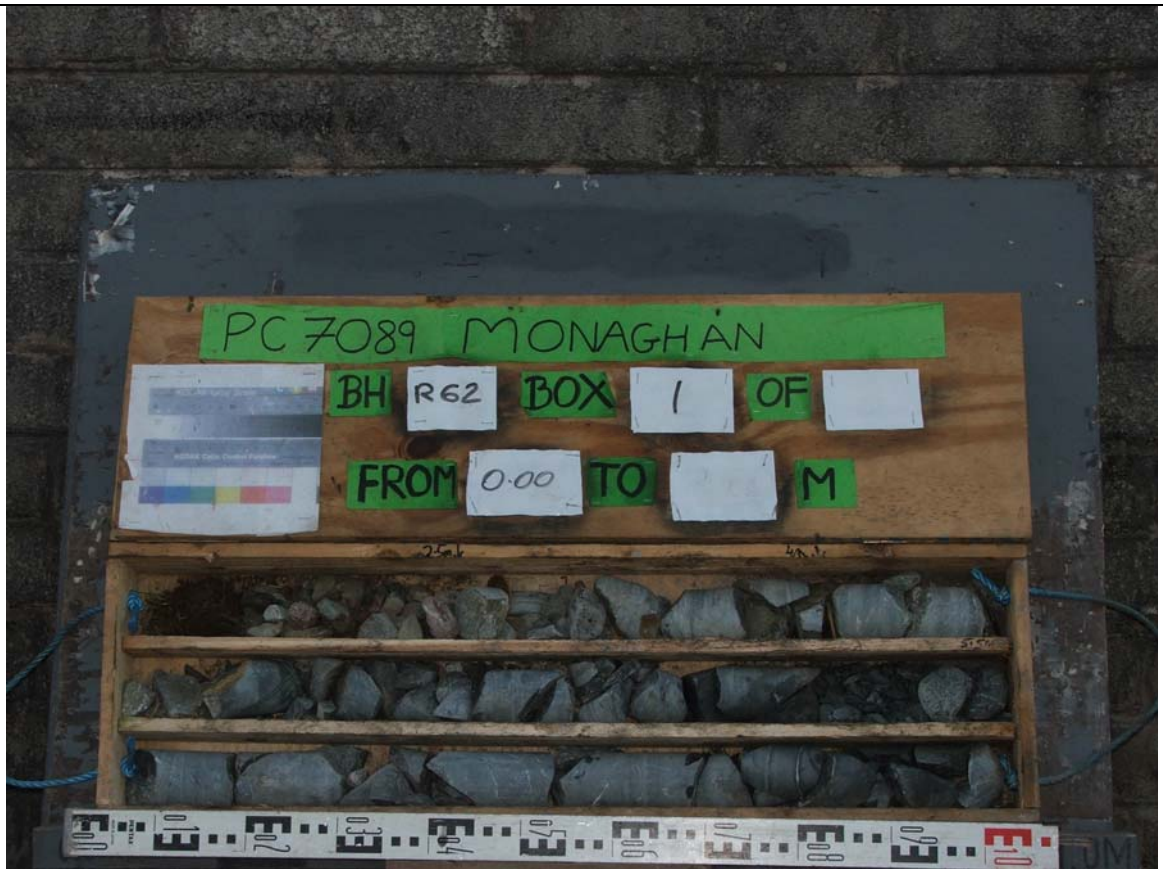




Rotary Borehole Number:	**BHR61**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out for	T. J. O'Connor & Associates, Consulting Engineers

Rotary Core Photographic Record

Priority Geotechnical Limited





Rotary Borehole Number:	**BHR62**	**Project**	Monaghan Town Collection Network	
		Project No	PC7089	
		Carried Out for	T. J. O'Connor & Associates, Consulting Engineers	

Rotary Core Photographic Record

Priority Geotechnical Limited





Rotary Borehole Number:	**BHR63**	**Project**	Monaghan Town Collection Network	
		Project No	PC7089	
		Carried Out for	T. J. O'Connor & Associates, Consulting Engineers	

Rotary Core Photographic Record

Priority Geotechnical Limited





Rotary Borehole Number:	**BHR64**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out for	T. J. O'Connor & Associates, Consulting Engineers

Trial Pit Photographic Record

Priority Geotechnical Limited





Trial Pit Number:	**TP05**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out	T. J. O'Connor & Associates, Consulting Engineers

Trial Pit Photographic Record

Priority Geotechnical Limited





Trial Pit Number:	**TP06**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out	T. J. O'Connor & Associates, Consulting Engineers

Trial Pit Photographic Record

Priority Geotechnical Limited





Trial Pit Number:	**TP07**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out	T. J. O'Connor & Associates, Consulting Engineers

Trial Pit Photographic Record

Priority Geotechnical Limited





Trial Pit Number:	**TP08**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out	T. J. O'Connor & Associates, Consulting Engineers

Trial Pit Photographic Record

Priority Geotechnical Limited

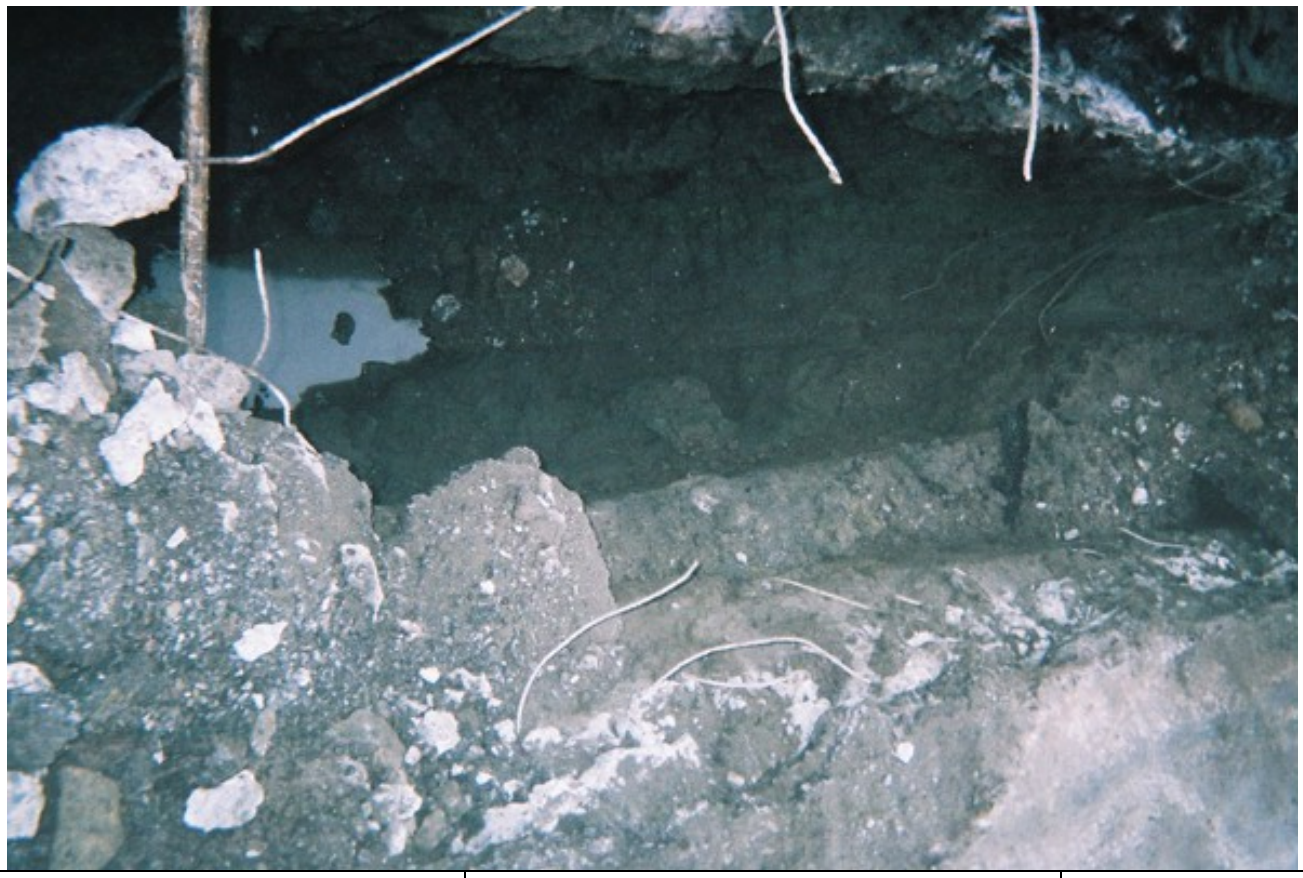


Trial Pit Number: **TP08**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Trial Pit Photographic Record

Priority Geotechnical Limited





Trial Pit Number:	**TP08A**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out	T. J. O'Connor & Associates, Consulting Engineers

Trial Pit Photographic Record

Priority Geotechnical Limited





Trial Pit Number: **TP15**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Trial Pit Photographic Record

Priority Geotechnical Limited



Trial Pit Number:	**TP15**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out	T. J. O'Connor & Associates, Consulting Engineers

Trial Pit Photographic Record

Priority Geotechnical Limited





Trial Pit Number:	**TP16**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out	T. J. O'Connor & Associates, Consulting Engineers

Trial Pit Photographic Record

Priority Geotechnical Limited





Trial Pit Number: **TP17**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Trial Pit Photographic Record

Priority Geotechnical Limited





Trial Pit Number:	**TP18**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out	T. J. O'Connor & Associates, Consulting Engineers

Trial Pit Photographic Record

Priority Geotechnical Limited



Trial Pit Number:	**TP18**	**Project** **Project No** **Carried Out**	Monaghan Town Collection Network PC7089 T. J. O'Connor & Associates, Consulting Engineers

Trial Pit Photographic Record

Priority Geotechnical Limited





Trial Pit Number: **TP19**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Trial Pit Photographic Record

Priority Geotechnical Limited



Trial Pit Number:	**TP19**	**Project** **Project No** **Carried Out**	Monaghan Town Collection Network PC7089 T. J. O'Connor & Associates, Consulting Engineers

Trial Pit Photographic Record

Priority Geotechnical Limited





Trial Pit Number:	**TP20**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out	T. J. O'Connor & Associates, Consulting Engineers

Trial Pit Photographic Record

Priority Geotechnical Limited



Trial Pit Number:	**TP20**	**Project** **Project No** **Carried Out**	Monaghan Town Collection Network PC7089 T. J. O'Connor & Associates, Consulting Engineers

Trial Pit Photographic Record

Priority Geotechnical Limited





Trial Pit Number: **TP21**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Trial Pit Photographic Record

Priority Geotechnical Limited





Trial Pit Number: **TP22**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Trial Pit Photographic Record

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Trial Pit Number:	**TP23**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out	T. J. O'Connor & Associates, Consulting Engineers

Trial Pit Photographic Record

Priority Geotechnical Limited





Trial Pit Number:	**TP23**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out	T. J. O'Connor & Associates, Consulting Engineers

Trial Pit Photographic Record

Priority Geotechnical Limited





Trial Pit Number: **TP24**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Trial Pit Photographic Record

Priority Geotechnical Limited





Trial Pit Number: **TP25**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Trial Pit Photographic Record

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Trial Pit Number: **TP25**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Trial Pit Photographic Record

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Trial Pit Number: **TP25**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Trial Pit Photographic Record

Priority Geotechnical Limited





Trial Pit Number: **TP26**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Trial Pit Photographic Record

Priority Geotechnical Limited



Trial Pit Number:	**TP26**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out	T. J. O'Connor & Associates, Consulting Engineers

Trial Pit Photographic Record

Priority Geotechnical Limited





Trial Pit Number: **TP27**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Trial Pit Photographic Record

Priority Geotechnical Limited





Trial Pit Number: **TP28**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Trial Pit Photographic Record

Priority Geotechnical Limited



Trial Pit Number:	**TP28**	**Project** **Project No** **Carried Out**	Monaghan Town Collection Network PC7089 T. J. O'Connor & Associates, Consulting Engineers

Trial Pit Photographic Record

Priority Geotechnical Limited





Trial Pit Number:	**TP29**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out	T. J. O'Connor & Associates, Consulting Engineers

Trial Pit Photographic Record

Priority Geotechnical Limited



Trial Pit Number: **TP**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Trial Pit Photographic Record

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Trial Pit Number: **TP29A**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Trial Pit Photographic Record

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Trial Pit Number:	**TP29A**	**Project** **Project No** **Carried Out**	Monaghan Town Collection Network PC7089 T. J. O'Connor & Associates, Consulting Engineers

Trial Pit Photographic Record

Priority Geotechnical Limited





Trial Pit Number:	**TP30**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out	T. J. O'Connor & Associates, Consulting Engineers

Trial Pit Photographic Record

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Trial Pit Number: **TP31**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Trial Pit Photographic Record

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Trial Pit Number: **TP32**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Trial Pit Photographic Record

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Trial Pit Number: **TP33**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Trial Pit Photographic Record

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Trial Pit Number: **TP34**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Trial Pit Photographic Record

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Trial Pit Number: **TP35**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Trial Pit Photographic Record

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Trial Pit Number:	**TP36**	**Project** **Project No** **Carried Out**	Monaghan Town Collection Network PC7089 T. J. O'Connor & Associates, Consulting Engineers

Trial Pit Photographic Record

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Trial Pit Number:	**TP36**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out	T. J. O'Connor & Associates, Consulting Engineers

Trial Pit Photographic Record

Priority Geotechnical Limited





Trial Pit Number: TP37	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Trial Pit Photographic Record

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Trial Pit Number:	**TP37A**	**Project** **Project No** **Carried Out**	Monaghan Town Collection Network PC7089 T. J. O'Connor & Associates, Consulting Engineers

Trial Pit Photographic Record

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Trial Pit Number: **TP38**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Trial Pit Photographic Record

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Trial Pit Number:	**TP38**	**Project** **Project No** **Carried Out**	Monaghan Town Collection Network PC7089 T. J. O'Connor & Associates, Consulting Engineers

Trial Pit Photographic Record

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Trial Pit Number:	**TP39**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out	T. J. O'Connor & Associates, Consulting Engineers

Trial Pit Photographic Record

Priority Geotechnical Limited



Trial Pit Number:	**TP39**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out	T. J. O'Connor & Associates, Consulting Engineers

Trial Pit Photographic Record

Priority Geotechnical Limited





Trial Pit Number:	**TP40**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out	T. J. O'Connor & Associates, Consulting Engineers

Trial Pit Photographic Record

Priority Geotechnical Limited



Trial Pit Number:	**TP40**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out	T. J. O'Connor & Associates, Consulting Engineers

Trial Pit Photographic Record

Priority Geotechnical Limited





Trial Pit Number: **TP43**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Trial Pit Photographic Record

Priority Geotechnical Limited



Trial Pit Number:	**TP43**	**Project** **Project No** **Carried Out**	Monaghan Town Collection Network PC7089 T. J. O'Connor & Associates, Consulting Engineers

Trial Pit Photographic Record

Priority Geotechnical Limited





Trial Pit Number:	**TP44**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out	T. J. O'Connor & Associates, Consulting Engineers

Trial Pit Photographic Record

Priority Geotechnical Limited





Trial Pit Number: **TP44**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Trial Pit Photographic Record

Priority Geotechnical Limited





Trial Pit Number: **TP45**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Trial Pit Photographic Record

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Trial Pit Number:	**TP45A**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out	T. J. O'Connor & Associates, Consulting Engineers

Trial Pit Photographic Record

Priority Geotechnical Limited





Trial Pit Number:	**TP50A**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out	T. J. O'Connor & Associates, Consulting Engineers

Trial Pit Photographic Record

Priority Geotechnical Limited





Trial Pit Number:	**TP55**	**Project** **Project No** **Carried Out**	Monaghan Town Collection Network PC7089 T. J. O'Connor & Associates, Consulting Engineers

Trial Pit Photographic Record

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Trial Pit Number:	**TP55**	**Project**	Monaghan Town Collection Network	
		Project No	PC7089	
		Carried Out	T. J. O'Connor & Associates, Consulting Engineers	

Trial Pit Photographic Record

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Trial Pit Number:	**TP57**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out	T. J. O'Connor & Associates, Consulting Engineers

Trial Pit Photographic Record

Priority Geotechnical Limited



Trial Pit Number:	**TP57**	**Project** **Project No** **Carried Out**	Monaghan Town Collection Network PC7089 T. J. O'Connor & Associates, Consulting Engineers

Trial Pit Photographic Record

Priority Geotechnical Limited





Trial Pit Number: **TP58**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Trial Pit Photographic Record

Priority Geotechnical Limited





Trial Pit Number: **TP59**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Trial Pit Photographic Record

Priority Geotechnical Limited



Trial Pit Number:	**TP59**	**Project** **Project No** **Carried Out**	Monaghan Town Collection Network PC7089 T. J. O'Connor & Associates, Consulting Engineers

Trial Pit Photographic Record

Priority Geotechnical Limited





Trial Pit Number:	**TP60**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out	T. J. O'Connor & Associates, Consulting Engineers

Trial Pit Photographic Record

Priority Geotechnical Limited



Trial Pit Number:	**TP60**	**Project** **Project No** **Carried Out**	Monaghan Town Collection Network PC7089 T. J. O'Connor & Associates, Consulting Engineers

Trial Pit Photographic Record

Priority Geotechnical Limited





Trial Pit Number:	**TP65**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out	T. J. O'Connor & Associates, Consulting Engineers

Trial Pit Photographic Record

Priority Geotechnical Limited





Trial Pit Number:	**TP65**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out	T. J. O'Connor & Associates, Consulting Engineers

Trial Pit Photographic Record

Priority Geotechnical Limited





Trial Pit Number:	**TP66**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out	T. J. O'Connor & Associates, Consulting Engineers

Trial Pit Photographic Record

Priority Geotechnical Limited

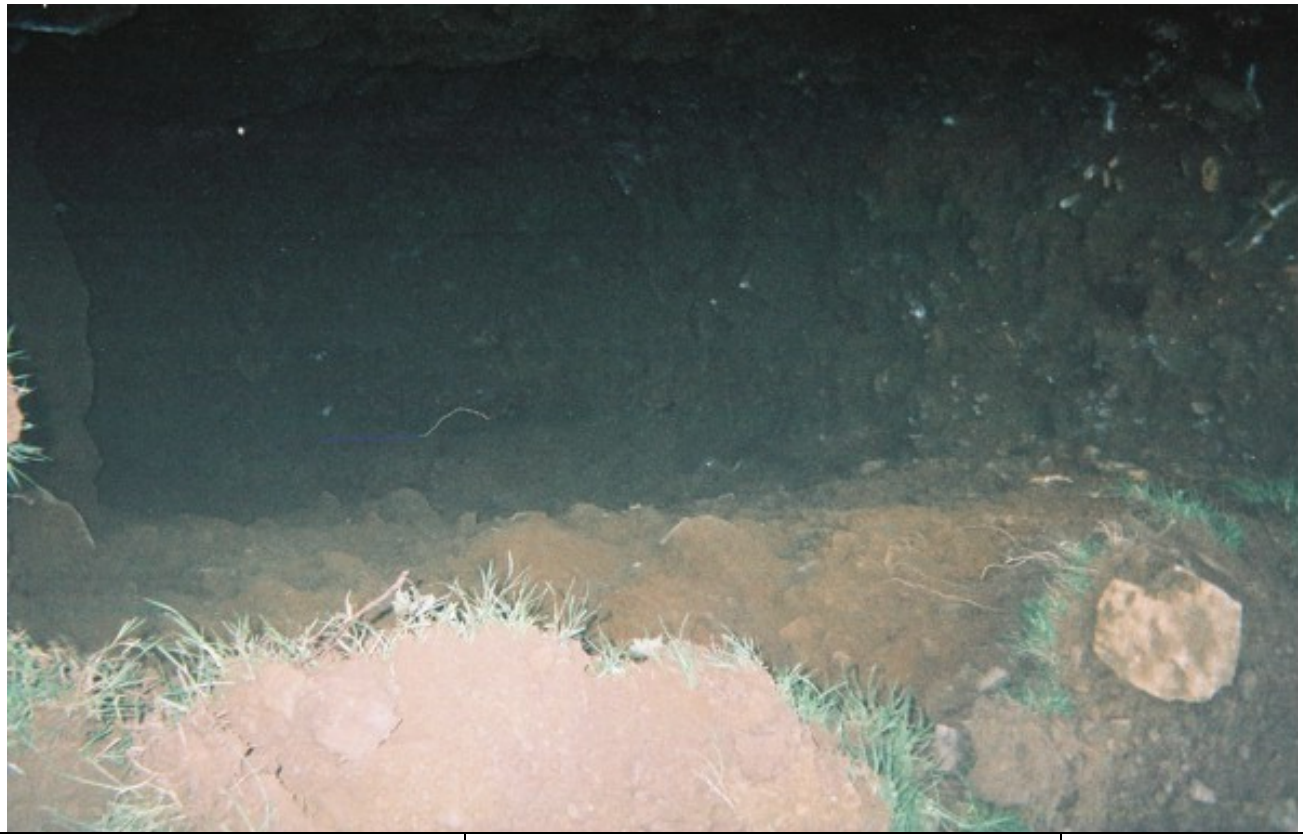


Trial Pit Number: **TP66**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Trial Pit Photographic Record

Priority Geotechnical Limited





Trial Pit Number:	**TP68**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out	T. J. O'Connor & Associates, Consulting Engineers

Trial Pit Photographic Record

Priority Geotechnical Limited



Trial Pit Number:	**TP68**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out	T. J. O'Connor & Associates, Consulting Engineers

Trial Pit Photographic Record

Priority Geotechnical Limited





Trial Pit Number:	**TP69**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out	T. J. O'Connor & Associates, Consulting Engineers

Trial Pit Photographic Record

Priority Geotechnical Limited



Trial Pit Number:	**TP69**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out	T. J. O'Connor & Associates, Consulting Engineers

Trial Pit Photographic Record

Priority Geotechnical Limited





Trial Pit Number: **TP73**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Trial Pit Photographic Record

Priority Geotechnical Limited



Trial Pit Number:	**TP73**	**Project** **Project No** **Carried Out**	Monaghan Town Collection Network PC7089 T. J. O'Connor & Associates, Consulting Engineers

Trial Pit Photographic Record

Priority Geotechnical Limited





Trial Pit Number: **TP74**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Trial Pit Photographic Record

Priority Geotechnical Limited



Trial Pit Number:	**TP74**	**Project** **Project No** **Carried Out**	Monaghan Town Collection Network PC7089 T. J. O'Connor & Associates, Consulting Engineers

Trial Pit Photographic Record

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Trial Pit Number: **TP75**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Trial Pit Photographic Record

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Trial Pit Number: **TP76**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Trial Pit Photographic Record

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Trial Pit Number: **TP77**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Trial Pit Photographic Record

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Trial Pit Number: **TP78**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Trial Pit Photographic Record

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Trial Pit Number:	**TP113**	**Project** **Project No** **Carried Out**	Monaghan Town Collection Network PC7089 T. J. O'Connor & Associates, Consulting Engineers

Trial Pit Photographic Record

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Trial Pit Number:	**TP114**	**Project** **Project No** **Carried Out**	Monaghan Town Collection Network PC7089 T. J. O'Connor & Associates, Consulting Engineers

Trial Pit Photographic Record

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Trial Pit Number: TP115	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Trial Pit Photographic Record

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Trial Pit Number:	**TP116**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out	T. J. O'Connor & Associates, Consulting Engineers

Trial Pit Photographic Record

Priority Geotechnical Limited





Trial Pit Number: **TP134**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Trial Pit Photographic Record

Priority Geotechnical Limited





Trial Pit Number:	**TP135**	**Project** **Project No** **Carried Out**	Monaghan Town Collection Network PC7089 T. J. O'Connor & Associates, Consulting Engineers

Trial Pit Photographic Record

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Trial Pit Number:	**TP135**	**Project** **Project No** **Carried Out**	Monaghan Town Collection Network PC7089 T. J. O'Connor & Associates, Consulting Engineers

Trial Pit Photographic Record

Priority Geotechnical Limited





Trial Pit Number:	**TP136**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out	T. J. O'Connor & Associates, Consulting Engineers

Trial Pit Photographic Record

Priority Geotechnical Limited



Trial Pit Number: **TP136**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Trial Pit Photographic Record

Priority Geotechnical Limited





Trial Pit Number: **TP137**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Trial Pit Photographic Record

Priority Geotechnical Limited





Trial Pit Number:	**TP138**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out	T. J. O'Connor & Associates, Consulting Engineers

Trial Pit Photographic Record

Priority Geotechnical Limited





Trial Pit Number:	**TP139**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out	T. J. O'Connor & Associates, Consulting Engineers

Trial Pit Photographic Record

Priority Geotechnical Limited





Trial Pit Number:	**TP140**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out	T. J. O'Connor & Associates, Consulting Engineers

Trial Pit Photographic Record

Priority Geotechnical Limited





Trial Pit Number:	**TP141**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out	T. J. O'Connor & Associates, Consulting Engineers

Trial Pit Photographic Record

Priority Geotechnical Limited





Trial Pit Number:	**TP141**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out	T. J. O'Connor & Associates, Consulting Engineers

Trial Pit Photographic Record

Priority Geotechnical Limited





Trial Pit Number:	**TP142**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out	T. J. O'Connor & Associates, Consulting Engineers

Trial Pit Photographic Record

Priority Geotechnical Limited





Trial Pit Number:	**TP142**	**Project** **Project No** **Carried Out**	Monaghan Town Collection Network PC7089 T. J. O'Connor & Associates, Consulting Engineers

Trial Pit Photographic Record

Priority Geotechnical Limited





Trial Pit Number:	**TP143**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out	T. J. O'Connor & Associates, Consulting Engineers

Trial Pit Photographic Record

Priority Geotechnical Limited



Trial Pit Number:	**TP143**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out	T. J. O'Connor & Associates, Consulting Engineers

Trial Pit Photographic Record

Priority Geotechnical Limited





Trial Pit Number:	**TP144**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out	T. J. O'Connor & Associates, Consulting Engineers

Trial Pit Photographic Record

Priority Geotechnical Limited



Trial Pit Number:	**TP144**	**Project** **Project No** **Carried Out**	Monaghan Town Collection Network PC7089 T. J. O'Connor & Associates, Consulting Engineers

Trial Pit Photographic Record

Priority Geotechnical Limited

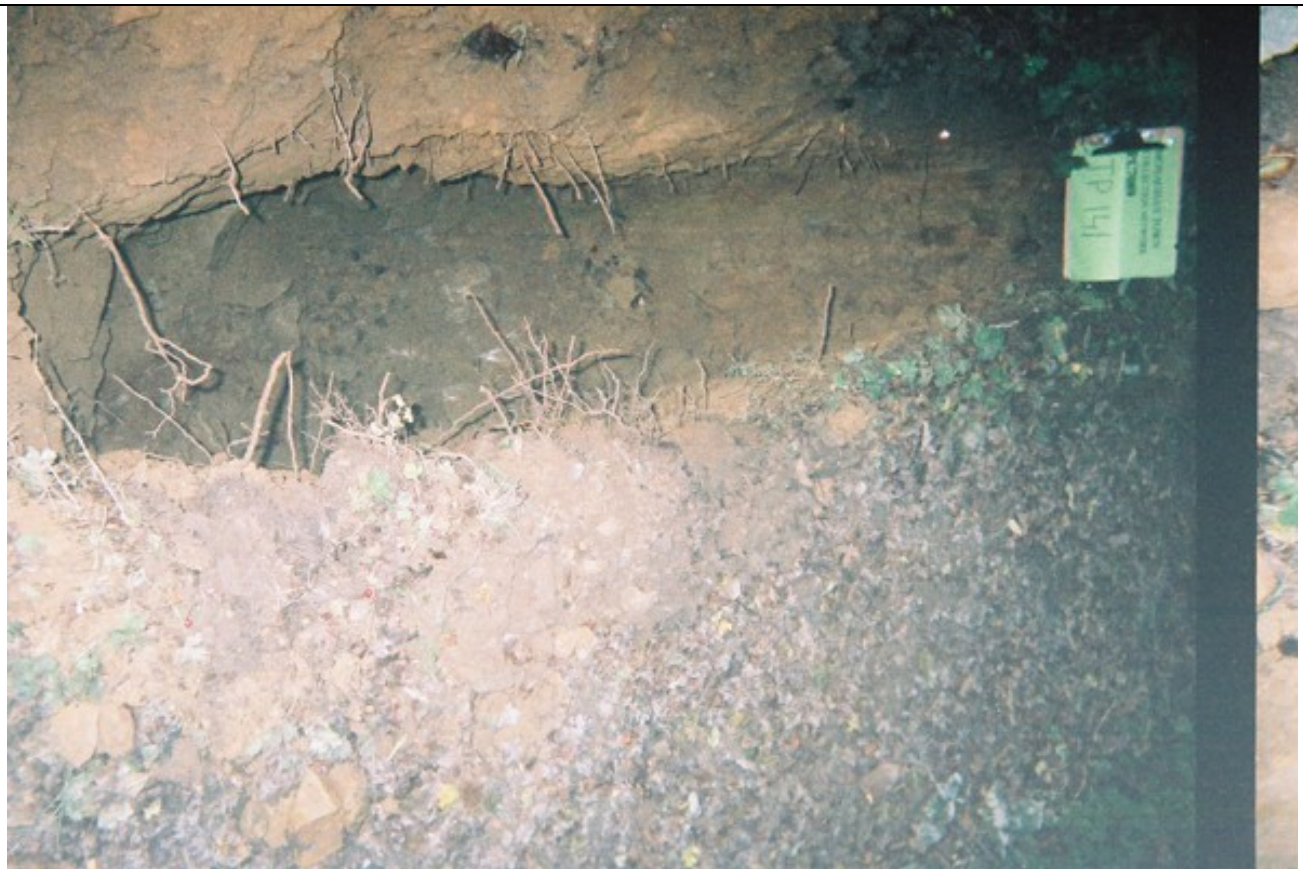




Trial Pit Number: **TP145**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Trial Pit Photographic Record

Priority Geotechnical Limited





Trial Pit Number:	**TP147**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out	T. J. O'Connor & Associates, Consulting Engineers

Trial Pit Photographic Record

Priority Geotechnical Limited



Trial Pit Number: **TP147**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Trial Pit Photographic Record

Priority Geotechnical Limited





Trial Pit Number: **TP148**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Trial Pit Photographic Record

Priority Geotechnical Limited





Trial Pit Number:	**TP149**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out	T. J. O'Connor & Associates, Consulting Engineers

Trial Pit Photographic Record

Priority Geotechnical Limited





Trial Pit Number: **TP150**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Trial Pit Photographic Record

Priority Geotechnical Limited





Trial Pit Number:	**TP158**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out	T. J. O'Connor & Associates, Consulting Engineers

Trial Pit Photographic Record

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Trial Pit Number:	**TP159**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out	T. J. O'Connor & Associates, Consulting Engineers

Trial Pit Photographic Record

Priority Geotechnical Limited



Trial Pit Number: **TP161**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Trial Pit Photographic Record

Priority Geotechnical Limited





Trial Pit Number:	**TP162**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out	T. J. O'Connor & Associates, Consulting Engineers

Trial Pit Photographic Record

Priority Geotechnical Limited



Trial Pit Number:	**TP162**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out	T. J. O'Connor & Associates, Consulting Engineers

Trial Pit Photographic Record

Priority Geotechnical Limited





Trial Pit Number:	**TP163**	**Project**	Monaghan Town Collection Network	
		Project No	PC7089	
		Carried Out	T. J. O'Connor & Associates, Consulting Engineers	

Trial Pit Photographic Record

Priority Geotechnical Limited





Trial Pit Number:	**TP164**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out	T. J. O'Connor & Associates, Consulting Engineers

Trial Pit Photographic Record

Priority Geotechnical Limited





Trial Pit Number:	**TP165**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out	T. J. O'Connor & Associates, Consulting Engineers

Trial Pit Photographic Record

Priority Geotechnical Limited





Trial Pit Number:	**TP166**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out	T. J. O'Connor & Associates, Consulting Engineers

Trial Pit Photographic Record

Priority Geotechnical Limited



Trial Pit Number:	**TP166**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out	T. J. O'Connor & Associates, Consulting Engineers

Trial Pit Photographic Record

Priority Geotechnical Limited





Trial Pit Number:	**TP167**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out	T. J. O'Connor & Associates, Consulting Engineers

Trial Pit Photographic Record

Priority Geotechnical Limited





Trial Pit Number:	**TP167**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out	T. J. O'Connor & Associates, Consulting Engineers

Trial Pit Photographic Record

Priority Geotechnical Limited





Trial Pit Number:	**TP168**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out	T. J. O'Connor & Associates, Consulting Engineers

Trial Pit Photographic Record

Priority Geotechnical Limited





Trial Pit Number:	**TP168**	**Project**	Monaghan Town Collection Network	
		Project No	PC7089	
		Carried Out	T. J. O'Connor & Associates, Consulting Engineers	

Trial Pit Photographic Record

Priority Geotechnical Limited





Trial Pit Number:	**TP171**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out	T. J. O'Connor & Associates, Consulting Engineers

Trial Pit Photographic Record

Priority Geotechnical Limited



Trial Pit Number: **TP171**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Trial Pit Photographic Record

Priority Geotechnical Limited





Trial Pit Number: **TP172**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Trial Pit Photographic Record

Priority Geotechnical Limited



Trial Pit Number: **TP172**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Trial Pit Photographic Record

Priority Geotechnical Limited



Trial Pit Number: **TP173**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Trial Pit Photographic Record

Priority Geotechnical Limited





Trial Pit Number:	**TP179**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out	T. J. O'Connor & Associates, Consulting Engineers

Trial Pit Photographic Record

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Trial Pit Number: **TP179**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Trial Pit Photographic Record

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Trial Pit Number:	**TP180**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out	T. J. O'Connor & Associates, Consulting Engineers

Trial Pit Photographic Record

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Trial Pit Number: **TP180**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Trial Pit Photographic Record

Priority Geotechnical Limited





Trial Pit Number:	**TP181**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out	T. J. O'Connor & Associates, Consulting Engineers

Trial Pit Photographic Record

Priority Geotechnical Limited





Trial Pit Number:	**TP182**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out	T. J. O'Connor & Associates, Consulting Engineers

Trial Pit Photographic Record

Priority Geotechnical Limited





Trial Pit Number:	**TP182**	**Project**	Monaghan Town Collection Network
		Project No	PC7089
		Carried Out	T. J. O'Connor & Associates, Consulting Engineers

Trial Pit Photographic Record

Priority Geotechnical Limited



Trial Pit Number: **TP186**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Trial Pit Photographic Record

Priority Geotechnical Limited





Trial Pit Number: **TP187**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Trial Pit Photographic Record

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Trial Pit Number: **TP187**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Trial Pit Photographic Record

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Trial Pit Number: **TP188**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Trial Pit Photographic Record

Priority Geotechnical Limited





Trial Pit Number: **TP189**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Trial Pit Photographic Record

Priority Geotechnical Limited





Trial Pit Number: **TP184**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Slit Trench Photographic Record

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Slit Trench Number: **ST01A**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Slit Trench Photographic Record

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Slit Trench Number: **ST01A**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Slit Trench Photographic Record

Priority Geotechnical Limited





Slit Trench Number: **ST05**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Slit Trench Photographic Record

Priority Geotechnical Limited





Slit Trench Number: **ST05**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Slit Trench Photographic Record

Priority Geotechnical Limited





Slit Trench Number:	**ST05**	**Project** **Project No** **Carried Out**	Monaghan Town Collection Network PC7089 T. J. O'Connor & Associates, Consulting Engineers

Slit Trench Photographic Record

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Slit Trench Number: **ST05**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Slit Trench Photographic Record

Priority Geotechnical Limited





Slit Trench Number: **ST05**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Slit Trench Photographic Record

Priority Geotechnical Limited





Slit Trench Number: **ST06**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Slit Trench Photographic Record

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Slit Trench Number: **ST06**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Slit Trench Photographic Record

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Slit Trench Number: **ST06**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Slit Trench Photographic Record

Priority Geotechnical Limited





Slit Trench Number: **ST07**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Slit Trench Photographic Record

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Slit Trench Number: **ST08**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Slit Trench Photographic Record

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Slit Trench Number: **ST08**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Slit Trench Photographic Record

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Slit Trench Number: **ST08**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Slit Trench Photographic Record

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Slit Trench Number: **ST09**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Slit Trench Photographic Record

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Slit Trench Number: **ST09**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Slit Trench Photographic Record

Priority Geotechnical Limited



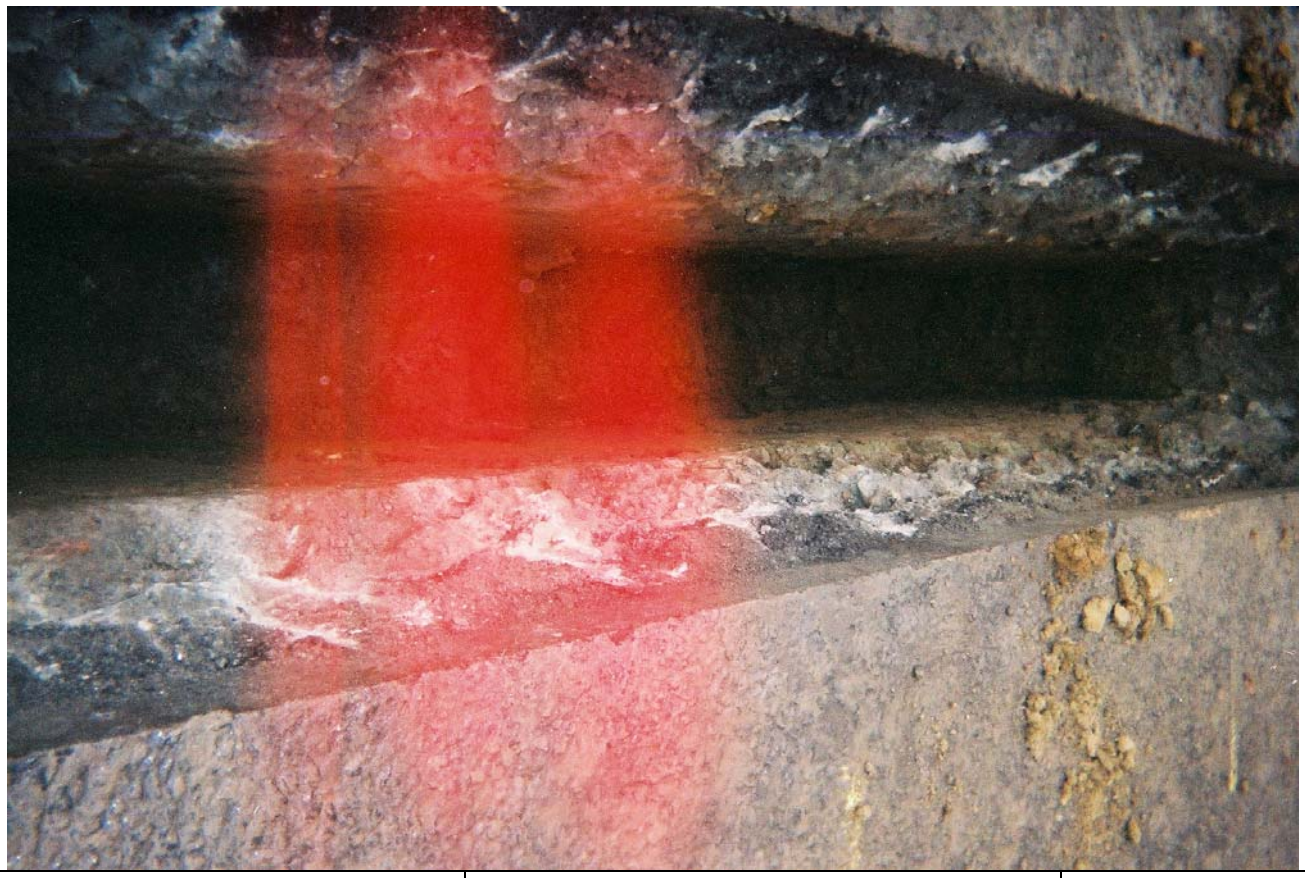


Slit Trench Number: **ST09**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Slit Trench Photographic Record

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Slit Trench Number: **ST09**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Slit Trench Photographic Record

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Slit Trench Number: **ST10**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Slit Trench Photographic Record

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Slit Trench Number: **ST10A**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Slit Trench Photographic Record

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Slit Trench Number: **ST10A**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Slit Trench Photographic Record

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Slit Trench Number: **ST12**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Slit Trench Photographic Record

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Slit Trench Number: **ST12**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Slit Trench Photographic Record

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Slit Trench Number: **ST12**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Slit Trench Photographic Record

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Slit Trench Number: **ST15**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Slit Trench Photographic Record

Priority Geotechnical Limited



Slit Trench Number: **ST15**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Slit Trench Photographic Record

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Slit Trench Number: **ST16**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Slit Trench Photographic Record

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Slit Trench Number: **ST16**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Slit Trench Photographic Record

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Slit Trench Number: **ST18**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Slit Trench Photographic Record

Priority Geotechnical Limited





Slit Trench Number: **ST18**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Slit Trench Photographic Record

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Slit Trench Number: **ST18**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Slit Trench Photographic Record

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Slit Trench Number: **ST20**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Slit Trench Photographic Record

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Slit Trench Number: **ST20**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Slit Trench Photographic Record

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Slit Trench Number: **ST20**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Slit Trench Photographic Record

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Slit Trench Number: **ST21**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Slit Trench Photographic Record

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Slit Trench Number: **ST21**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Slit Trench Photographic Record

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Slit Trench Number: **ST21**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

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Slit Trench Number: **ST21**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Slit Trench Photographic Record

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Slit Trench Number: **ST21**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Slit Trench Photographic Record

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Slit Trench Number: **ST22**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Slit Trench Photographic Record

Priority Geotechnical Limited





Slit Trench Number: **ST22**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Slit Trench Photographic Record

Priority Geotechnical Limited





Slit Trench Number: **ST22**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Slit Trench Photographic Record

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Slit Trench Number: **ST23**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Slit Trench Photographic Record

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Slit Trench Number: **ST23**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Slit Trench Photographic Record

Priority Geotechnical Limited





Slit Trench Number: **ST23**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

Slit Trench Photographic Record

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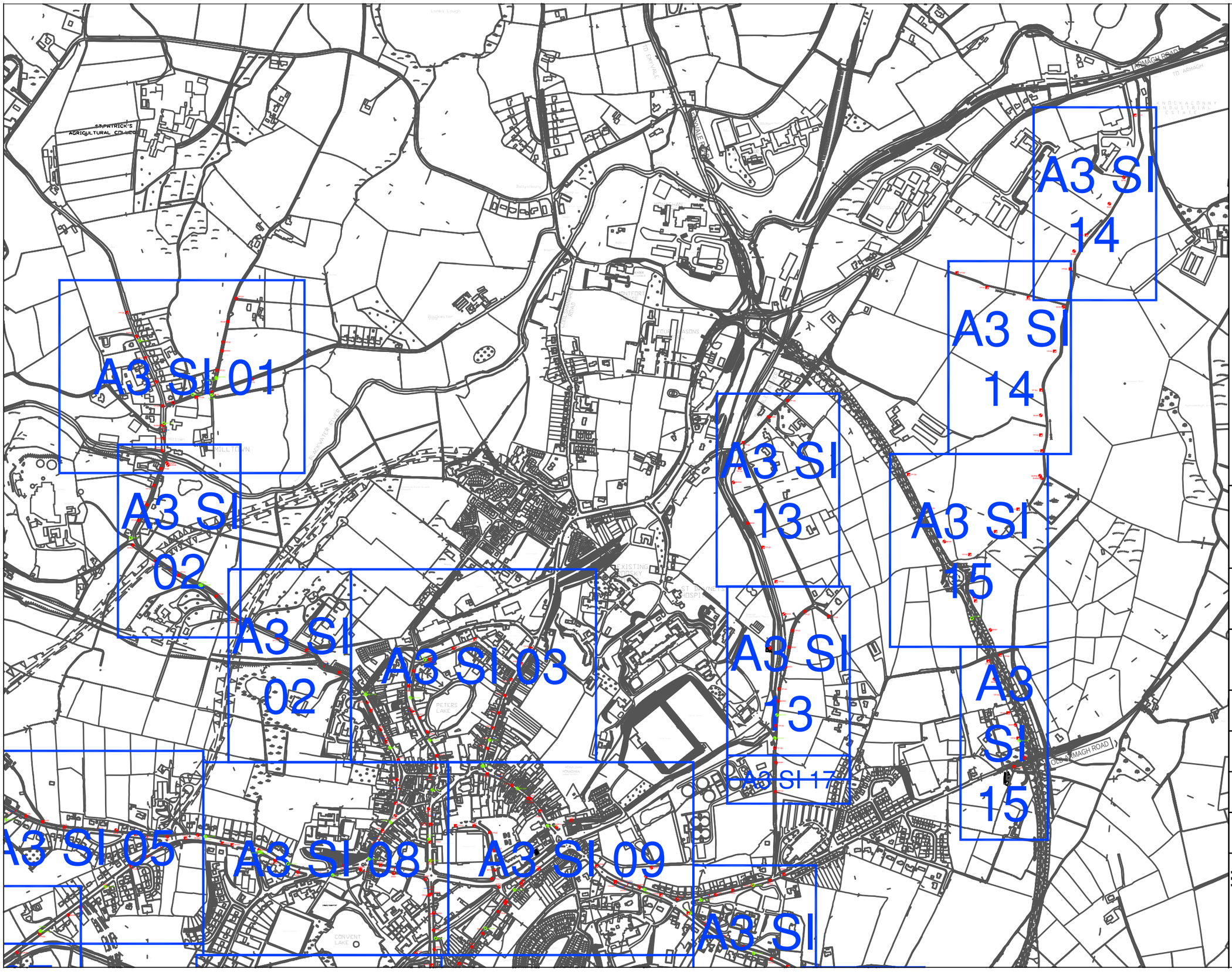


Slit Trench Number: **ST23**	**Project** Monaghan Town Collection Network **Project No** PC7089 **Carried Out** T. J. O'Connor & Associates, Consulting Engineers	

APPENDIX D

EXPLORATION LOCATION PLANS

Key to Exploration Location Plans	Key
Exploration Location Plans	PC7089-SI-A to PC7089-SI-C PC7089-SI-01 to PC7089-SI-18



JOB NAME:
MONAGHAN TOWN COLLECTION NETWORK

JOB NUMBER:
PC7089

DRAWING NUMBER:
PC7089–SI–A

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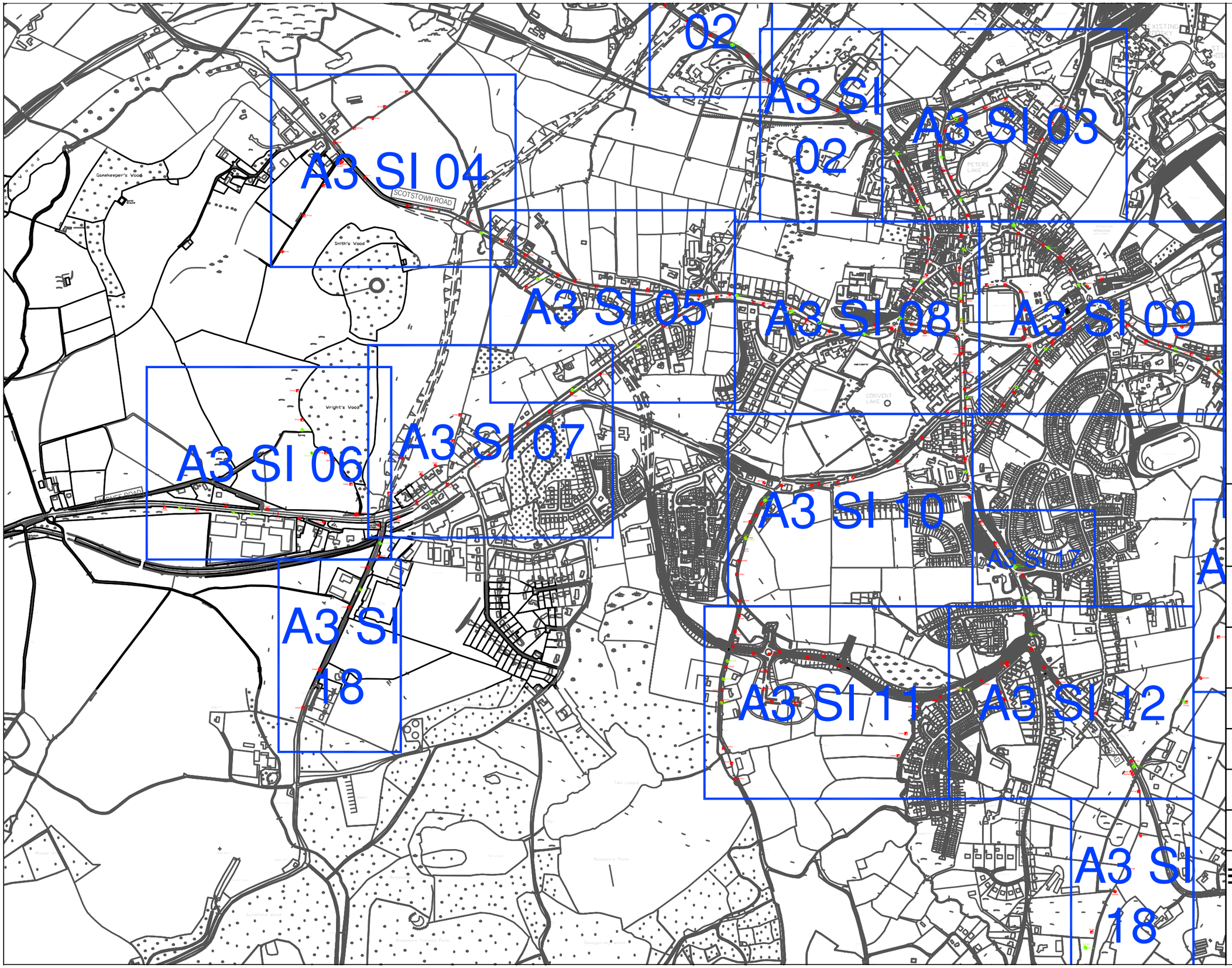
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REVISION:
F03

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JOB NAME:
MONAGHAN TOWN COLLECTION NETWORK

JOB NUMBER:
PC7089

DRAWING NUMBER:
PC7089–SI–B

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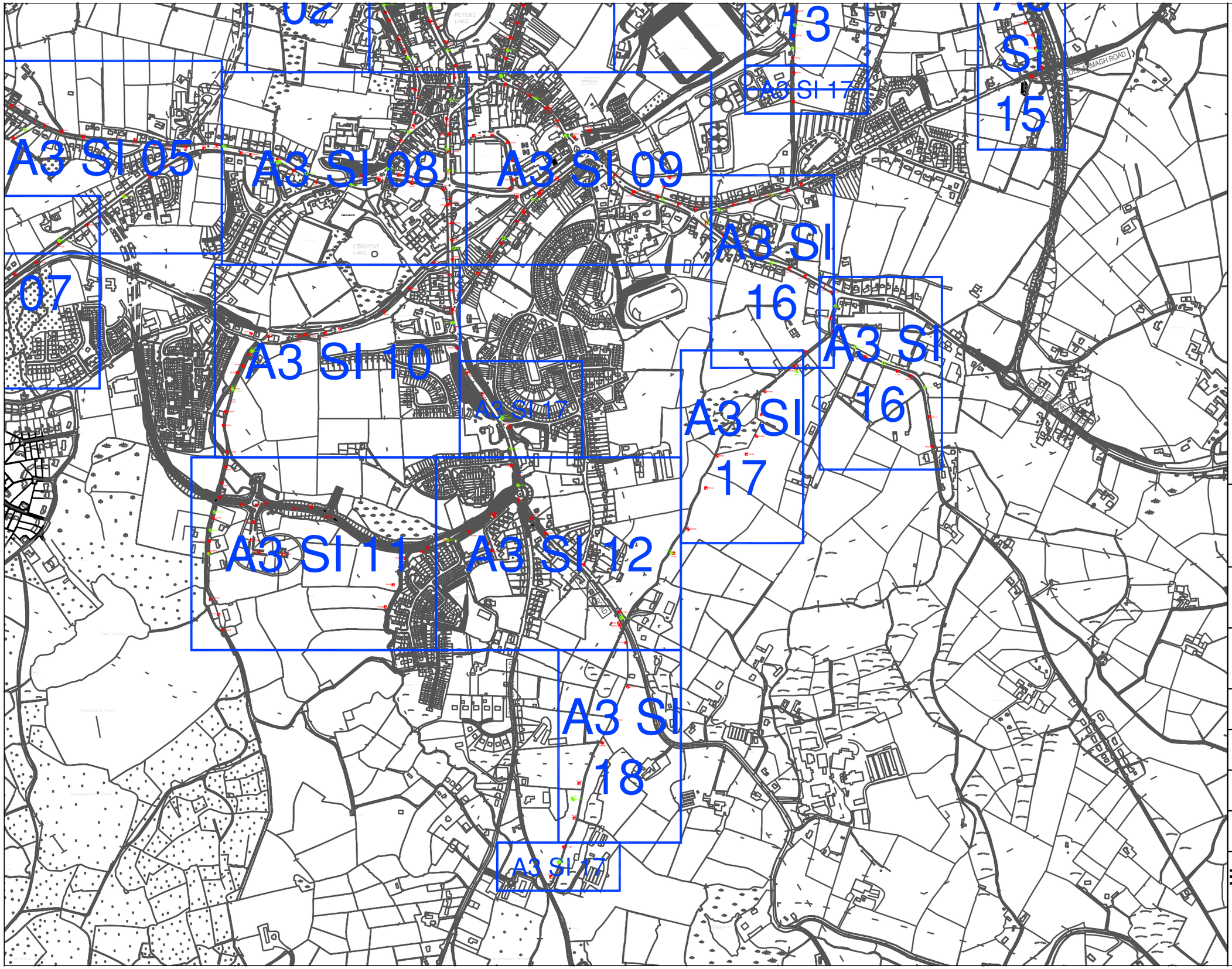
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REVISION:
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PRIORITY GEOTECHNICAL



JOB NAME:
MONAGHAN TOWN COLLECTION NETWORK

JOB NUMBER:
PC7089

DRAWING NUMBER:
PC7089–SI–C

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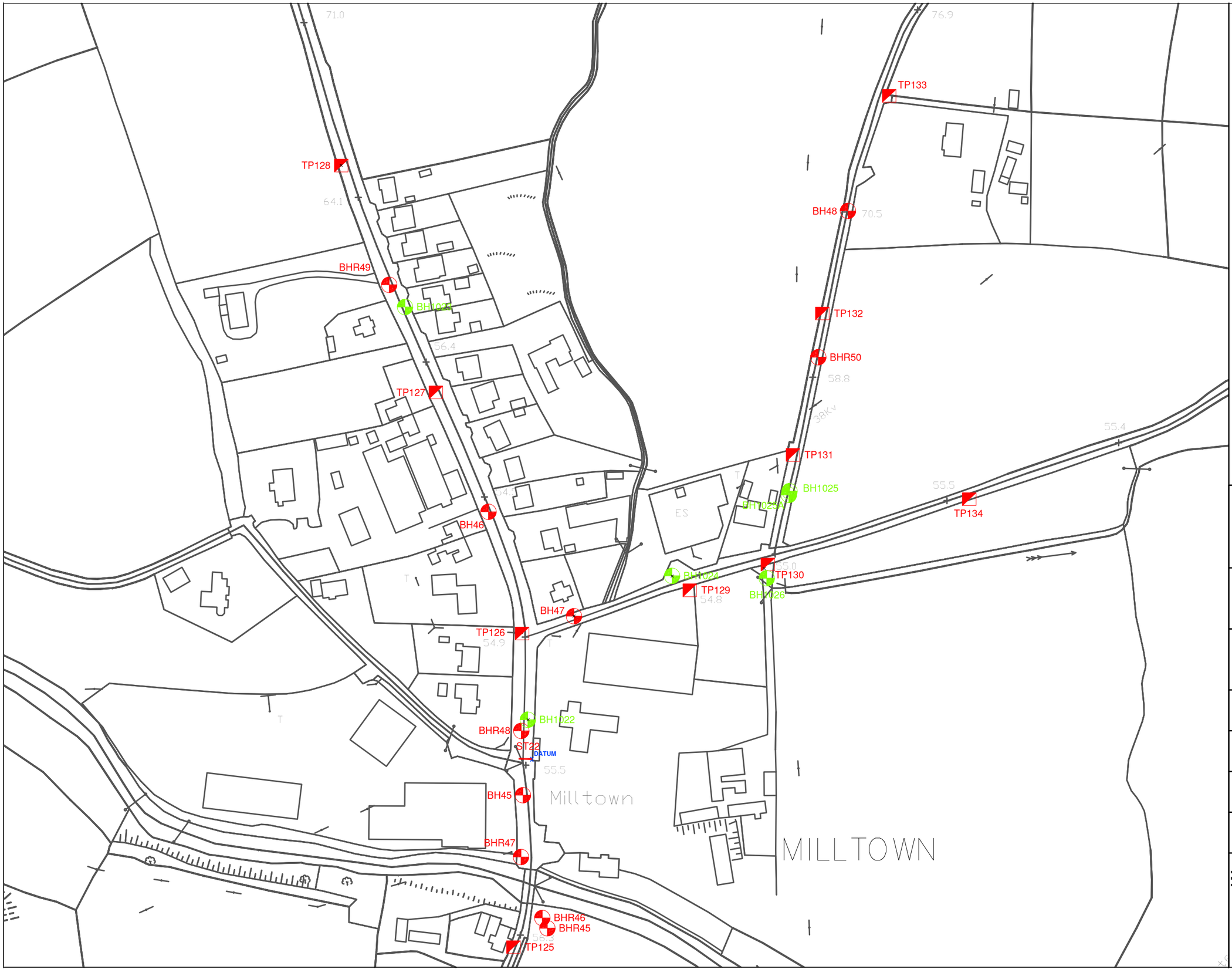
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REVISION:
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PRIORITY GEOTECHNICAL



JOB NAME:
MONAGHAN TOWN COLLECTION NETWORK

JOB NUMBER:
PC 7089

DRAWING NUMBER:
PC 7089–SI–01

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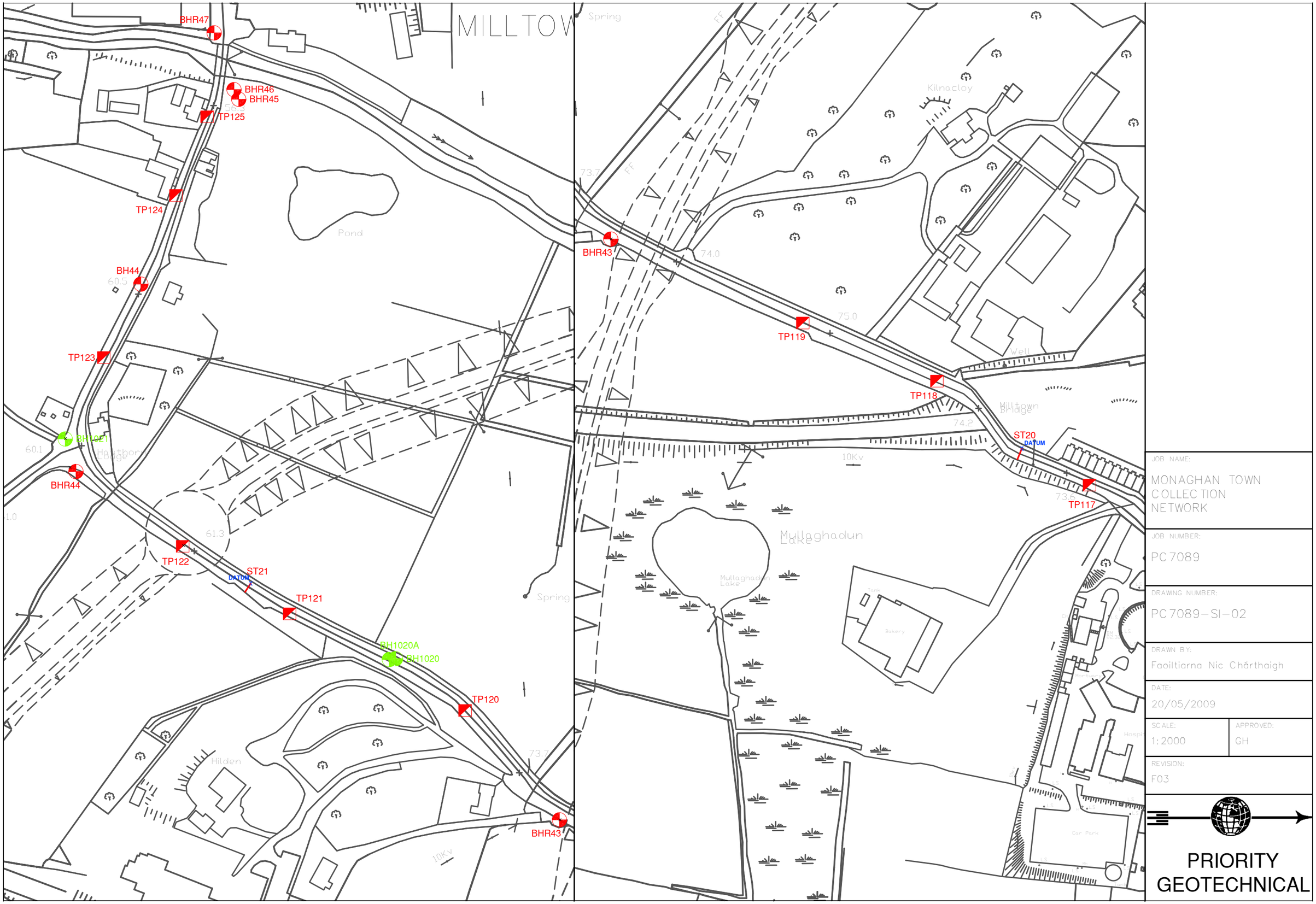
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PRIORITY GEOTECHNICAL



JOB NAME:
MONAGHAN TOWN COLLECTION NETWORK

JOB NUMBER:
PC7089

DRAWING NUMBER:
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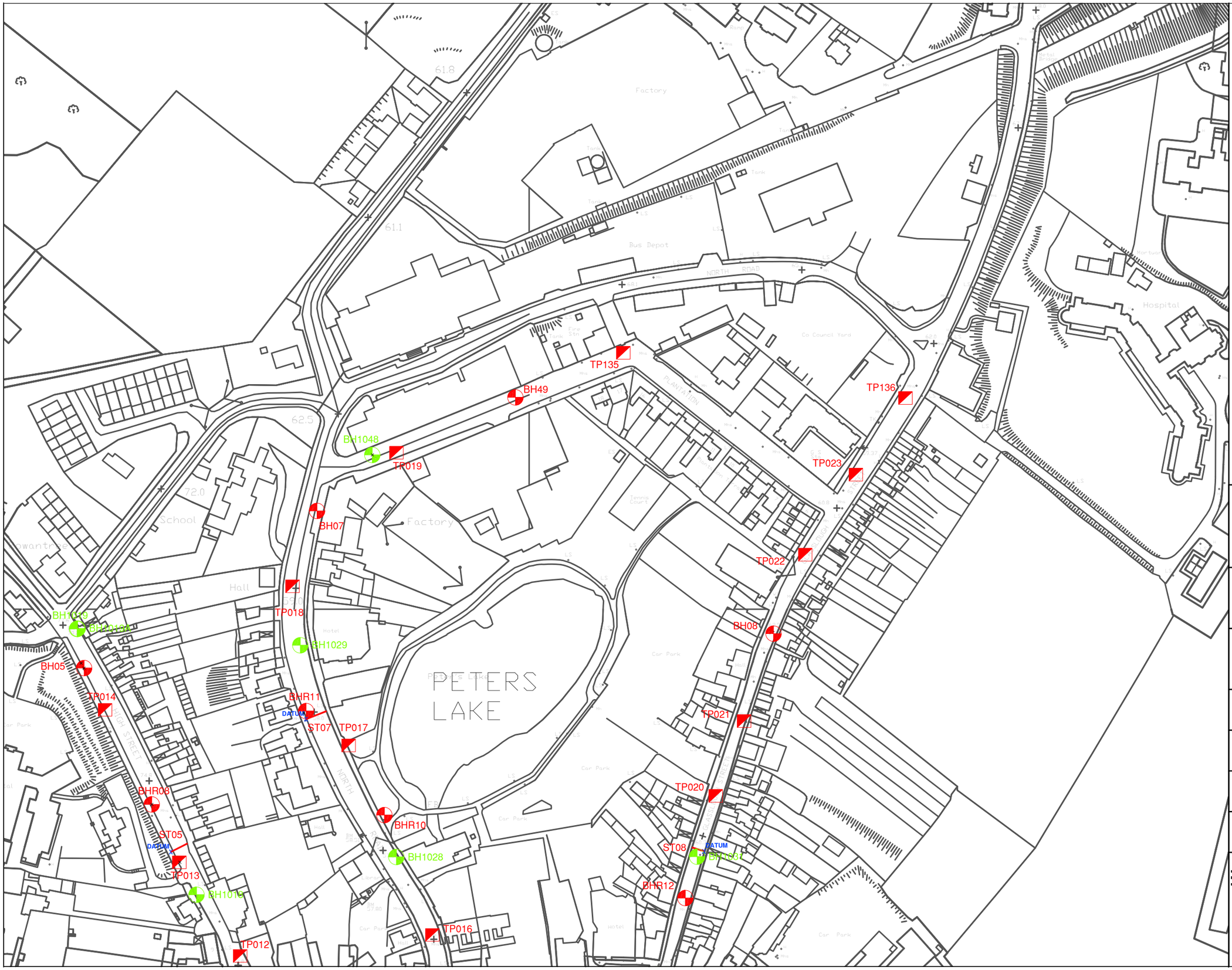
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GH

REVISION:
F03

PRIORITY GEOTECHNICAL



JOB NAME:
MONAGHAN TOWN COLLECTION NETWORK

JOB NUMBER:
PC7089

DRAWING NUMBER:
PC7089–SI–03

DRAWN BY:
Faoiltiarna Nic Chárthaigh

DATE:
20/05/2009

SCALE:
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GH

REVISION:
F03

PRIORITY GEOTECHNICAL

TP116
TP115
BH43
TP114
BH42
BHR42
BHR41
TP111
TP112
TP113
BH41
BH40
TP110
TP109
BHR39
BHR40
SCOTSTOWN ROAD
Smith's Wood
Well
38Kv
56.7
56.6
59.1
57.5
60.2
63.9
63.4
63.5
Pond

JOB NAME:
MONAGHAN TOWN
COLLECTION
NETWORK

JOB NUMBER:
PC7089

DRAWING NUMBER:
PC7089-SI-04

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APPROVED:
GH

REVISION:
F03

PRIORITY
GEOTECHNICAL

BHR40
TP108
ST19
DATUM
TP106
BH1015
BH39
TP107
TP105
TP104
BH38
TP103
DATUM
ST15.1
BH27
TP078
BHR34
ST15.2
DATUM
TP079
TP080
BH28
BH1005
TP081
BH29
BH1006
BH1006A
TP082

JOB NAME:
MONAGHAN TOWN COLLECTION NETWORK

JOB NUMBER:
PC7089

DRAWING NUMBER:
PC7089-SI-05

DRAWN BY:
Faoiltiarna Nic Chárthaigh

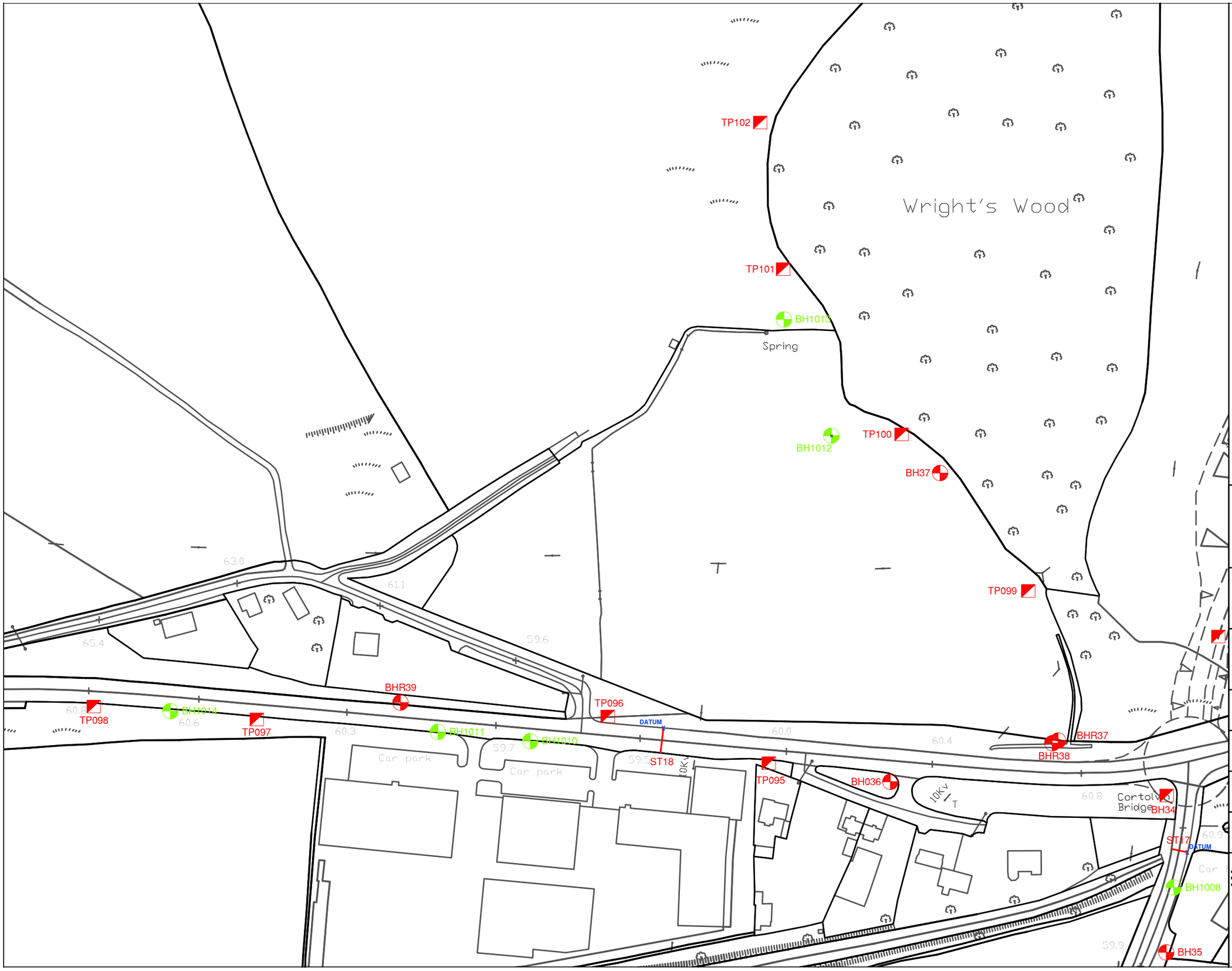
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JOB NAME:
MONAGHAN TOWN COLLECTION NETWORK

JOB NUMBER:
PC7089

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PC7089-SI-06

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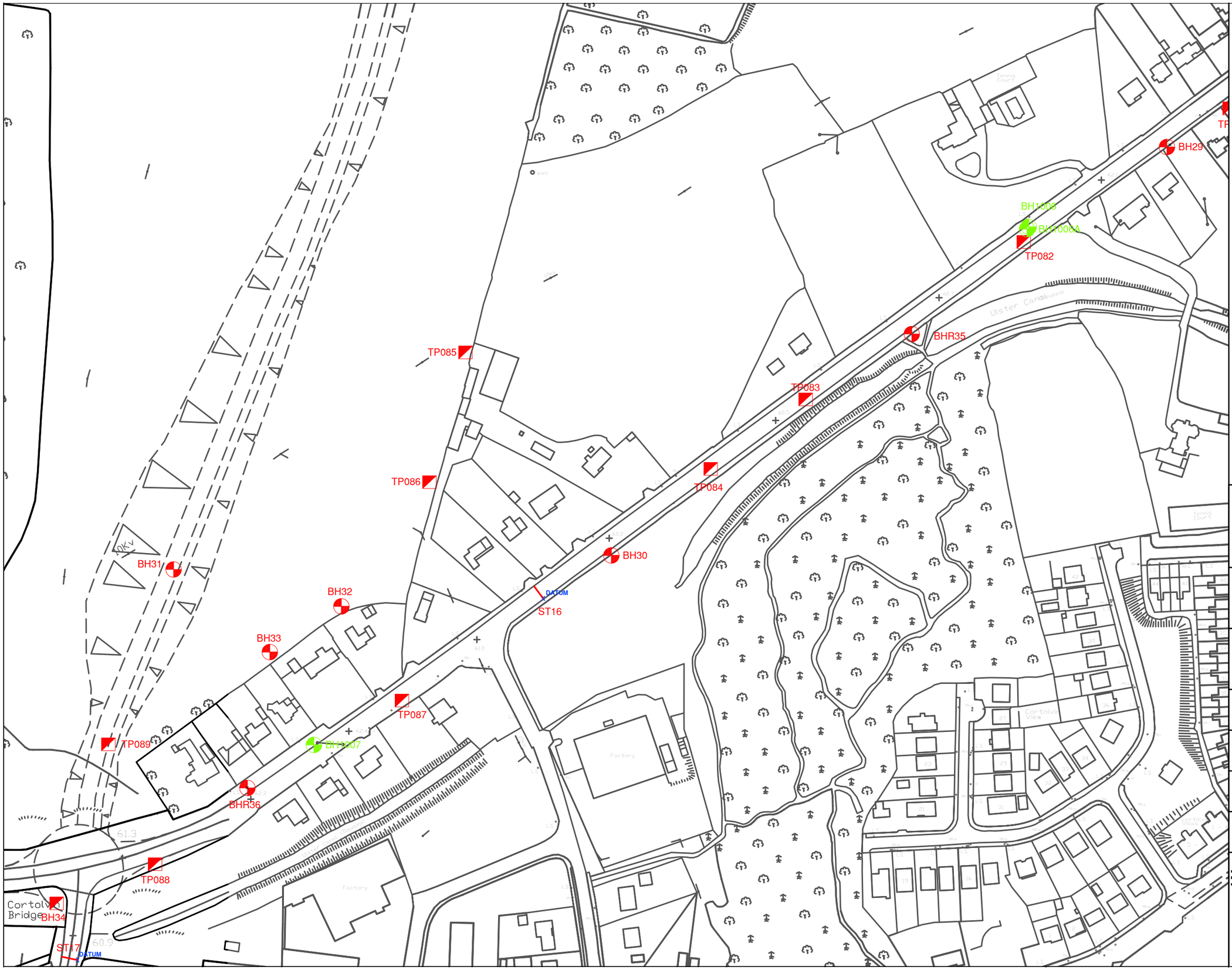
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REVISION:
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PRIORITY GEOTECHNICAL



JOB NAME:
MONAGHAN TOWN COLLECTION NETWORK

JOB NUMBER:
PC7089

DRAWING NUMBER:
PC7089–SI–07

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Faoiltiarna Nic Chárthaigh

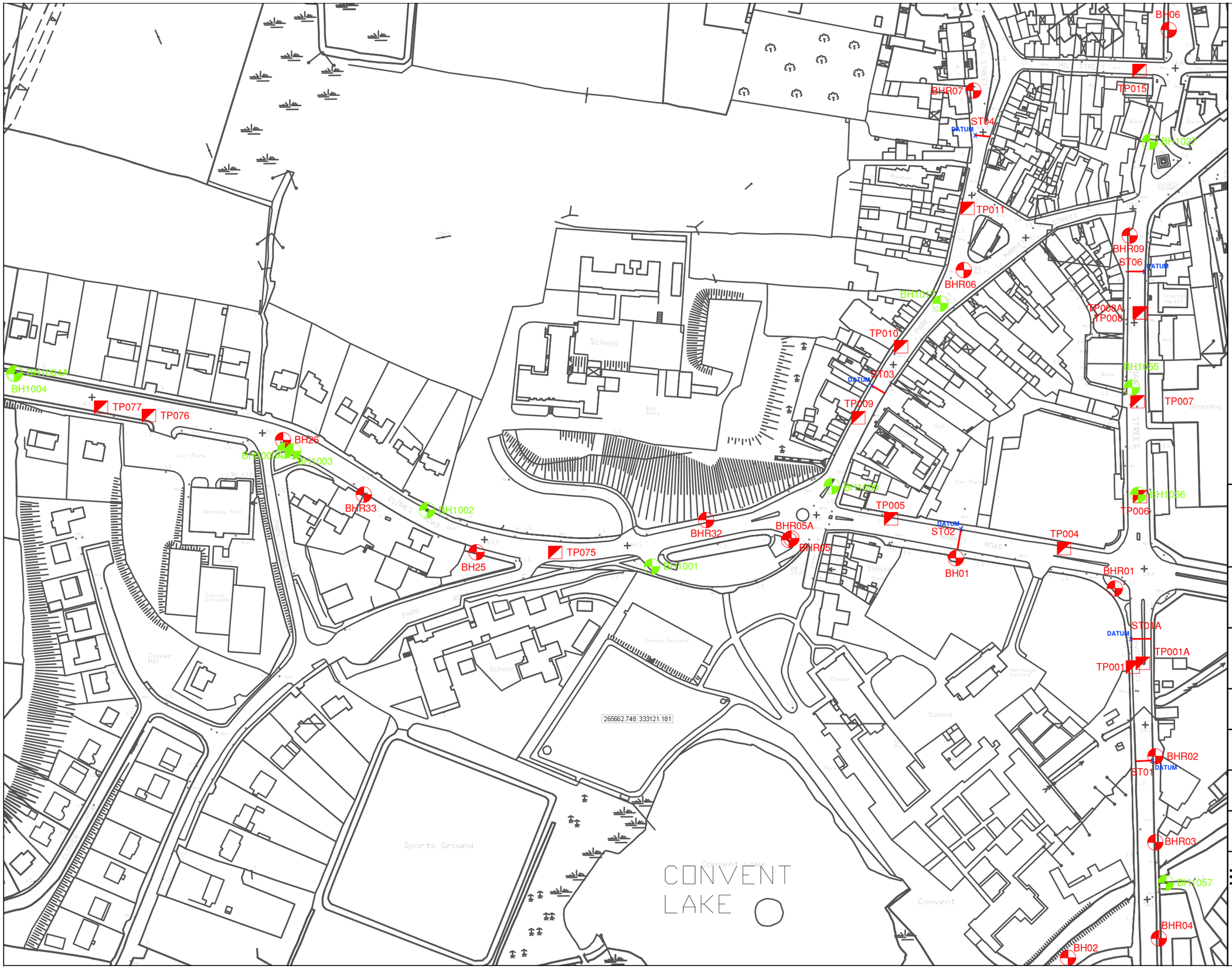
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REVISION:
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PRIORITY GEOTECHNICAL



JOB NAME:

MONAGHAN TOWN COLLECTION NETWORK

JOB NUMBER:

PC 7089

DRAWING NUMBER:

PC 7089–SI–08

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Faoiltiarna Nic Chárthaigh

DATE:

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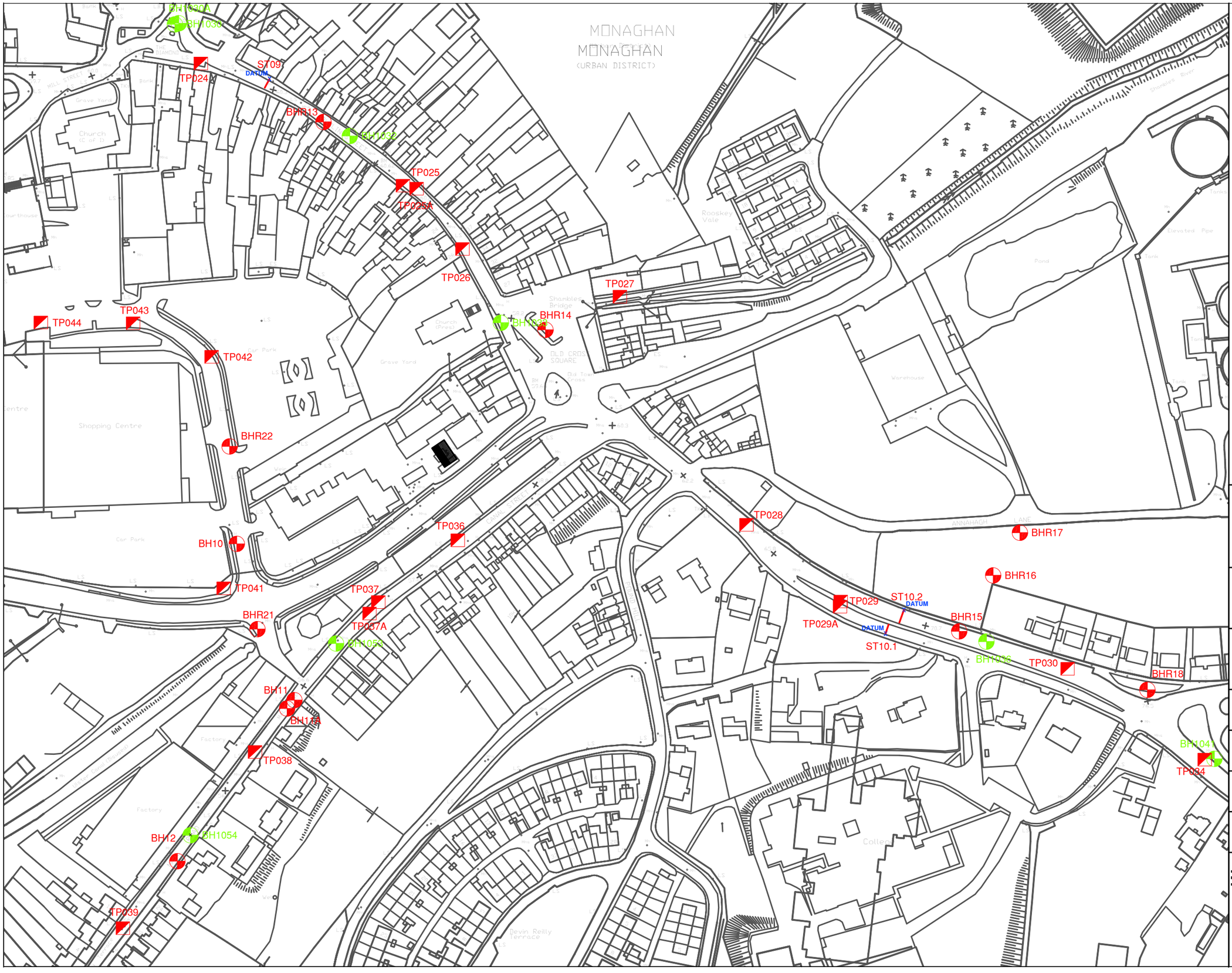
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REVISION:

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PRIORITY GEOTECHNICAL



JOB NAME:
MONAGHAN TOWN COLLECTION NETWORK

JOB NUMBER:
PC7089

DRAWING NUMBER:
PC7089-SI-09

DRAWN BY:
Faoiltiarna Nic Chárthaigh

DATE:
20/05/2009

SCALE:
1:2000

APPROVED:
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REVISION:
F03

PRIORITY GEOTECHNICAL

TP002
BH03
TP003
TP045
TP045A
BH04
BH1038
DATUM
ST12
BH18
BH17
BHR28
TP056
TP057
BH16
BHR23
BH1065
BH1065A
TP058
TP059
BH19
BH1063
TP060
BH1063A
DATUM
ST14
BHR29
TP061
62.2
TP062
10KV
Rossmore Park
Manor Wood
Tully Estate
Canal (mined)
Environmental Protection Agency
Co. Council Offices

JOB NAME:
MONAGHAN TOWN COLLECTION NETWORK

JOB NUMBER:
PC7089

DRAWING NUMBER:
PC7089–SI–10

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Faoiltiarna Nic Chárthaigh

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PRIORITY GEOTECHNICAL

BH20
TP063
BH21
BH22
TP064
TP065
TP066
BH23
TP067
BH1066
TP070
BHR30
BH1067
61.7
TP071
62.1
TP068
BHR31
BH1068
BH24
TP069
TP53
BHR27
TP054
TP055
64.1
TP072
TP073
TP074
67.4
Well
Well
Well
UD Bay

JOB NAME:
MONAGHAN TOWN COLLECTION NETWORK

JOB NUMBER:
PC7089

DRAWING NUMBER:
PC7089–SI–11

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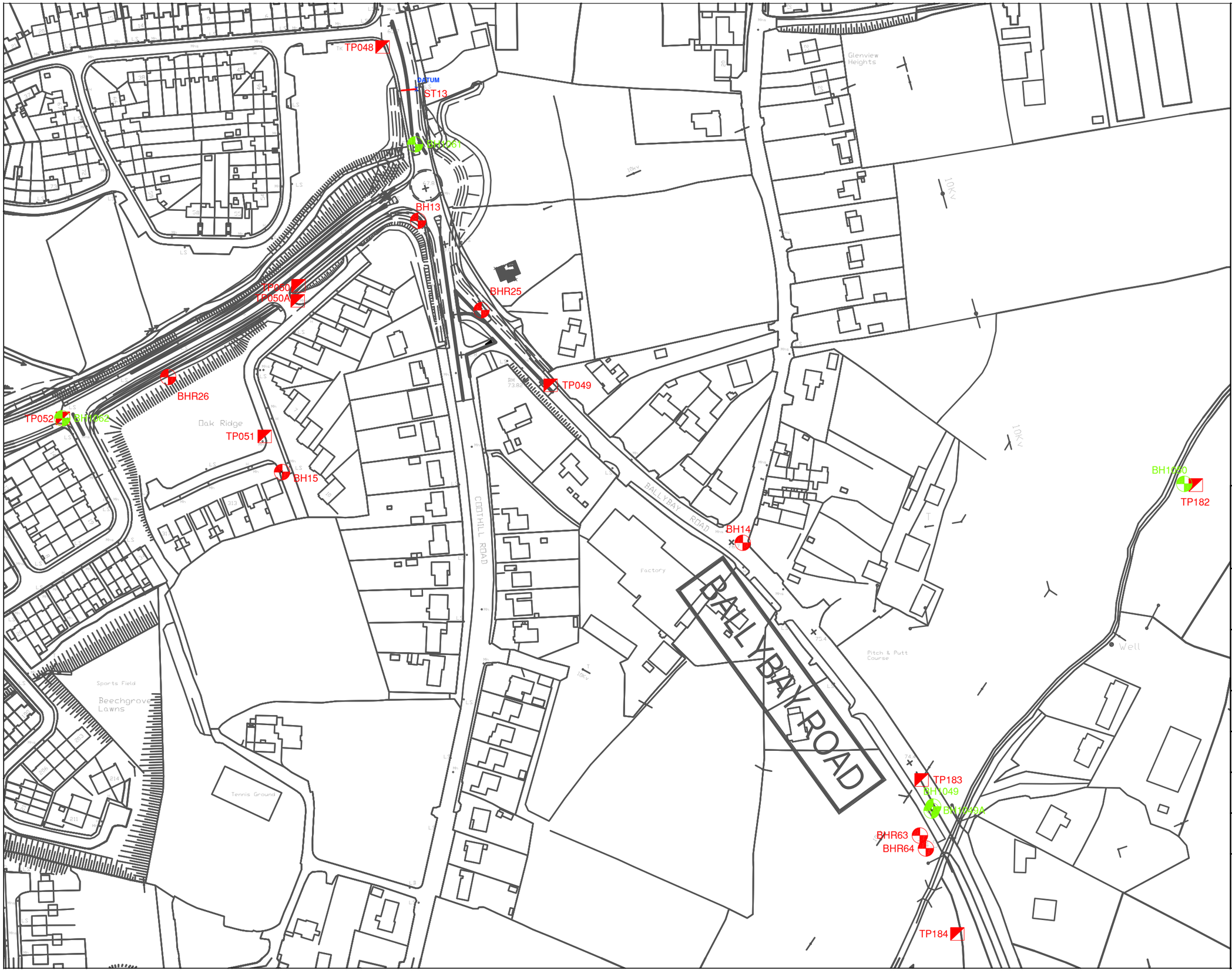
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MONAGHAN TOWN COLLECTION NETWORK

JOB NUMBER:
PC7089

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PC7089–SI–12

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APPROVED:
GH

REVISION:
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PRIORITY GEOTECHNICAL

TP146
BH55
60.5
TP145
TP144
60.0
BHR53
10Kv
65.3
BH54
66.0
TP143
64.9
TP142
Filter Beds
Sewage Treatment Plant
Tks
BHR52
55.0
BH53
TP147
TP148
Well
TP141
BH52
BH51
TP140
BHR51
BH1035
TP139
BH1034
TP138
BH50

JOB NAME:
MONAGHAN TOWN COLLECTION NETWORK

JOB NUMBER:
PC7089

DRAWING NUMBER:
PC7089-SI-13

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JOB NAME:
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JOB NUMBER:
PC7089

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PC7089–SI–14

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APPROVED:
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REVISION:
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PRIORITY GEOTECHNICAL

TP159
TP158
BH58
TP157
TP156
BH1049
BH57
BHR56
BHR55
TP161
TP160
62.9
65.6
TP155
TP154
BHR54
TP153
TP152
BH56
TP151
BH1039
TP150
TP149

JOB NAME:
MONAGHAN TOWN COLLECTION NETWORK

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PC7089

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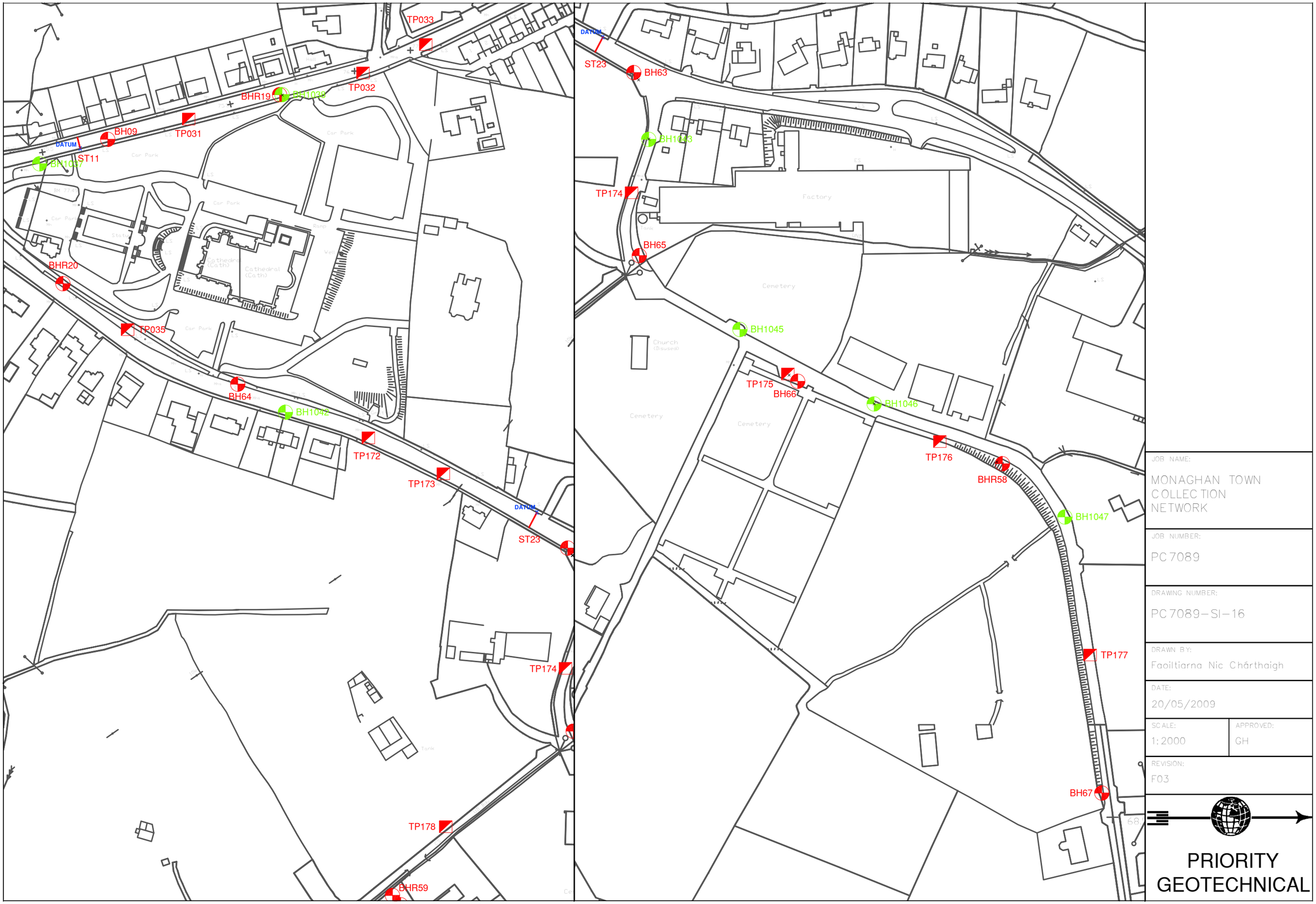
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JOB NUMBER:
PC7089

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PC7089–SI–16

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PRIORITY GEOTECHNICAL

TP178
BHR59
BHR60
BH1044
BH068
Aghanamimy Lough
TP179
BHR61
TP180
BH69
TP181
BHR62
TP046
TP047
GLEN ROAD
BH1059
BH1059A
BHR24
BH1060
BH50
TP137
Annahagh Close
Well
88.3
TP188
BH1052
BH1052A
TP189
Pond
Tk
Tk

JOB NAME:
MONAGHAN TOWN COLLECTION NETWORK

JOB NUMBER:
PC7089

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PC7089-SI-17

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Faoiltiarna Nic Chárthaigh

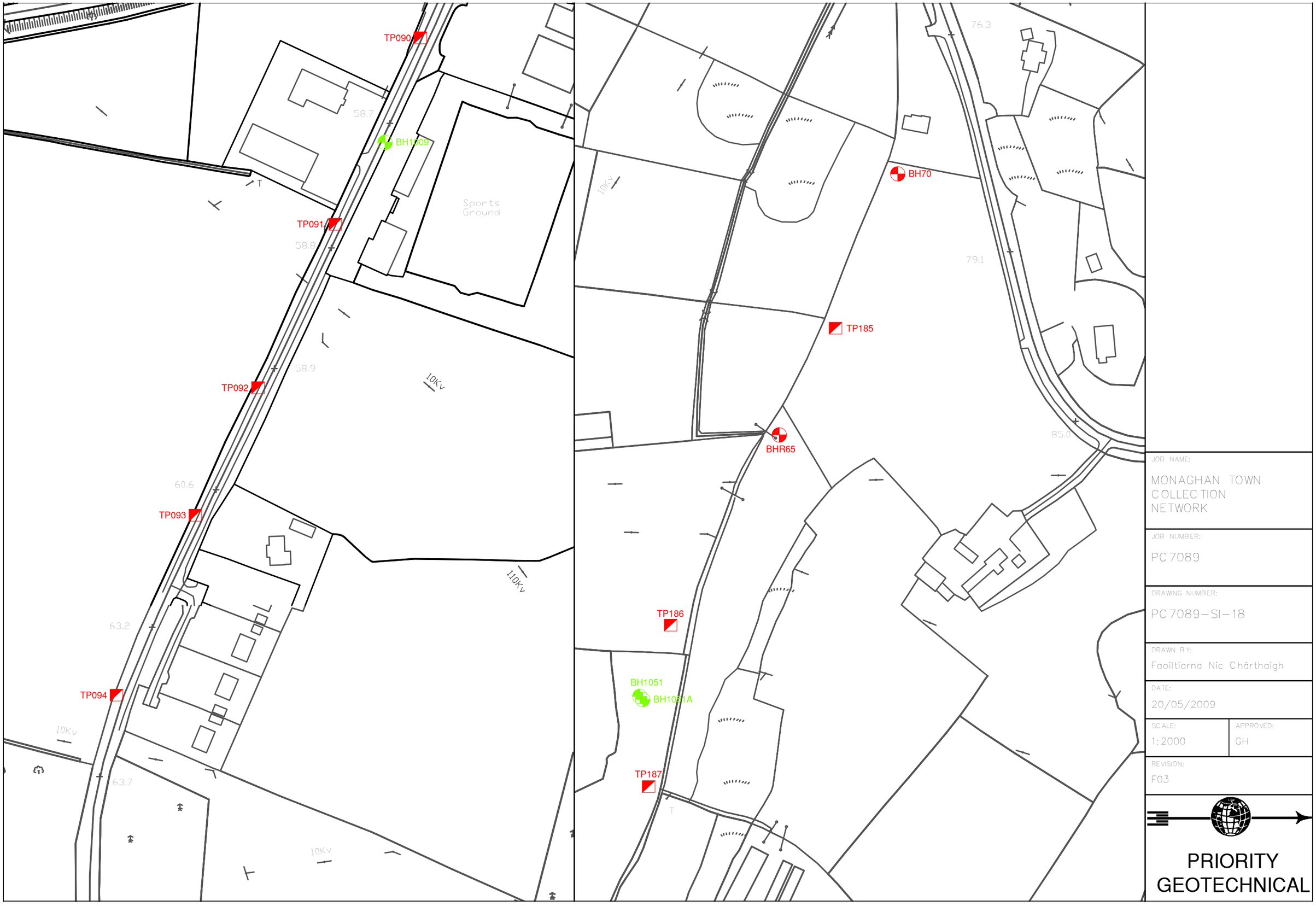
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JOB NAME:
MONAGHAN TOWN COLLECTION NETWORK

JOB NUMBER:
PC 7089

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Malone O'Regan Environmental Services Ltd

Monaghan Hydrogeological Assessment Report – Impacts of Temporary Construction Works on Groundwater

Job No. 41512745
Final Report RT-NN-1257/02

January 2007

MWH

Monaghan Hydrogeological Assessment

Draft Report

Main Contributors	Aspect/Section	Notes
Kathleen Peter	Report	
Giles Farrant	Report	
Michelle Clark	Report Section 4	

Project Code: 41512745		Document No: RT-NN-1257		Controlled Copy No:	
Revision No	**Date**	**Description/Amendment**	**Checked**	**Reviewed**	**Authorised for Issue**
03	18 Dec 06	Final Report	Giles Farrant	Giles Farrant	Robin Merlane
04	10 Jan 07	Final Report	Giles Farrant	Giles Farrant	Robin Merlane

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1. INTRODUCTION

It is proposed to construct a mixed-use residential and retail development in Monaghan town centre (IGR 267326 333593). The proposed development accommodates the requirement for car parking in a three-layer basement. The basement has an approximate area of 4850 m^2 and a depth of between 9 and 12 m below ground level. The development sits adjacent to the River Shambles, which runs south-west to north-east through the centre of the town. The River Shambles flows in a heavily modified channel approximately 20 m from the proposed development. The site is currently occupied by a surface level public car park.

MWH UK Ltd have been asked to carry out modelling on the groundwater conditions in the vicinity of the site in order to make a prediction of the likely impacts that the proposed basement may have on groundwater during the construction of the basement, in order to facilitate the planning of the construction works. This report therefore considers the following items:

- Will dewatering pose difficulties during construction of the basement?
- Will the pumping rates required to dewater excavations during the construction affect local groundwater levels?
- Will the River Shambles be adversely affected by the abstraction from the river during the construction works?

The approach is to determine the hydrogeological properties of the strata beneath the site and surrounding area and collect information on waterlevels. Once these properties and waterlevels are known the MODFLOW computer code model can be calibrated to give a representation of baseline groundwater conditions. Once this baseline has been established then the effect on groundwater flow during construction can be determined.

2. BASELINE CONDITIONS

The site is underlain by karstic limestone of Carboniferous age. In the north-east of the site the limestone is close to the surface covered only by approximately 3 m of Tarmac, Made Ground and clay. Whereas to the south-west the limestone gets progressively deeper probably due to erosion by the River Shambles channel. In some locations the limestone is directly overlain by a clay that is 1 to 2 m thick followed by a gravel of 2 to 5 m thick capped with clay, silt, peat deposits, Made Ground and Tarmac up to 6 m thick. In the south of the site, near the river the gravel and limestone are separated by approximately 5 m thickness of clay with cobbles between 8 and 15 m depth. The ground investigation data would indicate that the clay deposits are laterally discontinuous layers with the gravel layer being seen in all boreholes. It is possible that the layers of clays above and below the gravel create local partially confined areas of aquifer in the valley floor.

Baseline conditions were established by monitoring groundwater and river levels for approximately 1 month between 22 September and 24 October 2006. The locations of the monitoring wells and river stage monitoring locations are shown on **Figure 1** as MW1 to MW5 and RMP. The pumping well for the constant rate test is shown as PW1. **Figure 2** shows the results of the datalogger recordings for this period in the bedrock limestone aquifer. This data demonstrates that, as expected, river levels respond very quickly to rainfall events. Although groundwater levels do not rise and fall as dramatically as river levels the response in groundwater is equally sharp and immediate. This data also indicates that the peak groundwater levels occur slightly before or during periods of storm flow of

the river and therefore it is likely that there is also a component of recharge directly from rainfall as well as the river.

Figure 3 shows the groundwater levels recorded in the monitoring wells with response zones in the limestone and gravel. This figure indicates that the groundwater levels in the limestone are sometimes higher than in the overlying gravel alluvium (e.g. MW5 during the constant rate test). This suggests that the limestone may be partially confined at this locality.

2.1 Falling Head test in Pumping Borehole

Falling head tests on the pumping borehole were carried out on 22nd October 2006. A total of four tests were carried out. The observed drawdown was then used to calculate the hydraulic conductivity of the limestone aquifer (K). K values were obtained ranging from 1.21 x 10^{-3}m/s to 1.42 x 10^{-3}m/s, with an average value of 1.32 x 10^{-3}m/s. K was calculated using the method of Hvorslev (1951) described in British Standard 5930 (Code of practice for Site Investigations). The difference in the values obtained from the different tests is very small indicating good data quality. However, different methods for calculating K can yield considerably different values, and this is why a constant rate pumping test was carried out. The results observed as a typical hydraulic conductivity for a karst limestone [Ref. 1].

Table 1 – Falling Head Test Results

Test Number	Hydraulic Conductivity (K) m/s
Test 1	1.21 x 10^{-3}
Test 2	1.29 x 10^{-3}
Test 3	1.36 x 10^{-3}
Test 4	1.42 x 10^{-3}

2.2 Constant Rate Pumping Test

A constant rate pumping test was carried out between 25th – 28th October 2006 at a rate of 5 l/s. During the test, water levels were monitored in the pumping well, observation wells screened in the limestone (MW3-D, MW5-D, and MW2) and the drift deposits (MW5-S and MW3-S). The stage in the River Shambles was also monitored adjacent to the site. Daily rainfall totals were also received for a monitoring station in Co. Monaghan, and are plotted alongside all the groundwater and river levels in **Figure 4** for this period. The water levels in the pumping well respond to pumping with a maximum drawdown of 10 m as shown in **Figure 5**.

The groundwater and river levels in **Figure 4** demonstrate that on the 25th October 2006 (the day of the start of the constant rate test); a large rainfall event occurred with a total of 26.7 mm of rain falling during that day. On starting the test initial drawdown was only observed in MW5-D, MW3-D and MW5-S, with a maximum drawdown from rest water levels of 0.2 m in MW5-D occurring after 1 hour. Following this, the recharge caused by the heavy rainfall overwhelms the declining water levels and the water levels in all wells rise by approximately 0.5m whilst the river stage rises by 0.7 m. The rise in the river stage is not as sharp as the increase in groundwater levels and occurs over a longer period. Therefore it is likely that rainfall events transmit very rapidly to the aquifer, the river is in good connection with the aquifer, and at this point it is receiving flow from the limestone. Part of the river flow will be from surface water runoff, although it appears that baseflow is a significant component of the river flow at this location. The proportion of surface water runoff is likely to vary substantially over the course of a year, and will depend on the antecedent conditions in the entire catchment.

As the rainfall event and subsequent recharge dominates the response in the limestone to pumping, the constant rate test is difficult to analyse using conventional analytical methods of pump test analysis. However an estimate of permeability has been completed using the aquifer recovery data. It is assumed that the after 3 days of the constant rate test the drawdown has reached a steady state as a result of pumping. The recovery in the aquifer is rapid due to the high permeability of the strata and this is instantaneous in comparison to the variation due to rainfall. This recovery can be interpreted as a steady state drawdown and the Dupuit-Forcheimer equation (Ref. 2) can be used to calculate permeability between different monitoring wells. When this analysis is carried out it is found that the aquifer has a permeability of 1.34×10^{-3} m/s for a well that fully penetrates the aquifer which is 5 m thick. This agrees well with the falling head tests which tests a small volume of the aquifer close to the well. However the total thickness of the limestone aquifer and the pumping well is a partially penetrating well. When the analysis is carried out for a partially penetrating well with a variable aquifer thickness between 52 and 15 m thick, the range in hydraulic conductivity values are 5.81×10^{-4} m/s to 1.34×10^{-3} m/s respectively. It seems likely that the valleys of the model area have high hydraulic conductivity than elevated areas as a result of dissolution of the limestone by rainfall. Therefore in the groundwater model a value of 1×10^{-3} m/s is used in the valley whereas 1×10^{-4} m/s is used in the upland areas. In the vicinity of the site (valley) the hydraulic conductivity is taken to be 1×10^{-3} m/s.

3. STEADY STATE MODEL

The groundwater modelling code Visual MODFLOW Version 4.1 is a numerical model, which solves groundwater flow equations by finite difference. The MODLOW code was first developed by the United States Geological Survey and has become the industry standard groundwater model. Inherent in the MODFLOW approach is the assumption that the aquifer can be modelled as a continuum and the aquifer material behaves as porous media where Darcy's Law is valid. Such an assumption may not always be valid for a fractured aquifer with potentially large dissolution voids such as the limestone present in Monaghan. MODFLOW may give a good representation of groundwater flow at a large scale (10s of metres) but will not be a good model of the fracture networks and dissolution features on the metre scale. The flow on the fracture scale will be more similar to that of surface water such as that in rivers.

Steady state calculations have been carried out using MODFLOW. Steady state modelling takes no account of groundwater variation in the short term such as might occur with an individual rain fall event but rather models the average flow state of the aquifer. The steady state model is calibrated to the existing groundwater levels. The effect of temporary

construction works can be modelled by inserting pile wall elements and groundwater lowering boreholes into the model.

3.1 Baseline Calibration

The average of the groundwater levels and river stage level collected in the monitoring of 22 September and 24 October 2006 were used to calibrate levels in the vicinity of the site. No regional groundwater data has been made available so it is not possible to calibrate the model for the wider area.

3.1.1 The River Shambles

A sensitivity analysis on the conductance of the River Shambles (the degree of hydraulic connectivity between the river and aquifer) was carried out and a value of 432 m^2/day determined to give a good calibration. This is quite a high value but would not be unexpected with such a permeable aquifer with interbedded layers of clay and gravel above it.

3.1.2 Other Surface Water Features

Other water features have been identified from the 1:50,000 topographic map. These are;

- Peter's Lake – 400 m north of the site.
- Mullaghadun Lough – 800 m to the north-west of site.
- Crannog Lake – 500 m to the south-west.

No information is available on the stage levels of these features but it is assumed to be their elevation on the topographic map. The features have been modelled with a lower conductance of 288 m^2/day although no specific data is available to enable calibration.

3.1.3 Recharge

An effective rainfall of 2 mm/day has been estimated from an annual effective rainfall of 700 mm/year based on approximately 1200 mm/year average rainfall (data obtained from the Irish Meterological Service website).

3.1.4 Ground Model

The ground model was generated using the topographic information given on the 1:50,000 topographic and geological map and ground investigation data. Generally Carboniferous Limestone underlies the whole area and the valley of the River Shambles is infilled with a mixture of clay, peat and gravel deposits.

In MODFLOW these superficial deposits are represented by a thin layer of clay upon gravel. The input hydraulic conductivity's for these layers are typical literature values for such materials [Ref. 1]. **Table 2** summarises the model inputs for hydraulic conductivity.

Table 2: Hydraulic Conductivity's used in Steady State Model

Material	Hydraulic Conductivity (m/s)	
	Horizontal	Vertical
Clay	1.0×10^{-6}	1.0×10^{-7}
Gravel	0.05	0.005
Valley Floor Limestone	0.001	0.0001
Limestone in Elevated Areas	0.0001	0.00001

4. DEWATERING DURING CONSTRUCTION

The assessment has been undertaken on the basis that the proposed method for constructing the basement will be to form a secant pile wall around the perimeter of the basement and de-water the interior before excavation and formation of the basal slab. This will require lowering the groundwater table to the base of the excavation so that it does not become flooded. This groundwater lowering can be carried out by pumping from a single pumping well or a number of wells. In the case of the site at Monaghan the groundwater table must be lowered to at least 44 mAOD, i.e. a drawdown of approximately 9 to 10 m. To assess the practicality of this, the first assessment has been undertaken by modelling the de-watering using a single well in the centre of the excavation. The MODFLOW steady state model has been used for this situation and a cross-section of the proposed pile wall is given in **Figure 6** as an illustration. **Figure 7** shows the locations of the observation points DW1 to DW3 in the model. The pumping rate was increased incrementally to 825 l/s when the groundwater level within excavation was lowered to 45.34 mAOD at DW2.

Table 3: Drawdown inside the excavation pumping from a single well at 825 l/s

Well/Point	Design Level (mAOD)	Model Level (mAOD)	Design – Model (m)
DW1	44	45.815	1.815
DW2	44	45.340	1.340
DW3	44	45.666	1.666

Unfortunately it was not possible to increase the pumping rate further as the model did not converge. This is probably the result of dewatering of model cells around the pumping well and very high calculated groundwater gradients. To further increase the pumping rate a model was run with five wells pumping at the edges of the excavation on the inside of the pile wall. It was found that a pumping rate of 225 litres per second in three pumping wells (PW1(2), PW1(3) and PW1(4)) and 250 litres per second in two pumping wells (PW1(5) and PW1(6)) was required to achieve the necessary drawdown. The total abstraction volume is 1175 litres per second.

Although the pile wall provides some degree of cut-off to groundwater flow into the investigation there will still be a significant level of drawdown outside the wall of the excavation. **Table 4** shows the calculated groundwater levels at the previous observation points. As can be seen from the table between approximately 1.6 and 3.2 m of drawdown would be expected outside of the pile wall.

Observations from site and anecdotal evidence would suggest that the car parking and hardstand areas around the shopping centre have been founded on the alluvial deposits.

These alluvial deposits contain a mixture of peat, clay and gravels. The thickness of peat is up to 10 m in some locations. Lowering the groundwater table in this area by 1 to 2 m is likely to cause significant settlement within the peat, clay and gravel horizons and may cause settlement of the structures founded on these deposits. This will be more pronounced where a significant thickness of saturated peat is present. It is expected that the buildings are constructed onto the limestone bedrock, and, as such are unlikely to be impacted by dewatering. However, if this is not the case, then pumping at these high rates does have the potential to result in some settlement of these buildings.

Table 4: Results of Groundwater Lowering Simulation on OBHs Outside Pile Wall.

Observation Point Name	Location	Level of Measurement	Model Without GW Lowering (mAOD)	Model With GW Lowering (mAOD)	With – Without (m)
OBH1	Between Shopping Centre & Proposed Basement	Base of Shopping Centre Basement	53.21584	51.30077	-1.91507
OBH1	Between Shopping Centre & Proposed Basement	Base of Proposed Basement	52.75484	50.83968	-1.91516
OBH3	West side of church	Base of Proposed Basement	52.50879	49.28738	-3.22141
OBH3	West side of church	Base of Church Basement	dry	dry	dry
OBH4	North side of proposed basement	Base of Proposed Basement	52.8273	49.89231	-2.93499
OBH5	South side of proposed basement	Base of Proposed Basement	52.58564	50.94798	-1.63766

4.1 The Effect of the Secant Pile Wall Cut-Off

Running the same steady state model for groundwater lowering (pumping at a combined rate of 1175 l/s) but without the pile wall makes it possible to determine the effectiveness of the pile wall as a cut-off. **Table 5** shows the results of removing the pile wall on the observation points within the excavation. It can be seen that the water level would rise by approximately 8 m with the result that pumping at 1175 l/s would not be sufficient to lower the groundwater table to the desired level and that a higher pumping rate would be required which is not considered a realistic option. Therefore the installation of the secant pile wall will be beneficial in reducing the overall volume of water to be dewatered during construction.

Table 5: Drawdown inside the excavation pumping from five wells at a combined abstraction rate of 1175 l/s with no pile wall

Well/Point	Pile Wall (mAOD)	No Pile Wall (mAOD)	Wall – No Wall (m)
DW1	43.51731	49.9683	6.45099
DW2	42.68804	48.31735	5.62931
DW3	42.69294	50.74142	8.04848

4.2 Groundwater Lowering System Design

It may be possible to reduce the required pumping rate from the excavation by placing wells at the perimeter of the excavation however experience has shown [Ref. 2&3] that the permeability of the ground encountered on site is probably on the upper range of what is possible by two stage well points or deep wells. The high permeability of ground coupled

with the recharge boundary of the river close by may make inflows to the excavation excessive.

The upper economic limit for the use of a deep well or well point system is of the order of 5×10^{-3} m/s[Ref. 2]. The pumping costs of dealing with soils of greater permeability are generally uneconomic. In such high permeability soil, exclusion methods may offer a more cost-effective expedient. Consideration should therefore be given to alternative dewatering scheme designs such as a deeper secant pile wall or wet excavation or grouting of the limestone floor of the basement.

5. MODELLING STORM EVENTS

The constant rate test was carried out during a large storm event during a period of above average rainfall and fluctuations in groundwater levels were recorded (0.7 m) over the timescale of a few days. Information from the Met Office of Ireland indicates that such a rainfall event (26.7 mm in one day) whilst being a heavy storm has a return period of less than 6 months. Therefore the groundwater level rise seen in such a storm is likely to be more significant than the steady state changes seen over longer time periods.

6. LIMITATIONS

- No information has been made available for the hydrogeological properties of the aquifer in the areas surrounding the site. This has been assumed based on a karstic limestone geology and information taken from the 1:50,000 topographic map of the area.
- A water features survey has not been made available for this work.
- MODFLOW is a continuum model, which assumes that aquifer materials can be modelled as porous media using Darcy's law. In highly Karstic aquifers this assumption may not be valid.
- Sensitivity analysis on the model parameter values and the impact of differing storm events have not been examined

7. CONCLUSIONS & RECOMMENDATIONS

7.1 Conclusions

Based on the modelling work completed, it is reasonable to conclude the following:

- The dewatering that will be required to construct the basement as currently designed, even with the secant pile wall in place, will present a significant dewatering challenge due to the adverse ground conditions beneath the site and also the recharge capabilities of the adjoining River Shambles.

- Pumping from a single abstraction point is not considered a viable option as the level of pumping that will be required to lower groundwater levels for the dewatering operations has the potential to affect both local groundwater levels and the River Shambles. Increasing the number of abstraction points will likely lower total water abstraction rate.

- Additional work is necessary in order to determine the optimum dewatering design balancing construction practicality and cost while also ensuring that there are no offsite impacts on either local groundwater levels or the River Shambles.

7.2 Recommendations

In determining the optimum dewatering design it is recommended that the following items should be considered by the Contractor:

- How many abstraction points will be required to lower the water levels on-site in a manner that will not impact on surrounding lands or the River Shambles?

- Is there scope to revise the current design such as increasing the depth of the secant pile wall in order to reduce the dewatering requirements?

- How can the works be sequenced in order to minimise the area that would need to be dewatered at any given time?

- How can the works be programmed so that the time to construct the basement (duration) and construction season reduces the potential impacts from storm events?

- What criteria are the Local Authority likely to stipulate with regards to discharging water from the site into the River Shambles during the construction phase?

- Would alternative dewatering scheme designs such as wet excavation or grouting of the limestone floor of the basement be more economically viable?

To assist in providing clarification to some or all of these points, the following additional work could be undertaken:

1. Modelling

The initial dewatering model indicates that a single well point would require significant dewatering to reduce the groundwater level to allow construction. This will have an impact on the surrounding ground as settlement occurs through dewatering. An initial model utilising 5 well points indicates that this is likely to have a lower dewatering

rate, with a subsequent smaller impact on the surrounding ground. Further modelling of dewatering scenarios must be undertaken to gain optimum conditions from a design perspective. This must include sensitivity analysis in the following parameters:-

- Number of abstraction boreholes
- Deeper secant pile wall
- Dewatering smaller working areas and constructing the basement in smaller sections
- Varying the permeability of the limestone with depth

Further modelling work must also be carried out to determine the effect of storm events on groundwater levels. It may be possible to use MODFLOW to generate transient simulations of the groundwater response as a result of storm events recorded on site but depending on the initial results, different software packages may need to be utilised in order to accurately model the kind of transient behaviour observed.

2. Data collection

Additional data is required as part of this modelling exercise as follows:-

- The water feature survey must be completed – this must include flow data from the River Shambles and rainfall intensity over time.
- Any additional construction details that can be obtained on the structures surrounding the site.
- A geological review of the deeper limestone should be undertaken through desk study research of borehole data available from the public record.

3. Field Work

This modelling will have to include a number of assumptions for the condition of the aquifer below the current investigation boreholes. As this will have a significant impact on the construction of the basement, a confirmatory borehole and testing will be required to ensure the parameters modelled are realistic.

8. REFERENCES

1. Freeze and Cherry, 1979: Groundwater.

2. Cashman, P.M., & Preene, M., 2001: Groundwater Lowering in Construction – A practical Guide.

3. Preene, M., Roberts, T.O. L., Powrie, W. and Dyer, M.R., 2000: Groundwater Control – Design and Practice. Construction Industry Research and Information Association, CIRIA Report C515, London.

Figure 1: Monitoring and Pumping Well Locations

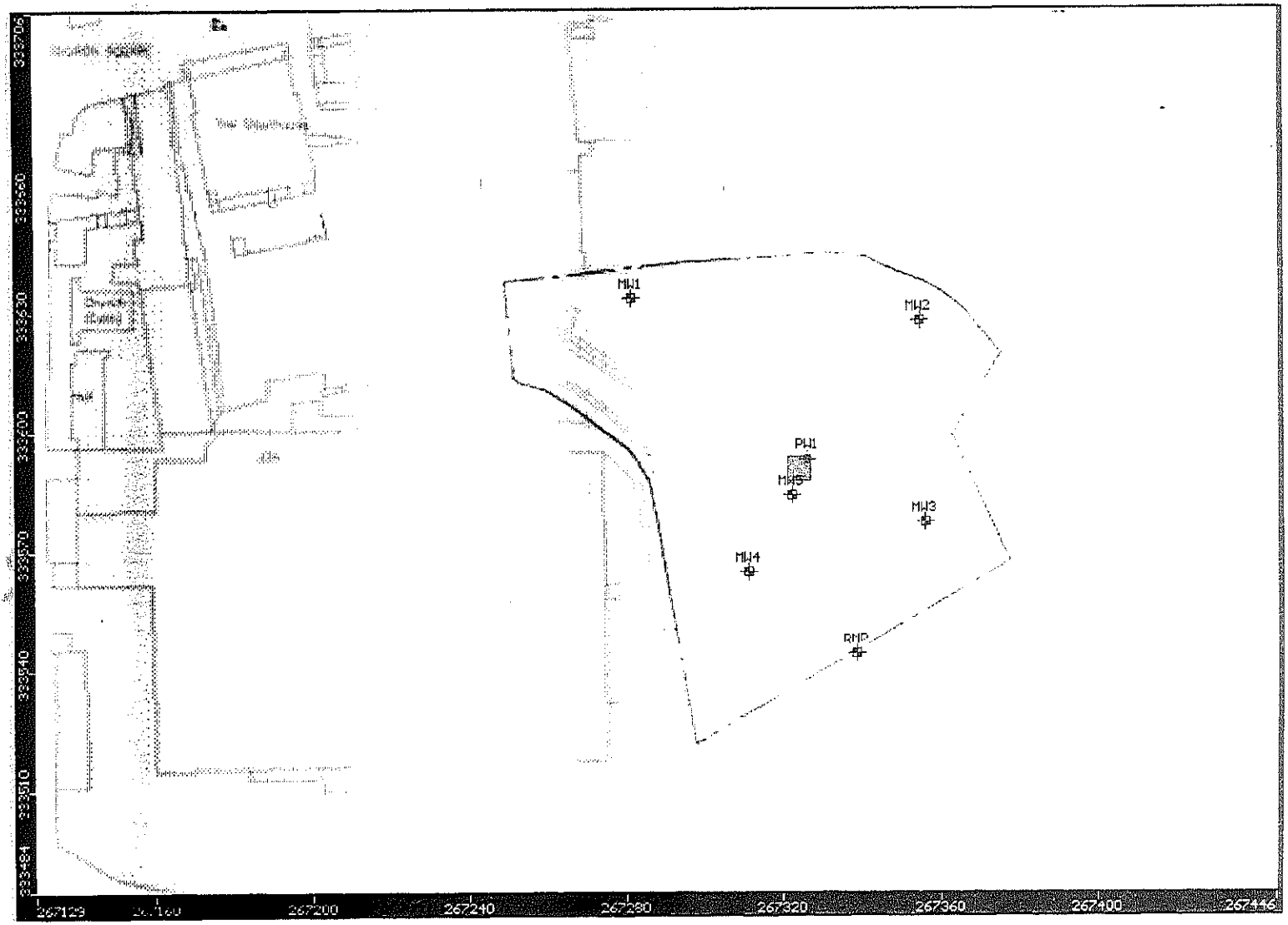


Figure 2: Groundwater Levels in the Limestone between 21st September and 31 October 2006

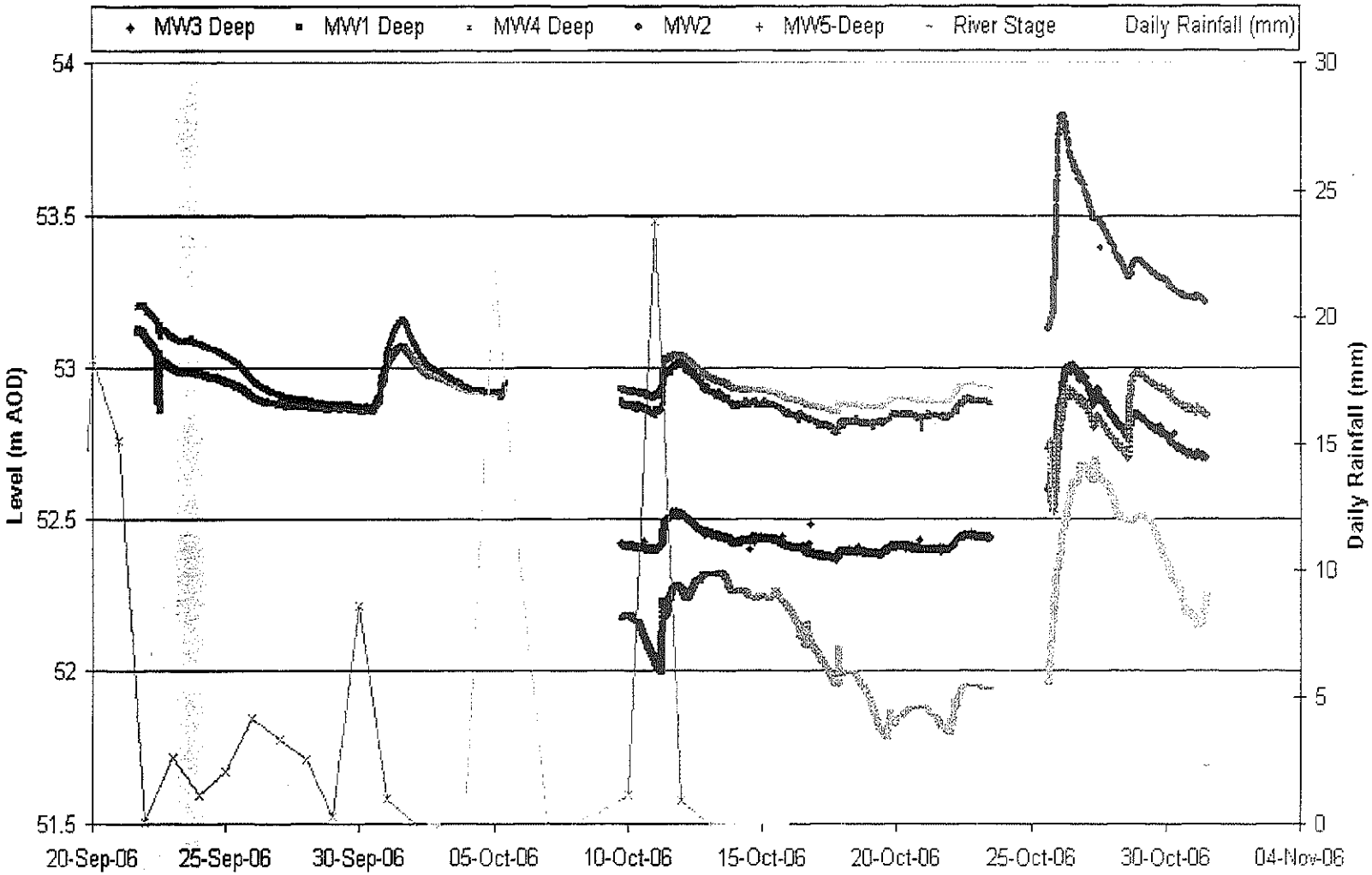
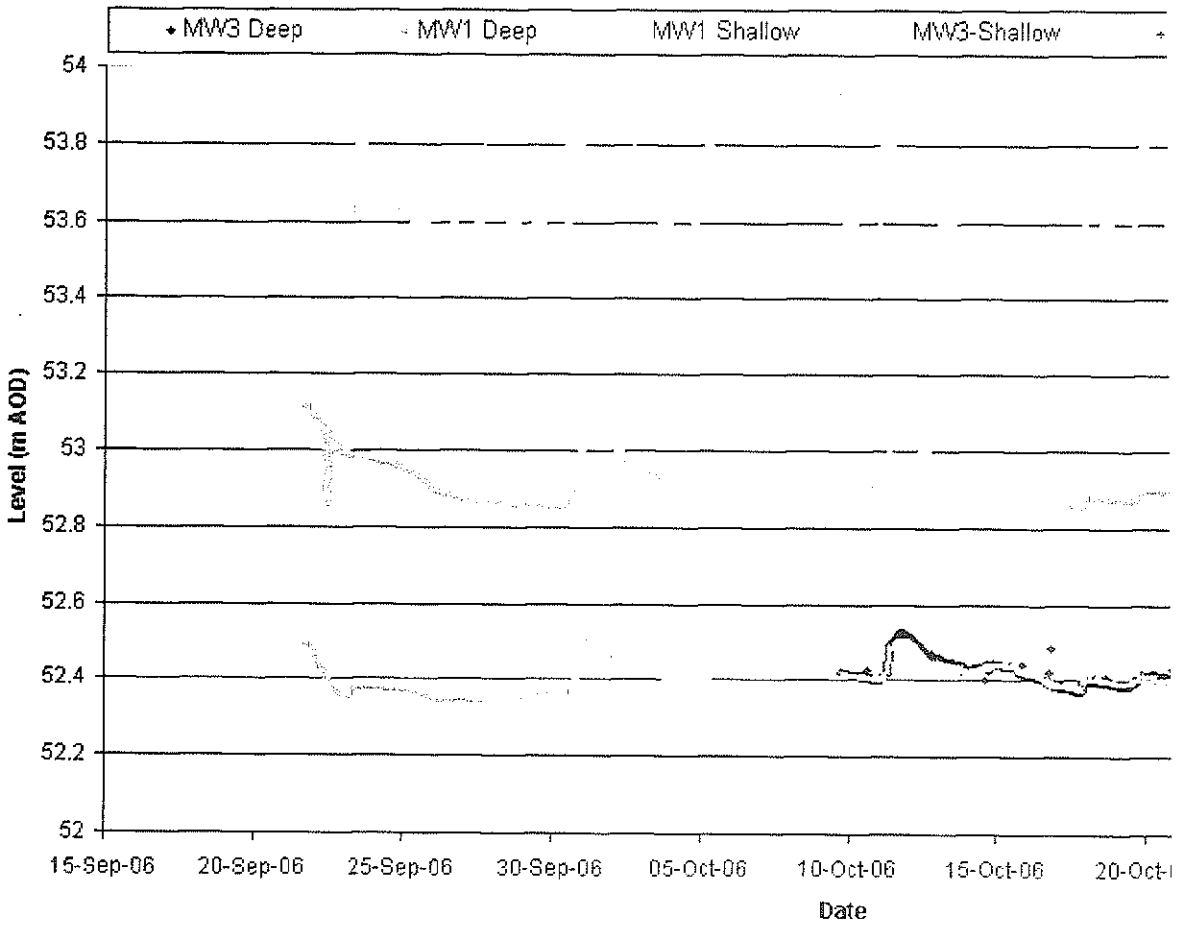


Figure 3: Groundwater Levels in the Limestone and Gravels



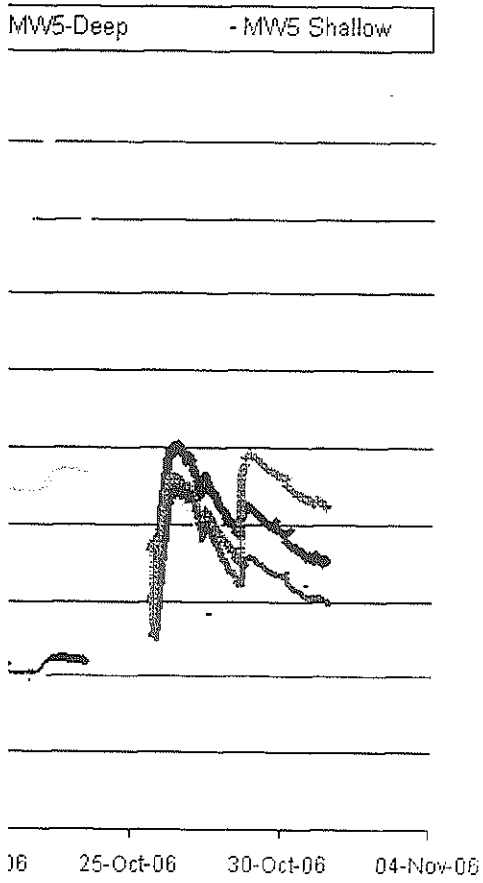

MW5-Deep
- MW5 Shallow
)6
25-Oct-06
30-Oct-06
04-Nov-06

Figure 4: Groundwater Levels during Constant Rate Test in Observation Boreholes

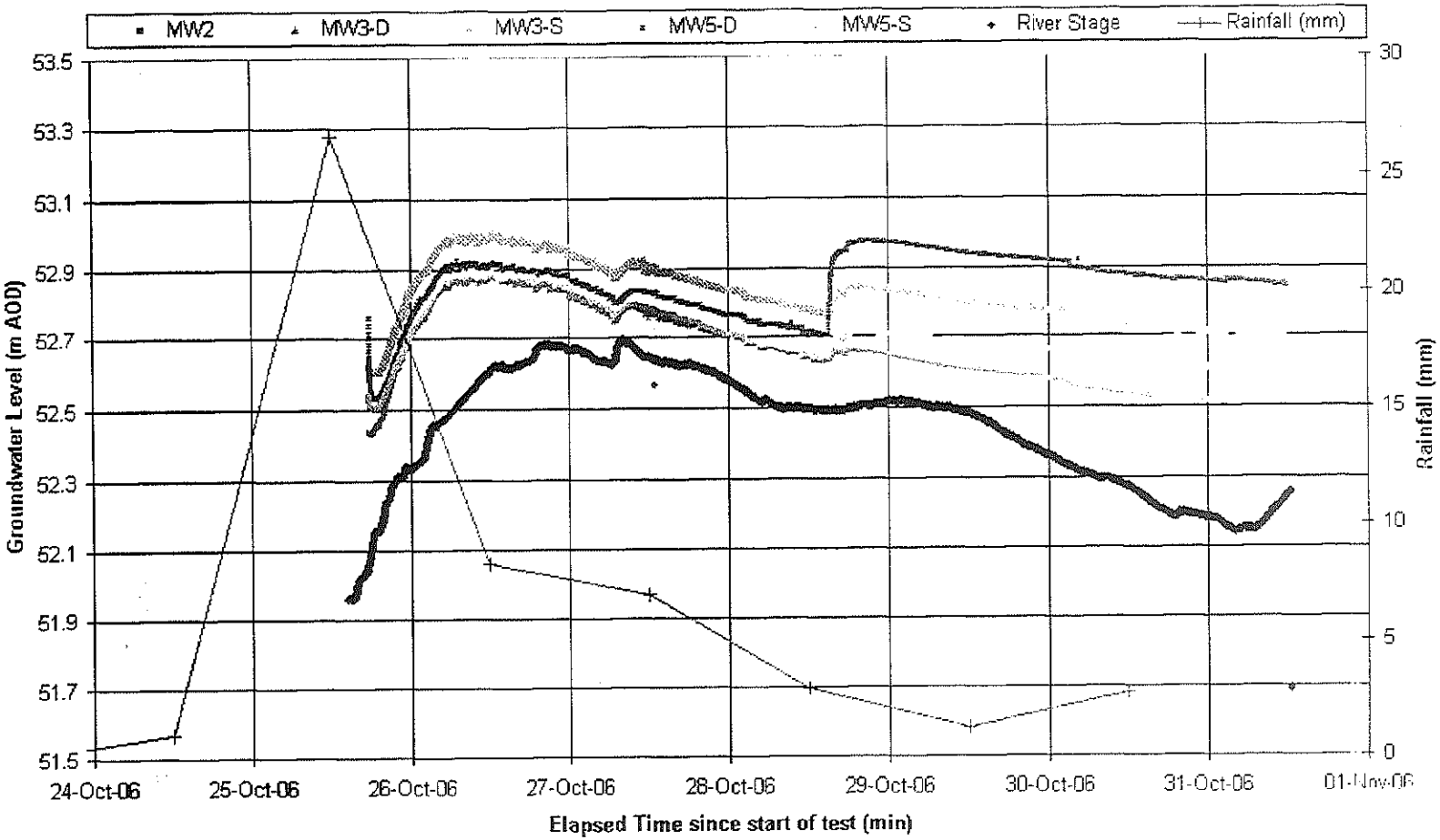


Figure 5: Drawdown in the Pumping Well during Constant Rate Test

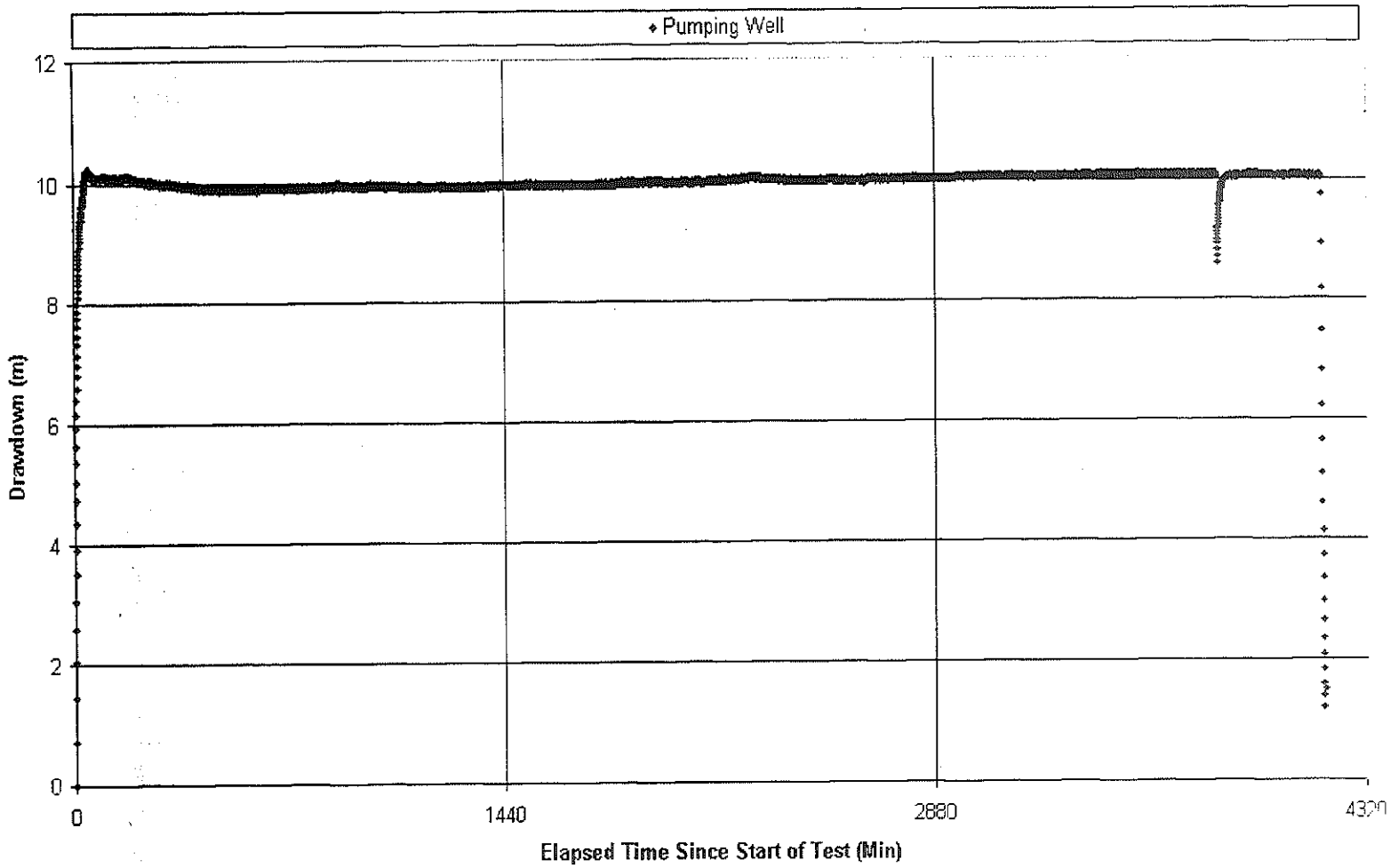


Figure 6: Cross-section of Proposed Piles

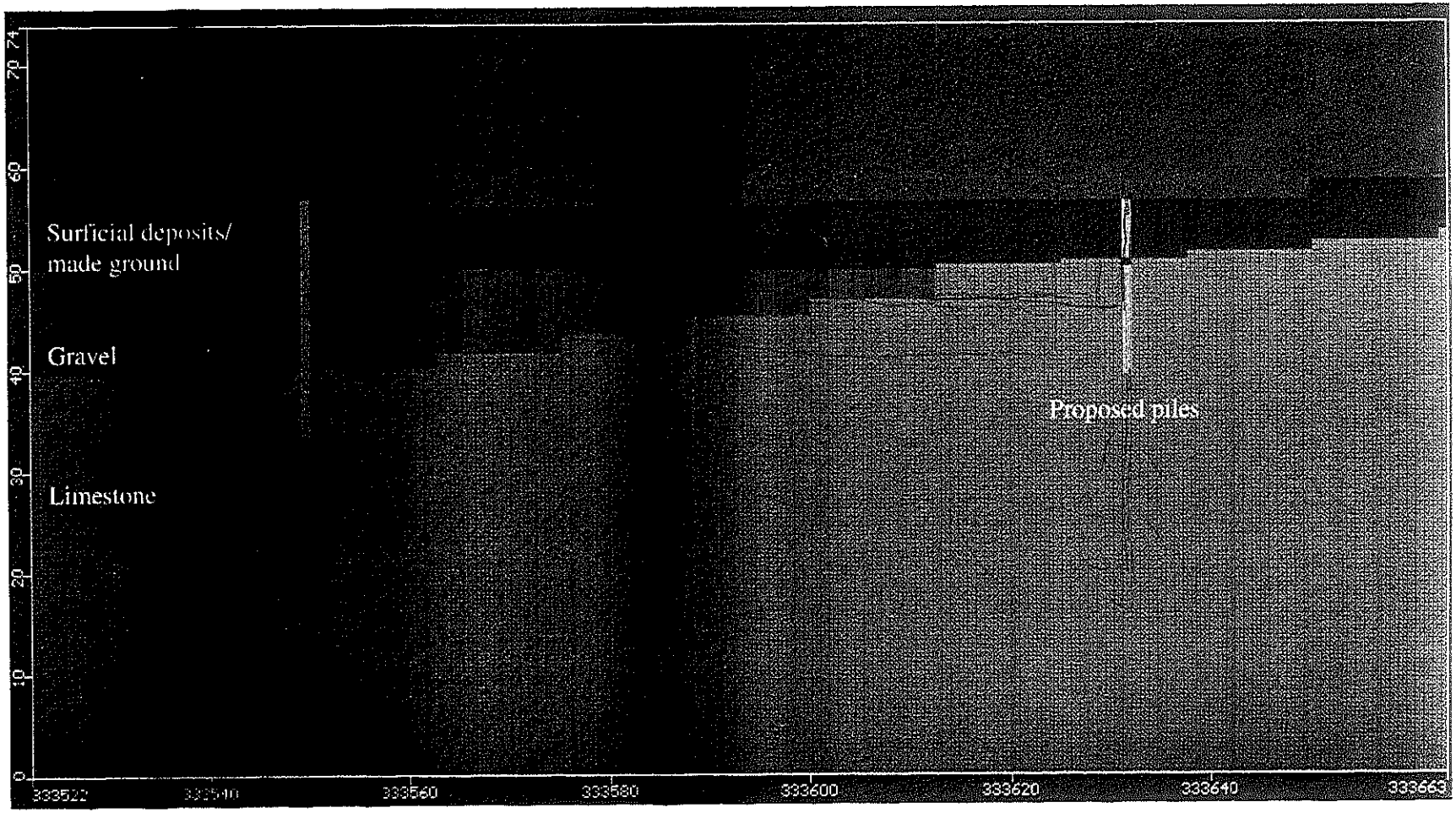
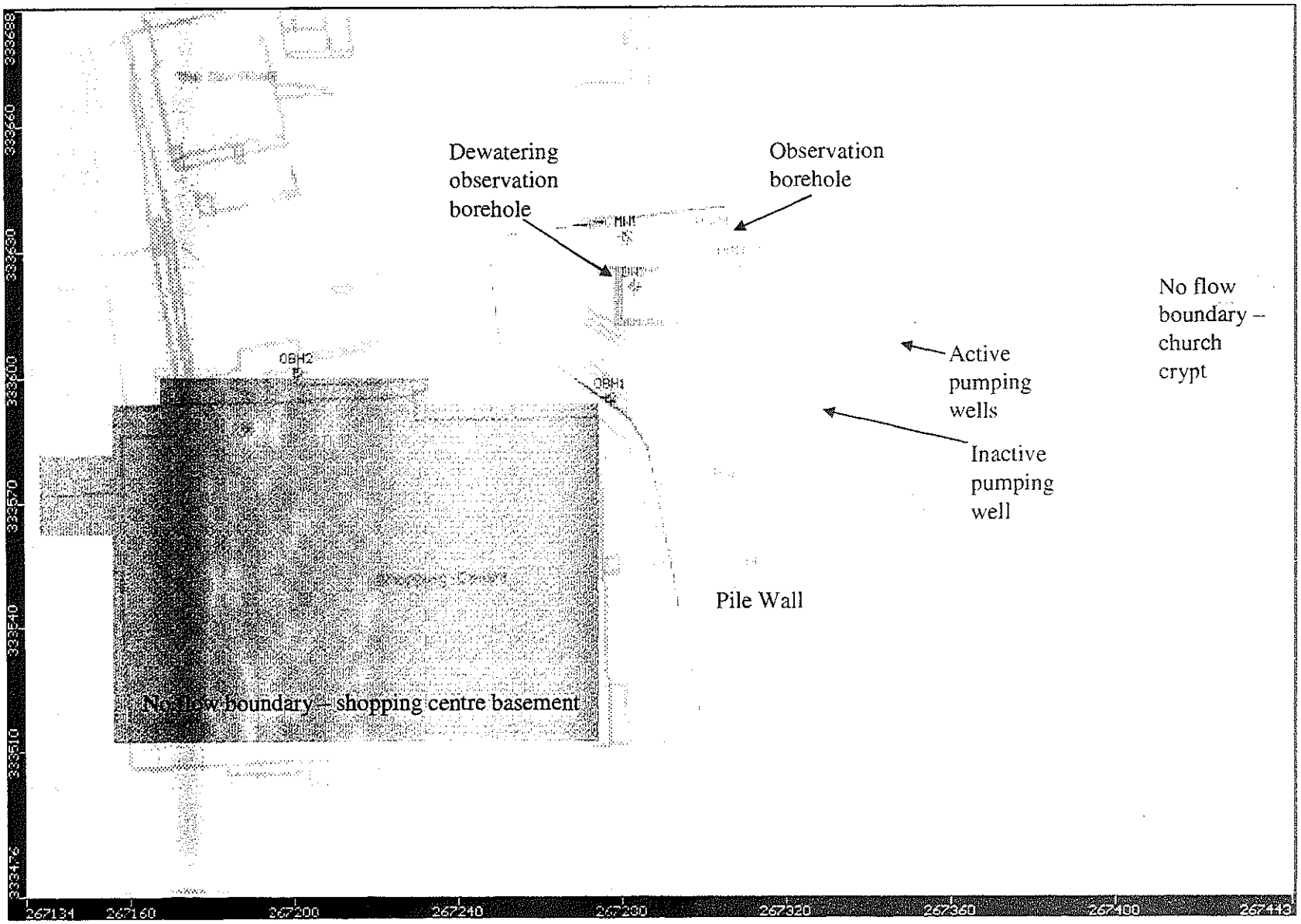


Figure 7: Location of monitoring points in the groundwater lowering model



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Proposed Mixed Use Development
Rooskey, Monaghan Town, Co. Monaghan
P.T. McWilliams

Webber Associates
Consultant Geotechnical Engineers

July 2007

Proposed Mixed Use Development
Rooskey, Monaghan Town, Co. Monaghan

Hydrogeology Assessment

July 2007

Webber Associates (UK) Ltd
Conyngham Hall, Knaresborough
North Yorkshire, HG5 9AY
Tel: 01423 799033, Fax: 01423 799032

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1.0 INTRODUCTION

1.1 General

Monaghan County Council is redeveloping the Lower Courthouse Carpark, Monaghan Town as a mixed use development. Part of this development includes a three tiered basement excavation. Clarke Engineering Ltd were appointed as developer for the project who in turn retained the services of P. T. McWilliams as contractor. P.T. McWilliams has asked Webber Associates (UK) Ltd (WA) to provide a supplementary hydrogeological assessment of the site.

The aim of this report is to summarize the WA designed hydrogeological investigation carried out on site, comment on their results and possible implications for groundwater entry during excavation of the basement

1.2 Description of the Project

The site is situated in Rooskey, Monaghan Town, Co. Monaghan, Ireland. The site is an approximately one acre site that gently slopes from the north (+56 mOD) to the south (+53 mOD). The site is bound by the courthouse and various retail units to the north and east, and by a Tesco Shopping Centre to the west. The site is adjacent to the River Shambles which flows eastwards through a man made channel along the southern boundary of the site.

A surface level car park currently occupies the site. The proposed development comprises 10 blocks of 4-storey retail and residential units enclosing a central courtyard. Most of the proposed development will be underlain by a three tiered basement. The excavation and construction of this basement is the scope of this report.

1.3 Site Investigations and Site Assessments

Several site investigations and ground and groundwater assessments have been carried out on site, including the following which investigated groundwater and permeability:

- MWH Monaghan Hydrogeological Assessment Report RT-NN-1257/01 (included 4 number Falling Head Tests and a Constant Rate Pumping Test) (2006)

- Malone O' Regan Environmental Services Ltd, Monaghan Hydrogeological Assessment Report RT-NN-1257/02 (2007)

- Malone O' Regan Environmental Services Ltd, Monaghan Hydrogeological Assessment Report – Impacts of Temporary Construction Works on Groundwater. RT-NN-1257/02 (2007)

The results and findings of these reports indicate very high permeabilities for both overburden and rock. On this basis, substantial ground water entry into the basement excavation was predicted which would make it difficult if not impossible to construct the basement.

In order to assess this problem further, a supplementary site investigation was designed by WA and carried out by Irish Geotechnical Services Ltd (IGSL) in May 2007. The purpose of the site investigation was to assess the ground and groundwater conditions specifically for basement design and excavation. This investigation included:

- 1 number cable percussion borehole
- 6 number rotary drilled boreholes
- 6 number standpipe piezometer installations
- 6 number variable head permeability tests
- 8 number Packer Permeability tests
- 1 number pump test

Rock cores were retained for logging and laboratory testing. The following tests were scheduled by WA.

- Uniaxial Compressive Strength
- Point load testing

2.0 GROUND CONDITIONS

2.1 Stratigraphic Profile

The site investigations indicate that two different stratigraphic profiles are present on site. In the northern section of the site, rockhead is typically found about 5 m below ground level. This is overlain by Glacial Till. Surface level is about 55 mOD.

The southern section of the site is differentiated by a sudden drop in rockhead level to approximately 15 m below ground level. This section of the site has been upfilled by 3 m as it was once marshland. This made ground overlies a thick layer of peat over Glacial Till. Surface level is about 53 mOD.

Summaries of these profiles are presented in Table 2.1 and Table 2.2.

Table 2.1 Summary of Ground Conditions in northern section of the site

Stratum	Description	Depth to Base		Thickness	
		min	max	min	max
Made Ground	Tarmacadam and fill (cobbles and boulders)	1.5	3	1.5	3
Peat	Fibrous - found in one borehole	3.5		2	
Glacial Clay	Silty sandy clay	3.4	5.6	0.4	2.6
Glacial Gravels	Silty sandy gravels	4	6	1	4.1
Limestone	Moderately to highly weathered, fractured, clay infill	4.5*	9.4*	Base not seen	

* Rockhead

Table 2.2 Summary of Ground Conditions in southern section of the site

Stratum	Description	Depth to Base		Thickness	
		min	max	min	max
Made Ground	Tarmacadam and fill (cobbles and boulders)	3.2	4.5	3.2	4.5
Peat	Fibrous	7.6	11.2	4.4	6.7
Glacial Clay	Silty sandy clay	9	13.5	1.4	2.5
Glacial Gravels	Silty sandy gravels	10	17.7	1	4.2
Limestone	Moderately to highly weathered, fractured, clay infill	12.5*	17.7*	Base not seen	

* Rockhead

2.2 Groundwater

Ground water was encountered in all exploratory holes. Water strikes were typically encountered between 1.7 m and 4.2 m below ground level.

Standpipe piezometers were installed in six boreholes. A summary of levels are tabulated below.

Table 2.3 Summary of Piezometer Levels

Borehole	Surface Level (m OD)	Depth to Water (m bgl)
B1	55.2	2.5
C	55.6	2.8
D	55.5	2.6
E	55.6	2.8
F	53.2	1.2*
G	53.2	0.6*

* Results not available at time of writing report, highest recorded strike listed

3.0 HYDROGEOLOGICAL TESTING

3.1 Variable Head Tests

Variable head tests were carried out in the glacial gravels and weathered rock in order to assess permeability. The available results are tabulated below (Table 3.1). Dual tests were carried out where possible to confirm permeability readings. Rising and falling head tests indicate permeabilities in the range 10^{-3} to 10^{-4} m/s.

Table 3.1 Summary of Variable Head Tests

Exploratory Hole no.	Ground level (mOD)	Material in Test Zone	Level for Tests (mOD)	Initial Ground water level (mOD)	Permeability from Falling Head Tests (m/s)	Permeability from Rising Head Tests (m/s)
C	55.6	Gravels	51.32	52.64	$1.17x10^{-3}$	
D	55.5	Gravels	51.11	52.78	$1.14x10^{-3}$	$1.14x10^{-4}$
F	53.16	Limestone	35.32	52.72		$2.26x10^{-4}$

3.2 Packer Tests

Eight packer tests or Lugeon tests were carried out in the limestone at specific levels to assess the extent of the fracturing within the limestone and hence its permeability. The packer test gives a measure of the acceptance by in-situ rock of water by pressure. The available results are listed in Table 3.2. The results indicate permeability in the range 0.5 to 10 $x10^{-5}$ m/s. Most results are in the range 1 to 2 $x10^{-5}$ m/s.

Table 3.2 Summary of Packer Tests

Exploratory Hole no.	Ground level (mOD)	Material in Test Zone	Level for Tests (mOD)	Initial Ground water level (mOD)	Method 1*	Method 2**
B1	55.2	Limestone	42.4 – 41.4	52.74	$1.12x10^{-5}$	$8.86x10^{-6}$
			44.2 – 43.2	52.74	$6.35x10^{-6}$	$5.24x10^{-6}$
C	55.6	Limestone	39.8 – 38.8	53.11	$2.32x10^{-5}$	$1.9x10^{-5}$
			42.1 – 41.1	53.02	$3.18x10^{-5}$	$2.63x10^{-5}$
D	55.5	Limestone	42.0 – 41.0	52.85	$4.96x10^{-5}$	$3.97x10^{-5}$
			44.0 – 43.0	52.85	$1.89x10^{-5}$	$1.52x10^{-5}$
E	55.6	Limestone	41.6 – 40.6	52.96	$1.04x10^{-4}$	-
F	53.16	Limestone	31.92 – 30.92	52.8	$4.83x10^{-6}$	$3.63x10^{-6}$

3.3 Well Pump Test

A four day field pumping test was carried out on site. The pressure distribution was measured by piezometers on radial lines away from the well borehole. Previously excavated boreholes were also monitored for drawdown. The pumping test yielded a 1.3 l/s for a drawdown in the well of 7 m.

4.0 IMPLICATIONS OF PERMEABILITY RESULTS

An in-depth and accurate investigation and assessment of the sub surface's various permeabilities are required for the effective construction of the proposed basement. The initial investigations and reports on Monaghan once reviewed revealed that discrepancies had occurred. It was noted that the positions of the monitoring piezometers were mostly in gravels rather than rock. Any discrepancies within the site investigation during permeability testing can lead to the errors in the assessment of permeability to a factor of ten.

Further discrepancies were also noted in the calculations for drawdown, yield and inflow. Permeability of the gravels and limestone were given as 10^{-3} m/s but the well produced 10 m of drawdown for a yield of 5 l/s. This data is contradictory, either permeability is lower or the well was very inefficient. Groundwater modeling predicted an inflow of 825 l/s, which implies 160 number wells, would be required for dewatering. This is almost certainly wrong because the model used very high permeabilities, i.e. limestone k_h of 10^{-3} m/s and gravel k_h 5 x 10^{-2} m/s.

It was on this basis that a supplementary investigation and assessment was carried out. Rising and falling head tests in the gravels indicate permeabilities in the range of 10^{-3} to 10^{-4} m/s although the extent of the gravels is limited. The gravels may be related to the weathered surface of the limestone.

The limestone's permeability is in the range of 10^{-5} m/s. This is a typical moderately permeable rock. The consistency of the results (all over short, 1m test lengths) indicates that jointing is probably widespread but joint apertures are probably small. The highest permeability recorded was associated with the poorest quality rock in borehole E in the north west corner of the site which extended to 20 m depth.

The drawdowns observed in boreholes around the site during the pumping test were plotted as contours. The contours suggest an ENE – WSW elongation consistent with a feature within the limestone bedrock. This may have implications for settlement outside the site. General information suggests that the ground is at a higher elevation

to the north of the site and building are probably founded on the limestone above the water table. Risk of settlement damage in these areas should therefore be limited.

Small drawdowns, around 0.1 m, were observed at other locations including within the peat. It is not clear whether these are due to the pumping test or other factors such as changing river levels or generally drainage.

The southern section of the site may be vulnerable to dewatering settlement due to the depth of peat but buildings are generally piled in this area. This area needs to be investigated further and monitoring of water levels and ground settlement instigated. Recharge is not appropriate due to moderate permeabilities in the rock.

The effects of the temporary dewatering should be limited to the area immediately adjacent to the basement and should not impact on the adjacent buildings. However, possible vulnerable buildings will need to be identified and monitored.

5.0 PROPOSED MEASURES

Because of potential high permeabilities in the gravels and local stability a cut off to the rock is required. A deep cut off is considered to be inappropriate due to moderate rock permeability and the difficulty in forming a deep cut off in strong rock. A cut off generally penetrating 3 m into the rock (or less if "solid" rock is encountered) is a more effective solution. This will leave a substantial rock face exposed on one side of the excavation.

The excavation can be constructed using deep dewatering wells installed within the structure. Design of a dewatering scheme would be difficult to design in detail due to the variable conditions across the site. However, based upon experience and simple empirical calculations six to eight wells yielding 5 l/s with two wells at 10 to 20 l/s would probably suffice. Total flow for the site would be between 30 and 50 l/s.

Wells should be located inside the retaining walls, however on the NE side piles will be short and there will be an exposed face of rock.

There are two main options for the permanent works design.

1. Design the structure to resist full uplift pressure
2. Design it to be permanently drained.

Due to the significant flows of groundwater likely to be encountered and the difficulties of getting a long term abstraction licensed for such flows, the drained option is not recommended.

6.0 CONCLUSIONS

Ground water entry is expected during excavation of the basement in Monaghan. Exact flow rates are difficult to estimate due to the highly variable ground conditions on site. However, flows between 30 l/s and 50 l/s are anticipated. Groundwater entry could be temporarily controlled using deep wells within the confines of the excavation. The results of hydrogeological testing carried on site indicate that the effect of the temporary dewatering i.e. settlement, should be limited to the areas immediately adjacent to the basement and should not impact on the adjacent buildings.

References

British Standards Institute, Code of practice for earth retaining structures. BS 8002:1994(1994)

British Standards Institute, Code of practice for site investigations. BS 5930:1999 (1999)

CIRIA Research Project 548, Control of Groundwater for Temporary Works, (1997)

IGSL, Report on a Site Investigation Monaghan Retail Development No. 12633 *(report not complete at time of writing this report)*

Glover Site Investigations Ltd, Mixed Use Development Report No. 04-411 (2004)

Glover Site Investigations Ltd, Monaghan Mixed Use Development, Bedrock Probe Survey Report No. 05-021 (2005)

Hartwell, D. Groundwater Management Consultant, Summary Comments on Groundwater and Dewatering issues (Monaghan Design Meeting 19th June 2007)

Malone O' Regan Environmental Services Ltd, Monaghan Hydrogeological Assessment Report RT-NN-1257/02 (2007)

Malone O' Regan Environmental Services Ltd, Monaghan Hydrogeological Assessment Report – Impacts of Temporary Construction Works on Groundwater. RT-NN-1257/02 (2007)

MWH, Monaghan Hydrogeological Assessment Report RT-NN-1257/01 (2006)

Tomlinson, M. J. Foundation Design and Construction. 7th Edition, Pearson Education Ltd (2001)

DPT Mixed Use Developments Ltd | Church Hill | Clones | Co. Monaghan
Tel 00353 (0) 47 58888 | Fax 00353 (0) 47 58899
Email clarke@clarkeltd.com | www.clarkeltd.com

Monaghan Town Council
16 JUL 2007
Comhairle Baile Muineachain

The Planning Department
Monaghan Town Council
Dublin Street
Monaghan.

16th July 2007

Dear Sirs,

Re: Planning Application M.T. 06/75 DPT Mixed Use Development Ltd
Planning Condition 26.

We attach the following in connection with the above planning application condition.

Condition 26: Copy of the Hydrogeology Assessment

Yours sincerely

D. Mole

David Mole

Cc: Mr Kevin McNally

(1) ack
(2) copy to K. Mc Nally
(3) " " TE
(4) " " Planning
(5) File

Registered in R.O.I. Company No: 396256. Registered Office: Church Hill, Clones, Co. Monaghan

Appendix

7b

IGSL Ground Investigation Factual Report

IGSL Ltd

Client: Monaghan County Council

Engineer: RPS Group

Monaghan Town – South Dublin Street and Backlands Regeneration Scheme - Ground Investigation

Project No. 22412

October 2021

M7 Business Park
Naas
Co. Kildare
Ireland

T: +353 (45) 846176
E: info@igsl.ie
W: www.igsl.ie

DOCUMENT ISSUE REGISTER

Distribution	Copies	Rev.	Date of Issue	Prepared By:
RPS	Factual Report – by email (PDF)	0	25th of October 2021	Ciaran Killaly Chartered Geotechnical Engineer BE CEng MIEI

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FOREWORD
The following conditions and notes on the geotechnical site investigation procedures should be read in conjunction with this report.

Standards
The ground investigation works for this project have been carried out by IGSL in accordance with Eurocode 7 - Part 2: Ground Investigation & Testing (EN 1997-2:2007). This has been used together with complementary documents such as BS 5930:2015 and BS 1377 (Parts 1 to 9) and the following European Norms:

- EN 1997-2 Eurocode 7: 2007 – Geotechnical Design – Part 2: Ground Investigation & Testing
- EN ISO 22475-1:2006 Geotechnical Investigation and Sampling – Sampling Methods & Groundwater Measurements
- EN ISO 14688-1:2018 Geotechnical Investigation and Testing – Identification and Classification of Soil, Part 1: Identification and Description
- EN ISO 14688-2:2018 Geotechnical Investigation and Testing – Identification and Classification of Soil, Part 2: Classification Principles
- EN ISO 14689-1:2018 Geotechnical Investigation and Testing - Identification & Classification of Rock, Part 1: Identification & Description

Reporting
This report has been prepared for Monaghan County Council and RPS and the information should not be used without prior written permission of either party. IGSL Ltd accepts no responsibility or liability for this document being used other than for the purposes for which it was intended. No responsibility can be held by IGSL Ltd for ground conditions between exploratory hole locations.

The engineering logs provide ground profiles and configuration of strata relevant to the investigation depths achieved and caution should be taken when extrapolating between exploratory points. No liability is accepted for ground conditions extraneous to the investigation points. Unless specifically stated, no account has been taken of possible subsidence due to mineral extraction, mining works or karstification below or close to the site.

Boring Procedures
Unless otherwise stated, 'shell and auger' or cable percussive boring technique has been employed as defined by Section 6.3 of IS EN ISO 22475-1:2006. The boring operations, sampling and in-situ testing complies with the recommendations of IS EN 1997-2:2007 and BS 1377:1990 and EN ISO 22476-3:2005+A1:2011. The shell and auger boring technique allows for continuous sampling in clay and silt above the water table and sand and gravel below the water table (Table 2 of IS EN ISO 22475-1:2006).

It is highlighted that some disturbance and variations is unavoidable in particular ground (e.g. blowing sands, gravel / cobble dominant glacial deposits etc). Attention is drawn to this condition, whenever it is suspected. Where cobbles and boulders are recorded, no conclusion should be drawn concerning the size, presence, lithological nature, or numbers per unit volume of ground.

Rotary Drilling Procedures
Rotary drilling methods are used to recover very heavily over-consolidated glacial till and bedrock samples in line with Section 3.5 of IS EN 1997-2:2007 and IS EN ISO 22475-1. Open hole drilling methods (odex or symmetrix) are utilized to advance the drillholes through granular dominant superficial deposits, with coring in hard ('cemented') fine grained or cohesive glacial deposits and bedrock.

In-Situ Testing
Standard penetration tests are conducted by IGSL strictly in accordance with Section 4.6 of IS EN 1997-2:2007. The SPT equipment (hammer energy test) has been calibrated in accordance with EN ISO 22476-3:2005+A1:2011 and the Energy Ratio (E_r) is defined as the ratio of the actual energy E_{meas} (measured energy during calibration) delivered to the drive weight assembly into the drive rod below the anvil, to the theoretical energy (E_{theor}) as calculated from the drive weight assembly. The measured number of blows (N) reported on the engineering logs are uncorrected. In sands, the energy losses due to rod length and the effect of the overburden pressure should be taken into account (see IS EN ISO 22476-3:2005+A1:2011).

Groundwater
The depth of entry of any influx of groundwater is recorded during the course of boring or drilling operations. However, the normal rate of boring does not usually permit the recording of an equilibrium level for any one water strike. Where possible drilling is suspended for a period of twenty minutes to monitor the subsequent rise in water level. Groundwater conditions observed in the borings or pits are those appertaining to the period of investigation. It should be noted however, that groundwater levels are subject to diurnal, seasonal and climatic variations and can also be affected by drainage conditions, tidal variations etc.

Soil Sampling
Three categories of sampling methods are outlined in EN ISO 22475-1:2006. The categories are referenced A, B and C for any given ground conditions and are shown in Tables 1 and 2 of EN ISO 22475-1:2006. Reference should be made to EN 1997-2:2007 for guidelines on sample class and quality for strength and compressibility testing. Samples of quality classes 1 or 2 can only be obtained by using Category A sampling methods.

Where appropriate Class 1 thin wall undisturbed tube samples (UT100) are obtained in fine grained soils and strictly meet the requirements of EN 1997-2:2007 and EN ISO 22475-1:2006. Soil samples for laboratory tests are divided into five classes with respect to the soil properties that are assumed to remain unchanged during sampling, handling transport and storage. The minimum sample quality required for testing purposes to Eurocode 7 compatibility (EN 1997-2:2007) is shown in Table A.

Table A – Details of Sample Quality Requirements

EN 1997 Clause	Test	Minimum Sample Quality Class
5.5.3	Water Content	3
5.5.4	Bulk Density	2
5.5.5	Particle Density	N/S
5.5.6	Particle Size Analysis	N/S
5.5.7	Consistency Limits	4
5.5.8	Density Index	N/S
5.5.9	Soil Dispersivity	N/S
5.5.10	Frost Susceptibility	N/S
5.6.2	Organic Content	4
5.6.3	Carbonate Content	3
5.6.4	Sulphate Content	3
5.6.5	pH	3
5.6.6	Chloride Content	3
5.7	Strength Index	1
5.8	Strength Tests	1
5.9	Compressibility Tests	1
5.10	Compaction Tests	N/S
5.11	Permeability	2

N/S – not stated. Presume a representative sample of appropriate size.

Samples recovered from trial pits or trenches meet the requirements of IS EN ISO 22475-1. It is highlighted that unforeseen circumstances such as variations in geological strata may lead to lower quality sample classes being obtained.

Engineering Logging

Soil and rock identification is based on the examination of the samples recovered and conforms with IS EN ISO 14688-1:2018 and IS EN ISO 14689-1:2018. Rock weathering classification conforms to IS EN ISO 14689-1:2018 while discontinuities (bedding planes, joints, cleavages, faults etc) are classified in accordance with 4.3.3 of IS EN ISO 14689-1:2018. Rock mechanical indices (TCR, SCR, RQD) are defined in accordance with IS EN ISO 22475-1:2006.

Retention of Samples

After satisfactory completion of all the scheduled laboratory tests on any sample, the remaining material will be discarded. Unless a period of retention of samples is agreed, it is company policy to discard soil samples one month after submission of our final report.

1. INTRODUCTION

At the instruction of RPS, working on behalf of Monaghan County Council, IGSL has undertaken a programme of geotechnical site investigation works for the proposed regeneration project on Dublin Street.

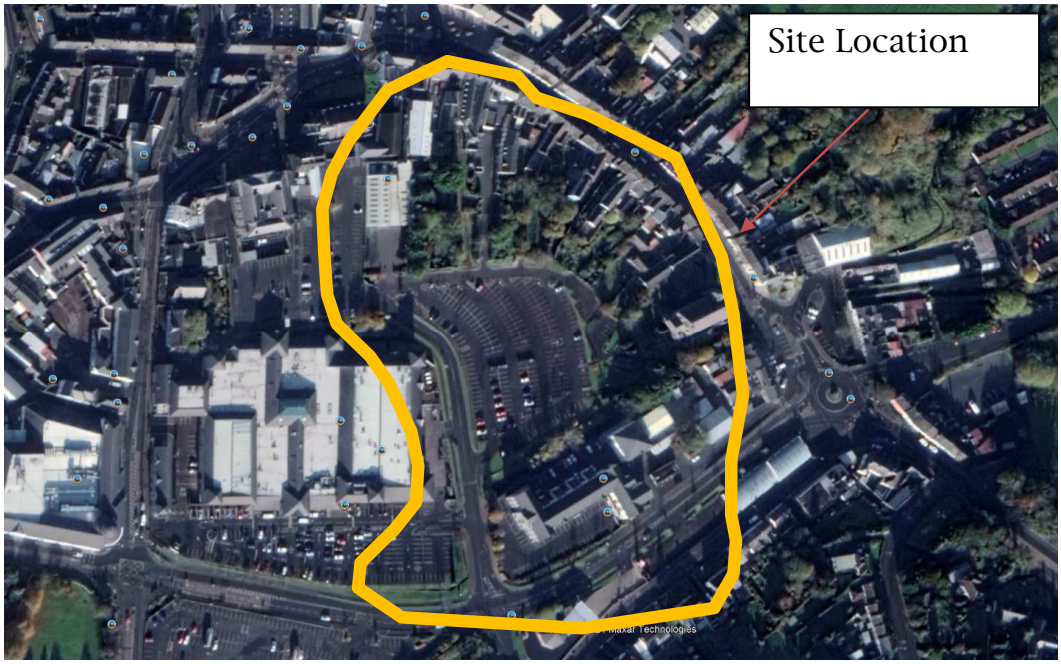
This report relates to the geotechnical investigation works acquired during the 2021 ground investigation works. The geotechnical investigatory works included cable percussive boreholes, rotary coreholes, trial pits, slit trenches, infiltration tests, associated laboratory testing and surveying.

The field investigations were executed in accordance with BS 5930, Code of Practice for Site Investigations (2015) and EN 1997-2 Eurocode 7 Part 2 Ground Investigation & Testing. Chemical laboratory testing was conducted by Chemtest on samples selected by the Employer's Representative.

Traffic Management was implemented by IGSL in accordance with the "Department of Transport Traffic Signs Manual- Chapter 8 Temporary Traffic Measures and signs for Roadworks". All Traffic management was installed and removed under the supervision of an IGSL Engineer with a Solas/FÁS CSCS Card in Lighting, Signing and Guarding at Roadworks.

This report presents the factual geotechnical data acquired from the site investigation.

Figure 1: Site Location Plan (Google Earth Image 2021)



2.0 CONTRACT OUTLINE & OBJECTIVES

The scope of work for this project was performed in one phase.

The primary objectives of the works were as follows:

- Determine the composition, consistency and strength / stiffness of the superficial soils
- Recover samples for Geotechnical and Environmental laboratory testing in accordance with the requirements of the Employer's Representative
- Establish the rockhead elevation, weathering profile, discontinuity characteristics and strength of the bedrock
- Identify the location of existing services
- Ascertain Infiltration paraments

3. FIELDWORKS

3.1 General

The geotechnical investigation was carried out from July to September 2021and comprised the following:

- Cable Percussive Borehole
- Rotary Coreholes
- Trial Pits
- Slit Trenches
- Infiltration testing
- Associated soil sampling
- Setting Out & Surveying

The ground investigations were executed in accordance with BS 5930, Code of Practice for Site Investigations (2015), EN 1997-2 Eurocode 7 Part 2 Ground Investigation & Testing and the Engineers Ireland Specification for Ground Investigation & related documents (2nd Edition 2016)

3.2 Cable Percussive Boreholes

The cable percussion boreholes (200mm diameter) were sunk using a Dando 2000 rig and employed conventional cable tool boring methods as outlined in the Foreword.

Representative bulk disturbed samples were taken at approximately 1.00m intervals or change of stratum and double sealed in polyethene bags. Environmental samples were taken as directed by the Employer's Representative and these included glass jars, a glass vial and a plastic tub.

Standard Penetration Tests (SPT's) were performed in the boreholes in accordance with Section 3.3, Part 9 of BS 1377 (1990). The SPT measures the number of blows required by a 63 kg hammer falling through a drop height of 760mm to drive a cone or a split spoon a distance of 300mm through the soil. Prior to the commencement of the test, the cone or split spoon is driven an initial distance of 150mm into the soil and the number of blows for this penetration depth are recorded as the "seating blows". The subsequent blowcounts for each 75mm increment (300mm) of penetration are recorded and summated to give the 'N-Value' as reported on the borehole log. The seating and test blow counts are reported in brackets with the N-Value recorded accordingly (e.g. BH001 at 1.2m where N=06 (4,4,3,0,2,1). The Energy Ratio for the SPT Hammer used on the contract is 77.09%(SPT Hammer No: SA4).

Details of the soils (strata) encountered, SPT N-Values, samples recovered and chiseling durations (hard strata boring) are presented on the boring records in Appendix 1.

3.2 Rotary Core Drillholes
Rotary core drilling was carried out using a tracked Commachio Geo 205 rig. Open hole drilling (odex) was employed in the superficial deposits (overburden) with air mist coring in the bedrock units. The rotary drilling produced 78mm diameter cores and total core recovery (TCR) was generally excellent (100% in the majority of the runs).

Standard Penetration Tests (SPT's) were performed in selected drillholes and given the nature of the soils, a solid cone was used. It is noted that the SPT N-Values reported are the number of blows for 300mm increment penetration. These exclude the seating blow values, which represent the initial 150mm depth of penetration. Where partial penetration was achieved during testing, the number of blows is shown for the actual penetration depth achieved.

The cores were placed in 3m capacity timber boxes and logged by an IGSL engineering geologist. This included photography of the cores with a digital camera. Where rock core was recovered, a graphic fracture log is also presented alongside the mechanical indices. This illustrates the fracture state of the rock cores and allows easy identification of highly fractured / non-intact zones and discontinuity spacings. It should be noted that no correction for dip of the joints has been made and that the spacings shown are successive joint / core intersections within the core. The core log records and photographs are presented in Appendix 1 of the factual report and include engineering geological descriptions, details of the bedding / discontinuities and mechanical indices (TCR, SCR and RQD's) for each core run.

A Groundwater monitoring standpipe was installed in RC001. The standpipes consisted of 50mm diameter HDPE pipework with proprietary 1mm slots and incorporated a pea gravel filter pack and cement / bentonite grout seal. Headwork covers were concreted in place.

Details of the soils (strata) encountered, SPT N-Values, samples recovered and chiseling durations (hard strata boring) are presented on the boring records in Appendix 2.

3.3 Trial Pits
The trial pits were undertaken using a 5 tonne tracked excavator. The pits were logged and sampled by an IGSL geotechnical engineer.

Representative disturbed bulk and environmental samples were taken as the pits were excavated, these were placed in heavy-duty polyethene bags and tubs and returned to the site laboratory for examination and laboratory testing. Environmental samples were taken as directed by the Employer's Representative and these included glass jars, a glass vial and a plastic tub.

The trial pits were backfilled with the as-dug arisings and reinstated to the satisfaction of the Employer's Representative. The trial pit logs are presented in Appendix 3 and include engineering descriptions of the soils encountered, samples recovered, groundwater strikes and stability of the pit sidewalls.

3.4 Slit Trenches
Slit trenches were excavated at locations specified by the Employer's Representative. Trenches were performed using a rubber tracked excavator and dug to a maximum depth of 1.50mbgl. The Slit Trenches were backfilled in accordance with the Department of the Environment "Guidelines for the opening, backfilling and reinstatement of trenches in public roads".

A detailed record of the depth, diameter and type of each service encountered within the trench is presented in Appendix 4. The soil profile provided on the slit trench logs describes the majority of the soils across the transverse trench. Where services have been located the material above the service and bedding material is described as Made Ground.

3.5 Infiltration Tests
One infiltration test was performed to assess the suitability of the sub-soils for dispersion of storm water through a soakaway system. The infiltration tests were performed in accordance with BRE

Digest 365 'Soakaway Design'. To obtain a measure of the infiltration rate of the sub-soils, water is poured into each test pit, and records taken of the fall in water level against time. The infiltration rate is the volume of water dispersed per unit of exposed area per unit of time, and is generally expressed as metres / minute or metres / second. Designs are based on the slowest infiltration rate, which is generally calculated from the final cycle. The final cycle soakaway test records are presented in Appendix 5.

3.6 Setting Out & Surveying

Following completion of the exploratory works, surveying was carried out using GPS and total station techniques. Co-ordinates (x, y) were measured to Irish Transverse Mercator Grid (ITM), the geographic coordinate system for Ireland with ground levels (z) established to Malin Head. The co-ordinates and ground levels are shown on the exploratory logs while the 'as-built' exploratory plans are presented in Appendix 9.

4. LABORATORY ANALYSIS

A programme of soil and rock laboratory testing has been carried out in accordance with BS 1377 and ISO 17892-9:2018. The test schedule was prepared by the Employer's Representative.

The soil laboratory testing comprised the following and the results are presented in Appendix 6:

- Moisture Content
- Atterberg Limits
- Particle Size Distribution
- Hydrometer
- Lab Shear Vanes
- 60 x 60mm shearbox

The rock laboratory testing comprised the following and the results are presented in Appendix 7:

- point load strength index

Chemical analyses were carried out on selected soil and water samples, by specialist accredited chemical laboratory, Chemtest. The chemical testing was scheduled by the Employer's Representative and the results are presented in Appendix 8.

References

1. BS 5930 (2015) Code of Practice for Site Investigation, British Standards Institution (BSI).

2. BS 1377 (1990) Methods of Testing of Soils for Civil Engineering Purposes, BSI.

3. Brown E.T., (1984) Rock Characterization Testing and Monitoring, ISRM Suggested Methods.

4. Site Investigation Practice: Assessing BS 5930 (1986), Geological Society Special Publication, No. 2.

5. IS EN 1997-2 Eurocode 7: 2007 – Geotechnical Design – Part 2: Ground Investigation & Testing

6. IS EN ISO 22475-1:2006 Geotechnical Investigation and Sampling – Sampling Methods & Groundwater Measurements

7. IS EN ISO 14688-1:2018 Geotechnical Investigation and Testing – Identification and Classification of Soil, Part 1: Identification and Description

8. IS EN ISO 14688-2:2018 Geotechnical Investigation and Testing – Identification and Classification of Soil, Part 2: Classification Principles

9. IS EN ISO 14689-1:2018 Geotechnical Investigation and Testing - Identification & Classification of Rock, Part 1: Identification & Description

10. Specification and related documents for Ground Investigation in Ireland, 2nd Edition(Engineers Ireland, 2016)

11. CIRIA C665:2007, Assessing risks posed by hazardous ground gases to buildings

Appendix 1 - Cable Percussive Borehole Records

GEOTECHNICAL BORING RECORD

REPORT NUMBER 23412

CONTRACT	Monaghan town	**BOREHOLE NO.**	**BH001**
		SHEET	Sheet 1 of 1
CO-ORDINATES	667,183.00 E 833,675.00 N	**RIG TYPE**	Dando 2000
		BOREHOLE DIAMETER (mm)	200
GROUND LEVEL (mOD)	56.65	**BOREHOLE DEPTH (m)**	3.60
		DATE COMMENCED	07/07/2021
		DATE COMPLETED	08/07/2021
CLIENT	Monaghan Co. Council	**SPT HAMMER REF. NO.**	SA4
ENGINEER	RPS	**ENERGY RATIO (%)**	77.09
		BORED BY	Wayne Bulter
		PROCESSED BY	M.Kluj

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples: Ref. Number	Sample Type	Depth (m)	Recovery	Field Test Results	Standpipe Details
0	MADE GROUND Loose grey sandy fine to medium angular GRAVEL. and is fie to coarse		56.40	0.25	AA163475	ENV	0.00-0.20			
					AA163476	ENV	0.30-0.50			
	MADE GROUND. Firm brown slightly gavelly sandy CLAY with low cobble content.Sand is fine to coarse. Gravel is fine to coarse angular to subrounded of various lithoogies. Cobbles are subangular of various lothologies. Contains brick, slate roof, martar, pottery, scrap metal, coal and ash.		55.75	0.90	AA153476	ENV	0.70-0.90			
1			55.55	1.10	AA163477	B	1.00-1.10			
			55.25	1.40	AA153477	B	1.10-1.40		N = 6 (4, 4, 3, 0, 2, 1)	
	Firm o#light orangish brown slightlly silty sandy CLAY with ocasional gravel. Sand is fine to coarse. Gravel is subangular fine to medium predominantly of limestone.		54.65	2.00	AA154151	B	2.00-2.50		N = 3 (1, 0, 1, 1, 0, 1)	
2										
	Medium dence loght yellowish brown to light greish brown slity fine to coarse SAND with occasinal gravel. Gravel is ine to medium predominantly of limestone.									
3					AA154152	B	3.00-3.60		N = 19 (2, 3, 5, 5, 4, 5)	
	Very soft dark bown sandu CLAY									
	Firm/stiff dark brown slightly gravelly sandy silty CLAY		53.05	3.60					N = 50/10 mm (25, 50)	
	Obstruction End of Borehole at 3.60 m									
4										
5										
6										
7										
8										
9										

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (h)	Comments
3.60	3.60	1.5	

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
3.60	3.60	No	3.55	20	Slow

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments
08-07-21	3.60	0.00	3.50	End of Borehole

REMARKS Set up Pedestrain Barriers and Covid safety Barriers

Sample Legend

D - Small Disturbed (tub)
B - Bulk Disturbed
LB - Large Bulk Disturbed
Env - Environmental Sample (Jar + Vial + Tub)
UT - Undisturbed 100mm Diameter Sample
P - Undisturbed Piston Sample
W - Water Sample

IGSL BH LOG 23412.GPJ IGSL.GDT 29/10/21

GEOTECHNICAL BORING RECORD

REPORT NUMBER 23412

CONTRACT	Monaghan town	**BOREHOLE NO.**	**BH003**
		SHEET	Sheet 1 of 1
CO-ORDINATES	667,285.00 E 833,623.00 N	**RIG TYPE**	Dando 2000
		BOREHOLE DIAMETER (mm)	200
GROUND LEVEL (mOD)	55.05	**BOREHOLE DEPTH (m)**	3.40
		DATE COMMENCED	09/07/2021
		DATE COMPLETED	09/07/2021
CLIENT	Monaghan Co. Council	**SPT HAMMER REF. NO.**	SA4
ENGINEER	RPS	**ENERGY RATIO (%)**	77.09
		BORED BY	Wayne Bulter
		PROCESSED BY	C.Killaly

Depth (m)	Description	Legend	Elevation	Depth (m)	Samples: Ref. Number	Sample Type	Depth (m)	Recovery	Field Test Results	Standpipe Details
0	MADE GROUND comprised of Tarmcadam				AA154153	ENV	0.00-0.20			
			54.55	0.50	AA154153	ENV	0.30-0.50			
	MADE GROUND comrpised of grey clayey sandy Gravel with medium cobble content(Cl 804)				AA154153	ENV	0.70-0.90			
1					AA154153	B	1.00-1.50		N = 50 (5, 10, 18, 12, 18, 2)	
2			52.85	2.20	AA154154	B	2.00-2.00		N = 60/225 mm (9, 15, 18, 32, 10)	
	MADE GROUND comprised of brown clayey sandy GRAVEl with medium cobble content		52.75	2.30	AA154155	B	2.20-2.30			
	MADE GROUND comrpised of grey clayey sandy Gravel with medium cobble content(Cl 804)				AA154156	B	3.00-3.40		N = 50/75 mm (25, 50)	
3			51.65	3.40					N = 50/75 mm (25, 50)	
	Obstruction End of Borehole at 3.40 m									
4										
5										
6										
7										
8										
9										

HARD STRATA BORING/CHISELLING

From (m)	To (m)	Time (h)	Comments
1.20	2.00	2	Hard Stratum Boring
3.20	3.40	1.5	

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
					No water strike

GROUNDWATER PROGRESS

Date	Hole Depth	Casing Depth	Depth to Water	Comments

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type

REMARKS Set up Pedestrain Barriers and Covid safety Barriers

Sample Legend
D - Small Disturbed (tub)
B - Bulk Disturbed
LB - Large Bulk Disturbed
Env - Environmental Sample (Jar + Vial + Tub)
UT - Undisturbed 100mm Diameter Sample
P - Undisturbed Piston Sample
W - Water Sample

IGSL BH LOG 23412.GPJ IGSL.GDT 29/10/21

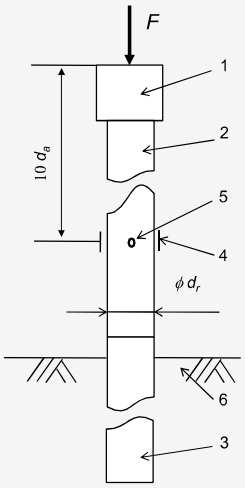
SPT Calibration Report

Hammer Energy Measurement Report

Type of Hammer		SPT HAMMER
Test No		EQU2657
Client		IGSL
Test Depth (m)		10.00
Mass of hammer	m =	63.5kg
Falling height	h =	0.76m
E_{theor} =	$m \times g \times h$ =	473J

Characteristics of the instrumented rod

Diameter	d_r =	0.052 m
Length of instrumented rod		0.558 m
Area	A =	11.61 cm²
Modulus	E_a =	206843 MPa



Key

1 Anvil
2 Part of instrumented rod
3 Drive Rod
4 Strain Gauge
5 Accelerometer
6 Ground

F Force
d_r Diameter of rod

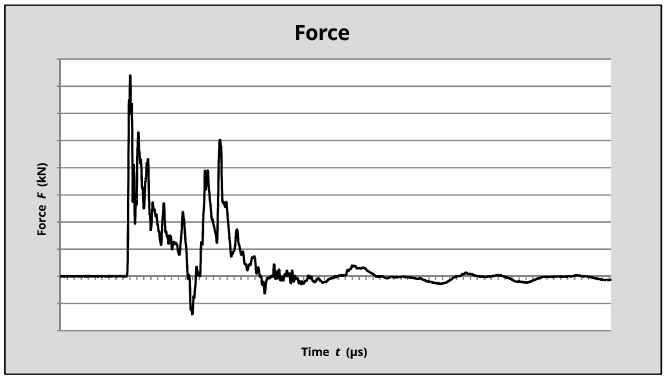
Fig. B.1 and B.2
BS EN ISO 22476-3 : 2005 + A1 : 2011

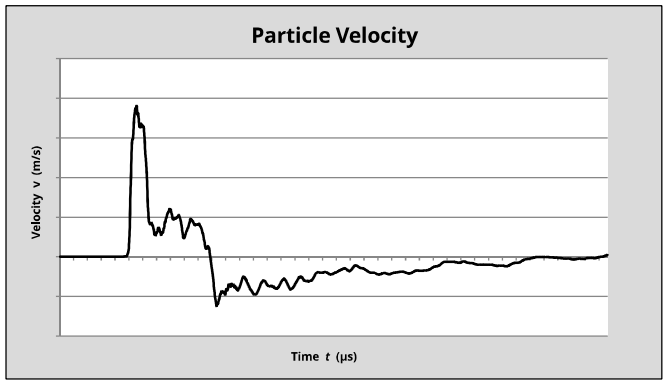
DATE OF TEST	VALID UNTIL	HAMMER ID
18/12/2020	18/12/2021	SA4

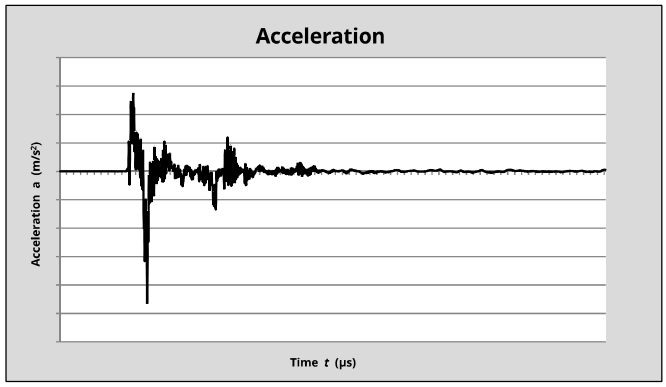
E_{meas} = **0.365** kN-m

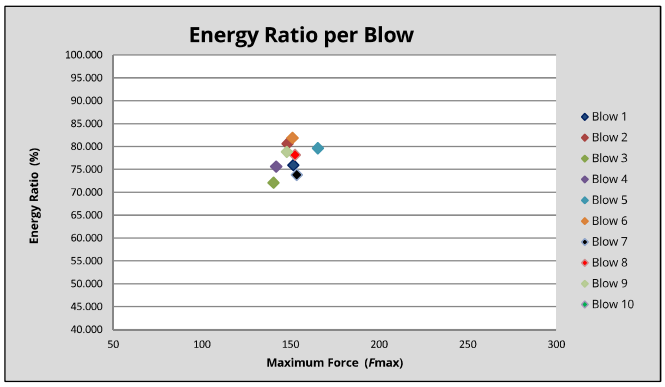
E_{theor} = **0.473** kN-m

Comments









Energy Ratio (Er) = $\frac{E_{meas}}{E_{theor}}$

77.16%

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Equipe SPT Analyzer Operator	Certificate prepared by	Certificate checked by	Certificate date
JML			07/01/2021

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Tel: +44 (0)1295 670990 Fax: +44 (0)1295 678232 Email: info@equipegroup.com

Appendix 2 - Rotary Corehole Records

GEOTECHNICAL CORE LOG RECORD

REPORT NUMBER 23412

CONTRACT	Monaghan Town	**DRILLHOLE NO**	**RC01**
		SHEET	Sheet 1 of 2
CO-ORDINATES	667,183.00 E 833,675.00 N	**RIG TYPE**	GEO-205
GROUND LEVEL (mOD)	56.65	**FLUSH**	Air/Mist
		DATE COMMENCED	15/09/2021
		DATE COMPLETED	15/09/2021
CLIENT	Monaghan Co. Council	**INCLINATION (deg)**	-90
ENGINEER	RPS	**CORE DIAMETER (mm)**	78
		DRILLED BY	IGSL
		LOGGED BY	D.O'Shea

Downhole Depth (m)	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture Spacing Log (mm) 0 250 500	Non-intact Zone	Legend	Description	Depth (m)	Elevation	Standpipe Details	SPT (N Value)
0								SYMMETRIX DRILLING: No recovery, observed by driller as returns of MADE GROUND grey sandy fine to medium angular gravel	0.90	55.75		
1								SYMMETRIX DRILLING: No recovery, observed by driller as returns of light orangish brown slightly silty sandy CLAY with occasional gravel. Sand is fine to coarse. Gravel is subangular fine to medium predominantly of limestone.	1.10 1.40	55.55 55.25		
2								SYMMETRIX DRILLING: No recovery, observed by driller as returns of light yellowish brown to light greyish brown silty fine to coarse SAND with occasional gravel. Gravel is ine to medium predominantly of limestone.	2.00	54.65		
3								SYMMETRIX DRILLING: No recovery, observed by driller as returns of dark bown sandy CLAY SYMMETRIX DRILLING: No recovery, observed by driller as returns of dark brown slightly gravelly sandy silty CLAY	3.60	53.05		
4								SYMMETRIX DRILLING: No recovery, observed by driller as returns of clayey sandy gravel with occasional cobbles				
5									5.60	51.05		
6	6.10							SYMMETRIX DRILLING: No recovery, observed by driller as returns of probable ROCK	6.10	50.55		
7	7.10	100	59	56				Very strong to locally medium strong, thickly to thinly bedded, pale blueish grey to dark grey, fine-grained, LIMESTONE (local muddy layers, local stylolites, locally fossiliferous, common chert layers), fresh to locally slightly weathered. Very local shale layer at 9.71-9.79m Discontinuities are widely to closely spaced, smooth to locally rough, planar. Apertures are tight to locally open, locally clay/gravel filled (at 6.79-7.21m, 7.86-7.89m, 9.17-9.21m, 9.49-9.55m, 9.71-9.79m & 10.12-10.15m), locally slightly iron-oxide stained, locally quartz-veined (1-2mm thick). Dips are subhorizontal & locally 80°				
		100	42	16								
8	8.10				670.000000000001							
9		100	94	81	529.999999999999							
	9.50											

REMARKS

Hole cased 0.00-6.10m. Erect Covid-19 Safe Zone - 1hr.

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
5.60	5.60	N/S			Slow

GROUNDWATER DETAILS

Date	Hole Depth	Casing Depth	Depth to Water	Comments

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type
15-09-21	11.00	1.00	11.00	50mm SP

IGSL RC FI 10M 23412.GPJ IGSL.GDT 28/10/21

GEOTECHNICAL CORE LOG RECORD

REPORT NUMBER 23412

CONTRACT	Monaghan Town	**DRILLHOLE NO**	**RC01**
		SHEET	Sheet 2 of 2
CO-ORDINATES	667,183.00 E 833,675.00 N	**DATE COMMENCED**	15/09/2021
GROUND LEVEL (mOD)	56.65	**DATE COMPLETED**	15/09/2021
CLIENT	Monaghan Co. Council	**DRILLED BY**	IGSL
ENGINEER	RPS	**LOGGED BY**	D.O'Shea
RIG TYPE	GEO-205		
FLUSH	Air/Mist		
INCLINATION (deg)	-90		
CORE DIAMETER (mm)	78		

Downhole Depth (m)	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture Spacing Log (mm) 0 250 500	Non-intact Zone	Legend	Description	Depth (m)	Elevation	Standpipe Details	SPT (N Value)
10		100	81	78								
	11.00							End of Borehole at 11.00 m	11.00	45.65		
11												
12												
13												
14												
15												
16												
17												
18												
19												

REMARKS

Hole cased 0.00-6.10m. Erect Covid-19 Safe Zone - 1hr.

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
5.60	5.60	N/S			Slow

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type
15-09-21	11.00	1.00	11.00	50mm SP

GROUNDWATER DETAILS

Date	Hole Depth	Casing Depth	Depth to Water	Comments
15-09-21	11.00	6.10	3.70	Water level recorded 5 mins after end of drilling.

IGSL RC FI 10M 23412.GPJ IGSL.GDT 28/10/21

GEOTECHNICAL CORE LOG RECORD

REPORT NUMBER 23412

CONTRACT	Monaghan Town	**DRILLHOLE NO**	**RC02**
		SHEET	Sheet 1 of 2
CO-ORDINATES	667,215.00 E 833,691.00 N	**DATE COMMENCED**	14/09/2021
GROUND LEVEL (mOD)	57.38	**DATE COMPLETED**	14/09/2021
CLIENT	Monaghan Co. Council	**DRILLED BY**	IGSL
ENGINEER	RPS	**LOGGED BY**	D.O'Shea
RIG TYPE	GEO-205		
FLUSH	Air/Mist		
INCLINATION (deg)	-90		
CORE DIAMETER (mm)	78		

Downhole Depth (m)	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture Spacing Log (mm) 0 250 500	Non-intact Zone	Legend	Description	Depth (m)	Elevation	Standpipe Details	SPT (N Value)
0								SYMMETRIX DRILLING: No recovery, observed by driller as returns of MADE GROUND comprised of clayey gravel				
1									1.40	55.98		N = 8 (1, 0, 1, 2, 2, 3)
2								SYMMETRIX DRILLING: No recovery, observed by driller as returns of grey/brown sandy gravelly CLAY	2.70	54.68		
3								SYMMETRIX DRILLING: No recovery, observed by driller as returns of grey/light brown clayey sandy GRAVEL				N = 18 (2, 2, 3, 4, 6, 5)
4												
5	4.90								4.80	52.58		N = 71/210 mm (3, 3, 3, 18, 50)
								SYMMETRIX DRILLING: No recovery, observed by driller as returns of probable ROCK	4.90	52.48		
		100	47	37				Returns of stiff dark brown slightly sandy slightly gravelly CLAY. Sand iis fine to coarse. Gravel is angular to subrounded fine to coarse of limestone.	5.50	51.88		
6	6.10							Very strong to locally medium strong, thickly to thinly bedded, pale blueish grey to dark grey, fine-grained, LIMESTONE (local muddy layers, local stylolites, locally fossiliferous, common chert layers), fresh to locally slightly weathered.				
		100	85	49	609.9999999999999			Discontinuities are widely to closely spaced, smooth to locally rough, planar. Apertures are tight to locally open, locally clay/gravel filled (at 6.16-6.20m), locally slightly iron-oxide stained, locally quartz-veined (1-4mm thick). Dips are subhorizontal & locally 80°				
7	7.70											
8		100	68	62	510							
9	9.30											

REMARKS

Hole cased 0.00-4.90m. Erect Covid-19 Safe Zone - 1hr.

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
					No water strike recorded

GROUNDWATER DETAILS

Date	Hole Depth	Casing Depth	Depth to Water	Comments

INSTALLATION DETAILS

Date	Tip Depth	RZ Top	RZ Base	Type

GEOTECHNICAL CORE LOG RECORD

REPORT NUMBER 23412

CONTRACT	Monaghan Town	**DRILLHOLE NO**	**RC02**
		SHEET	Sheet 2 of 2
CO-ORDINATES	667,215.00 E 833,691.00 N	**DATE COMMENCED**	14/09/2021
GROUND LEVEL (mOD)	57.38	**DATE COMPLETED**	14/09/2021
CLIENT	Monaghan Co. Council	**DRILLED BY**	IGSL
ENGINEER	RPS	**LOGGED BY**	D.O'Shea
RIG TYPE	GEO-205		
FLUSH	Air/Mist		
INCLINATION (deg)	-90		
CORE DIAMETER (mm)	78		

Downhole Depth (m)	Core Run Depth (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture Spacing Log (mm) 0 250 500	Non-intact Zone	Legend	Description	Depth (m)	Elevation	Standpipe Details	SPT (N Value)
10		100	87	65								
	10.80								10.80	46.58		
11								End of Borehole at 10.80 m				
12												
13												
14												
15												
16												
17												
18												
19												

REMARKS

Hole cased 0.00-4.90m. Erect Covid-19 Safe Zone - 1hr.

WATER STRIKE DETAILS

Water Strike	Casing Depth	Sealed At	Rise To	Time (min)	Comments
					No water strike recorded

GROUNDWATER DETAILS

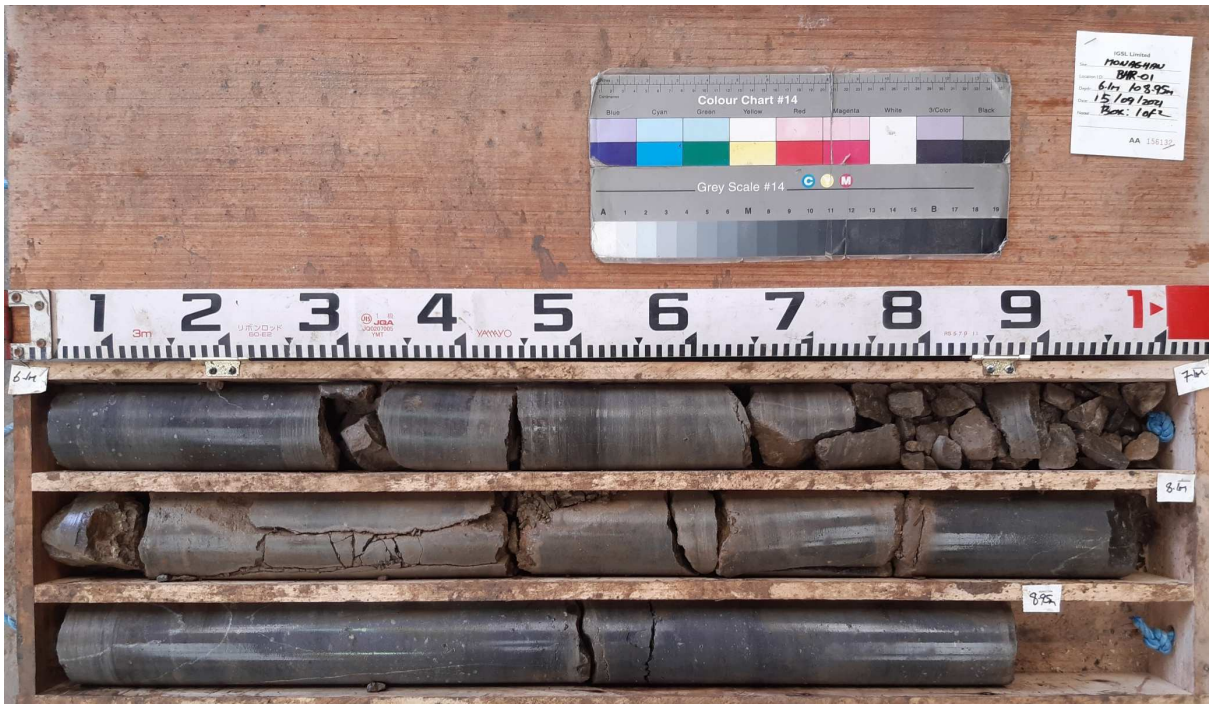
Date	Hole Depth	Casing Depth	Depth to Water	Comments
14-09-21	10.80	4.90	9.70	Water level recorded 5 mins after end of drilling.

INSTALLATION DETAILS

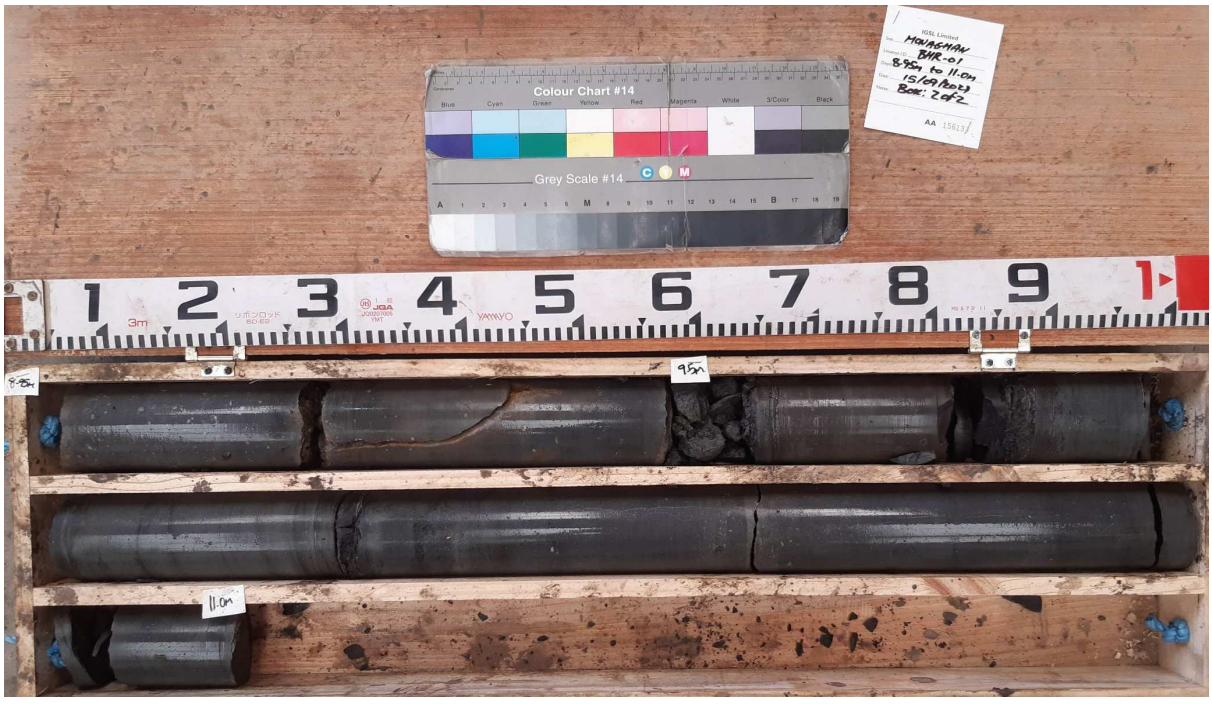
Date	Tip Depth	RZ Top	RZ Base	Type

IGSL RC FI 10M 23412.GPJ IGSL.GDT 28/10/21

RC01 Box 1 of 2 – 6.10-8.95m



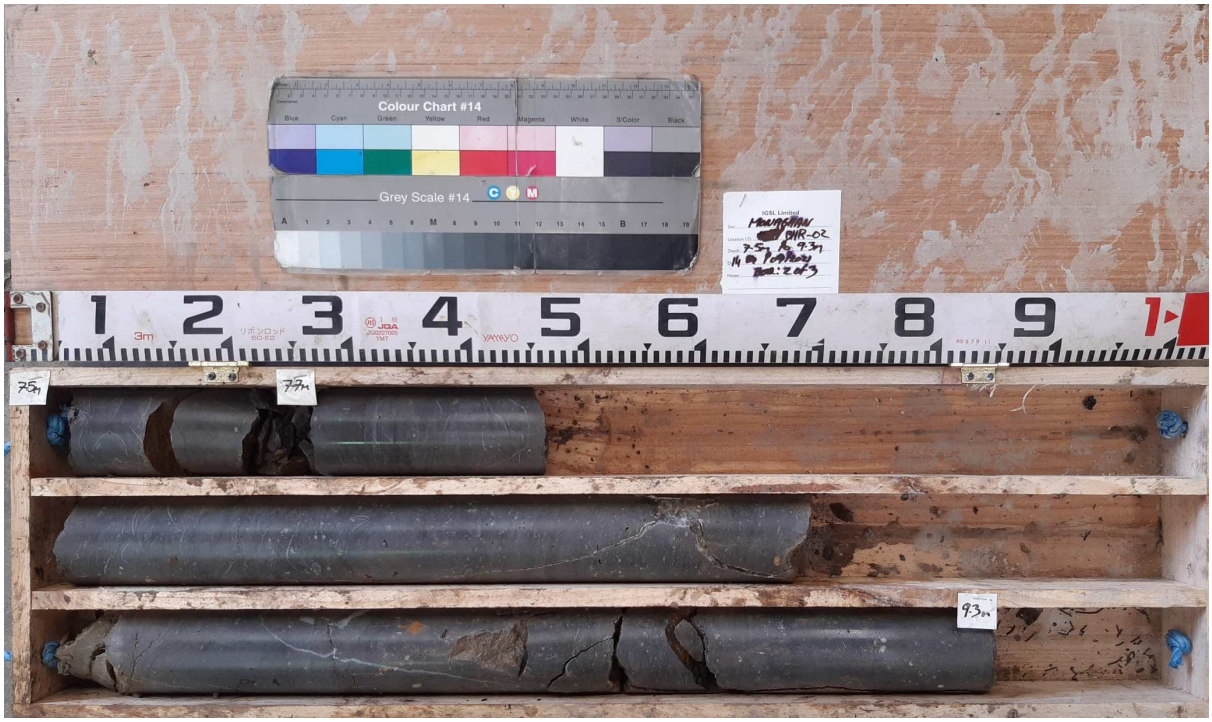
RC01 Box 2 of 2 – 8.95-11.00m



RC02 Box 1 of 3 – 4.90-7.50m



RC02 Box 2 of 3 – 7.50-9.30m



RC02 Box 3 of 3 – 9.30-10.80m



Appendix 3 - Trial Pit Records

TRIAL PIT RECORD

REPORT NUMBER 23412

CONTRACT	Monaghan Town	**TRIAL PIT NO.**	**TP01**
		SHEET	Sheet 1 of 1
LOGGED BY	M.Kluj	**CO-ORDINATES**	667,277.23 E 833,676.58 N
		DATE STARTED	01/07/2021
		DATE COMPLETED	01/07/2021
CLIENT	Monaghan Co. Council	**GROUND LEVEL (m)**	58.60
ENGINEER	RPS	**EXCAVATION METHOD**	3 T exavator

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0 TOPSOIL Unstable sites									
MADE GROUND. Firm brown locally light brownish grey slightly gravelly very sandy CLAY with low cobble and boulder content. Contains fragments of glass pottery, scrap metal, brick, slate roof tiles, lime mortar and ash. Sand is fine to coarse. Gravel is fine to coarse angular to subrounded of varius lithologies.		0.25	58.35		AA167597	B	0.30-0.50		
Firm light orangish brown slightly silty slightly gravelly sandy CLAY. Sand is fine to coarse. Gravel is fine to medium subangular predominantly of limestone.		0.90	57.70		AA157598	B	1.00-1.20	70 20[R]	
Medium dence light brown slightly sandy very clayey fine to coarse angular to subrounded GRAVEL with medium cobble and boulder content. Sand is fine to coarse. Gravel is of limestone. Cobbles and bolders are angular and subangular of limestone.		1.40	57.20		AA167598	B	1.50-1.70		
End of Trial Pit at 1.90m		1.90	56.70						

Groundwater Conditions
None

Stability
Moderate

General Remarks

TRIAL PIT RECORD

REPORT NUMBER 23412

CONTRACT	Monaghan Town	**TRIAL PIT NO.**	**TP02**
		SHEET	Sheet 1 of 1
LOGGED BY	M.Kluj	**CO-ORDINATES**	667,293.35 E 833,714.64 N
		DATE STARTED	06/07/2021
		DATE COMPLETED	06/07/2021
CLIENT	Monaghan Co. Council	**GROUND LEVEL (m)**	59.89
ENGINEER	RPS	**EXCAVATION METHOD**	1.9 T exavator

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
CONCRETE Unstable sites		0.10	59.79						
MADE GROUND. Loose grey sandy fine to coarse angular to subrunded GRAVEL with medium cobble and boulder content. Contains brick, fragments of cast iron and lead. Sand is fine to coarse. Cobbles and boulders are angular to subrounded of various lithologies.		0.30	59.59		AA167599	B	0.40-0.60		
MADE GROUND. Loose brown slightly clayey snady fine to coarse angular GRAVEL with low cobble and boulder content. Contains brick, slate tiles, glass, scrap metal, lime mortar, ash, timber and coal. Sand is fine to coarse. Cobbles and boulders are subangular to subrounded predominantly of sandstone and limestone.		0.70	59.19		AA157600	B	0.70-0.90	66 20[R]	
Firm light orangish brown slightly silty slightly gravelly sandy CLAY. Sand is fine to coarse. Gravel is fine to medium subangular predominantly of limestone.		0.90	58.99		AA167600	B	1.20-1.40		
Medium dence light brown slightly sandy very clayey fine to coarse angular to subrounded GRAVEL with medium cobble and boulder content. Sand is fine to coarse. Gravel is of limestone. Cobbles and bolders are angular and subangular of limestone.		1.70	58.19						
End of Trial Pit at 1.70m									

Groundwater Conditions
None

Stability
Moderate

General Remarks

IGSL TP LOG 23412.GPJ IGSL.GDT 28/10/21

TRIAL PIT RECORD

REPORT NUMBER 23412

CONTRACT	Monaghan Town	**TRIAL PIT NO.**	**TP03**
		SHEET	Sheet 1 of 1
LOGGED BY	M.Kluj	**CO-ORDINATES**	667,302.94 E 833,732.40 N
		DATE STARTED	06/07/2021
		DATE COMPLETED	06/07/2021
CLIENT	Monaghan Co. Council	**GROUND LEVEL (m)**	59.88
ENGINEER	RPS	**EXCAVATION METHOD**	1.9 T exavator

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
CONCRETE Restricted access		0.12	59.76						
MADE GROUND. Firm brown locally light brownish grey slightly gravelly very sandy CLAY with low cobble and boulder content. Contains fragments of lead pipes glass pottery brick, slate roof tiles, lime mortar. Sand is fine to coarse. Gravel is fine to coarse subangular of various lithologis.					AA163474	B	0.30-0.50		
Firm light orangish brown slightly silty slightly gravelly sandy CLAY. Sand is fine to coarse. Gravel is fine to medium subangular predominantly of limestone.		1.05	58.83		AA153474	B	1.00-1.20	64 20[R]	
End of Trial Pit at 1.00m		1.20	58.68						

Groundwater Conditions
None

Stability
Good

General Remarks

IGSL TP LOG 23412.GPJ IGSL.GDT 28/10/21

FOUNDATION INSPECTION PIT RECORD

REPORT NUMBER

23412

CONTRACT: Monaghan town

LOCATION: TP03

LOGGED BY: M.Kluj

Date of survey:06/07/2021



TRIAL PIT NO. **TP03**

SHEET Sheet 1 of 1



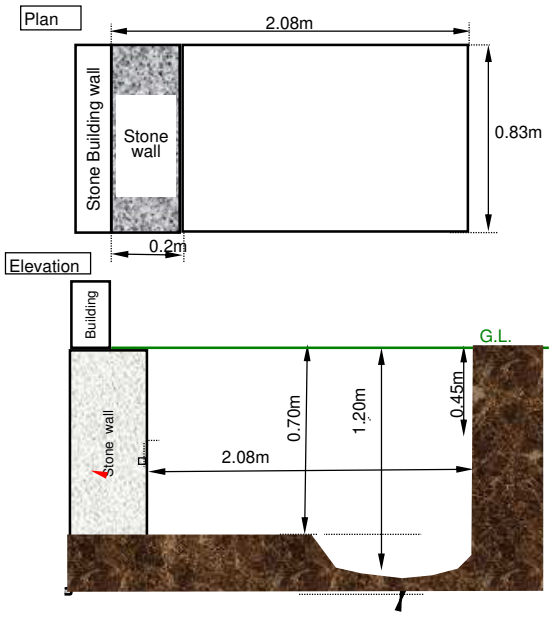
Summary of ground conditions

from	to	Description	Ground water
0.00	0.10	CONCRETE	DRY
0.10	1.05	MADE GROUND. Firm brown locally light brownish grey slightly gravelly very sandy CLAY with	
1.05	1.20	Firm light orangish brown slightly silty slightly gravelly sandy CLAY. Sand is fine to coarse.	
		RHS concrete (possibly duckt) 0.45m below the surface from 1.35m	

NOTICE: Sample bag taken noted in TP log

LOCATION **TP03**

DETAIL



Appendix 4 - Slit Trench Records

Report No. 23412	SLIT TRENCH RECORD	FACING DIRECTION: N	IGSL

		Survey				
Project: Monaghan Town		Easting (m)	Northing (m)	Elevation (mOD)	Slit Trench No.	ST001
Engineer: RPS					Sheet	1 of 1
Crew: M.Kluj, Flanagan	Start of Trench	667230.379	833668.814	62.125	Date Commenced	01.07.2021
	End of Trench	667234.178	833669.642	56.593	Date Completed	01.07.2021

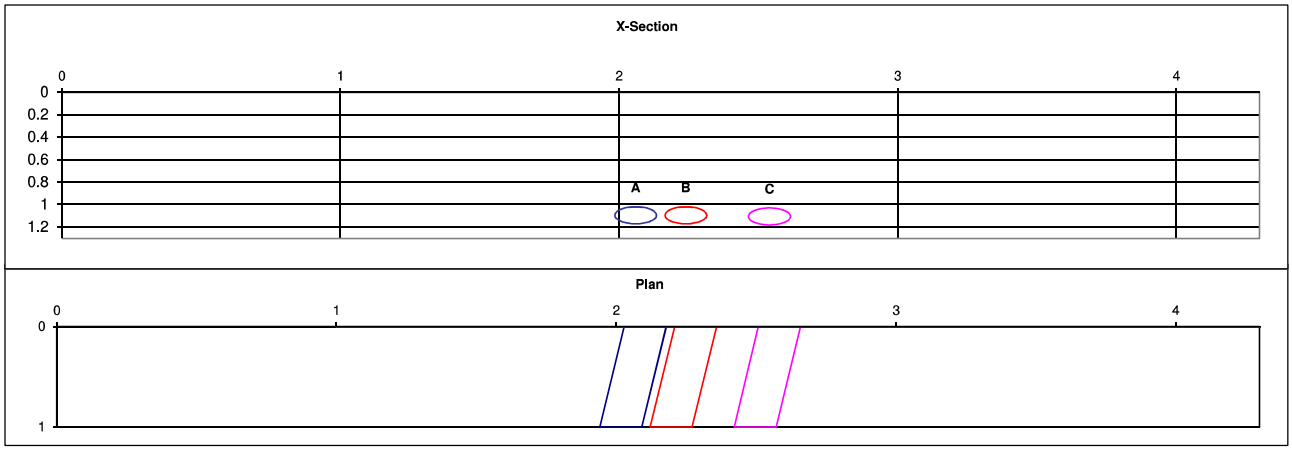
Ground Conditions

From (m)	To (m)	Soil Description
0.00	0.15	TOPSOIL
0.15	1.30	occasional small boulder and roots and rootlets Sand is fine to coarse. Gravel is fine to coarse. Contains fragments of brick, glass, pottery, slte roof tiles, wood, cables,

Photograph



Trench Dimensions		Location	Excavation Quantities		
LHS of Trench (m)	0.00		Surface	Length (m)	Material
RHS of Trench (m)	4.30		Footpath		
Trench Depth (m)	1.30		Drain(LHS)		
Trench Width (m)	1.00		Drain (RHS)		
			Grass Verge (LHS)	4.30	MADE GROUND
			Grass Verge (RHS)		
Facing Direction	0	SAMPLES	Other		
Facing Features	looking towars th wall on the LHS		Total Length	4.30	
Groundwater	None		Zero Metres Taken As: LHS		



	Diameter (mm)	Material	Description	Distance (m)	Depth to crown (m)	Angle (deg.)
Service A	150	Red PVC	LIVE ESB with warning tape	2.06	1.02	85
Service B	150	Red PVC	LIVE ESB with warning tape	2.24	1.02	85
Service C	150	Red PVC	LIVE ESB with warning tape	2.54	1.03	85
Service D						
Service E						
Service F						
Service G						
Service H						
Service I						
Service J						
Service K						
Service L						
Service M						

Report No. 23412	SLIT TRENCH RECORD	FACING DIRECTION: S	N / W / E / S	IGSL

		Survey				
Project: Monaghan Town		Easting (m)	Northing (m)	Elevation (mOD)	Slit Trench No.	ST002
Engineer: RPS					Sheet	1 of 1
Crew: M.Kluj, Flanagan	Start of Trench	667250.84	833656.96	56.1	Date Commenced	07.07.2021
	End of Trench	667244.843	833657	56.0	Date Completed	08.07.2021

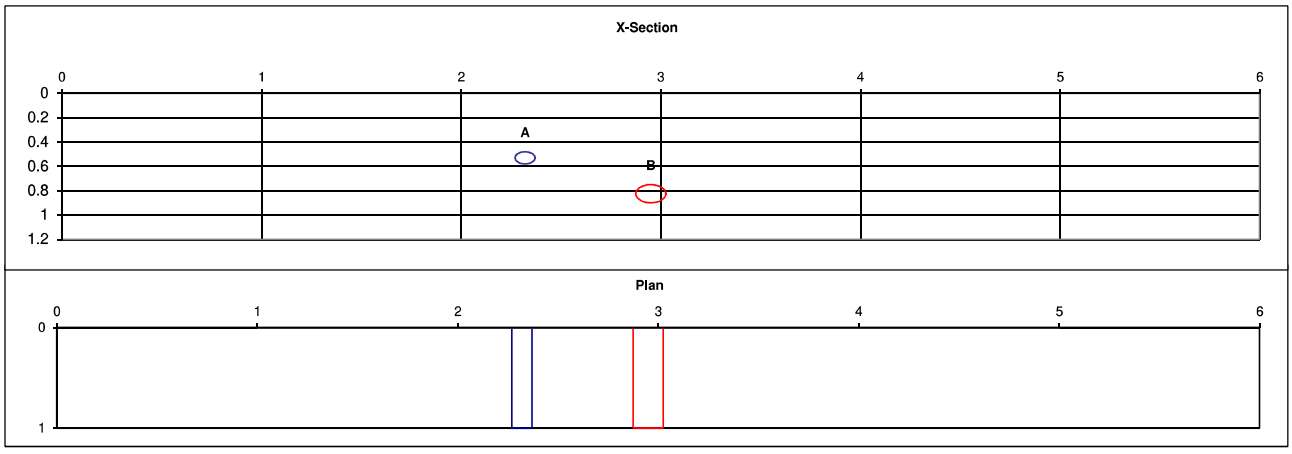
Ground Conditions

From (m)	To (m)	Soil Description
0.00	0.07	MACADAM
0.07	0.48	Loose grey sandy fine to coarse angular limestone GRAVEL with low cobble content. Sand is fine to coarse. coarse. Cobbles and boulder are angular off limestone
0.48	1.10	Medium dence light yellowish brown and light greish brown slightly gravelly silty fine to coarse SAND. Gravel is fine to medium subangular predominantly of limestone.
1.10	1.20	Dence dence orangish brown slightly sandy fine to coarse subangular of limestone GRAVEL with low cobble content and occasional boulder. Sand is fine to coarse.

Photograph



Trench Dimensions		Location	Excavation Quantities		
LHS of Trench (m)	0.00		Surface	Length (m)	Material
RHS of Trench (m)	6.00		Road	4.20	Macadam
Trench Depth (m)	1.20		Path(LHS)+13cm curb	1.80	Concrete
Trench Width (m)	1.00		Drain (RHS)		
			Grass Verge (LHS)		
			Grass Verge (RHS)		
Facing Direction	186	SAMPLES	Other		
Facing Features	Looking towords overflow carpark	B 0.60-0.90 AA153475	Total Length	6.00	
Groundwater	None		Zero Metres Taken As: LHS		



	Diameter (mm)	Material	Description	Distance (m)	Depth to crown (m)	Angle (deg.)
Service A	100	Blue PVC	Water with pea gravel and tape	2.32	0.48	90
Service B	150	Red PVC	Live ESB with pea gravel and tape	2.95	0.75	90
Service C						
Service D						
Service E						
Service F						
Service G						
Service H						
Service I						
Service J						
Service K						
Service L						
Service M						

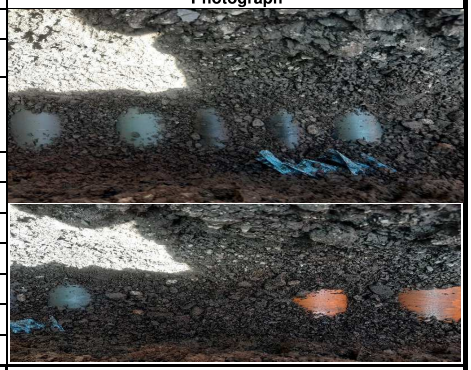
Report No. 23412	SLIT TRENCH RECORD	FACING DIRECTION: NE	IGSL

		Survey				
Project: Monaghan Town		Easting (m)	Northing (m)	Elevation (mOD)	Slit Trench No.	ST003
Engineer: RPS					Sheet	1 of 1
Crew: M.Kluj, Flanagan	Start of Trench	667284.201	833672.693	58.342	Date Commenced	30.06.2021
	End of Trench	667287.841	833671.159	58.457	Date Completed	30.06.2021

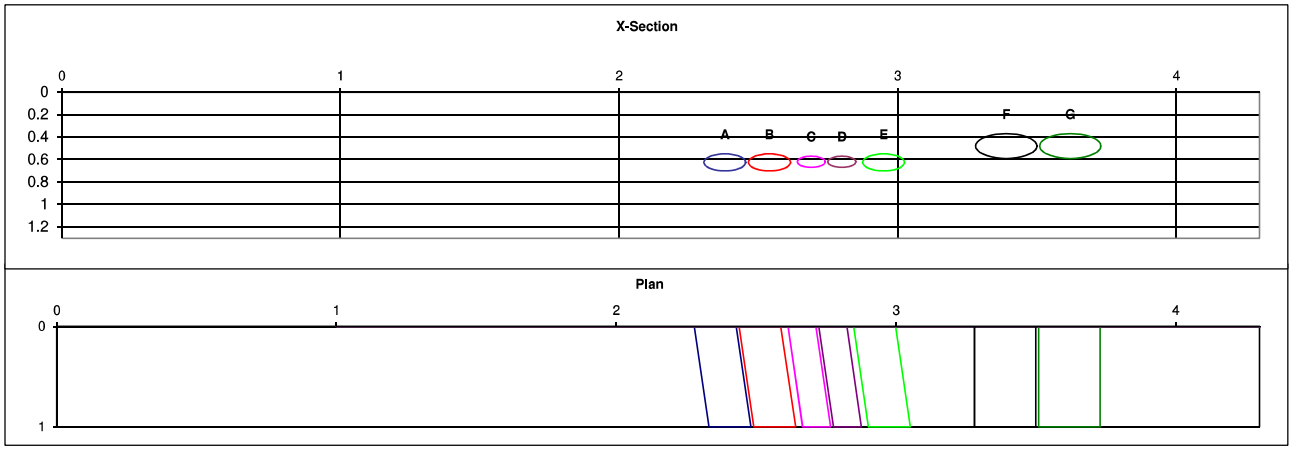
Ground Conditions

From (m)	To (m)	Soil Description
0.00	0.08	Brick concrete pavers
0.08	0.48	MADED GROUND. Loose grey very sandy fine to medium angular limestone GRAVEL. Sand is fine to coarse.
0.48	1.30	MADE GROUND brown to dark brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is fine to coarse angular to sbrounded of various lithologes. Contains brick, glass, plastic, pottery, lime mortar, bones, ash.

Photograph



Trench Dimensions		Location	Excavation Quantities		
LHS of Trench (m)	0.00		Surface	Length (m)	Material
RHS of Trench (m)	4.30		Footpath	4.30	Concrete pavers
Trench Depth (m)	1.30		Drain(LHS)		
Trench Width (m)	1.00		Drain (RHS)		
			Grass Verge (LHS)		
			Grass Verge (RHS)		
Facing Direction	30	SAMPLES	Other		
Facing Features	looking towards the diamont		Total Length	4.30	
Groundwater	None		Zero Metres Taken As: LHS		



	Diameter (mm)	Material	Description	Distance (m)	Depth to crown (m)	Angle (deg.)
Service A	150	Grey PVC	pea gravel and tape	2.38	0.55	93
Service B	150	Light grey PVC	pea gravel and tape	2.54	0.55	93
Service C	100	Black PVC	water pea gravel and tape	2.69	0.57	93
Service D	100	Black PVC	water pea gravel and tape	2.8	0.57	93
Service E	150	Light grey PVC	pea gravel and tape	2.95	0.55	93
Service F	220	Orange PVC	Drain in pea gravel	3.39	0.37	90
Service G	220	Orange PVC	Drain in pea gravel	3.62	0.37	90
Service H			Electric signal detected underneath the left curb			
Service I						
Service J						
Service K						
Service L						
Service M						

Report No. 23412	SLIT TRENCH RECORD	FACING DIRECTION: NE	IGSL

		Survey				
Project: Monaghan Town		Easting (m)	Northing (m)	Elevation (mOD)	Slit Trench No.	ST004
Engineer: RPS					Sheet	1 of 1
Crew: M.Kluj, Flanagan	Start of Trench	667290.338	833686.462	58.987	Date Commenced	30.06.2021
	End of Trench	667294.052	833683.918	59.003	Date Completed	30.06.2021

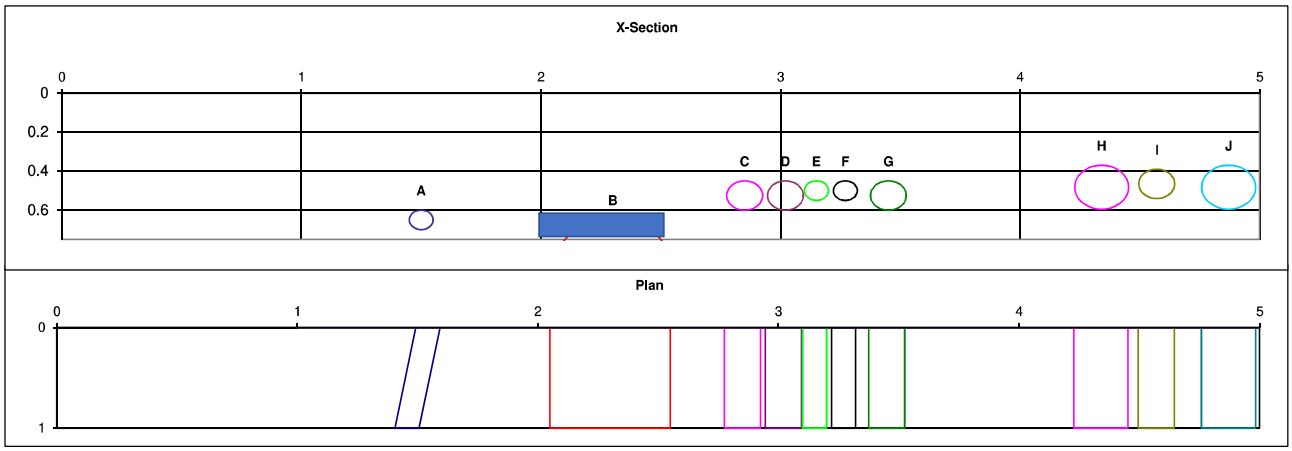
Ground Conditions

From (m)	To (m)	Soil Description
0.00	0.08	Brick concrete pavers
0.08	0.38	MADE GROUND. Loose grey very sandy fine to medium angular limestone GRAVEL. Sand is fine to coarse.
0.38	0.75	MADE GROUND brown to dark brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is fine to coarse angular to sbrounded of various lithologes. Contains brick, glass, plastic, pottery, lime mortar, bones, ash.

Photograph



Trench Dimensions		Location	Excavation Quantities		
LHS of Trench (m)	0.00		Surface	Length (m)	Material
RHS of Trench (m)	5.00		Footpath	5.00	Concrete pavers
Trench Depth (m)	0.75		Drain(LHS)		
Trench Width (m)	1.00		Drain (RHS)		
			Grass Verge (LHS)		
			Grass Verge (RHS)		
Facing Direction	44	SAMPLES	Other		
Facing Features	looking towars the diamont	B/ENV 0.35 -0.55 AA167596	Total Length		
Groundwater	None		Zero Metres Taken As: LHS		



	Diameter (mm)	Material	Description	Distance (m)	Depth to crown (m)	Angle (deg.)
Service A	100	Light grey PVC	ESB oetected by wooden poste and tape	1.50	0.6	85
Service B	500	Concrete covering ESB	ESB under concrete (2.05-2.55)	2.3	0.65	90
Service C	150	Grey PVC	Unknown	2.85	0.45	90
Service D	150	Light grey PVC	pea gravel and tape	3.02	0.45	90
Service E	100	Black PVC	water pea gravel and tape	3.15	0.45	90
Service F	100	Black PVC	water pea gravel and tape	3.27	0.45	90
Service G	150	Light grey PVC	pea gravel and tape	3.45	0.45	90
Service H	225	Orange PVC	Drain in pea gravel	4.34	0.37	90
Service I	150	Light grey PVC	in pea gravel	4.57	0.39	90
Service J	225	Orange PVC	Drain in pea gravel	4.87	0.37	90
Service K						
Service L						
Service M						

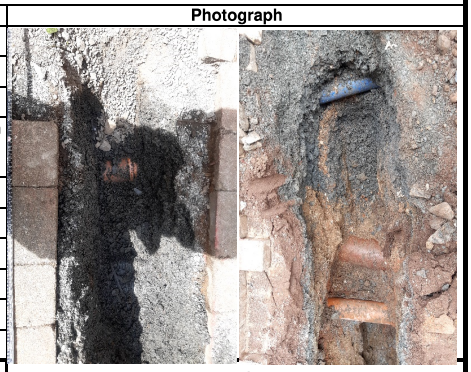
Report No. 23412	SLIT TRENCH RECORD	FACING DIRECTION: NNE	IGSL

		Survey				
Project: Monaghan Town		Easting (m)	Northing (m)	Elevation (mOD)	Slit Trench No.	ST005
Engineer: RPS					Sheet	1 of 1
Crew: M.Kluj, Flanagan	Start of Trench	667254.750	833743.670	59.940	Date Commenced	01.07.2021
	End of Trench	667258.290	833742.270	59.920	Date Completed	01.07.2021

Ground Conditions

From (m)	To (m)	Soil Description
0.00	0.08	Brick pavers
0.08	0.10	MADE GROUND. Redish brown fine to coarce SAND.
0.10	0.14	Leanmix
0.14	1.20	MADE GROUND. Angular coarse gravel up to 1.00 from LHS. Made ground. Brown slightly gravelly clayey to very clayey finw to coarse SAND with medium cobble content. Contains fragments of brick. Gravel is angular fine to corse.

Photograph



Trench Dimensions	
LHS of Trench (m)	0.00
RHS of Trench (m)	3.80
Trench Depth (m)	1.20
Trench Width (m)	1.00
Facing Direction	25
Facing Features	looking towars the diamont
Groundwater	None

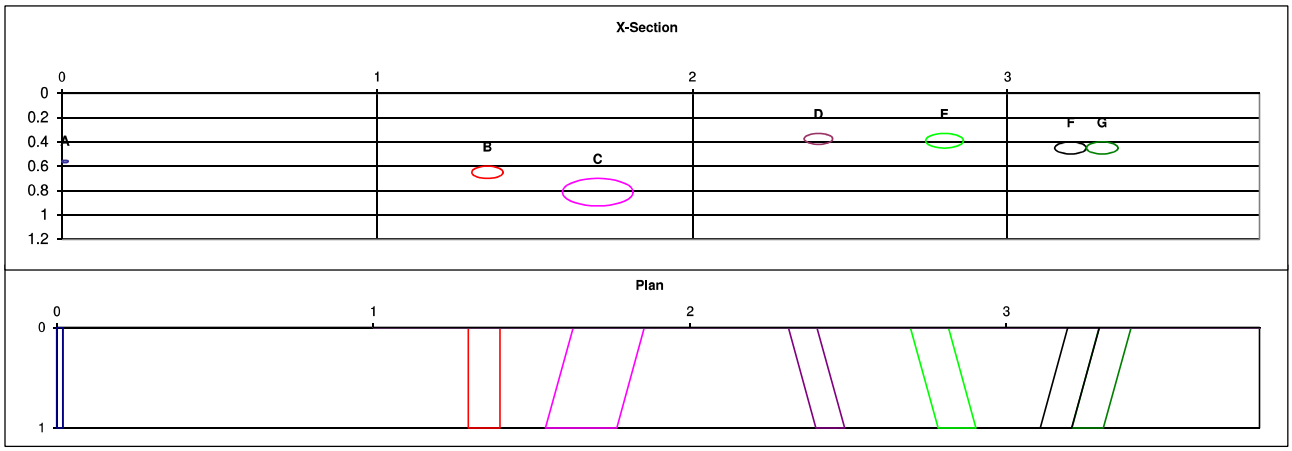
Location

SAMPLES

Excavation Quantities

Surface	Length (m)	Material
Footpath	3.80	Brick pavers
Drain(LHS)		
Drain (RHS)		
Grass Verge (LHS)		
Grass Verge (RHS)		
Other		
Total Length	3.80	

Zero Metres Taken As: LHS



	Diameter (mm)	Material	Description	Distance (m)	Depth to crown (m)	Angle (deg.)
Service A	20	Blue PVC	water with warning tape	0.01	0.55	90
Service B	100	Orange PVC	drain	1.35	0.6	90
Service C	225	clay pipe	Unknown	1.70	0.7	85
Service D	90	Blue PVC	water	2.4	0.33	95
Service E	120	Orange PVC	drain	2.8	0.33	95
Service F	100	corrigated black	media	3.2	0.4	85
Service G	100	corrigated black	media	3.3	0.4	85
Service H						
Service I						
Service J						
Service K						
Service L						
Service M						

Report No. 23412	SLIT TRENCH RECORD	FACING DIRECTION: SW (N / W / E / S)	IGSL

		Survey				
Project: Monaghan Town		Easting (m)	Northing (m)	Elevation (mOD)	Slit Trench No.	ST006
Engineer: RPS					Sheet	1 of 1
Crew: M.Kluj, Flanagan	Start of Trench	667324.957	833664.093	57.686	Date Commenced	02.07.2021
	End of Trench	667328.518	833662.877	58.104	Date Completed	02.07.2021

Ground Conditions

From (m)	To (m)	Soil Description
0.00	0.03	Macadam
0.03	0.20	MADE GROUND. Grey slightly sandy fine to medium angular GRAVEL
0.20	0.95	with medium cobble and low boulder content. Contains brick, slate roof tiles, pottery and scrap metal. At 0.95 1.90 fro LHS cobble stone pavement.
95.00	1.50	LHS from 0 to 1.80m and to the 1.50 depth. MADED GROUND. Light brown sandy fine to coarse angular to subrounded GRAVEL with medium cobble and low boulder content. Contains brick, slate roof tiles, pottery and scrap metal.

Photograph



Trench Dimensions	
LHS of Trench (m)	0.00
RHS of Trench (m)	3.60
Trench Depth (m)	1.50
Trench Width (m)	1.00
Facing Direction	225
Facing Features	looking towars the overflow carpark
Groundwater	None

Location

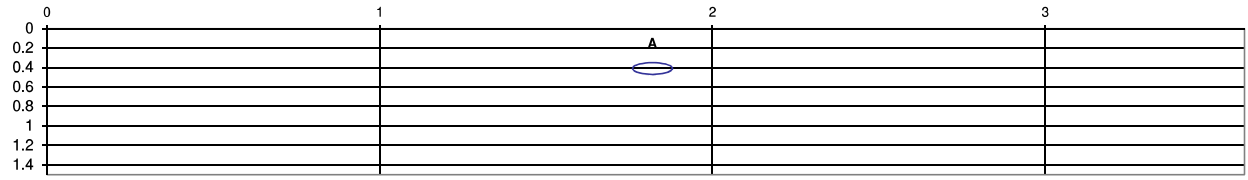
SAMPLES

Excavation Quantities

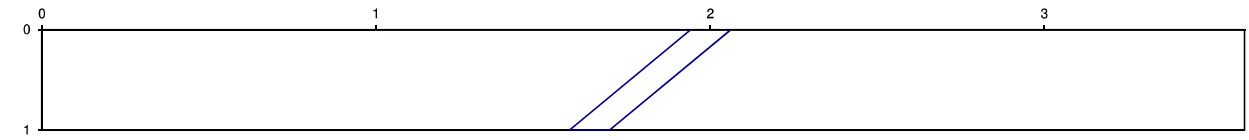
Surface	Length (m)	Material
Access Road	3.58	Mackadam
Drain(LHS)		
Drain (RHS)		
Grass Verge (LHS)		
Grass Verge (RHS)		
Other		
Total Length	3.60	

Zero Metres Taken As: LHS

X-Section



Plan



	Diameter (mm)	Material	Description	Distance (m)	Depth to crown (m)	Angle (deg.)
Service A	120	Grey PVC	sewer	1.82	0.35	70
Service B						
Service C						
Service D						
Service E						
Service F						
Service G						
Service H						
Service I						
Service J						
Service K						
Service L						
Service M						

Report No. 23412	SLIT TRENCH RECORD	FACING DIRECTION: NE (N / W E / S)	IGSL

		Survey				
Project: Monaghan Town		Easting (m)	Northing (m)	Elevation (mOD)	Slit Trench No.	ST007A
Engineer: RPS					Sheet	1 of 1
Crew: M.Kluj, Flanagan	Start of Trench	667354.240	833676.775	59.100	Date Commenced	02.07.2021
	End of Trench	667354.762	833675.921	59.151	Date Completed	02.07.2021

Ground Conditions

From (m)	To (m)	Soil Description
0.00	0.10	Concrete
0.10	0.30	BIG Boulder ranging from 0.1- to 0.30 covered by brownslightly clayey sandy fine to medium angular to subrounded GRAVEL (MADED GROUND)
0.30	0.30	Obstruction

Photograph



Trench Dimensions	
LHS of Trench (m)	0.00
RHS of Trench (m)	0.75
Trench Depth (m)	0.30
Trench Width (m)	1.00
Facing Direction	60
Facing Features	looking away from overflow carpark
Groundwater	None

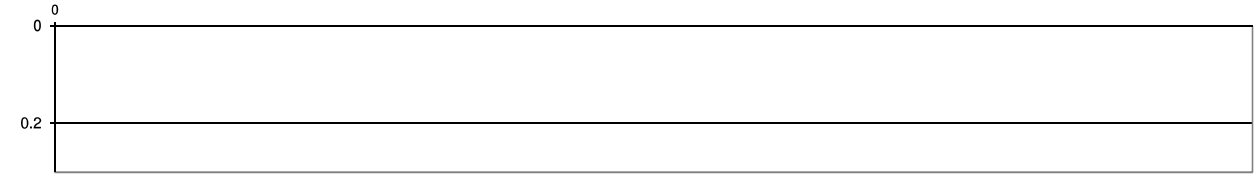
Location

SAMPLES

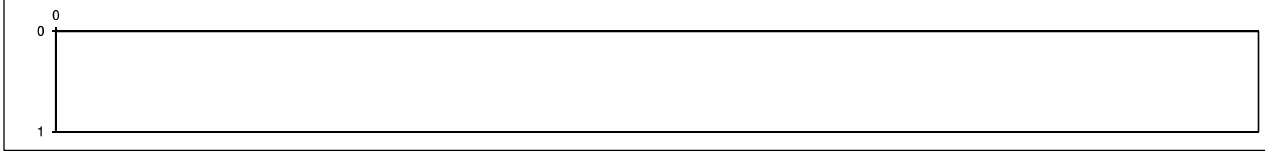
Excavation Quantities		
Surface	Length (m)	Material
Access Road	0.75	Concrete
Drain(LHS)		
Drain (RHS)		
Grass Verge (LHS)		
Grass Verge (RHS)		
Other		
Total Length	0.75	

Zero Metres Taken As: LHS

X-Section



Plan



	Diameter (mm)	Material	Description	Distance (m)	Depth to crown (m)	Angle (deg.)
Service A						
Service B						
Service C						
Service D						
Service E						
Service F						
Service G						
Service H						
Service I						
Service J						
Service K						
Service L						
Service M						

Report No. 23412	SLIT TRENCH RECORD	FACING DIRECTION: NE (N / W / E / S)	IGSL

		Survey				
Project: Monaghan Town		Easting (m)	Northing (m)	Elevation (mOD)	Slit Trench No.	ST007B
Engineer: RPS					Sheet	1 of 1
Crew: M.Kluj, Flanagan	Start of Trench	667356.091	833677.194	59.250	Date Commenced	02.07.2021
	End of Trench	667357.042	833676.029	59.310	Date Completed	02.07.2021

Ground Conditions

From (m)	To (m)	Soil Description
0.00	0.10	Concrete
0.10	0.15	MADE GROUND. Grey sandy fine to medium GRAVEL. Contains brick and fragments of clay pipe.
0.15	0.55	MADE GROUND. Brown slightly clayey very sandy fine to medium GRAVEL. Contains brick and fragments of clay pipe
0.00	0.55	Obstruction

Photograph



Trench Dimensions	
LHS of Trench (m)	0.00
RHS of Trench (m)	1.50
Trench Depth (m)	0.55
Trench Width (m)	0.60

Location

Facing Direction	60
Facing Features	looking away from overflow carpark
Groundwater	None

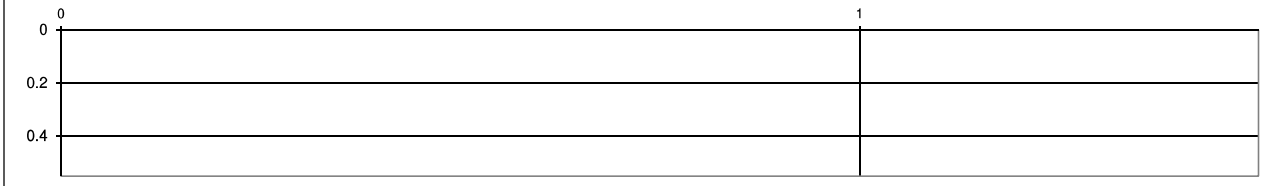
SAMPLES

Excavation Quantities

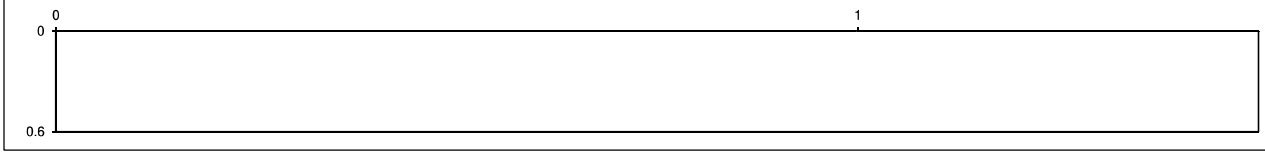
Surface	Length (m)	Material
Access Road	1.50	Concrete
Drain(LHS)		
Drain (RHS)		
Grass Verge (LHS)		
Grass Verge (RHS)		
Other		
Total Length	1.50	

Zero Metres Taken As: LHS

X-Section



Plan



	Diameter (mm)	Material	Description	Distance (m)	Depth to crown (m)	Angle (deg.)
Service A						
Service B						
Service C						
Service D						
Service E						
Service F						
Service G						
Service H						
Service I						
Service J						
Service K						
Service L						
Service M						

Report No. 23412	SLIT TRENCH RECORD	FACING DIRECTION: SW (N / W / E / S)	IGSL

		Survey				
Project: Monaghan Town		Easting (m)	Northing (m)	Elevation (mOD)	Slit Trench No.	ST008
Engineer: RPS					Sheet	1 of 1
Crew: M.Kluj, Flanagan	Start of Trench	667290.260	833643.205	56.479	Date Commenced	25.06.2021
	End of Trench	667284.395	833643.732	56.357	Date Completed	25.06.2021

Ground Conditions

From (m)	To (m)	Soil Description
0.00	0.09	MACADAM
0.09	0.14	MADE GROUND. Loose brownish greys very sandy fine to medium angular limestone GRAVEL. Sand is fine to coarse.
0.14	0.45	MADE GROUND. Medium Dence grey slightly silty slightly sandy fine to coarse angular limestone GRAVEL. Sand is fine to coarse.
0.45	1.50	MADE GROUND. Medium Dence grey slightly silty slightly sandy fine to coarse angular limestone GRAVEL with low cobble content and occasional small boulder. Sand is fine to coarse. Cobbles and boulders are angular of limestone.

Photograph

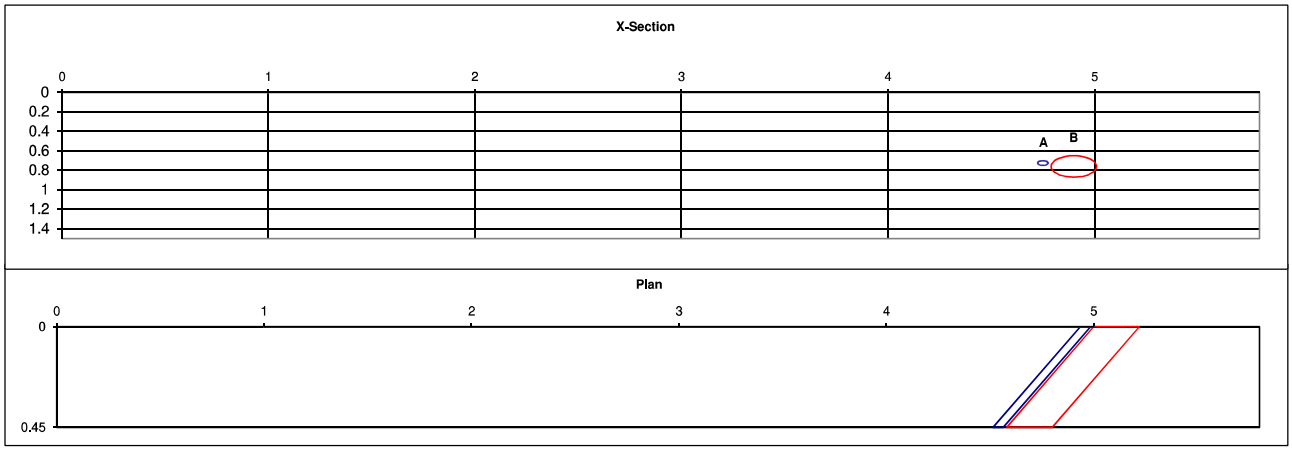


Trench Dimensions		Location
LHS of Trench (m)	0.00	
RHS of Trench (m)	5.80	
Trench Depth (m)	1.50	
Trench Width (m)	0.45	
Facing Direction	200	SAMPLES
Facing Features		
Groundwater	None	

Excavation Quantities

Surface	Length (m)	Material
Road	5.80	Macadam
Drain(LHS)		
Drain (RHS)		
Grass Verge (LHS)		
Grass Verge (RHS)		
Other		
Total Length	5.80	

Zero Metres Taken As: LHS



	Diameter (mm)	Material	Description	Distance (m)	Depth to crown (m)	Angle (deg.)
Service A	50	Red PVC	Live ESB with pea gravel and tape.	4.75	0.7	47
Service B	220	Orang PVC	Drain	4.9	0.65	47
Service C						
Service D						
Service E						
Service F						
Service G						
Service H						
Service I						
Service J						
Service K						
Service L						
Service M						

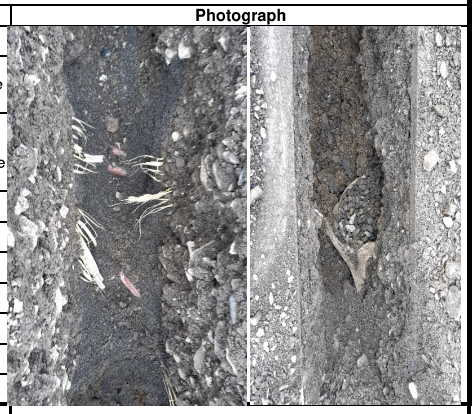
Report No. 23412	SLIT TRENCH RECORD	FACING DIRECTION: SE (N / W E / S)	IGSL

		Survey				
Project: Monaghan Town		Easting (m)	Northing (m)	Elevation (mOD)	Slit Trench No.	ST009
Engineer: RPS					Sheet	1 of 1
Crew: M.Kluj, Flanagan	Start of Trench	667258.890	833613.036	54.524	Date Commenced	24.06.2021
	End of Trench	667253.597	833608.334	54.291	Date Completed	24.06.2021

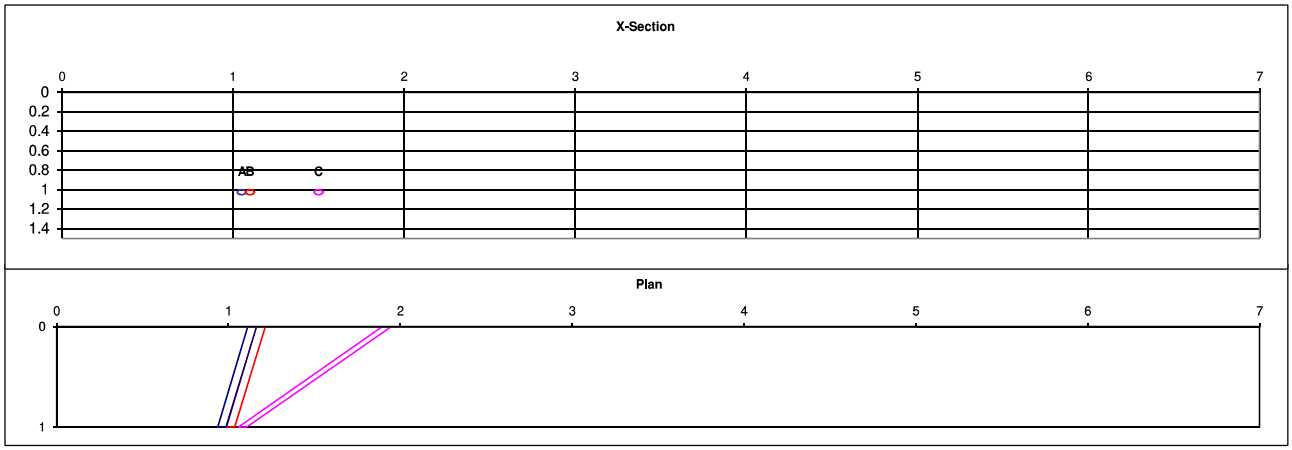
Ground Conditions

From (m)	To (m)	Soil Description
0.00	0.07	MACADAM
0.07	0.15	MADE GROUND. Medium dence grey sligtly sandy fine to medium angular limestone GRAVEL. Sand is fine to coarse.
0.15	1.50	MADE GROUND. Medium dence grey slightly silty slightly sandy fine to coarse angular limestone GRAVEL. Sand is fine to coarse. Geofabric starts on RHS of the thrench at depth 0.70 and 5.65 from the LHS of the trench. coarese angular limestone fabric insude the fabric(possible atteniuation tank)

Photograph



Trench Dimensions		Location	Excavation Quantities		
LHS of Trench (m)	0.00		Surface	Length (m)	Material
RHS of Trench (m)	7.00		Road	7.00	Macadam
Trench Depth (m)	1.50		Drain(LHS)		
Trench Width (m)	1.00		Drain (RHS)		
			Grass Verge (LHS)		
			Grass Verge (RHS)		
Facing Direction	115	SAMPLES	Other		
Facing Features	looking towars bottle bank		Total Length	7.00	
Groundwater	water at 1.2		Zero Metres Taken As: LHS		



	Diameter (mm)	Material	Description	Distance (m)	Depth to crown (m)	Angle (deg.)
Service A	50	Red PVC	pea gravel and tape services prependiculatr to carpark	1.05	1	80
Service B	50	Red PVC	Live ESB with pea gravel and tape	1.1	1	80
Service C	50	Red PVC	Live ESB with pea gravel and tape	1.5	1	50
Service D						
Service E						
Service F						
Service G						
Service H						
Service I						
Service J						
Service K						
Service L						
Service M						

Report No. 23412	SLIT TRENCH RECORD	FACING DIRECTION: S (N / W / E / S)	IGSL

		Survey				
Project: Monaghan Town		Easting (m)	Northing (m)	Elevation (mOD)	Slit Trench No.	ST010
Engineer: RPS					Sheet	1 of 1
Crew: M.Kluj, Flanagan	Start of Trench	667276.817	833582.321	53.617	Date Commenced	24.06.2021
	End of Trench	667270.519	833580.968	53.506	Date Completed	24.06.2021

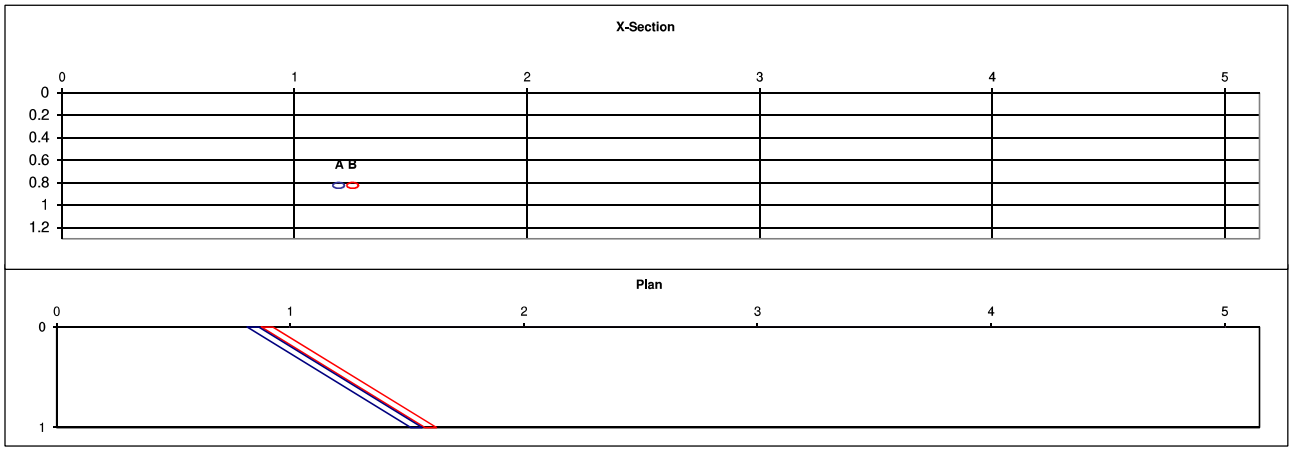
Ground Conditions

From (m)	To (m)	Soil Description
0.00	0.07	MACADAM
0.07	0.20	MADE GROUND. Grey sligtly sandy fine to medium angular limestone GRAVEL. Sand is fine to coarse.
0.20	0.70	MADE GROUND. Medium Dence grey slightly silty slightly sandy fine to coarse angular limestone GRAVEL. Sand is fine to coarse.
0.70	1.20	Geofabric at 0.70. MADE GROUND. Loose Grey slightly silty coarse angular limestone GRAVEL. Possible attenuation tank.

Photograph



Trench Dimensions		Location	Excavation Quantities		
LHS of Trench (m)	0.00		Surface	Length (m)	Material
RHS of Trench (m)	5.15		Road	5.15	Macadam
Trench Depth (m)	1.30		Drain(LHS)		
Trench Width (m)	1.00		Drain (RHS)		
			Grass Verge (LHS)		
			Grass Verge (RHS)		
Facing Direction	115	SAMPLES	Other		
Facing Features	looking towars bottle bank		Total Length	5.15	
Groundwater	water at 1.1		Zero Metres Taken As: LHS		



	Diameter (mm)	Material	Description	Distance (m)	Depth to crown (m)	Angle (deg.)
Service A	50	Red PVC	Live ESB with pea gravel and tape.	1.19	0.8	125
Service B	50	Red PVC	Live ESB with pea gravel and tape	1.25	0.8	125
Service C						
Service D						
Service E						
Service F						
Service G						
Service H						
Service I						
Service J						
Service K						
Service L						
Service M						

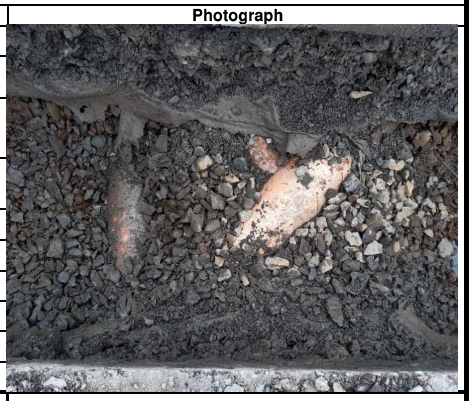
Report No. 23412	SLIT TRENCH RECORD	FACING DIRECTION:SE (N / W / E / S)	IGSL

		Survey				
Project: Monaghan Town		Easting (m)	Northing (m)	Elevation (mOD)	Slit Trench No.	ST011
Engineer: RPS					Sheet	1 of 1
Crew: M.Kluj, Flanagan	Start of Trench	667294.076	833578.062	53.662	Date Commenced	23.06.2021
	End of Trench	667288.875	833574.720	53.597	Date Completed	23.06.2021

Ground Conditions

From (m)	To (m)	Soil Description
0.00	0.10	MACADAM
0.10	0.20	MADE GROUND. Medium dence grey sligtly sandy fine to medium angular limestone GRAVEL. Sand is fine to coarse.
0.20	0.55	MADE GROUND. Medium Dence Grey slightly silty slightly sandy fine to coarse angular limestone GRAVEL. Sand is fine to coarse. Contains reinforcement bars 10mm to 50 mm.
0.55	1.30	Geofabric at 0.55. MADE GROUND. Loose Grey slightly silty coarse angular limestone GRAVEL. Possible attenuation tank.

Photograph



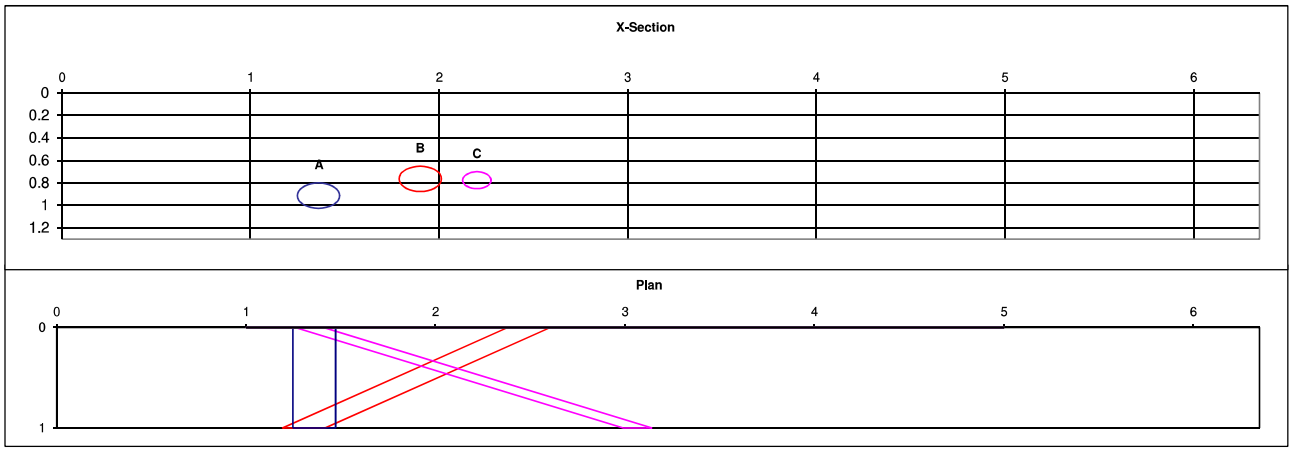
Trench Dimensions	
LHS of Trench (m)	0.00
RHS of Trench (m)	6.35
Trench Depth (m)	1.30
Trench Width (m)	1.00
Facing Direction	127
Facing Features	
Groundwater	water at 1.1

Location

SAMPLES

Excavation Quantities		
Surface	**Length (m)**	**Material**
Road	6.35	Macadam
Drain(LHS)		
Drain (RHS)		
Grass Verge (LHS)		
Grass Verge (RHS)		
Other		
Total Length	6.35	

Zero Metres Taken As: LHS



	Diameter (mm)	Material	Description	Distance (m)	Depth to crown (m)	Angle (deg.)
Service A	225	Orange PVC	Drain	1.36	0.8	90
Service B	225	Orange PVC	Drain	1.9	0.65	40
Service C	150	Orange PVC	Drain conected at 90 to service B	2.2	0.7	150
Service D						
Service E						
Service F						
Service G						
Service H						
Service I						
Service J						
Service K						
Service L						
Service M						

Report No. 23412	SLIT TRENCH RECORD	FACING DIRECTION: SE	IGSL

		Survey				
Project: Monaghan Town		Easting (m)	Northing (m)	Elevation (mOD)	Slit Trench No.	ST012
Engineer: RPS					Sheet	1 of 1
Crew: M.Kluj, Flanagan	Start of Trench	667224.355	833613.787	54.293	Date Commenced	29.06.2021
	End of Trench	667220.279	833610.027	54.444	Date Completed	29.06.2021

Ground Conditions

From (m)	To (m)	Soil Description
0.00	0.07	MACADAM
0.07	0.30	MADE GROUND. Loose grey sligtly sandy fine to medium angular limestone GRAVEL. Sand is fine to coarse.
0.30	1.30	Grey slightly silty sandy fine to coarse GRAVEL with occasional cobble. Very strong pinkish grey CONCRETE. Depth from 0.30(0.70 from 0) to 0.95 (0.25 from 0) .Vertical fabric membrane from 0.70.
		RHS
0.00	0.25	TOPSOIL
0.25		Very strong pinkish grey CONCRETE.

Photograph

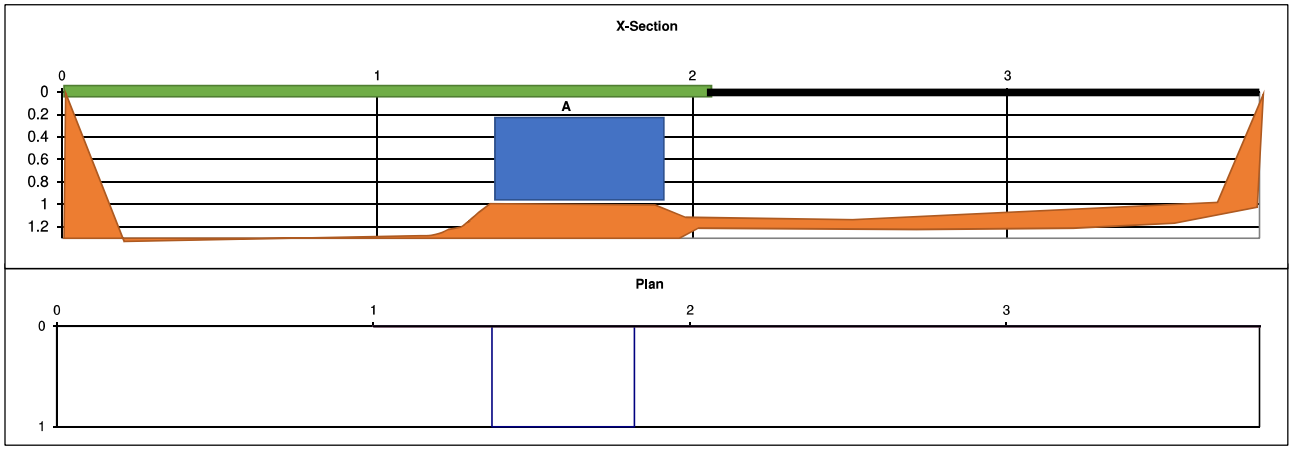


Trench Dimensions		Location
LHS of Trench (m)	0.00	
RHS of Trench (m)	3.80	
Trench Depth (m)	1.30	
Trench Width (m)	1.00	
Facing Direction	180	SAMPLES
Facing Features	looking towars N54	
Groundwater	water at 1.30	

Excavation Quantities

Surface	Length (m)	Material
Footpath	1.70	Macadam
Drain(LHS)		
Drain (RHS)		
Grass Verge (LHS)	2.10	ly gravelly sandy (
Grass Verge (RHS)		
Other		
Total Length	3.80	

Zero Metres Taken As: LHS



	Diameter (mm)	Material	Description	Distance (m)	Depth to crown (m)	Angle (deg.)
Service A	450	Concrete	Unknown	1.60	0.3	90
Service B						
Service C						
Service D						
Service E						
Service F						
Service G						
Service H						
Service I						
Service J						
Service K						
Service L						
Service M						

Report No. 23412	SLIT TRENCH RECORD	FACING DIRECTION: S	N / W / E / S

Project: Monaghan Town		Survey			Slit Trench No.	ST013
Engineer: RPS		Easting (m)	Northing (m)	Elevation (mOD)	Sheet	1 of 1
Crew: M.Kluj, Flanagan	Start of Trench	667248.129	833558.903	53.436	Date Commenced	24.06.2021
	End of Trench	667242.832	833557.825	53.382	Date Completed	24.06.2021

Ground Conditions

From (m)	To (m)	Soil Description
0.00	0.07	Concrete
0.07	0.27	MADE GROUND. Loose grey slightly sandy fine to medium angular limestone GRAVEL. Sand is fine to coarse.
0.27	0.70	Very strong pinkish grey CONCRETE.
		LHS VERDGE
0.00	0.15	MADE GROUND. Loose slightly gravelly clayey fine to coarse SAND
0.15	0.95	MADE GROUND. Firm slightly gravelly sandy CLAY. Sand is fine to coarse. Gravel was fine to coarse subangular to subrounded of various lithologies. Concrete varing
		RHS
0.00	0.15	MADE GROUND. Loose slightly gravelly clayey fine to coarse SAND
0.15	0.65	MADE GROUND. Firm slightly gravelly sandy CLAY. Sand is fine to coarse. Gravel was fine to coarse subangular to subrounded of various lithologies.

Photograph



Trench Dimensions		Location	Excavation Quantities		
LHS of Trench (m)	0.00		Surface	Length (m)	Material
RHS of Trench (m)	5.27		Road/Footpath	1.90	Concrete
Trench Depth (m)	1.00		Drain(LHS)		
Trench Width (m)	1.00		Drain (RHS)		
			Grass Verge (LHS)	2.10	wild flower area
			Grass Verge (RHS)	1.27	wils flower area
Facing Direction	180	SAMPLES	Other		
Facing Features	looking towars N54		Total Length	5.27	
Groundwater	water at 0.90		Zero Metres Taken As: LHS		



	Diameter (mm)	Material	Description	Distance (m)	Depth to crown (m)	Angle (deg.)
Service A	50	Red PVC	Live ESB with pea gravel and tape.	4.54	0.6	95
Service B	120	Concrete	Curb footing	4	0.4	95
Service C						
Service D						
Service E						
Service F						
Service G						
Service H						
Service I						
Service J						
Service K						
Service L						
Service M						

Report No. 23412	SLIT TRENCH RECORD	FACING DIRECTION: S	N / W / E / S

		Survey				
Project: Monaghan Town		Easting (m)	Northing (m)	Elevation (mOD)	Slit Trench No.	ST014
Engineer: RPS					Sheet	1 of 1
Crew: M.Kluj, Flanagan	Start of Trench	667251.561	833528.714	53.273	Date Commenced	28.06.2021
	End of Trench	667247.803	833528.161	53.243	Date Completed	28.06.2021

Ground Conditions

From (m)	To (m)	Soil Description
0.00	0.07	Concrete
0.07	0.35	MADED GROUND: Loose grey slightly sandy fine to medium angular limestone GRAVEL. Sand is fine to coarse.
0.35	0.70	Very strong pinkish grey CONCRETE. Depth from 0.10 to 0.60.
		LHS VERDGE
0.00	0.15	TOPSOIL
0.15	0.35	MADED GROUND: Medium dence slightly sandy clayey fine to medium GRAVEL. Sand is fine to coarse.
0.35	0.45	Concrete paving bricks
0.45	1.50	MADED GROUND: Medium dence slightly sandy clayey fine to coarse angular to subangular GRAVEL. Contains cobble size fragments of concrete pavement

Photograph



Trench Dimensions	
LHS of Trench (m)	0.00
RHS of Trench (m)	3.80
Trench Depth (m)	1.00
Trench Width (m)	1.00

Location

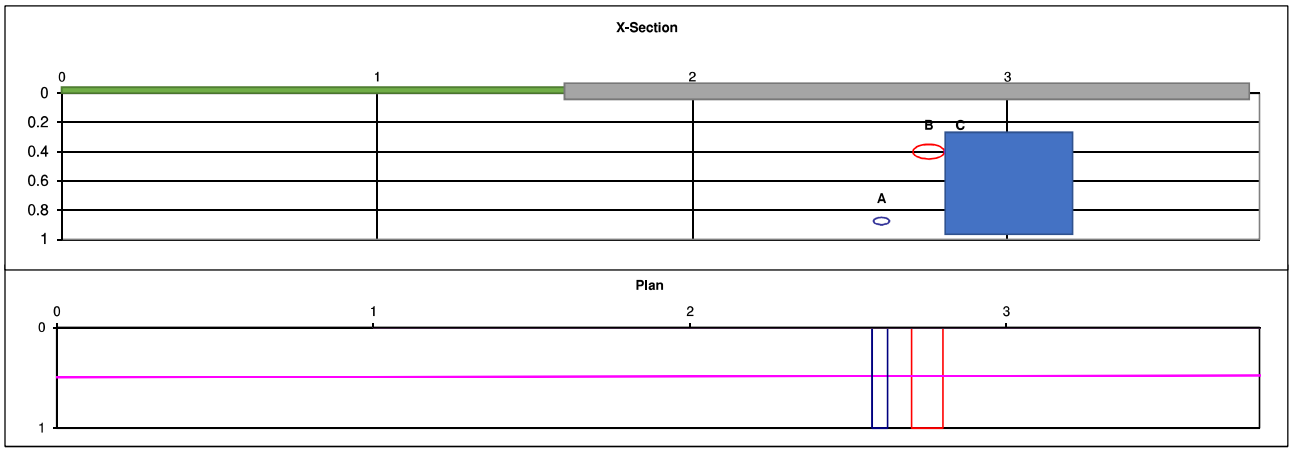
Facing Direction	180
Facing Features	looking towars N54
Groundwater	water at 1.30

SAMPLES

Excavation Quantities

Surface	Length (m)	Material
Footpath	1.70	Concrete
Drain(LHS)		
Drain (RHS)		
Grass Verge (LHS)	2.10	ly gravelly sandy (
Grass Verge (RHS)		
Other		
Total Length	3.80	

Zero Metres Taken As: LHS



	Diameter (mm)	Material	Description	Distance (m)	Depth to crown (m)	Angle (deg.)
Service A	50	blacl PVC	ESB not live	2.60	0.85	90
Service B	100	Green PVC	Vibre	2.75	0.35	90
Service C	100	Concrete	concret with live cable within it	2.85	0.35	
Service D						
Service E						
Service F						
Service G						
Service H						
Service I						
Service J						
Service K						
Service L						
Service M						

Report No. 23412	SLIT TRENCH RECORD	FACING DIRECTION:SW	N / W / E / S

		Survey				
Project: Monaghan Town		Easting (m)	Northing (m)	Elevation (mOD)	Slit Trench No.	ST015
Engineer: RPS					Sheet	1 of 1
Crew: M.Kluj, Flanagan	Start of Trench	667244.570	833481.655	54.314	Date Commenced	01.07.2021
	End of Trench	667242.073	833483.105	54.090	Date Completed	01.07.2021

Ground Conditions

From (m)	To (m)	Soil Description
0.00	0.08	Brick pavers
0.08	0.25	MADE GROUND. Medium dece grey becoming redish brown fine to coarce SAND.
0.25	0.29	Leanmix Concrete
0.29	1.50	MADE GROUND. Loose grey slightly silty slightly sandy fine to coarse angular limestone GRAVEL with occasional cobble. San is fine to coarse. Cobbles are

Photograph



Trench Dimensions	
LHS of Trench (m)	0.00
RHS of Trench (m)	2.90
Trench Depth (m)	1.50
Trench Width (m)	0.80

Location

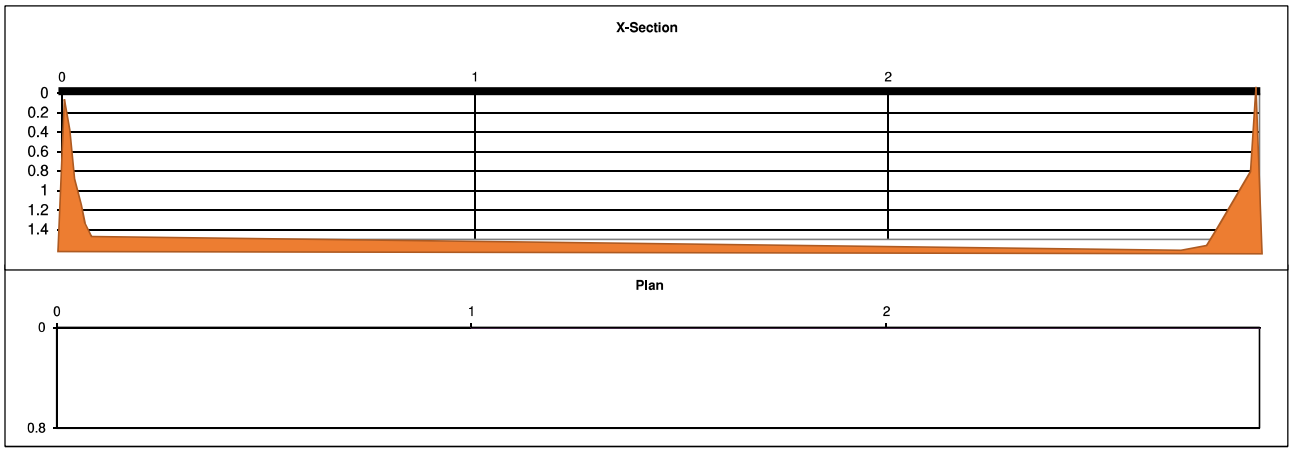
Facing Direction	227
Facing Features	Looking towords overflow car park
Groundwater	None

SAMPLES

Excavation Quantities

Surface	Length (m)	Material
Footpath	2.90	Brick pavers
Drain(LHS)		
Drain (RHS)		
Grass Verge (LHS)		
Grass Verge (RHS)		
Other		
Total Length	2.90	

Zero Metres Taken As: LHS



	Diameter (mm)	Material	Description	Distance (m)	Depth to crown (m)	Angle (deg.)
Service A						
Service B						
Service C						
Service D						
Service E						
Service F						
Service G						
Service H						
Service I						
Service J						
Service K						
Service L						
Service M						

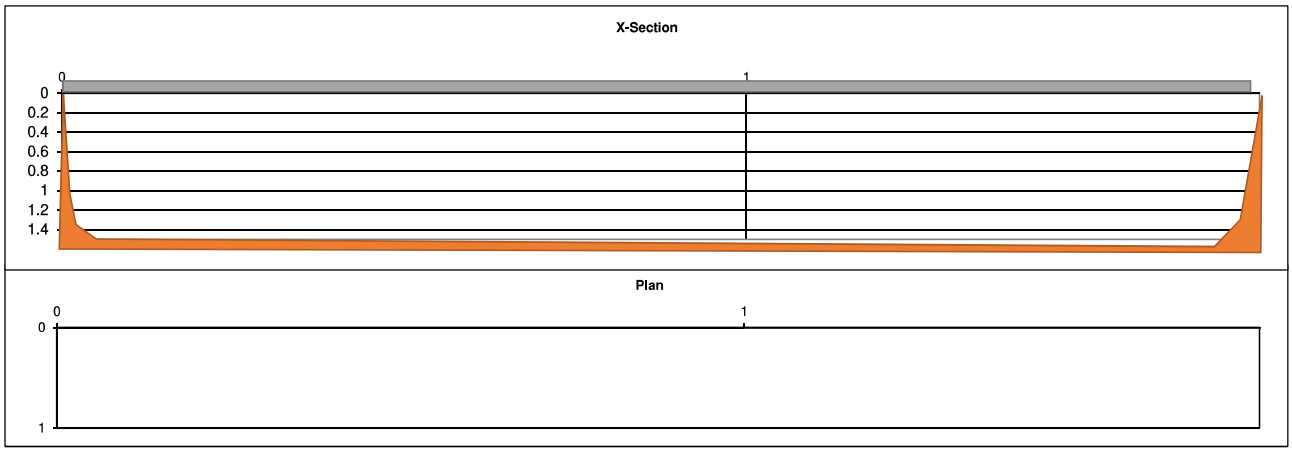
Report No. 23412	SLIT TRENCH RECORD	FACING DIRECTION: NW	N / W / E / S

		Survey				
Project: Monaghan Town		Easting (m)	Northing (m)	Elevation (mOD)	Slit Trench No.	ST016A
Engineer: RPS					Sheet	1 of 1
Crew: M.Kluj, Flanagan	Start of Trench	667265.169	833487.389	55.012	Date Commenced	08.07.2021
	End of Trench	667264.742	833485.592	55.0	Date Completed	08.07.2021

Ground Conditions

From (m)	To (m)	Soil Description	Photograph
0.00	0.15	CONCRETE	
0.15	0.35	MADE GROUND loose brown very sandy fine to medium angular limestone GRAVEL.	
0.35	0.45	CONCRETE	
0.45	0.85	MADE GROUND loose Greyslightly silty sandy fine to coarse angular limestone GRAVEL. Sand is fine to coarse.	
0.85	1.50	occasional small boulder. Sand is fine to coarse. Gravel is fine to coarse angu	

Trench Dimensions		Location	Excavation Quantities		
LHS of Trench (m)	0.00		Surface	Length (m)	Material
RHS of Trench (m)	1.75		Footpath	1.75	Concrete
Trench Depth (m)	1.50		Drain(LHS)		
Trench Width (m)	1.00		Drain (RHS)		
			Grass Verge (LHS)		
			Grass Verge (RHS)		
Facing Direction	307	SAMPLES	Other		
Facing Features	looking towords shopping center.	B/ ENV AA153478	Total Length	1.75	
Groundwater	None		Zero Metres Taken As: LHS		



	Diameter (mm)	Material	Description	Distance (m)	Depth to crown (m)	Angle (deg.)
Service A						
Service B						
Service C						
Service D						
Service E						
Service F						
Service G						
Service H						
Service I						
Service J						
Service K						
Service L						
Service M						

Report No. 23412	SLIT TRENCH RECORD	FACING DIRECTION:NW W N E S	IGSL

		Survey				
Project: Monaghan Town		Easting (m)	Northing (m)	Elevation (mOD)	Slit Trench No.	ST016B
Engineer: RPS					Sheet	1 of 1
Crew: M.Kluj, Flanagan	Start of Trench	667267.143	833483.712	54.940	Date Commenced	09.07.2021
	End of Trench	667267.910	833485.430	54.930	Date Completed	09.07.2021

Ground Conditions

From (m)	To (m)	Soil Description
0.00	0.25	TOPSOIL
0.25	0.60	MADE GROUND: Loose brownish grey slightly silty sandy fine to medium angular GRAVEL. Sand is fine to coarse.

Photograph



Trench Dimensions	
LHS of Trench (m)	0.0
RHS of Trench (m)	2.0
Trench Depth (m)	0.6
Trench Width (m)	0.6
Facing Direction	307
Facing Features	looking towords shopping center.
Groundwater	None

Location

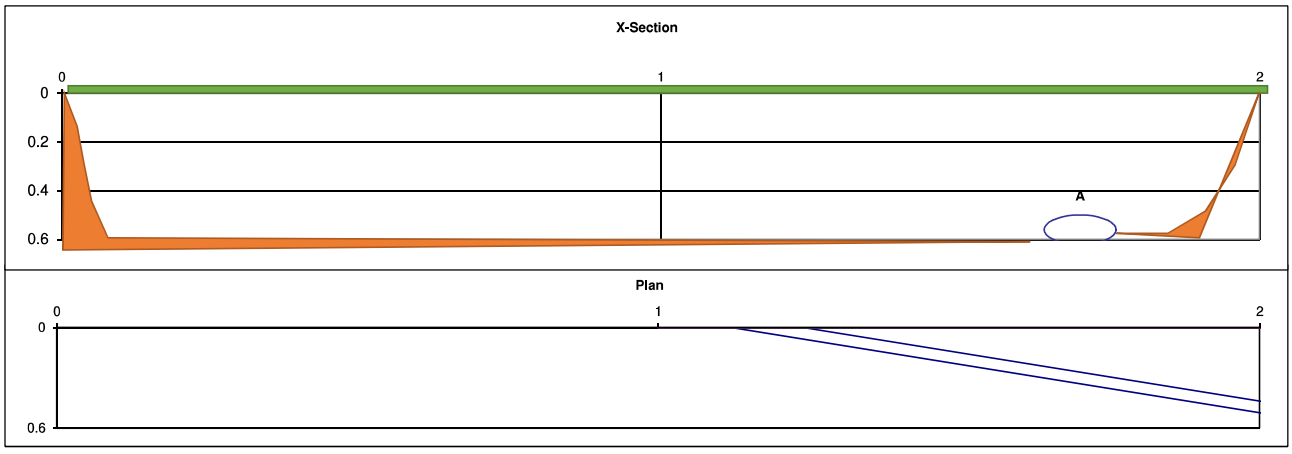
SAMPLES

B/ ENV AA153478

Excavation Quantities

Surface	Length (m)	Material
Road		
Path (LHS)		
Path (RHS)		
Grass Verge (LHS)	2.00	Grass
Grass Verge (RHS)		
Other		
Total Length	2.00	

Zero Metres Taken As:LHS



	Diameter (mm)	Material	Description	Distance (m)	Depth to crown (m)	Angle (deg.)
Service A	120	Green PVC	Virgin media parrarel to the road	1.7	0.5	150
Service B						
Service C						
Service D						
Service E						
Service F						
Service G						
Service H						
Service I						
Service J						
Service K						
Service L						
Service M						

Appendix 5 - Infiltration Testing Records

TRIAL PIT RECORD

REPORT NUMBER 23412

CONTRACT	Monaghan Town	**TRIAL PIT NO.**	**BRE TEST 1**
		SHEET	Sheet 1 of 1
LOGGED BY	M.Kluj	**CO-ORDINATES**	667,305.13 E 833,580.00 N
		DATE STARTED	06/07/2021
		DATE COMPLETED	06/07/2021
CLIENT	Monaghan Co. Council	**GROUND LEVEL (m)**	53.73
ENGINEER	RPS	**EXCAVATION METHOD**	1.9 T exavator

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Samples: Sample Ref	Samples: Type	Samples: Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
TOPSOIL Unstable sites and water tabe at 1.15m		0.20	53.53						
MADE GROUND. Loose brown slightly clayey snady fine to coarse angular GRAVEL with low cobble and boulder content. Contains brick, scrap metal, timber ,concrete, macadam, plastic, PVC pipe and glass. Sand is fine to coarse. Cobbles and boulders are subangular of various lithologies. Geo fabric and plastic net at 1.00m				1 (Moderate)	AA157599	B	0.40-0.60		
End of Trial Pit at 1.30m		1.30	52.43						

Groundwater Conditions
Water at 1.15

Stability
Moderate

General Remarks

Soakaway Design f -value from field tests (F2C) IGSL

Contract: Dublin Street Monaghan Contract No. 23412
Test No. 1
Client Monaghan CoCo
Date: #######

Summary of ground conditions

from	to	Description	Ground water
0.00	0.20	TOPSOIL	GW Encountered at 1.15mbgl
0.20	1.30	MADE GROUND. Loose brown slightly clayey sandy fine to coarse angular GRAVEL with low cobble and boulder content. Contains brick, scrap metal, timber ,concrete, macadam, plastic, PVC pipe and glass. Sand is fine to coarse. Cobbles and boulders are subangular of various lithologies. Geo fabric and plastic net at 1.00m	

Notes: GW Encountered at 1.15mbgl

Field Data

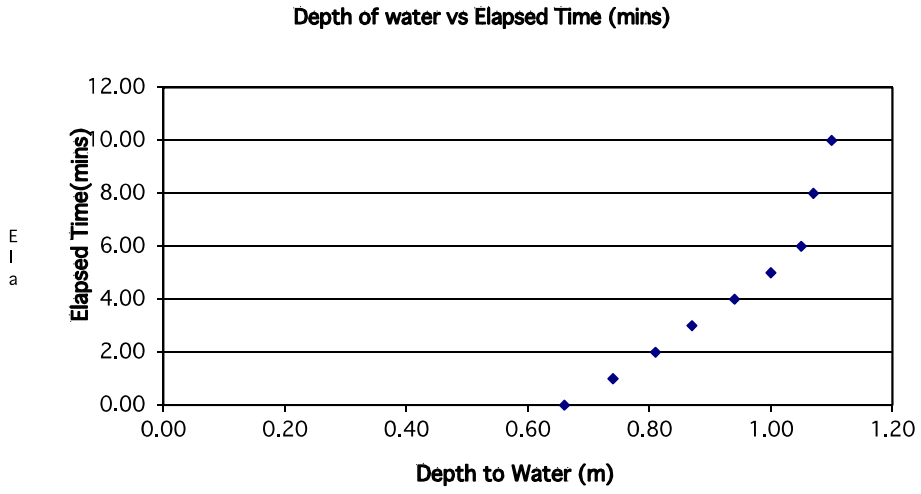
Depth to Water (m)	Elapsed Time (min)
0.66	0.00
0.74	1.00
0.81	2.00
0.87	3.00
0.94	4.00
1.00	5.00
1.05	6.00
1.07	8.00
1.10	10.00

Field Test

Depth of Pit (D)	1.30	m
Width of Pit (B)	0.65	m
Length of Pit (L)	0.80	m
Initial depth to Water =	0.66	m
Final depth to water =	1.10	m
Elapsed time (mins)=	10.00	
Top of permeable soil		m
Base of permeable soil		m
Base area=	0.52	m2
*Av. side area of permeable stratum over test perio	1.218	m2
Total Exposed area =	1.738	m2

Infiltration rate (f) = Volume of water used/unit exposed area / unit time

f= 0.01316 m/min or 0.0002194 m/sec



Soakaway Design f -value from field tests (F2C) IGSL

Contract: Dublin Street Monaghan Contract No. 23412
Test No. 2
Client Monaghan CoCo
Date: #######

Summary of ground conditions

from	to	Description	Ground water
0.00	0.20	TOPSOIL	GW Encountered at 1.15mbgl
0.20	1.30	MADE GROUND. Loose brown slightly clayey sandy fine to coarse angular GRAVEL with low cobble and boulder content. Contains brick, scrap metal, timber ,concrete, macadam, plastic, PVC pipe and glass. Sand is fine to coarse. Cobbles and boulders are subangular of various lithologies. Geo fabric and plastic net at 1.00m	

Notes: GW Encountered at 1.15mbgl

Field Data

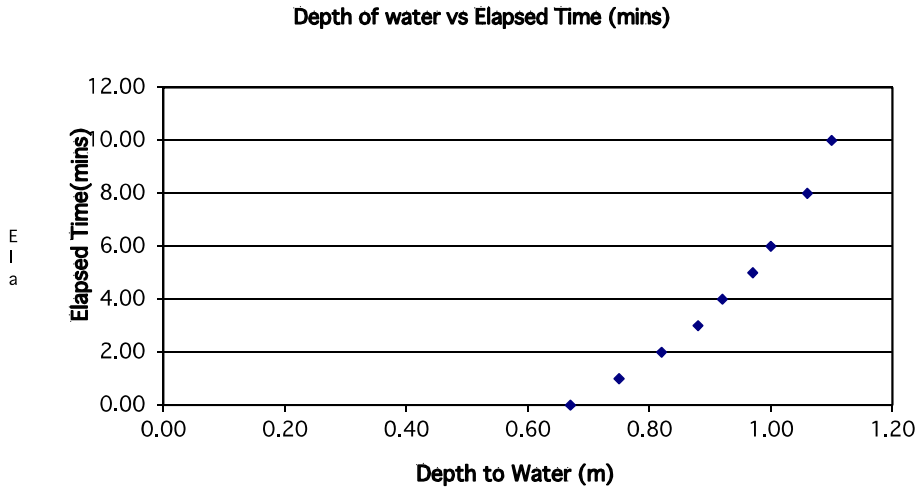
Depth to Water (m)	Elapsed Time (min)
0.67	0.00
0.75	1.00
0.82	2.00
0.88	3.00
0.92	4.00
0.97	5.00
1.00	6.00
1.06	8.00
1.10	10.00

Field Test

Depth of Pit (D)	1.30	m
Width of Pit (B)	0.65	m
Length of Pit (L)	0.80	m
Initial depth to Water =	0.67	m
Final depth to water =	1.10	m
Elapsed time (mins)=	10.00	
Top of permeable soil		m
Base of permeable soil		m
Base area=	0.52	m2
*Av. side area of permeable stratum over test perio	1.2035	m2
Total Exposed area =	1.7235	m2

Infiltration rate (f) = Volume of water used/unit exposed area / unit time

f= 0.01297 m/min or 0.0002162 m/sec



Soakaway Design f -value from field tests (F2C) IGSL

Contract: Dublin Street Monaghan Contract No.
Test No. 3
Client Monaghan CoCo
Date: #######

Summary of ground conditions

from	to	Description	Ground water
0.00	0.20	TOPSOIL	GW Encountered at 1.15mbgl
0.20	1.30	MADE GROUND. Loose brown slightly clayey sandy fine to coarse angular GRAVEL with low cobble and boulder content. Contains brick, scrap metal, timber ,concrete, macadam, plastic, PVC pipe and glass. Sand is fine to coarse. Cobbles and boulders are subangular of various lithologies. Geo fabric and plastic net at 1.00m	

Notes: GW Encountered at 1.15mbgl

Field Data

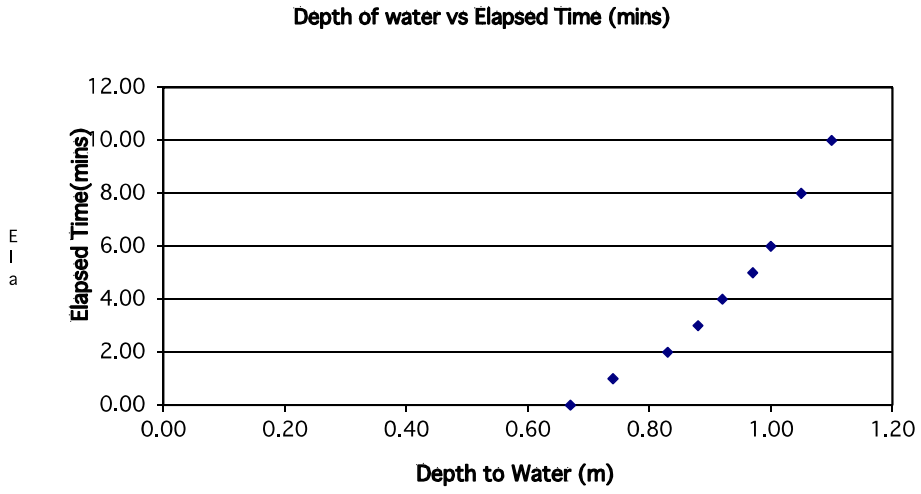
Depth to Water (m)	Elapsed Time (min)
0.67	0.00
0.74	1.00
0.83	2.00
0.88	3.00
0.92	4.00
0.97	5.00
1.00	6.00
1.05	8.00
1.10	10.00

Field Test

Depth of Pit (D)	1.30	m
Width of Pit (B)	0.65	m
Length of Pit (L)	0.80	m
Initial depth to Water =	0.67	m
Final depth to water =	1.10	m
Elapsed time (mins)=	10.00	
Top of permeable soil		m
Base of permeable soil		m
Base area=	0.52	m2
*Av. side area of permeable stratum over test perio	1.2035	m2
Total Exposed area =	1.7235	m2

Infiltration rate (f) = Volume of water used/unit exposed area / unit time

f= 0.01297 m/min or 0.0002162 m/sec



Appendix 6 - Geotechnical Soil Laboratory Records

IGSL Ltd
Materials Laboratory
Unit J5, M7 Business Park
Newhall, Naas
Co. Kildare
045 846176

Test Report

Determination of Moisture Content, Liquid & Plastic Limits

Tested in accordance with BS1377:Part 2:1990, clauses 3.2, 4.3, 4.4 & 5.3**

Report No. **R126192** Contract No. 23412 Contract Name: Monaghan Town

Customer Monaghan Co.Co./ RPS

Samples Received: 07/09/21 Date Tested: 07/09/21

BH/TP*	Sample No.	Depth* (m)	Lab. Ref	Sample Type*	Moisture Content %	Liquid Limit %	Plastic Limit %	Plasticity Index	% <425µm	Preparation	Liquid Limit Clause	Classification (BS5930)	Description
BH001	AA163475	0.0	A21/4465	B	19								Brown sandy gravelly SILT/CLAY
BH001	AA163476	0.3	A21/4466	B	34								Brown sandy gravelly SILT/CLAY
BH001	AA153476	0.7	A21/4467	B	38								Brown sandy gravelly SILT/CLAY
BH001	AA163477	1.0	A21/4468	B	32	73	34	39	75	WS	4.4	C V	Brown sandy, slightly gravelly, CLAY
BH001	AA153477	1.1	A21/4469	B	21	37	18	19	76	WS	4.4	C I	Brown sandy, slightly gravelly, CLAY
BH001	AA154151	2.0	A21/4470	B	18	23	NP	NP	83	WS	4.4		Brown sandy, slightly gravelly, SILT
BH001	AA154152	3.0	A21/4471	ENV	27	30	NP	NP	96	WS	4.4		Brown sandy, slightly gravelly, SILT
BH003	AA154153	0.0	A21/4472	ENV	9.4	33	NP	NP	21	WS	4.4		Brown silty, very sandy, GRAVEL
BH003	AA154153	0.3	A21/4473	ENV	5.8								Brown silty/clayey sandy GRAVEL
BH003	AA154153	0.7	A21/4474	B	4.7								Brown silty/clayey sandy GRAVEL
BH003	AA154153	1.0	A21/4475	B	4.1								Brown clayey/silty, sandy, GRAVEL with some cobbles
BH003	AA154154	2.0	A21/4476	B	8.8								Brown silty/clayey sandy GRAVEL
BH003	AA154155	2.2	A21/4477	B	9.4								Brown silty/clayey sandy GRAVEL
BH003	AA154156	3.0	A21/4478	B	8.5								Brown silty/clayey sandy GRAVEL

WS - Wet sieved
AR - As received
NP - Non plastic

Liquid Limit Clause: 4.3 Cone Penetrometer definitive method
4.4 Cone Penetrometer one point method

Sample Type: B - Bulk Disturbed
U - Undisturbed

Remarks:
Results relate only to the specimen tested,in as received condition unless otherwise noted.
NOTE: **These clauses have been superceded by EN 17892-1 and EN17892-12.
Opinions and interpretations are outside the scope of accreditation. * denotes Customer supplied information.
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Persons authorized to approve reports
H Byrne (Laboratory Manager)

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IGSL Ltd
Materials Laboratory
Unit J5, M7 Business Park
Newhall, Naas
Co. Kildare
045 846176

Test Report

Determination of Moisture Content, Liquid & Plastic Limits

Tested in accordance with BS1377:Part 2:1990, clauses 3.2, 4.3, 4.4 & 5.3**

ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

Report No. **R126193** Contract No. 23412 Contract Name: Monaghan Town

Customer Monaghan Co.Co./ RPS

Samples Received: 07/09/21 Date Tested: 07/09/21

BH/TP*	Sample No.	Depth* (m)	Lab. Ref	Sample Type*	Moisture Content %	Liquid Limit %	Plastic Limit %	Plasticity Index	% <425µm	Preparation	Liquid Limit Clause	Classification (BS5930)	Description
TP01	AA167597	0.3	A21/4479	B	14								Brown clayey/silty, very sandy, GRAVEL
TP01	AA167598	1.0	A21/4480	B	17	39	21	18	62	WS	4.4	C I	Brown sandy, slightly gravelly, CLAY
TP01	AA167598	1.5	A21/4481	B	10	40	22	18	44	WS	4.4	C I	Brown clayey, very sandy, GRAVEL
TP02	AA167599	0.4	A21/4482	B	39								Brown sandy, slightly gravelly, SILT/CLAY
TP02	AA157600	0.7	A21/4483	B	33								Brown sandy gravelly SILT/CLAY
TP02	AA167600	1.2	A21/4484	B	22	36	21	15	57	WS	4.4	C I	Brown slightly sandy, gravelly, CLAY
TP03	AA163474	0.3	A21/4485	B	18								Brown slightly sandy, gravelly, SILT/CLAY
TP03	AA153474	1.0	A21/4486	B	25	44	25	19	56	WS	4.4	C I	Brown sandy, slightly gravelly, CLAY
BRE TEST 1	AA157599	0.4	A21/4487	B	17								Brown sandy gravelly SILT/CLAY

WS - Wet sieved
AR - As received
NP - Non plastic

Liquid Limit Clause: 4.3 Cone Penetrometer definitive method
4.4 Cone Penetrometer one point method

Sample Type: B - Bulk Disturbed
U - Undisturbed

Remarks:
Results relate only to the specimen tested,in as received condition unless otherwise noted.
NOTE: **These clauses have been superceded by EN 17892-1 and EN17892-12.
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Persons authorized to approve reports
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TEST REPORT
Determination of Particle Size Distribution
Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5**
(note: Sedimentation stage not accredited)

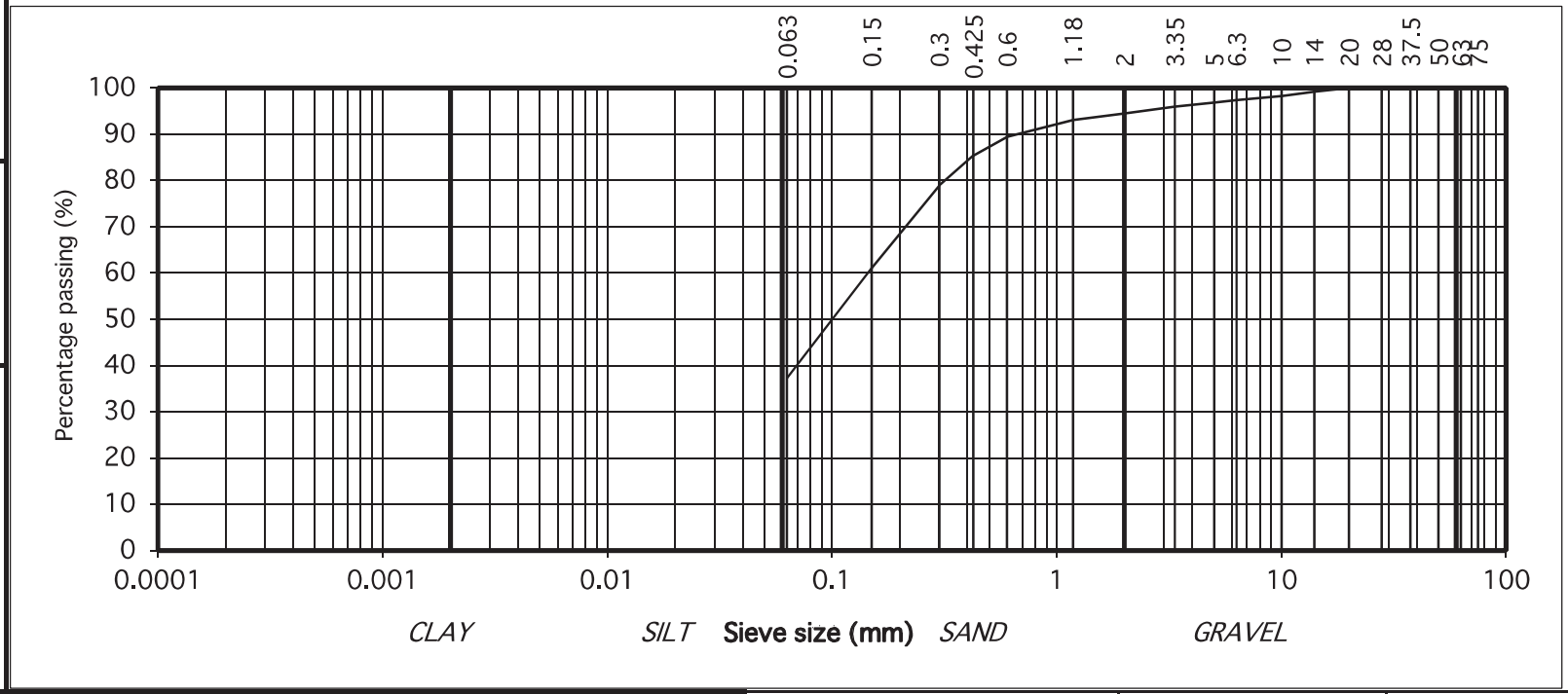
ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	100	
28	100	
20	100	
14	99	
10	98	
6.3	97	
5	97	
3.35	96	
2	95	
1.18	93	SAND
0.6	89	
0.425	85	
0.3	79	
0.15	61	
0.063	37	SILT/CLAY

Contract No. 23412 Report No. R127126
Contract Name: South Dublin St. & Backlands Rehabilitation Scheme - Monaghan Town
BH/TP* : BH01
Sample No.* AA163477 Lab. Sample No. A21/4468
Sample Type: B
Depth* (m) 1.00 Customer: Monaghan Co.Cc
Date Received 07/09/2021 Date Testing started 07/09/2021
Description: Brown sandy, slightly gravelly, CLAY

Remarks Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2016 .

Results relate only to the specimen tested in as received condition unless otherwise noted. * denotes Customer supplied information. Opinions and interpretations are outside the scope of accreditation.
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Persons authorised to approve report: J Barrett (Quality Manager) H Byrne (Laboratory Manager)

TEST REPORT
Determination of Particle Size Distribution
Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5**
(note: Sedimentation stage not accredited)

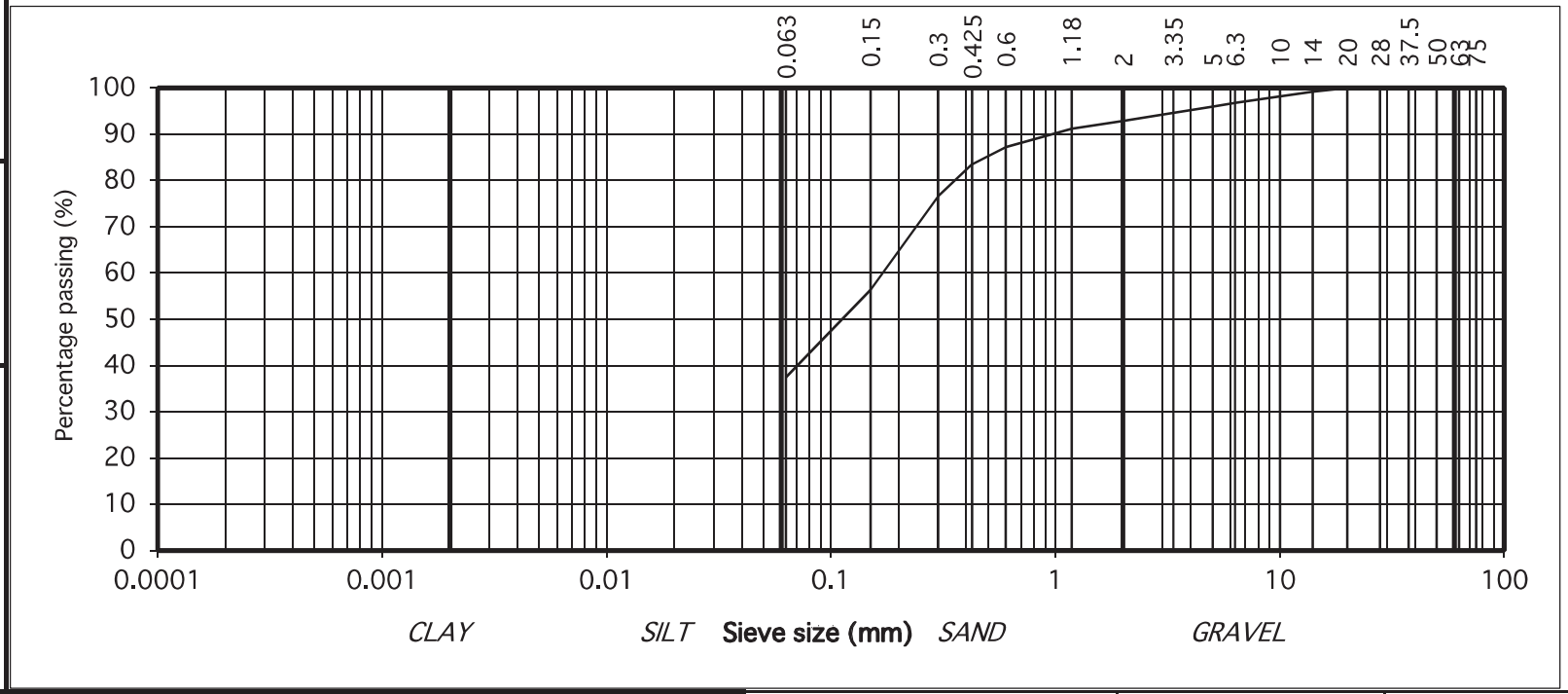
ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	100	
28	100	
20	100	
14	99	
10	98	
6.3	97	
5	96	
3.35	95	
2	93	
1.18	91	SAND
0.6	87	
0.425	84	
0.3	77	
0.15	56	
0.063	37	SILT/CLAY

Contract No. 23412 Report No. R127124
Contract Name: South Dublin St. & Backlands Rehabilitation Scheme - Monaghan Town
BH/TP* : BH01
Sample No.* AA153477 Lab. Sample No. A21/4469
Sample Type: B
Depth* (m) 1.1-1.4 Customer: Monaghan Co.Cc
Date Received 07/09/2021 Date Testing started 07/09/2021
Description: Brown sandy, slightly gravelly, CLAY

Remarks Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2016 .

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TEST REPORT
Determination of Particle Size Distribution
Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5**
(note: Sedimentation stage not accredited)

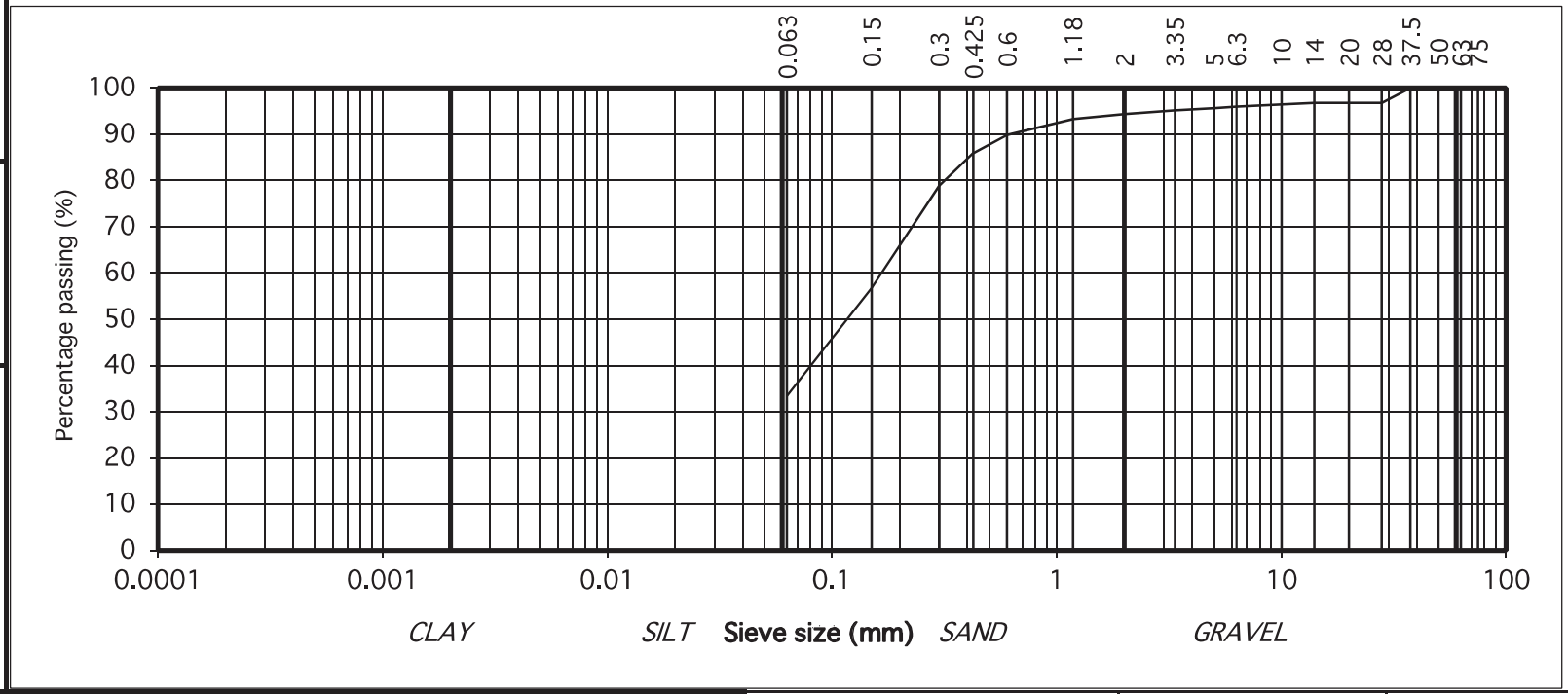
ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	100	
28	97	
20	97	
14	97	
10	96	
6.3	96	
5	96	
3.35	95	
2	94	
1.18	93	SAND
0.6	90	
0.425	86	
0.3	79	
0.15	57	
0.063	33	SILT/CLAY

Contract No. 23412 Report No. R127125
Contract Name: South Dublin St. & Backlands Rehabilitation Scheme - Monaghan Town
BH/TP* : BH01
Sample No.* AA154151 Lab. Sample No. A21/4470
Sample Type: B
Depth* (m) 2.0-2.5 Customer: Monaghan Co.Cc
Date Received 07/09/2021 Date Testing started 07/09/2021
Description: Brown sandy, slightly gravelly, SILT

Remarks Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2016 .

Results relate only to the specimen tested in as received condition unless otherwise noted. * denotes Customer supplied information. Opinions and interpretations are outside the scope of accreditation.
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TEST REPORT
Determination of Particle Size Distribution
Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5**
(note: Sedimentation stage not accredited)

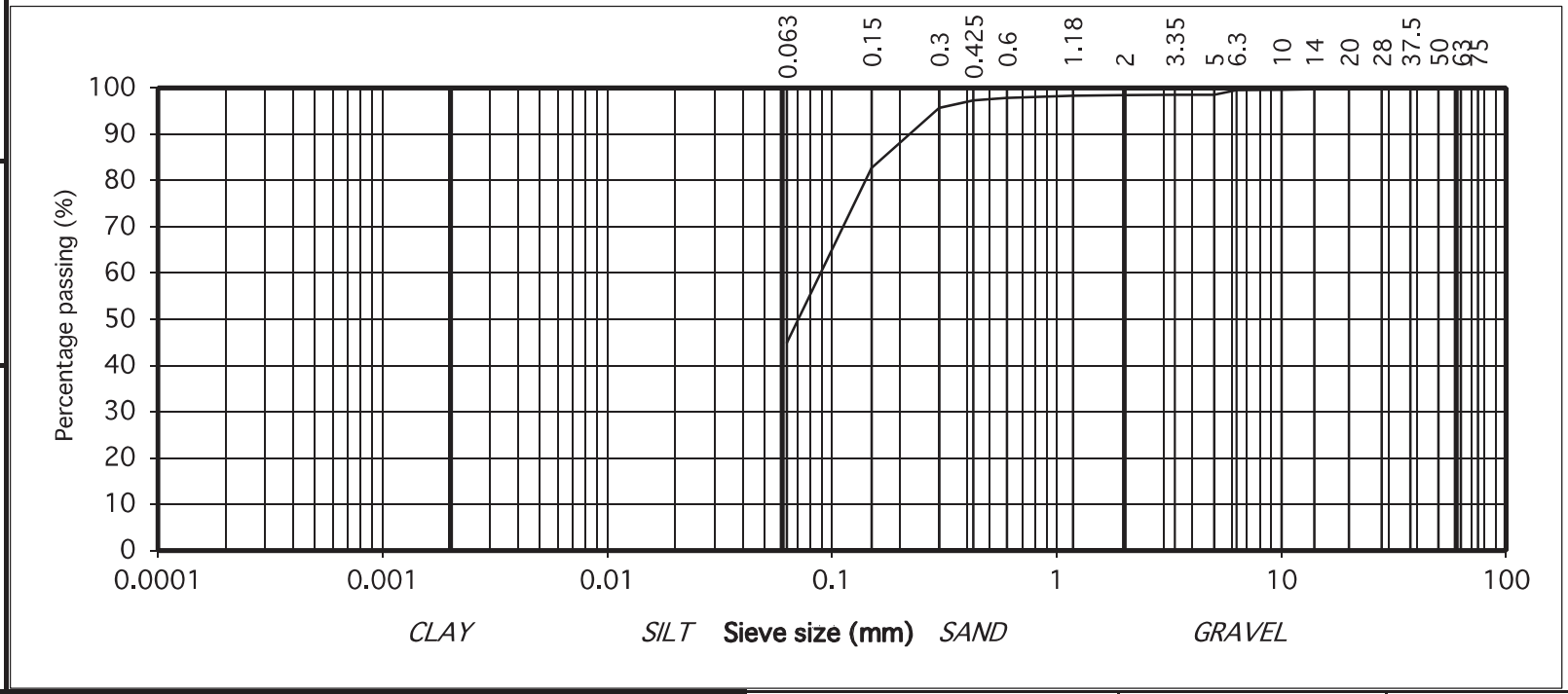
ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	100	
28	100	
20	100	
14	100	
10	100	
6.3	100	
5	99	
3.35	99	
2	99	
1.18	98	SAND
0.6	98	
0.425	97	
0.3	96	
0.15	83	
0.063	45	SILT/CLAY

Contract No. 23412 Report No. R127127
Contract Name: South Dublin St. & Backlands Rehabilitation Scheme - Monaghan Town
BH/TP* : BH01
Sample No.* AA154152 Lab. Sample No. A21/4478
Sample Type: B
Depth* (m) 3.00 Customer: Monaghan Co.Cc
Date Received 07/09/2021 Date Testing started 07/09/2021
Description: Brown sandy, slightly gravelly, SILT

Remarks Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2016 .

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TEST REPORT
Determination of Particle Size Distribution
Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5**
(note: Sedimentation stage not accredited)

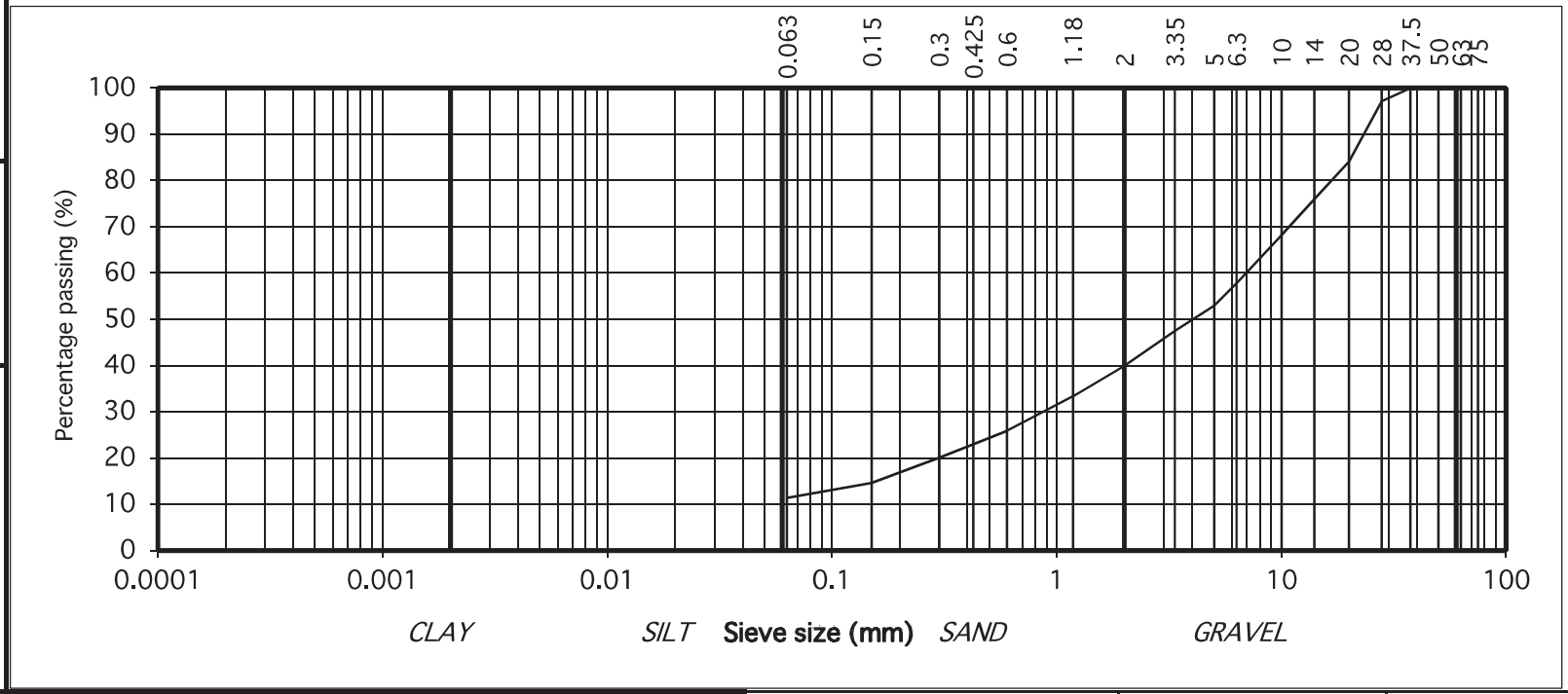
ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	100	
28	97	
20	84	
14	76	
10	68	
6.3	58	
5	53	
3.35	47	
2	40	
1.18	33	SAND
0.6	26	
0.425	23	
0.3	20	
0.15	15	
0.063	11	SILT/CLAY

Contract No. 23412 Report No. R126603
Contract Name: South Dublin St. & Backlands Rehabilitation Scheme - Monaghan Town
BH/TP* : BH03
Sample No.* AA154153 Lab. Sample No. A21/4472
Sample Type: B
Depth* (m) 0.00-0.20 Customer: Monaghan Co.Cc
Date Received 07/09/2021 Date Testing started 07/09/2021
Description: Brown silty, very sandy, GRAVEL

Remarks Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2016 .

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TEST REPORT
Determination of Particle Size Distribution
Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5**
(note: Sedimentation stage not accredited)

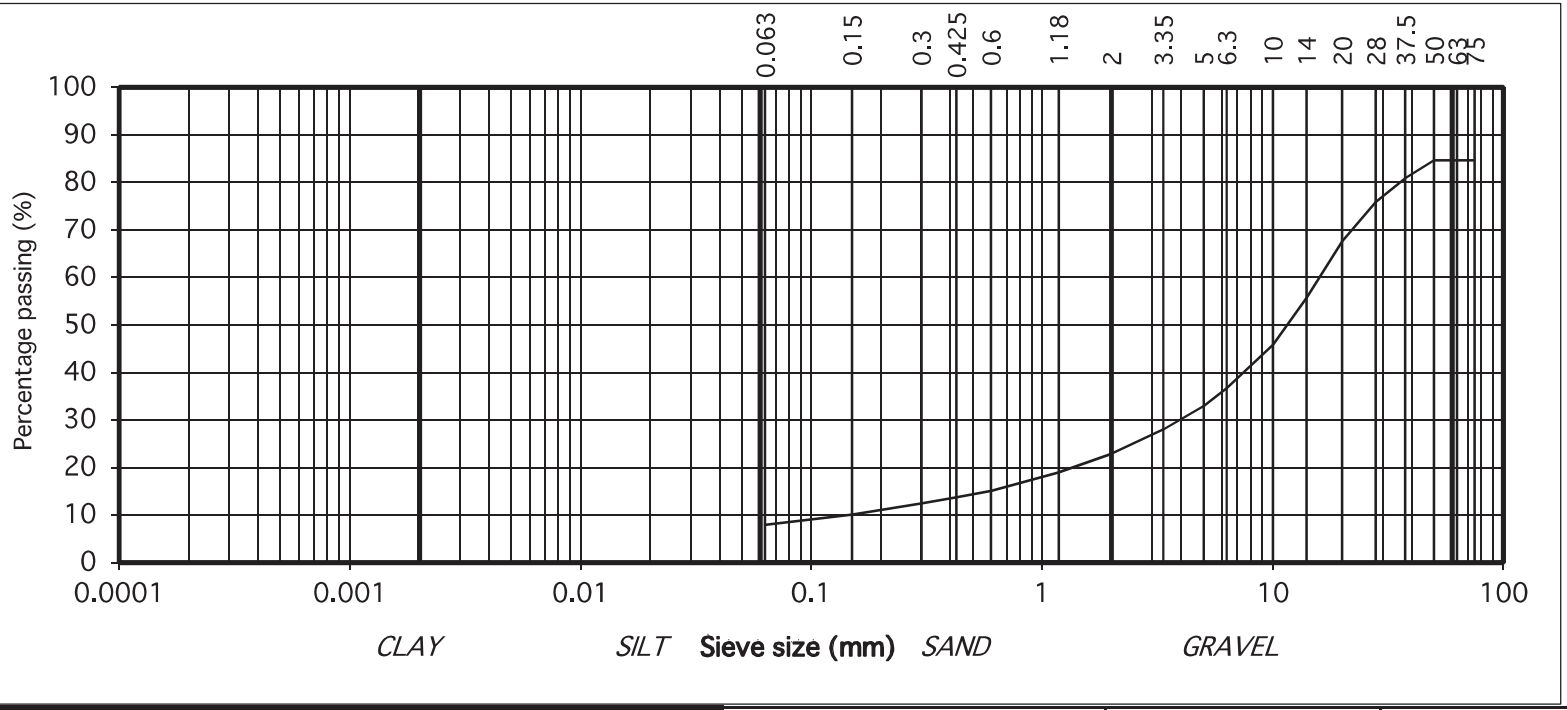
ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

particle size	% passing	
75	85	COBBLES
63	85	
50	85	GRAVEL
37.5	81	
28	76	
20	68	
14	56	
10	46	
6.3	37	
5	33	
3.35	28	
2	23	
1.18	19	SAND
0.6	15	
0.425	14	
0.3	12	
0.15	10	
0.063	8	SILT/CLAY

Contract No. 23412 Report No. R126585
Contract Name: South Dublin St. & Backlands Rehabilitation Scheme - Monaghan Town
BH/TP* : BH03
Sample No.* AA153474 Lab. Sample No. A21/4475
Sample Type: B
Depth* (m) 1.00 Customer: Monaghan Co.Cc
Date Received 07/09/2021 Date Testing started 07/09/2021
Description: Brown clayey/silty, sandy, GRAVEL with some cobbles

Remarks Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2 Sample size did not meet the requirements of BS1377

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Persons authorised to approve report: J Barrett (Quality Manager) H Byrne (Laboratory Manager)

TEST REPORT
Determination of Particle Size Distribution
Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5**
(note: Sedimentation stage not accredited)

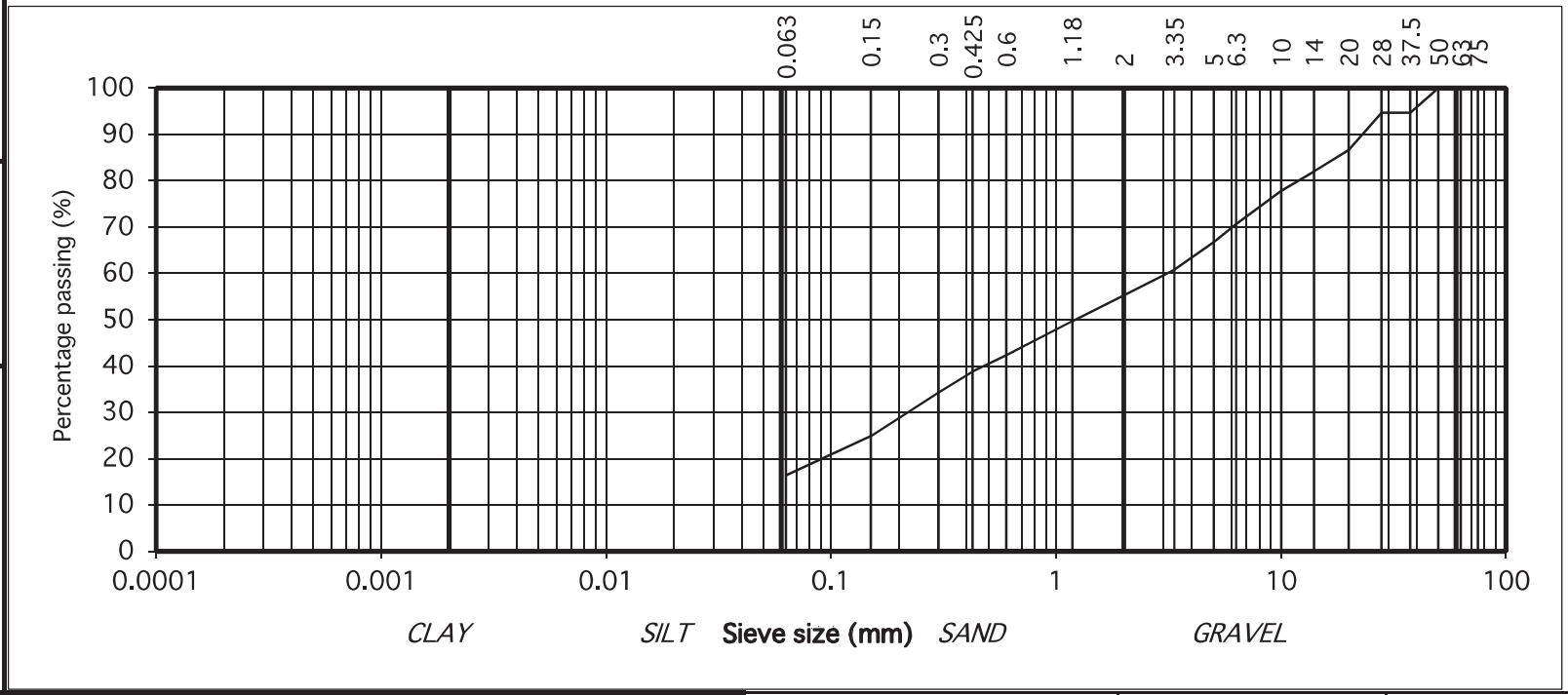
ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	95	
28	95	
20	87	
14	82	
10	78	
6.3	71	
5	67	
3.35	61	
2	55	
1.18	50	SAND
0.6	42	
0.425	39	
0.3	34	
0.15	25	
0.063	16	SILT/CLAY

Contract No. 23412 Report No. R126601
Contract Name: South Dublin St. & Backlands Rehabilitation Scheme - Monaghan Town
BH/TP* : TP01
Sample No.* AA167597 Lab. Sample No. A21/4479
Sample Type: B
Depth* (m) 0.30-0.50 Customer: Monaghan Co.Cc
Date Received 07/09/2021 Date Testing started 07/09/2021
Description: Brown clayey/silty, very sandy, GRAVEL

Remarks Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2016 .

Results relate only to the specimen tested in as received condition unless otherwise noted. * denotes Customer supplied information. Opinions and interpretations are outside the scope of accreditation.
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Persons authorised to approve report: J Barrett (Quality Manager) H Byrne (Laboratory Manager)

TEST REPORT
Determination of Particle Size Distribution
Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5**
(note: Sedimentation stage not accredited)

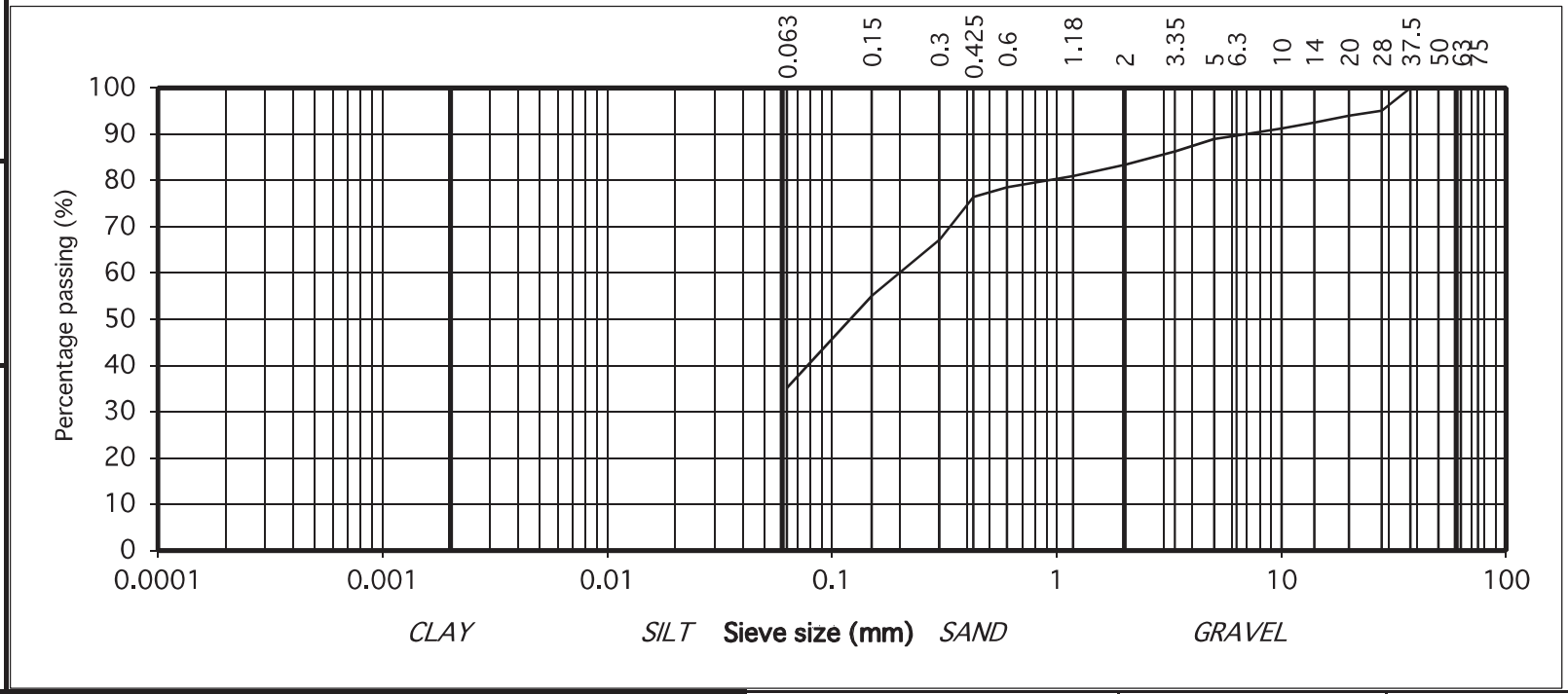
ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	100	
28	95	
20	94	
14	93	
10	91	
6.3	90	
5	89	
3.35	86	
2	83	
1.18	81	SAND
0.6	79	
0.425	76	
0.3	67	
0.15	55	
0.063	35	SILT/CLAY

Contract No. 23412 Report No. R127128
Contract Name: South Dublin St. & Backlands Rehabilitation Scheme - Monaghan Town
BH/TP* : TP01
Sample No.* AA157598 Lab. Sample No. A21/4478
Sample Type: B
Depth* (m) 1-1.2 Customer: Monaghan Co.Cc
Date Received 07/09/2021 Date Testing started 07/09/2021
Description: Brown sandy, slightly gravelly, CLAY

Remarks Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2016 .

Results relate only to the specimen tested in as received condition unless otherwise noted. * denotes Customer supplied information. Opinions and interpretations are outside the scope of accreditation.
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Persons authorised to approve report: J Barrett (Quality Manager) H Byrne (Laboratory Manager)

TEST REPORT
Determination of Particle Size Distribution
Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5**
(note: Sedimentation stage not accredited)

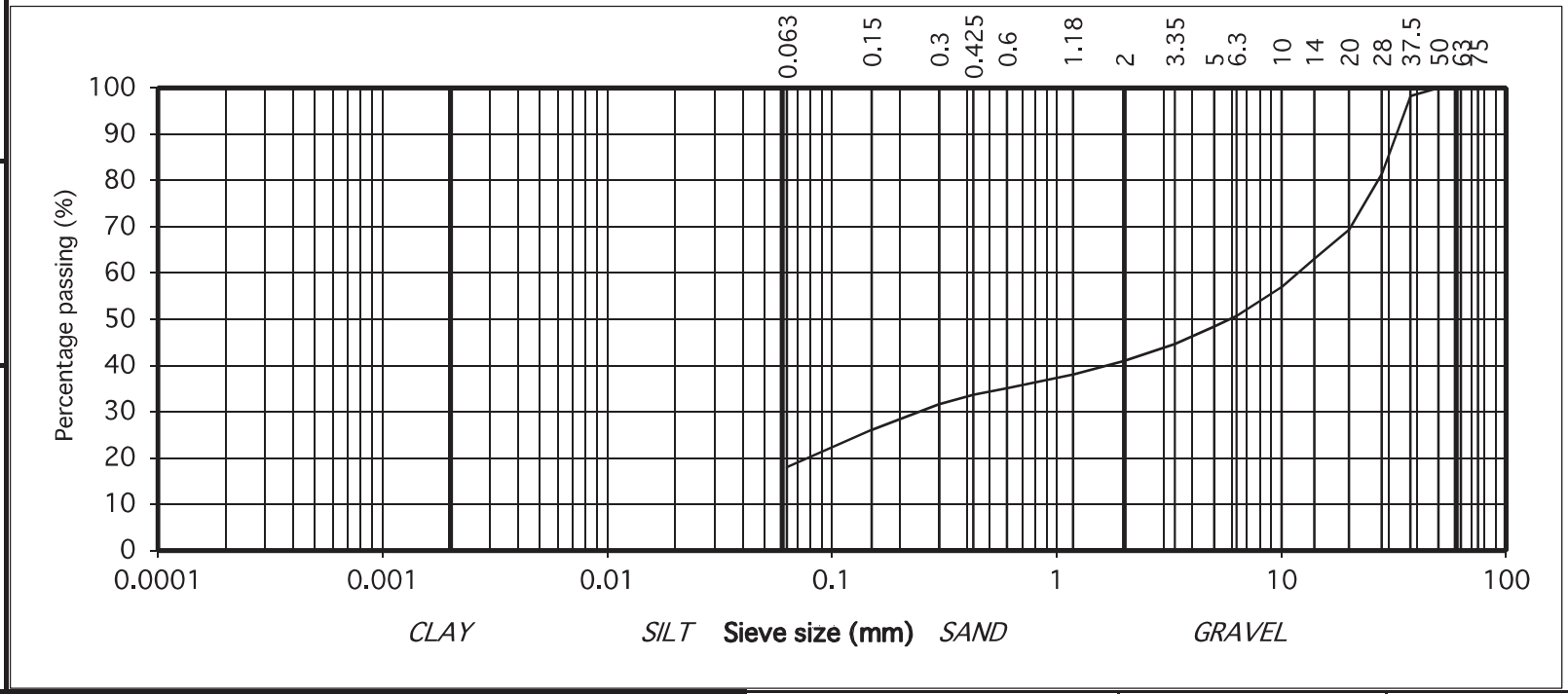
ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	98	
28	81	
20	69	
14	63	
10	57	
6.3	51	
5	48	
3.35	45	
2	41	
1.18	38	SAND
0.6	35	
0.425	34	
0.3	32	
0.15	26	
0.063	18	SILT/CLAY

Contract No. 23412 Report No. R126582
Contract Name: South Dublin St. & Backlands Rehabilitation Scheme - Monaghan Town
BH/TP* : TP01
Sample No.* AA167598 Lab. Sample No. A21/4481
Sample Type: B
Depth* (m) 1.50 Customer: Monaghan Co.Cc
Date Received 07/09/2021 Date Testing started 07/09/2021
Description: Brown clayey, very sandy, GRAVEL

Remarks Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2016 .

Results relate only to the specimen tested in as received condition unless otherwise noted. * denotes Customer supplied information. Opinions and interpretations are outside the scope of accreditation.
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Approved by:	Date:	Page no:
	23/09/21	1 of 1

Persons authorised to approve report: J Barrett (Quality Manager) H Byrne (Laboratory Manager)

TEST REPORT
Determination of Particle Size Distribution
Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5**
(note: Sedimentation stage not accredited)

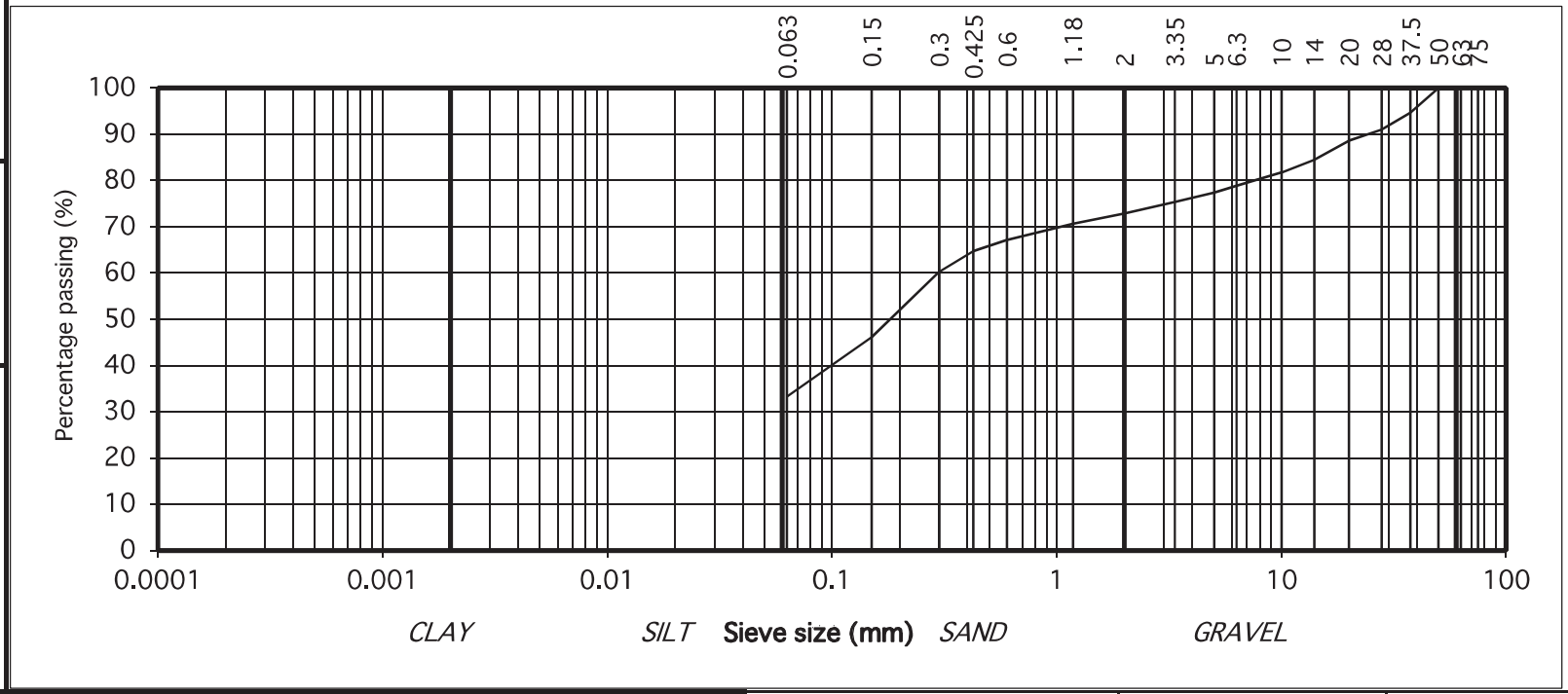
ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	95	
28	91	
20	89	
14	85	
10	82	
6.3	79	
5	77	
3.35	75	
2	73	
1.18	71	SAND
0.6	67	
0.425	65	
0.3	60	
0.15	46	
0.063	33	SILT/CLAY

Contract No. 23412 Report No. R126583
Contract Name: South Dublin St. & Backlands Rehabilitation Scheme - Monaghan Town
BH/TP* : TP02
Sample No.* AA167599 Lab. Sample No. A21/4482
Sample Type: B
Depth* (m) 0.40 Customer: Monaghan Co.Cc
Date Received 07/09/2021 Date Testing started 07/09/2021
Description: Brown sandy, slightly gravelly, SILT/CLAY

Remarks Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2016 .

Results relate only to the specimen tested in as received condition unless otherwise noted. * denotes Customer supplied information. Opinions and interpretations are outside the scope of accreditation.
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IGSL Ltd Materials Laboratory

Approved by:	Date:	Page no:
	23/09/21	1 of 1

Persons authorised to approve report: J Barrett (Quality Manager) H Byrne (Laboratory Manager)

TEST REPORT
Determination of Particle Size Distribution
Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5**
(note: Sedimentation stage not accredited)

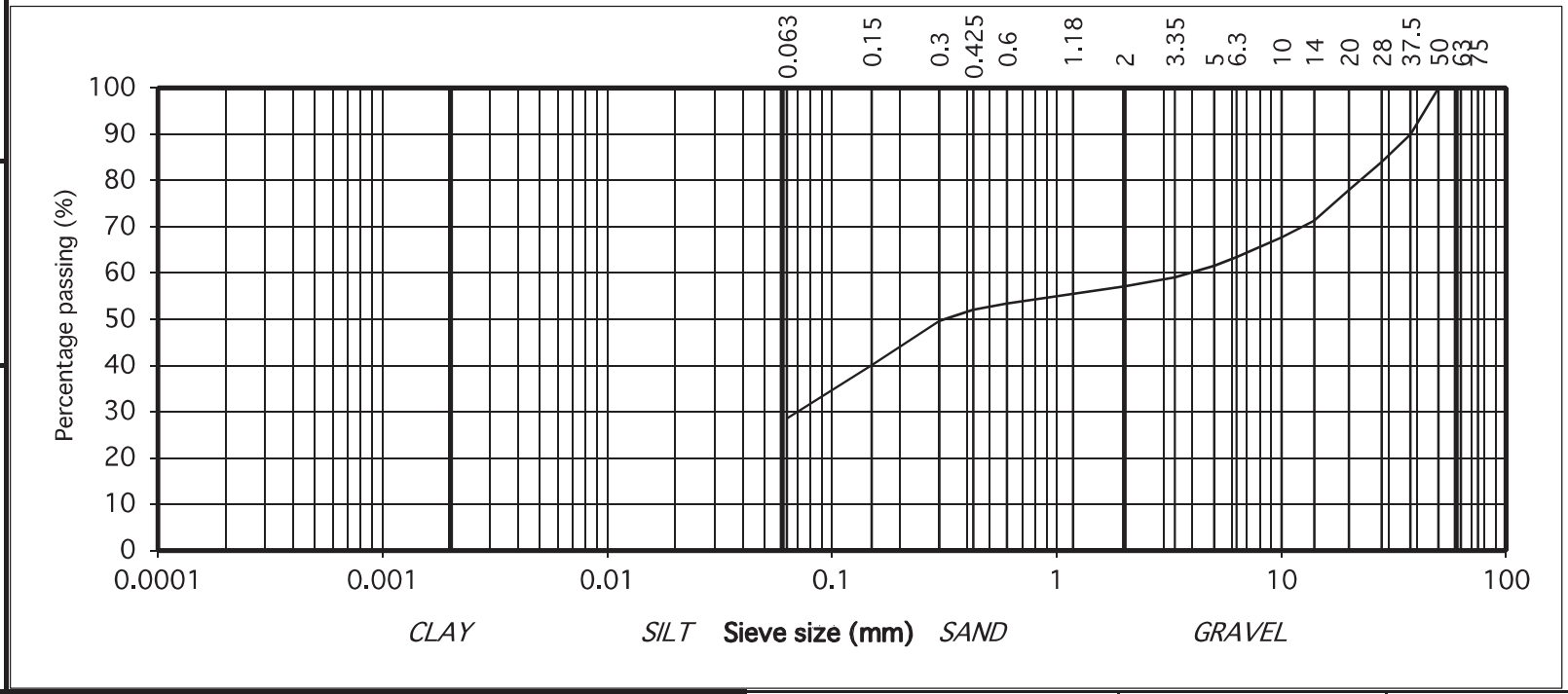
ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	90	
28	84	
20	78	
14	71	
10	68	
6.3	63	
5	62	
3.35	59	
2	57	
1.18	55	SAND
0.6	53	
0.425	52	
0.3	50	
0.15	40	
0.063	29	SILT/CLAY

Contract No. 23412 Report No. R126602
Contract Name: South Dublin St. & Backlands Rehabilitation Scheme - Monaghan Town
BH/TP* : TP02
Sample No.* AA167600 Lab. Sample No. A21/4484
Sample Type: B
Depth* (m) 1.20-1.40 Customer: Monaghan Co.Cc
Date Received 07/09/2021 Date Testing started 07/09/2021
Description: Brown slightly sandy, gravelly, CLAY

Remarks Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2016 .

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Persons authorised to approve report: J Barrett (Quality Manager) H Byrne (Laboratory Manager)

TEST REPORT
Determination of Particle Size Distribution
Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5**
(note: Sedimentation stage not accredited)

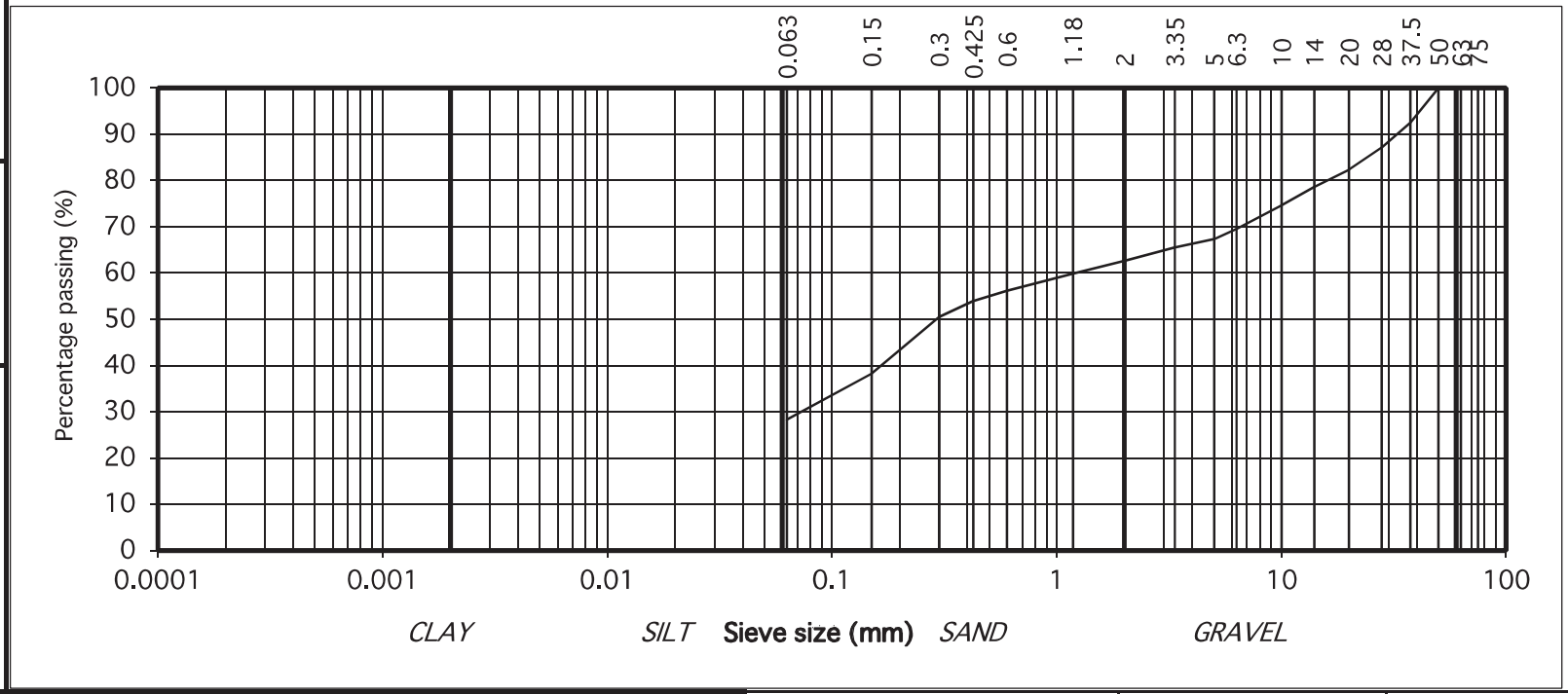
ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	93	
28	87	
20	82	
14	79	
10	75	
6.3	70	
5	67	
3.35	66	
2	63	
1.18	60	SAND
0.6	56	
0.425	54	
0.3	50	
0.15	38	
0.063	28	SILT/CLAY

Contract No. 23412 Report No. R163484
Contract Name: South Dublin St. & Backlands Rehabilitation Scheme - Monaghan Town
BH/TP* : TP03
Sample No.* AA163474 Lab. Sample No. A21/4485
Sample Type: B
Depth* (m) 0.30 Customer: Monaghan Co.Cc
Date Received 07/09/2021 Date Testing started 07/09/2021
Description: Brown slightly sandy, gravelly, SILT/CLAY

Remarks Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2016 .

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	23/09/21	1 of 1

Persons authorised to approve report: J Barrett (Quality Manager) H Byrne (Laboratory Manager)

TEST REPORT
Determination of Particle Size Distribution
Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5**
(note: Sedimentation stage not accredited)

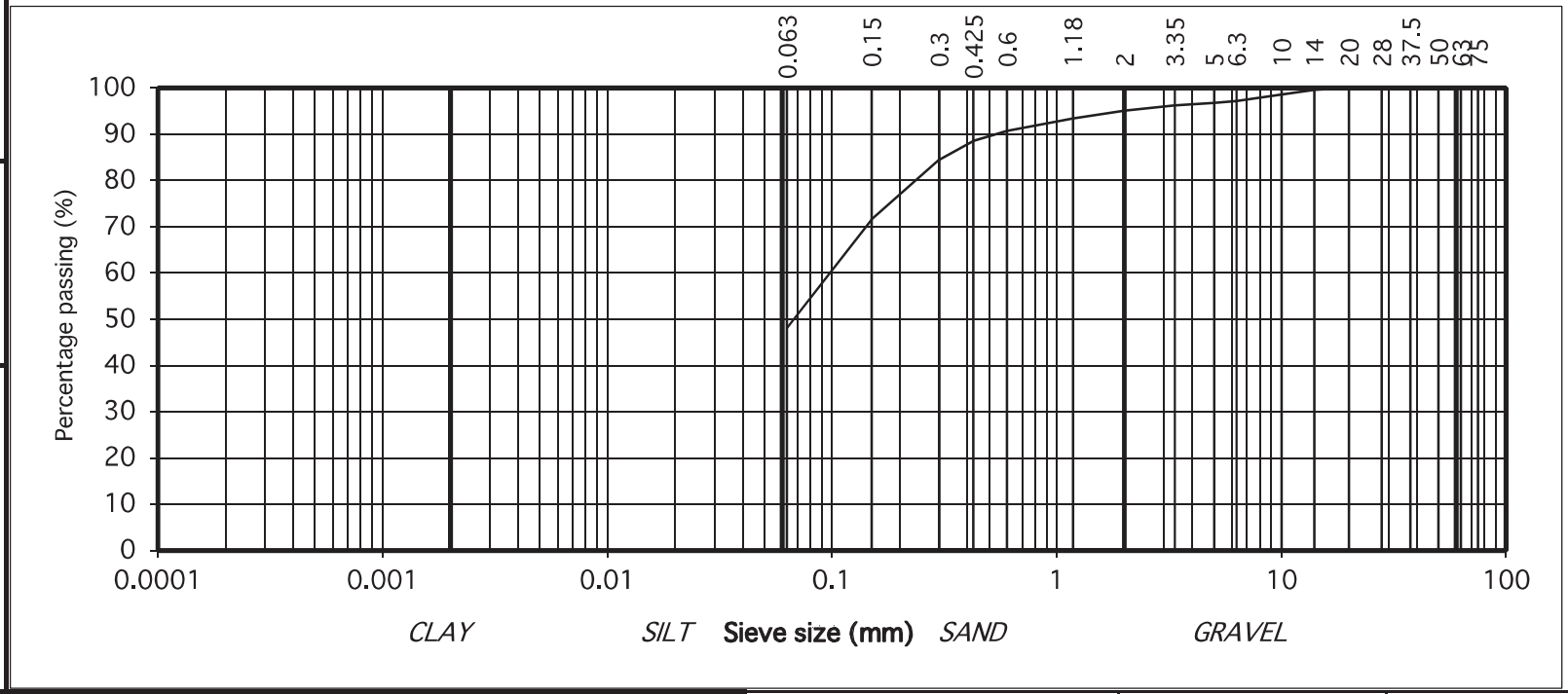
ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	100	
28	100	
20	100	
14	100	
10	99	
6.3	97	
5	97	
3.35	96	
2	95	
1.18	93	SAND
0.6	91	
0.425	89	
0.3	85	
0.15	72	
0.063	48	SILT/CLAY

Contract No. 23412 Report No. R127129
Contract Name: South Dublin St. & Backlands Rehabilitation Scheme - Monaghan Town
BH/TP* : TP03
Sample No.* AA157598 Lab. Sample No. A21/4486
Sample Type: B
Depth* (m) 1-1.2 Customer: Monaghan Co.Cc
Date Received 07/09/2021 Date Testing started 07/09/2021
Description: Brown sandy, slightly gravelly, CLAY

Remarks Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2016 .

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Approved by:	Date:	Page no:
	29/09/21	1 of 1

Persons authorised to approve report: J Barrett (Quality Manager) H Byrne (Laboratory Manager)

IGSL Ltd
Materials Laboratory
Unit J5, M7 Business Park
Newhall, Naas
Co. Kildare
045 846176

Test Report

Determination of Shear Strength by the Laboratory Vane Method

Tested in accordance with BS1377:Part 7:1990, clause 3

Report No. **R123716** Contract No. 23412 Contract Name: Monaghan Town

Customer Monaghan County Council

Samples Received: Date Tested: 14/09/21

BH/TP	Sample No.	Depth (m)	Specimen Type	Average Shear Strength (kPa) (average of 3 tests)	Average Remoulded Shear Strength (kPa) after 2 revolutions of the vane	Moisture Content %	Vane Size (mm)	Description
BH01	163477	1.0	R	18.8	4.2	20.8	12.7 x 12.7	Grey brown slightly gravelly sandy SILT/CLAY
BH01	154151	2.0	R	9.4	2.7	18.1	12.7 x 12.7	Grey brown sandy SILT/CLAY
BH01	154152	3.0	R	5.5	1.0	27.3	12.7 x 12.7	Grey brown sandy SILT/CLAY
TP01	157598	1.0	R	70.0	7.9	18.1	12.7 x 12.7	Brown slightly gravelly sandy SILT/CLAY with roots
TP03	153474	1.0	R	31.3	1.6	26.7	12.7 x 12.7	Yellowish brown slightly gravelly sandy SILT/CLAY

Specimen Types: P - Piston U - U100 tube R - Remoulded specimen (compacted into container)

IGSL Ltd Laboratory	Persons authorized to approve reports	Approved by	Date	Page
	J Barrett (Quality Manager)		21/09/21	1 of 1

Determination of Shear Strength by Direct Shear

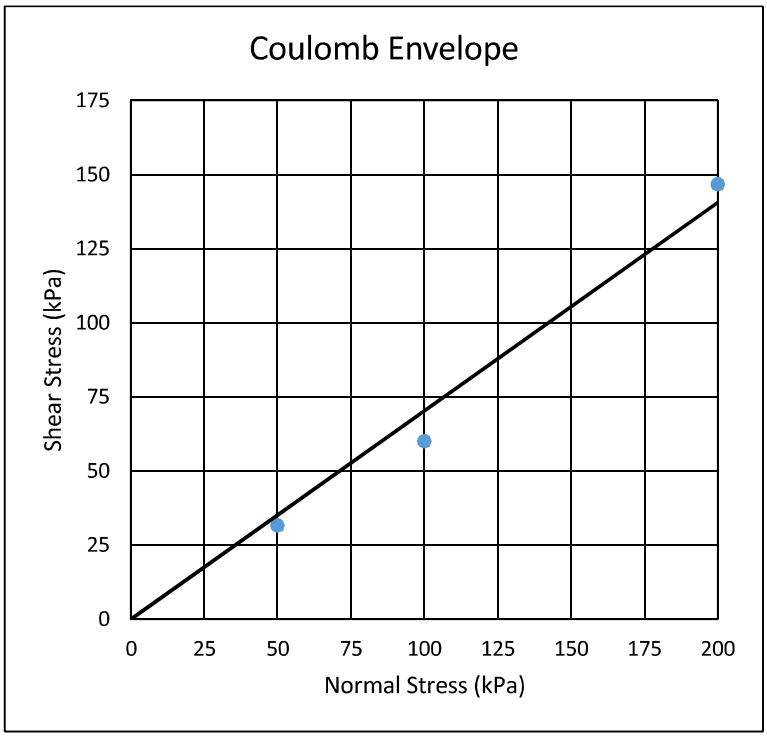
Small Shearbox Apparatus BS1377:Part 7:1990, Clause 4

Contract:	Monaghan Town			Contract No.	23412
Location*:	BH01	Depth (m)*	1	Sample No.*	163477
Report No.	R126745			Customer:	Monaghan County Council
Sample Received:	-			Testing started:	01/10/21

Method of Preparation: <2mm material compacted into cutter at as received Moisture content

Description: Grey brown sandy slightly gravelly SILT/CLAY

	Specimen		
	1	2	3
Normal Stress (kPa)	50	100	200
Length/Width (mm)	60.0 x 60.0	60.0 x 60.0	60.0 x 60.0
Height (mm)	23.0	23.0	23.0
Initial Moisture Content (%)	36	36	36
Initial Bulk Density (Mg/m^3)	1.91	1.90	1.90
Initial Dry Density (Mg/m^3)	1.40	1.40	1.40
Particle Density (Mg/m^3) (Assumed)	2.65	2.65	2.65
Maximum Shear Stress (kPa)	31.62	59.96	146.703
Horizontal displacement at failure (mm)	5.27	11.15	12
Rate Horizontal displacement (mm/min)	0.019	0.012	0.016
Condition (Dry (D) / Submerged (S))	S	S	S



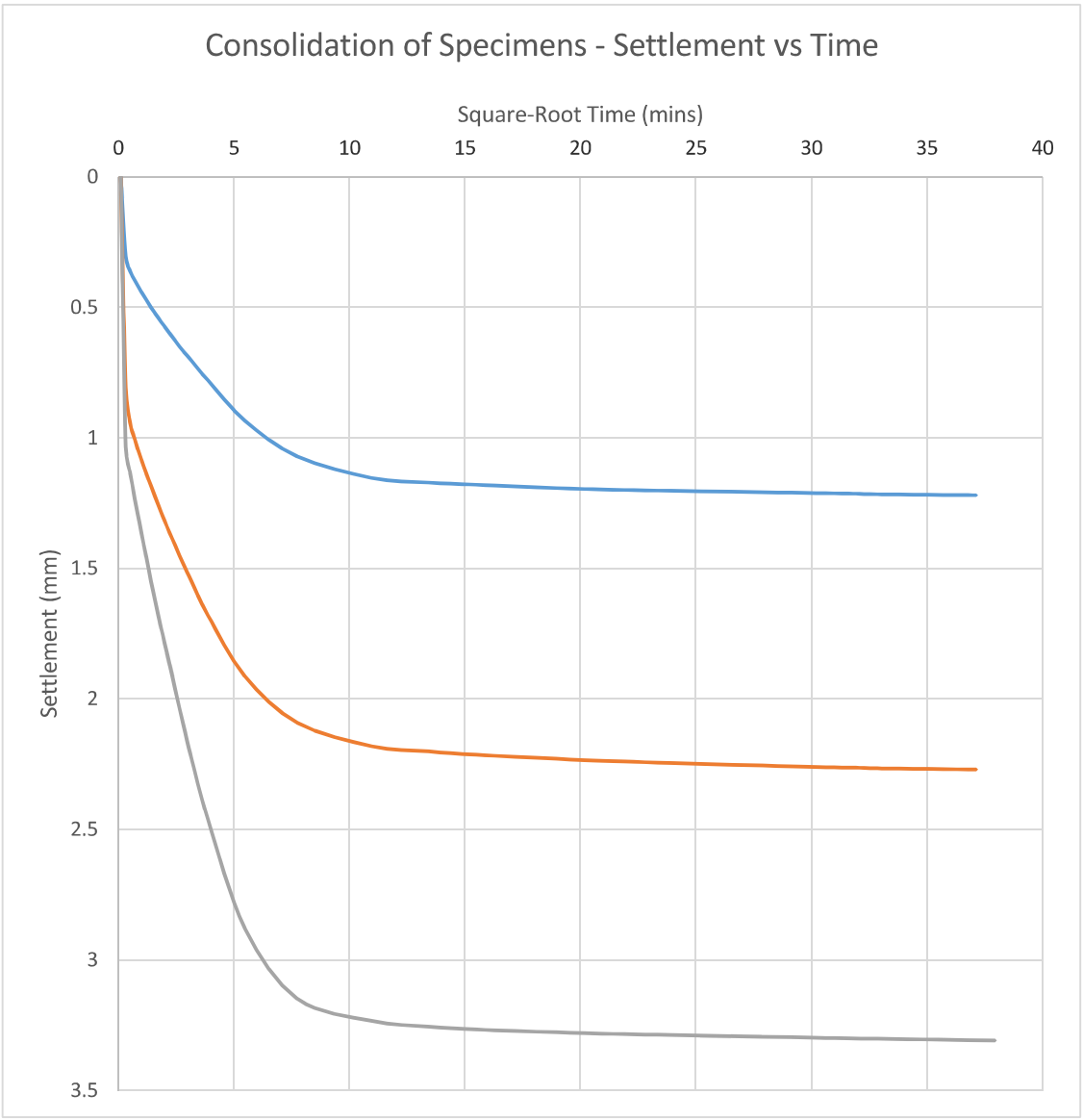
c' (kPa)	0
ϕ' (degrees)	35

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Determination of Shear Strength by Direct Shear

Small Shearbox Apparatus BS1377:Part 7:1990, Clause 4

Contract:	Monaghan Town			Contract No.	23412
Location:	BH01	Depth (m)	1	Sample No.	163477



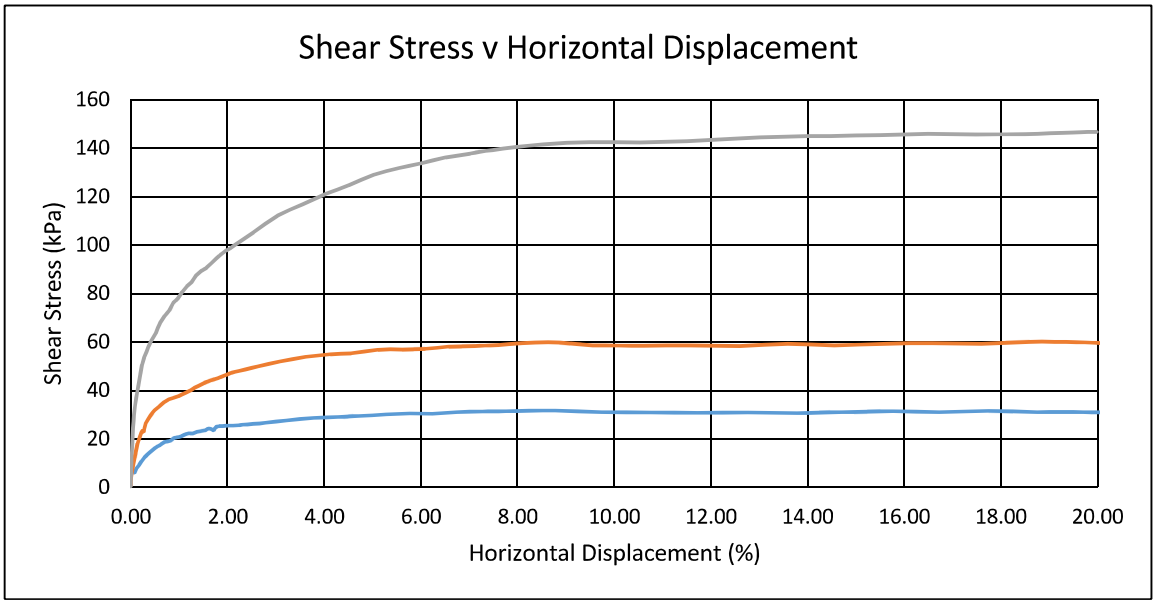
Determination of Shear Strength by Direct Shear

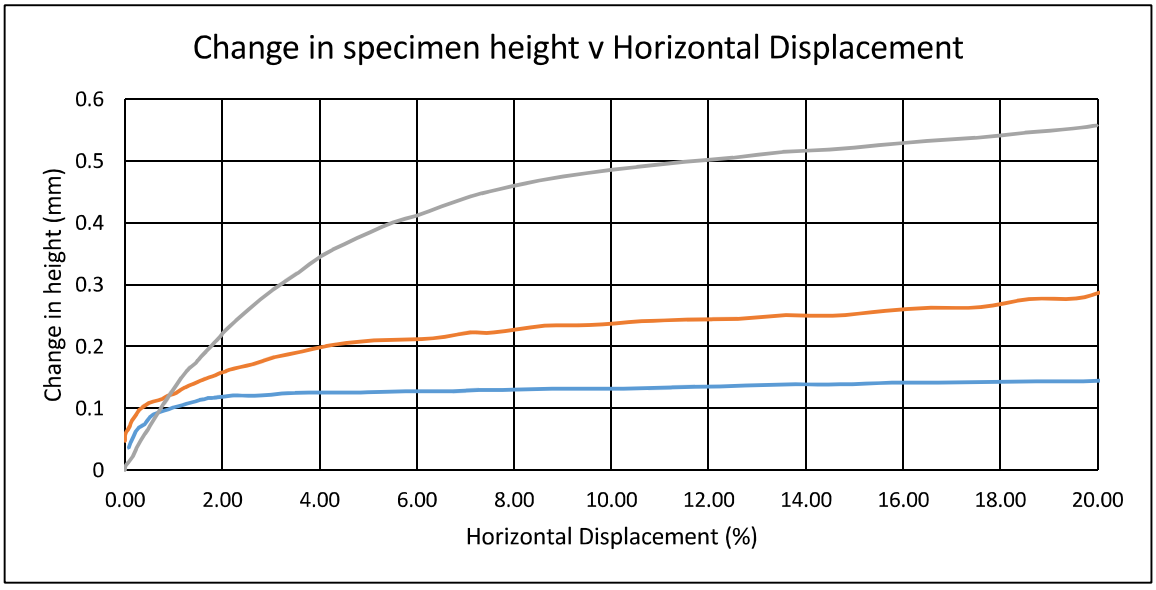
Small Shearbox Apparatus BS1377:Part 7:1990, Clause 4

Contract: Monaghan Town Contract No. 23412

Location: BH01 Depth (m) 1 Sample No. 163477

Report No. R126745





Results relate to the specimen tested. Approved signatories ☐ J Barrett (Quality Manager) ☐ H Byrne (Laboratory Manager)	Approved by	Date	Page 3 of 3
		06/10/21	

Determination of Shear Strength by Direct Shear

Small Shearbox Apparatus BS1377:Part 7:1990, Clause 4

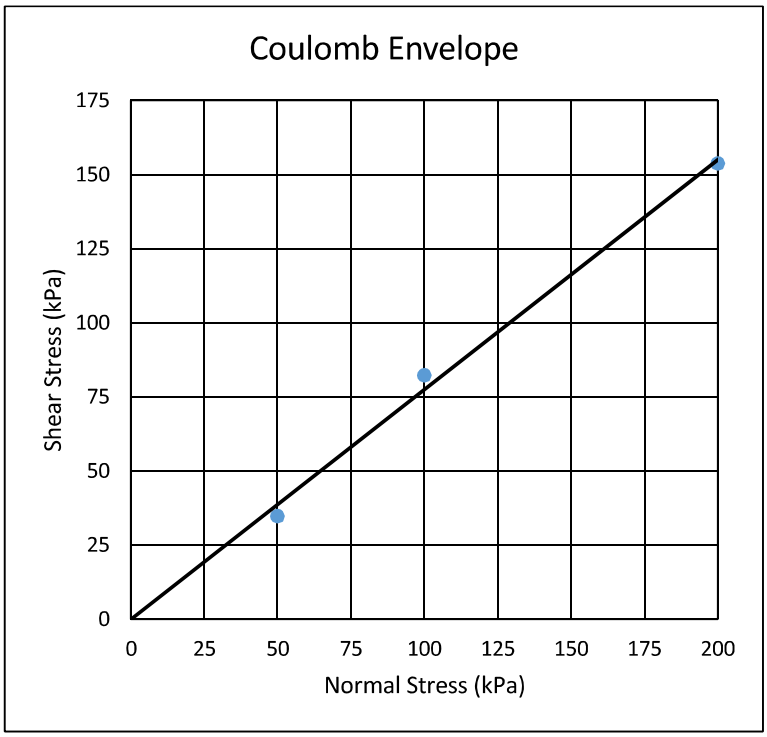
ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 1331

Contract:	Monaghan Town			Contract No.	23412
Location*:	BH01	Depth (m)*	1.2	Sample No.*	153477
Report No.	R126746			Customer:	Monaghan County Council
Sample Received:	-			Testing started:	05/10/21

Method of Preparation: <2mm material compacted into cutter at as received Moisture content

Description: Grey brown sandy slightly gravelly SILT/CLAY

	Specimen		
	1	2	3
Normal Stress (kPa)	50	100	200
Length/Width (mm)	60.0 x 60.0	60.0 x 60.0	60.0 x 60.0
Height (mm)	23.0	23.0	23.0
Initial Moisture Content (%)	22	22	22
Initial Bulk Density (Mg/m^3)	2.05	2.04	2.03
Initial Dry Density (Mg/m^3)	1.68	1.68	1.67
Particle Density (Mg/m^3) (Assumed)	2.65	2.65	2.65
Maximum Shear Stress (kPa)	34.71	82.25	153.736
Horizontal displacement at failure (mm)	3.48	4.44	4.43
Rate Horizontal displacement (mm/min)	0.016	0.022	0.044
Condition (Dry (D) / Submerged (S))	S	S	S



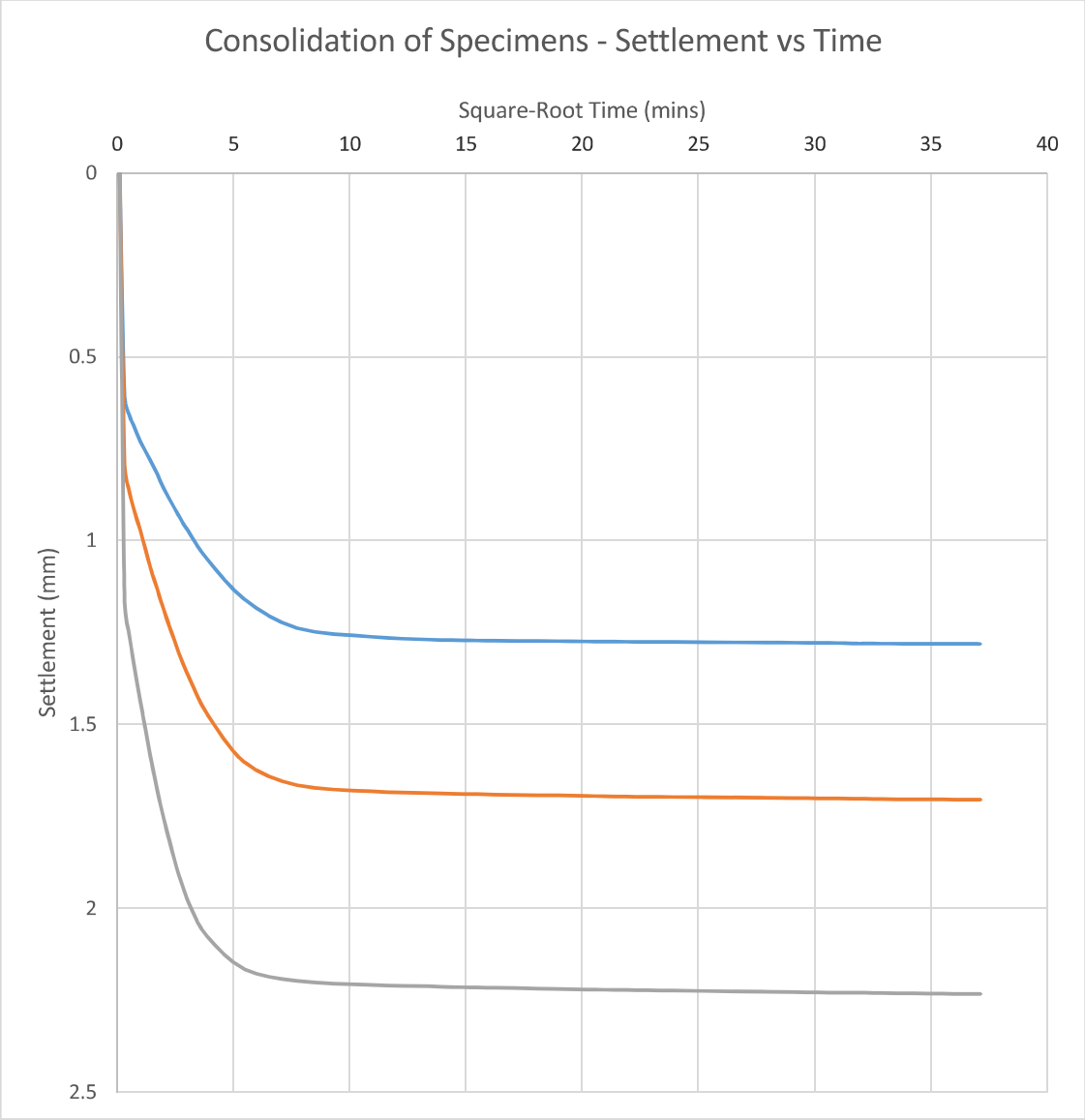
c' (kPa)	0
ϕ' (degrees)	38

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Determination of Shear Strength by Direct Shear

Small Shearbox Apparatus BS1377:Part 7:1990, Clause 4

Contract:	Monaghan Town			Contract No.	23412
Location:	BH01	Depth (m)	1.2	Sample No.	153477



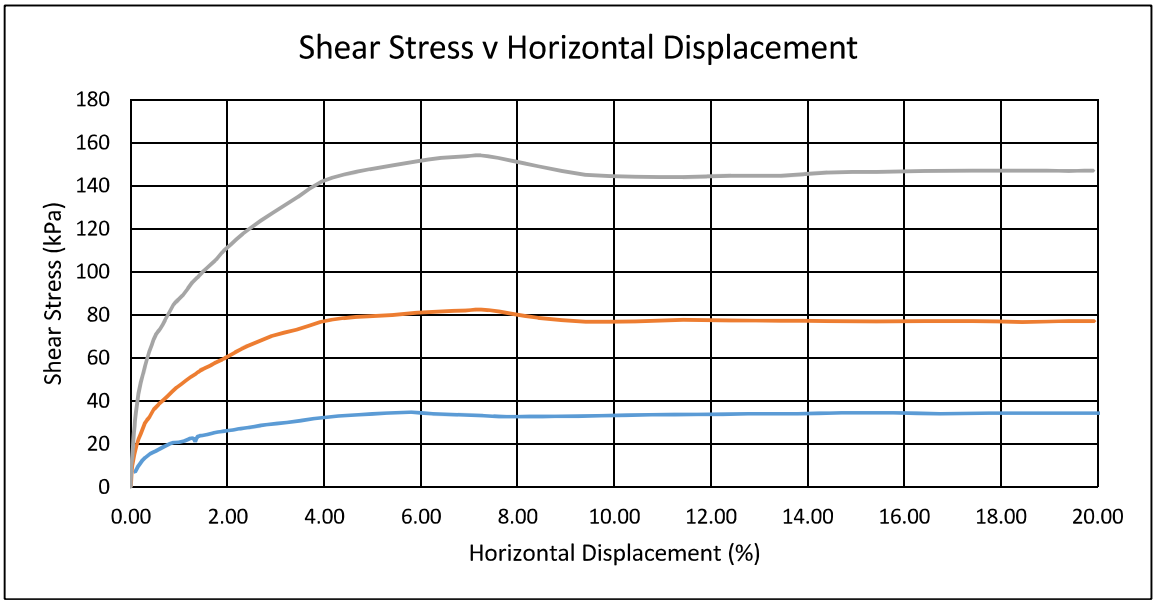
Determination of Shear Strength by Direct Shear

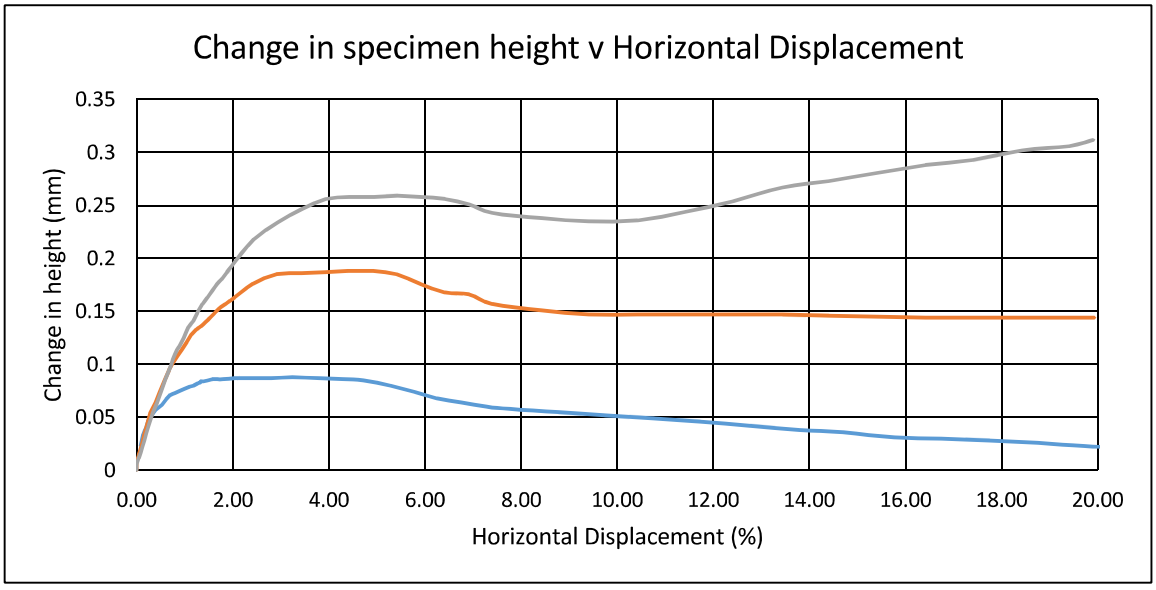
Small Shearbox Apparatus BS1377:Part 7:1990, Clause 4

Contract: Monaghan Town Contract No. 23412

Location: BH01 Depth (m) 1.2 Sample No. 153477

Report No. R126746





Results relate to the specimen tested. Approved signatories ☐ J Barrett (Quality Manager) ☐ H Byrne (Laboratory Manager)	Approved by	Date	Page 3 of 3
		08/10/21	

Determination of Shear Strength by Direct Shear

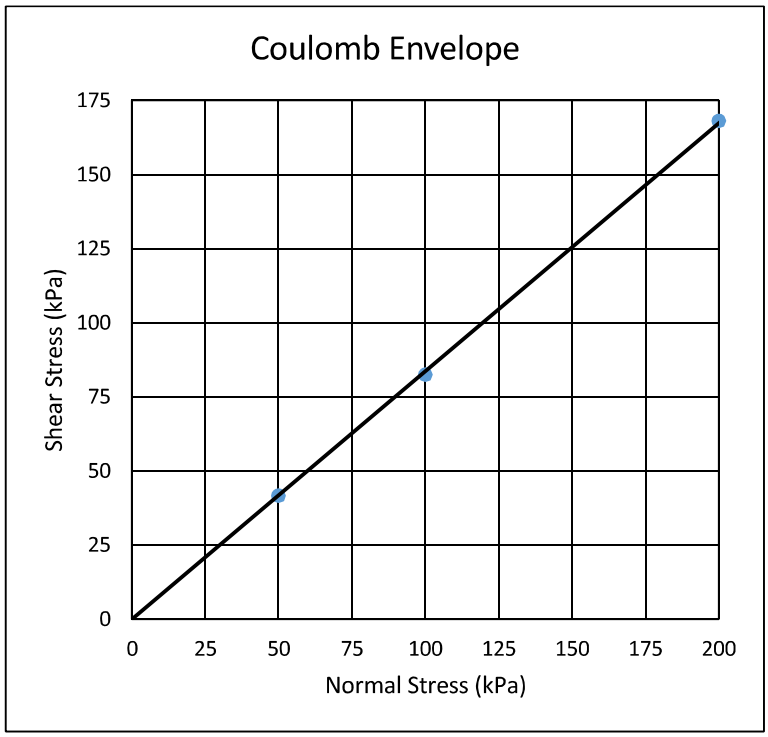
Small Shearbox Apparatus BS1377:Part 7:1990, Clause 4

Contract:	Monaghan Town			Contract No.	23412
Location*:	BH01	Depth (m)*	2.0	Sample No.*	154151
Report No.	R126747			Customer:	Monaghan County Council
Sample Received:	-			Testing started:	08/10/21

Method of Preparation: <2mm material compacted into cutter at as received Moisture content

Description: Grey brown very sandy SILT/CLAY

	Specimen		
	1	2	3
Normal Stress (kPa)	50	100	200
Length/Width (mm)	60.0 x 60.0	60.0 x 60.0	60.0 x 60.0
Height (mm)	23.0	23.0	23.0
Initial Moisture Content (%)	18	18	18
Initial Bulk Density (Mg/m^3)	2.12	2.13	2.13
Initial Dry Density (Mg/m^3)	1.79	1.80	1.80
Particle Density (Mg/m^3) (Assumed)	2.65	2.65	2.65
Maximum Shear Stress (kPa)	41.62	82.40	168.043
Horizontal displacement at failure (mm)	3.07	2.84	3.19
Rate Horizontal displacement (mm/min)	0.058	0.097	0.109
Condition (Dry (D) / Submerged (S))	S	S	S



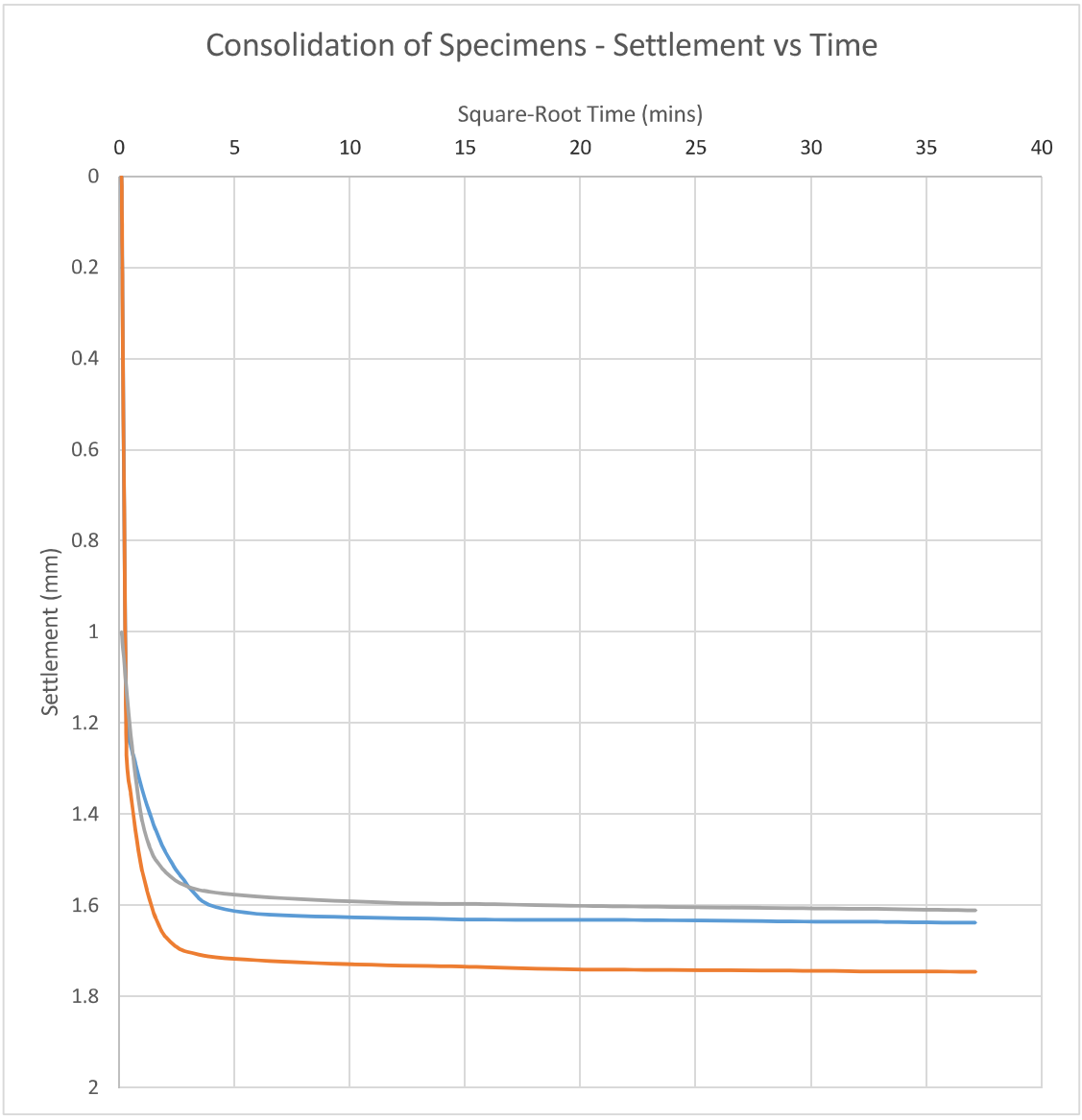
c' (kPa)	0
ϕ' (degrees)	40

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Determination of Shear Strength by Direct Shear

Small Shearbox Apparatus BS1377:Part 7:1990, Clause 4

Contract:	Monaghan Town			Contract No.	23412
Location:	BH01	Depth (m)	2.0	Sample No.	154151



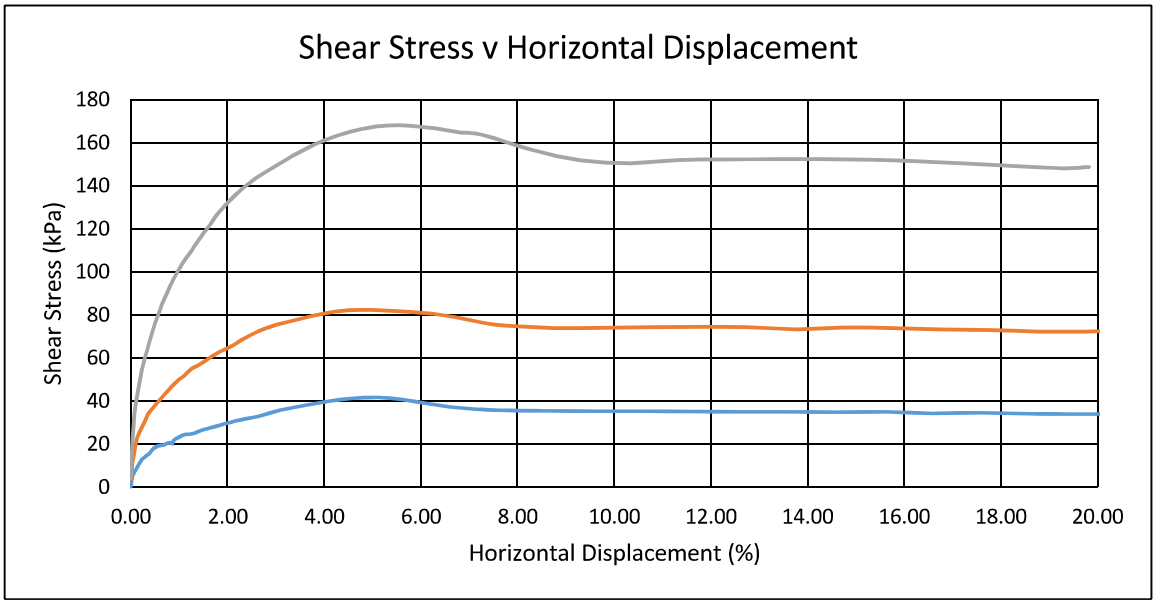
Determination of Shear Strength by Direct Shear

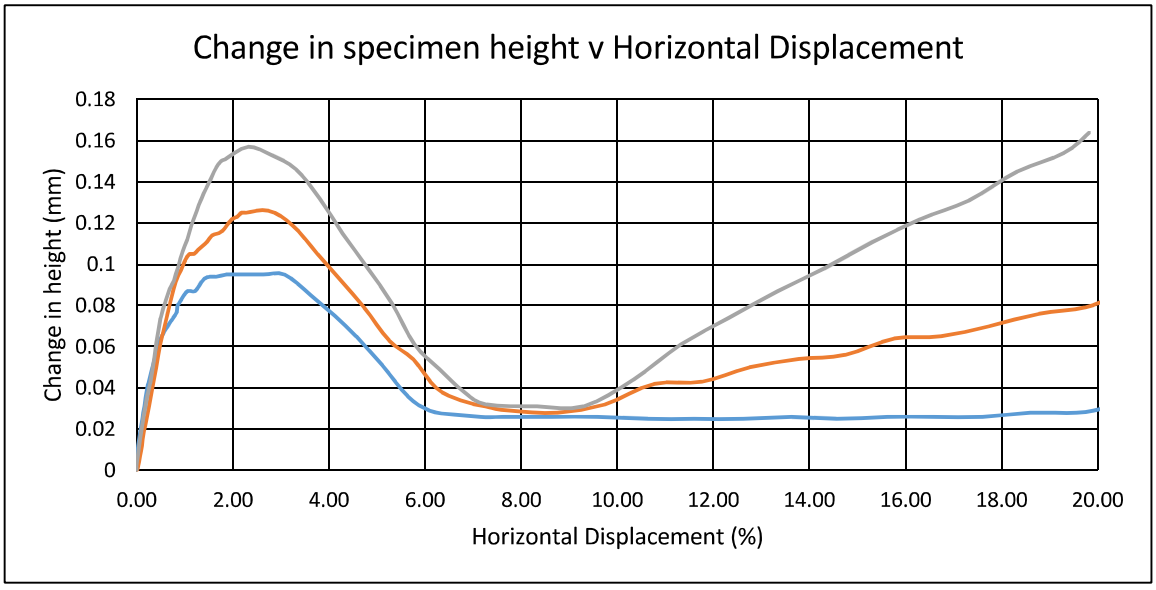
Small Shearbox Apparatus BS1377:Part 7:1990, Clause 4

Contract: Monaghan Town Contract No. 23412

Location: BH01 Depth (m) 2.0 Sample No. 154151

Report No. R126747





Results relate to the specimen tested. Approved signatories ☐ J Barrett (Quality Manager) ☐ H Byrne (Laboratory Manager)	Approved by	Date	Page 3 of 3
		12/10/21	

Determination of Shear Strength by Direct Shear

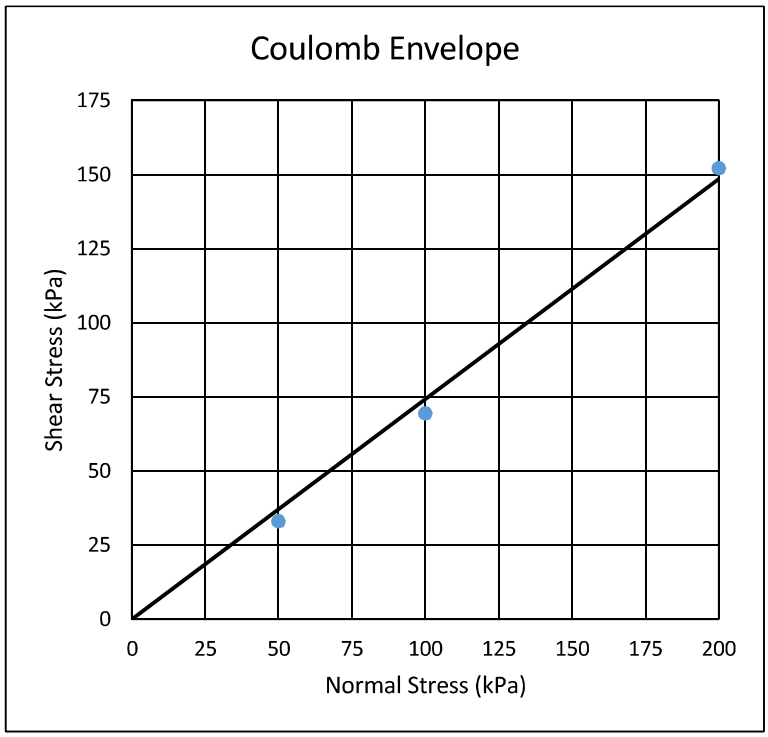
Small Shearbox Apparatus BS1377:Part 7:1990, Clause 4

Contract:	Monaghan Town			Contract No.	23412
Location*:	BH01	Depth (m)*	3.0	Sample No.*	154151
Report No.	R126748			Customer:	Monaghan County Council
Sample Received:	-			Testing started:	11/10/21

Method of Preparation: <2mm material compacted into cutter at as received Moisture content

Description: Grey sandy SILT/CLAY with occasional roots

	Specimen		
	1	2	3
Normal Stress (kPa)	50	100	200
Length/Width (mm)	60.0 x 60.0	60.0 x 60.0	60.0 x 60.0
Height (mm)	23.0	23.0	23.0
Initial Moisture Content (%)	28	28	28
Initial Bulk Density (Mg/m^3)	2.09	2.09	2.08
Initial Dry Density (Mg/m^3)	1.63	1.63	1.62
Particle Density (Mg/m^3) (Assumed)	2.65	2.65	2.65
Maximum Shear Stress (kPa)	32.96	69.33	152.107
Horizontal displacement at failure (mm)	3.96	11.14	4.55
Rate Horizontal displacement (mm/min)	0.071	0.097	0.097
Condition (Dry (D) / Submerged (S))	S	S	S



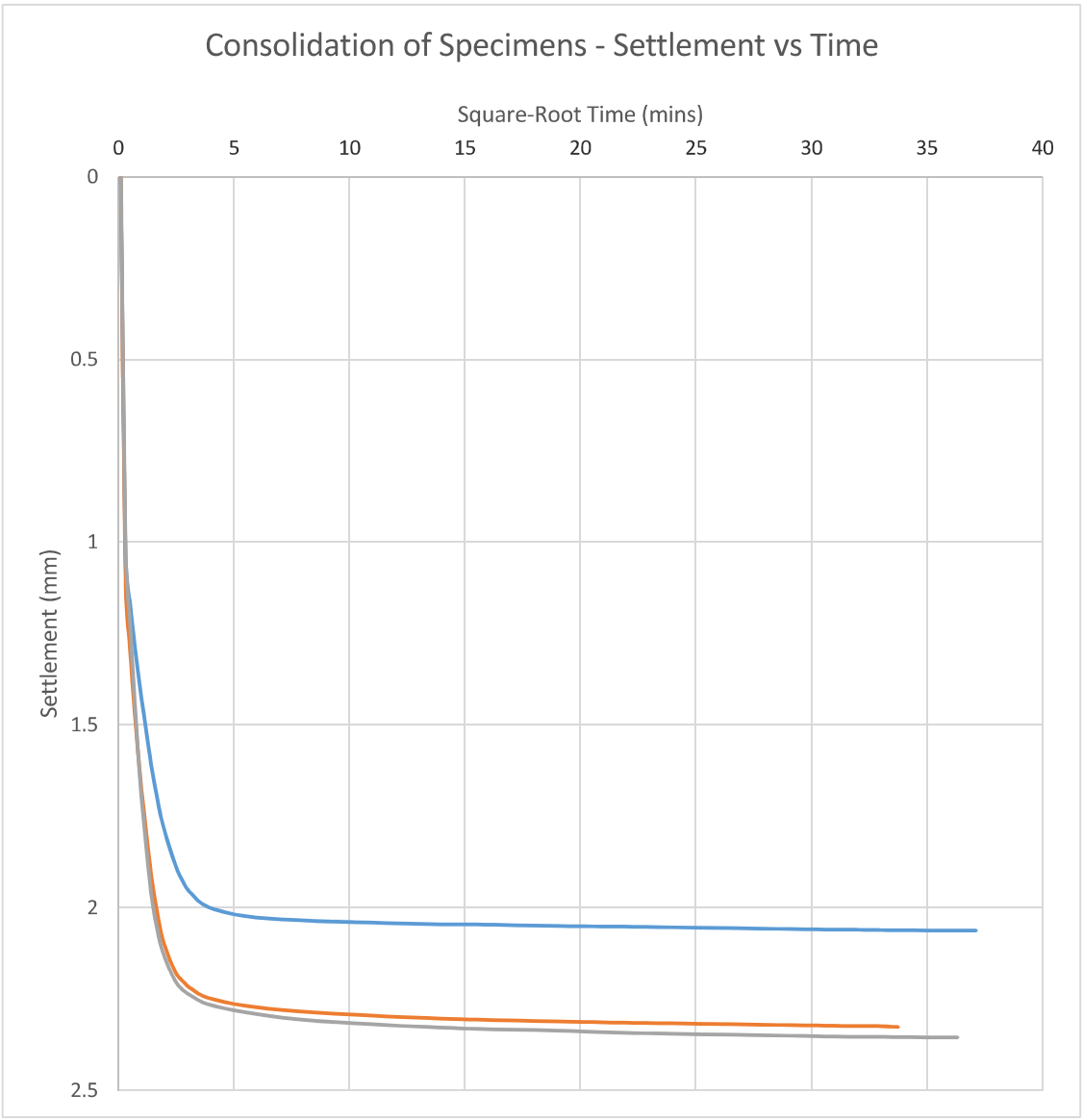
c' (kPa)	0
ϕ' (degrees)	37

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Determination of Shear Strength by Direct Shear

Small Shearbox Apparatus BS1377:Part 7:1990, Clause 4

Contract:	Monaghan Town			Contract No.	23412
Location:	BH01	Depth (m)	3.0	Sample No.	154151



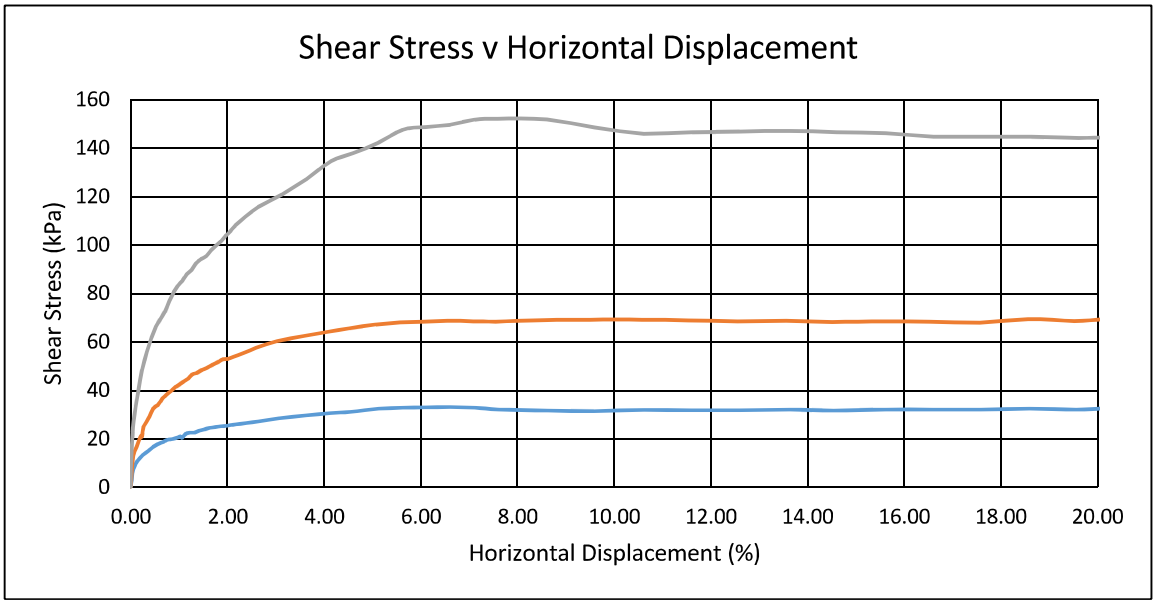
Determination of Shear Strength by Direct Shear

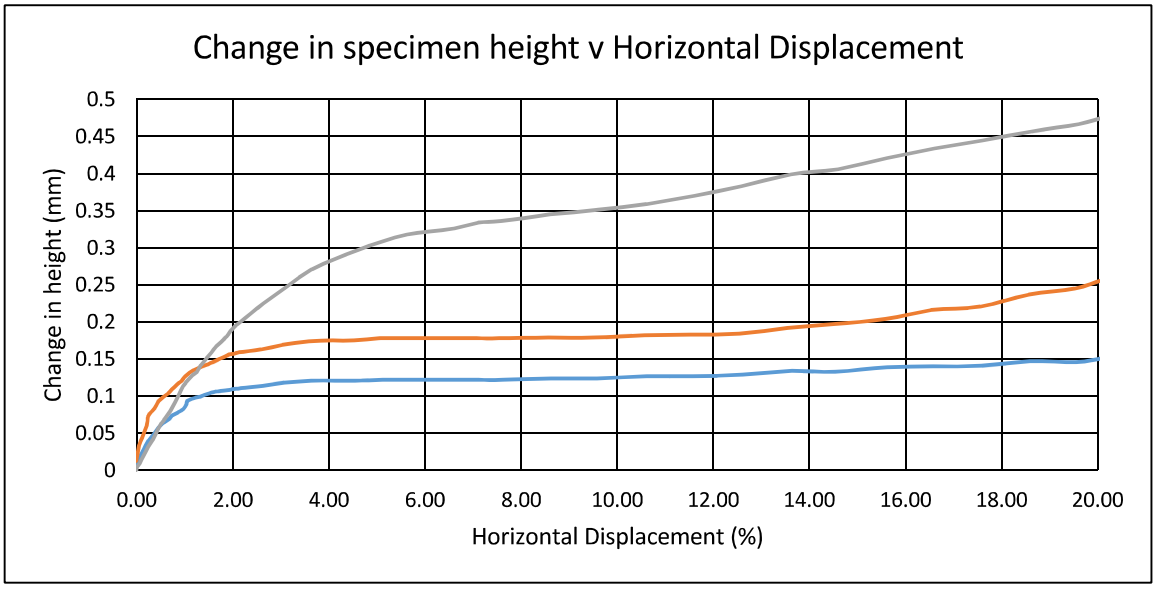
Small Shearbox Apparatus BS1377:Part 7:1990, Clause 4

Contract: Monaghan Town Contract No. 23412

Location: BH01 Depth (m) 3.0 Sample No. 154151

Report No. R126748





Results relate to the specimen tested. Approved signatories ☐ J Barrett (Quality Manager) ☐ H Byrne (Laboratory Manager)	Approved by	Date	Page 3 of 3
		13/10/21	

Determination of Shear Strength by Direct Shear

Small Shearbox Apparatus BS1377:Part 7:1990, Clause 4

Contract: Monaghan Town | Contract No. 23412

Location*: TP1 | Depth (m)* 1.0-1.2 | Sample No.* 157598

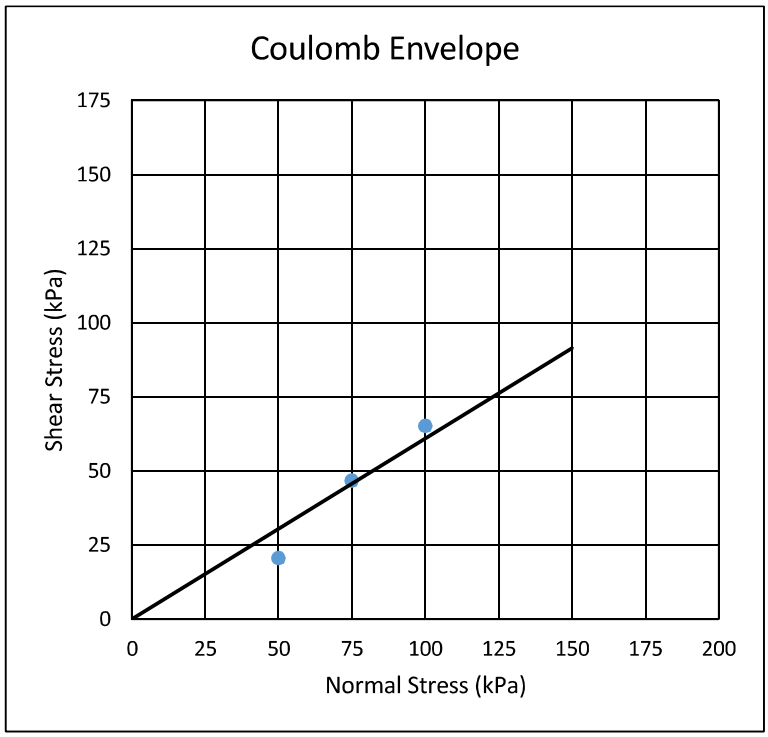
Report No. R126749 | Customer: Monaghan County Council

Sample Received: - | Testing started: 27/09/21

Method of Preparation: <2mm material compacted into cutter at as received Moisture content

Description: Brown sandy slightly gravelly SILT/CLAY with roots

	Specimen		
	1	2	3
Normal Stress (kPa)	50	75	100
Length/Width (mm)	60.0 x 60.0	60.0 x 60.0	60.0 x 60.0
Height (mm)	23.0	23.0	23.0
Initial Moisture Content (%)	19.0	19.0	19.0
Initial Bulk Density (Mg/m^3)	1.39	1.39	1.38
Initial Dry Density (Mg/m^3)	1.17	1.16	1.16
Particle Density (Mg/m^3) (Assumed)	2.65	2.65	2.65
Maximum Shear Stress (kPa)	20.59	46.74	65.147
Horizontal displacement at failure (mm)	9.47	11.78	11.95
Rate Horizontal displacement (mm/min)	0.082	0.24	0.22
Condition (Dry (D) / Submerged (S))	S	S	S



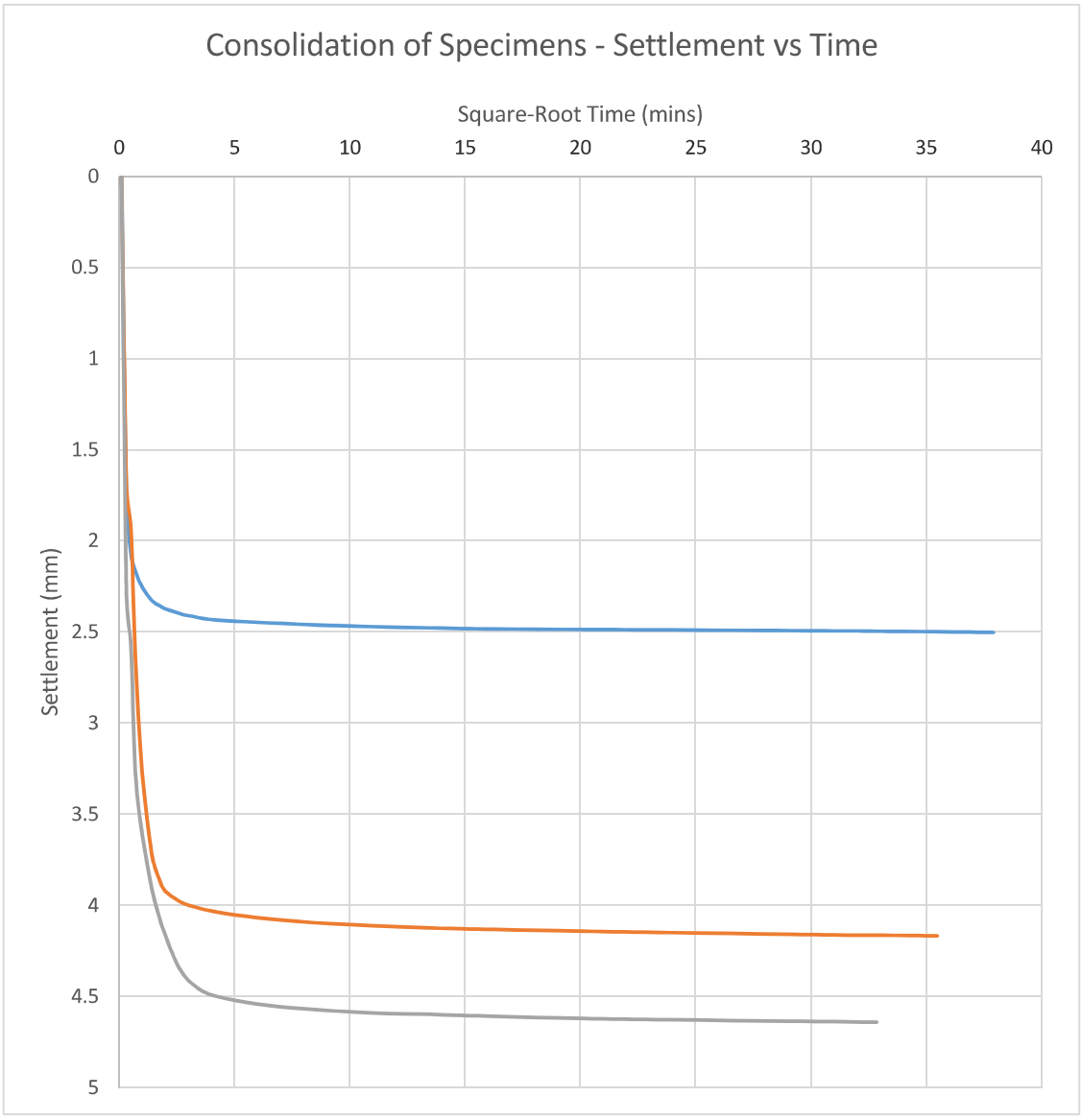
c' (kPa)	0
ϕ' (degrees)	32

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* denotes customer supplied information
Opinions and Interpretations are outside the scope of accreditation
The results relate to the specimen in as received condition unless otherwise stated.

Determination of Shear Strength by Direct Shear

Small Shearbox Apparatus BS1377:Part 7:1990, Clause 4

Contract:	Monaghan Town			Contract No.	23412
Location:	TP1	Depth (m)	1.0-1.2	Sample No.	157598



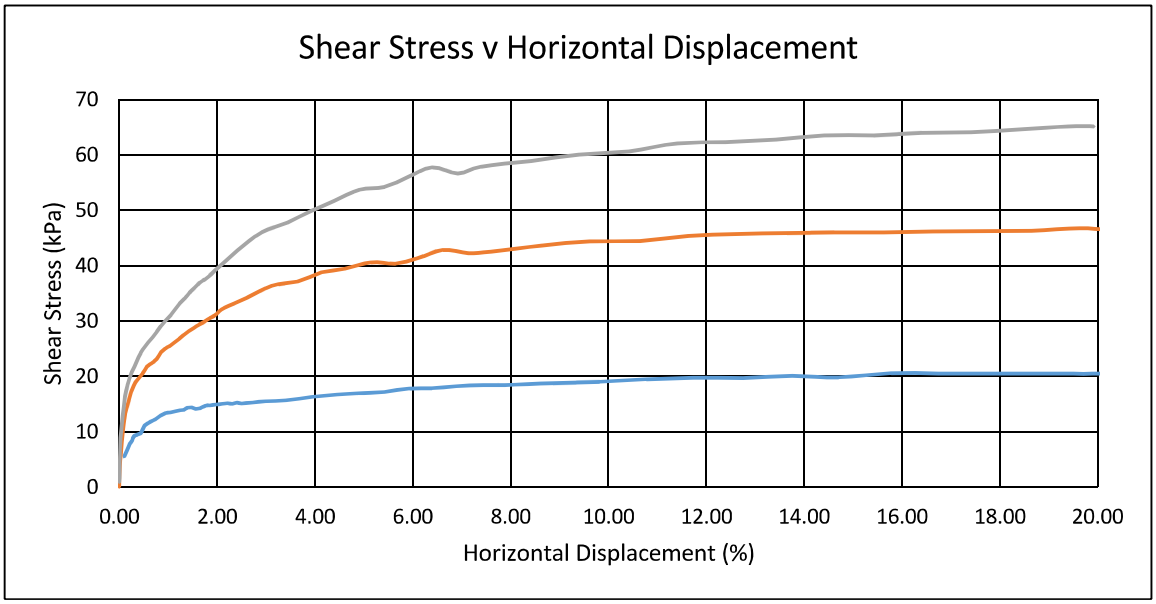
Determination of Shear Strength by Direct Shear

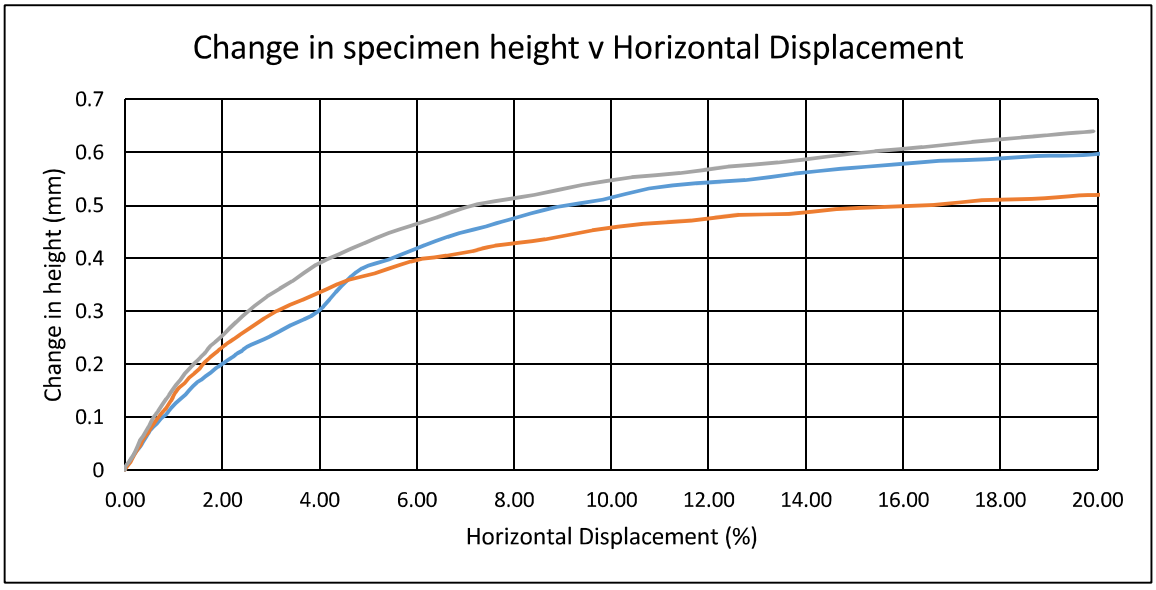
Small Shearbox Apparatus BS1377:Part 7:1990, Clause 4

Contract: Monaghan Town Contract No. 23412

Location: TP1 Depth (m) 1.0-1.2 Sample No. 157598

Report No. R126749





Results relate to the specimen tested. Approved signatories ☐ J Barrett (Quality Manager) ☐ H Byrne (Laboratory Manager)	Approved by	Date
		30/09/21

Determination of Shear Strength by Direct Shear

Small Shearbox Apparatus BS1377:Part 7:1990, Clause 4

ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

Contract: Monaghan Town | Contract No. 23412

Location*: TP3 | Depth (m)* 1.0 | Sample No.* 153474

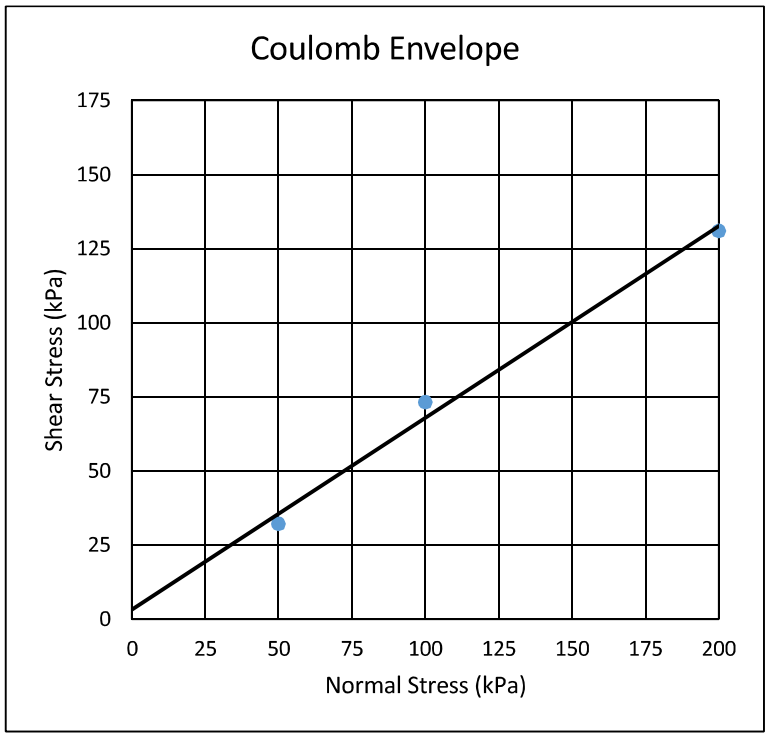
Report No. R126750 | Customer: Monaghan County Council

Sample Received: - | Testing started: 28/09/21

Method of Preparation: <2mm material compacted into cutter at as received Moisture content

Description: Brown slightly sandy slightly gravelly SILT/CLAY

	Specimen		
	1	2	3
Normal Stress (kPa)	50	100	200
Length/Width (mm)	60.0 x 60.0	60.0 x 60.0	60.0 x 60.0
Height (mm)	23.0	23.0	23.0
Initial Moisture Content (%)	26	26	26
Initial Bulk Density (Mg/m^3)	1.97	1.97	1.98
Initial Dry Density (Mg/m^3)	1.56	1.57	1.57
Particle Density (Mg/m^3) (Assumed)	2.65	2.65	2.65
Maximum Shear Stress (kPa)	32.12	73.14	130.92
Horizontal displacement at failure (mm)	4.04	4.71	4.7
Rate Horizontal displacement (mm/min)	0.054	0.026	0.026
Condition (Dry (D) / Submerged (S))	S	S	S



c' (kPa)	3
ϕ' (degrees)	33

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* denotes customer supplied information

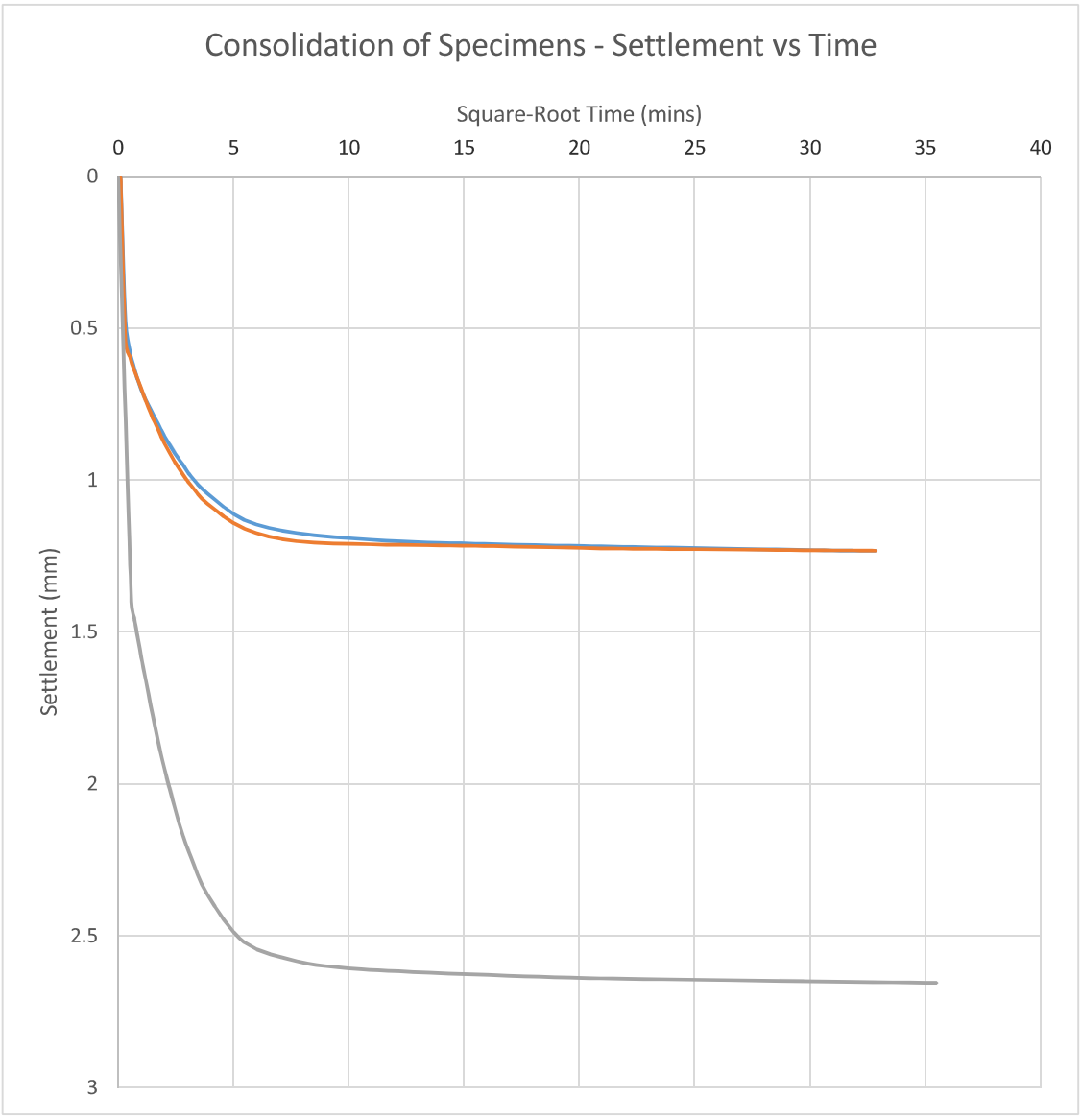
Opinions and Interpretations are outside the scope of accreditation

The results relate to the specimen in as received condition unless otherwise stated.

Determination of Shear Strength by Direct Shear

Small Shearbox Apparatus BS1377:Part 7:1990, Clause 4

Contract:	Monaghan Town			Contract No.	23412
Location:	TP3	Depth (m)	1.0	Sample No.	153474



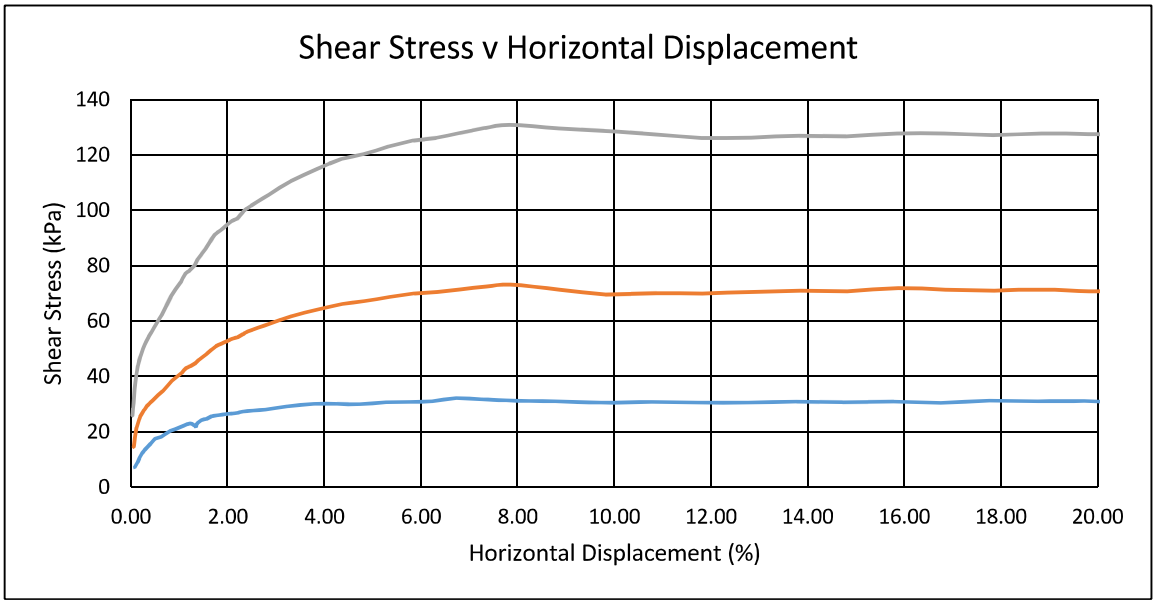
Determination of Shear Strength by Direct Shear

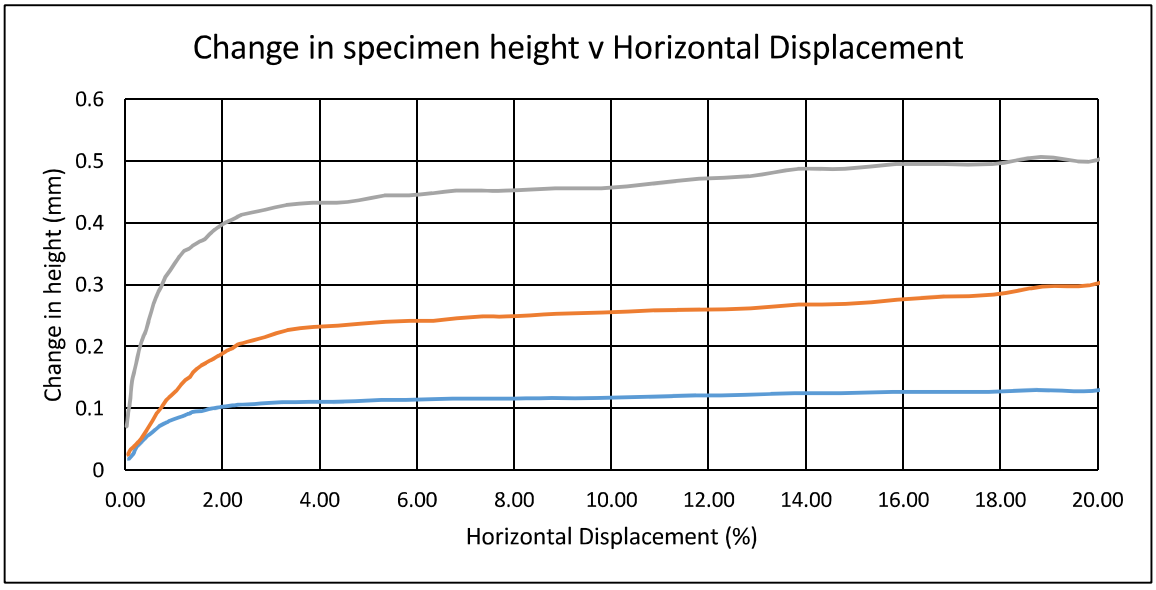
Small Shearbox Apparatus BS1377:Part 7:1990, Clause 4

Contract: Monaghan Town Contract No. 23412

Location: TP3 Depth (m) 1.0 Sample No. 153474

Report No. R126750





Results relate to the specimen tested. Approved signatories ☐ J Barrett (Quality Manager) ☐ H Byrne (Laboratory Manager)	Approved by	Date	Page 3 of 3
		01/10/21	

Appendix 7 - Geotechnical Rock Laboratory Records

(Diametrial) POINT LOAD STRENGTH INDEX TEST DATA

Contract: Monaghan Town
Contract no. 23412
Date of test: 23/09/2021

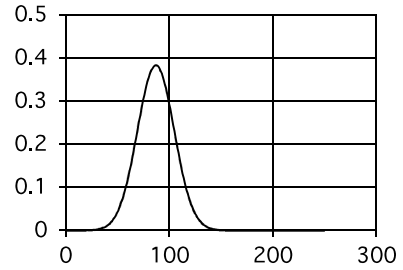
Sample Type: Core

RC No.	Depth m	D (Diameter) mm	P (failure load) kN	F	Is (index strength) Mpa	Is(50) (index strength) Mpa	*UCS MPa	Type	Orienation
RC01	6.2	78	22.0	1.222	3.62	4.42	88	d	//
	6.6	78	26.0	1.222	4.27	5.22	104	d	//
	8.0	78	24.0	1.222	3.94	4.82	96	d	//
	8.3	78	15.0	1.222	2.47	3.01	60	d	//
	8.8	78	28.0	1.222	4.60	5.62	112	d	//
	9.4	78	22.0	1.222	3.62	4.42	88	d	//
	10.4	78	20.0	1.222	3.29	4.02	80	d	//
	10.6	78	19.0	1.222	3.12	3.81	76	d	//
	10.8	78	23.0	1.222	3.78	4.62	92	d	//
RC02	5.9	78	24.0	1.222	3.94	4.82	96	d	//
	6.3	78	27.0	1.222	4.44	5.42	108	d	//
	7.4	78	25.0	1.222	4.11	5.02	100	d	//
	7.8	78	25.0	1.222	4.11	5.02	100	d	//
	8.0	78	21.0	1.222	3.45	4.22	84	d	//
	8.1	78	11.0	1.222	1.81	2.21	44	d	//
	8.6	78	18.0	1.222	2.96	3.61	72	d	//
	9.2	78	19.0	1.222	3.12	3.81	76	d	//

Statistical Summary Data	Is(50)	UCS*
Number of Samples Tested	17	17
Minimum	2.21	44
Average	4.36	87
Maximum	5.62	112
Standard Dev.	0.89	18
Upper 95% Confidence Limit	6.09	121.89
Lower 95% Confidence Limit	2.62	52.43

Comments:
*UCS taken as k x Point Load Is(50): k= 20

*UCS Normal Distribution Curve



Abbreviations	
i	irregular
a	axial
b	block
d	diametral

approx. orientation to planes of weakness/bedding

U	unknown
P	perpendicular
//	parallel

Appendix 8 - Chemical Laboratory Records

eurofins | Chemtest
Eurofins Chemtest Ltd
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

UKAS TESTING
2183

Final Report

Report No.:	21-30124-1
Initial Date of Issue:	06-Sep-2021
Client	IGSL
Client Address:	M7 Business Park Naas County Kildare Ireland
Contact(s):	Darren Keogh
Project	Monaghan Town - South Dublin Street and Backlands

Quotation No.:		**Date Received:**	31-Aug-2021
Order No.:		**Date Instructed:**	27-Aug-2021
No. of Samples:	7		
Turnaround (Wkdays):	7	**Results Due:**	07-Sep-2021
Date Approved:	06-Sep-2021		

Approved By:



Details: Glynn Harvey, Technical Manager

Results - Soil

Project: Monaghan Town - South Dublin Street and Backlands

Client: IGSL			**Chemtest Job No.:**		21-30124	21-30124	21-30124	21-30124	21-30124	21-30124	21-30124
Quotation No.:			**Chemtest Sample ID.:**		1269758	1269759	1269760	1269761	1269762	1269763	1269764
Order No.:			Client Sample Ref.:		A163475	AA163476	AA153476	AA154153	AA154153	AA154153	AA157599
			Sample Location:		BH001	BH001	BH001	BH003	BH003	BH003	BRE Test 1
			Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		0.00	0.30	0.70	0.00	0.30	0.70	0.40
			Bottom Depth (m):		0.20	0.50	0.90	0.20	0.50	0.90	0.60
Determinand	**Accred.**	**SOP**	**Units**	**LOD**							
Moisture	N	2030	%	0.020	13	21	24	4.0	3.8	4.7	6.7
pH	U	2010		4.0	[A] 8.5	[A] 8.3	[A] 7.5	[A] 8.9	[A] 9.0	[A] 9.0	
pH (2.5:1)	N	2010		4.0							[A] 8.7
Magnesium (Water Soluble)	N	2120	g/l	0.010							[A] 0.43
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	[A] 0.061	[A] 0.052	[A] < 0.010	[A] 0.076	[A] 0.081	[A] 0.081	[A] 0.037
Total Sulphur	U	2175	%	0.010							[A] 0.17
Chloride (Water Soluble)	U	2220	g/l	0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010
Nitrate (Water Soluble)	N	2220	g/l	0.010							< 0.010
Ammonium (Water Soluble)	U	2220	g/l	0.01							< 0.01
Sulphate (Acid Soluble)	U	2430	%	0.010							[A] 0.068

Deviations

In accordance with UKAS Policy on Deviating Samples TPS 63. Chemtest have a procedure to ensure 'upon receipt of each sample a competent laboratory shall assess whether the sample is suitable with regard to the requested test(s)'. This policy and the respective holding times applied, can be supplied upon request.The reason a sample is declared as deviating is detailed below. Where applicable the analysis remains UKAS/MCERTs accredited but the results may be compromised.

Sample:	Sample Ref:	Sample ID:	Sample Location:	Sampled Date:	Deviation Code(s):	Containers Received:
1269758	A163475		BH001		A	Amber Glass 250ml
1269758	A163475		BH001		A	Plastic Tub 500g
1269759	AA163476		BH001		A	Amber Glass 250ml
1269759	AA163476		BH001		A	Plastic Tub 500g
1269760	AA153476		BH001		A	Amber Glass 250ml
1269760	AA153476		BH001		A	Plastic Tub 500g
1269761	AA154153		BH003		A	Amber Glass 250ml
1269761	AA154153		BH003		A	Plastic Tub 500g
1269762	AA154153		BH003		A	Amber Glass 250ml
1269762	AA154153		BH003		A	Plastic Tub 500g
1269763	AA154153		BH003		A	Amber Glass 250ml
1269763	AA154153		BH003		A	Plastic Tub 500g
1269764	AA157599		BRE Test 1		A	Amber Glass 250ml
1269764	AA157599		BRE Test 1		A	Plastic Tub 500g

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2175	Total Sulphur in Soils	Total Sulphur	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2220	Water soluble Chloride in Soils	Chloride	Aqueous extraction and measuremernt by 'Aquakem 600' Discrete Analyser using ferric nitrate / mercuric thiocyanate.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.

Report Information

Key	
U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"
SOP	Standard operating procedure
LOD	Limit of detection

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
Uncertainty of measurement for the determinands tested are available upon request
None of the results in this report have been recovery corrected
All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis
All Asbestos testing is performed at the indicated laboratory
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

A - Date of sampling not supplied
B - Sample age exceeds stability time (sampling to extraction)
C - Sample not received in appropriate containers
D - Broken Container
E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 30 days from the date of receipt
All water samples will be retained for 14 days from the date of receipt
Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.com

Eurofins Chemtest Ltd
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

2183

Final Report

Report No.:	21-31291-1
Initial Date of Issue:	21-Oct-2021
Client	IGSL
Client Address:	M7 Business Park Naas County Kildare Ireland
Contact(s):	Darren Keogh
Project	Dublin Street, Monaghan

Quotation No.:		**Date Received:**	04-Oct-2021
Order No.:		**Date Instructed:**	04-Oct-2021
No. of Samples:	1		
Turnaround (Wkdays):	14	**Results Due:**	21-Oct-2021
Date Approved:	21-Oct-2021		

Approved By:



Details: Glynn Harvey, Technical Manager

Results - Water

Project: 23412 - Dublin Street, Monaghan

Client: IGSL			**Chemtest Job No.:**		21-31291
Quotation No.:			**Chemtest Sample ID.:**		1275753
Order No.:			Client Sample Ref.:		2001
			Sample Location:		RC01
			Sample Type:		WATER
Determinand	**Accred.**	**SOP**	**Units**	**LOD**	
pH	U	1010		N/A	[A] 7.8
Electrical Conductivity	U	1020	µS/cm	1.0	[A] 520
Chloride	U	1220	mg/l	1.0	[A] 22
Ammonia (Free)	N	1220	mg/l	0.050	[A] < 0.050
Nitrite	U	1220	mg/l	0.020	[A] < 0.020
Nitrate	U	1220	mg/l	0.50	[A] < 0.50
Sulphate	U	1220	mg/l	1.0	[A] 38
Cyanide (Total)	U	1300	mg/l	0.050	[A] < 0.050
Potassium	U	1455	mg/l	0.50	[A] 3.0
Arsenic (Dissolved)	U	1455	µg/l	0.20	[A] 0.78
Boron (Dissolved)	U	1455	µg/l	10.0	[A] 92
Cadmium (Dissolved)	U	1455	µg/l	0.11	[A] < 0.11
Chromium (Dissolved)	U	1455	µg/l	0.50	[A] 4.7
Copper (Dissolved)	U	1455	µg/l	0.50	[A] 0.66
Mercury (Dissolved)	14	1455	µg/l	0.05	[A] < 0.05
Manganese (Dissolved)	U	1455	µg/l	0.50	[A] 40
Nickel (Dissolved)	U	1455	µg/l	0.50	[A] 3.1
Lead (Dissolved)	U	1455	µg/l	0.50	[A] < 0.50
Zinc (Dissolved)	U	1455	µg/l	2.5	[A] < 2.5
Aliphatic TPH >C5-C6	N	1675	µg/l	0.10	[A] < 0.10
Aliphatic TPH >C6-C8	N	1675	µg/l	0.10	[A] < 0.10
Aliphatic TPH >C8-C10	N	1675	µg/l	0.10	[A] < 0.10
Aliphatic TPH >C10-C12	N	1675	µg/l	0.10	[A] < 0.10
Aliphatic TPH >C12-C16	N	1675	µg/l	0.10	[A] < 0.10
Aliphatic TPH >C16-C21	N	1675	µg/l	0.10	[A] < 0.10
Aliphatic TPH >C21-C35	N	1675	µg/l	0.10	[A] < 0.10
Aliphatic TPH >C35-C44	N	1675	µg/l	0.10	[A] < 0.10
Total Aliphatic Hydrocarbons	N	1675	µg/l	5.0	[A] < 5.0
Aromatic TPH >C5-C7	N	1675	µg/l	0.10	[A] <0.10
Aromatic TPH >C7-C8	N	1675	µg/l	0.10	[A] < 0.10
Aromatic TPH >C8-C10	N	1675	µg/l	0.10	[A] < 0.10
Aromatic TPH >C10-C12	N	1675	µg/l	0.10	[A] < 0.10
Aromatic TPH >C12-C16	N	1675	µg/l	0.10	[A] < 0.10
Aromatic TPH >C16-C21	N	1675	µg/l	0.10	[A] < 0.10
Aromatic TPH >C21-C35	N	1675	µg/l	0.10	[A] < 0.10
Aromatic TPH >C35-C44	N	1675	µg/l	0.10	[A] < 0.10
Total Aromatic Hydrocarbons	N	1675	µg/l	5.0	[A] <5.0
Total Petroleum Hydrocarbons	N	1675	µg/l	10	[A] <10.0
Benzene	U	1760	µg/l	1.0	[A] < 1.0
Toluene	U	1760	µg/l	1.0	[A] < 1.0

Results - Water

Project: 23412 - Dublin Street, Monaghan

Client: IGSL			**Chemtest Job No.:**		21-31291
Quotation No.:			**Chemtest Sample ID.:**		1275753
Order No.:			Client Sample Ref.:		2001
			Sample Location:		RC01
			Sample Type:		WATER
Determinand	**Accred.**	**SOP**	**Units**	**LOD**	
Ethylbenzene	U	1760	µg/l	1.0	[A] < 1.0
m & p-Xylene	U	1760	µg/l	1.0	[A] < 1.0
o-Xylene	U	1760	µg/l	1.0	[A] < 1.0
Methyl Tert-Butyl Ether	N	1760	µg/l	1.0	[A] < 1.0
Naphthalene	U	1800	µg/l	0.10	[A] < 0.10
Acenaphthylene	U	1800	µg/l	0.10	[A] < 0.10
Acenaphthene	U	1800	µg/l	0.10	[A] < 0.10
Fluorene	U	1800	µg/l	0.10	[A] < 0.10
Phenanthrene	U	1800	µg/l	0.10	[A] < 0.10
Anthracene	U	1800	µg/l	0.10	[A] < 0.10
Fluoranthene	U	1800	µg/l	0.10	[A] < 0.10
Pyrene	U	1800	µg/l	0.10	[A] < 0.10
Benzo[a]anthracene	U	1800	µg/l	0.10	[A] < 0.10
Chrysene	U	1800	µg/l	0.10	[A] < 0.10
Benzo[b]fluoranthene	U	1800	µg/l	0.10	[A] < 0.10
Benzo[k]fluoranthene	U	1800	µg/l	0.10	[A] < 0.10
Benzo[a]pyrene	U	1800	µg/l	0.10	[A] < 0.10
Indeno(1,2,3-c,d)Pyrene	U	1800	µg/l	0.10	[A] < 0.10
Dibenz(a,h)Anthracene	U	1800	µg/l	0.10	[A] < 0.10
Benzo[g,h,i]perylene	U	1800	µg/l	0.10	[A] < 0.10
Total Of 16 PAH's	U	1800	µg/l	2.0	[A] < 2.0
Total Phenols	U	1920	mg/l	0.030	[A] < 0.030

Deviations

In accordance with UKAS Policy on Deviating Samples TPS 63. Chemtest have a procedure to ensure 'upon receipt of each sample a competent laboratory shall assess whether the sample is suitable with regard to the requested test(s)'. This policy and the respective holding times applied, can be supplied upon request.The reason a sample is declared as deviating is detailed below. Where applicable the analysis remains UKAS/MCERTs accredited but the results may be compromised.

Sample:	Sample Ref:	Sample ID:	Sample Location:	Sampled Date:	Deviation Code(s):	Containers Received:
1275753	2001		RC01		A	Coloured Winchester 1000ml
1275753	2001		RC01		A	EPA Vial 40ml

Test Methods

SOP	Title	Parameters included	Method summary
1010	pH Value of Waters	pH	pH Meter
1020	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Conductivity Meter
1220	Anions, Alkalinity & Ammonium in Waters	Fluoride; Chloride; Nitrite; Nitrate; Total; Oxidisable Nitrogen (TON); Sulfate; Phosphate; Alkalinity; Ammonium	Automated colorimetric analysis using 'Aquakem 600' Discrete Analyser.
1300	Cyanides & Thiocyanate in Waters	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Continuous Flow Analysis.
1455	Metals in Waters by ICP-MS	Metals, including: Antimony; Arsenic; Barium; Beryllium; Boron; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Tin; Vanadium; Zinc	Filtration of samples followed by direct determination by inductively coupled plasma mass spectrometry (ICP-MS).
1675	TPH Aliphatic/Aromatic split in Waters by GC-FID(cf. Texas Method 1006 / TPH CWG)	Aliphatics: >C5–C6, >C6–C8, >C8– C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Pentane extraction / GCxGC FID detection
1760	Volatile Organic Compounds (VOCs) in Waters by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics. (cf. USEPA Method 8260)	Automated headspace gas chromatographic (GC) analysis of water samples with mass spectrometric (MS) detection of volatile organic compounds.
1800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Waters by GC-MS	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Pentane extraction / GCMS detection
1920	Phenols in Waters by HPLC	Phenolic compounds including: Phenol, Cresols, Xylenols, Trimethylphenols Note: Chlorophenols are excluded.	Determination by High Performance Liquid Chromatography (HPLC) using electrochemical detection.

Report Information

Key	
U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"
SOP	Standard operating procedure
LOD	Limit of detection

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
Uncertainty of measurement for the determinands tested are available upon request
None of the results in this report have been recovery corrected
All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

14

All Asbestos testing is performed at the indicated laboratory
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

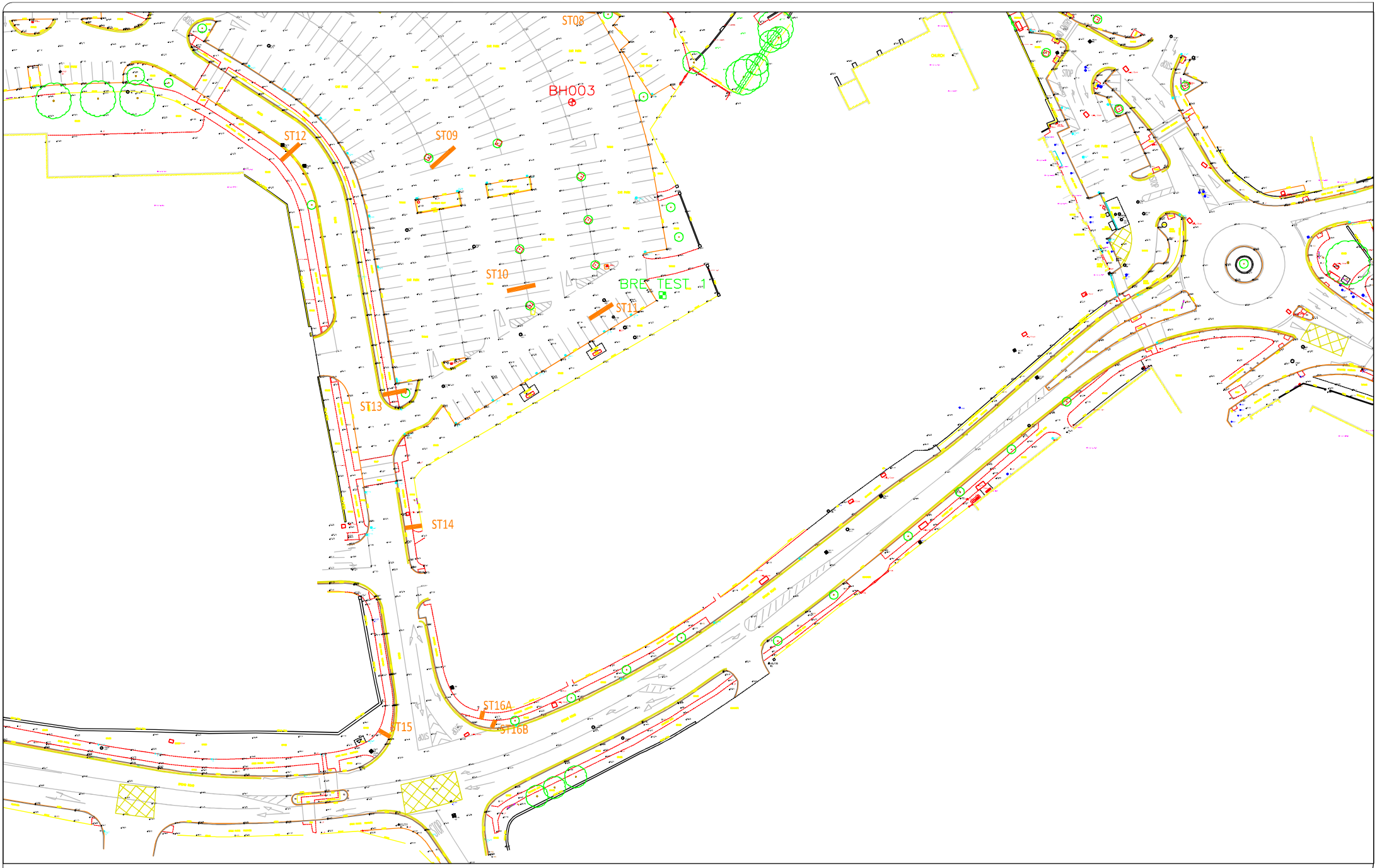
A - Date of sampling not supplied
B - Sample age exceeds stability time (sampling to extraction)
C - Sample not received in appropriate containers
D - Broken Container
E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 30 days from the date of receipt
All water samples will be retained for 14 days from the date of receipt
Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.com

Appendix 9 - Exploratory Hole Site Plan



North

Borehole Location

Trial Pit Location

Soakaway Location

ST Slit Trench Location

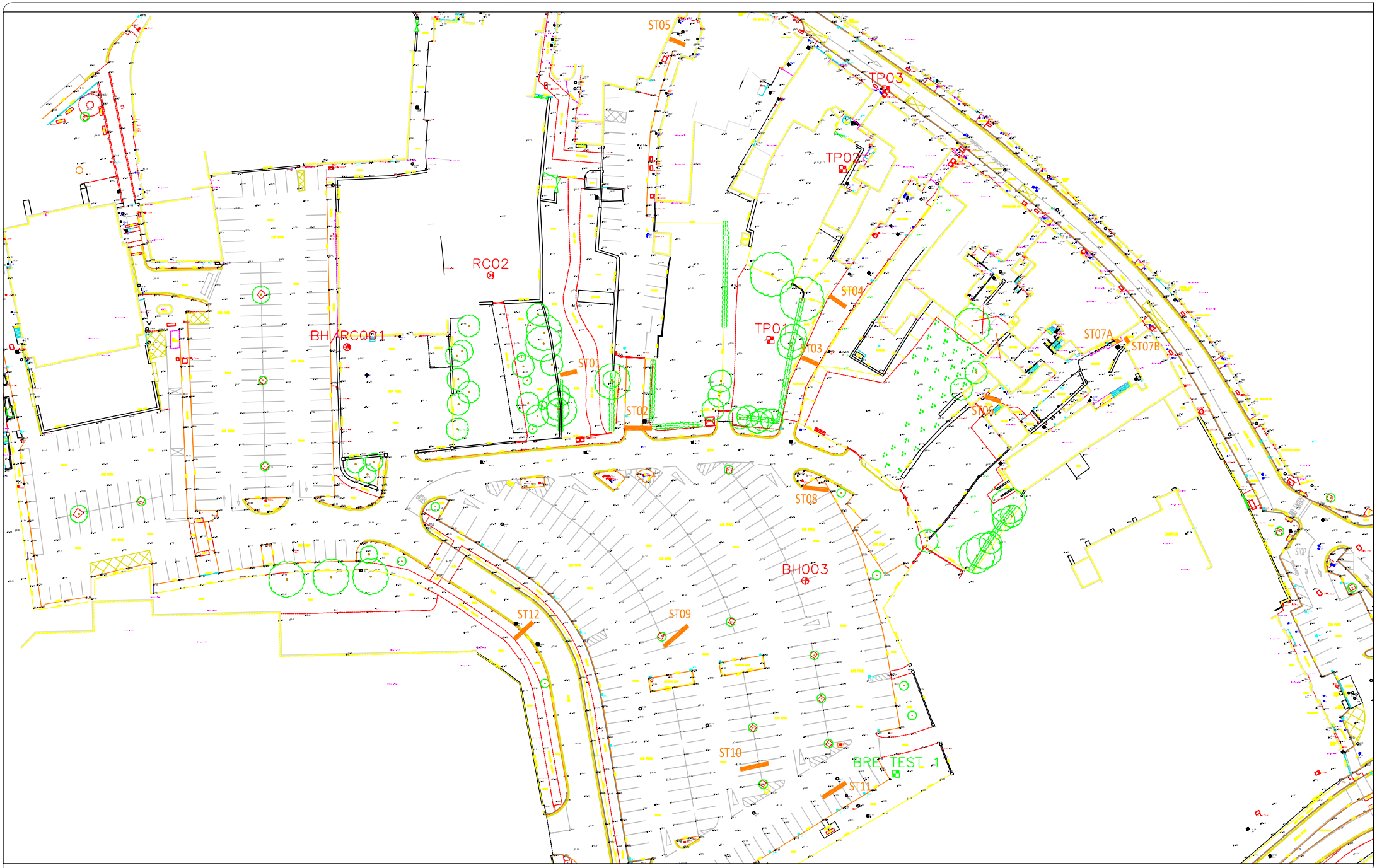
IGSL

SITE INVESTIGATION & GEOTECHNICAL SPECIALISTS

Rev	By	Date	Description
0	CK	20/10	Layout Plan

Project:	Monaghan Town - Dublin Street regeneration Project				
Component:	Ground Investigation Contract				
Title:	Location Plan				
Designed:	CK	Date:	20/10	File Name:	23412
Drawn:	CK	Date:	20/10	Original Scale:	1:750 @A3
Checked:	MK	Date:	20/10	Date:	20/10/2021

Drawing No: 23412-000-101



North

Borehole Location

Trial Pit Location

Soakaway Location

ST Slit Trench Location

IGSL

Rev	By	Date	Description
0	CK	20/10	Layout Plan

Project:	Monaghan Town - Dublin Street regeneration Project				
Component:	Ground Investigation Contract				
Title:	Location Plan				
Designed:	CK	Date:	20/10	File Name:	23412
Drawn:	CK	Date:	20/10	Original Scale:	1:750 @A3
Checked:	MK	Date:	20/10	Date:	20/10/2021

Drawing No: 23412-000-102

Appendix

8a

Data Gathered from National Biodiversity Data Centre (NBDC)

Feature name	Species group	Species name	Record count	Date of last record	Title of dataset	Designation
Custom	amphibian	Common Frog (Rana temporaria)	3	15/06/2003	Irish National Frog Database	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex V || Protected Species: Wildlife Acts
Custom	amphibian	Smooth Newt (Lissotriton vulgaris)	2	29/06/2010	Newt Survey 2010-2014	Protected Species: Wildlife Acts
Custom	annelid	Aulodrilus pluriseta	1	31/12/1971	Aquatic Oligochaeta of Ireland	
Custom	annelid	Glossiphonia complanata	1	19/09/2007	River Biologists' Database (EPA)	
Custom	annelid	Lumbriculus variegatus	1	31/12/1971	Aquatic Oligochaeta of Ireland	
Custom	annelid	Spirosperma ferox	1	31/12/1971	Aquatic Oligochaeta of Ireland	
Custom	annelid	Stylodrilus heringianus	1	31/12/1971	Aquatic Oligochaeta of Ireland	
Custom	bird	Barn Owl (Tyto alba)	5	31/07/1991	The Second Atlas of Breeding Birds in Britain and Ireland: 1988-1991	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Custom	bird	Barn Swallow (Hirundo rustica)	30	18/05/2012	Birds of Ireland	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Custom	bird	Black-billed Magpie (Pica pica)	49	18/05/2012	Birds of Ireland	
Custom	bird	Blackcap (Sylvia atricapilla)	23	18/05/2012	Birds of Ireland	
Custom	bird	Black-headed Gull (Larus ridibundus)	16	14/04/2012	Birds of Ireland	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Custom	bird	Blue Tit (Cyanistes caeruleus)	48	18/05/2012	Birds of Ireland	
Custom	bird	Bohemian Waxwing (Bombycilla garrulus)	1	31/12/2011	Bird Atlas 2007 - 2011	
Custom	bird	Brambling (Fringilla montifringilla)	5	31/12/2011	Bird Atlas 2007 - 2011	
Custom	bird	Carrion Crow (Corvus corone)	1	29/02/1984	The First Atlas of Wintering Birds in Britain and Ireland: 1981/82-1983/84.	

Custom	bird	Chaffinch (Fringilla coelebs)	50	18/05/2012	Birds of Ireland	
Custom	bird	Coal Tit (Periparus ater)	42	18/05/2012	Birds of Ireland	
Custom	bird	Common Blackbird (Turdus merula)	51	18/05/2012	Birds of Ireland	
Custom	bird	Common Bullfinch (Pyrrhula pyrrhula)	42	18/05/2012	Birds of Ireland	
Custom	bird	Common Buzzard (Buteo buteo)	27	06/10/2017	Birds of Ireland	
Custom	bird	Common Chiffchaff (Phylloscopus collybita)	31	18/05/2012	Birds of Ireland	
Custom	bird	Common Coot (Fulica atra)	28	18/05/2012	Birds of Ireland	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Custom	bird	Common Crossbill (Loxia curvirostra)	2	06/09/2016	Birds of Ireland	
Custom	bird	Common Cuckoo (Cuculus canorus)	11	31/12/2011	Bird Atlas 2007 - 2011	
Custom	bird	Common Goldeneye (Bucephala clangula)	4	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Custom	bird	Common Grasshopper Warbler (Locustella naevia)	11	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List

Custom	bird	Common Kestrel (Falco tinnunculus)	24	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Custom	bird	Common Kingfisher (Alcedo atthis)	10	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Custom	bird	Common Linnet (Carduelis cannabina)	14	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Custom	bird	Common Moorhen (Gallinula chloropus)	44	18/05/2012	Birds of Ireland	
Custom	bird	Common Pheasant (Phasianus colchicus)	27	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section I Bird Species

Custom	bird	Common Pochard (Aythya ferina)	7	31/12/2001	Irish Wetland Birds Survey (I-WeBS) 1994-2001.	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Custom	bird	Common Raven (Corvus corax)	13	11/02/2012	Birds of Ireland	
Custom	bird	Common Redshank (Tringa totanus)	1	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Custom	bird	Common Sandpiper (Actitis hypoleucos)	1	31/07/1991	The Second Atlas of Breeding Birds in Britain and Ireland: 1988-1991	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Custom	bird	Common Snipe (Gallinago gallinago)	28	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section III Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List

Custom	bird	Common Starling (Sturnus vulgaris)	45	18/05/2012	Birds of Ireland	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Custom	bird	Common Swift (Apus apus)	15	18/05/2012	Birds of Ireland	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Custom	bird	Common Tern (Sterna hirundo)	1	31/07/1991	The Second Atlas of Breeding Birds in Britain and Ireland: 1988-1991	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Custom	bird	Common Whitethroat (Sylvia communis)	10	31/12/2011	Bird Atlas 2007 - 2011	
Custom	bird	Common Wood Pigeon (Columba palumbus)	49	18/05/2012	Birds of Ireland	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section I Bird Species

Custom	bird	Corn Crake (Crex crex)	5	31/07/1991	The Second Atlas of Breeding Birds in Britain and Ireland: 1988-1991	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Custom	bird	Eurasian Collared Dove (Streptopelia decaocto)	19	18/05/2012	Birds of Ireland	
Custom	bird	Eurasian Curlew (Numenius arquata)	13	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation
Custom	bird	Eurasian Dotterel (Charadrius morinellus)	1	12/05/2005	Rare birds of Ireland	
Custom	bird	Eurasian Hobby (Falco subbuteo)	1	01/07/2014	Rare birds of Ireland	
Custom	bird	Eurasian Jackdaw (Corvus monedula)	51	04/08/2017	Birds of Ireland	
Custom	bird	Eurasian Jay (Garrulus glandarius)	21	18/05/2012	Birds of Ireland	
Custom	bird	Eurasian Siskin (Carduelis spinus)	20	14/04/2012	Birds of Ireland	
Custom	bird	Eurasian Sparrowhawk (Accipiter nisus)	22	31/12/2011	Bird Atlas 2007 - 2011	

Custom	bird	Eurasian Teal (Anas crecca)	9	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Custom	bird	Eurasian Tree Sparrow (Passer montanus)	8	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Custom	bird	Eurasian Treecreeper (Certhia familiaris)	33	18/05/2012	Birds of Ireland	
Custom	bird	Eurasian Wigeon (Anas penelope)	7	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List

Custom	bird	Eurasian Woodcock (Scolopax rusticola)	11	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section III Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Custom	bird	European Golden Plover (Pluvialis apricaria)	4	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species || Protected Species: EU Birds Directive >> Annex II, Section II Bird Species || Protected Species: EU Birds Directive >> Annex III, Section III Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Custom	bird	European Goldfinch (Carduelis carduelis)	38	18/05/2012	Birds of Ireland	
Custom	bird	European Greenfinch (Carduelis chloris)	38	14/04/2012	Birds of Ireland	
Custom	bird	European Robin (Erithacus rubecula)	56	18/05/2012	Birds of Ireland	
Custom	bird	Fieldfare (Turdus pilaris)	14	31/12/2011	Bird Atlas 2007 - 2011	
Custom	bird	Goldcrest (Regulus regulus)	41	18/05/2012	Birds of Ireland	
Custom	bird	Great Bittern (Botaurus stellaris)	1	31/12/1955	Rare birds of Ireland	Protected Species: Wildlife Acts

Custom	bird	Great Cormorant (Phalacrocorax carbo)	10	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Custom	bird	Great Crested Grebe (Podiceps cristatus)	18	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Custom	bird	Great Egret (Ardea alba)	1	31/12/2011	Bird Atlas 2007 - 2011	
Custom	bird	Great Spotted Woodpecker (Dendrocopos major)	1	18/08/2016	Birds of Ireland	
Custom	bird	Great Tit (Parus major)	50	18/05/2012	Birds of Ireland	
Custom	bird	Grey Heron (Ardea cinerea)	33	14/04/2012	Birds of Ireland	
Custom	bird	Grey Partridge (Perdix perdix)	1	31/07/1972	The First Atlas of Breeding Birds in Britain and Ireland: 1968-1972.	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section I Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Custom	bird	Grey Plover (Pluvialis squatarola)	1	29/02/1984	The First Atlas of Wintering Birds in Britain and Ireland: 1981/82-1983/84.	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Custom	bird	Grey Wagtail (Motacilla cinerea)	26	31/12/2011	Bird Atlas 2007 - 2011	

Custom	bird	Greylag Goose (Anser anser)	3	31/12/2011	Bird Atlas 2007 - 2011	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> Regulation S.I. 477 (Ireland) || Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Custom	bird	Hawfinch (Coccothraustes coccothraustes)	1	31/12/1890	Rare birds of Ireland	
Custom	bird	Hedge Accentor (Prunella modularis)	46	18/05/2012	Birds of Ireland	
Custom	bird	Herring Gull (Larus argentatus)	5	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Custom	bird	Hooded Crow (Corvus cornix)	44	18/05/2012	Birds of Ireland	
Custom	bird	House Martin (Delichon urbicum)	19	18/05/2012	Birds of Ireland	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Custom	bird	House Sparrow (Passer domesticus)	39	18/05/2012	Birds of Ireland	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List

Custom	bird	Jack Snipe (Lymnocryptes minimus)	1	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section III Bird Species
Custom	bird	Lesser Black-backed Gull (Larus fuscus)	2	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Custom	bird	Lesser Redpoll (Carduelis cabaret)	26	14/04/2012	Birds of Ireland	
Custom	bird	Little Egret (Egretta garzetta)	3	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species
Custom	bird	Little Grebe (Tachybaptus ruficollis)	8	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Custom	bird	Long-eared Owl (Asio otus)	9	31/12/2011	Bird Atlas 2007 - 2011	
Custom	bird	Long-tailed Tit (Aegithalos caudatus)	28	18/05/2012	Birds of Ireland	
Custom	bird	Mallard (Anas platyrhynchos)	40	18/05/2012	Birds of Ireland	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section I Bird Species
Custom	bird	Meadow Pipit (Anthus pratensis)	30	31/12/2011	Bird Atlas 2007 - 2011	

Custom	bird	Merlin (Falco columbarius)	3	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Custom	bird	Mew Gull (Larus canus)	3	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Custom	bird	Mistle Thrush (Turdus viscivorus)	45	18/05/2012	Birds of Ireland	
Custom	bird	Mute Swan (Cygnus olor)	29	11/02/2012	Birds of Ireland	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Custom	bird	Northern Lapwing (Vanellus vanellus)	18	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Custom	bird	Northern Wheatear (Oenanthe oenanthe)	1	31/07/1972	The First Atlas of Breeding Birds in Britain and Ireland: 1968-1972.	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List

Custom	bird	Peregrine Falcon (Falco peregrinus)	5	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species
Custom	bird	Pied Wagtail (Motacilla alba subsp. yarrellii)	7	04/08/2017	Birds of Ireland	
Custom	bird	Redwing (Turdus iliacus)	20	23/10/2017	Birds of Ireland	
Custom	bird	Reed Bunting (Emberiza schoeniclus)	29	03/02/2017	Birds of Ireland	
Custom	bird	Rock Pigeon (Columba livia)	13	04/08/2017	Birds of Ireland	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species
Custom	bird	Rook (Corvus frugilegus)	50	04/08/2017	Birds of Ireland	
Custom	bird	Sand Martin (Riparia riparia)	9	18/05/2012	Birds of Ireland	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Custom	bird	Sedge Warbler (Acrocephalus schoenobaenus)	18	18/05/2012	Birds of Ireland	
Custom	bird	Sky Lark (Alauda arvensis)	9	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Custom	bird	Song Thrush (Turdus philomelos)	48	18/05/2012	Birds of Ireland	
Custom	bird	Spotted Flycatcher (Muscicapa striata)	16	18/05/2012	Birds of Ireland	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List

Custom	bird	Stock Pigeon (Columba oenas)	2	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Custom	bird	Stonechat (Saxicola torquata)	2	31/12/2011	Bird Atlas 2007 - 2011	
Custom	bird	Tufted Duck (Aythya fuligula)	16	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Custom	bird	Water Rail (Rallus aquaticus)	13	18/05/2012	Birds of Ireland	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Custom	bird	White Wagtail (Motacilla alba)	36	31/12/2011	Bird Atlas 2007 - 2011	
Custom	bird	White-throated Dipper (Cinclus cinclus)	16	31/12/2011	Bird Atlas 2007 - 2011	
Custom	bird	Whooper Swan (Cygnus cygnus)	11	31/12/2011	Bird Atlas 2007 - 2011	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Custom	bird	Willow Warbler (Phylloscopus trochilus)	31	18/05/2012	Birds of Ireland	

Custom	bird	Winter Wren (Troglodytes troglodytes)	50	18/05/2012	Birds of Ireland	
Custom	bird	Yellowhammer (Emberiza citrinella)	7	31/07/1991	The Second Atlas of Breeding Birds in Britain and Ireland: 1988-1991	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Custom	bony fish (Actinopterygii)	Perch (Perca fluviatilis)	1	31/12/1967	Freshwater Fish in Irish Lakes	
Custom	bony fish (Actinopterygii)	Pike (Esox lucius)	1	31/12/1967	Freshwater Fish in Irish Lakes	
Custom	bony fish (Actinopterygii)	Rudd (Scardinius erythrophthalmus)	1	31/12/1967	Freshwater Fish in Irish Lakes	
Custom	centipede	Geophilus flavus	2	01/01/1913	Centipedes of Ireland	
Custom	centipede	Geophilus insculptus	1	01/09/1912	Centipedes of Ireland	
Custom	centipede	Lithobius (Lithobius) forficatus	1	01/05/1968	Centipedes of Ireland	
Custom	centipede	Lithobius (Lithobius) variegatus	2	01/01/1913	Centipedes of Ireland	
Custom	conifer	Noble Fir (Abies procera)	1	22/08/2006	Species Data from the National Vegetation Database	
Custom	crustacean	Freshwater White-clawed Crayfish (Austropotamobius pallipes)	22	06/07/2010	River Biologists' Database (EPA)	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex II || Protected Species: EU Habitats Directive >> Annex V || Protected Species: Wildlife Acts
Custom	false scorpion (Pseudoscorpiones)	Common Chthonid (Chthonius (Chthonius) ischnocheles)	1	31/12/1912	Pseudoscorpions of Ireland	
Custom	fern	Broad Buckler-fern (Dryopteris dilatata)	3	22/08/2006	Species Data from the National Vegetation Database	
Custom	fern	Hard-fern (Blechnum spicant)	2	26/04/2005	Species Data from the National Vegetation Database	
Custom	fern	Lady-fern (Athyrium filix-femina)	2	26/04/2005	Species Data from the National Vegetation Database	
Custom	fern	Polypody (Polypodium vulgare)	1	26/04/2005	Species Data from the National Vegetation Database	
Custom	fern	Scaly Male-fern (Dryopteris affinis)	3	22/08/2006	Species Data from the National Vegetation Database	
Custom	fern	Soft Shield-fern (Polystichum setiferum)	1	26/04/2005	Species Data from the National Vegetation Database	

Custom	flatworm (Turbellaria)	Arthurdendyus triangulatus	2	29/10/2012	New Zealand Flatworm (Arthurdendyus triangulates) Database	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> High Impact Invasive Species
Custom	flowering plant	Alder (Alnus glutinosa)	2	14/06/2017	Online Atlas of Vascular Plants 2012-2020	
Custom	flowering plant	American Skunk-cabbage (Lysichiton americanus)	1	07/03/2019	Online Atlas of Vascular Plants 2012-2020	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> Medium Impact Invasive Species || Invasive Species: Invasive Species >> EU Regulation No. 1143/2014 || Invasive Species: Invasive Species >> Regulation S.I. 477 (Ireland)
Custom	flowering plant	Ash (Fraxinus excelsior)	6	14/06/2017	Online Atlas of Vascular Plants 2012-2020	
Custom	flowering plant	Barren Strawberry (Potentilla sterilis)	1	26/04/2005	Species Data from the National Vegetation Database	
Custom	flowering plant	Beech (Fagus sylvatica)	4	25/04/2018	Online Atlas of Vascular Plants 2012-2020	
Custom	flowering plant	Bird Cherry (Prunus padus)	1	31/12/1929	BSBI tetrad data for Ireland	
Custom	flowering plant	Blackthorn (Prunus spinosa)	1	27/05/2009	Species Data from the National Vegetation Database	
Custom	flowering plant	Bluebell (Hyacinthoides non-scripta)	6	09/05/2020	Online Atlas of Vascular Plants 2012-2020	
Custom	flowering plant	Bog Stitchwort (Stellaria alsine)	2	27/05/2009	Species Data from the National Vegetation Database	
Custom	flowering plant	Bogbean (Menyanthes trifoliata)	1	28/05/2007	Species Data from the National Vegetation Database	
Custom	flowering plant	Bottle Sedge (Carex rostrata)	4	27/05/2009	Species Data from the National Vegetation Database	
Custom	flowering plant	Bramble (Rubus fruticosus agg.)	5	25/04/2018	Online Atlas of Vascular Plants 2012-2020	
Custom	flowering plant	Branched Bur-reed (Sparganium erectum)	2	27/05/2009	Species Data from the National Vegetation Database	
Custom	flowering plant	Broad-leaved Dock (Rumex obtusifolius)	2	27/05/2009	Species Data from the National Vegetation Database	
Custom	flowering plant	Broad-leaved Pondweed (Potamogeton natans)	1	28/05/2007	Species Data from the National Vegetation Database	
Custom	flowering plant	Brooklime (Veronica beccabunga)	2	27/05/2009	Species Data from the National Vegetation Database	
Custom	flowering plant	Brown Sedge (Carex disticha)	2	27/05/2009	Species Data from the National Vegetation Database	
Custom	flowering plant	Bugle (Ajuga reptans)	1	27/05/2009	Species Data from the National Vegetation Database	

Custom	flowering plant	Bulbous Rush (Juncus bulbosus)	2	27/05/2009	Species Data from the National Vegetation Database	
Custom	flowering plant	Bulrush (Typha latifolia)	1	28/05/2007	Species Data from the National Vegetation Database	
Custom	flowering plant	Bush Vetch (Vicia sepium)	3	27/05/2009	Species Data from the National Vegetation Database	
Custom	flowering plant	Canadian Waterweed (Elodea canadensis)	1	19/09/2007	River Biologists' Database (EPA)	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> High Impact Invasive Species || Invasive Species: Invasive Species >> Regulation S.I. 477 (Ireland)
Custom	flowering plant	Carnation Sedge (Carex panicea)	2	27/05/2009	Species Data from the National Vegetation Database	
Custom	flowering plant	Cat's-ear (Hypochaeris radicata)	2	27/05/2009	Species Data from the National Vegetation Database	
Custom	flowering plant	Cherry Laurel (Prunus laurocerasus)	1	26/04/2005	Species Data from the National Vegetation Database	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> High Impact Invasive Species
Custom	flowering plant	Cleavers (Galium aparine)	3	27/05/2009	Species Data from the National Vegetation Database	
Custom	flowering plant	Cock's-foot (Dactylis glomerata)	3	21/08/2016	Online Atlas of Vascular Plants 2012-2020	
Custom	flowering plant	Common Bent (Agrostis capillaris)	2	27/05/2009	Species Data from the National Vegetation Database	
Custom	flowering plant	Common Chickweed (Stellaria media)	1	27/05/2009	Species Data from the National Vegetation Database	
Custom	flowering plant	Common Cottongrass (Eriophorum angustifolium)	3	27/05/2009	Species Data from the National Vegetation Database	
Custom	flowering plant	Common Dog-violet (Viola riviniana)	1	26/04/2005	Species Data from the National Vegetation Database	
Custom	flowering plant	Common Duckweed (Lemna minor)	1	28/05/2007	Species Data from the National Vegetation Database	
Custom	flowering plant	Common Knapweed (Centaurea nigra)	2	27/05/2009	Species Data from the National Vegetation Database	
Custom	flowering plant	Common Mouse-ear (Cerastium fontanum)	4	27/05/2009	Species Data from the National Vegetation Database	
Custom	flowering plant	Common Nettle (Urtica dioica)	2	27/05/2009	Species Data from the National Vegetation Database	
Custom	flowering plant	Common Ragwort (Senecio jacobaea)	3	27/05/2009	Species Data from the National Vegetation Database	
Custom	flowering plant	Common Sedge (Carex nigra)	3	27/05/2009	Species Data from the National Vegetation Database	
Custom	flowering plant	Common Sorrel (Rumex acetosa)	7	27/05/2009	Species Data from the National Vegetation Database	

Custom	flowering plant	Common Spotted-orchid (Dactylorhiza fuchsii)	3	27/05/2009	Species Data from the National Vegetation Database	
Custom	flowering plant	Common Water-starwort (Callitriche stagnalis)	1	27/05/2009	Species Data from the National Vegetation Database	
Custom	flowering plant	Cow Parsley (Anthriscus sylvestris)	1	27/05/2009	Species Data from the National Vegetation Database	
Custom	flowering plant	Cowbane (Cicuta virosa)	1	28/05/2007	Species Data from the National Vegetation Database	
Custom	flowering plant	Creeping Bent (Agrostis stolonifera)	12	27/05/2009	Species Data from the National Vegetation Database	
Custom	flowering plant	Creeping Buttercup (Ranunculus repens)	6	27/05/2009	Species Data from the National Vegetation Database	
Custom	flowering plant	Creeping Thistle (Cirsium arvense)	1	27/05/2009	Species Data from the National Vegetation Database	
Custom	flowering plant	Crested Dog's-tail (Cynosurus cristatus)	3	27/05/2009	Species Data from the National Vegetation Database	
Custom	flowering plant	Cuckooflower (Cardamine pratensis)	6	09/05/2020	Online Atlas of Vascular Plants 2012-2020	
Custom	flowering plant	Curled Dock (Rumex crispus)	2	27/05/2009	Species Data from the National Vegetation Database	
Custom	flowering plant	Curled Pondweed (Potamogeton crispus)	1	19/09/2007	River Biologists' Database (EPA)	
Custom	flowering plant	Daisy (Bellis perennis)	2	27/05/2009	Species Data from the National Vegetation Database	
Custom	flowering plant	Devil's-bit Scabious (Succisa pratensis)	1	27/05/2009	Species Data from the National Vegetation Database	
Custom	flowering plant	Downy Birch (Betula pubescens)	5	27/05/2009	Species Data from the National Vegetation Database	
Custom	flowering plant	Eared Willow (Salix aurita)	1	22/05/2007	Species Data from the National Vegetation Database	
Custom	flowering plant	Early-purple Orchid (Orchis mascula)	1	26/04/2005	Species Data from the National Vegetation Database	
Custom	flowering plant	Elder (Sambucus nigra)	1	29/05/2018	Online Atlas of Vascular Plants 2012-2020	
Custom	flowering plant	Enchanter's-nightshade (Circaea lutetiana)	2	22/08/2006	Species Data from the National Vegetation Database	
Custom	flowering plant	False Hook-lobed Dandelion (Taraxacum pseudohamatum)	1	31/12/1986	BSBI tetrad data for Ireland	
Custom	flowering plant	False Oat-grass (Arrhenatherum elatius)	3	27/05/2009	Species Data from the National Vegetation Database	
Custom	flowering plant	False-brome (Brachypodium sylvaticum)	2	26/04/2005	Species Data from the National Vegetation Database	
Custom	flowering plant	Field Wood-rush (Luzula campestris)	2	27/05/2009	Species Data from the National Vegetation Database	
Custom	flowering plant	Floating Bur-reed (Sparganium angustifolium)	1	31/12/1929	BSBI tetrad data for Ireland	
Custom	flowering plant	Floating Sweet-grass (Glyceria fluitans)	2	27/05/2009	Species Data from the National Vegetation Database	

Custom	flowering plant	Foxglove (Digitalis purpurea)	1	25/04/2018	Online Atlas of Vascular Plants 2012-2020	
Custom	flowering plant	Germander Speedwell (Veronica chamaedrys)	2	27/05/2009	Species Data from the National Vegetation Database	
Custom	flowering plant	Giant Hogweed (Heracleum mantegazzianum)	5	05/08/2016	Online Atlas of Vascular Plants 2012-2020	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> High Impact Invasive Species || Invasive Species: Invasive Species >> Regulation S.I. 477 (Ireland)
Custom	flowering plant	Glaucous Sedge (Carex flacca)	1	26/04/2005	Species Data from the National Vegetation Database	
Custom	flowering plant	Goat Willow (Salix caprea)	2	26/04/2005	Species Data from the National Vegetation Database	
Custom	flowering plant	Gorse (Ulex europaeus)	2	05/02/2018	Online Atlas of Vascular Plants 2012-2020	
Custom	flowering plant	Greater Bird's-foot-trefoil (Lotus pedunculatus)	3	27/05/2009	Species Data from the National Vegetation Database	
Custom	flowering plant	Greater Spearwort (Ranunculus lingua)	1	28/05/2007	Species Data from the National Vegetation Database	
Custom	flowering plant	Greater Stitchwort (Stellaria holostea)	1	27/05/2009	Species Data from the National Vegetation Database	
Custom	flowering plant	Guelder-rose (Viburnum opulus)	1	03/06/2020	Online Atlas of Vascular Plants 2012-2020	
Custom	flowering plant	Hairy Sedge (Carex hirta)	1	27/05/2009	Species Data from the National Vegetation Database	
Custom	flowering plant	Hawthorn (Crataegus monogyna)	5	27/05/2009	Species Data from the National Vegetation Database	
Custom	flowering plant	Hazel (Corylus avellana)	2	26/04/2005	Species Data from the National Vegetation Database	
Custom	flowering plant	Heath Bedstraw (Galium saxatile)	2	27/05/2009	Species Data from the National Vegetation Database	
Custom	flowering plant	Heath Wood-rush (Luzula multiflora)	1	27/05/2009	Species Data from the National Vegetation Database	
Custom	flowering plant	Hedge Bindweed (Calystegia sepium)	1	09/10/2019	Online Atlas of Vascular Plants 2012-2020	
Custom	flowering plant	Herb-Robert (Geranium robertianum)	3	29/05/2018	Online Atlas of Vascular Plants 2012-2020	
Custom	flowering plant	Himalayan Knotweed (Persicaria wallichii)	1	21/08/2016	National Invasive Species Database	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> Medium Impact Invasive Species || Invasive Species: Invasive Species >> Regulation S.I. 477 (Ireland)

Custom	flowering plant	Hogweed (Heracleum sphondylium)	1	26/04/2005	Species Data from the National Vegetation Database	
Custom	flowering plant	Holly (Ilex aquifolium)	2	22/08/2006	Species Data from the National Vegetation Database	
Custom	flowering plant	Honeysuckle (Lonicera periclymenum)	3	22/08/2006	Species Data from the National Vegetation Database	
Custom	flowering plant	Horse-chestnut (Aesculus hippocastanum)	1	26/04/2005	Species Data from the National Vegetation Database	
Custom	flowering plant	Hybrid Black-poplar (Populus nigra x deltoides = P. x canadensis)	2	31/12/1969	BSBI tetrad data for Ireland	
Custom	flowering plant	Hybrid Sweet-grass (Glyceria fluitans x notata = G. x pedicellata)	2	31/12/1986	BSBI tetrad data for Ireland	
Custom	flowering plant	Indian Balsam (Impatiens glandulifera)	1	07/12/2017	Online Atlas of Vascular Plants 2012-2020	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> High Impact Invasive Species || Invasive Species: Invasive Species >> Regulation S.I. 477 (Ireland)
Custom	flowering plant	Irish Whitebeam (Sorbus hibernica)	1	13/06/2019	Online Atlas of Vascular Plants 2012-2020	
Custom	flowering plant	Ivy (Hedera helix)	3	22/08/2006	Species Data from the National Vegetation Database	
Custom	flowering plant	Ivy-leaved Crowfoot (Ranunculus hederaceus)	1	27/05/2009	Species Data from the National Vegetation Database	
Custom	flowering plant	Japanese Knotweed (Fallopia japonica)	3	12/06/2019	Online Atlas of Vascular Plants 2012-2020	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> High Impact Invasive Species || Invasive Species: Invasive Species >> Regulation S.I. 477 (Ireland)
Custom	flowering plant	Least Bur-reed (Sparganium natans)	1	31/12/1929	BSBI tetrad data for Ireland	
Custom	flowering plant	Lesser Bulrush (Typha angustifolia)	1	31/12/1986	BSBI tetrad data for Ireland	
Custom	flowering plant	Lesser Celandine (Ranunculus ficaria)	3	10/03/2020	Online Atlas of Vascular Plants 2012-2020	
Custom	flowering plant	Lesser Spearwort (Ranunculus flammula)	2	27/05/2009	Species Data from the National Vegetation Database	
Custom	flowering plant	Lesser Water-parsnip (Berula erecta)	1	31/12/1929	BSBI tetrad data for Ireland	
Custom	flowering plant	Lords-and-Ladies (Arum maculatum)	1	26/04/2005	Species Data from the National Vegetation Database	
Custom	flowering plant	Lousewort (Pedicularis sylvatica)	2	27/05/2009	Species Data from the National Vegetation Database	
Custom	flowering plant	Marsh Cinquefoil (Potentilla palustris)	6	27/05/2009	Species Data from the National Vegetation Database	

Custom	flowering plant	Marsh Pennywort (Hydrocotyle vulgaris)	1	28/05/2007	Species Data from the National Vegetation Database	
Custom	flowering plant	Marsh Ragwort (Senecio aquaticus)	2	27/05/2009	Species Data from the National Vegetation Database	
Custom	flowering plant	Marsh Thistle (Cirsium palustre)	4	27/05/2009	Species Data from the National Vegetation Database	
Custom	flowering plant	Marsh Willowherb (Epilobium palustre)	5	27/05/2009	Species Data from the National Vegetation Database	
Custom	flowering plant	Marsh Woundwort (Stachys palustris)	1	21/08/2016	Online Atlas of Vascular Plants 2012-2020	
Custom	flowering plant	Marsh-bedstraw (Galium palustre)	6	27/05/2009	Species Data from the National Vegetation Database	
Custom	flowering plant	Marsh-marigold (Caltha palustris)	2	27/05/2009	Species Data from the National Vegetation Database	
Custom	flowering plant	Meadow Buttercup (Ranunculus acris)	5	27/05/2009	Species Data from the National Vegetation Database	
Custom	flowering plant	Meadow Foxtail (Alopecurus pratensis)	3	27/05/2009	Species Data from the National Vegetation Database	
Custom	flowering plant	Meadow Vetchling (Lathyrus pratensis)	4	27/05/2009	Species Data from the National Vegetation Database	
Custom	flowering plant	Meadowsweet (Filipendula ulmaria)	6	27/05/2009	Species Data from the National Vegetation Database	
Custom	flowering plant	Opposite-leaved Golden-saxifrage (Chrysosplenium oppositifolium)	2	07/03/2018	Online Atlas of Vascular Plants 2012-2020	
Custom	flowering plant	Pedunculate Oak (Quercus robur)	3	22/08/2006	Species Data from the National Vegetation Database	
Custom	flowering plant	Peppermint (Mentha aquatica x spicata = M. x piperita)	1	31/12/1929	BSBI tetrad data for Ireland	
Custom	flowering plant	Perennial Rye-grass (Lolium perenne)	3	27/05/2009	Species Data from the National Vegetation Database	
Custom	flowering plant	Pineappleweed (Matricaria discoidea)	1	27/05/2009	Species Data from the National Vegetation Database	
Custom	flowering plant	Potentilla erecta x anglica = P. x suberecta	2	27/05/2009	Species Data from the National Vegetation Database	
Custom	flowering plant	Primrose (Primula vulgaris)	9	09/05/2020	Online Atlas of Vascular Plants 2012-2020	
Custom	flowering plant	Purple-loosestrife (Lythrum salicaria)	1	19/09/2007	River Biologists' Database (EPA)	
Custom	flowering plant	Ragged-Robin (Lychnis flos-cuculi)	2	27/05/2009	Species Data from the National Vegetation Database	
Custom	flowering plant	Ramsons (Allium ursinum)	1	13/04/2016	Online Atlas of Vascular Plants 2012-2020	
Custom	flowering plant	Red Clover (Trifolium pratense)	1	27/05/2009	Species Data from the National Vegetation Database	
Custom	flowering plant	Red Fescue (Festuca rubra)	4	27/05/2009	Species Data from the National Vegetation Database	
Custom	flowering plant	Reed Canary-grass (Phalaris arundinacea)	1	19/09/2007	River Biologists' Database (EPA)	

Custom	flowering plant	Rhododendron ponticum	1	25/05/2019	Online Atlas of Vascular Plants 2012-2020	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> High Impact Invasive Species || Invasive Species: Invasive Species >> Regulation S.I. 477 (Ireland)
Custom	flowering plant	Ribwort Plantain (Plantago lanceolata)	2	27/05/2009	Species Data from the National Vegetation Database	
Custom	flowering plant	Rosebay Willowherb (Chamerion angustifolium)	2	14/06/2017	Online Atlas of Vascular Plants 2012-2020	
Custom	flowering plant	Rough Meadow-grass (Poa trivialis)	4	27/05/2009	Species Data from the National Vegetation Database	
Custom	flowering plant	Rusty Willow (Salix cinerea subsp. oleifolia)	2	28/05/2007	Species Data from the National Vegetation Database	
Custom	flowering plant	Salix cinerea	3	27/05/2009	Species Data from the National Vegetation Database	
Custom	flowering plant	Sanicle (Sanicula europaea)	1	26/04/2005	Species Data from the National Vegetation Database	
Custom	flowering plant	Selfheal (Prunella vulgaris)	3	27/05/2009	Species Data from the National Vegetation Database	
Custom	flowering plant	Sharp-flowered Rush (Juncus acutiflorus)	2	27/05/2009	Species Data from the National Vegetation Database	
Custom	flowering plant	Shining Pondweed (Potamogeton lucens)	1	31/12/1986	BSBI tetrad data for Ireland	
Custom	flowering plant	Short-fruited Willowherb (Epilobium obscurum)	3	27/05/2009	Species Data from the National Vegetation Database	
Custom	flowering plant	Silverweed (Potentilla anserina)	1	27/05/2009	Species Data from the National Vegetation Database	
Custom	flowering plant	Smooth Meadow-grass (Poa pratensis)	3	27/05/2009	Species Data from the National Vegetation Database	
Custom	flowering plant	Soft-rush (Juncus effusus)	8	21/08/2016	Online Atlas of Vascular Plants 2012-2020	
Custom	flowering plant	Spear Thistle (Cirsium vulgare)	2	27/05/2009	Species Data from the National Vegetation Database	
Custom	flowering plant	Spindle (Euonymus europaeus)	1	04/09/2018	Online Atlas of Vascular Plants 2012-2020	
Custom	flowering plant	Spotted Dandelion (Taraxacum maculosum)	1	31/12/1986	BSBI tetrad data for Ireland	
Custom	flowering plant	Star Sedge (Carex echinata)	2	27/05/2009	Species Data from the National Vegetation Database	
Custom	flowering plant	Sweet Vernal-grass (Anthoxanthum odoratum)	5	27/05/2009	Species Data from the National Vegetation Database	
Custom	flowering plant	Sycamore (Acer pseudoplatanus)	2	26/04/2005	Species Data from the National Vegetation Database	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> Medium Impact Invasive Species

Custom	flowering plant	Tall Tutsan (Hypericum androsaemum x hircinum = H. x inodorum)	2	31/12/2010	BSBI tetrad data for Ireland	
Custom	flowering plant	Taraxacum aggregate	4	28/03/2018	Online Atlas of Vascular Plants 2012-2020	
Custom	flowering plant	Thyme-leaved Speedwell (Veronica serpyllifolia)	3	27/05/2009	Species Data from the National Vegetation Database	
Custom	flowering plant	Tormentil (Potentilla erecta)	2	27/05/2009	Species Data from the National Vegetation Database	
Custom	flowering plant	Trailing Tormentil (Potentilla anglica)	2	27/05/2009	Species Data from the National Vegetation Database	
Custom	flowering plant	Tufted Hair-grass (Deschampsia cespitosa)	3	27/05/2009	Species Data from the National Vegetation Database	
Custom	flowering plant	Velvet Bent (Agrostis canina)	4	27/05/2009	Species Data from the National Vegetation Database	
Custom	flowering plant	Water Mint (Mentha aquatica)	1	27/05/2009	Species Data from the National Vegetation Database	
Custom	flowering plant	Wavy Bitter-cress (Cardamine flexuosa)	1	27/05/2009	Species Data from the National Vegetation Database	
Custom	flowering plant	White Clover (Trifolium repens)	5	27/05/2009	Species Data from the National Vegetation Database	
Custom	flowering plant	White Sedge (Carex curta)	1	28/05/2007	Species Data from the National Vegetation Database	
Custom	flowering plant	Wild Angelica (Angelica sylvestris)	5	27/05/2009	Species Data from the National Vegetation Database	
Custom	flowering plant	Wild Privet (Ligustrum vulgare)	1	26/04/2005	Species Data from the National Vegetation Database	
Custom	flowering plant	Wild Strawberry (Fragaria vesca)	2	26/04/2005	Species Data from the National Vegetation Database	
Custom	flowering plant	Winter Heliotrope (Petasites fragrans)	1	22/12/2017	Online Atlas of Vascular Plants 2012-2020	
Custom	flowering plant	Wood Anemone (Anemone nemorosa)	4	10/03/2020	Online Atlas of Vascular Plants 2012-2020	
Custom	flowering plant	Wood Avens (Geum urbanum)	2	26/04/2005	Species Data from the National Vegetation Database	
Custom	flowering plant	Wood-sedge (Carex sylvatica)	2	22/08/2006	Species Data from the National Vegetation Database	
Custom	flowering plant	Wood-sorrel (Oxalis acetosella)	2	21/05/2016	Online Atlas of Vascular Plants 2012-2020	
Custom	flowering plant	Wych Elm (Ulmus glabra)	3	22/08/2006	Species Data from the National Vegetation Database	
Custom	flowering plant	Yellow Iris (Iris pseudacorus)	1	26/04/2005	Species Data from the National Vegetation Database	
Custom	flowering plant	Yellow Pimpernel (Lysimachia nemorum)	1	27/05/2009	Species Data from the National Vegetation Database	
Custom	flowering plant	Yellow Sedge (Carex viridula)	2	27/05/2009	Species Data from the National Vegetation Database	
Custom	flowering plant	Yorkshire-fog (Holcus lanatus)	12	27/05/2009	Species Data from the National Vegetation Database	

Custom	fungus	Blue Spot Knight (Tricholoma columbetta)	1	18/10/2003	Fungal Records for Ireland	
Custom	fungus	Candlesnuff Fungus (Xylaria hypoxylon)	1	18/10/2003	Fungal Records for Ireland	
Custom	fungus	Clouded Funnel (Clitocybe nebularis)	1	18/10/2003	Fungal Records for Ireland	
Custom	fungus	Common Bonnet (Mycena galericulata)	1	18/10/2003	Fungal Records for Ireland	
Custom	fungus	Common Inkcap (Coprinopsis atramentaria)	1	18/10/2003	Fungal Records for Ireland	
Custom	fungus	Deceiver (Laccaria laccata)	1	18/10/2003	Fungal Records for Ireland	
Custom	fungus	Fiery Milkcap (Lactarius pyrogalus)	1	18/10/2003	Fungal Records for Ireland	
Custom	fungus	Fly Agaric (Amanita muscaria var. muscaria)	1	18/10/2003	Fungal Records for Ireland	
Custom	fungus	Honey Fungus (Armillaria mellea)	1	18/10/2003	Fungal Records for Ireland	
Custom	fungus	Inocybe sindonia	1	18/10/2003	Fungal Records for Ireland	
Custom	fungus	Jellybaby (Leotia lubrica)	1	18/10/2003	Fungal Records for Ireland	
Custom	fungus	Livid Pinkgill (Entoloma sinuatum)	1	18/10/2003	Fungal Records for Ireland	
Custom	fungus	Nitrous Bonnet (Mycena leptocephala)	1	18/10/2003	Fungal Records for Ireland	
Custom	fungus	Oakbug Milkcap (Lactarius quietus)	1	18/10/2003	Fungal Records for Ireland	
Custom	fungus	Rufous Milkcap (Lactarius rufus)	1	18/10/2003	Fungal Records for Ireland	
Custom	fungus	Russet Toughshank (Collybia dryophila)	1	18/10/2003	Fungal Records for Ireland	
Custom	fungus	Silky Piggyback (Asterophora parasitica)	1	18/10/2003	Fungal Records for Ireland	
Custom	fungus	Snapping Bonnet (Mycena vitilis)	1	18/10/2003	Fungal Records for Ireland	
Custom	fungus	Sulphur Tuft (Hypholoma fasciculare var. fasciculare)	1	18/10/2003	Fungal Records for Ireland	
Custom	harvestman (Opiliones)	Leiobunum blackwalli	1	02/10/1995	Harvestmen (Opiliones) of Ireland	
Custom	harvestman (Opiliones)	Leiobunum rotundum	1	02/10/1995	Harvestmen (Opiliones) of Ireland	
Custom	harvestman (Opiliones)	Mitopus morio	1	02/10/1995	Harvestmen (Opiliones) of Ireland	
Custom	harvestman (Opiliones)	Nelima gothica	1	02/10/1995	Harvestmen (Opiliones) of Ireland	
Custom	harvestman (Opiliones)	Nemastoma bimaculatum	3	02/10/1995	Harvestmen (Opiliones) of Ireland	
Custom	harvestman (Opiliones)	Oligolophus hanseni	2	02/10/1995	Harvestmen (Opiliones) of Ireland	
Custom	harvestman (Opiliones)	Oligolophus tridens	1	02/10/1995	Harvestmen (Opiliones) of Ireland	
Custom	harvestman (Opiliones)	Paroligolophus agrestis	2	02/10/1995	Harvestmen (Opiliones) of Ireland	
Custom	harvestman (Opiliones)	Phalangium opilio	1	02/10/1995	Harvestmen (Opiliones) of Ireland	

Custom	hornwort	Smooth Hornwort (Phaeoceros laevis)	2	31/08/2007	Bryophytes of Ireland	Threatened Species: Least concern
Custom	horsetail	Water Horsetail (Equisetum fluviatile)	8	27/05/2009	Species Data from the National Vegetation Database	
Custom	insect - beetle (Coleoptera)	7-spot Ladybird (Coccinella septempunctata)	3	18/04/2019	Ladybirds of Ireland	
Custom	insect - beetle (Coleoptera)	Agabus (Acatodes) sturmii	1	12/10/1909	Water Beetles of Ireland	
Custom	insect - beetle (Coleoptera)	Agabus (Gaurodytes) affinis	1	12/10/1909	Water Beetles of Ireland	
Custom	insect - beetle (Coleoptera)	Agabus (Gaurodytes) bipustulatus	1	12/10/1909	Water Beetles of Ireland	
Custom	insect - beetle (Coleoptera)	Agabus (Gaurodytes) paludosus	1	12/10/1909	Water Beetles of Ireland	
Custom	insect - beetle (Coleoptera)	Agabus (Gaurodytes) unguicularis	1	12/10/1909	Water Beetles of Ireland	
Custom	insect - beetle (Coleoptera)	Anacaena globulus	1	12/10/1909	Water Beetles of Ireland	
Custom	insect - beetle (Coleoptera)	Colymbetes fuscus	1	12/10/1909	Water Beetles of Ireland	
Custom	insect - beetle (Coleoptera)	Dytiscus semisulcatus	1	12/10/1909	Water Beetles of Ireland	
Custom	insect - beetle (Coleoptera)	Elmis aenea	2	03/07/2007	River Biologists' Database (EPA)	
Custom	insect - beetle (Coleoptera)	Enochrus coarctatus	1	12/10/1909	Water Beetles of Ireland	
Custom	insect - beetle (Coleoptera)	Enochrus testaceus	1	12/10/1909	Water Beetles of Ireland	
Custom	insect - beetle (Coleoptera)	Graptodytes pictus	1	12/10/1909	Water Beetles of Ireland	
Custom	insect - beetle (Coleoptera)	Great Diving Beetle (Dytiscus marginalis)	1	12/10/1909	Water Beetles of Ireland	
Custom	insect - beetle (Coleoptera)	Gyrinus caspius	1	12/10/1909	Water Beetles of Ireland	
Custom	insect - beetle (Coleoptera)	Haliplus (Haliplinus) ruficollis	1	12/10/1909	Water Beetles of Ireland	
Custom	insect - beetle (Coleoptera)	Haliplus (Haliplus) confinis	1	12/10/1909	Water Beetles of Ireland	
Custom	insect - beetle (Coleoptera)	Haliplus (Liaphlus) flavicollis	1	12/10/1909	Water Beetles of Ireland	
Custom	insect - beetle (Coleoptera)	Haliplus (Neohaliplus) lineatocollis	1	12/10/1909	Water Beetles of Ireland	
Custom	insect - beetle (Coleoptera)	Helophorus (Atracthelophorus) brevipalpis	1	12/10/1909	Water Beetles of Ireland	
Custom	insect - beetle (Coleoptera)	Hydraena britteni	1	12/10/1909	Water Beetles of Ireland	
Custom	insect - beetle (Coleoptera)	Hydraena riparia	1	12/10/1909	Water Beetles of Ireland	

Custom	insect - beetle (Coleoptera)	Hydrobius fuscipes	1	12/10/1909	Water Beetles of Ireland	
Custom	insect - beetle (Coleoptera)	Hydroporus angustatus	1	12/10/1909	Water Beetles of Ireland	
Custom	insect - beetle (Coleoptera)	Hydroporus erythrocephalus	1	12/10/1909	Water Beetles of Ireland	
Custom	insect - beetle (Coleoptera)	Hydroporus gyllenhalii	1	12/10/1909	Water Beetles of Ireland	
Custom	insect - beetle (Coleoptera)	Hydroporus memnonius	1	12/10/1909	Water Beetles of Ireland	
Custom	insect - beetle (Coleoptera)	Hydroporus nigrita	1	12/10/1909	Water Beetles of Ireland	
Custom	insect - beetle (Coleoptera)	Hydroporus palustris	1	12/10/1909	Water Beetles of Ireland	
Custom	insect - beetle (Coleoptera)	Hydroporus striola	1	12/10/1909	Water Beetles of Ireland	
Custom	insect - beetle (Coleoptera)	Hydroporus tessellatus	1	12/10/1909	Water Beetles of Ireland	
Custom	insect - beetle (Coleoptera)	Hydroporus umbrosus	1	12/10/1909	Water Beetles of Ireland	
Custom	insect - beetle (Coleoptera)	Ilybius fuliginosus	1	12/10/1909	Water Beetles of Ireland	
Custom	insect - beetle (Coleoptera)	Ilybius quadriguttatus	1	12/10/1909	Water Beetles of Ireland	
Custom	insect - beetle (Coleoptera)	Laccobius bipunctatus	1	12/10/1909	Water Beetles of Ireland	
Custom	insect - beetle (Coleoptera)	Limnebius truncatellus	1	12/10/1909	Water Beetles of Ireland	
Custom	insect - beetle (Coleoptera)	Ochthebius (Homalochthebius) minimus	1	12/10/1909	Water Beetles of Ireland	
Custom	insect - beetle (Coleoptera)	Porhydrus lineatus	1	12/10/1909	Water Beetles of Ireland	
Custom	insect - butterfly	Green-veined White (Pieris napi)	14	14/05/2019	Butterflies of Ireland	
Custom	insect - butterfly	Large White (Pieris brassicae)	3	10/06/2019	Butterflies of Ireland	
Custom	insect - butterfly	Meadow Brown (Maniola jurtina)	8	12/08/2019	Butterflies of Ireland	
Custom	insect - butterfly	Orange-tip (Anthocharis cardamines)	10	19/04/2020	Butterflies of Ireland	
Custom	insect - butterfly	Painted Lady (Vanessa cardui)	1	26/08/2019	Butterflies of Ireland	
Custom	insect - butterfly	Peacock (Inachis io)	8	26/08/2019	Butterflies of Ireland	
Custom	insect - butterfly	Red Admiral (Vanessa atalanta)	3	04/09/2020	Butterflies of Ireland	
Custom	insect - butterfly	Ringlet (Aphantopus hyperantus)	12	28/07/2019	Butterflies of Ireland	
Custom	insect - butterfly	Silver-washed Fritillary (Argynnis paphia)	1	31/12/1978	Distribution Atlas of Butterflies in Ireland 1979 (An Foras Forbartha)	
Custom	insect - butterfly	Small Heath (Coenonympha pamphilus)	2	31/12/1977	Distribution Atlas of Butterflies in Ireland 1979 (An Foras Forbartha)	Threatened Species: Near threatened
Custom	insect - butterfly	Small Tortoiseshell (Aglais urticae)	6	09/09/2020	Butterflies of Ireland	

Custom	insect - butterfly	Small White (Pieris rapae)	7	05/08/2020	Butterflies of Ireland	
Custom	insect - butterfly	Speckled Wood (Pararge aegeria)	14	29/09/2019	Butterflies of Ireland	
Custom	insect - butterfly	Wall (Lasiommata megera)	1	31/12/1978	Distribution Atlas of Butterflies in Ireland 1979 (An Foras Forbartha)	Threatened Species: Endangered
Custom	Insect - butterfly	Wood White (Leptidea sp.)	3	31/12/1977	Distribution Atlas of Butterflies in Ireland 1979 (An Foras Forbartha)	
Custom	insect - dragonfly (Odonata)	Azure Damselfly (Coenagrion puella)	2	05/06/2000	Dragonfly Ireland	
Custom	insect - dragonfly (Odonata)	Banded Demoiselle (Calopteryx splendens)	1	31/08/2020	Dragonfly Ireland 2019 to 2024	
Custom	insect - dragonfly (Odonata)	Blue-tailed Damselfly (Ischnura elegans)	3	26/08/2019	Dragonfly Ireland 2019 to 2024	
Custom	insect - dragonfly (Odonata)	Brown Hawker (Aeshna grandis)	4	26/08/2019	Dragonfly Ireland 2019 to 2024	
Custom	insect - dragonfly (Odonata)	Common Blue Damselfly (Enallagma cyathigerum)	4	15/09/2020	Dragonfly Ireland 2019 to 2024	
Custom	insect - dragonfly (Odonata)	Common Darter (Sympetrum striolatum)	1	28/07/2019	Dragonfly Ireland 2019 to 2024	
Custom	insect - dragonfly (Odonata)	Large Red Damselfly (Pyrrhosoma nymphula)	1	08/06/1919	Dragonfly Ireland	
Custom	insect - dragonfly (Odonata)	Variable Damselfly (Coenagrion pulchellum)	4	05/06/2000	Dragonfly Ireland	
Custom	insect - earwig (Dermaptera)	Common Earwig (Forficula auricularia)	1	22/08/2005	Grasshoppers, Crickets and Allied Insects (Orthoptera) of Ireland	
Custom	insect - flea (Siphonaptera)	Rabbit Flea (Spilopsyllus cuniculi)	2	31/12/1996	Fleas (Siphonaptera) of Ireland	
Custom	insect - hymenopteran	Bombus (Bombus) terrestris	1	04/04/2017	Bees of Ireland	
Custom	insect - hymenopteran	Common Carder Bee (Bombus (Thoracombus) pascuorum)	1	09/05/2019	Bees of Ireland	
Custom	Insect - hymenopteran	Synopeas aceris	1	19/04/2012	Platygastridae (Hymenoptera) of Ireland	
Custom	Insect - hymenopteran	Synopeas rhanis	1	27/04/2011	Platygastridae (Hymenoptera) of Ireland	
Custom	insect - mayfly (Ephemeroptera)	Serratella ignita	1	03/07/2007	River Biologists' Database (EPA)	
Custom	insect - moth	Anthophila fabriciana	1	09/07/1999	Moths Ireland	
Custom	insect - moth	Brimstone Moth (Opisthograptis luteolata)	2	09/07/1999	Moths Ireland	
Custom	insect - moth	Brown House-moth (Hofmannophila pseudospretella)	1	09/07/1999	Moths Ireland	
Custom	insect - moth	Bryotropha domestica	1	09/07/1999	Moths Ireland	
Custom	insect - moth	Bryotropha terrella	1	09/07/1999	Moths Ireland	
Custom	insect - moth	Celypha lacunana	1	09/07/1999	Moths Ireland	
Custom	insect - moth	Common Carpet (Epirrhoe alternata)	1	09/07/1999	Moths Ireland	

Custom	insect - moth	Common Grass-veneer (Agriphila tristella)	2	10/08/2003	Moths Ireland	
Custom	insect - moth	Crinan Ear (Amphipoea crinanensis)	1	31/08/1911	Moths Ireland	
Custom	insect - moth	Death's-head Hawk-moth (Acherontia atropos)	1	31/12/1900	Moths Ireland	
Custom	insect - moth	Eucosma cana	1	09/07/1999	Moths Ireland	
Custom	insect - moth	Furness Dowd (Blastobasis adustella)	1	20/06/1971	Moths Ireland	
Custom	insect - moth	Garden Carpet (Xanthorhoe fluctuata)	1	21/08/2016	Moth Records of Ireland	
Custom	insect - moth	Garden Grass-veneer (Chrysoteuchia culmella)	1	09/07/1999	Moths Ireland	
Custom	insect - moth	Garden Pebble (Evergestis forficalis)	1	09/07/1999	Moths Ireland	
Custom	insect - moth	Green Carpet (Colostygia pectinataria)	1	21/08/2016	Moth Records of Ireland	
Custom	insect - moth	Least Yellow Underwing (Noctua interjecta)	1	21/08/2016	Moth Records of Ireland	
Custom	insect - moth	Little Grey (Dipleurina lacustrata)	1	09/07/1999	Moths Ireland	
Custom	insect - moth	Middle-barred Minor (Oligia fasciuncula)	1	09/07/1999	Moths Ireland	
Custom	insect - moth	Pseudococcyx posticana	2	26/04/1971	Moths Ireland	
Custom	insect - moth	Purple Clay (Diarsia brunnea)	1	09/07/1999	Moths Ireland	
Custom	insect - moth	Red-barred Tortrix (Ditula angustiorana)	2	12/05/1971	Moths Ireland	
Custom	insect - moth	Riband Wave (Idaea aversata)	1	09/07/1999	Moths Ireland	
Custom	insect - moth	Round-winged Muslin (Thumatha senex)	1	09/07/1999	Moths Ireland	
Custom	insect - moth	Shaded Broad-bar (Scotopteryx chenopodiata)	1	10/08/2003	Moths Ireland	
Custom	insect - moth	Small China-mark (Cataclysta lemnata)	1	09/07/1999	Moths Ireland	
Custom	insect - moth	Smoky Wainscot (Mythimna impura)	1	21/08/2016	Moth Records of Ireland	
Custom	insect - moth	Snout (Hypena proboscidalis)	1	09/07/1999	Moths Ireland	
Custom	insect - moth	Spectacle (Abrostola tripartita)	1	09/07/1999	Moths Ireland	
Custom	insect - moth	Stenoptilia bipunctidactyla	5	31/12/1903	Microlepidoptera collections (National Museum of Ireland)	
Custom	insect - moth	Straw Grass-veneer (Agriphila straminella)	2	10/08/2003	Moths Ireland	
Custom	insect - moth	Swallow-tailed Moth (Ourapteryx sambucaria)	1	09/07/1999	Moths Ireland	
Custom	insect - moth	Twin-spotted Quaker (Orthosia munda)	1	30/04/1894	Moths Ireland	
Custom	insect - moth	Udea lutealis	1	10/08/2003	Moths Ireland	
Custom	insect - orthopteran	Common Green Grasshopper (Omocestus viridulus)	2	21/07/2011	Grasshoppers, Crickets and Allied Insects (Orthoptera) of Ireland	
Custom	insect - true bug (Hemiptera)	Cicadella viridis	1	21/08/2016	General Biodiversity Records from Ireland	

Custom	insect - true bug (Hemiptera)	Common Backswimmer (Notonecta (Notonecta) glauca)	1	21/08/2016	True Bugs (Heteroptera) of Ireland	
Custom	insect - true bug (Hemiptera)	Common Green Capsid (Lygocoris (Lygocoris) pabulinus)	1	31/12/1911	True Bugs (Heteroptera) of Ireland	
Custom	insect - true bug (Hemiptera)	Green Shieldbug (Palomena prasina)	1	21/08/2016	True Bugs (Heteroptera) of Ireland	
Custom	insect - true bug (Hemiptera)	Sloe Shieldbug (Dolycoris baccarum)	1	21/08/2016	True Bugs (Heteroptera) of Ireland	
Custom	insect - true bug (Hemiptera)	Sphagnum Bug (Hebrus (Hebrusella) ruficeps)	1	12/10/1900	True Bugs (Heteroptera) of Ireland	
Custom	insect - true fly (Diptera)	Eristalis arbustorum	5	14/09/2013	Hoverflies (Syrphidae) of Ireland	
Custom	insect - true fly (Diptera)	Eristalis horticola	1	23/08/2012	Hoverflies (Syrphidae) of Ireland	
Custom	insect - true fly (Diptera)	Eristalis pertinax	2	14/09/2013	Hoverflies (Syrphidae) of Ireland	
Custom	insect - true fly (Diptera)	Eristalis tenax	3	14/09/2013	Hoverflies (Syrphidae) of Ireland	
Custom	insect - true fly (Diptera)	Helophilus hybridus	2	14/09/2013	Hoverflies (Syrphidae) of Ireland	
Custom	insect - true fly (Diptera)	Helophilus pendulus	5	14/09/2013	Hoverflies (Syrphidae) of Ireland	
Custom	insect - true fly (Diptera)	Marmalade Hoverfly (Episyrphus balteatus)	1	14/09/2013	Hoverflies (Syrphidae) of Ireland	
Custom	insect - true fly (Diptera)	Melanostoma scalare	1	14/09/2013	Hoverflies (Syrphidae) of Ireland	
Custom	insect - true fly (Diptera)	Neoascia podagrica	3	14/09/2013	Hoverflies (Syrphidae) of Ireland	
Custom	insect - true fly (Diptera)	Platycheirus albimanus	2	14/09/2013	Hoverflies (Syrphidae) of Ireland	
Custom	insect - true fly (Diptera)	Platycheirus granditarsus	1	25/09/1971	Hoverflies (Syrphidae) of Ireland	
Custom	insect - true fly (Diptera)	Rhingia campestris	3	14/09/2013	Hoverflies (Syrphidae) of Ireland	
Custom	insect - true fly (Diptera)	Sericomyia silentis	1	14/09/2013	Hoverflies (Syrphidae) of Ireland	
Custom	insect - true fly (Diptera)	Syrphus vitripennis	1	24/09/1971	Hoverflies (Syrphidae) of Ireland	
Custom	insect - true fly (Diptera)	Zodion cinereum	1	02/08/1958	Conopidae of Ireland	
Custom	liverwort	Anomalous Flapwort (Mylia anomala)	1	30/06/1961	Bryophytes of Ireland	Threatened Species: Least concern
Custom	liverwort	Bifid Crestwort (Lophocolea bidentata)	4	31/08/2007	Bryophytes of Ireland	Threatened Species: Least concern
Custom	liverwort	Blueish Veilwort (Metzgeria violacea)	2	31/08/2007	Bryophytes of Ireland	Threatened Species: Least concern
Custom	liverwort	Bog Pouchwort (Calypogeia sphagnicola)	2	30/06/1961	Bryophytes of Ireland	Threatened Species: Least concern

Custom	liverwort	Bog-moss Flapwort (Odontoschisma sphagni)	1	31/07/1900	Bryophytes of Ireland	Threatened Species: Least concern
Custom	liverwort	Chiloscyphus polyanthos	2	31/08/2007	Bryophytes of Ireland	Threatened Species: Least concern
Custom	liverwort	Cliff Scalewort (Porella cordaeana)	1	31/12/1904	Bryophytes of Ireland	Threatened Species: Near threatened
Custom	liverwort	Common Frillwort (Fossombronia pusilla)	1	31/08/2007	Bryophytes of Ireland	Threatened Species: Least concern
Custom	liverwort	Common Liverwort (Marchantia polymorpha)	2	31/12/1980	Bryophytes of Ireland	
Custom	liverwort	Common Pouchwort (Calypogeia fissa)	2	15/05/1965	Bryophytes of Ireland	Threatened Species: Least concern
Custom	liverwort	Crenulated Flapwort (Jungermannia gracillima)	1	15/05/1965	Bryophytes of Ireland	Threatened Species: Least concern
Custom	liverwort	Dilated Scalewort (Frullania dilatata)	4	31/08/2007	Bryophytes of Ireland	Threatened Species: Least concern
Custom	liverwort	Endive Pellia (Pellia endiviifolia)	3	31/08/2007	Bryophytes of Ireland	Threatened Species: Least concern
Custom	liverwort	Even Scalewort (Radula complanata)	4	31/08/2007	Bryophytes of Ireland	Threatened Species: Least concern
Custom	liverwort	Forked Veilwort (Metzgeria furcata)	1	31/08/2007	Bryophytes of Ireland	Threatened Species: Least concern
Custom	liverwort	Greasewort (Aneura pinguis)	2	31/08/2007	Bryophytes of Ireland	Threatened Species: Least concern
Custom	liverwort	Greater Featherwort (Plagiochila asplenioides)	1	31/08/2007	Bryophytes of Ireland	Threatened Species: Least concern
Custom	liverwort	Jagged Notchwort (Lophozia incisa)	1	30/06/1961	Bryophytes of Ireland	Threatened Species: Least concern
Custom	liverwort	Lesser Featherwort (Plagiochila porelloides)	2	30/06/1961	Bryophytes of Ireland	Threatened Species: Least concern
Custom	liverwort	Marchantia polymorpha subsp. polymorpha	2	31/08/2007	Bryophytes of Ireland	Threatened Species: Least concern
Custom	liverwort	Marchantia polymorpha subsp. ruderalis	3	07/07/2012	Bryophytes of Ireland	Threatened Species: Least concern
Custom	liverwort	Notched Pouchwort (Calypogeia arguta)	3	15/05/1965	Bryophytes of Ireland	Threatened Species: Least concern
Custom	liverwort	Overleaf Pellia (Pellia epiphylla)	1	15/05/1965	Bryophytes of Ireland	Threatened Species: Least concern
Custom	liverwort	Pinnate Scalewort (Porella pinnata)	2	31/08/2007	Bryophytes of Ireland	Threatened Species: Least concern
Custom	liverwort	St Winifrid's Other Moss (Chiloscyphus pallescens)	1	31/12/1980	Bryophytes of Ireland	Threatened Species: Least concern
Custom	liverwort	Two-horned Pincerwort (Cephalozia bicuspidata)	2	15/05/1965	Bryophytes of Ireland	Threatened Species: Least concern
Custom	liverwort	Western Pouncewort (Lejeunea lamacerina)	1	31/08/2007	Bryophytes of Ireland	Threatened Species: Least concern
Custom	liverwort	White Earwort (Diplophyllum albicans)	1	30/06/1961	Bryophytes of Ireland	Threatened Species: Least concern
Custom	millipede	Brachyiulus pusillus	1	30/04/1979	Millipedes of Ireland	

Custom	millipede	Common Flat-backed Millipede (Polydesmus angustus)	2	02/10/1995	Millipedes of Ireland	
Custom	millipede	Cylindroiulus britannicus	1	30/04/1979	Millipedes of Ireland	
Custom	millipede	Eyed Flat-backed Millipede (Nanogona polydesmoides)	1	02/10/1995	Millipedes of Ireland	
Custom	millipede	Ophyiulus pilosus	1	02/10/1995	Millipedes of Ireland	
Custom	millipede	Polydesmus coriaceus	1	30/04/1979	Millipedes of Ireland	
Custom	millipede	White-legged Snake Millipede (Tachypodoiulus niger)	2	02/10/1995	Millipedes of Ireland	
Custom	mollusc	Ancylus fluviatilis	3	19/09/2007	River Biologists' Database (EPA)	
Custom	mollusc	Arion (Arion)	2	09/04/1982	All Ireland Non-Marine Molluscan Database	
Custom	mollusc	Arion (Carinarion)	2	31/12/1913	All Ireland Non-Marine Molluscan Database	
Custom	mollusc	Arion (Kobeltia)	2	31/12/1913	All Ireland Non-Marine Molluscan Database	
Custom	mollusc	Brown Lipped Snail (Cepaea (Cepaea) nemoralis)	3	09/04/1982	All Ireland Non-Marine Molluscan Database	
Custom	mollusc	Carychium	2	31/12/1913	All Ireland Non-Marine Molluscan Database	
Custom	mollusc	Cellar Snail (Oxychilus (Oxychilus) cellarius)	2	31/12/1913	All Ireland Non-Marine Molluscan Database	
Custom	mollusc	Clear Glass Snail (Aegopinella pura)	3	09/04/1982	All Ireland Non-Marine Molluscan Database	
Custom	mollusc	Cochlicopa	3	31/12/1913	All Ireland Non-Marine Molluscan Database	
Custom	mollusc	Columella aspera	1	31/12/1913	All Ireland Non-Marine Molluscan Database	
Custom	mollusc	Common Bithynia (Bithynia (Bithynia) tentaculata)	3	18/06/1969	All Ireland Non-Marine Molluscan Database	
Custom	mollusc	Common Bladder Snail (Physa fontinalis)	2	18/06/1969	All Ireland Non-Marine Molluscan Database	
Custom	mollusc	Common Chrysalis Snail (Lauria (Lauria) cylindracea)	3	09/04/1982	All Ireland Non-Marine Molluscan Database	
Custom	mollusc	Common Whorl Snail (Vertigo (Vertigo) pygmaea)	1	31/12/1913	All Ireland Non-Marine Molluscan Database	Threatened Species: Near threatened
Custom	mollusc	Dusky Slug (Arion (Mesarion) subfuscus)	2	31/12/1913	All Ireland Non-Marine Molluscan Database	
Custom	mollusc	Dwarf Pond Snail (Galba (Galba) truncatula)	1	31/12/1913	All Ireland Non-Marine Molluscan Database	
Custom	mollusc	Dwarf Snail (Punctum (Punctum) pygmaeum)	1	31/12/1913	All Ireland Non-Marine Molluscan Database	
Custom	mollusc	Eccentric Grass Snail (Vallonia cf. excentrica)	2	31/12/1913	All Ireland Non-Marine Molluscan Database	
Custom	mollusc	English Chrysalis Snail (Leiostyla (Leiostyla) anglica)	2	18/06/1969	All Ireland Non-Marine Molluscan Database	Threatened Species: Vulnerable
Custom	mollusc	Euconulus	1	31/12/1913	All Ireland Non-Marine Molluscan Database	

Custom	mollusc	Field Slug (Deroceras (Deroceras) agreste)	1	31/12/1913	All Ireland Non-Marine Molluscan Database	Threatened Species: Data deficient
Custom	mollusc	Flat Valve Snail (Valvata (Valvata) cristata)	1	31/12/1913	All Ireland Non-Marine Molluscan Database	
Custom	mollusc	Garlic Snail (Oxychilus (Oxychilus) alliarius)	3	09/04/1982	All Ireland Non-Marine Molluscan Database	
Custom	mollusc	Glossy Glass Snail (Oxychilus (Oxychilus) navarricus subsp. helveticus)	1	31/12/1910	All Ireland Non-Marine Molluscan Database	
Custom	mollusc	Great Pond Snail (Lymnaea (Lymnaea) stagnalis)	3	18/06/1969	All Ireland Non-Marine Molluscan Database	
Custom	mollusc	Hairy Snail (Trochulus (Trochulus) hispidus)	2	31/12/1913	All Ireland Non-Marine Molluscan Database	
Custom	mollusc	Hedgehog Slug (Arion (Kobeltia) intermedius)	2	31/12/1913	All Ireland Non-Marine Molluscan Database	
Custom	mollusc	Horny Orb Mussel (Sphaerium corneum)	4	18/06/1969	All Ireland Non-Marine Molluscan Database	
Custom	mollusc	Keeled Ramshorn (Planorbis carinatus)	3	18/06/1969	All Ireland Non-Marine Molluscan Database	
Custom	mollusc	Keeled Slug (Tandonia sowerbyi)	1	31/12/1913	All Ireland Non-Marine Molluscan Database	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> Medium Impact Invasive Species
Custom	mollusc	Lake Limpet (Acroloxus lacustris)	1	18/06/1969	All Ireland Non-Marine Molluscan Database	
Custom	mollusc	Large Amber Snail (Succinea putris)	1	31/12/1910	All Ireland Non-Marine Molluscan Database	
Custom	mollusc	Least Slippery Snail (Cochlicopa cf. lubricella)	1	09/04/1982	All Ireland Non-Marine Molluscan Database	
Custom	mollusc	Lymnaea (Stagnicola)	1	31/12/1913	All Ireland Non-Marine Molluscan Database	
Custom	mollusc	Lymnaea (Stagnicola) fuscus	1	18/06/1969	All Ireland Non-Marine Molluscan Database	
Custom	mollusc	Marsh Slug (Deroceras (Deroceras) laeve)	1	31/12/1913	All Ireland Non-Marine Molluscan Database	
Custom	mollusc	Marsh Whorl Snail (Vertigo (Vertigo) antivertigo)	1	31/12/1913	All Ireland Non-Marine Molluscan Database	Threatened Species: Vulnerable
Custom	mollusc	Milky Crystal Snail (Vitrea contracta)	1	09/04/1982	All Ireland Non-Marine Molluscan Database	
Custom	mollusc	Netted Slug (Deroceras (Deroceras) reticulatum)	2	09/04/1982	All Ireland Non-Marine Molluscan Database	
Custom	mollusc	Pellucid Glass Snail (Vitrina pellucida)	2	31/12/1913	All Ireland Non-Marine Molluscan Database	
Custom	mollusc	Pfeiffer's Amber Snail (Oxyloma (Oxyloma) elegans)	2	31/12/1913	All Ireland Non-Marine Molluscan Database	
Custom	mollusc	Plated Snail (Spermodea lamellata)	1	31/12/1913	All Ireland Non-Marine Molluscan Database	Threatened Species: Endangered

Custom	mollusc	Porous Pea Mussel (Pisidium obtusale)	1	31/12/1913	All Ireland Non-Marine Molluscan Database	
Custom	mollusc	Prickly Snail (Acanthinula aculeata)	1	31/12/1913	All Ireland Non-Marine Molluscan Database	Threatened Species: Near threatened
Custom	mollusc	Rayed Glass Snail (Nesovitrea (Perpolita) hammonis)	2	31/12/1913	All Ireland Non-Marine Molluscan Database	
Custom	mollusc	Rounded Snail (Discus (Gonyodiscus) rotundatus)	3	09/04/1982	All Ireland Non-Marine Molluscan Database	
Custom	mollusc	Shiny Glass Snail (Zonitoides (Zonitoides) nitidus)	3	31/12/1913	All Ireland Non-Marine Molluscan Database	
Custom	mollusc	Short-ended Pea Mussel (Pisidium subtruncatum)	2	31/12/1913	All Ireland Non-Marine Molluscan Database	
Custom	mollusc	Smooth Glass Snail (Aegopinella nitidula)	3	09/04/1982	All Ireland Non-Marine Molluscan Database	
Custom	mollusc	Smooth Jet Slug (Milax gagates)	1	31/12/1913	All Ireland Non-Marine Molluscan Database	
Custom	mollusc	Strawberry Snail (Trochulus (Trochulus) striolatus)	3	09/04/1982	All Ireland Non-Marine Molluscan Database	
Custom	mollusc	Striated Whorl Snail (Vertigo (Vertigo) substriata)	2	31/12/1913	All Ireland Non-Marine Molluscan Database	Threatened Species: Near threatened
Custom	mollusc	Swan Mussel (Anodonta (Anodonta) cygnea)	1	18/06/1969	All Ireland Non-Marine Molluscan Database	Threatened Species: Vulnerable
Custom	mollusc	Tree Slug (Lehmannia marginata)	1	31/12/1913	All Ireland Non-Marine Molluscan Database	
Custom	mollusc	Tree Snail (Balea (Balea) perversa)	2	09/04/1982	All Ireland Non-Marine Molluscan Database	Threatened Species: Vulnerable
Custom	mollusc	Twisted Ramshorn (Bathyomphalus contortus)	1	31/12/1910	All Ireland Non-Marine Molluscan Database	
Custom	mollusc	Two-toothed Door Snail (Clausilia (Clausilia) bidentata)	3	09/04/1982	All Ireland Non-Marine Molluscan Database	
Custom	mollusc	Valve Snail (Valvata (Cincinna) piscinalis)	3	18/06/1969	All Ireland Non-Marine Molluscan Database	
Custom	mollusc	Vitrea	2	31/12/1913	All Ireland Non-Marine Molluscan Database	
Custom	mollusc	Wandering Snail (Radix balthica)	3	31/12/1913	All Ireland Non-Marine Molluscan Database	
Custom	mollusc	White Ramshorn (Gyraulus (Gyraulus) albus)	3	18/06/1969	All Ireland Non-Marine Molluscan Database	
Custom	mollusc	White-lipped Ramshorn (Anisus (Anisus) leucostoma)	1	31/12/1910	All Ireland Non-Marine Molluscan Database	
Custom	mollusc	Yellow Slug (Limacus flavus)	1	31/12/1913	All Ireland Non-Marine Molluscan Database	
Custom	moss	Aloe Haircap (Pogonatum aloides)	3	15/05/1965	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Amblystegium serpens var. serpens	1	31/08/2007	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Awl-leaved Earth-moss (Pleuridium subulatum)	3	31/08/2007	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Barbula sardoa	1	15/05/1965	Bryophytes of Ireland	

Custom	moss	Big Shaggy-moss (Rhytidiadelphus triquetrus)	2	31/08/2007	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Bird's-claw Beard-moss (Barbula unguiculata)	4	07/07/2012	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Blunt Feather-moss (Homalia trichomanoides)	2	31/05/1965	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Bog Groove-moss (Aulacomnium palustre)	2	30/06/1961	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Broom Fork-moss (Dicranum scoparium)	2	15/05/1965	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Brown Ditrichum (Ditrichum pusillum)	1	31/12/1912	Bryophytes of Ireland	Threatened Species: Data deficient
Custom	moss	Bruch's Pincushion (Ulota bruchii)	1	31/08/2007	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Bryum dichotomum	3	31/08/2007	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Cape Thread-moss (Orthodontium lineare)	1	31/08/2007	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Capillary Thread-moss (Bryum capillare)	3	31/08/2007	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Common Bladder-moss (Physcomitrium pyriforme)	1	31/08/2007	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Common Cord-moss (Funaria hygrometrica)	3	07/07/2012	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Common Feather-moss (Eurhynchium praelongum)	4	31/08/2007	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Common Haircap (Polytrichum commune)	1	30/06/1961	Bryophytes of Ireland	
Custom	moss	Common Pocket-moss (Fissidens taxifolius)	2	15/05/1965	Bryophytes of Ireland	
Custom	moss	Common Pottia (Tortula truncata)	1	31/08/2007	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Common Smoothcap (Atrichum undulatum)	4	31/08/2007	Bryophytes of Ireland	
Custom	moss	Common Striated Feather-moss (Eurhynchium striatum)	4	31/08/2007	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Common Tamarisk-moss (Thuidium tamariscinum)	4	31/08/2007	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Crisped Pincushion (Ulota crispa)	3	15/05/1965	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Ctenidium molluscum var. molluscum	1	15/05/1965	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Curly Crisp-moss (Trichostomum crispulum)	1	15/05/1965	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Cylindric Beard-moss (Didymodon insulanus)	1	31/08/2007	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Cypress-leaved Plait-moss (Hypnum cupressiforme)	4	31/08/2007	Bryophytes of Ireland	

Custom	moss	Dotted Thyme-moss (Rhizomnium punctatum)	1	15/05/1965	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Drab Brook-moss (Hygrohypnum luridum)	1	31/12/1910	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Drepanocladus revolvens sensu lato	1	31/12/1907	Bryophytes of Ireland	
Custom	moss	Dwarf Feather-moss (Eurhynchium pumilum)	1	15/05/1965	Bryophytes of Ireland	
Custom	moss	Dwarf Neckera (Neckera pumila)	1	31/08/2007	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Elegant Bristle-moss (Orthotrichum pulchellum)	1	31/08/2007	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Ephemerum serratum var. minutissimum	1	31/08/2007	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Fallacious Beard-moss (Didymodon fallax)	1	31/08/2007	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Feathery Bog-moss (Sphagnum cuspidatum)	1	31/12/1907	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Felted Thyme-moss (Rhizomnium pseudopunctatum)	1	31/12/1912	Bryophytes of Ireland	Threatened Species: Near threatened
Custom	moss	Fern-leaved Hook-moss (Cratoneuron filicinum)	3	07/07/2012	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Field Forklet-moss (Dicranella staphylina)	1	31/08/2007	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Fissidens bryoides	2	31/08/2007	Bryophytes of Ireland	
Custom	moss	Fissidens taxifolius var. taxifolius	1	31/08/2007	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Fissidens viridulus sensu lato	1	15/05/1965	Bryophytes of Ireland	
Custom	moss	Flat Neckera (Neckera complanata)	3	31/08/2007	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Floating Hook-moss (Warnstorfia fluitans)	1	30/06/1961	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Fountain Apple-moss (Philonotis fontana)	1	15/05/1965	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Fountain Feather-moss (Amblystegium tenax)	2	31/08/2007	Bryophytes of Ireland	Threatened Species: Near threatened || Threatened Species: Least concern
Custom	moss	Fox-tail Feather-moss (Thamnobryum alopecurum)	1	31/08/2007	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Fringed Bog-moss (Sphagnum fimbriatum)	1	30/06/1961	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Frizzled Pincushion (Ulota phyllantha)	2	31/08/2007	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Giant Spear-moss (Calliergon giganteum)	1	31/12/1907	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Glittering Wood-moss (Hylocomium splendens)	1	15/05/1965	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Greater Water-moss (Fontinalis antipyretica var. antipyretica)	1	31/08/2007	Bryophytes of Ireland	Threatened Species: Least concern

Custom	moss	Green-tufted Stubble-moss (Weissia controversa)	1	15/05/1965	Bryophytes of Ireland	
Custom	moss	Grey-cushioned Grimmia (Grimmia pulvinata)	2	31/08/2007	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Hair-pointed Feather-moss (Cirriphyllum piliferum)	2	31/08/2007	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Hart's-tongue Thyme-moss (Plagiomnium undulatum)	4	31/08/2007	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Heart-leaved Spear-moss (Calliergon cordifolium)	1	30/06/1961	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Heath Plait-moss (Hypnum jutlandicum)	2	30/06/1961	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Heath Star Moss (Campylopus introflexus)	1	31/08/2007	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Hornschuch's Beard-moss (Pseudocrossidium hornschuchianum)	1	31/08/2007	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Hutchins' Pincushion (Ulota hutchinsiae)	1	31/12/1912	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Hypnum cupressiforme sensu lato	3	15/05/1965	Bryophytes of Ireland	
Custom	moss	Intermediate Hook-moss (Drepanocladus cossonii)	1	31/12/1907	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Isothecium myosuroides var. myosuroides	2	31/08/2007	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Juicy Silk-moss (Plagiothecium succulentum)	1	15/05/1965	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Juniper Haircap (Polytrichum juniperinum)	1	30/06/1961	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Larger Mouse-tail Moss (Isothecium alopecuroides)	2	15/05/1965	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Lateral Cryphaea (Cryphaea heteromalla)	3	31/08/2007	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Lesser Bird's-claw Beard-moss (Barbula convoluta)	4	07/07/2012	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Lesser Yoke-moss (Zygodon conoideus)	1	31/08/2007	Bryophytes of Ireland	
Custom	moss	Lindberg's Plait-moss (Hypnum lindbergii)	3	15/05/1965	Bryophytes of Ireland	
Custom	moss	Little Shaggy-moss (Rhytidiadelphus loreus)	1	30/06/1961	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Long-beaked Thyme-moss (Plagiomnium rostratum)	1	30/06/1961	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Long-beaked Water Feather-moss (Rhynchostegium riparioides)	1	31/08/2007	Bryophytes of Ireland	
Custom	moss	Long-shanked Pincushion (Ptychomitrium polyphyllum)	1	30/06/1961	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Lyell's Bristle-moss (Orthotrichum lyellii)	1	31/12/1907	Bryophytes of Ireland	Threatened Species: Least concern

Custom	moss	Marsh Forklet-moss (Dicranella palustris)	1	30/06/1961	Bryophytes of Ireland	
Custom	moss	Matted Feather-moss (Sciuro-hypnum populeum)	2	31/08/2007	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Neat Feather-moss (Scleropodium purum)	4	31/08/2007	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Pale Glaucous Thread-moss (Pohlia wahlenbergii)	2	15/05/1965	Bryophytes of Ireland	
Custom	moss	Pale Thread-moss (Bryum pallens)	1	31/08/2007	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Palustriella commutata var. commutata	1	31/12/1910	Bryophytes of Ireland	
Custom	moss	Pea Bryum (Bryum ruderale)	2	31/08/2007	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Pointed Spear-moss (Calliergonella cuspidata)	5	07/07/2012	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Purple-stalked Pocket-moss (Fissidens osmundoides)	1	31/12/1907	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Racomitrium heterostichum sensu lato	1	30/06/1961	Bryophytes of Ireland	
Custom	moss	Red Beard-moss (Bryoerythrophyllum recurvirostrum)	1	15/05/1965	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Redshank (Ceratodon purpureus)	3	31/08/2007	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Red-stemmed Feather-moss (Pleurozium schreberi)	2	30/06/1961	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Revolute Beard-moss (Pseudocrossidium revolutum)	1	15/05/1965	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Rigid Beard-moss (Didymodon rigidulus)	1	31/08/2007	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	River Feather-moss (Brachythecium rivulare)	1	15/05/1965	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Rock Pocket-moss (Fissidens dubius)	1	15/05/1965	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Rough-stalked Feather-moss (Brachythecium rutabulum)	3	31/08/2007	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Rufous Beard-moss (Bryoerythrophyllum ferruginascens)	2	31/08/2007	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Rusty Bog-moss (Sphagnum fuscum)	3	31/12/1900	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Schistidium apocarpum sensu lato	2	15/05/1965	Bryophytes of Ireland	
Custom	moss	Schreber's Forklet-moss (Dicranella schreberiana)	3	31/08/2007	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Sessile Grimmia (Schistidium apocarpum)	1	31/08/2007	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Sickle-leaved Hook-moss (Sanionia uncinata)	2	30/06/1961	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Silky Forklet-moss (Dicranella heteromalla)	1	30/06/1961	Bryophytes of Ireland	Threatened Species: Least concern

Custom	moss	Silky Wall Feather-moss (Homalothecium sericeum)	1	15/05/1965	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Silver-moss (Bryum argenteum)	4	07/07/2012	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Slender Pocket-moss (Fissidens exilis)	3	31/12/1965	Bryophytes of Ireland	Threatened Species: Vulnerable
Custom	moss	Spiky Bog-moss (Sphagnum squarrosum)	1	30/06/1961	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Springy Turf-moss (Rhytidiadelphus squarrosus)	4	31/08/2007	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Supine Plait-moss (Hypnum cupressiforme var. resupinatum)	3	31/08/2007	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Swan's-neck Thyme-moss (Mnium hornum)	1	30/06/1961	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Swartz's Feather-moss (Oxyrrhynchium hians)	2	31/08/2007	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Tall Thyme-moss (Plagiomnium elatum)	1	31/12/1980	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Taper-leaved Earth-moss (Pleuridium acuminatum)	1	15/05/1965	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Thick-nerved Apple-moss (Philonotis calcarea)	1	31/12/1912	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Transparent Fork-moss (Dichodontium pellucidum)	1	30/06/1961	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Tree-moss (Climacium dendroides)	1	30/06/1961	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Urn Haircap (Pogonatum urnigerum)	1	30/06/1961	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Variable Forklet-moss (Dicranella varia)	2	07/07/2012	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Wall Screw-moss (Tortula muralis)	3	07/07/2012	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Wall Thread-moss (Bryum radiculosum)	1	31/12/1907	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Wood Bristle-moss (Orthotrichum affine)	1	31/08/2007	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Woolly Fringe-moss (Racomitrium lanuginosum)	1	30/06/1961	Bryophytes of Ireland	Threatened Species: Least concern
Custom	moss	Zygodon viridissimus var. viridissimus	2	15/05/1965	Bryophytes of Ireland	Threatened Species: Least concern
Custom	slime mould	Trichia varia	1	18/10/2003	General Biodiversity Records from Ireland	
Custom	spider (Araneae)	Araniella cucurbitina sensu lato	1	21/08/2016	Citizen Science Spider Records for Ireland	
Custom	spider (Araneae)	Metellina segmentata	1	21/08/2016	Citizen Science Spider Records for Ireland	
Custom	spider (Araneae)	Pachygnatha clercki	1	21/08/2016	Citizen Science Spider Records for Ireland	

Custom	spider (Araneae)	Xysticus cristatus	1	21/08/2016	Citizen Science Spider Records for Ireland	
Custom	terrestrial mammal	American Mink (Mustela vison)	1	05/09/2013	Atlas of Mammals in Ireland 2010-2015	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> High Impact Invasive Species || Invasive Species: Invasive Species >> Regulation S.I. 477 (Ireland)
Custom	terrestrial mammal	Daubenton's Bat (Myotis daubentonii)	1	01/09/2006	National Bat Database of Ireland	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts
Custom	terrestrial mammal	Eastern Grey Squirrel (Sciurus carolinensis)	8	31/12/2012	Irish Squirrel Survey 2012	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> High Impact Invasive Species || Invasive Species: Invasive Species >> EU Regulation No. 1143/2014 || Invasive Species: Invasive Species >> Regulation S.I. 477 (Ireland)
Custom	terrestrial mammal	Eurasian Badger (Meles meles)	30	31/12/2014	Badger Setts of Ireland Database	Protected Species: Wildlife Acts
Custom	terrestrial mammal	Eurasian Red Squirrel (Sciurus vulgaris)	12	05/10/2018	Mammals of Ireland 2016-2025	Protected Species: Wildlife Acts
Custom	terrestrial mammal	European Otter (Lutra lutra)	4	19/08/2014	Atlas of Mammals in Ireland 2010-2015	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex II || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts
Custom	terrestrial mammal	European Rabbit (Oryctolagus cuniculus)	13	15/02/2015	Atlas of Mammals in Ireland 2010-2015	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> Medium Impact Invasive Species

Custom	terrestrial mammal	Fallow Deer (Dama dama)	1	22/05/1990	Badger and Habitats Survey of Ireland	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> High Impact Invasive Species || Invasive Species: Invasive Species >> Regulation S.I. 477 (Ireland) || Protected Species: Wildlife Acts
Custom	terrestrial mammal	Feral Ferret (Mustela furo)	6	20/04/2007	National Feral Ferret (Mustela putoris furo) Database	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> High Impact Invasive Species
Custom	terrestrial mammal	Irish Hare (Lepus timidus subsp. hibernicus)	4	18/05/1992	Badger and Habitats Survey of Ireland	
Custom	terrestrial mammal	Irish Stoat (Mustela erminea subsp. hibernica)	1	31/12/1982	Mammal Recording Scheme 1970-1985 (An Foras Forbartha)	
Custom	terrestrial mammal	Lesser Noctule (Nyctalus leisleri)	3	20/06/2012	National Bat Database of Ireland	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts
Custom	terrestrial mammal	Pine Marten (Martes martes)	4	21/05/2018	Mammals of Ireland 2016-2025	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex V || Protected Species: Wildlife Acts
Custom	terrestrial mammal	Pipistrelle (Pipistrellus pipistrellus sensu lato)	1	20/06/2012	National Bat Database of Ireland	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts
Custom	terrestrial mammal	Red Fox (Vulpes vulpes)	2	10/04/2018	Mammals of Ireland 2016-2025	
Custom	terrestrial mammal	Soprano Pipistrelle (Pipistrellus pygmaeus)	2	20/06/2012	National Bat Database of Ireland	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts
Custom	terrestrial mammal	West European Hedgehog (Erinaceus europaeus)	6	31/12/1981	Mammal Recording Scheme 1970-1985 (An Foras Forbartha)	Protected Species: Wildlife Acts

Appendix

8b

Invasive Species Survey Report

OUTLINE INVASIVE SPECIES MANAGEMENT PLAN

Regeneration Scheme in Monaghan Town: Phase 1 South Dublin Street and Backlands

NI 2162 Monaghan Town:
South Dublin Street and
Backlands Ecology
OISMP
F01
15 August 2022

www.rpsgroup.com

Document Status

Version	Purpose of document	Authored by	Reviewed by	Approved by	Review date
F01	OISMP	S. O'Hara	S. Lowry	R. Holbeach	15/08/22

Approval for issue

S. Lowry	15/08/22

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Prepared by:

RPS Ireland Ltd (NI)

Samuel O'Hara
Senior Ecologist

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

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

Prepared for:

Monaghan County Council

Noel Finnegan
A/Senior Executive Engineer

Corporate Assets Department
Monaghan County Council

T 00353 47 30500
E nfinnegan@monaghancoco.ie

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1 INTRODUCTION

1.1 Introduction

RPS was commissioned by Monaghan County Council to produce an Outline Invasive Species Management Plan (OISMP) for lands at Monaghan Town Centre in association with the proposed Monaghan Town Regeneration Scheme Phase 1: South Dublin Street and Backlands.

1.2 Statement of Authority

The author, Samuel O'Hara, is a Senior Ecologist with RPS and holds a BSc (Hons) in Ecology and has over five years of experience in the field of ecology. Samuel has 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.

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 proposed project is an urban regeneration scheme which will involve the demolition of buildings/properties; the provision of new streets, roads, public areas, car parking, pedestrian and cycle facilities; the provision of new utility services; urban landscaping; and the provision of public realm and amenity facilities.

The proposed development works will take between 12 - 24 months to complete and will comprise the following works:

- The demolition of buildings and structures, including street frontage buildings No's 8-11 Dublin Street and associated outbuildings and structures; the building to the rear of No. 24 Dublin Street; partial removal of the rear section of the Northern Standard building fronting the Lower Courthouse car park; storage sheds, walls, and fencing
- Construction of structural masonry walls and new facades/side elevations to No's 7 and 12-13 Dublin Street
- Creation of new urban civic spaces, streets, junctions, pedestrian pavements, steps, and cycle routes
- Construction of new public realm comprising new surfaces, kerbing, street furniture, public street and feature lighting, soft landscape planting, cycle parking and signage
- Clearance, regrading and creation of two potential development areas with supporting embankments, hardcore surfacing and boundary fencing
- New boundary treatments comprising walls, railings and fencing
- Alterations to the existing car parking layouts within the Courthouse car park and Lower Courthouse car park, and a reduction in long stay parking spaces
- Upgrading and installation of new utility services, CCTV, and a new ESB sub-station

- All associated site development works.

1.4 Site Description

The site consists of 2.1 ha of urban lands bordered by further areas of urban development to the north, east, south and west, comprising Monaghan Town Centre. The site consists of a range of largely urban habitats including buildings, hardstanding, amenity grassland, scrub and recolonising vegetation. The invasive non-native species Japanese Knotweed *Fallopia japonica* was recorded within the site of the proposed project.

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.

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. Japanese knotweed is 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 JAPANESE KNOTWEED

An Extended Phase 1 Habitat Survey was conducted on the 14th February 2020 and 23rd June 2020 within the site of the proposed project. Japanese knotweed was the only invasive alien species recorded within the site.

Japanese knotweed is an invasive non-native species in Ireland originating from Japan and northern China. It is a perennial plant with vigorous growth and consists of dense stands with extensive underground root systems known as rhizomes. These rhizomes, which can grow up to 7m from the parent plant and 3m below the ground and are responsible for the spread of the plant. If left unchecked the plant can cause considerable damage to biodiversity, buildings, hard surfaces and infrastructure. Japanese knotweed does not spread from seed. It is entirely spread by the movement of plant material or the movement of contaminated soil containing fragments of rhizome.

Japanese knotweed was recorded at approximately six locations within the site. The stands of knotweed are of varying size and are largely scattered around the site. An additional stand of knotweed (JK07) lies outside of the site boundary but within proximity to the project. Table 2 below provides descriptive details of each stand of knotweed. Figure 1 illustrates the location of the Japanese knotweed on the site.

Table 2: Details of Japanese Knotweed Stands Recorded in Monaghan Town Centre

Site Reference	Grid Reference	Average Height of Stem (cm)	Vegetation Composition	Proximity to Water	Slope	Approximate Area (m^2)
JK01	267357, 333631	120	Other Species Present	No	No	10.2
JK02	267335, 333687	150	Other Species Present	No	No	160
JK03	267310, 333661	110	Other Species Present	No	No	22.5
JK04	267291, 333683	150	Other Species Present	No	No	30
JK05	267256, 333654	50	JK Only	No	No	18
JK06	267257, 333639	25	JK Only	No	No	4
JK07	267155, 333622	150	Other Species Present	No	Yes	140

4 OUTLINE MANAGEMENT PLAN

4.1 Responsibility

The OISMP has been drafted prior to the grant of planning permission or procurement of a Contractor. 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 eradication 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 excavation and removal; supervising decontamination procedures; 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 eradicate Japanese knotweed located on site prior to commencement of initial site preparation works and the main construction contract.

4.3 Management Options

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

- Excavation & Removal Off Site
- Excavation & Burial On Site
- Bund Method (excavation & stockpiling for future treatment)
- In-situ Herbicide Treatment (stem injection or folia application)
- Combined Method (combined treatment of digging & herbicide)

It is not an acceptable option to consider doing nothing. Given the timescales involved, the only feasible management options for JK01 – 06, located within the site boundary, is excavation and either removal off site to landfill or burial on site. JK07 located outside of the site boundary will not be subject to management through herbicide treatment or other method targeting above ground growth as the area is not owned by the council and is outside of their control. However, contamination zones, within 7m of the stand, remain relevant to proposed excavation works. The location of Japanese knotweed is illustrated in Figure 1.

4.3.1 Preventing Further Spread

- Immediate priority should be given to setting up a Contamination Zone around each stand of Japanese knotweed. The Contamination Zone should extended 7m 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 Japanese knotweed. No access should be allowed within the Contamination Zones.
- 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 Japanese knotweed. 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.

4.3.2 Option 1: Excavation, Cell Formation & Burial on Site

- JK01 - 06 will be treated with herbicide immediately prior to excavation using stem injection and/or 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 to treat the knotweed. 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 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 Japanese knotweed 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.
- Eradication works should avoid the use of machinery and vehicles with caterpillar tracks. 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.
- A Cell Formation Area will be identified and prepared prior to the excavation of all stands of Japanese knotweed. Cell formation will involve excavation of a pit to the require dimensions; installation of root barrier membrane to completely encapsulate the contaminated knotweed material; layering of sand to protect the membrane; insertion of contaminated knotweed 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 Japanese knotweed 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 knotweed stands should be excavated to the recommended minimum depth of 3m below ground level and within a perimeter of 7m 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 and will not be allowed to contaminate drains, ditches or watercourses.
- Care must be taken to ensure that all equipment used on site is cleaned and free from knotweed 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 Japanese knotweed eradication.
- The Contractor should provide method statements detailing the procedures for Japanese knotweed eradication including:
  - Method Statement for Application of Herbicide to Japanese Knotweed
  - Method Statement for Cell Formation
  - Method Statement for Excavation of Japanese Knotweed
  - Method Statement for Loading & Transporting Japanese Knotweed
- 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 Japanese knotweed if the root barrier membranes is incorrectly sealed or if the integrity of the membrane is breeched.

4.3.3 Option 2: Excavation & Removal Off-Site to Landfill

- Excavation and removal off-site to landfill should take place prior to the commencement of initial site preparation works and the main construction contract.
- JK01 – 06 should be treated with herbicide immediately prior to commencement of excavation using stem injection and/or folia application and left in-situ for a period of two weeks. Herbicide must be applied by a '*Suitable Qualified and Fully Trained Operative'*. Herbicide Records including details of herbicides used, dose rate, application rates and dates applied should be kept in Appendix I. It is

recommended that glyphosate is used to treat the knotweed. 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.

- All contractors, sub-contractors and site personnel working on site should first be briefed on the presence and location of Japanese knotweed on the site. They should receive a tool box talk in the identification of this invasive 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.
- Eradication works should avoid the use of machinery and vehicles with caterpillar tracks. 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.
- A haulage route, transfer site and decontamination area, protected with a root barrier membrane, will be set up and isolated by exclusion fencing and signs erected to indicate Japanese knotweed contamination. The route barrier membrane will be protected from damage by a 100 mm 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, transfer site and decontamination area will be sited in consultation with the ECoW.
- Where conditions allow knotweed stands should be excavated to the recommended minimum depth of 3m below ground level and within a perimeter of 7m from the knotweed 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.
- The excavated soil will be transferred directly into a tipper truck within the transfer site. The truck will be filled to a maximum of 20cm from the top and securely covered to prevent any loss of material during transportation. The truck will then proceed to the decontamination area prior to leaving the site for a licence waste management facility. The EM will be responsible for ensuring all waste transfer documentation is in place in accordance with relevant legislation. Waste records should be kept in Appendix II.
- 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 material must be disposed of along with the other contaminated material and will not be allowed to contaminate drains, ditches or watercourses.
- Care must be taken to ensure that all equipment used on site is cleaned and free from knotweed material before leaving the site to avoid committing an offence under the European Communities Regulations 2011.

- The Contractor should provide a site plan indicating the location haulage routes & decontamination areas and method statements detailing the procedures for Japanese knotweed eradication.
- The Contractor should provide method statements detailing the procedures for Japanese knotweed eradication including:
  - Method Statement for Application of Herbicide to Japanese Knotweed
  - Method Statement for Excavation of Japanese Knotweed
  - Method Statement for Loading & Transporting Japanese Knotweed
- The Contractor should liaise with the relevant authorities to ensure compliance with all legislation, licence and permit requirements.

4.3.4 Ongoing Management

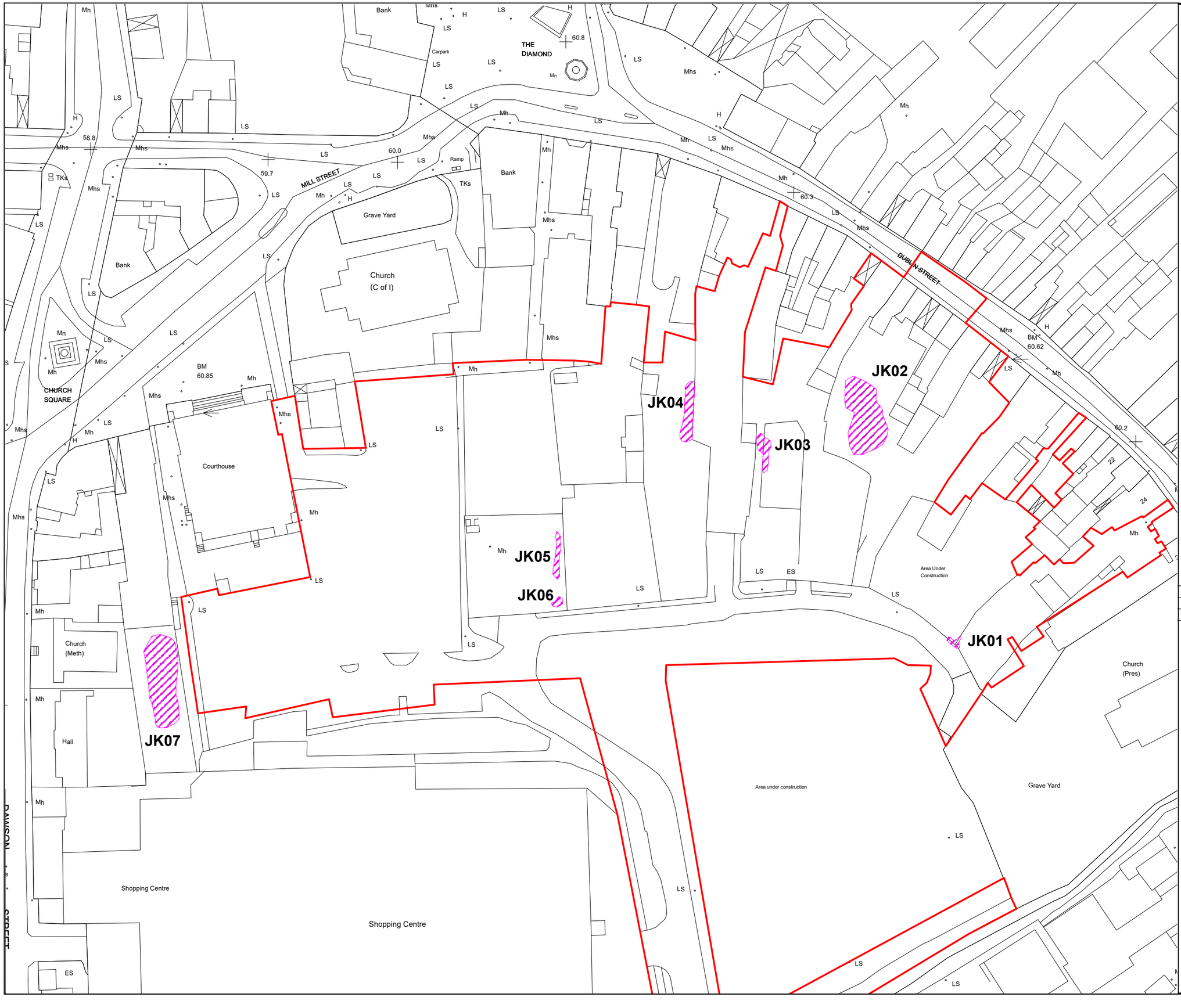
Maintenance of the proposed project will typically include the spraying or cutting of any proposed amenity grassland or vegetation to maintain proposed areas of hardstanding and public open space. As part of operational phase landscape management, periodic inspection for Japanese knotweed should be undertaken.

5 REFERENCES

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

Figures

Figure 1: Location of Invasive Non-Native Species



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3. This drawing should be read in conjunction with all other relevant drawings and specifications.

Site Boundary

Japanese Knotweed Stands

Rev	Description	By	Ckd	Date

Elmwood House, 74 Boucher Road,
BELFAST, BT12 6RZ
T: 028 9066 7914

Monaghan County Council

Monaghan Town Centre

Invasive Species Survey Plan

Figure Number 1

Status	Scale @ A3	Date
Preliminary	**1:1250**	**24.06.20**

RPS Project Number
NI2162

Revision
--

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N

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.

Appendix

8c

Ecological Survey for Bats

ECOLOGICAL SURVEY FOR BATS

Regeneration Scheme in Monaghan Town: Phase 1 South Dublin Street and Backlands



NI2162 Monaghan Town: South Dublin Street and Backlands- Ecology
ESB
F01
March 2021

www.rpsgroup.com

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S. Lowry	[S. Lowry.	25/03/21

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Prepared by:

RPS Ireland Ltd (NI)

Samuel O'Hara
Senior Ecologist

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

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

Prepared for:

Monaghan County Council

Noel Finnegan
A/Senior Executive Engineer

Corporate Assets Department
Monaghan County Council

T 00353 47 30500
E **nfinnegan@monaghancoco.ie**

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Figure 1: Ecological Survey for Bats

SUMMARY

RPS was commissioned by Monaghan County Council to undertake an Ecological Impact Assessment (EcIA) of lands within Monaghan town centre, in association with phase 1 of a proposed regeneration scheme for the town centre. This bat survey report includes the results of a desk study, preliminary appraisal of potential roost features for bats within the site and the findings of emergence/re-entry surveys conducted of a group of buildings within the site to inform the wider ecological impact assessment, as detailed within the Environmental Impact Assessment Report (EIAR) Chapter 8: Biodiversity to which this report is appended.

The proposed development is an urban regeneration scheme which will involve the demolition of buildings/properties, the provision of new streets, roads, public areas, car parking and pedestrian and cycle facilities; the provision of new utility services; urban landscaping and the provision of public realm and amenity facilities.

The site of the proposed project is approximately 2.6 ha in size and largely comprises hardstanding and buildings in addition to small areas of unmanaged semi-natural habitat including scrub, tall ruderal and recolonising hardstanding in addition to scattered trees and a number of hedgerows.

A number of buildings within the Application Site were noted to have potential to support roosting bats and will be lost as a result of the proposed development. These buildings were assessed as having low potential to support roosting bats and subject to emergence/re-entry survey. No roosting bats were recorded to be using these buildings.

No other opportunities for roosting bats were recorded during the surveys, with only low numbers of foraging bats recorded. On this basis and given the urban nature of the site, which is relatively disconnected from semi-natural habitats in the wider area it is not considered that the proposals would have potential to give rise to any significant impacts upon this group.

Should the proposals seek to deliver enhancement for bats it is recommended that bat boxes be incorporated into the scheme design.

1 INTRODUCTION

1.1 Introduction

RPS was commissioned by Monaghan County Council to undertake an Ecological Survey for Bats of lands within Monaghan town centre, in association with EIA for phase 1 of a proposed regeneration scheme for the town centre.

1.2 Ecological Survey for Bats

The Ecological Survey Report has been written in accordance with the Chartered Institute of Ecological and Environmental Management (CIEEM) *Guidelines for Ecological Report Writing* (CIEEM 2017). The aim of the report is to provide a description of the bat survey methods used; to provide the detailed results of bat surveys; and to provide an interpretation of the results. The Ecological Survey for Bats is used to inform the Ecological Impact Assessment (EcIA) set out within EIAR Chapter 8: Biodiversity to which this report is appended.

1.3 Legislation

All bats are protected species under the Wildlife Act 1976 and Wildlife (Amendment) Act 2000. Across Europe, they are further protected under the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention 1982), which, in relation to bats, exists to conserve all species and their habitats.

The Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention 1979, enacted 1983) was instigated to protect migrant species across all European boundaries. The Irish government has ratified both these conventions.

Also, the EC Directive on The Conservation of Natural habitats and of Wild Fauna and Flora (Habitats Directive 1992), seeks to protect rare species, including bats, and their habitats and requires that appropriate monitoring of populations be undertaken. All bat species are protected under Annex IV of the EU Habitats Directive, while the lesser horseshoe bat is listed under Annex II. Member states are required to designate Special Areas of Conservation for all species listed under Annex II in order to protect them.

1.4 Proposed Project

The proposed development is an urban regeneration scheme which will involve the demolition of buildings/properties, the provision of new streets, roads, public areas, car parking and pedestrian and cycle facilities; the provision of new utility services; urban landscaping and the provision of public realm and amenity facilities. Full description of the proposals is set out at Chapter 2 of the EIAR.

The location of the proposed project and the ecological study area are illustrated on Figure 8.1 of the EIAR.

2 METHODOLOGY

2.1 Statement of Authority

The author and ecological surveyor, Samuel O'Hara, is a Senior Ecologist with RPS and holds a BSc (Hons) in Ecology and has over five years of experience in the field of ecology. Samuel has 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 information prepared and provided is true and 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 2013). We confirm that the professional judgement expressed herein is the true and bona fide opinion of our professional ecologists.

2.2 Preliminary Ecological Appraisal for Bats

A Preliminary Ecological Appraisal for Bats (PEAB) comprising of a desk study and site walkover has been completed for the proposed project.

Bat Conservation Ireland (BCI) was consulted in order to identify existing bat records within 1 km of the site of the proposed project. The information gathered during consultation is third party controlled data purchased for the purposes of this report only. RPS cannot guarantee its accuracy and cannot be held liable for any inaccuracies.

The aim of the site walkover was to observe, assess and record the potential suitability of the site of the proposed project to support bat roosting habitat, commuting habitat and/or foraging habitat. Habitat features were classified as negligible, low, moderate or high in accordance with Bat Conservation Trust (BCT) Good Practice Guidelines (Collins 2016).

2.3 Preliminary Roost Assessment of Structures

A Preliminary Roost Assessment (PRA) of structures within the site was carried out during daylight hours in accordance with Collins (2016). An external and internal inspection survey of structures was undertaken from the ground to look for potential and actual bat entry/exit points, evidence of bat roosts and signs of bat related activity in order to determine the presence of bats or likely presence of bats. Presence of bats is indicated primarily by their signs, such as staining, feeding signs/prey remains, and droppings.

2.4 Preliminary Roost Assessment of Trees

A Preliminary Roost Assessment (PRA) of trees within the site was carried out during daylight hours in accordance with the Collins (2016). An external inspection of trees was undertaken from the ground to identify Potential Roost Features (PRFs) and to determine the presence of bats or likely presence of bats. PRFs that may be used by bats include hollows, cavities, rot holes, hazard beams, cracks or splits, loose bark, knot holes, man-made holes, cankers, butt-rot, double-leaders and partially detached ivy.

2.5 Emergence/Re-Entry Surveys of Structures

Emergence/re-entry survey of structures was carried out to watch, listen and records bats exiting or entering potential roosts. A total of one dusk survey and one dawn survey were carried out by two surveyors in

August 2020. The surveys were carried out when weather conditions were forecast to consist of temperatures >10 °C with little or no wind or precipitation. Elekon Batlogger M bat detectors with real time full spectrum recording, an integrated Global Positioning System (GPS) and temperature logger were used to record bat echolocation calls for later sound analysis using Bat Explorer Software. The number of bats, bat species, bat behaviour and the direction of flight of each bat was also recorded where possible.

3 RESULTS

3.1 Preliminary Ecological Appraisal for Bats

Consultation with Bat Conservation Ireland identified a single historical record of bat roosts within 1km of the site of the proposed project. This record was that of a Leisler's bat *Nyctalus leisleri* roost located within the same Irish Grid square as the proposed development, with the description for the roost location being limited to Monaghan Town. The only other record returned was that of foraging common pipistrelle *Pipistrellus pipistrellus* and soprano pipistrelle *Pipistrellus pygmaeus*, from a location 0.3km to the north-west of the Application Site.

The potential suitability of the site to provide significant habitat for foraging and commuting bats is considered low. The site itself largely consists of hardstanding and buildings with some small areas of scrub, scattered trees, hedgerows and recolonising vegetation, which could be used by a small number of foraging bats. Foraging opportunities within 250 m are limited given the urban nature of the site and habitats within the site are not well linked to the wider landscape.

3.2 Preliminary Roost Assessment of Structures

A map illustrating the site boundary and the existing habitats on the site can be found in **Figure 8.3 Extended Phase 1 Habitat Map of the** EIAR**.**

The site supports a range of buildings of varying structure and age. The vast majority of these structures will however be retained in-situ within the proposed project. Of the buildings to be lost in order to facilitate the construction of the new vehicular access from Dublin Street, two joined structures were deemed to support features with potential to support roosting bats, namely gaps in soffiting and brickwork.

Structure Characteristics

The buildings to be lost to the proposed project, which were assessed as supporting features offering potential opportunities for roosting bats face onto Dublin Street and back onto an area of unmanaged tall ruderal habitat with Japanese knotweed. The locations of the buildings are shown at **Figure 1.0 Bat Roost Survey**.

The structures are two storey and three storey respectively and appear to be constructed from stone or brick with cement render and are of considerable age. The buildings support an arched walkway between Dublin Street and the rear entrances.

The roofs of both structures are pitched slate, with relatively old soffit and facia boards, supporting several gaps on the southern aspect. The chimneys of both buildings are brick and support a number of gaps in pointing and brickwork.

Given the locations of these structures, which are not connected to areas of semi-natural habitat in the wider area and are subject to artificial lighting, they were considered to have **low suitability** to support roosting bats.

Other buildings to be demolished to facilitate the proposed development were considered to offer negligible opportunities for roosting bats.

3.3 Preliminary Roost Assessment of Trees

While the Application Site supports a low number of mature and middle-age trees, none of these were recorded to support features which were considered to offer potential roosting opportunities for bats, such as splits, cracks, rot-holes, flaking bark or other features.

These trees are relatively isolated, within an urban area, and are subject to some degree of artificial lighting.

It is therefore considered that scattered trees within the Application Site offer **negligible opportunities** for roosting bats.

3.4 Emergence/Re-Entry Surveys of Structures

In order to ascertain the presence or absence of roosting bats within structures identified as offering low suitability emergence and re-entry surveys of these buildings were undertaken in August 2020. Table 1.0 includes a summary of the dates of these surveys in addition to the weather conditions.

Table 1.0 Bat Emergence/Re-entry Survey Details

Date	Type of survey	Sunset/sunrise time	Survey Start time	Survey End time	Av.Temp. (°C)	Wind	Precipitation
06.08.20	Emergence	20:18	19:50	21:50	16	Light breeze	None
24.08.20	Re-entry	05:20	03:35	05:30	12	Light breeze	None

Surveyor locations during these surveys are illustrated in **Figure 1.0 Bat Roost Survey**.

No bats were recorded emerging from or re-entering either of the buildings assessed as having low potential to support roosting bats during the surveys. It is considered therefore on the basis of this information, that the buildings to be lost in order to facilitate the proposals do not support roosting bats species.

During the surveys relatively limited bat activity was recorded, with passes limited to a relatively small number of common pipistrelle, soprano pipistrelle and Leisler's bat.

4 DISCUSSION & ANALYSIS OF RESULTS

On the basis of the findings detailed above it is considered that buildings within the Application Site which are to be demolished in order to facilitate construction of the proposed access road from Dublin Street, while considered to have low potential to support roosting bats, were not recorded to support roosting bats at the time of survey.

Trees within the Application Site were not noted to support features offering suitable opportunities for roosting bats.

The site offers limited opportunities for a low number of more common and widespread bat species, namely common pipistrelle, soprano pipistrelle and Leisler's bat.

It is therefore considered that the proposals will not have potential to give rise to significant impacts to bat populations in the locality or individual bats which may utilise the site for the purposes of foraging on an infrequent basis.

5 CONCLUSION

In relation to bats, there are no concerns in view of the proposed demolition works and wider proposals and no specific mitigation measures will be required.

Should the project seek to provide some measure of ecological enhancement, it is recommended that bat boxes be incorporated into the scheme design. These can be installed on existing retained structures where possible.

6 REFERENCES

Collins, J. (ed.) (2016) *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (3rd edn), The Bat Conservation Trust, London.

Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention) 1982.
Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention) 1979.

CIEEM (2017) *Guidelines for Ecological Report Writing*, Chartered Institute of Ecology and Environmental Management, Winchester.

EC Directive on The Conservation of Natural habitats and of Wild Fauna and Flora (Habitats Directive) 1992.

Wildlife Act 1976 and Wildlife (Amendment) Act 2000. Government of Ireland.

Figures

Ecological Survey for Bats



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Site Boundary

Buildings (to be lost) with low potential for roosting bats.

Emergence/Re-entry Surveyor Locations

Rev	Description	By	Ckd	Date

Elmwood House, 74 Boucher Road,
BELFAST, BT12 6RZ
T: 028 9066 7914

Monaghan County Council

Monaghan Town Centre

Ecological Survey for Bats

Figure Number 1.0

Status	Scale @ A3	Date
Preliminary	**1:1250**	**19.03.21**

RPS Project Number	Revision
NI2162	**--**

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Appendix

9a

Scoping Study

SOUTH DUBLIN STREET REGENERATION

Scoping Study

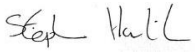
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Approval for issue

S Houlihan		29 November 2021

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Prepared by:

RPS

Stephen Houlihan MSc BSc CMILT MTPS
Associate - Highways, Civil and Transportation

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

T +44 2890 667 914
E stephen.houlihan@rpsgroup.com

Prepared for:

Monaghan County Council

Noel Finnegan
Senior Executive Engineer

The Glen
Glen Road
Co. Monaghan

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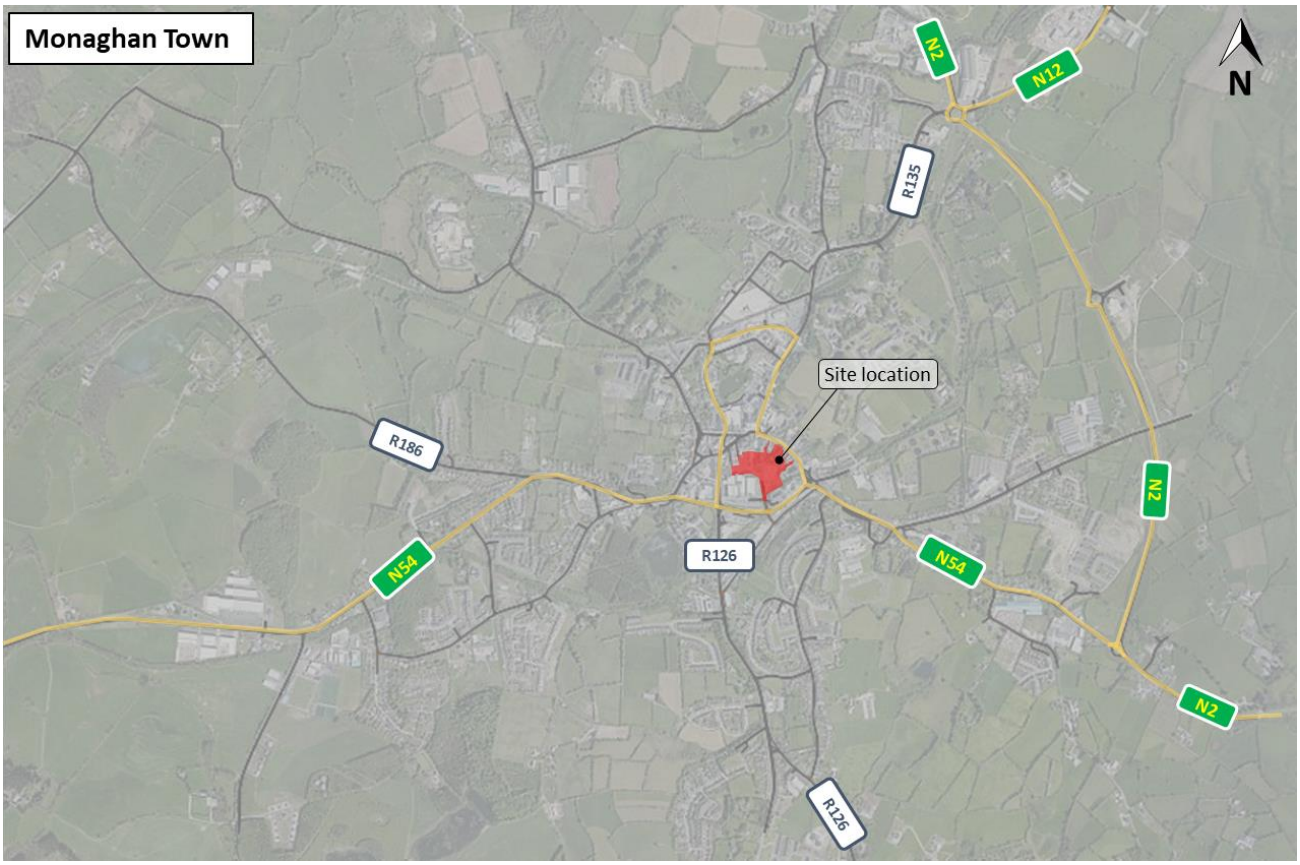
Appendices

Appendix A – Proposed Site Layout
Appendix B – Traffic Flow Diagrams

1 INTRODUCTION

RPS was commissioned by Monaghan County Council to prepare an Environmental Impact Assessment Report (EIAR) for the proposed public realm development as part of the South Dublin Street and Backlands Regeneration Scheme. As part of the EIAR, a Traffic and Transportation Assessment (TTA) chapter will be prepared to include a traffic impact assessment as a result of the scheme. The key aim of the EIAR TTA is to determine the potential impacts of the improved street works and the introduction of a new access on Dublin Street. The site location in the context of Monaghan Town is presented in **Figure 1.1**.

Figure 1.1 – Site Location



1.1 Purpose of the report

The purpose of this scoping report is to outline the methodology and parameters to be undertaken as part of the EIAR TTA. It is anticipated that a EIAR TTA Chapter will be required to support the development application, which will be prepared in accordance with the relevant guidance.

1.2 Proposed Development

The regeneration area is split between two Masterplan areas, north and south of Dublin Street. The concept Masterplan for the southern lands, which forms the basis of this assessment, is outlined in **Figure 1.2** and is presented in greater detail in **Appendix A**.

Figure 1.2 – South Dublin Street and Backlands Regeneration Scheme Masterplan Layout



The planning application will seek permission for the following works:

- Creation of new urban spaces, comprising streets and civic spaces:
  - New street, shared surface event space, and junction connecting Dublin Street into its backland areas - to be known as Charles Gavan Duffy Place
  - New street connecting the Courthouse car park to the new space, to be known as Charles Gavan Duffy Place
  - Realignment of Castle Street, its junction with N54 Macartan (Broad) Road, and the internal roads throughout the Courthouse and lower Courthouse car parks.
- Creation of new high quality public realm, comprising:
  - New pavements, high quality surfaces and kerbing, including resurfacing of existing pavements
  - New railings, bollards and pop-up power supply
  - Bicycle parking
  - Street furniture including bins and seats
  - Traffic calming ramps, pedestrian crossings
  - Boundary treatments and landscape planting
  - Demolition of 5 buildings, associated outbuildings and structures
  - Construction of new structural masonry walls and building facades
  - Regrading of land and new embankments, to create two future development plots
  - New / replacement street lighting and CCTV
  - Reduction in long stay car parking spaces
  - Utility and drainage improvements, including new utility services, upgrading of existing ESB services, Wi-Fi and Broadband; and
  - Associated site construction and access works

1.2.1 Site Access

It is proposed that vehicular access to the site will be provided via the existing accesses on Church Street, a realignment of the N54 Macartan (Broad) Road / Castle Street (to be renamed Farney Road) access; and a new 3-arm priority access on Dublin Street, to the south of The Diamond. The access will be designed to cater for Heavy Goods Vehicles access, with vehicle Swept Paths assessment and Road Safety Audits undertaken to inform the design.

1.2.2 Parking Provision

As there is no quantum of new floorspace proposed as part of the development, there will be no additional parking provided as part of the development. The development proposals do, however, propose to reduce the level of car parking within the Upper Courthouse car park, with the spaces reallocated for public realm and to facilitate walking and cycling to/from and within the site.

2 PROPSOED IMPROVEMETNS / MODIFICATIONS

A desktop baseline accessibility assessment will be undertaken to establish the existing transport provision serving the site and its surrounds. The assessment will consider travel by sustainable modes of transport including walking, cycling and public transport; and provides a brief assessment of available infrastructure and service provision.

2.1 Pedestrian, Cycling & Public Transport Facilities

As the site is located within an existing urban centre, pedestrian and cycling facilities are well established. A full assessment of walking and cycling facilities surrounding and within the site will be undertaken and presented within the EIAR TTA.

2.2 Public Transport

There are no changes to public transport facilities as part of the development proposals, with the site proposed to be catered for using existing provision. A review of public transport infrastructure surrounding the site will be presented within the EIAR TTA.

3 TRAFFIC IMPACT ASSESSMENT

3.1 Vehicle Trip Generation

3.1.1 Construction Phase

Although there is no contractor appointed at this stage, a review of the anticipated volumes of construction traffic and likely routes to access the site will be provided win the report. It is anticipated that construction traffic would utilise the strategic road network to access the site via Castle Street, as observed from HGV movements via the new traffic counts undertaken to inform the study.

3.1.2 Operational Phase

As mentioned, there will be no uplift in development floorspace as part of the proposals. The new access on Dublin Street, will however, result in some localised redistribution as set out below.

3.1.3 Trip Distribution

New traffic turning counts, queue and an Automatic Number Plate Recognition surveys were undertaken in October 2021 to establish existing traffic conditions in the vicinity of the site. The ANPR surveys also provide information on the level of traffic that is accessing the site from Castle Street (via Dublin Street) and Church Street, who will likely make use of the new access at Charles Gavan Duffy Place to access the site. Traffic Flow Diagrams illustrating the existing traffic on the network and the level of traffic likely to be diverted via the new Dublin Street / Charles Gavan Duffy Place access is presented in **Appendix B**.

3.2 Critical Time Period for Assessment

In order to determine base traffic flows within the study area, new classified traffic count surveys were undertaken by MHC Traffic Ltd on Thursday 23rd October 2021 at the following junctions.

From these surveys, it was determined that the morning and evening peak hours to be taken forward for a detailed traffic impact assessment will be as follows:

- Morning Peak: 0815-0915; and
- Evening Peak: 1715-1815.

Figure 3.1 - Location of Junction Turning Counts and Queue Surveys



J. No.	Junction Name
1	N54 Clones Road / Market Road / Park Street roundabout
2	N54 Market Road / Broad Road / Glen Road signalised junction
3a/b	a) N54 Broad Road / McNally's Car Park priority junction b) Glen Road / McNally's Car Park priority junction
4	N54 Broad Road / Castle Road / Castle Street priority junction
5	Canal Street / Mall Road / Go Petrol Station priority junction
6	N54 Broad Road / Dublin Street / Old Cross Square / Canal Street Rbt
7	Old Cross Square / Pound Hill priority junction
8a-d	a) Castle Road / Retail Park / Credit Union access b) Castle Street / Lower Courthouse Car Park (s) access c) Castle Street / Lower Courthouse Car Park (n) access d) Castle Street / Upper Courthouse Car Park access
9	Market Street / Park Street gyratory priority junction
10	Dawson Street / Church Square / Market Street signals / priority
11	Church Square / Car Park Exit & Car Park entrance
12	Church Square / Mill Street priority junction
13	North Road / Mill Street signals / priority junction
14	Dublin Street / The Diamond / Glaslough Street / Car Park priority junction

4 SITE OPERATION

For the purposes of assessing the traffic impact of the development, it is assumed that the proposed development will be constructed and operational by 2025. Future assessment years of 2030 (opening year + 5 years) and 2040 (opening year + 15 years) will also be considered at the new Dublin Street / Charles Gavan Duffy Place priority junction, in line with relevant guidelines.

5 TRAFFIC GROWTH

The Chartered Institute of Highways and Transportation (CIHT) Guidelines for traffic impact assessments makes the following comments to the application of traffic growth:

- Paragraph 3.7.12 of the CIHT guidelines indicates that:

  'local data should be used where possible, whether it be based on trip-end model predictions or a trends based projection of historic traffic counts'. The paragraph also indicates that 'trend data on its own cannot provide a realistic forecasting model. Hence the procedure often adopted is to compare trend data with National Road Traffic Forecasts and use this comparison to predict into the future'.

- Paragraph 3.1.17 of the CIHT guidelines properly highlights that applying growth onto the surrounding network and then adding development traffic could result in some double counting and therefore an over estimation of traffic flows.

- *National Road Traffic Forecasts* are also based on 'annual average traffic flows' and paragraph 3.7.14, bullet point 5, of the CIHT guidelines indicates that evidence suggests that peak hour activity is not increasing at a similar rate to off peak traffic levels.

Therefore, the application of any traffic growth during the peak hour periods could result in a significant overestimation of future year traffic volumes. However, for the purposes of this assessment, it is proposed to use the Transport Infrastructure Ireland (TII) Central Growth rates as indicated in **Table 1**. Surveyed traffic flows were converted to Passenger Car Units (PCU) using the conversion factors from the Transport for London Traffic Modelling Guidelines as shown in **Table 5.2.** As TII guidelines do not provide growth factors for PCUs, the factors in Table 1 were established by using the percentage Heavy Vehicles (HV) observed from the new traffic count surveys in **Appendix B**. PCUs are the standard format of assessing traffic within approved modelling software packages LinSig V.3 (for signalised junctions) and Junctions 9 (for priority and roundabout junctions).

Table 1: Traffic Grow Rates

Central Growth Rates			
	LV	HV	PCU
2021-2025	1.035	1.078	1.037
2021-2030	1.096	1.220	1.101
2030-2040	1.048	1.118	1.051

Table 2: Vehicle to PCU Conversion Factors

Vehicle to PCU Conversion Factors						
P/C	M/C	Car	LGV	OGV1	OGV2	Bus/Coach
0.2	0.4	1	1	1.5	2.3	2

6 CUMULATIVE ASSESSMENT DEVELOPMENT FLOWS (COMMITTED DEVELOPMENT)

A review of the Monaghan County Council Planning poral was undertaken to determine if there are any other significant generators of traffic within the vicinity of the proposed development site which have received planning approval but are yet to be constructed.

It was noted that planning permission was granted for a potential foodstore located at McNally's Car Park site. The traffic flows for this development were extracted from the traffic impact assessment undertaken by TPS Ltd. and added to the network to form the Base scenario (cumulative assessment). The traffic flows associated with the foodstore development are presented in **Appendix X**.

We would request that any additional committed developments be determined, to be included within the traffic impact assessment.

7 THRESHOLD ANALYSIS

We propose to use the 10% threshold level within this assessment. Any junctions that are found to have an impact of more than 10% will be assessed using the relevant junction capacity assessment tools, LinSig v.3 for signalised junctions and Junctions 9 for priority and roundabout junctions.

The threshold analysis within **Appendix B** shows that only the new Dublin Road / Charles Gavan Duffy Place priority junction demonstrates an impact of greater than 10%, with the Old Square Roundabout and N54 Macartan (Broad) Road demonstrating an overall reduction in traffic flows as a result of the new access at Charles Gavan Duffy Place and as traffic is diverted into the site at this location.

It is recognised that the N54 Macartan (Broad) Road / Dawson Street / Glen Road signalised junction suffers from localised congestion during peak periods. Given the proximity of this junction to the existing site access at Castle Street, reference to its operational capacity may also be considered within the EIAR TTA. However, it is noted that there are no mitigation measures proposed to improve this junction as part of the development proposals.

8 PROPOSED SENSITIVITY TESTING

There is no sensitivity testing proposed to be undertaken within the EIAR TTA.

9 ANY ADDITIONAL DETAIL AFFECTING TRANSPORTATION

There is no additional information associated with the scheme that would affect Transportation.

Appendix A – Proposed Site Layout

Appendix B – Traffic Flow Diagrams

Appendix

9b

RSA Stage 1

MONAGHAN TOWN – DUBLIN STREET REGENERATION PROJECT

Stage 1 Road Safety Audit



MGT0528-RPS-00-XX-RP0002
Stage 1 Road Safety Audit
S3.P01
5th January 2021

rpsgroup.com

Document status

Version	Purpose of document	Authored by	Reviewed by	Approved by	Review date
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S3.P01	Review and Comment	PD	KMC	PD	05/01/2021

Approval for issue

PD	5 January 2021

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Prepared by:

RPS

Prepared for:

Monaghan County Council

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Appendix D Audit Team Approval 28

1 INTRODUCTION

This report was prepared in response to a commission from Mark Finnegan of RPS Group, Galway Office on behalf of Monaghan County Council to undertake a Stage 1 Road Safety Audit (RSA) of the Monaghan Town – Dublin Street Regeneration Project, Co. Monaghan.

The independent RSA Audit Team comprised of:

Team Leader:	**Peter Dickson** BEng (Hon) MIEI Cert Comp RSA,
	RPS Consulting Engineers Ltd.
	TII Auditor Approval Ref: PD1324187
Team Member:	**Kieran McCafferty** MEng BEng (Hon) MIEI
	RPS Consulting Engineers Ltd.
	TII Auditor Approval Ref: KM3376501

The TII auditor approval letter is included in Appendix D.

This Stage 1 Road Safety Audit has been carried out generally in accordance with the requirements of Transport Infrastructure Ireland's (TII) standard for Road Safety Audits GE-STY-01024, December 2017 (formerly NRA HD19).

The audit comprised an examination of the site by the Audit Team in daylight on 13th October 2020. The weather on the day of the site visit was dry, and the road surface was dry. The traffic conditions on site were considered low. A number of pedestrians were noted during the site visit.

This scheme has been examined and this report compiled in respect of the consideration of those matters that have an adverse effect on road safety. It has not been examined or verified for compliance with any other standards or criteria. The problems identified in this report are considered by the Audit Team to require action in order to improve the safety of the scheme and minimise collision occurrence. A map of the problem locations is included in Appendix C.

Items not provided to the Audit Team were not examined as part of this Audit. Where the absence of these items constitutes a Road Safety Problem, these have been included as problems in these reports. Information not provided to the Audit Team for this Stage 1 Audit included cross sections, signage, road marking, drainage, landscaping details or swept path analysis.

A Road Safety Audit Feedback Form is attached in Appendix B to this report which lists the problems identified and this form requires completion by the Design Team Leader. If any of the recommendations within this safety audit report are not accepted, a written response is required, stating reasons for non-acceptance. Comments (if any) made within the report under the heading of Observation are intended to be for information only. Written responses to Observations are not required.

No previous Road Safety Audits have been undertaken on this scheme.

2 PROJECT BACKGROUND

The proposed Monaghan Town – Dublin Street Regeneration Project consists of the enhancement of the physical and spatial quality of the streets and spaces in the Dublin Street (South) Regeneration Plan area. The project will focus on enhancements to the urban realm, providing improved accessibility and connectivity to pedestrians, cyclists and drivers between Dublin Street and N54 Broad Road at the Monaghan Shopping Centre. Works are proposed to the existing carparks, access roads, Church Street Access, Broad Road and Dublin Street as well as the currently disused plots of land to the rear of Dublin Street known as the backland area.

The scheme extents are shown in Figure 2-1. The proposed works comprise:

- Demolition of four properties along Dublin Street;
- New building facades and associated retaining structures to facilitate a new junction to Dublin Street;
- The creation of new streets and civic spaces including:
    - New civic square, street and junction connecting the backland area to Dublin Street – to be known as Gavin Duffy Place;
    - New civic space to be known as Courthouse Square;
    - New street, to be known as Church Walk;
    - Realignment of an existing road, to create a promenade to be known as The Mall;
    - Realignment of an existing road, to be known as Farney Road;
- High quality public realm including:
    - New pavements, high quality surfaces and kerbing;
    - New railings, bollards and pop-up power supply;
    - Bicycle parking, bins, seating, trees and vegetation.
    - Traffic calming ramps, pedestrian crossings and signage;
- New / replacement street lighting and CCTV;
- Reduction in car parking;
- New utility services / upgrading of existing ESB services, WiFi and Broadband; and
- Associated civil engineering improvements.

It is intended the large area at the centre of the development hatched in purple will be reserved as a future development site with vehicular access intended on Church Walk. It is intended there will be a 60mm high kerb upstand between the natural stone paving within the carriageway and the footpaths on Church Walk. It is also proposed to relocate the existing recycling bins to the southern corner of the carpark adjacent to Farney Road.

The existing streets within the scheme extents comprise footpaths and carriageways with a number of narrow and inconsistent pedestrian facilities. The existing speed limit within the scheme extents is 50km/h. The surrounding land uses are predominantly commercial and retail.



Figure 2-1: Scheme extents

3 COLLISION DATA

No collision data was provided to the Audit Team. Collision data was examined on the RSA website (rsa.ie) between 2005 and 2016 within the scheme extents and immediate surrounds. Within the scheme extents there were 2no. minor injury collisions.

One minor injury collision occurred on Dublin Street in 2011 and involved a pedestrian.

One minor injury collision occurred on N54 Broad Road in 2014 and involved a pedestrian. This collision occurred in close proximity to the existing pedestrian crossing.

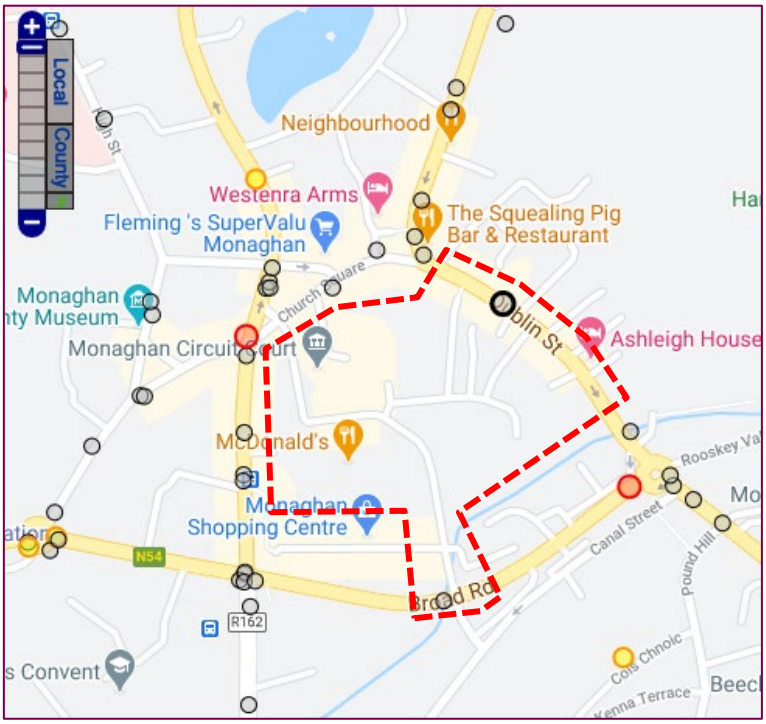


Figure 3-1: Collisions (Source: rsa.ie)

4 STAGE 1 RSA FINDINGS

4.1 Problem

Drawing No: MGT0528-RPS-00-XX-DR-C-LA0001 SK04

Summary: Collisions due to lack of junction control

At this stage in the design process, the road marking and signage designs have not been fully developed. It is proposed to alter the layout and operation of multiple junctions throughout the scheme, creating new or revised junction layouts.

The type of junction control throughout the scheme is not clear. Inappropriate or missing junction control, road markings or signage could lead to driver confusion and possible collisions.



Recommendation:

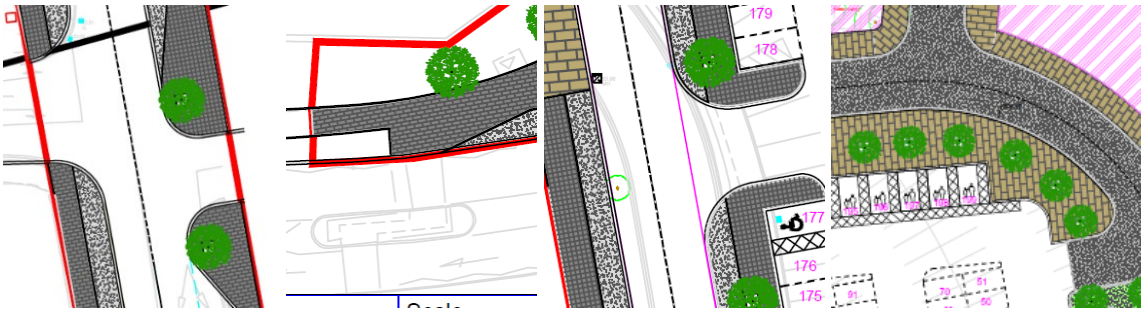
Appropriate junction control should be provided throughout the scheme.

4.2 Problem

Drawing No: MGT0528-RPS-00-XX-DR-C-LA0001 SK04

Summary: Personal injury incidents due to general lack of pedestrian crossings

In a number of locations throughout the scheme where the footpath and cycleways are broken across junctions and accesses, tactile paving or dropped kerbs have not been indicated on the drawings. The absence or incorrect layout of tactile paving or dropped kerbs could lead to possible trip/fall incidents for pedestrians.



Recommendation:

Appropriate dropped kerbs and tactile paving should be provided throughout the scheme at junctions, accesses and pedestrian crossings.

4.3 Problem

Drawing No: MGT0528-RPS-00-XX-DR-C-LA0001 SK04

Summary: Personal injuries for pedestrians pushing trolleys

It is proposed to revise the layout of the two carparks to the side and rear of Monaghan Shopping Centre, including the Tesco supermarket. No direct pedestrian route is proposed from the front entrance of the shopping centre to the eastern carpark. In this location there is an existing raised table crossing which is proposed to be removed.

If a safe route for mobility impaired pedestrians or pedestrians pushing shopping trollies is not provided between the eastern carpark and the front shopping centre access, these pedestrians may have difficulty ascending or descending the full height kerbs. This could lead to trips or falls and result in possible personal injuries.



Recommendation:

An appropriate pedestrian route should be provided from the front entrance of the shopping centre to the eastern carpark.

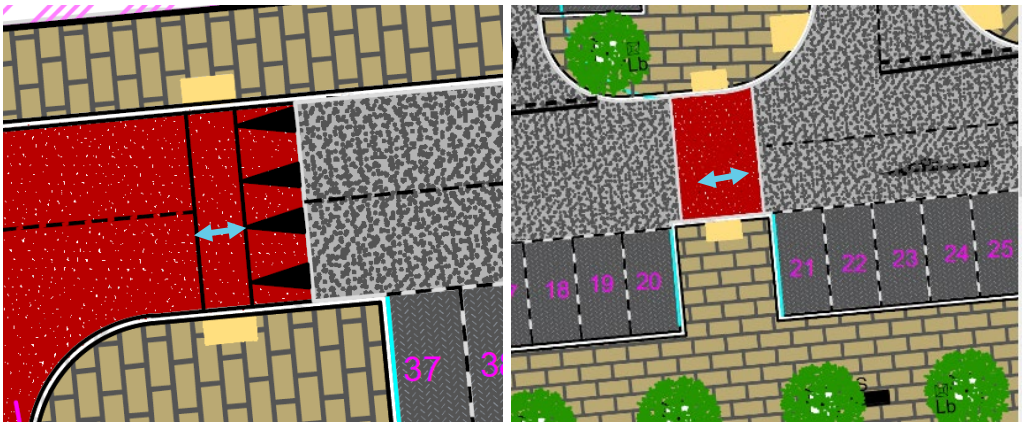
4.4 Problem

Drawing No: MGT0528-RPS-00-XX-DR-C-LA0001 SK04

Summary: Personal injury due to insufficient width for shopping trolleys and wheelchairs on raised pedestrian crossings

It is proposed to revise the layout of the two carparks to the side and rear of the Monaghan Shopping Centre. A number of raised table crossings are proposed with tactile paving approximately 1.6m wide, it is unclear if sufficient width is provided on the raised pedestrian crossings to allow two trolleys or a wheelchair and trolley to pass safely.

If insufficient width is provided on the raised ramps, pedestrians could slip down the sloped ramp into waiting vehicles, resulting in possible personal injuries.



Recommendation:

Sufficient width should be provided on the raised pedestrian crossings.

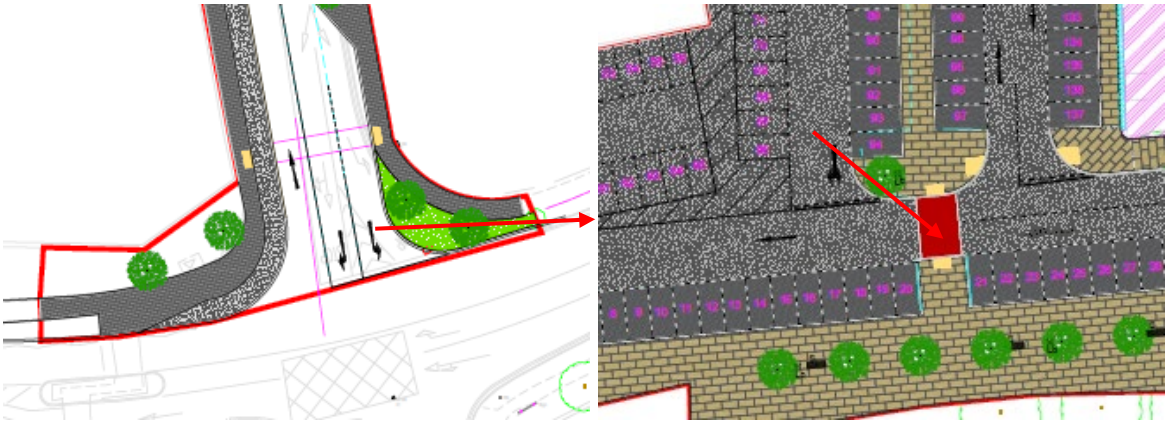
4.5 Problem

Drawing No: MGT0528-RPS-00-XX-DR-C-LA0001 SK04

Summary: Side impact collisions due to obscured visibility at priority junctions

A number of priority junctions are proposed throughout the scheme. In some locations, trees are proposed within the visibility splays of the junctions. This could obscure visibility for drivers at the junction, especially drivers in higher vehicles during heavy foliage periods.

If insufficient visibility at the junctions is provided, it could lead to a driver pulling out in front of an oncoming vehicle, resulting in possible side impact collisions.



Recommendation:

Sufficient visibility splays should be provided at junctions.

4.6 Problem

Drawing No: MGT0528-RPS-00-XX-DR-C-LA0001 SK04

Summary: Vehicle-pedestrian collisions due to narrow archway and termination of footpath

The eastern Church Street Access is proposed to be redeveloped with a similar layout to the existing with two narrow footpaths on each side of the street. Asphalt surfacing is proposed for vehicles along the street, giving them a sense of priority through the narrow archway. However, it was observed on site a significant number of pedestrians use this route and these pedestrians have to walk within the carriageway in front of oncoming vehicles.

Drivers entering the arch from Church Square may not expect a pedestrian to be in the carriageway in this location, especially drivers unfamiliar with the area or during poor visibility conditions. There is a risk that pedestrians may enter the carriageway in front of an oncoming vehicle, leading to possible vehicle-pedestrian collisions.





Recommendation:

Improved pedestrian facilities should be provided on the Church Street Access.

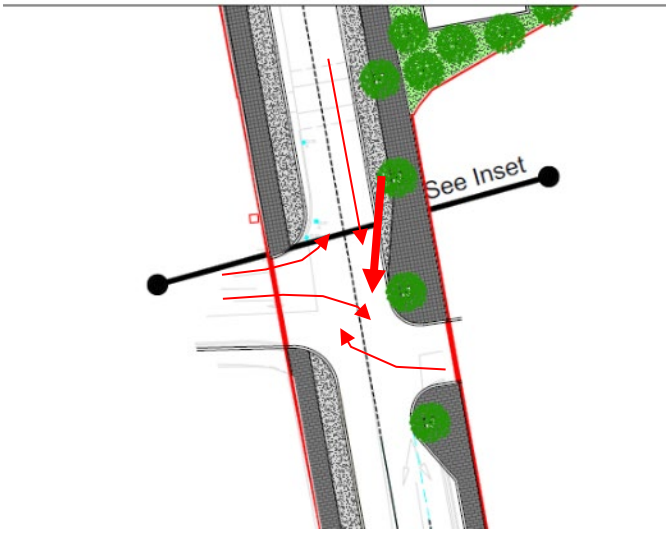
4.7 Problem

Drawing No: MGT0528-RPS-00-XX-DR-C-LA0001 SK04

Summary: Vehicle-cyclist collisions as cyclists merge with traffic in the vicinity of a staggered crossroads junction

A new cycleway is proposed on Farney Road on both sides of the carriageway. The southbound cycleway is terminated in the centre of a staggered crossroads junction and cyclists traveling towards Broad Road are required to merge with the traffic lane here. Cyclists, especially during poor visibility condition, may fail to observe oncoming vehicles coming from behind, to the right and to the left.

Cyclists who fail to observe all of the vehicle movements may enter the traffic lane in front of an oncoming vehicle resulting in possible vehicle-cyclist collisions.



Recommendation:

The southbound cycleway should be terminated in a safe location.

4.8 Problem

Drawing No: MGT0528-RPS-00-XX-DR-C-LA0001 SK04

Summary: Vehicle-pedestrian collisions due to discontinuity of footpath

The footpath to the western extents of the carpark ties into an existing footpath on the western Church Street Access. At the tie-in point there are a number of existing planters which block the footpath for pedestrians, especially the mobility impaired.

Pedestrians on the western Church Street Access may have to walk within the carriageway around these planters where they are at an increased risk of being struck by a vehicle.



Recommendation:

Continuity of pedestrian facilities at the tie-in points should be provided.

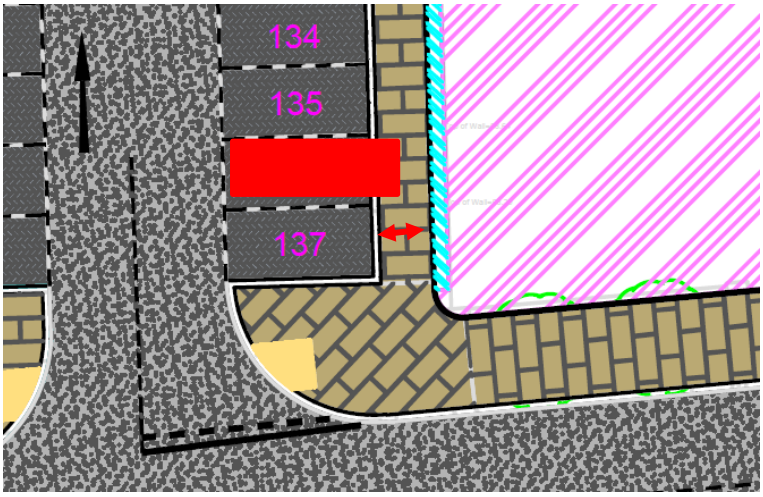
4.9 Problem

Drawing No: MGT0528-RPS-00-XX-DR-C-LA0001 SK04

Summary: Vehicle-pedestrian strike due to blocked footpath

A new footpath is proposed behind a row of perpendicular parking bays (number 121 – 137) with a wall also proposed at the back of the footpath. It is unclear if this footpath is of sufficient width for pedestrians if long vehicles in the parking bays overhang the footpath.

If vehicles overhang the footpath, mobility impaired pedestrians may choose to travel within the carriageway in this location where they are at an increased risk of being struck by a vehicle.



Recommendation:

Sufficient footpath width should be provided behind perpendicular parking bays.

4.10 Problem

Drawing No: MGT0528-RPS-00-XX-DR-C-LA0001 SK04

Summary: Vehicle-pedestrian collisions due to reduced visibility to the footpath

A new footpath and cycleway are proposed on Farney Road immediately adjacent to the existing boundary fence and gated access. Currently there is an existing grass strip between the wall and footpath which affords drivers exiting the access visibility to approaching pedestrians or cyclists.

It is unclear if there is sufficient visibility provided to approaching pedestrians or cyclists for drivers existing the access due to the high fence. Insufficient visibility to pedestrians or cyclists crossing the commercial access could lead to a reduced reaction time for drivers and possible vehicle-pedestrian or vehicle-cyclist collisions.



Recommendation:

Sufficient visibility to pedestrians and cyclists should be provided for drivers exiting the access.

4.11 Problem

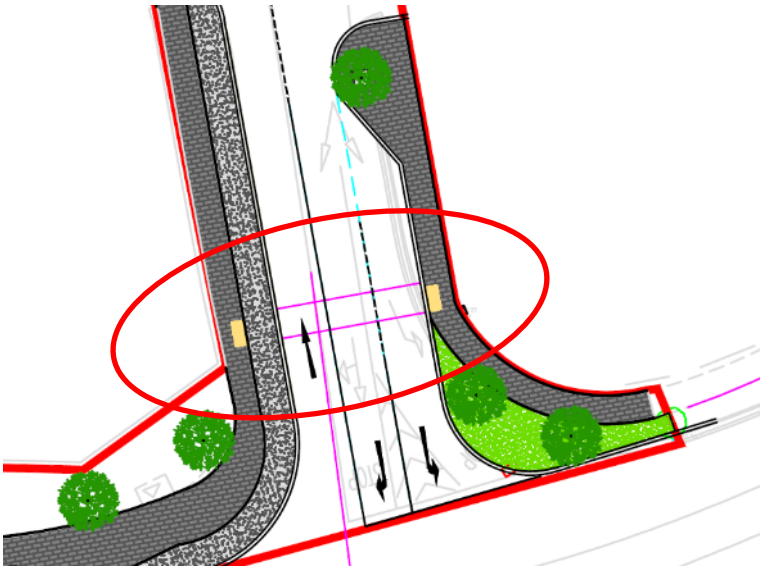
Drawing No: MGT0528-RPS-00-XX-DR-C-LA0001 SK04

Summary: Pedestrian-vehicle collisions due to long pedestrian crossing of three traffic lanes and a cycleway

On Farney Road an uncontrolled pedestrian crossing of three traffic lanes and the cycleway is proposed, in close proximity to the N54 Broad Road priority crossroads junction. This pedestrian crossing is of significant length and pedestrians, especially the mobility impaired may have difficulty completing the crossing when the carriageway is clear, especially during peak traffic periods. This could lead to possible vehicle-pedestrian or cyclist-pedestrian collisions.

Pedestrians at the crossing may be inclined to wait within the cycleway rather than at the tactile paving location shown. This could lead to possible cyclist-pedestrian collisions within the cycleway.

Additionally, pedestrians making the crossing will also be required to descend/ascend a full height kerb at the traffic edge of the cycleway.



Recommendation:

A safer pedestrian crossing alternative should be provided of Farney Road.

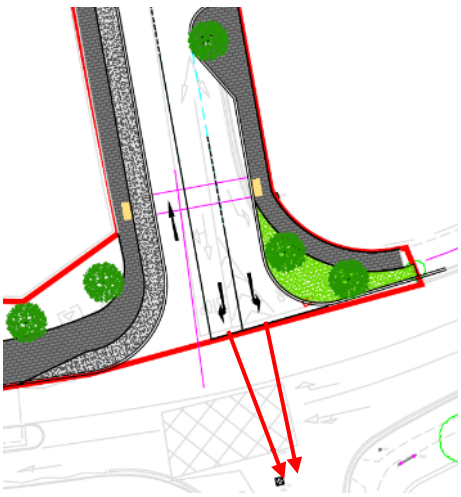
4.12 Problem

Drawing No: MGT0528-RPS-00-XX-DR-C-LA0001 SK04

Summary: Side swipe collisions due to the absence of a straight-ahead lane

At the existing N54 Broad Road crossroads junction there is currently a left turn only lane and a right/straight ahead lane into the service station. It is proposed to remove the straight-ahead lane and bring both lanes closer together by removing the white hatching.

It is considered the proposed layout could create confusion for drivers intending to continue straight ahead when leaving Farney Road. There is a risk that drivers in both lanes may attempt to continue straight ahead at the junction, resulting in possible side swipe collisions.



Recommendation:

Provision for drivers continuing straight ahead at the junction should be provided.

4.13 Problem

Drawing No: MGT0528-RPS-00-XX-DR-C-LA0001 SK04

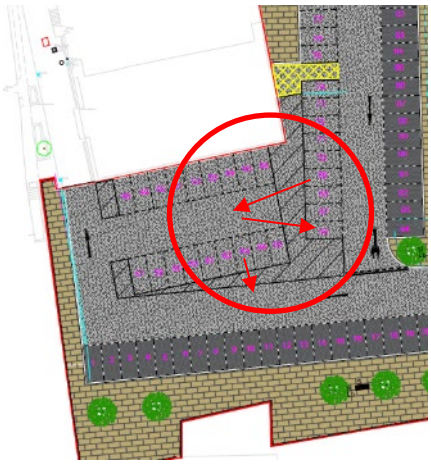
Summary: Pedestrian-vehicle collisions due to informal parking or driver short cuts

Road marking hatched areas have been proposed in both the eastern and western carparks. During high parking demand times, these hatched areas may attract informal parking or drivers may use these hatched areas as short cuts to access nearby parking spaces.

Pedestrians walking within the carparks are likely to use these hatched areas as informal walkways and standing areas. Vehicles parked informally in the hatched areas could obscure visibility to pedestrians walking in these locations, resulting in an increased likelihood of vehicle-pedestrian collisions.

Additionally, drivers attempting to drive through the hatched areas as a short cut may not expect a pedestrian to be walking in the hatched area, resulting in possible vehicle-pedestrian collisions.





Recommendation:

Road marking hatched areas within the carparks should not be provided where pedestrians are likely to walk or stand.

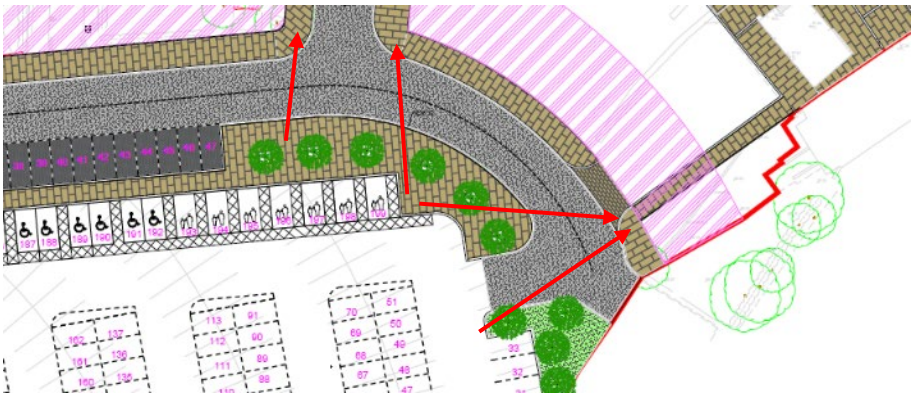
4.14 Problem

Drawing No: MGT0528-RPS-00-XX-DR-C-LA0001 SK04

Summary: Personal injury incidents due to no pedestrian crossing to the eastern end of The Mall

Three new pedestrian links are proposed to Dublin Street along with a new alignment of The Mall. It is considered drivers parking within the eastern carpark wishing to access the two most eastern pedestrian links are likely to cross The Mall at its eastern end, where no pedestrian crossings have been proposed.

If pedestrians cross The Mall in an unsafe location it could lead to trip incidents resulting in possible personal injuries.



Recommendation:

Pedestrian crossings should be provided of the Mall in appropriate locations.

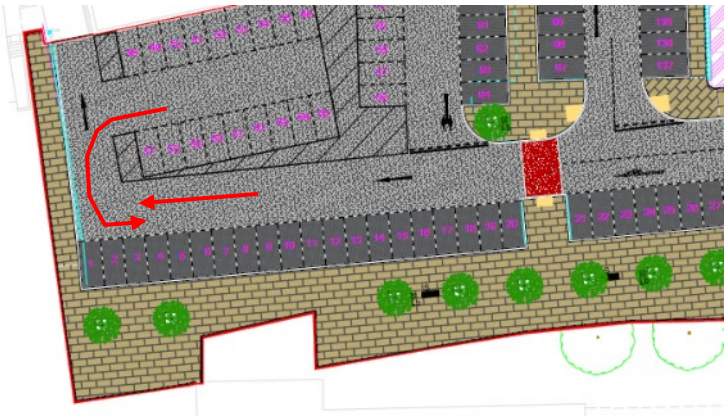
4.15 Problem

Drawing No: MGT0528-RPS-00-XX-DR-C-LA0001 SK04

Summary: Head on collisions due to ghost drivers in the carpark

It is proposed to provide a one-way carriageway within the western carpark so that drivers traveling towards the western end of the carpark have to exit the scheme via the western Church Street Access.

During peak parking times, as drivers attempt to find a parking space at the western end of the carpark, they may not wish to exit the scheme via Church Street Access. This could lead to drivers performing U-turns in the carriageway and traveling against the flow of traffic, resulting in possible low speed head on collisions.



Recommendation:

Drivers within the western extents of the scheme should be able to turn back towards The Mall.

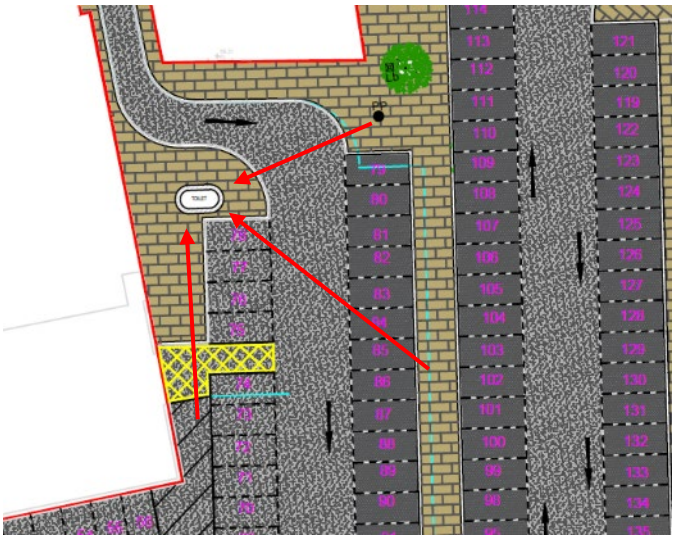
4.16 Problem

Drawing No: MGT0528-RPS-00-XX-DR-C-LA0001 SK04

Summary: Personal injury incidents due to no pedestrian crossing to the public toilet

The existing public toilet is proposed to be retained to the northwest of the proposed scheme. No direct pedestrian access to the public toilet has been proposed, particularly for the mobility or visually impaired.

If appropriate access to the toilet is not provided, pedestrians ascending or descending the kerb could trip resulting in possible personal injuries.



Recommendation:

Appropriate access for pedestrians should be provided to the public toilet.

4.17 Problem

Drawing No: MGT0528-RPS-00-XX-DR-C-LA0001 SK04

Summary: Difficulty for mobility impaired pedestrians / cyclists at steep gradient

Three new pedestrian/cyclist links are proposed to Dublin Street. On the eastern most link, there is an existing steep gradient leading to property accesses. It is unclear if the steep gradient is proposed to be retained.

If the steep gradient is retained mobility impaired pedestrians may have difficulty traversing the slope leading to possible trip or fall incidents.



Recommendation:

An appropriate gradient should be provided at the eastern Dublin Street link to the property accesses.

4.18 Problem

Drawing No: MGT0528-RPS-00-XX-DR-C-LA0001 SK04

Summary: Vehicle-pedestrian collisions with visually impaired pedestrians on Dublin Street

Three new pedestrian links are proposed to Dublin Street. On the eastern most link, no works are proposed to the existing footpath on Dublin Street where there is a low kerb into the carriageway.

There is a risk visually impaired pedestrians may not appreciate the end of the footway if the low kerb is retained and inadvertently step into the carriageway on Dublin Street, where they could be struck by a vehicle.





Recommendation:

Sufficient guidance for visually impaired pedestrians should be provided as to the termination of the footpath at the end of the pedestrian links to Dublin Street.

4.19 Problem

Drawing No: MGT0528-RPS-00-XX-DR-C-LA0001 SK04

Summary: Personal injury incidents from informal bicycle parking

It is unclear from the drawings if bicycle parking is proposed in the vicinity of Dublin Street and Church Walk. It appears that the only bicycle parking proposed is at the rear entrance to Monaghan Shopping Centre.

If sufficient bicycle parking is not provided it could lead to informal bicycle parking at poles or trees railings, blocking footpaths which could result in possible personal injury incidents.

Recommendation:

Sufficient bicycle parking should be provided throughout the scheme.

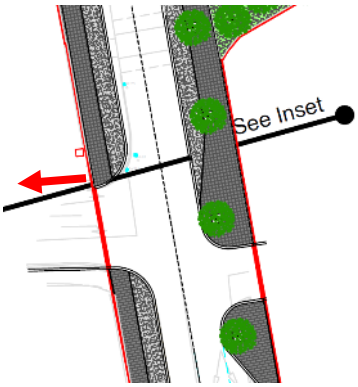
4.20 Problem

Drawing No: MGT0528-RPS-00-XX-DR-C-LA0001 SK04

Summary: Vehicle pedestrian collisions due to discontinuity of footpath

There are currently poor pedestrian facilities connecting from the proposed scheme to the front of the Monaghan Shopping Centre access. On the existing layout the footpath is terminated with no tactile paving and pedestrians then are required to cross a delivery access and weave between bollards to access the shopping centre.

Visually impaired pedestrians traveling from the new scheme to the shopping centre access may have difficulty locating this informal footpath and inadvertently step into the carriageway or parking bays where they are at an increased risk of being struck by a vehicle.







Recommendation:

Continuity of pedestrian facilities at the tie-in points should be provided.

4.21 Problem

Drawing No: MGT0528-RPS-00-XX-DR-C-LA0001 SK04

Summary: Personal injury incidents as cyclists attempt to merge with the proposed cycleway

A new cycleway is proposed on Farney Road which commences on the western side after the existing zebra crossing on Broad Road. However, it is unclear how cyclists will join the cycleway when traveling from the east off Broad Road.

If no facility for cyclists travelling from the east is provided to access the cycleway, cyclists may attempt to ascend the kerb at the junction radius, resulting in possible falls and personal injury incidents.



Recommendation:

A merge point for cyclists traveling from the east on Broad Road should be provided.

4.22 Problem

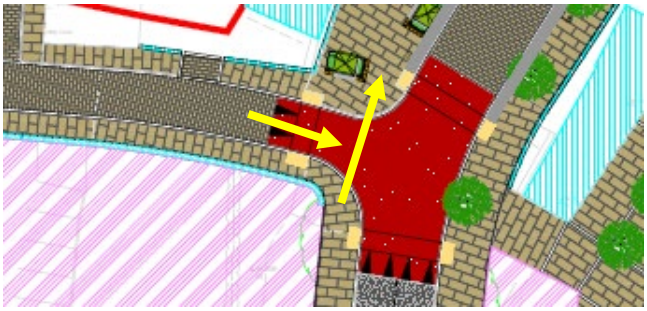
Drawing No: MGT0528-RPS-00-XX-DR-C-LA0001 SK04

Summary: Vehicle-pedestrian collisions due to the crossing location

Pedestrians traveling from The Mall to Gavin Duffy Place have to cross Church Walk at the raised table crossing. The pedestrian crossing at this location is set back from the junction mouth away

from the pedestrian desire line. It is considered pedestrians may not use the crossing and instead follow the desire line over the raised table.

Drivers undertaking turning manoeuvres at the junction may not expect a pedestrian to step into the carriageway away from crossing point. This could lead to a reduced reaction time for drivers to a crossing pedestrian, resulting in possible vehicle-pedestrian collisions.



Recommendation:

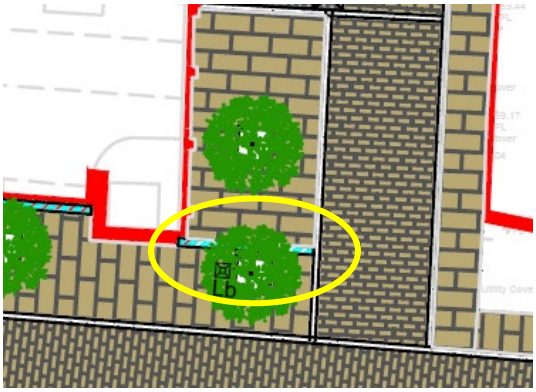
The crossing point should be positioned within the pedestrian desire line.

5 OBSERVATIONS

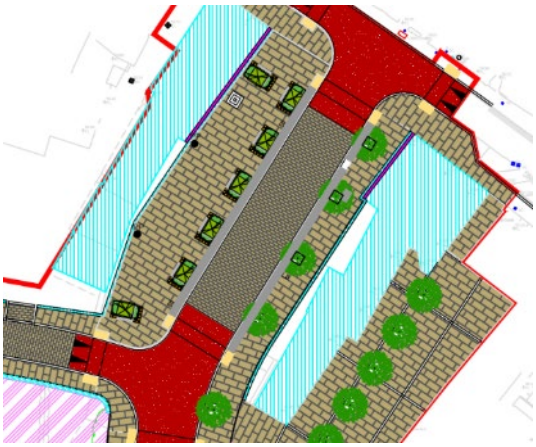
5.1 The existing pedestrian access to the Credit Union carpark is positioned behind a carparking space and it is not clear if it is proposed to be retained to removed. A proposal should be made for this informal access within the design.



5.2 It is unclear if a wall is proposed between Church Walk and the adjoining alleyway. If this is a wall it will significantly restrict the visibility of both drivers and pedestrians. A wall should not be proposed at this location

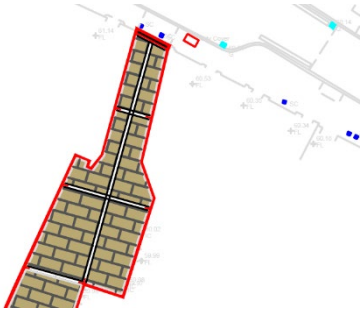


5.3 At this stage in the design process, the tree species has not been proposed. It is unclear if the positioning of trees throughout the scheme will overhang the carriageway. Ensure the positioning and species of trees selected will not overhang the carriageway.



5.4 It is unclear if appropriate space has been provided for parking ticket metres in the carparks. Provision should be made for parking ticket metres throughout the scheme

5.5 In some locations a white line is shown within a natural stone paved area. It is unclear if this is a visual kerb feature or a surface drainage channel. Drainage channels which may attract standing water during icy conditions should be avoided.



6 AUDIT STATEMENT

We certify that we have examined the drawings and other information listed in Appendix A and visited the site during the day of the 13th October 2020. The examination has been carried out with the sole purpose of identifying any features of the scheme that could be removed or modified in order to improve road safety.

The problems identified have been noted in this report together with suggestions for road safety improvement, which we recommend should be studied for improvement. The road safety audit has been conducted by the persons named below who have no involvement in the design of the scheme.

Peter Dickson	**Signed:**	
(Audit Team Leader)	**Date:**	05/01/2021
Kieran McCafferty	**Signed:**	
(Audit Team Member)	**Date:**	05/01/2021

Appendix A

Information Provided

Drawing/Document No.	Title	Status	Rev
MGT0528-RPS-00-XX-DR-C-LA0001 SK04	General Arrangements		P01.06

Appendix B

Audit Feedback Form

Appendix B - Road Safety Audit Feedback Form

Route / Scheme: Monaghan Town – Dublin Street Regeneration Project

Audit Stage: Stage 1 Road Safety Audit

Date Audit Completed: 21st October 2020

	To be Completed by Designer			*To be Completed by Audit Team Leader*
Paragraph No. in Audit Report	**Problem accepted (yes/no)**	**Recommended measure accepted (yes/no)**	**Describe alternative measure(s). Give reasons for not accepting recommended measure. Only complete if recommended measure is not accepted**	**Alternative measures or reasons accepted by Auditors (yes/no)**
4.1	Yes	Yes		
4.2	Yes	Yes		
4.3	Yes	Yes		
4.4	Yes	Yes		
4.5	Yes	Yes		
4.6	Yes	No	A shared trafficked and pedestrian area will be provided on the eastern Church Street Access within the scheme extents. This will indicate to drivers of the potential of pedestrians within the access lane. The area north of the stone arch is outside of the scheme extents. Client will be informed of this problem and requested to provide a mitigating proposal during the detailed design stage.	Yes
4.7	Yes	Yes		
4.8	Yes	Yes		

	To be Completed by Designer			*To be Completed by Audit Team Leader*
Paragraph No. in Audit Report	**Problem accepted (yes/no)**	**Recommended measure accepted (yes/no)**	**Describe alternative measure(s). Give reasons for not accepting recommended measure. Only complete if recommended measure is not accepted**	**Alternative measures or reasons accepted by Auditors (yes/no)**
4.9	Yes	Yes		
4.10	Yes	No	Tactile paving will be used to warn pedestrians that this is a crossing point. This access is a delivery access only and is lightly trafficked by professional drivers in a high seating position. Property owner will be contacted and internal signage warning drivers of presence of crossing pedestrians will be proposed.	Yes
4.11	Yes	Yes		
4.12	Yes	Yes		
4.13	Yes	Yes		
4.14	Yes	Yes		
4.15	Yes	Yes		
4.16	Yes	Yes		
4.17	Yes	No	The gradients where possible will be adjusted to improve ease of movement for mobility impaired users. In some locations due to existing built form this may not be possible as accesses are to privately owned buildings and adjusting these is not possible.	Yes
4.18	Yes	Yes		

	To be Completed by Designer			*To be Completed by Audit Team Leader*
Paragraph No. in Audit Report	**Problem accepted (yes/no)**	**Recommended measure accepted (yes/no)**	**Describe alternative measure(s). Give reasons for not accepting recommended measure. Only complete if recommended measure is not accepted**	**Alternative measures or reasons accepted by Auditors (yes/no)**
4.19	Yes	Yes		
4.20	Yes	Yes	This problem exists within privately owned lands. Landowner will be made aware of this problem and will be liaised with to mitigate this issue at detailed design stage	
4.21	Yes	Yes		
4.22	Yes	Yes		

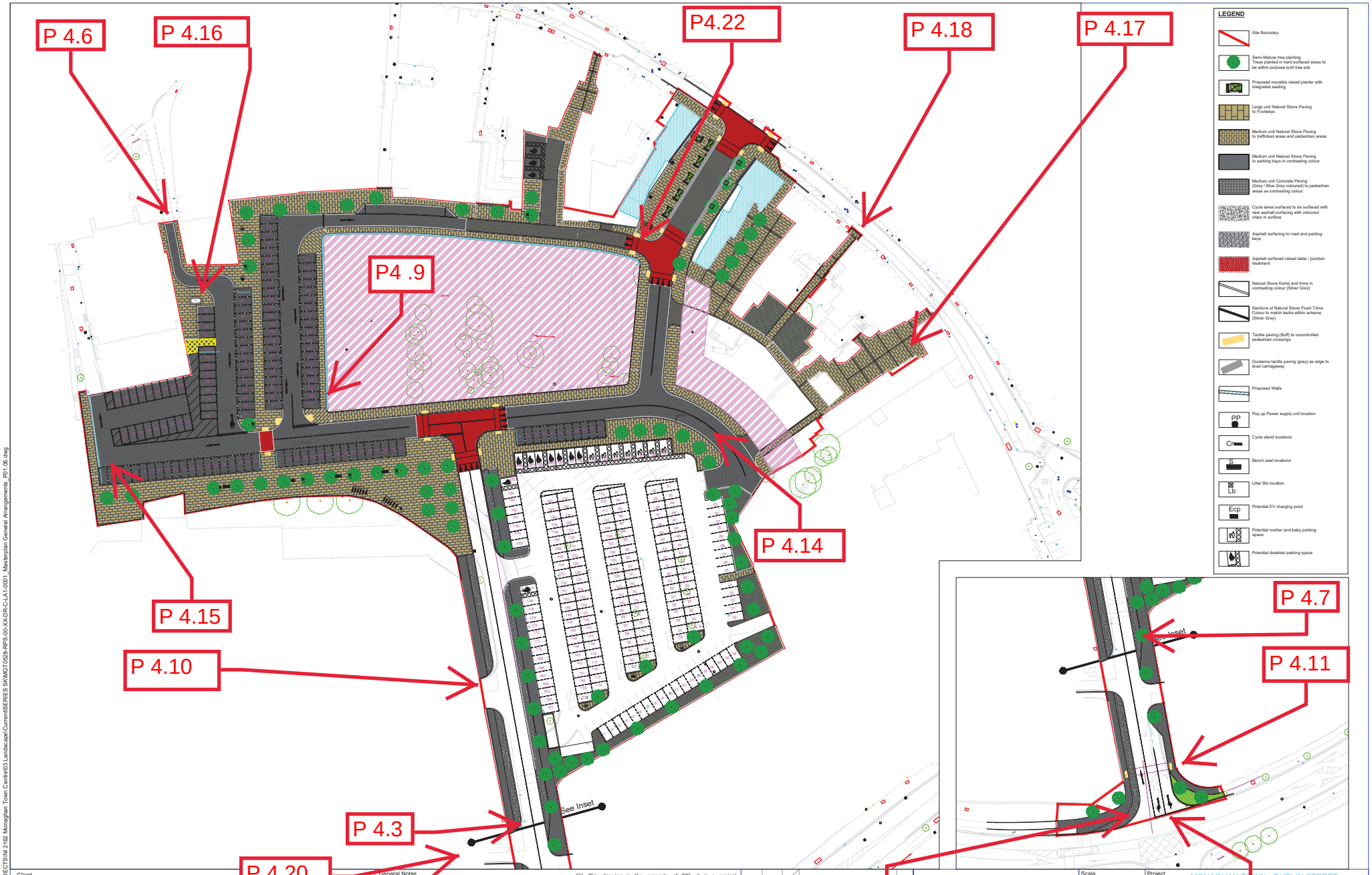
Signed **Designer** **Date 04/01/2021**

Signed **Audit Team Leader** **Date** 05/01/2021

Signed **Employer** **Date** 6 Jan 21

Appendix C

Problem Locations



Q:\Projects\ALL RPSES PROJECTS\NI 2162 Monaghan Town Centre\03 Landscape\Current\SERIES SK\MGT0528-RPS-00-XX-DR-C-LA1-0001_Masterplan General Arrangements_P01.06.dwg

Client

Comhairle Contae Mhuineacháin
Monaghan County Council

General Notes

(i) Hard copies, dwf and pdf will form a controlled issue of the drawing. All other formats (dwg etc.) are deemed to be an uncontrolled issue and any work carried out based on these files is at the recipients own risk. RPS will not accept any responsibility for any errors from the use of these files, either by human error by the recipient, listing of the un-dimensioned measurements, compatibility with the recipients software, and any errors arising when these files are used to aid the recipients drawing production, or setting out on site.

(ii) DO NOT SCALE, use figured dimensions only.

(iii) This drawing is the property of RPS, it is a project confidential classified document. It must not be copied used or its contents divulged without prior written consent. The needs and expectations of client and RPS must be considered when working with this drawing.

(iv) Information including topographical survey, geotechnical investigation and utility detail used in the design have been provided by others.

(v) All Levels refer to Ordnance Survey Datum, Malin Head.

Rev	Date	Drn	Chk	Amendment / Issue	App
P01.06	Sept.'20	SA		Issued for Review	

Model File Identifier: -

Scale: 1:500 @ A1, 1:1000 @ A3

Created on: February 2020

Sheets: of 01

Project: MONAGHAN TOWN - DUBLIN STREET PROJECT

Title: General Arrangements

File Identifier: MGT0528-RPS-00-XX-DR-C-LA0001 - SK04

Status: DRAFT

Rev: P01.06

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Appendix D

Audit Team Approval

Peter Dickson

From: TII Systems Notification <noreply@tii.systems>
Sent: Tuesday 1 December 2020 11:02
To: Mark Finnegan
Cc: roadsafetyaudits@nra.ie; Fiona.Bohane@corkrdo.ie; Alastair.DeBeer@TII.ie; Bryan.kennedy@TII.ie; LCurtis@Kerrycoco.ie; Peter Dickson; Kieran McCafferty
Subject: RSAAS - Road Safety Audit Approvals System - Audit Approval 12923150/14901/Stage 1

Importance: High

CAUTION: This email originated from outside of RPS.

Mark Finnegan
West Pier Business Campus
Dun Laoghaire
Co Dublin

Date: 01/12/2020

Our Ref: 12923150/14901/Stage 1

re: N54 Monaghan Town, South Dublin St & Backlands Regeneration

APPROVAL OF ROAD SAFETY AUDIT TEAM, Stage 1

Dear Mark Finnegan,

The following members of the proposed road safety audit team are approved to carry out the Stage 1 road safety audit of N54 Monaghan Town, South Dublin St & Backlands Regeneration.

1. Peter Dickson - RPS Consulting Engineers - Leader
2. Kieran Mc Cafferty - RPS Consulting Engineers - Member

A copy of all audit reports, design team response and exception reports must be uploaded through RSAAS. Successful upload of these reports and completion of the audit approval process is necessary for any further audit approval on this scheme.

Yours sincerely,

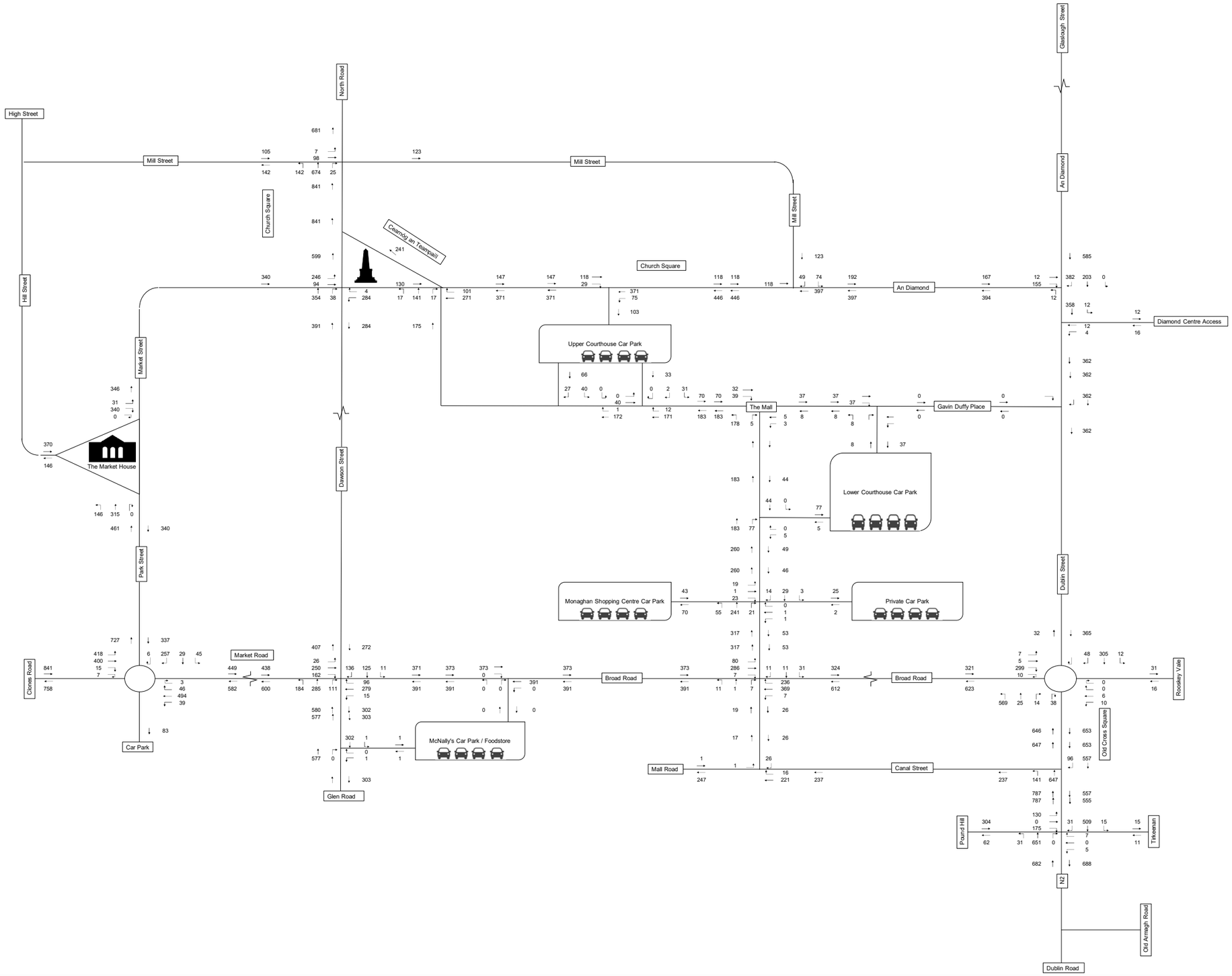
Lucy Curtis

Regional Road Safety Engineer
roadsafetyaudits@tii.ie

Appendix

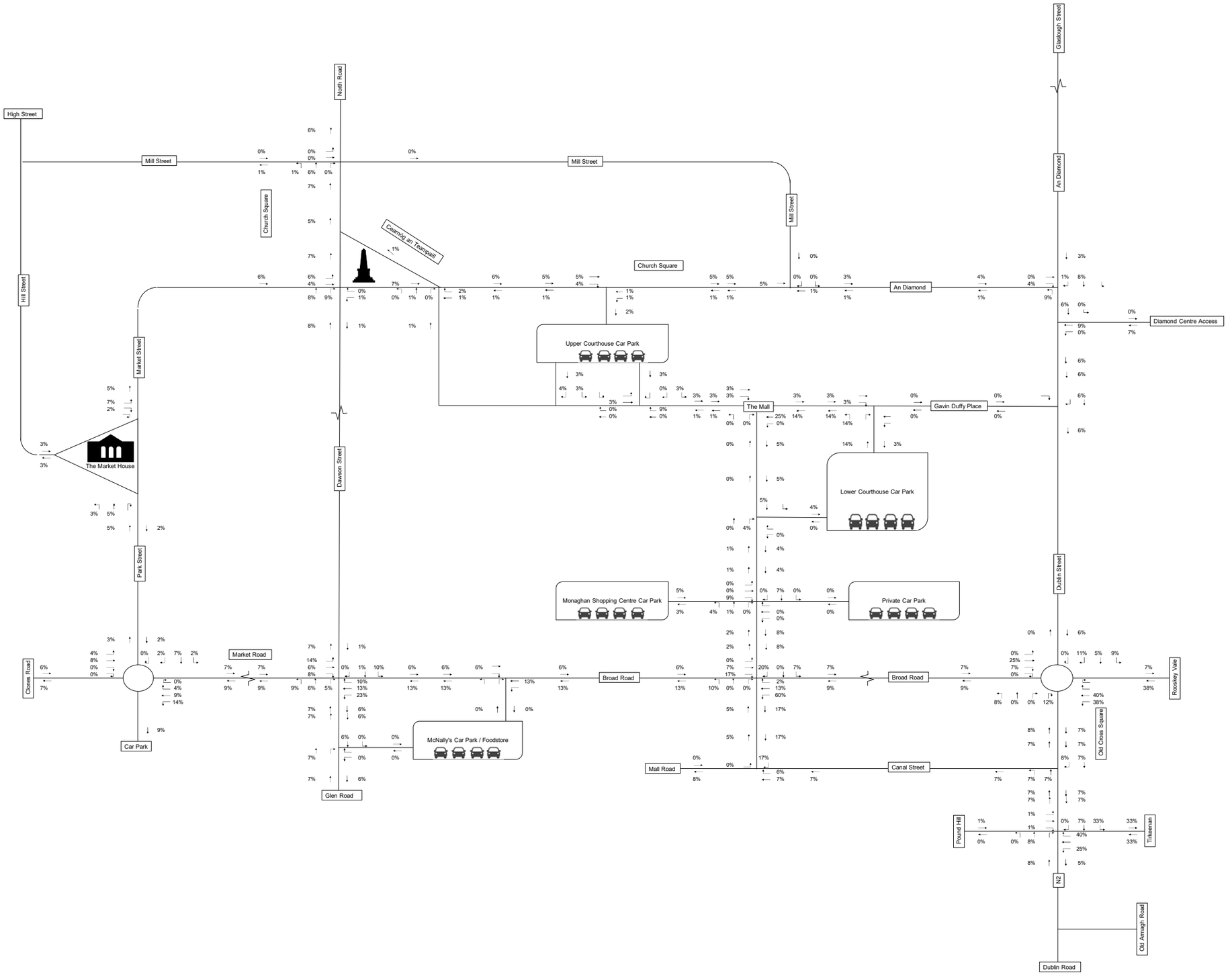
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Existing Traffic Flows



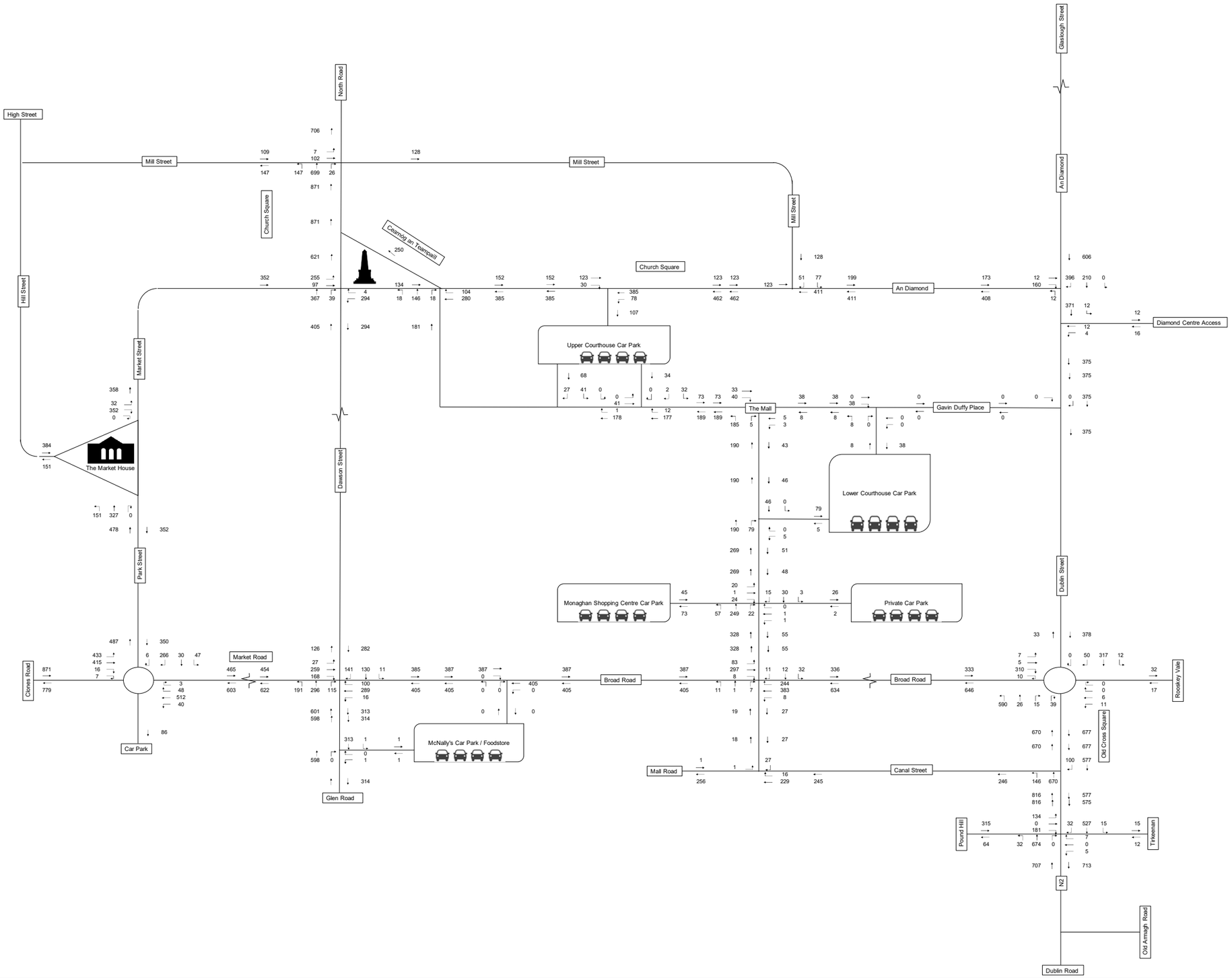
MAKING COMPLEX EASY

IBH0710 Monaghan Public Realm
2021 Existing Flows
PCUs
AM Peak 08:15-09:15



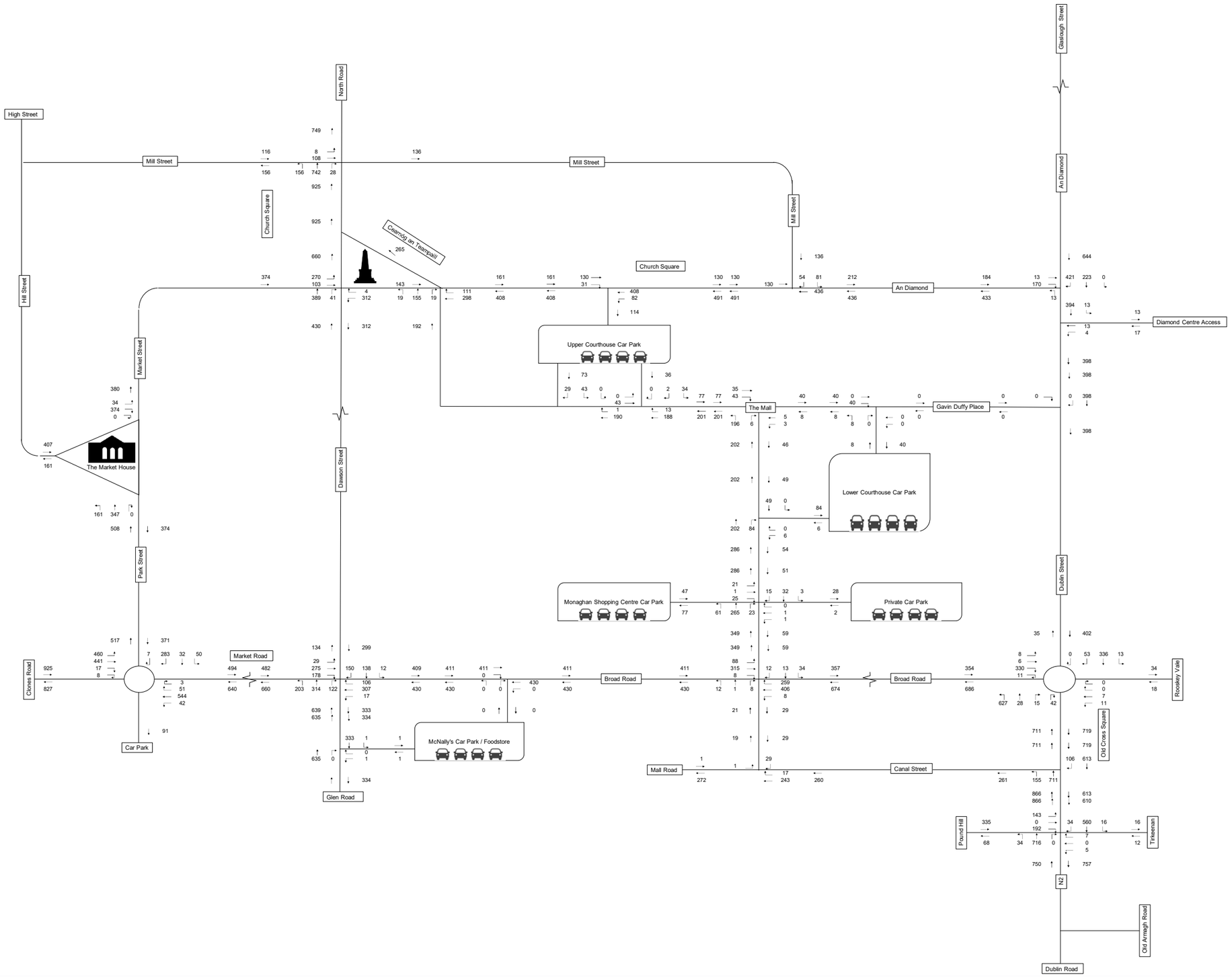
MAKING COMPLEX EASY

IBH0710 Monaghan Public Realm
2021 Existing Flows
% HV
AM Peak 08:15-09:15



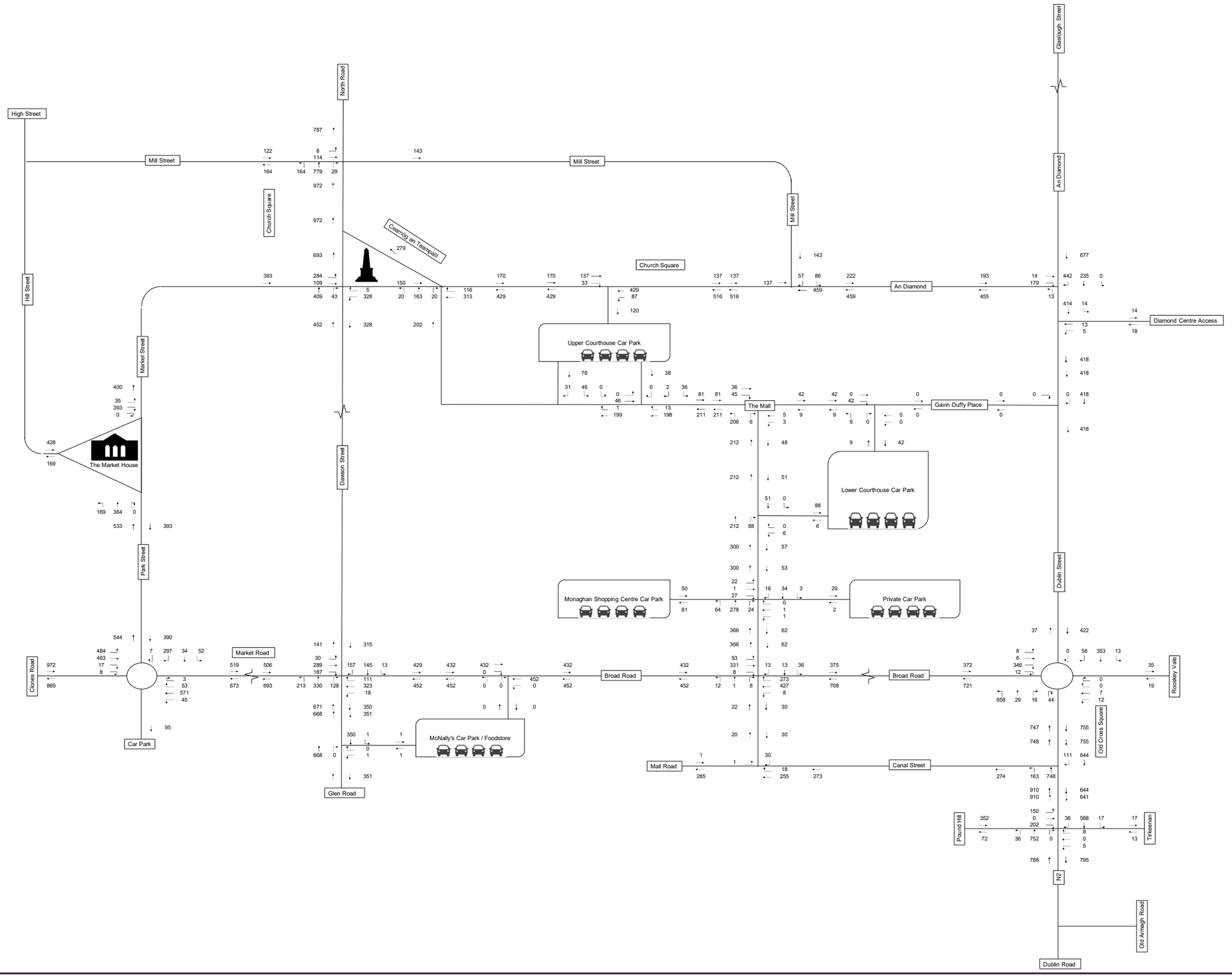
MAKING COMPLEX EASY

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2025 Existing Flows
PCU
AM Peak 08:15-09:15

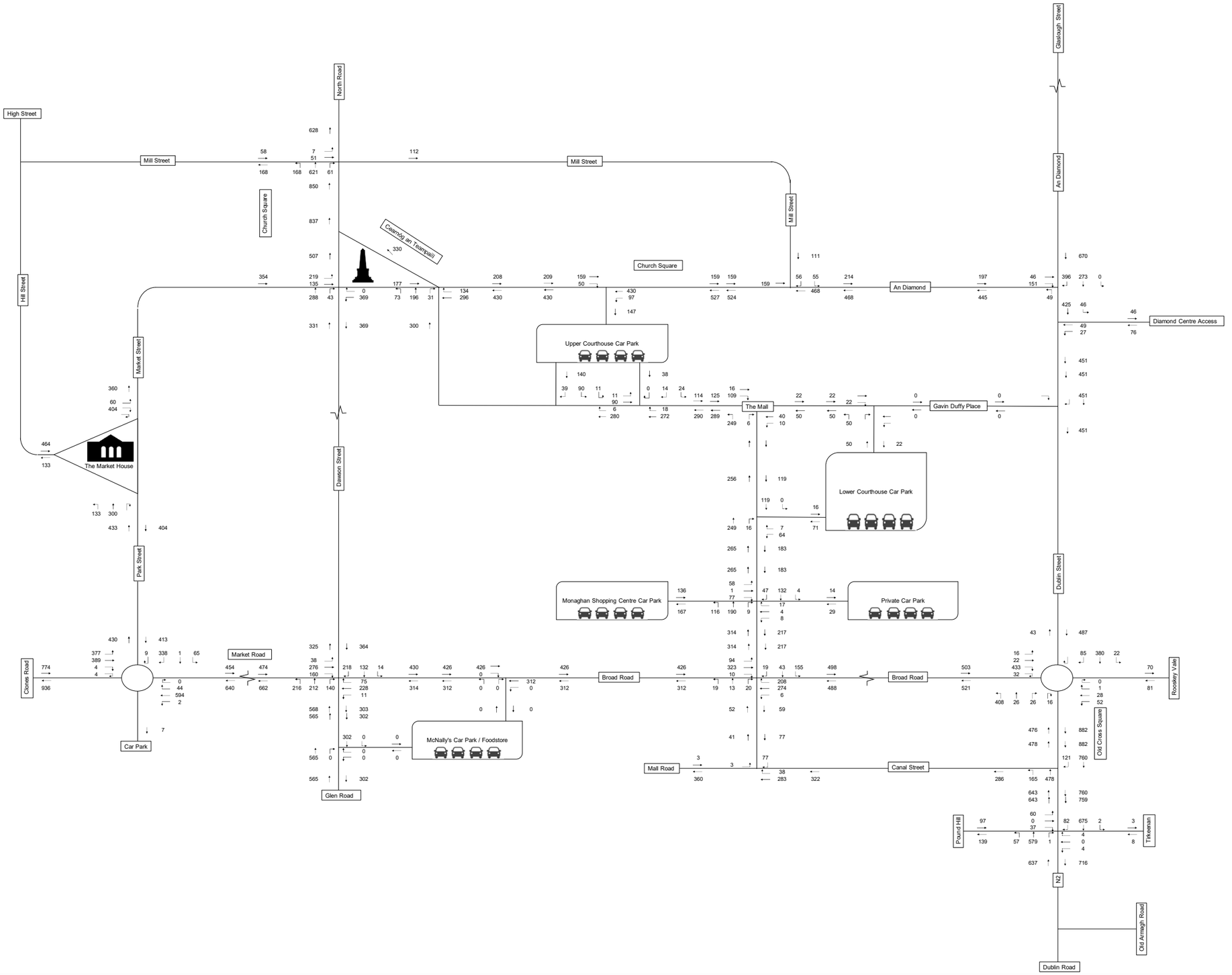


MAKING COMPLEX EASY

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2030 Existing Flows
PCU
AM Peak 08:15-09:15

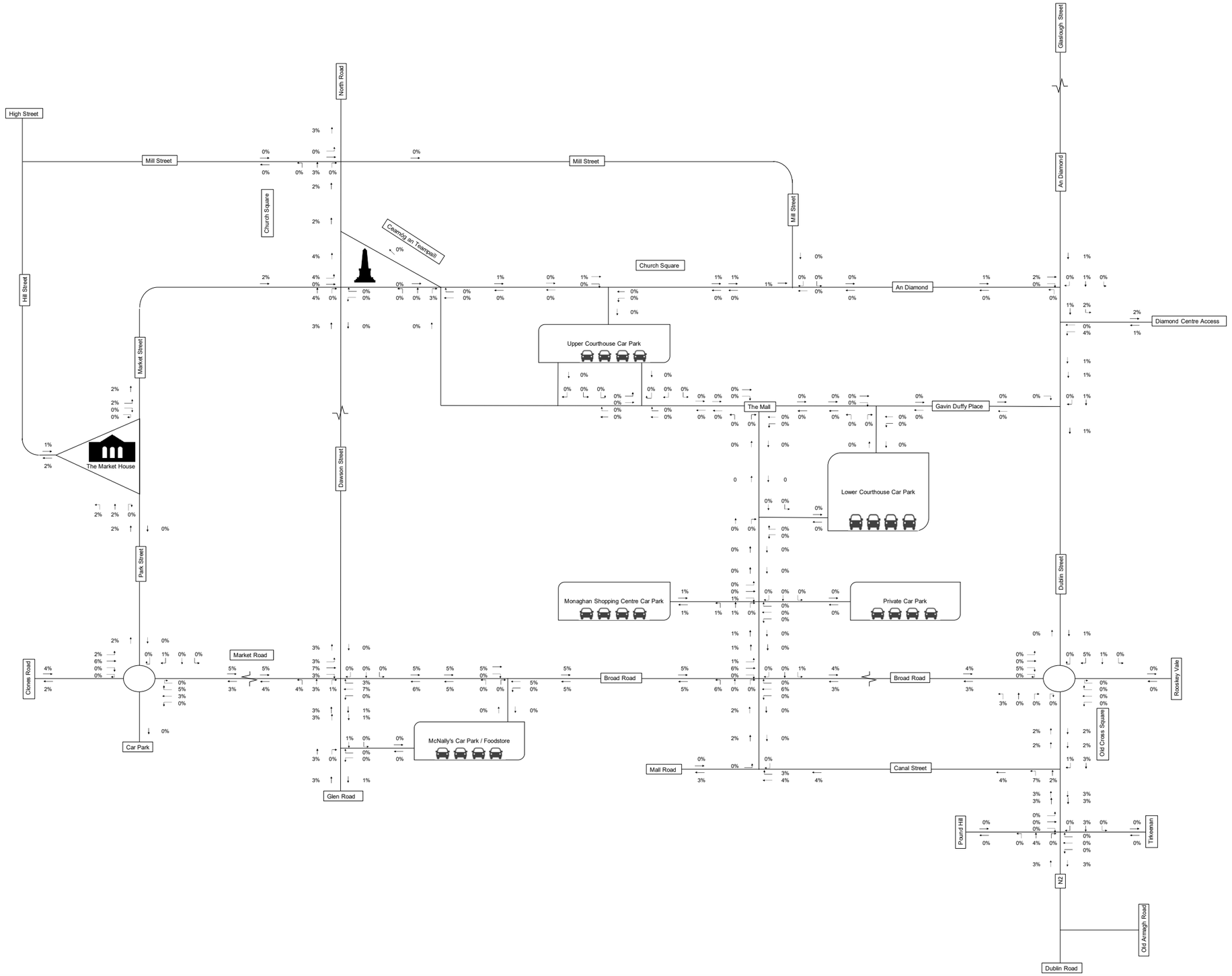


IBH0710 Monaghan Public Realm
2040 Existing Flows
PCU
AM Peak 08:15-09:15



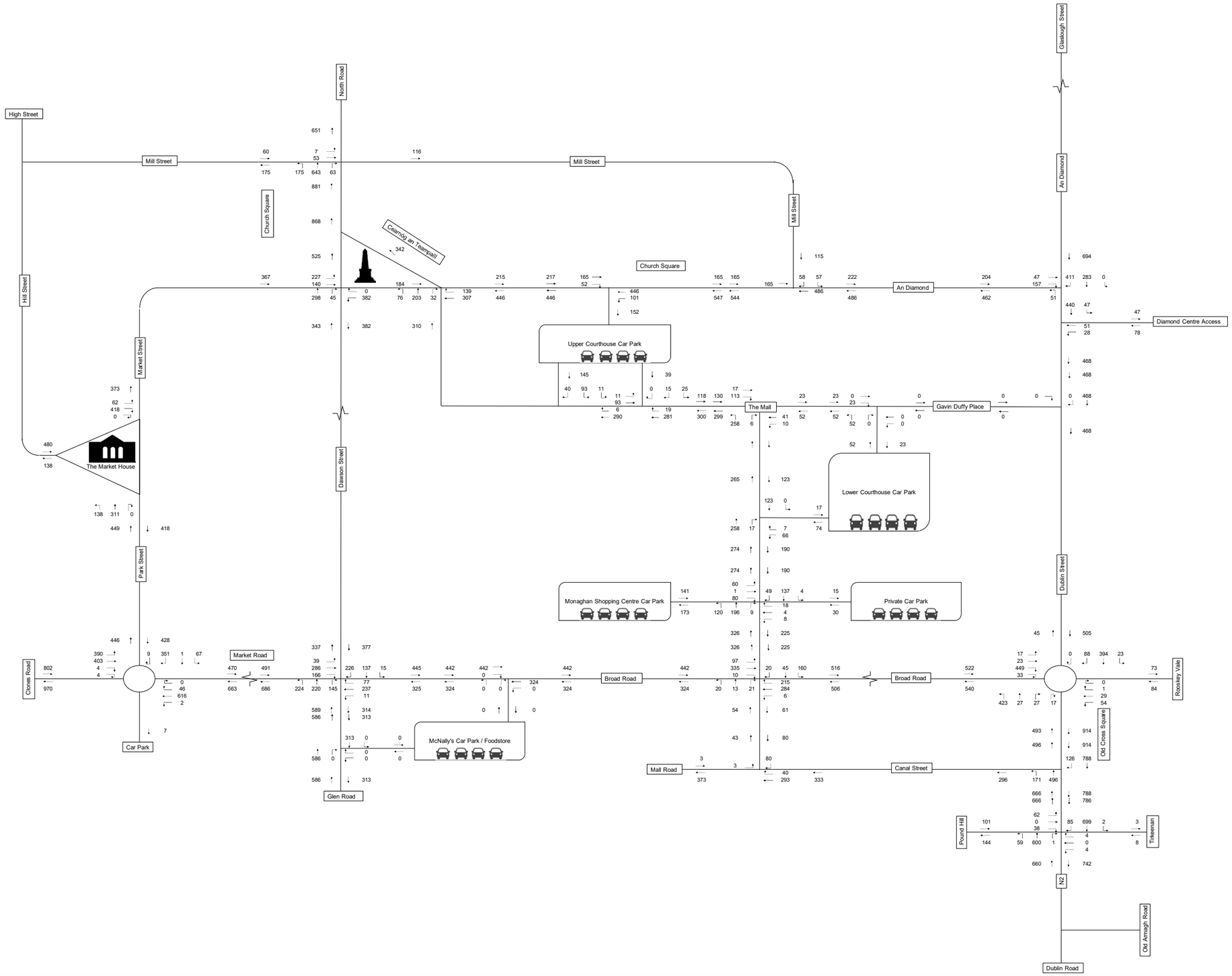
MAKING COMPLEX EASY

IBH0710 Monaghan Public Realm
2021 Existing Flows
PCUs
PM Peak 17:15-18:15



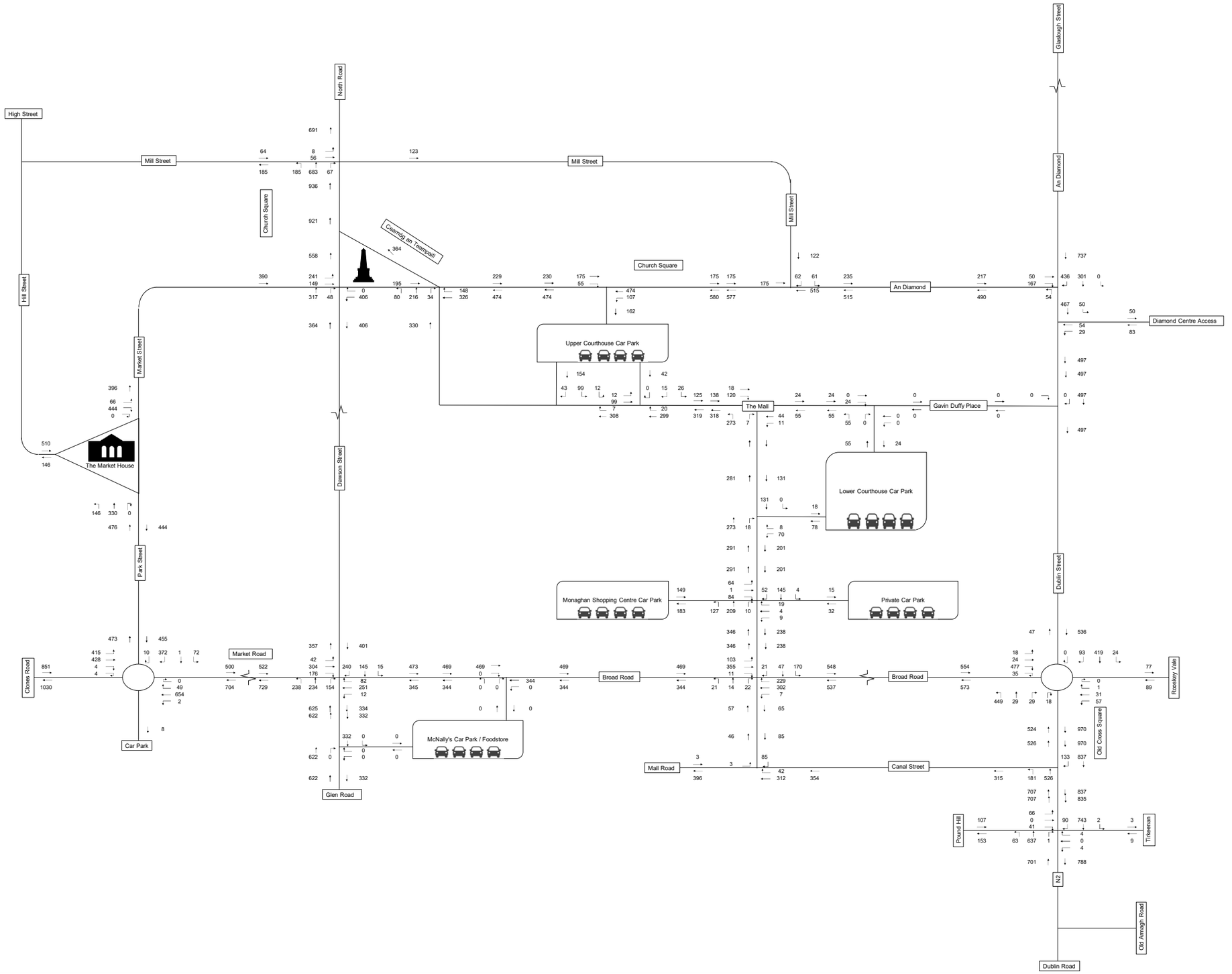
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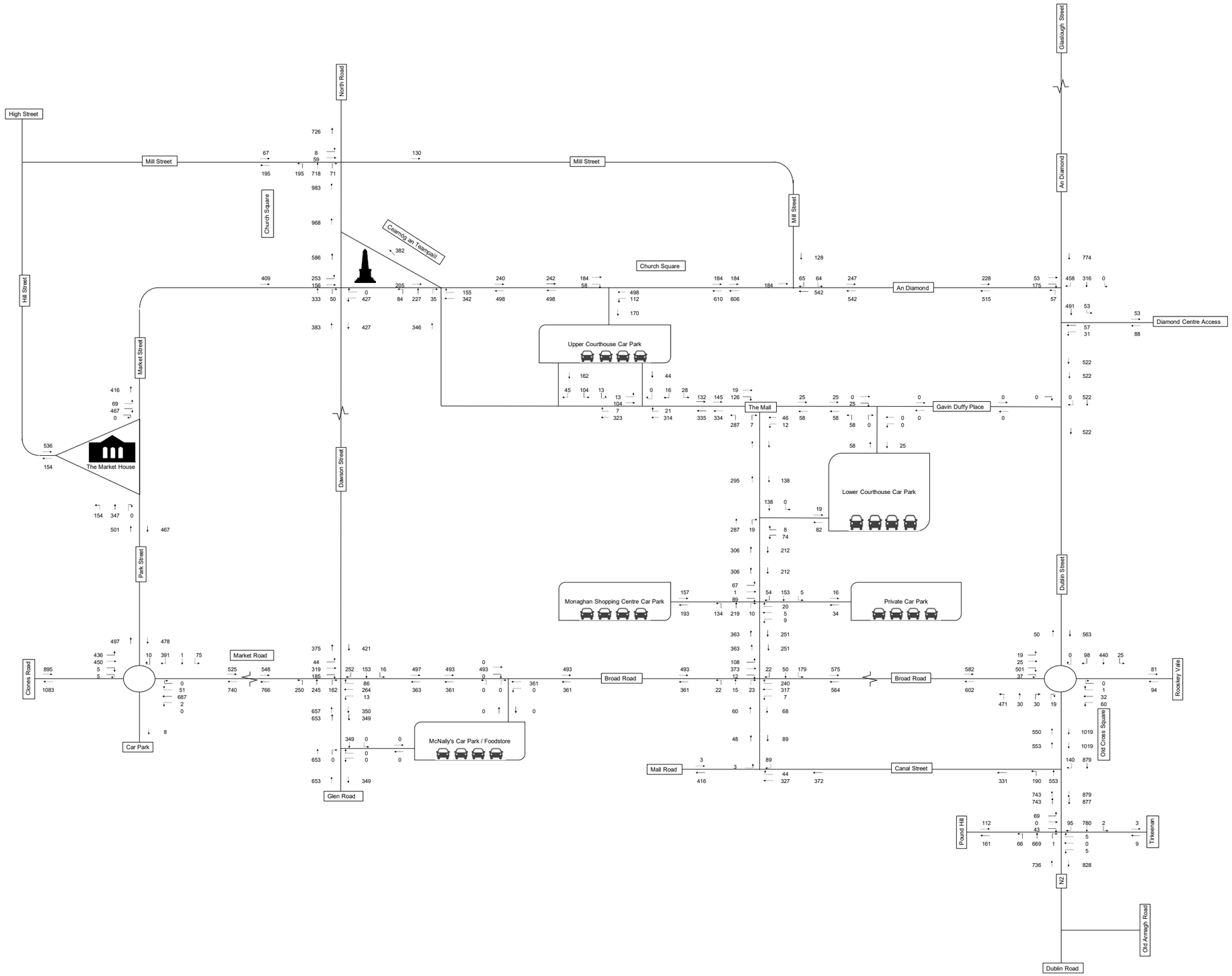
IBH0710 Monaghan Public Realm
2021 Existing Flows
% HV
PM Peak 17:15-18:15



MAKING COMPLEX EASY

IBH0710 Monaghan Public Realm
2025 Existing Flows
PCUs
PM Peak 17:15-18:15


North Road
High Street
Mill Street
Church Square
Cearnóg an Teampaill
Mill Street
Glaslough Street
An Diamond
Hill Street
Church Square
An Diamond
Diamond Centre Access
Market Street
Upper Courthouse Car Park
The Market House
The Mall
Gavin Duffy Place
Dawson Street
Lower Courthouse Car Park
Park Street
Monaghan Shopping Centre Car Park
Private Car Park
Dublin Street
Clones Road
Market Road
Broad Road
Broad Road
Rockley Vale
Car Park
McNally's Car Park / Foodstore
Old Cross Square
Mall Road
Canal Street
Pound Hill
Tirkeenan
N2
Old Armagh Road
Glen Road
Dublin Road



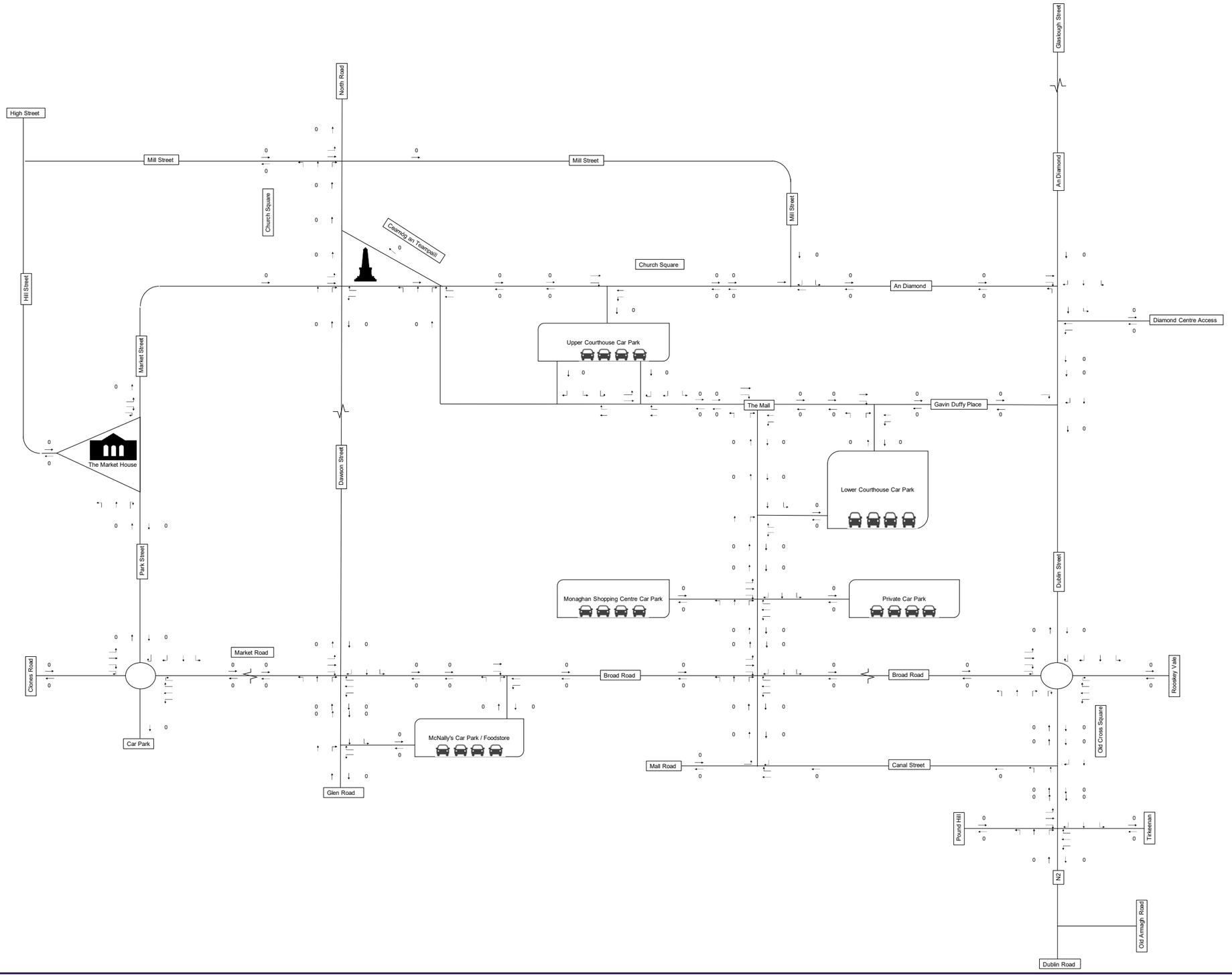
MAKING COMPLEX EASY

IBH0710 Monaghan Public Realm
2040 Existing Flows
PCUs
PM Peak 17:15-18:15

Appendix

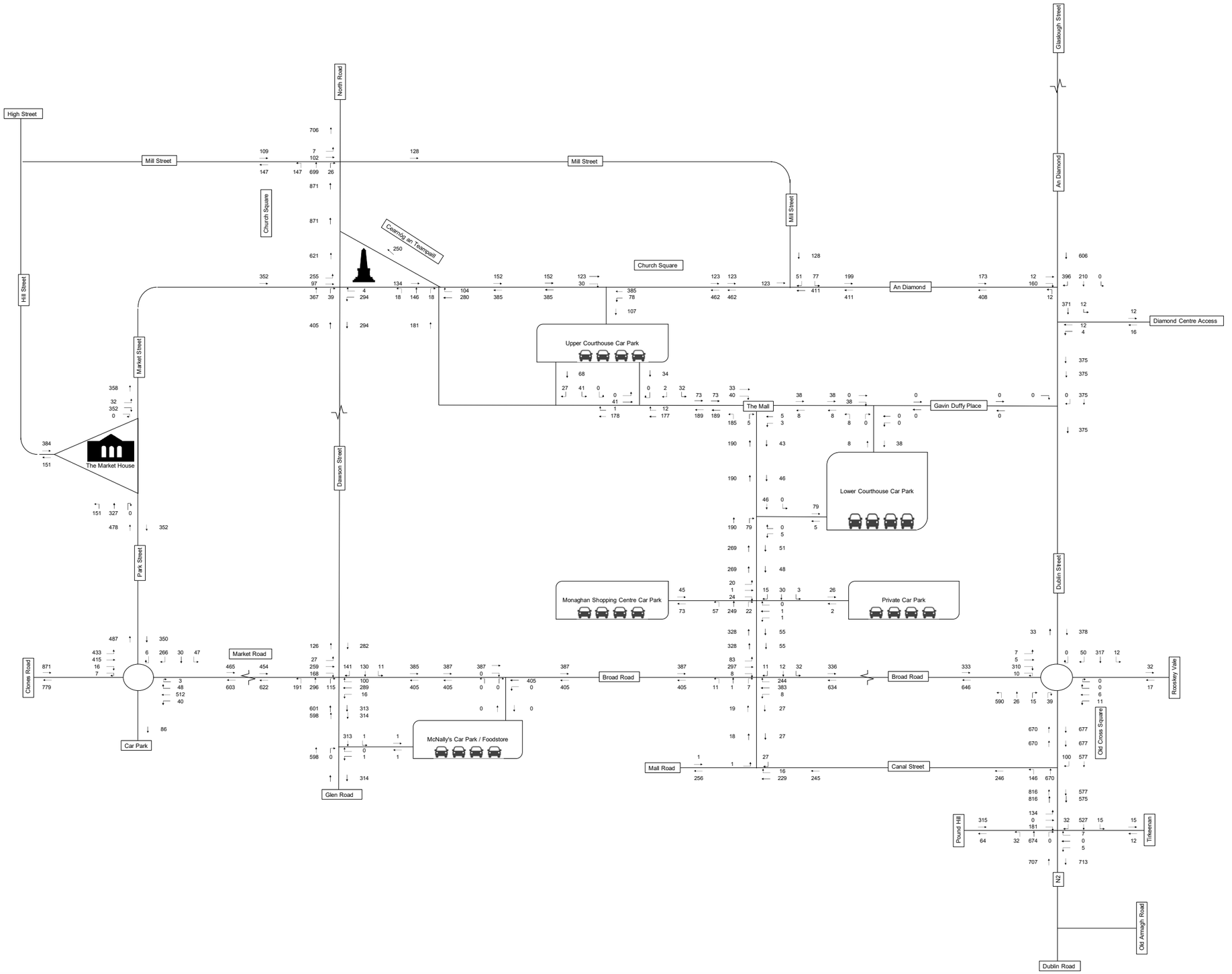
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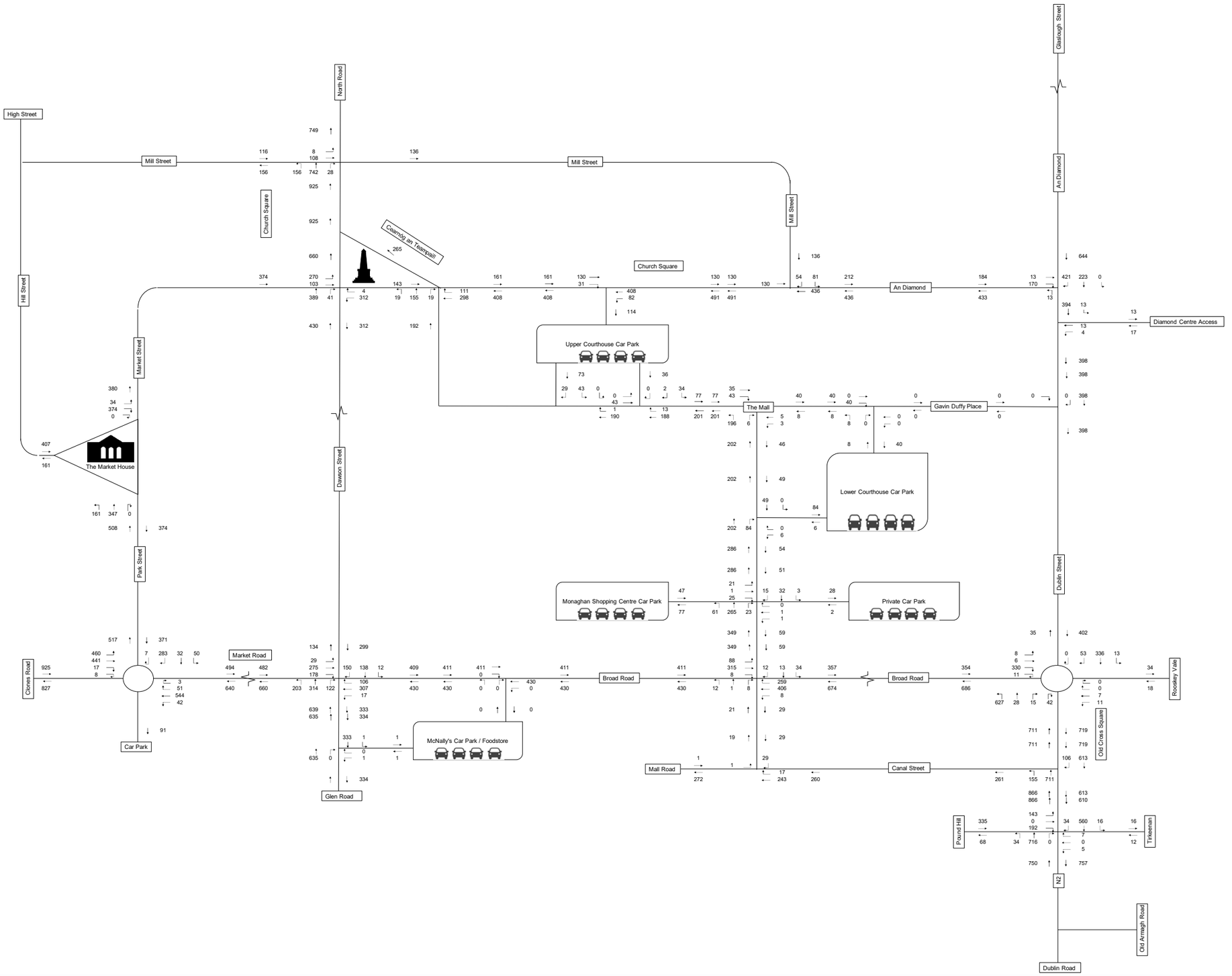
Committed & Base Traffic



MAKING COMPLEX EASY

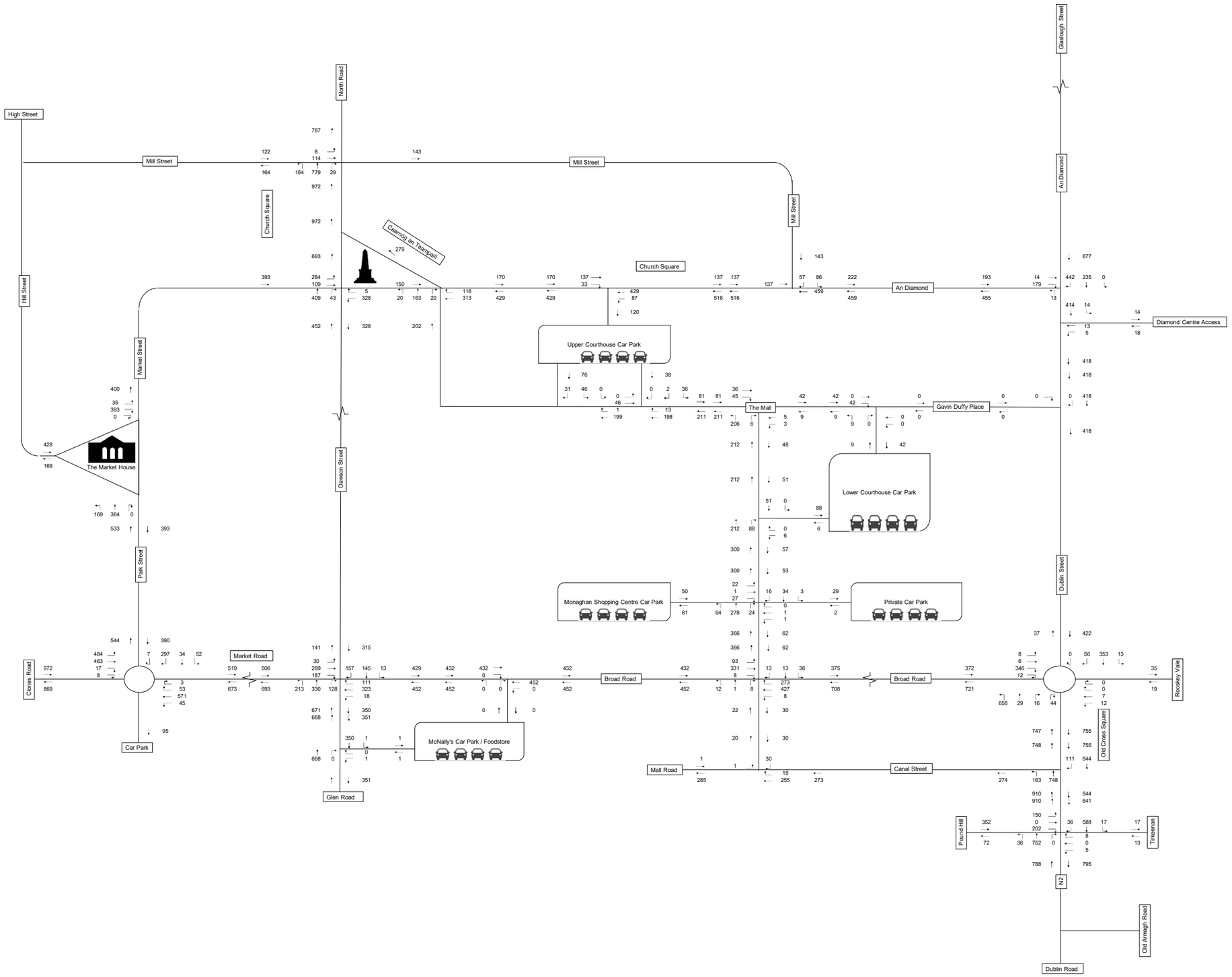
IBH0710 Monaghan Public Realm
Cumulative Development - NO TRIPS IN AM
Total Vehicles/PCU
AM Peak 08:15-09:15


North Road
High Street
Mill Street
Church Square
Cearrbhaigh an Teampaill
Mill Street
Glasdough Street
An Diamond
Hill Street
Market Street
Church Square
An Diamond
Diamond Centre Access
Upper Courthouse Car Park
The Market House
Dawson Street
The Mall
Gavin Duffy Place
Lower Courthouse Car Park
Park Street
Monaghan Shopping Centre Car Park
Private Car Park
Dublin Street
Clones Road
Market Road
Broad Road
Broad Road
Rooskey Vale
Car Park
McNally's Car Park / Foodstore
Old Cross Square
Mall Road
Canal Street
Pound Hill
Tirkeenan
N2
Old Armagh Road
Glen Road
Dublin Road



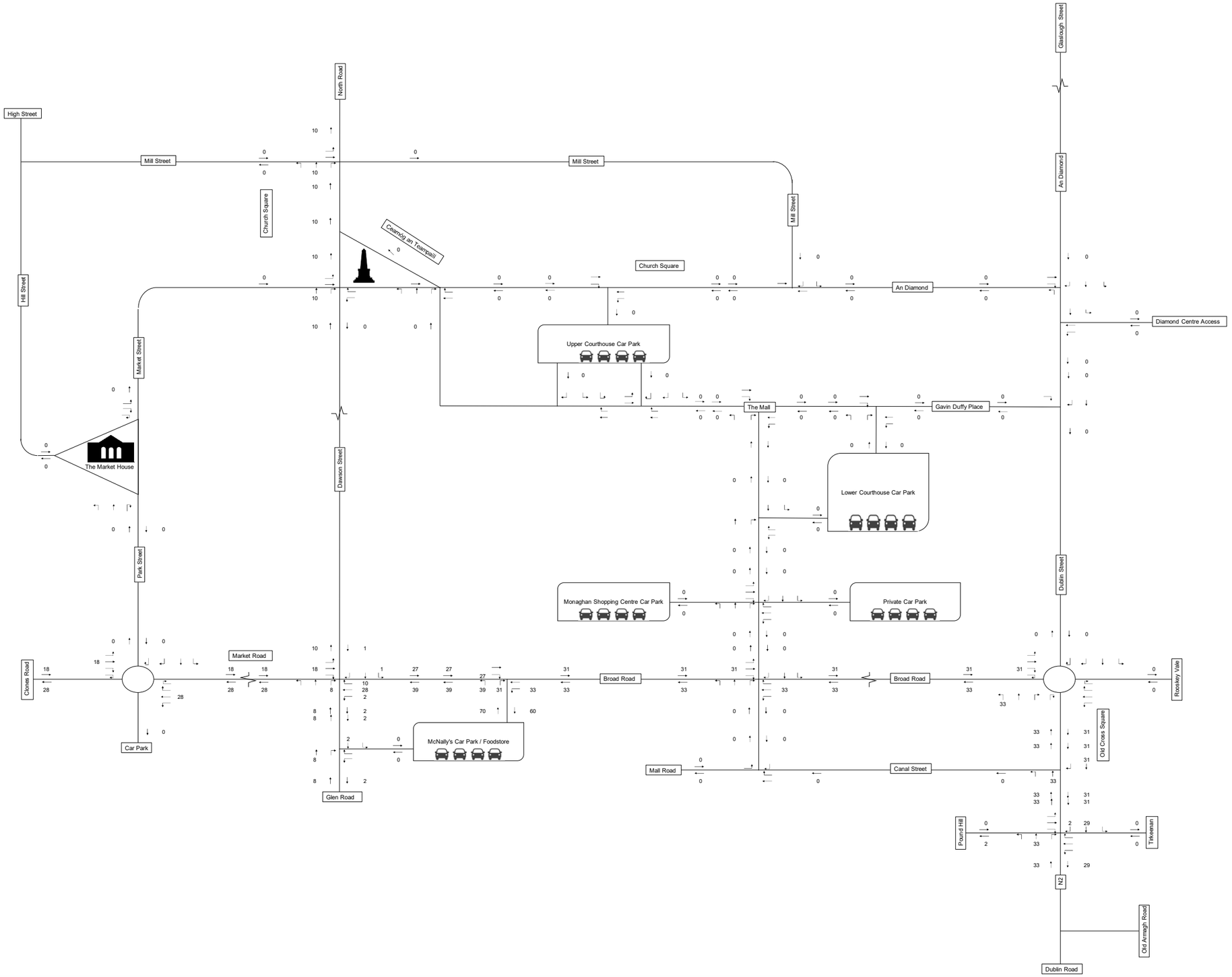
MAKING COMPLEX EASY

IBH0710 Monaghan Public Realm
2030 Base Flows
PCU
AM Peak 08:15-09:15



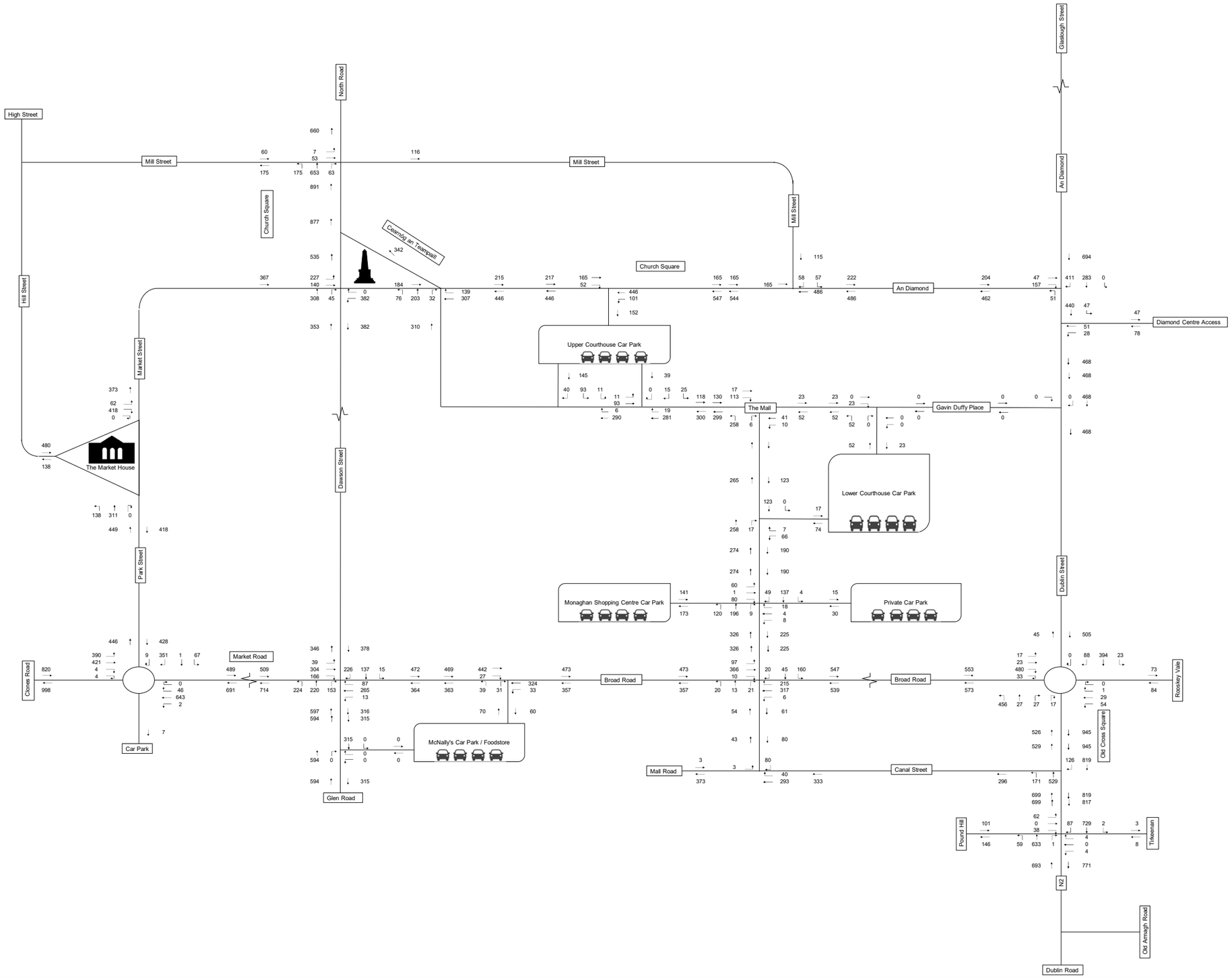
MAKING COMPLEX EASY

IBH0710 Monaghan Public Realm
2040 Base Flows
PCU
AM Peak 08:15-09:15



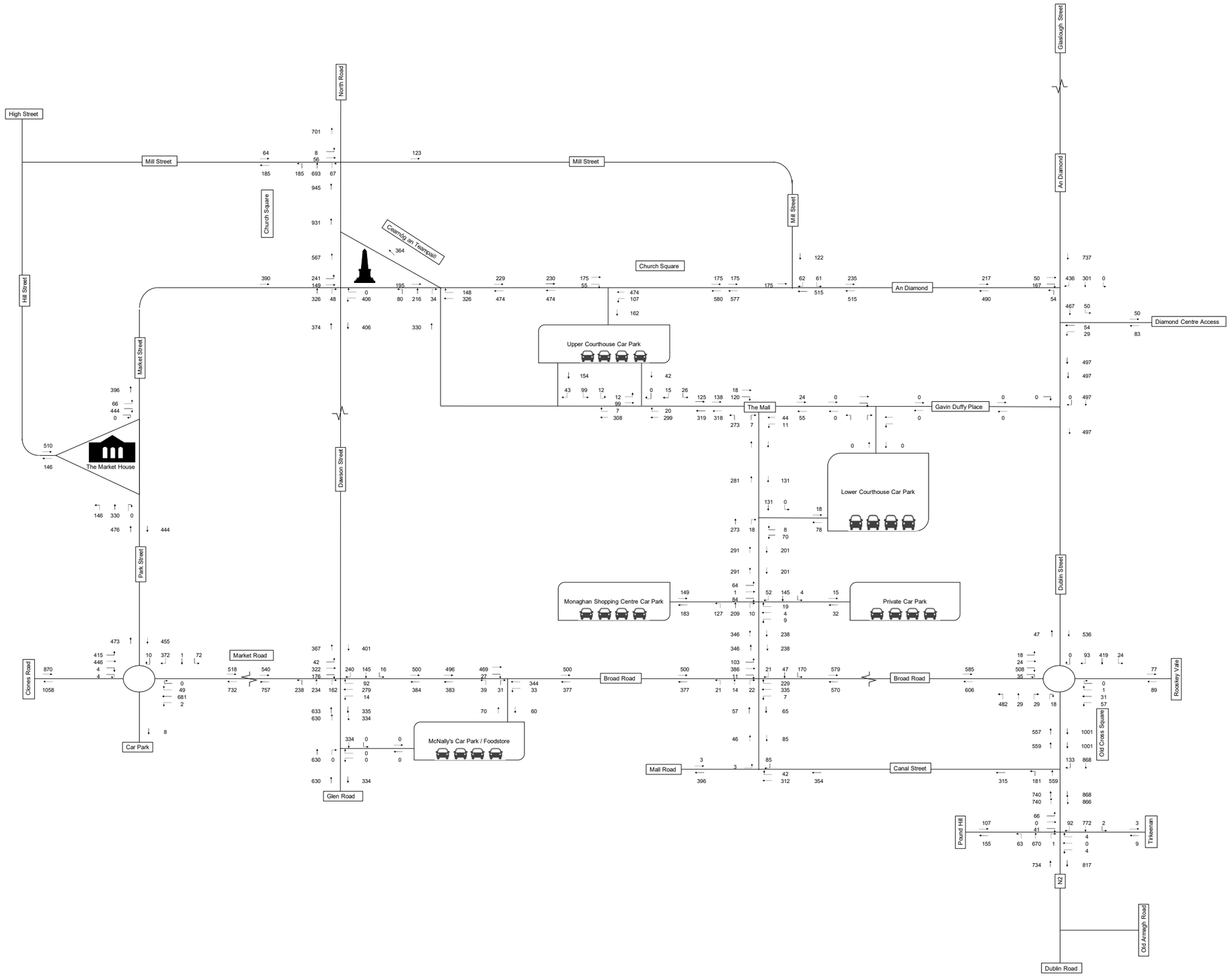
MAKING COMPLEX EASY

IBH0710 Monaghan Public Realm
Cumulative Development
Total Vehicles/PCU
PM Peak 17:15-18:15



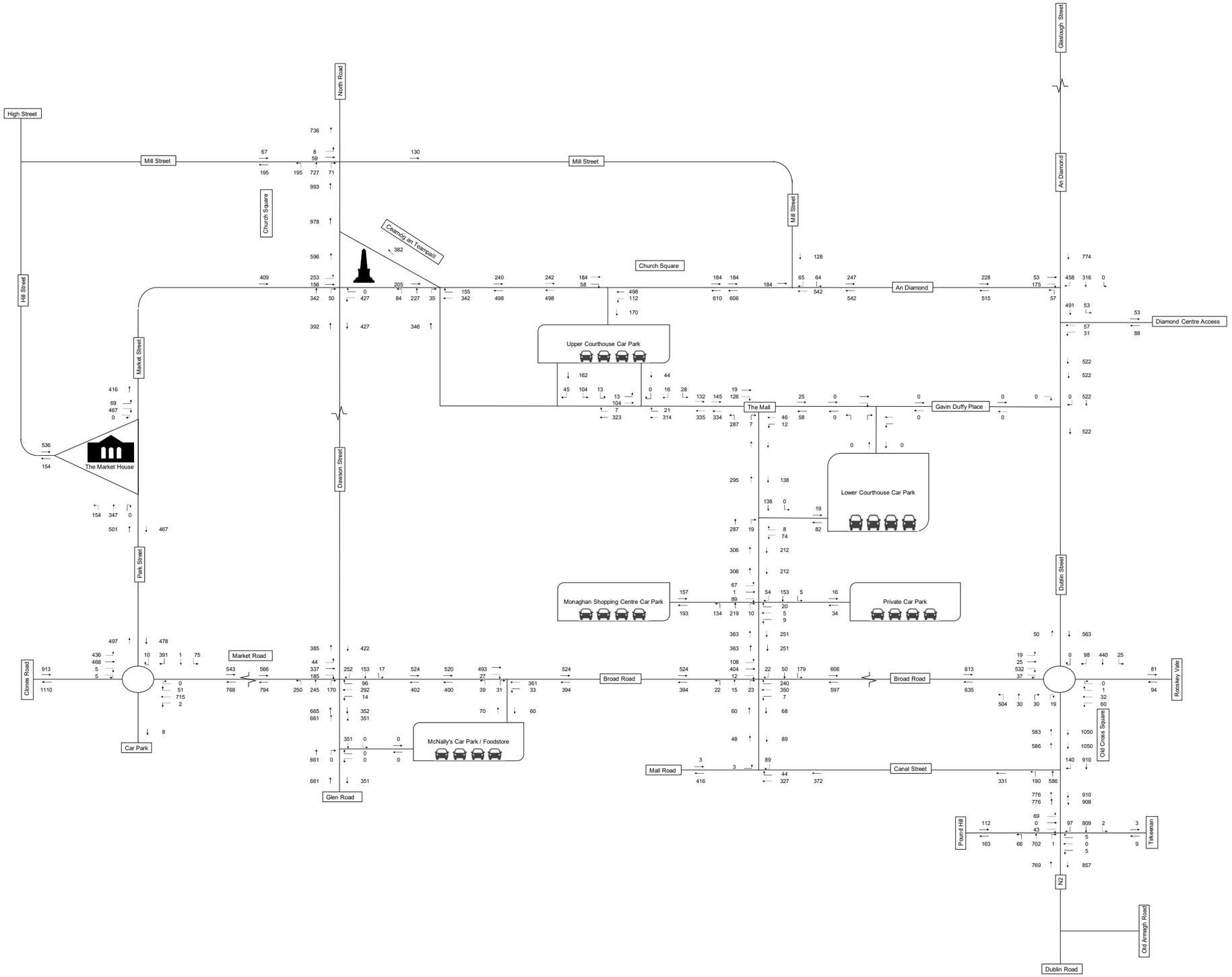
MAKING COMPLEX EASY

IBH0710 Monaghan Public Realm
2025 Base Flows
PCU
PM Peak 17:15-18:15



MAKING COMPLEX EASY

IBH0710 Monaghan Public Realm
2030 Base Flows
PCU
PM Peak 17:15-18:15



MAKING COMPLEX EASY

IBH0710 Monaghan Public Realm
2040 Base Flows
PCU
PM Peak 17:15-18:15

Appendix

15a

Photographic Record

Appendix 15A: Photographic Record



Plate 1: View facing northwest towards Dublin Street ACA and Monaghan First Presbyterian Church (NIAH 41303131 and RPS 41001050)



Plate 2: View facing east from development boundary towards market cross (MO009-060006-)



Plate 3: View facing west of Dublin Street ACA including No 10 Dublin Street (NIAH ref. 41303129, RPS ref. 41001071)



Plate 4: View facing southeast of No.10 Dublin Street (RPS ref. 41001071, NIAH ref. 41303129)



Plate 5: View facing north of location of TP003, No. 10 Dublin Street (RPS ref. 41001071, NIAH ref. 41303129)



Plate 6: View facing east of The Diamond ACA towards C McNally (NIAH 41303126, RPS 41001086) and Magill Jewellers (NIAH 41303127, RPS Local 3)



Plate 7: View facing southeast of Monaghan Town Hall (NIAH 41303128, RPS 41001100)



Plate 8: View of The Diamond ACA from the northern boundary of the proposed development area towards town defences (MO009-060004-) and 16th century house (MO009-060010-).



Plate 9: View facing north from northwest boundary of proposed development of The Diamond ACA towards location of town defences (MO009-060004-) and 16th C house (MO009-060010-)



Plate 10: View facing south of western boundary of development from graveyard (MO009-060009-) and church (MO009-00012-)



Plate 11: View facing east towards western entrance of proposed new mews lane ‘Church Walk’ and possible location of Bawn MO009-060013 and House MO009-060003



Plate 12: View facing west towards Monaghan Courthouse (NIAH 41303123, RPS 41000170) and burial (MO009-060005-) from western boundary



Plate 13: View facing northwest from southwest corner of proposed development towards St Patrick's Church (NIAH 41001091, RPS 41303125) and Monaghan Courthouse (NIAH 41303123, RPS 41000170)



Plate 14: View facing east along site boundary (Castle Road) towards Monaghan First Presbyterian Church (NIAH Reg. no. 41303131 and RPS 41001050).



Plate 15: View facing north towards Dublin Street of laneway from boundary of development



Plate 16: View facing west along site boundary (Castle Road) to rear of Dublin Street properties



Plate 17: View facing south of rear plot at No.10 Dublin Street (RPS ref. 41001071, NIAH ref. 41303129)



Plate 18: View facing north of rear plot at Nos.8 and 9 The Diamond from southern boundary of development



Plate 19: View facing north of rear plot at No.7 Dublin Street (location of TR001) from southern boundary of development area

Appendix

15b

Cultural Heritage Figures

Appendix 15B: Figures

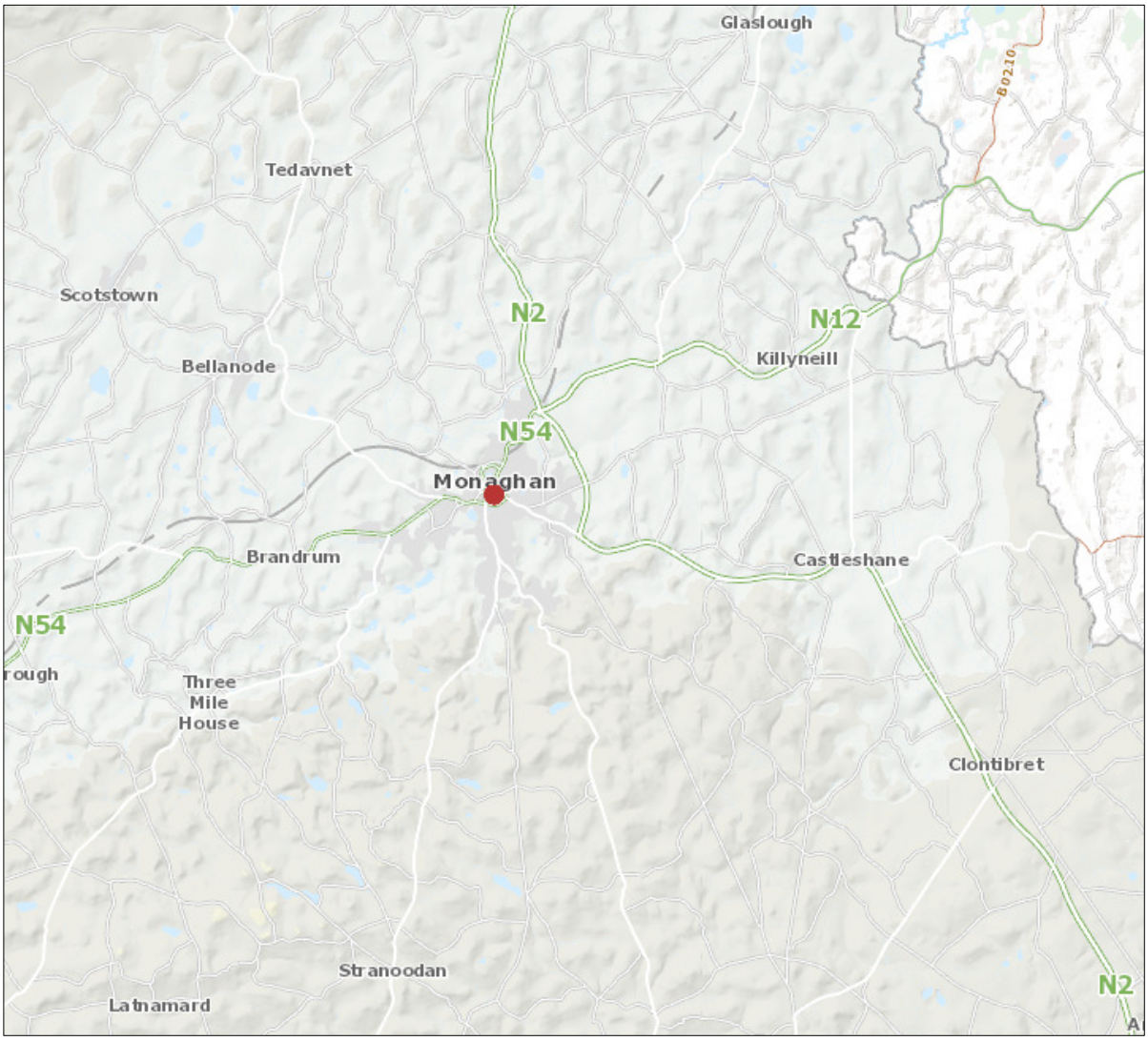


***Figure 15.1**: General location of subject site (OS 1:10000 scale) (Source: http://webgis.archaeology.ie/historicenvironment/)*



Figure 15.2: *Location of South Dublin Street & Backlands Regeneration Scheme area (red outline)*

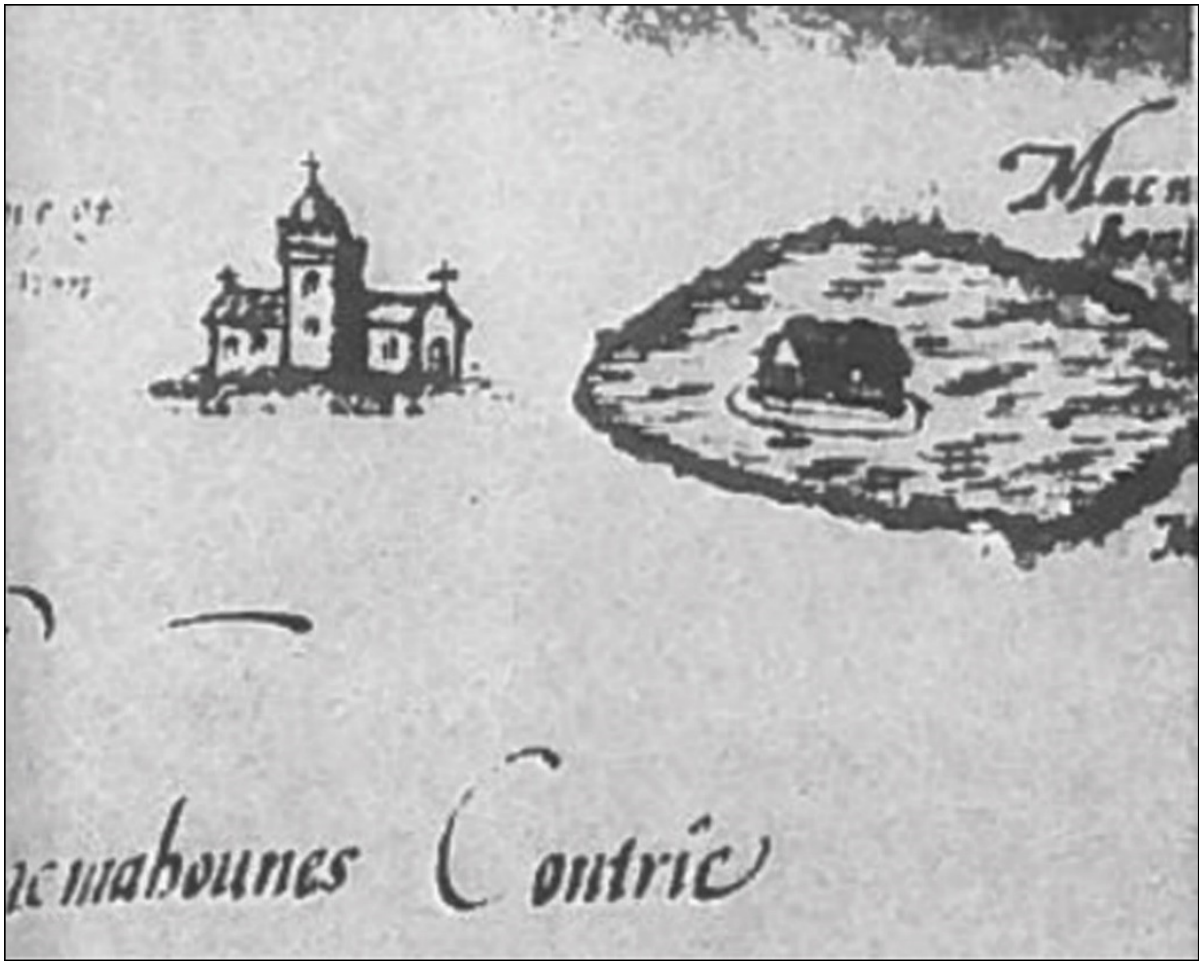


Figure 15.3: *Detail from c.1591 map believed to depict Franciscan Friary and Crannog (labelled 'MacMahoons house') at Monaghan (after Mooney 1957 pl.12)*

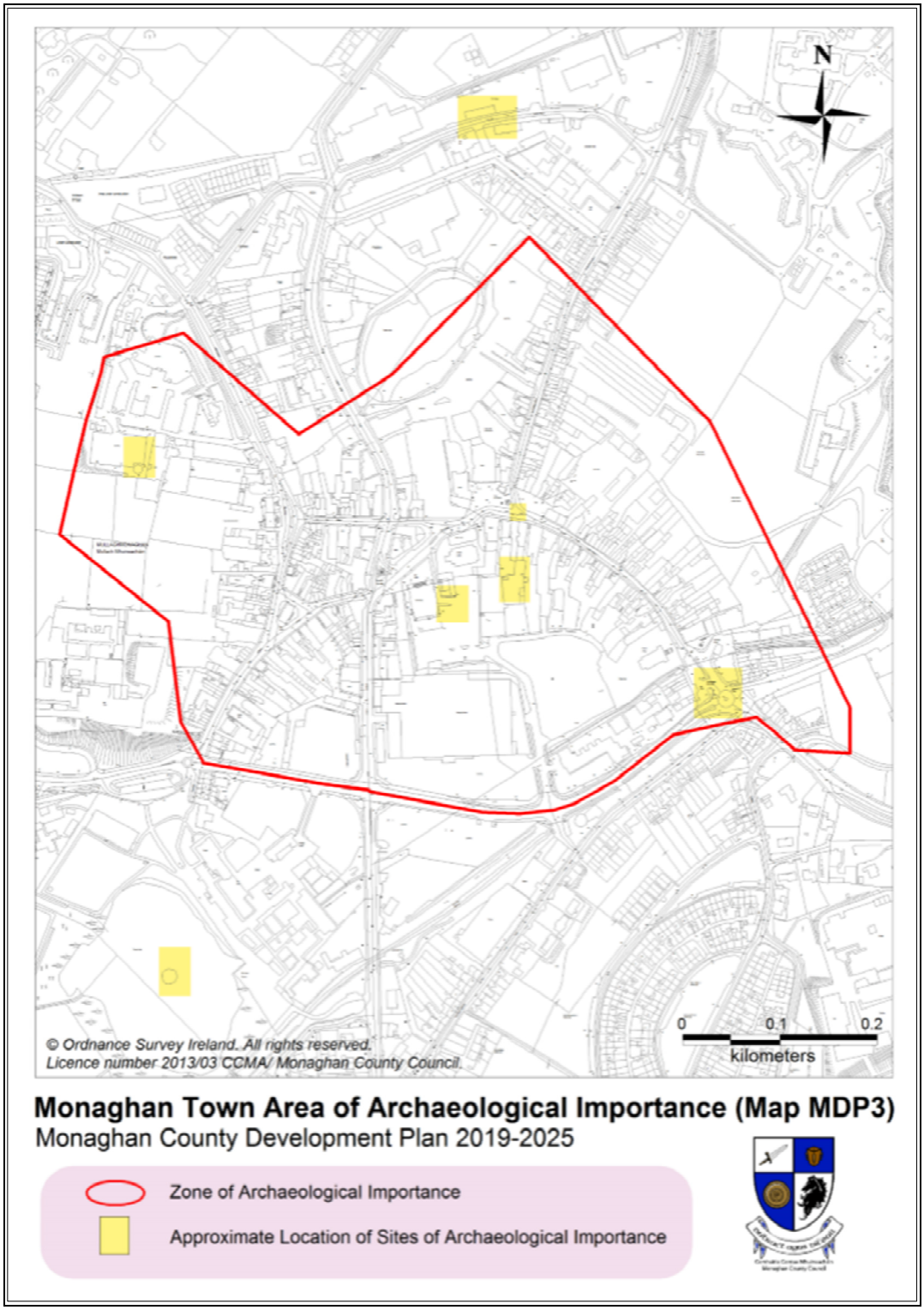


Figure 15.4: *Area of Archaeological Importance as defined in Monaghan County Development Plan 2019-2025*

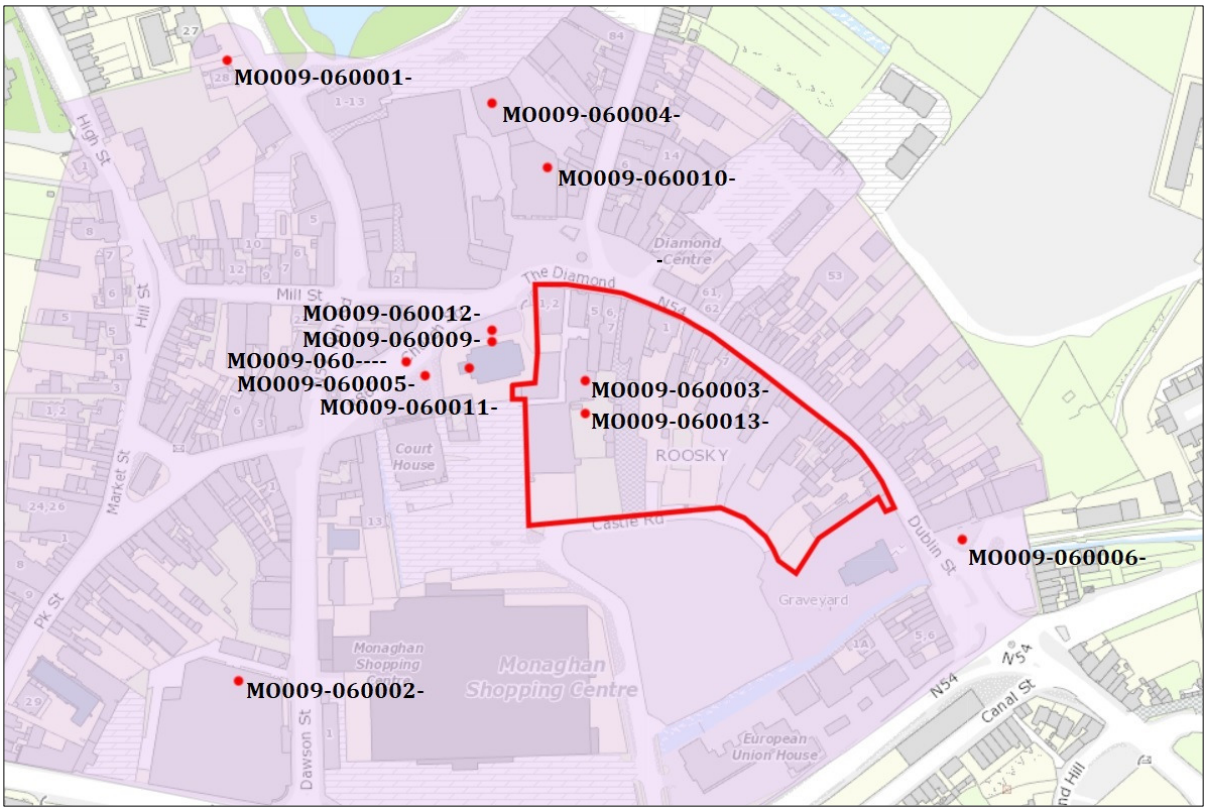


Figure 15.5: *Showing area of historic settlement (purple) and location of SMR sites (red dot) in study area (Source: http://webgis.archaeology.ie/historicenvironment/)*



Figure 15.6: *Detail from Brown and Baptiste's map of the County of Monaghan (1590)*



Figure 15.7: *Detail from Richard Bartlett's plan of Monaghan Fort (c.1602)*

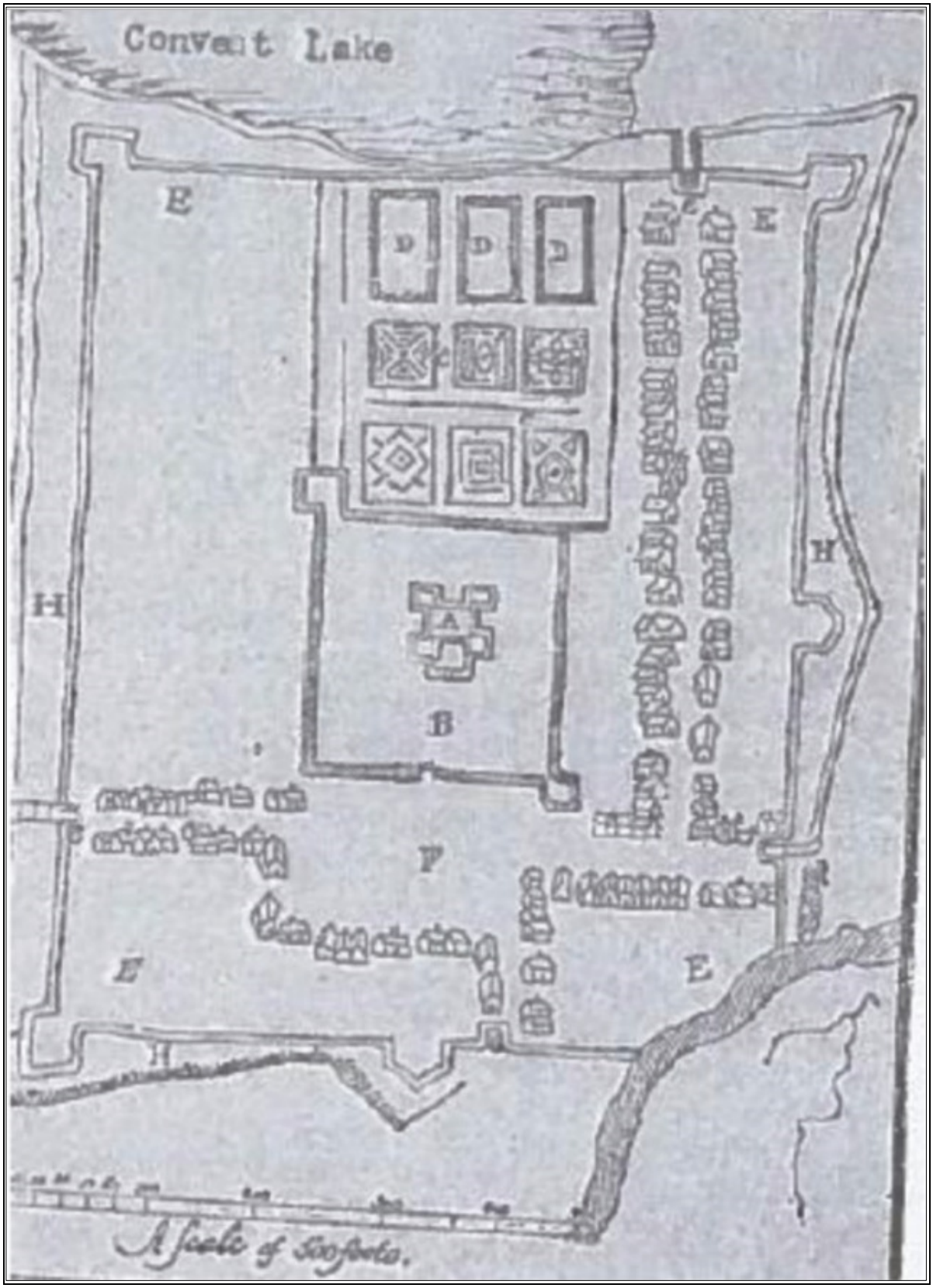


Figure 15.8: *Illustration of c.1611-13 map likely drawn up for Sir Edward Blaney (Ó Gallachair after Trinity College Dublin (Ms 1209 (32))*

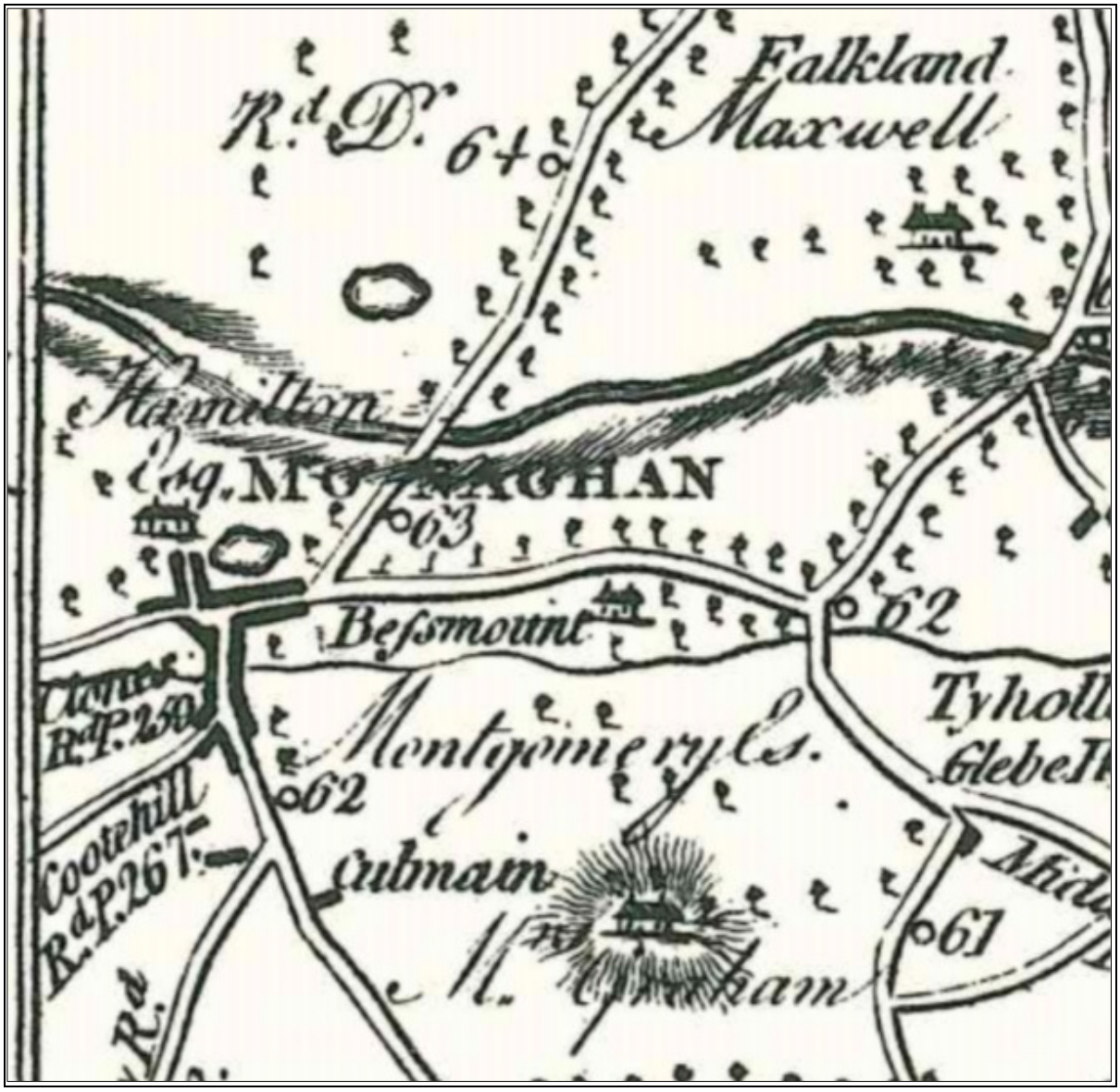


Figure 15.9: *Detail from Taylor and Skinner's Maps of the Roads of Ireland (1777)*

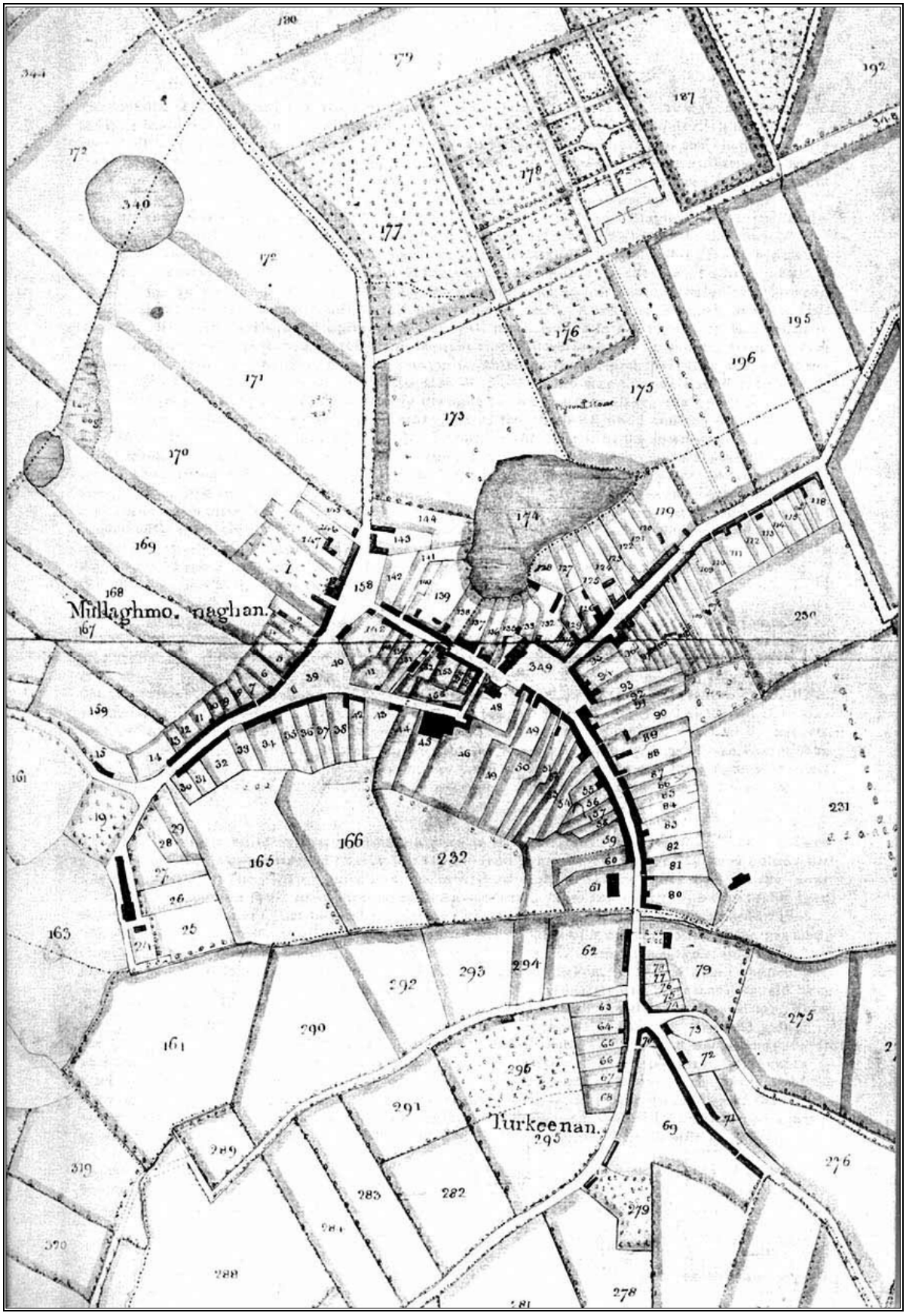


Figure 15.10: *Map of Monaghan town made by Arthur Richards Neville for the Rossmore Estate (1790)*

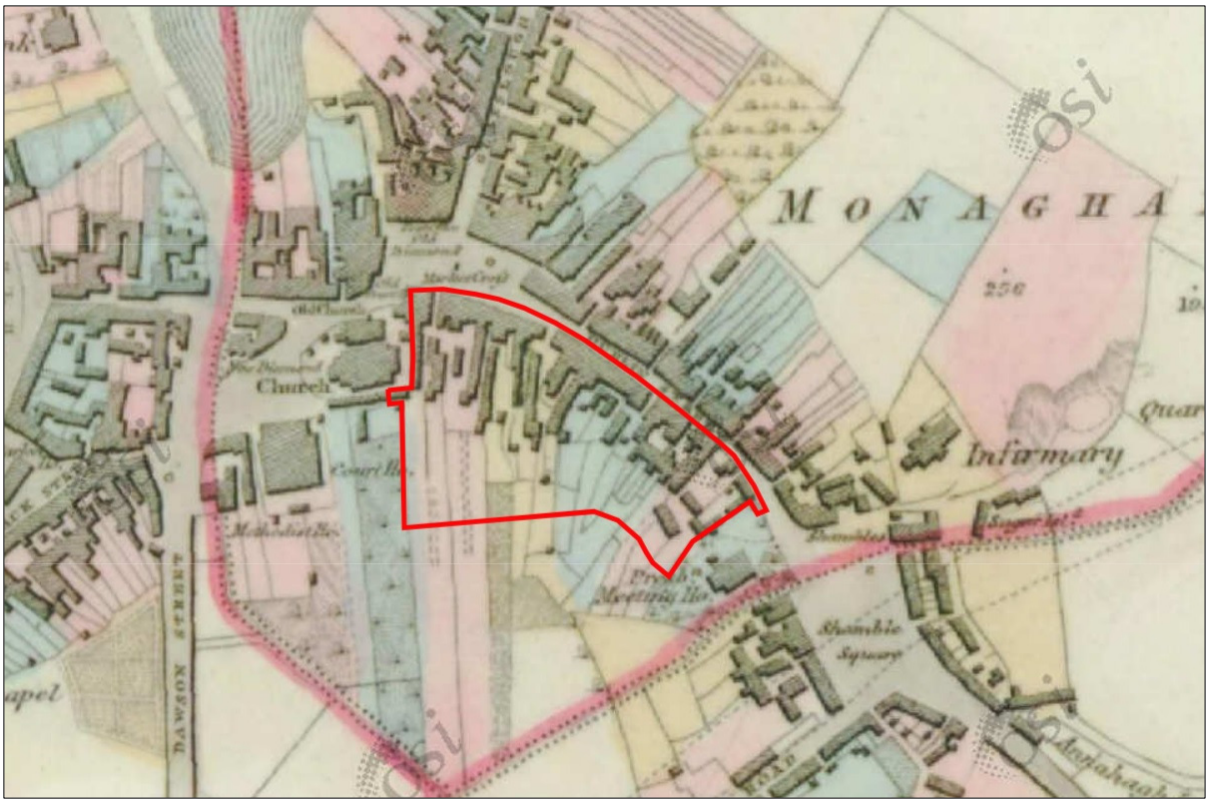


Figure 15.11: *Monaghan Town as depicted on first edition six-inch OS map (c.1836-1840) (Reproduced under Ordnance Survey Ireland Licence No. SU 0003320 (© Ordnance Survey Ireland/Government of Ireland)*

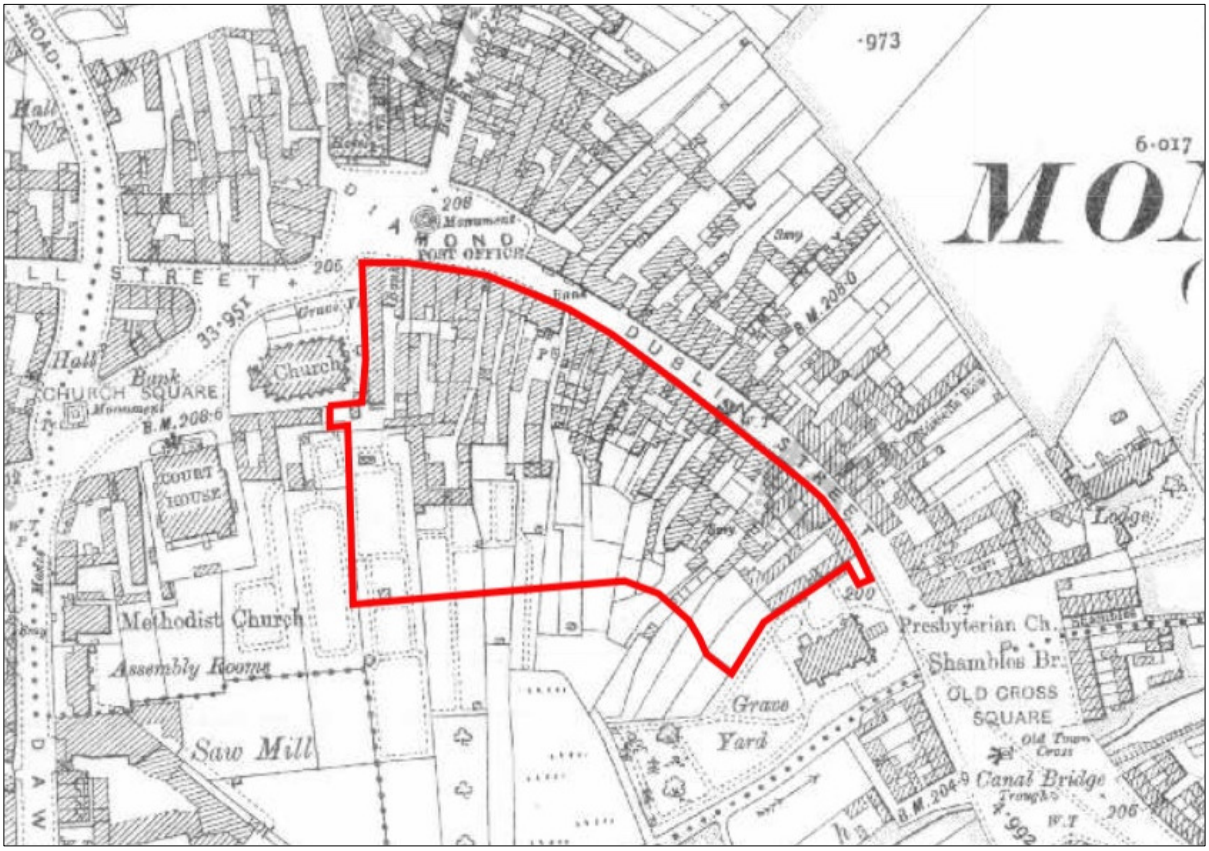


Figure 15.12: *Monaghan Town as depicted on 25-inch Ordnance Survey map (c.1910) (Reproduced under Ordnance Survey Ireland Licence No. SU 0003320 (© Ordnance Survey Ireland/Government of Ireland)*

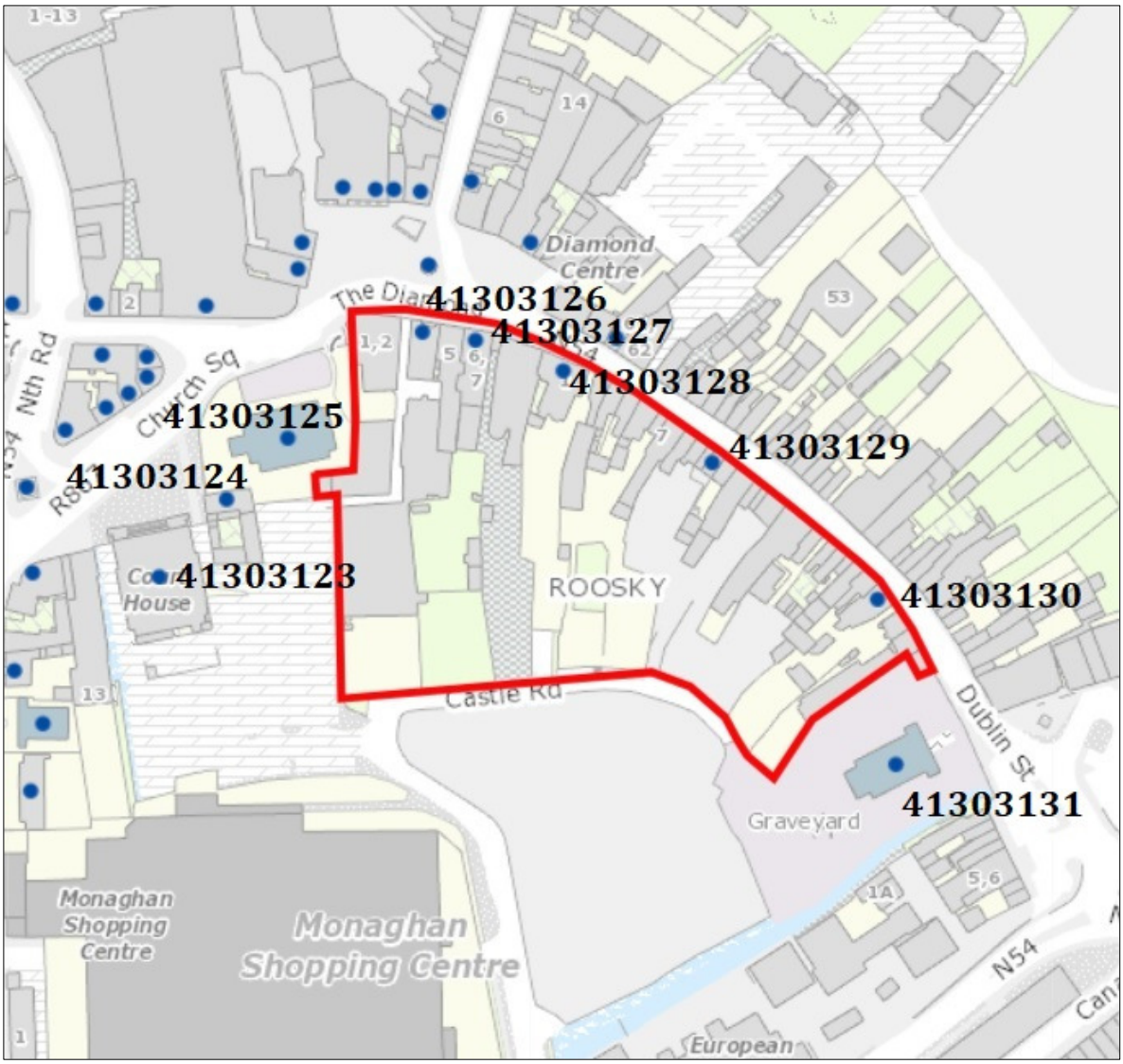


Figure 15.13: *NIAH sites within the development area (red) and immediate vicinity (Source: http://webgis.archaeology.ie/historicenvironment/)*

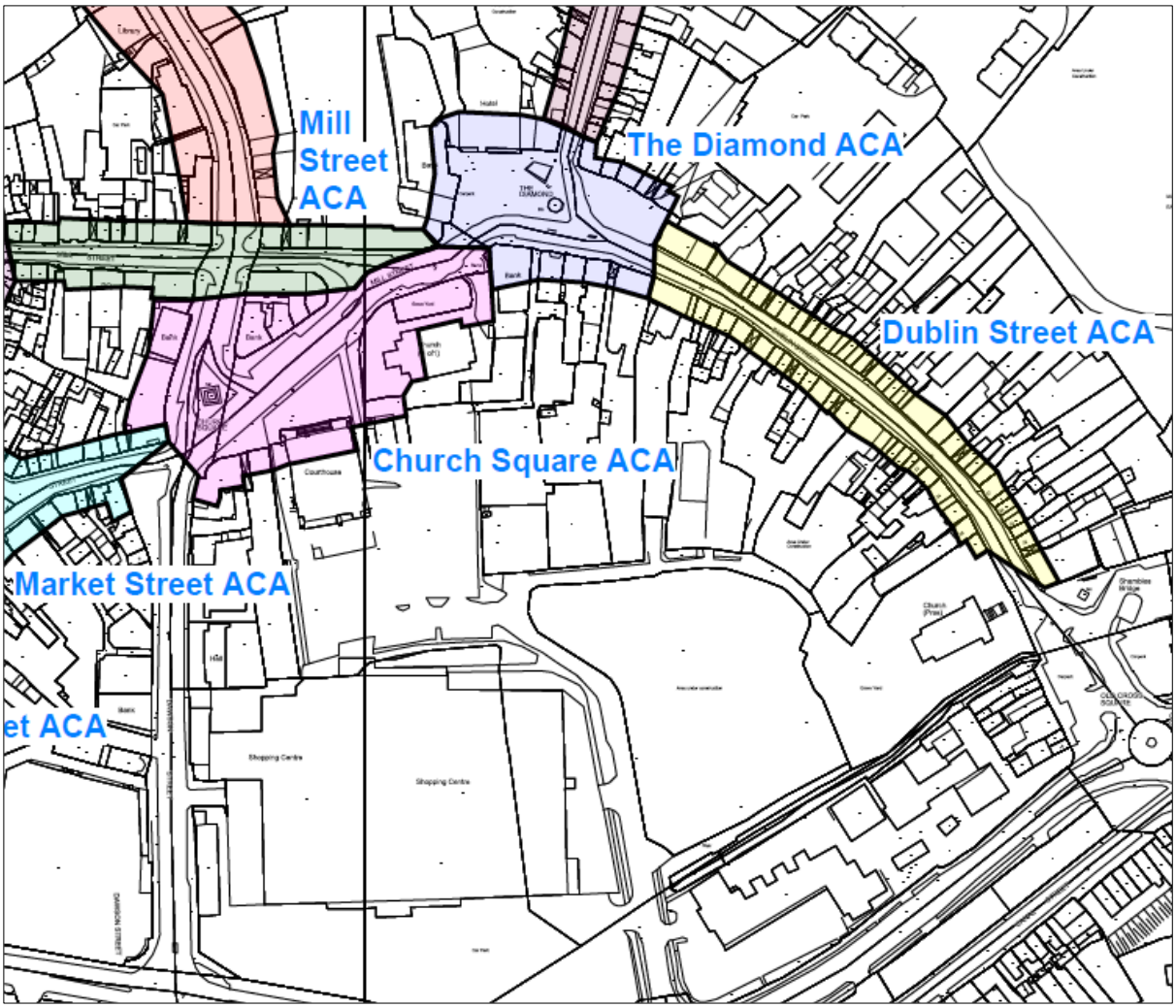


Figure 15.14: *Extract of ACA's for Monaghan Town showing those located close to the development area (Source: Monaghan County Development Plan 2019-2025)*

Appendix

15c

Cultural Heritage Site Inventories

Appendix 15 C: Cultural heritage Site Inventories

Archaeological Heritage Assets

RMP No.	MO009-060----
Class	Historic town
Townland	Kilnacloy, Tirkeenan, Mullaghmonaghan, Roosky
Irish Grid Co-Ords	267180, 333730
Description (per www.archaeology.ie)	Monaghan town (Muineacháin – hilly place) is situated on a hill or low ridge between Peter's Lake to the N and Convent Lake to the S. There are references to a McMahon 'caislean' or castle at Monaghan in 1492 (AFM, AU), which is described as a 'house' in 1496 (AU). It is probably the crannog in Convent Lake (MO009-037----), which is described on a map of c. 1590 as 'McMahon's house'. The foundation of a Franciscan friary (MO009-060002-) nearby in 1462 would have added to the developing nucleus of a settlement, and this has been demonstrated through excavation (MO009-06010-). Monaghan was incorporated as a county with five baronies in 1585, and this location where there was already a friary and a strongpoint of the MacMahons as well as a small settlement may have been selected then for future development as the county town. In 1589-91 the lord deputy, Sir William Fitzwilliam, took advantage of a Mac Mahon dispute to establish a garrison here at the friary. This was part of a political and land settlement that effectively abolished the Mac Mahon chieftainship and the use of Brehon law in the territory. The land settlement was generally accepted by the larger Gaelic magnates as it secured their personal estates, and it also ensured that the county escaped plantation with the other Ulster counties after 1603. However, the infiltration of settlers through the foreclosure of debt and land purchase continued apace. (Moore 1955, 34-7; MacDuinnshleibhe 1955, 49-50; Duffy 1981, 2) Although the garrison at Monaghan was successfully re-supplied after the government defeat at the battle of Clontibret in May 1595, it was probably abandoned soon afterwards and it was not re-established until 1602 when its commander John Berkley built the small fort (MO009-060007-) N of the settlement (Hayes-McCoy 1960, 16; Livingstone 1982, 90-4). In 1604 Sir Edward Blayney was appointed seneschal or governor of the county and the garrison, and two years later he received extensive grants of land around the town and around what would become Castleblayney (Duffy 1981. 14, fig. 5). These were confirmed in 1612, although the castle at Monaghan was specifically excluded (Coyle 1980). In 1606 Sir John Davies, the attorney general, described the town as 'consisting of divers scattered cabins or cottages, whereof the most part was possessed by the cast soldiers of that garrison. In the northmost part thereof there is a little fort, which is kept by the foot company of Sir Edward Blayney, who is seneschal or governor of the county by patent. In the midst of this village there is a foundation of a new castle, which being raised ten or twelve feet from the ground, and so left neglected for the space of two years, is now ready to fall into ruin again' (quoted in Shirley 1879, 113; Livingstone 1980, 98). The town was incorporated in 1613, and had up to 100 houses in 1640. In the census of c.

1659 Monaghan town had an adult male population of 32 English and Scots and 101 Irish (Pender 1939, 149).

The map by Richard Bartlett of c. 1602 shows a fortified enclosure with fourteen thatched houses and eight bastions. This is a fanciful idealised fortified town, which did not exist at Monaghan then, but the plan does show the ruins of the friary in the foreground and the little fort that was mentioned by Davies in the background. The town is represented on a slightly later map prepared for Sir Edward Blayney, probably c. 1611-13 and now held in Trinity College Dublin (Ms 1209 (32)), which was illustrated by Ó Gallachair (1962, 145). It depicts the town as a fortified rectangular area which was defended by walls or ramparts and outer fosses. It is situated between the two lakes, but both of these would have been larger than at present. There were five bastions in all and a gate on each side. At the centre the castle being built by Blayney is represented as a rectangular structure that has large rectangular corner towers at the angles and a small enclosed court on its N side in the style of fortified houses. This is within a rectangular bawn with corner bastions at the NW and SE angles. Gardens and fishponds lay to its S but in its curtilage, and the market place, now the Diamond, was immediately to the N. Three streets are represented running from the Diamond, that are now called Glasslough, Dublin and Mill Streets, with Market Street / Park Street running S from Mill Street W of the Diamond also represented on the map rather than Dawson Street, which appears to be a late eighteenth century creation (Bradley and Dunne 1989, 19-21).

The town would have been a large rectangle (dims c. 500m E-W; c. 400m N-S), but it would not have been as regular as depicted on the Trinity map. The rear of properties on the identified streets provide the best indication of where the perimeter of the town lay, notably the straight lines formed by the backs of properties on the NE side of Dublin St. and the W side of Park St. Excavation (02E1147; 03E0027) on the N side of the Diamond uncovered evidence of a fosse where it might be expected on the N side of the town as well as evidence of floor levels inside it dating to 1550-1590 (O'Connor 2002, 2006). The sites of the friary (MO009-060002-), the original fort (MO009-060007-), the parish church (MO009-060012-), and Blayney's castle (MO009-06003-) can be identified with some certainty but the only surviving monument from the era of the town's foundation is the market cross (MO009-060006-), which is intact but no longer in its original location.

Compiled by: Michael Moore

References:

1. AFM - Annals of the kingdom of Ireland by the Four Masters from the earliest period to the year 1616, ed. and trans. John O'Donovan (7 vols., Dublin, 1851; reprint New York, 1966)

2. AU (1983) - The Annals of Ulster to 1311, ed. S. Mac Airt and G. Mac Niocaill (Dublin 1983)

3. Bradley, J. and Dunne, N. 1989 Urban archaeological survey - county Monaghan. Unpublished report commissioned by the Office of Public Works, Dublin.

	4. Coyle, M. 1980 (ed.) Letters Patent to Sir Edward Balyney dated 18th June 1612. Clogher Record, vol. 10, No. 2, 215-222. 5. Duffy, P. J. 1981 The territorial organization of Gaelic landownership and its transformation in County Monaghan, 1591-1640. Irish Geography, 14, 1-26. 6. Livingstone, P. 1980 The Monaghan Story. Enniskillen. 7. Mac Duinnshleibhe, P. 1955 The legal murder of Audh Rua McMahon, 1590. Clogher Record, vol. 1, 2, 39-52. 8. Moore, P. 1955 The MacMahons of Monaghan (1590-1593). Clogher Record, vol. 1, No. 3, 22-38. 9. Ó Gallachair, Rev. P. 1962 The 1641 war in Clogher. Clogher Record, vol. 4, No. 3, 135-47. 10. Pender, S. (ed.) 1939 A census of Ireland, c. 1659. Dublin. Irish Manuscripts Commission. 11. Shirley, E.P. 1879 (Reprint 1988) The history of the county of Monaghan. London. Pickering.

RMP No.	MO009-060001-
Class	Burial
Townland	Mullaghmonaghan
Irish Grid Co-Ords	267086,333888
Description (per www.archaeology.ie)	According to a note in the IFC Schools MSS (957, 157), 'the monks from the monastery, murdered by English soldiers in either 1540 or 1589 are thought to be buried near the holy well which was on the site of the present provincial bank'. Its precise location is not known. See this web-page accessed on 12/12/2017: https://www.duchas.ie/en/cbes/4742056/4731389

RMP No.	MO009-060002-
Class	Religious house - Franciscan friars
Townland	Roosky
Irish Grid Co-Ords	267092, 333563
Description (per www.archaeology.ie)	A Franciscan friary was founded in 1462 by Phelim McMahon, but suggestions by Archdall (Gwynn and Hadcock 1970, 255) that it may have been on an older church site can be discounted (McKenna 1920, 1,3). Phelim McGuire was buried there in 1519 and Ruaraí Mac Redmond Mac Mahon was dragged from sanctuary there and murdered in 1539 (AU). The friary became Observant in 1567, and in 1589 it was sacked by English forces under the Lord Deputy, Sir William FitzWilliam, when the guardian and five others were killed. However, this is recorded under 1540 (AFM) when it might equally well have been perpetrated by a force under the Lord Deputy, Lord Leonard Grey. FitzWilliam left a garrison at the friary, but it was probably withdrawn after the battle of Clontibret in 1595 (Ó Mearáin 1956). Its lands were granted initially to Edward White, but these lands were granted to Edward Blayney in 1606 and confirmed to him in 1612 (Coyle 1980). He is said to have built a castle (MO009-060003-) from the materials of the friary, of which no trace remains. An image of the friary survives on a map of c. 1590 (Mooney 1957, Pl. 12) which shows a simple rectangular structure with a tower attached on the N side of what may have been the junction of the nave and chancel. The tower has battlements and a pointed roof, but a cloister and other buildings are not

	depicted (Mooney 1955, 140-1) and probably did not exist. The ruins of the friary are also illustrated on Bartlett's map of c. 1602 as a more complex building at a distance from the town, but this is probably fanciful about the relative locations of these features. In 1835 the OS recorded that in the rear of a large house on the Diamond opposite Glaslough St., which was thought to be Blayney's castle (MO009-060003-), were 'some old walls, said to be the remains of an old Abbey, whose burying ground in common with that of the church (MO009-060012-) would seem to have extended beyond its present bounds, as in levelling that open space before the old Gaol a quantity of human bones were dug up..' (Herity 2012, 175). This account was followed by Lewis (1837, vol. 2, 384). These descriptions would place it between the Diamond and Convent Lake, probably in the vicinity of the Court house and the parish church. Archaeological testing (96E0025; 96E0293) over an extensive area here failed to produce any evidence of such a structure (Swan 1997a; 1997b). The above description is derived from the published 'Archaeological Inventory of County Monaghan' (Dublin: Stationery Office, 1986). In certain instances the entries have been revised and updated in the light of recent research. Compiled by: Michael Moore References: 1. AFM - Annals of the kingdom of Ireland by the Four Masters from the earliest period to the year 1616, ed. and trans. John O'Donovan (7 vols., Dublin, 1851; reprint New York, 1966) 2. AU (1983) - The Annals of Ulster to 1311, ed. S. Mac Airt and G. Mac Niocaill (Dublin 1983) 3. Coyle, M. 1980 (ed.) Letters Patent to Sir Edward Balyney dated 18th June 1612. Clogher Record, vol. 10, No. 2, 215-222. 4. Gwynn, A. and Hadcock, R.N. 1970 (Reprint 1988) Medieval religious houses of Ireland. Dublin. Irish Academic Press. 5. Herity, M. (ed.) 2012 Ordnance Survey Letters: Londonderry, Fermanagh, Armagh-Monaghan, Louth, Cavan-Leitrim. Dublin, Fourmasters Press 6. Lewis, S. 1837 A topographical dictionary of Ireland, 2 vols. London. Lewis and Co. 7. McKenna, Rev. J. E. 1920 Parochial History of the Diocese of Clogher. 2 vols, Enniskillen, Author 8. Mooney, C. 1955 Franciscan architecture in Pre-Reformation Ireland, Part I. Journal of the Royal Society of Antiquaries of Ireland 85, 133-73. 9. Ó Mearáin, L. 1956 The Battle of Clontibret. Clogher Record, vol. 1, No. 4, 1-28. 10. Swan, R. 1997a Dawson Street / Dublin Road, Monaghan. Urban. in I. Bennett (ed.) Excavations 1997: summary accounts of archaeological excavations in Ireland, 90, No. 317. Bray, Wordwell 11. Swan, D. L. 1997b Town centre carpark development, Dublin Road, Monaghan. Urban. in I. Bennett (ed.) Excavations 1997: summary accounts of archaeological excavations in Ireland, 90-1, No. 318. Bray, Wordwell

RMP No.	MO009-060003-

Class	House – fortified house
Townland	Roosky
Irish Grid Co-Ords	267274,333720
Description (per www.archaeology.ie)	A castle was being built at Monaghan after 1604 by Sir Edward Blayney using material derived from the Franciscan friary (MO009-060002-). It was described in 1606 by John Davies, the attorney general, as 'the foundation of a new castle, which being raised ten or twelve feet from the ground, and so left and neglected for the space of two years, is now ready to fall into ruin again.' It is not represented on the Bartlett map of the town of 1602-03, which was more aspirational than actual. In 1611 the castle is described as 'a fayre castle buylte at Monaghan on the king's charge wherein Sr. Edward Blayne nowe dwells, who for making of it more convenient for himself for his owne tyme hath layde out good somes of money of his owne. '(Hunter 1975, 81). He is reputed to have spent £1200 on it. A map of the town, probably c. 1611-13 and now held in Trinity College Dublin (Ms 1209 (32)), which was illustrated by Ó Gallachair (1962, 145), shows the castle as a rectangular structure that has large rectangular corner towers and a small enclosed court on its N side in the style of fortified houses. The castle was within a rectangular bawn with a gate at the N and bastions at the NW and SE angles. South of the castle and within its curtilage the map shows gardens and fish ponds. In 1835 the site of this castle was pointed out as being on the Diamond opposite Glasslough St. (Herity 2012, 175) followed by Lewis (1837, 2, 384), but this structure was probably at the N side of the bawn, which would agree with the map of 1611-13. Archaeological excavations (96E0025; 96E0293) in the area to the SW failed to provide any evidence of the castle (Swan 1997a, 1997b). The above description is derived from the published 'Archaeological Inventory of County Monaghan' (Dublin: Stationery Office, 1986). In certain instances the entries have been revised and updated in the light of recent research. Compiled by: Michael Moore References: 1. Lewis, S. 1837 A topographical dictionary of Ireland, 2 vols. London. Lewis and Co. 2. Herity, M. (ed.) 2012 Ordnance Survey Letters: Londonderry, Fermanagh, Armagh-Monaghan, Louth, Cavan-Leitrim. Dublin, Fourmasters Press 3. Hunter, R.J. 1975 Carews survey of Ulster, 1611: the voluntary works. Ulster Journal of Archaeology Ser. 3, 38, 81-2. 4. Swan, R. 1997a Dawson Street / Dublin Road, Monaghan. Urban. in I. Bennett (ed.) Excavations 1997: summary accounts of archaeological excavations in Ireland, 90, No. 317. Bray, Wordwell 5. Swan, D. L. 1997b Town centre carpark development, Dublin Road, Monaghan. Urban. in I. Bennett (ed.) Excavations 1997: summary accounts of archaeological excavations in Ireland, 90-1, No. 318. Bray, Wordwell 6. Ó Gallachair, Rev. P. 1962 The 1641 war in Clogher. Clogher Record, vol. 4, No. 3, 135-47.

RMP No.	MO009-060004-
Class	Town Defences
Townland	Roosky
Irish Grid Co-Ords	667162, 833871
Description (per www.archaeology.ie)	Monaghan town is situated on a hill or low ridge between Peter's Lake to the N and Convent Lake to the S. Monaghan was incorporated as a county with five baronies in 1585, and this location where there was already a friary and a castle or strongpoint of the MacMahons together with a small settlement may have been selected then for future development as a county town. In 1589-91 the lord deputy, Sir William FitzWilliam, took advantage of a Mac Mahon dispute to impose a land settlement, and established a garrison here, effectively abolishing the Mac Mahon chieftainship and the use of Brehon law. The garrison at Monaghan was probably abandoned in 1595 after the battle of Clontibret but it was re-established by John Berkley in 1602. In 1604 Sir Edward Blayney was appointed seneschal or governor of the county and the garrison, and two years later he received extensive lands around the town and what would become Castleblayney (Duffy 1981. 14, fig. 5). These were confirmed to him in 1612, although the castle at Monaghan was specifically excluded (Coyle 1980). In 1606 Sir John Davies, the attorney general, described the town but does not mention any fortifications (Hunter 1975). A map of Richard Bartlett of c. 1602 shows a fortified enclosure with fourteen thatched houses and eight bastions. This is a fanciful idealised fortified town, which did not exist at Monaghan then. The town is represented on a slightly later map prepared for Sir Edward Blayney, probably c. 1611-13 and now held in Trinity College Dublin (Ms 1209 (32)) which was illustrated by Ó Gallachair (1962, 145). It depicts the town as a fortified rectangular area which was defended by walls or ramparts and outer fosses. The town would have been a large rectangle (dims c. 500m E-W; c. 400m N-S), but it would not have been as regular as depicted on the Trinity map. The rear of properties on the identified streets provide the best indication of where the perimeter of the town and its fortifications lay, notably the straight lines formed by the backs of properties on the NE side of Dublin St. and the W side of Park St. (Bradley and Dunne 1989, 19-21). Excavations (02E1147; 03E0027) on the N side of the Diamond uncovered evidence of a large fosse (Wth of top 14-20m; max. D 3m) where it might be expected on the N side of the town. The fosse was lined with marl in order to retain water, which it could have taken from St Peter's Lough for the defences on this side, and similar trenches can be expected on the other sides. (O'Connor 2002, 2006) Date of upload: 14 April 2011 See attached images of Monaghan town by Bartlett 1602 (MO009-060_1 copy) and c. 1612-13 (MO009-060_2a copy) Compiled by: Michael Moore

	O'Connor, D. 2002 Archaeological assessment of site of The Westerna Arms Hotel at The Diamond, Monaghan Town, Count y Monaghan. Licence No. 02E1447, unpublished report, Cultural Resource Development Services Ltd. **References**: • 1. Duffy, P. J. 1981 The territorial organization of Gaelic landownership and its transformation in County Monaghan, 1591-1640. Irish Geography, 14, 1-26. • 2. Hunter, R.J. 1975 Carews survey of Ulster, 1611: the voluntary works. Ulster Journal of Archaeology Ser. 3, 38, 81-2. • 3. Ó Gallachair, Rev. P. 1962 The 1641 war in Clogher. Clogher Record, vol. 4, No. 3, 135-47. • 4. O' Connor 2006 Westenra Arms Hotel, The Diamond, Monaghan. Town ditch. In I. Bennett (ed.), Excavations 2003: summary accounts of archaeological excavations in Ireland, 402, No. 1495. Bray. Wordwell

RMP No.	MO009-060005-
Class	Burial
Townland	Roosky
Irish Grid Co-Ords	267190,333723
Description (per www.archaeology.ie)	The following description is derived from the published 'Archaeological Inventory of County Monaghan' (Dublin: Stationery Office, 1986). In certain instances the entries have been revised and updated in the light of recent research. Burials uncovered during construction of public facilities in Church Square, Monaghan town, in 1940s. References: 1. McCarthy, M. 2006 Church Square, Monaghan. Burials. In I. Bennett (ed.) Excavations 2003: summary accounts of archaeological excavations in Ireland, 400-1, No. 1492. Bray, Wordwell

RMP No.	MO009-060006-
Class	Cross – Market cross
Townland	Tirkeenan
Irish Grid Co-Ords	267472,333637
Description (per www.archaeology.ie)	The cross is first recorded in 1714 (McKenna 1920, 1, 80-3) and it is described as 'Market Cross' in italic lettering on the 1834 edition of the OS 6-inch map at the centre of the Diamond where it had stood with the stocks beside it. Around 1875 the Rossmore Memorial, a neo-gothic memorial fountain, was erected in its stead and the Market cross was discarded. This caused great controversy at the time, when Nationalists rescued it and re-erected in the small square known as the Shambles and now called Old Cross Square. By the time Nationalists had a majority on the council in 1898 the heat had gone out of the issue, and the cross remains in Old Cross Square (McKenna 1920 1, 80-3). It is depicted on the 1907 edition of the OS 6-inch map as being in the centre of the

	square but this location must have caused traffic problems and it is now at the N side of the square. However, in setting up the cross here the head was attached upside down so that it no longer functions as a sun-dial (McMahon and Walsh 1982, 16). Six limestone steps lead to the rectangular base (dims 0.56m x 0.56m; H 0.446m) which supports a tapering limestone shaft (dims at base 0.44m x 0.43m; H 1.72m) with chamfered edges and curved stops. The head is a polygonal stone with four hemispherical hollows on different facets, each of which was originally aligned on a cardinal point. A gnomen or pointer would cast a shadow on lines in a particular cup depending on the time of day and season of the year. Even the N-facing cup provided readings on long summer's evenings. (ibid.) Compiled by: Michael Moore References: 1. McKenna, Rev. J. E. 1920 Parochial History of the Diocese of Clogher. 2 vols, Enniskillen, Author 2. McMahon, T. and Walsh, A. 1982 Monaghan - a signposted walking tour. Midland Regional Tourism Organisation with Bórd Fáilte Éireann. Monaghan.

RMP No.	MO009-060009-
Class	Graveyard
Townland	Roosky
Irish Grid Co-Ords	267225,333741
Description (per www.archaeology.ie)	The parish church of Monaghan town (MO009-060012-) was established by 1641 (Shirley 1879, 309-10), and its graveyard that is still extant around the Church of Ireland church of St Patrick as a D-shaped area (dims c. 50m E-W; c. 40m N-S) with straight sides at the E and S where it is defined by buildings but the perimeter is curved W-N where it is defined now by railings. Archaeological testing (03E1672) undertaken in 2003 prior to the erection of a memorial to the victims of the Monaghan bombings in 1974 located c. 8m W of the perimeter of the graveyard exposed both disarticulated human remains and one in situ skeleton oriented in an east-west direction. The remains are part of the graveyard and were preserved in situ (McCarthy 2006). Further archaeological monitoring (05E0219) of trenches in Church Square recovered some disarticulated remains representing three individuals. (Delaney 2008). Compiled by: Michael Moore References: 1. McCarthy, M. 2006 Church Square, Monaghan. Burials. In I. Bennett (ed.) Excavations 2003: summary accounts of archaeological excavations in Ireland, 400-1, No. 1492. Bray, Wordwell 2. Delaney, D. 2008 1278. Monaghan. Urban, burials. in I. Bennett (ed.) Excavations 2005: summary accounts of archaeological excavations in Ireland, 314. Dublin, Wordwell

RMP No.	MO009-060010-
Class	House - 16th century
Townland	Roosky
Irish Grid Co-Ords	267254,333832
Description (per www.archaeology.ie)	Archaeological excavation (Excavation Licence No. 02E1147) in advance of development at the Westenra Arms Hotel revealed continuous occupation levels dating from the 16th to the 20th century and an earlier phase of activity of which the exact date is unknown. This early phase of activity was represented by a series of post- and stake-holes and possible traces of wattles. Above this layer was a series of clay floors which are believed to date to between 1550 and 1590. A section of the town ditch (MO009-060004-) was also exposed. (O' Connor 2004, 440-1; O' Connor 2006, 401-2) References: O' Connor D. 2004, Westenra Arms Hotel, The Diamond, Monaghan Urban post-medieval. In I. Bennett (ed.), Excavations 2002: summary accounts of archaeological excavations in Ireland, 440-1 (No. 1546). Bray. Wordwell O' Connor D. 2006, Westenra Arms Hotel, The Diamond, Monaghan Urban. In I. Bennett (ed.), Excavations 2002: summary accounts of archaeological excavations in Ireland, 401-2 (No. 1494). Bray. Wordwell

RMP No.	MO009-060011-
Class	Graveslab
Townland	Roosky
Irish Grid Co-Ords	267213,333727
Description (per www.archaeology.ie)	The Ancketill graveslab was recovered c. 1830 from the foundations of the present Church of Ireland church of St Patrick (Shirley 1879, 310), which is in the graveyard of the seventeenth century parish church (MO009-060012-). The memorial is now preserved in the porch of the present church at the base of its tower. It is a sandstone slab (L 1.88m; Wth 0.85m) set upright into a wall and it is illustrated by Shirley (ibid. 155). The four corners are cut away in the original design and the inscription in false relief is within a slight moulded border and beneath the Ancketill crest. Oliver Ancketill was the first of the family to come to Ireland from Dorsetshire, and he was the father of Mathew Ancketill, whose graveslab (MO007-014006-) is preserved in St Saviour's Church of Ireland church at Glaslough. The family were prominent in Donagh parish into the nineteenth century (Lewis 1837, vol. 1, 464-5). The inscription reads: HERE LYETH THE BO / DY OF OLIVER ANCKE / TILL OF ANCKETILLS G / ROVE ESQVIRE DESCEND / ED OF THE ANIENT FA / MILY OF SHAWSTONE / IN DORSET SHIRE IN / ENGLAND, WHO DYE / D AT ARD MAGH A / ND WAS BURIED A / T MONAGHAN THE / 28th DAY OF / JVNE 1666. Compiled by: Michael Moore References:

	1. Lewis, S. 1837 A topographical dictionary of Ireland, 2 vols. London. Lewis and Co. 2. Shirley, E.P. 1879 (Reprint 1988) The history of the county of Monaghan. London. Pickering.

RMP No.	MO009-060012-
Class	Church
Townland	Roosky
Irish Grid Co-Ords	267225, 333747
Description (per www.archaeology.ie)	A church at Monaghan town is not known before the seventeenth century, and a church is not depicted on Bartlett's map of 1602-03, or the Blaney map of c. 1611-13. However, a parish church of Rackwallace had been established in the town by the outbreak of the Rebellion in 1641 (Shirley 1879, 309-10), and when bishop Spottiswood describes the church of Rackwallace as 'new built but indifferently repaired' (Leslie 1929, 228-33) a church in the town is intended rather than at Rackwallace (MO014-014001-) c. 6 km to the SE. Rushe (1916, 34) asserts that there was no church in the town before 1725, although there are records of the Blaney family burying there from 1629 (Mahoney 1907 158). It is possible that the church was rebuilt during the eighteenth century. The present Church of Ireland church of St Patrick was built in 1830-35 when the Ancketill graveslab (MO009-060011-) was recovered from the foundations (Shirley 1879, 310). This graveslab is now preserved in the porch of the present church at the base of its tower. The old church, of which nothing remains, is depicted on the 1835 ed. of the OS 6-inch map just N of the present building as a smaller structure (dims c. 20m E-W; c. 10m N-S) with a projection at the W end. It is described on the map as the 'Old Church' and is at the N edge of a D-shaped graveyard (dims c. 50m E-W; c. 40m N-S) with straight sides at the E and S where it is defined by buildings but the perimeter is curved W-N where it is defined now by railings. Archaeological testing (03E1672) undertaken in 2003 prior to the erection of a memorial to the victims of the Monaghan bombings in 1974 located c. 8m W of the perimeter of the graveyard exposed both disarticulated human remains and one in situ skeleton oriented in an east-west direction. The remains are part of the graveyard and were preserved in situ (McCarthy 2006). Compiled by: Michael Moore References: 1. Leslie, J.B. 1929 Clogher clergy and parishes. Enniskillen. 2. Mahony, P. G. 1907 Glaslough, Parish of Donagh. Journal of the Association for the Preservation of the Memorials of the Dead, Ireland. vol. 7, 157-8. 3. McCarthy, M. 2006 Church Square, Monaghan. Burials. In I. Bennett (ed.) Excavations 2003: summary accounts of archaeological excavations in Ireland, 400-1, No. 1492. Bray, Wordwell 4. Shirley, E.P. 1879 (Reprint 1988) The history of the county of Monaghan. London. Pickering.

RMP No.	MO009-060013-
Class	Bawn
Townland	Roosky
Irish Grid Co-Ords	267274,333703
Description (per www.archaeology.ie)	A castle (MO009-060003-) was being built at Monaghan after 1604 by Sir Edward Blayney using material derived from the Franciscan friary (MO009-060002-). It is not represented on the Bartlett map of the town of 1602-03, but it is shown on a map of the town, probably c. 1611-13 and now held in Trinity College Dublin (Ms 1209 (32)), which was illustrated by Ó Gallachair (1962, 145). It shows the castle within a rectangular bawn (B) with a gate at the N and bastions at the NW and SE angles. South of the castle and within its curtilage the map shows gardens and fish ponds. In 1835 the site of the castle was pointed out as being on the Diamond opposite Glasslough St. (Herity 2012, 175) followed by Lewis (1837, 2, 384), but this structure was probably at the N side of the bawn, which would agree with the map of 1611-13. Archaeological excavations (96E0025; 96E0293) in the area to the SW failed to provide any evidence of the castle (Swan 1997a, 1997b). Compiled by: Michael Moore References: 1. Herity, M. (ed.) 2012 Ordnance Survey Letters: Londonderry, Fermanagh, Armagh-Monaghan, Louth, Cavan-Leitrim. Dublin, Fourmasters Press 2. Ó Gallachair, Rev. P. 1962 The 1641 war in Clogher. Clogher Record, vol. 4, No. 3, 135-47. 3. Swan, R. 1997a Dawson Street / Dublin Road, Monaghan. Urban. in I. Bennett (ed.) Excavations 1997: summary accounts of archaeological excavations in Ireland, 90, No. 317. Bray, Wordwell 4. Swan, D. L. 1997b Town centre carpark development, Dublin Road, Monaghan. Urban. in I. Bennett (ed.) Excavations 1997: summary accounts of archaeological excavations in Ireland, 90-1, No. 318. Bray, Wordwell

Architectural Heritage Assets

Reg. No.	NIAH ref. 41303123, RPS ref. 41000170
Type	Courthouse
Townland/ Address	Roosky
Description (per www.buildingsofireland.ie)	Freestanding two-storey courthouse, built 1827, comprising five-bay front block with three-bay side elevations and pedimented three-bay breakfront comprising two centred half-fluted Doric columns and two flanking square piers surmounted by pediment with British Royal Coat-of-Arms to tympanum, projecting three-bay two-storey over basement wings to each side of rear, slightly recessed narrow two-bay two-storey over basement block to close rear of this U-plan arrangement, with further recessed two-storey block one-bay deep and six bays wide, easternmost bay being three storeys. Hipped slate roofs, pitched to rear gables of wings, with lead flashings, roofs concealed by parapet of ashlar sandstone, projecting carved sandstone string course at eaves level to

	front elevation, smooth-rendered chimneystacks, and cast-iron rainwater goods. Ashlar sandstone walls to first floor of front elevation and side blocks, rusticated ashlar sandstone with double string course to ground floor of front elevation, dressed coursed rubble walls with tooled block-and-start quoins to rear and side elevations. Round-headed windows to first floor of side blocks and square-headed elsewhere, with timber sliding sash windows. Tripartite nine-over-nine pane to round-headed windows with spoked fanlights, nine-over-nine pane to first floor of front and side elevations of front block, and to all of rear block except easternmost rear bay which has six-over-six pane windows. All other windows are six-over-six pane except for intermediate rear block which has four-over-four pane windows. Front first floor windows have carved architraves, round-headed windows have tooled ashlar block-and-start surrounds and voussoirs, ashlar block-and-start surrounds elsewhere. Front elevation has square-headed door openings with automatic glass door unit, with contemporary steel doors to outer bays. Round-arch door openings to side elevations with ashlar surrounds, timber panelled doors and spoked timber fanlights. Front elevation flanked to east and west by half-hexagonal arch vehicular entrances, each having rusticated ashlar walls and voussoirs, battened timber double-leaf door, moulded cornice and parapet. Building served by plinth of ten steps fronting directly onto paved forecourt to Church Square. Courtyard to rear with squared, coursed sandstone boundary wall. Recent metal monument to victims of car bomb blast of May 1974 to front of building.

Reg. No.	NIAH ref. 41303124, RPS ref. Local 8
Type	House
Townland/ Address	Roosky
Description (per www.buildingsofireland.ie)	Detached four-bay three-storey house with attic, built c.1870, with recent timber shopfront to ground floor, five-bay north side elevation (two rear bays behind addition), integral carriage arch to south end of front elevation accessing return wings to rear forming enclosed courtyard. Hipped replacement slate roof with gable-ended pitch to east, square-headed roof lights, projecting brick eaves course, smooth rendered chimneystacks, and replacement rainwater goods. Brick Flemish bond walling to north and west elevations, with portion of dressed stone to ground floor of front elevation and uncoursed rubble masonry to rear bays of ground floor of north elevation, and with roughcast render to east and south elevations. Square-headed window openings, brick voussoirs and stone sills with replacement uPVC windows. Shopfront comprising central doorway accessing upper floors, with timber panelled door and overlight having decorative detail to corners, flanked by shopfront to south having square-headed glazed timber door flanked by timber display windows, and with square-headed carriage-arch with sliding double-leaf timber battened doors. Rear wing returns comprise two-storey blocks with pitched corrugated iron roof to east and pitched slate roof to west, and lean-to corrugated

	iron roof to south. Random rubble walling and painted brick to east elevation, painted coursed rubble masonry to east and south elevations. Square headed window openings, smooth rendered surrounds to east elevation, stone sills, and replacement uPVC windows, square-headed timber casement windows to south elevation. Segmental-headed carriage-arch to east and south elevation with square-headed timber battened doors, stone steps accessing square-headed door opening to first floor to east elevation, iron steps accessing square-headed door opening with dormer pitch and timber panelled door to first floor of west elevation. Timber-built café erected within courtyard. Set within grounds shared by Saint Patrick's Church of Ireland fronting onto south-east side of Church Square, bounded by battered coursed random rubble walling to east, south and west with carriage arch to east linking with courthouse.

Reg. No.	NIAH ref. 41303125, RPS ref. 41001091
Type	Church (St Patrick's CoI)
Townland/ Address	Roosky
Description (per www.buildingsofireland.ie)	Freestanding Gothic Revival stone-built Church of Ireland church, built 1831–6 to designs by diocesan architect William Farrell of Dublin. Cruciform plan comprising six-bay nave, diminished single-bay narthex to west, chancel to east having single-bay vestries to each internal angle, and three-stage tower with spire. Pitched slate roof, roll-top blue/black ridge tiles, stone verges and octagonal-plan chimneystack to east nave gable, crenellated parapet to nave and vestries, continued to nave west gable, chancel gable, and narthex as carved quatrefoils with pierced spandrels, blind to gable inclination. Concealed gutters with exposed cast-iron hopper head and downpipe. Needle spire on octagonal plan atop tower, four stages of open lucarnes (that to top being blind), slight offsetting to base, no parapet. Ashlar sandstone walling over torus-moulded battered plinth (containing chamfered wrought-iron grilled square vents) with moulded string course at parapet base interrupted by three-stage strip buttresses recessed to each stage by gablet rising to terminate in skewed gabled needle pinnacles, diagonal buttresses all corners. Tower has moulded string courses between stages, that above second stage angled with carved crocket finial over clock faces (inserted 1902) to south and west elevations, timber blocked to north elevation, first stage south elevation has lugged blank shield supporting niched bishop's mitre delicately carved-in-the-round. Pointed-arch timber diagonally glazed lancets, splayed flush surrounds and sill throughout, carved foliated label-ended hood-mouldings to nave (also to tower first stage south elevation with stained-glass casement, blind to north elevation, and louvred to third stage tower), three four-centred-arch trefoil-headed lights with quatrefoil over with stop-ended hood-mouldings to chancel and diminished timber lights to tower second stage south elevation, square-headed timber tripartite trefoil-headed lights to second stage cheeks. Pointed-arch bolection-moulded stained and varnished timber doors, splayed surrounds with carved label-

	ended hood-mouldings and stepped thresholds to north and south elevations of vestries, double-leaf to tower first stage south elevation and narthex south and north elevations. Modern mild steel handrail to tower entrance with Zulu shield (Ishlangu)-like motifs. Interior has rib-vaulted smooth rendered ceiling borne on clustered marble columns interrupted by galleries with carved timber fronts over side aisles. Balconies accessed by cut limestone spiral stairways with iron railings having timber rails. Elaborately carved marble pulpit with marble steps, lectern and altar rails, marble baptismal font to west end. Variety of marble wall monuments and some brass memorials to nave, galleries and chancel. Set back from Church Square to west and The Diamond to north-east in lawned churchyard with flattened nineteenth-century gravestones, and with ornate cast-iron failings on cut-stone plinth with gates hinged to carved and splayed piers with pyramidal caps to south, south-west and north-west. Substantial crypt in graveyard to south marked by stone coping, vents and raised lawned features with fine wrought-iron railings and gate (accessing crypt) to west coping between Adamesque cast-iron railing posts.

Reg. No.	NIAH ref. 41303126, RPS ref. 41001086
Type	Shop/retail outlet
Townland/ Address	Roosky
Description (per www.buildingsofireland.ie)	End-of-terrace four bay three-storey house-over-shop, built c.1820, with late twentieth-century shopfront to ground floor. Pitched slate roof with roughcast rendered chimneystack, and cast-iron rainwater goods. Smooth-rendered ruled-and-lined walls with channelled quoins, and having orange tiled walls to shopfront. Square-headed window openings with keystone detail, six-over-six pane horned timber sash windows, and painted sills.

Reg. No.	NIAH ref. 41303127, RPS ref. Local 3
Type	Shop/retail outlet
Townland/ Address	Roosky
Description (per www.buildingsofireland.ie)	Terraced three bay three-storey house-over shop, built c.1820, with shopfront of c.2000 to ground floor having deeply recessed entrance. Pitched slate roof with red brick chimneystacks having cogging string course, and replacement rainwater goods. Squared, coursed rubble limestone walls, with marble-effect cladding to shopfront, with projecting clock to first floor. Square-headed window openings with dressed tooled limestone voussoirs, horned timber sash windows three-over-three pane to top floor and six-over-six pane to first floor, with dressed stone sills.

Reg. No.	NIAH ref. 41303128, RPS ref. 41001100
Type	Bank/financial institution
Townland/ Address	Roosky

Description (per www.buildingsofireland.ie)	End-of-terrace seven bay two-storey former bank of c.1880, altered c.1930 to town hall, with shallow pedimented breakfront framing central bays. Pitched roof concealed by parapet with moulded corniced coping with console brackets to margins, moulded scooping and surround to pediment. Smooth-rendered chimneystacks, and cast-iron rainwater goods. Smooth-rendered channelled walls, with smooth-rendered pilasters to breakfront, and with stepped string course at eaves level. Square-headed window openings with one-over-one pane horned timber sliding sash windows to first floor, cast-iron margined casement windows to ground floor, round-headed window opening to centre of pediment with moulded architrave and Napoleon-hat surround with multiple-pane timber casement window. Square-headed door opening with marble doorcase and double-leaf timber panelled door. Square-headed door opening to south-east bay with timber panelled door and overlight.

Reg. No.	NIAH ref. 41303129, RPS ref. 41001071
Type	Shop/retail outlet (Birthplace of Charles Gavin Duffy)
Townland/ Address	Roosky
Description (per www.buildingsofireland.ie)	Terraced three-bay three-storey house-over-shop, built c.1810, with shopfront and integral carriageway to ground floor. Pitched slate roof not visible from street, with smooth-rendered chimneystacks, and replacement rainwater goods. Smooth-rendered ruled-and-lined walls with block-and-start quoins to upper floors. Plaque to front wall inscribed 'Charles Gavan Duffy was born here 12th April 1816'. Square-headed window openings with replacement uPVC windows and painted sills. Shopfront has timber fasciaboard with console brackets, timber-framed display window and glazed door. Carriage-arch has depressed-arch opening and recent metal gate.

Reg. No.	NIAH ref. 41303130, RPS ref. 41001056
Type	Public house
Townland/ Address	Roosky
Description (per www.buildingsofireland.ie)	Terraced three-bay three-storey house-over-public-house, built c.1840, with pub front to ground floor. Pitched slate roof with recently rebuilt brick chimneystack, and cast-iron rainwater goods. Red brick Flemish bond walls, painted to ground floor, and smooth-rendered projecting plinth. Random rubble walls to gables with squared quoin stones. Square-headed window openings with patent margin surrounds, red brick voussoirs, six-over-six pane horned timber sliding sash windows, and painted sills. Pub front has tripartite timber-framed display window with decorative vent piercing to heads, and simple bracketed fascia. Square-headed door opening with timber panelled door with divided overlight.

Reg. No.	NIAH ref. 41303131, RPS ref. 41001050
Type	Church (Monaghan First Presbyterian Church)

Townland/ Address	Roosky
Description (per www.buildingsofireland.ie)	Freestanding gable-fronted Gothic Revival Presbyterian church, facing east, built 1827 on site of earlier building of 1745, and rebuilt 1899-1902 by Bright Brothers of Portadown, being two-storey with access to church proper via stone steps, having four-bay nave, front bay of south elevation projects to south, and with four-stage tower to east end bay of north elevation to partly match. Renovated 1911 by Thomas McElnea of Monaghan to designs by Roome & Boag of Belfast. Part of two-storey meetinghouse of 1827 retained at west end of building, with lean-to extensions under construction 2010. Pitched natural slate roof (pyramidal to tower with wrought-iron finial), angled blue/black terracotta ridge tiles, moulded stone verges to east gable, moulded cast-iron gutters on sandstone corbels, brick chimneystacks to west gables (rendered to church), crocketed finial to east gable. Nap-rendered with sandstone quoins to west gable and former meetinghouse projection; elsewhere rock-faced squared-and-snecked limestone walling with cut sandstone dressings, splayed plinth, moulded string-course to east gable eaves level, platband to fourth stage tower, buttresses with offsetting and sandstone quoins between bays, except east gable centre bay, which has south buttress raised to support conical pinnacle on spurred octagonal base; cast-iron pattress plates above basement level. Windows have leaded church glass with flush splayed sandstone surrounds and sills, pointed-arch lancets to upper level and shoulder-headed to lower level, tripartite to side elevations, stop-ended hood-mouldings to east gable. West gable has paired trefoil-headed lancets with elongated quatrefoil spandrel flanking plate tracery rose window with square-headed louvred aperture to apex. East gable has hexafoil rose window set in pointed-arch recess with chamfered surrounds, flush sill with offsetting, carved spandrels (with thistle, rose, and shamrock) with hood continuous with interrupted string-course; quatrefoil to third stages of tower, louvred trefoil to gable apex. Former meetinghouse projection has pointed-arch diminutive painted timber Y-tracery bipartite seven-over-six pane sashes (that to lower floor replaced with uPVC), dressed surround with Gibbs blocking and sill. East gable has shoulder-headed varnished vertically sheeted double-leaf door with wrought-iron strapwork, set in pointed-arch deeply rebated roll-moulded sandstone gabled surround with dressed spandrels and tympanum inscribed with roundel date plaque '1901', flanked by trefoil-headed windows having chamfered surrounds and stained glass, accessed by stone perron vaulted over basement channel to roadside pavement. Pointed-arch painted timber sheeted door offset to west gable (created out of window opening) with Y-tracery upper sash window overlight, Gibbs-blocked surrounds. Set back from Dublin Street to east by wrought- and cast-iron gates and railings hinged to ornate pyramidal capped and finialled chamfered cast-iron piers with foundry mark of 'RIDDEL CO. BELFAST'. Situated on sloping site rising to east with roadside pavement at upper floor level. Surrounding graveyard has many fine grave markers, and vault of 1816-17 to McMorran family. Interior entered via small entrance hall with

	polychrome tile floor. Gallery to north-east side. Stained timber pews with side aisles. Timber trussed roof with braces on carved stone brackets. Stained timber pulpit, baptismal font, table and organ to south-west end of nave. Various marble plaques to walls.

Appendix

15d

Previous Licenced Archaeological Excavations

Appendix 15D: Previous Licenced Archaeological Excavations

Licence No.	98E0175
Author	Rónán Swan, Arch-Tech Ltd, 32 Fitzwilliam Place, Dublin 2
Townland/Location	Ulster Bank, The Diamond
Description (per www.excavations.ie)	Testing was undertaken at the above site to determine whether there were any surviving traces of Monaghan Castle. There is a tradition recorded in the Ordnance Survey Letters 'That the large house in the Diamond opposite Glaslough Street, is said to possess (occupy?) the site of a castle'. This suggests the possibility that the castle stood in the location of the present Ulster Bank, which is adjacent to the Church of Ireland church and has been in use as a bank for at least 100 years. The present building was built in the 1960s on the site of a previous one, which had extended the length of the entire yard. Two trenches were positioned across the length and breadth of the site; they revealed a stratigraphy consistent with the extensive works that have taken place on the site over the past 150 years, which have effectively destroyed any archaeological evidence.

Licence No.	02E1447
Author	John O'Connor
Townland/Location	The Diamond
Description (per www.excavations.ie)	A pre-development assessment was undertaken before the construction of an extension to the Westenra Arms Hotel, Monaghan. The site is to the rear of the hotel, which is on the northern side of The Diamond, at its western corner. The proposed site had been cleared of outbuildings to surface level in the past. The development is near the area thought to contain the remains of Monaghan Castle and lies within the zone of archaeological potential around Monaghan town (SMR 9:60). The proposed development consists of the construction of a three-storey-over-basement extension to the hotel. It will involve substantial ground disturbance in the excavation of a basement level, as well as the digging of foundations and the provision of services. Six trenches were excavated by a mechanical digger fitted with a 2m toothless ditching bucket on 30 September and 1 October 2002. Excavation was undertaken to the depth of archaeological deposits and natural, undisturbed subsoil. Trenches 1–3 revealed the surviving walls of a late 18th-/early 19th-century rectangular structure built of stone, with strong, mortared walls sitting on a poured mortared footing, oriented north–south. This is almost certainly the building depicted on the OS maps of 1835, 1858 and 1860. As a differently oriented building is shown on the 18th-century estate map, we can confidently date the construction of this building to between 1790 and 1835. It was probably constructed in association with the other buildings fronting onto The Diamond. It is known that in around 1880 these buildings were remodelled and their front alignments were changed somewhat. The OS map of 1907 shows the building still standing and incorporated in the Westenra Arms Hotel. Perhaps its function was as a wing of the original hotel. Indeed the hotel is listed in Pigot's directory of 1824, and so a late 18th-century date seems reasonable.

	Sitting directly underneath the late 18th-century building were two clay-bonded walls that appeared to be at right angles to each other. They represented the lower course or foundation of a rectangular building much earlier than the structure above. The building was also oriented differently from the structure above, another indication of its age. Cartographic evidence suggests that the western boundary of the site of the Westenra Arms Hotel has not changed through the years. Interestingly, this building is aligned parallel to this boundary. It can therefore be speculated that the building may date to as far back as the initial organisation and layout of The Diamond in around 1611–13. The 18th-century estate map appears to show a building with a similar orientation. However, when scaled off and overlaid on later (more accurate) maps, this building does not appear to stretch back to where the walls have been discovered, suggesting that it had been removed previously. The only cartographic evidence that might place buildings in this area before the Westenra Arms Hotel is Blaney's map of 1611–13. On this map The Diamond is shown with a house-lined street running north from its north-western corner toward the lake. This has long been interpreted as Glaslough Street. It is quite possible that Glaslough Street was laid out sometime later, replacing this street as the town suburbs began to grow. Certainly the street appears in the 18th century, but the lack of development of the corner area between the old courthouse and the Westenra Arms Hotel seems to indicate an old thoroughfare. If this is shown to be the case, the structure would be of great importance in understanding the growth and development of Monaghan. Unfortunately the test excavations failed to produce any dating evidence for this structure. Two slab-lintelled drains (one collapsed) appeared to have a similar orientation to this earlier structure. The area around the collapsed drain produced some 17th-century pottery, although most came from secondary contexts. Trenches 4–6 may have uncovered evidence of the northern defensive ditch of the town, as displayed on Blaney's map of 1611–13. It appears that the eastern and southern sides of the town defences depicted on Blaney's map can be accurately traced on the 18th-century estate map, leading us to believe that the map is an accurate representation of the town. If the map is taken as accurate, it can be postulated that the northern ditch ran through the back yard of the Westenra Arms Hotel. Although further work is required to establish this firmly, it appears that evidence of a substantial ditch running across the site in an east–west direction was revealed in the test excavations. Organic marshy material over 3.5m deep was uncovered in Trenches 4 and 5, and Trench 6, despite being closer to the lake, contained natural subsoil quite close to the surface. The historical sources indicate that the town defences consisted of an external revetment of wood and earth and a large, wide wet moat (flooded presumably by the lake) with a substantial internal earthen rampart. The moat would over time become a marsh, as did a substantial part of the lake, and this is the material that has been uncovered in Trenches 4 and 5.

Licence No.	03E0027
Author	John O'Connor, CRDS Ltd, Unit 4, Dundrum Business Park, Dundrum, Dublin 14.
Townland/Location	The Diamond
Description (per www.excavations.ie)	Test excavation took place to the rear of the Westenra Arms Hotel, Monaghan town, in January 2003. It consisted of the excavation by mechanical digger of two trenches. Both trenches revealed a very substantial ditch, ranging between 14 and 20m in width and up to 3m in depth. It is believed to be the northern defensive ditch of the town, as displayed in Blaney's map of c. 1611/13. The ditch is saucer-shaped in profile and appears to have been lined with a white marl, presumably to allow it to retain water when it was flooded by the nearby lake. Historical sources would suggest the ditch was dug in c. 1602-4.

	In addition, a 19th-century stone-built well was discovered cut into the fill of the ditch. The well was crudely built and subcircular in plan and contained modern rubble fill up to 2m in depth. A number of finds were recovered from the well, including two sherds of 17th-century pottery and some clay-pipe fragments.

Licence No.	03E1672
Author	Margaret MacCarthy, Archaeological Services Unit, University College Cork
Townland/Location	Church Square
Description (per www.excavations.ie)	Testing was undertaken in Church Square, Monaghan, at a location chosen by the Town Council for the erection of a memorial to the victims of the Monaghan bombings. The excavated area measured 3.5m by 3.5m and ground disturbance reached a maximum depth of 1.15m. The trench was initially opened by machine, due to the presence of paving material and recent infill. Mechanical excavation ceased following the exposure of disarticulated human remains and all work was then undertaken by hand. The lower section of an in situ skeleton was exposed at a depth of 1.15m in the south-western corner of the trench. The skeleton was oriented east-west and the upper portion of the body extended under the excavation cutting limit. The exposed bones included the right and left tibia, right and left fibula and a number of ribs. Three human skulls and fragmented disarticulated limb bones were noted in the south-eastern corner of the trench adjacent to a stone-capped drain. The skulls were very fragmented and the overall impression from the state of the surviving bone is that the original burials were subjected to considerable damage at some stage in the past, probably when the drain was constructed. The stone-capped drain abutted the eastern baulk and it extended across the entire north-south length of the trench leading from the Courthouse to the street frontage. It was stratified beneath a rubble infill layer and occurred at a depth of 0.68m below the surface. Its construction resulted in the disturbance to earlier burials and at least three individuals are represented in the disarticulated remains that were scattered on the surface. Most of the deposits above the in situ burial had been disturbed previously and the individual layers contained a large amount of butchered animal bone and some 19th- and 20th-century ceramics. Historic and cartographic evidence indicates that the area of the proposed memorial site was landscaped until the mid-19th century. The nearby St Patrick's Church was constructed in 1836 on the site of an earlier church built in 1725. The neoclassical courthouse was constructed in 1829 on the site of an old gaol. An OS map of 1836 shows the new St Patrick's Church, with the Courthouse to the west. The human remains uncovered may relate to the old gaol or to burial plots associated with either of the two churches. Skeletal remains recovered during the construction of public facilities in Church Square in the 1940s were interpreted as Famine victims. The burial and disarticulated bone remained unexcavated and were covered with heavy-duty industrial fibre prior to the trench being backfilled. The proposed development strategy in terms of buried archaeological remains was one of in situ preservation and a structural design has been developed in order to avoid intrusion into the archaeological strata.

Licence No.	04E1566
Author	Carmel Duffy, Umberstown Great, Summerhill, Co. Meath
Townland/Location	Park Street

Description (per www.excavations.ie)	Monitoring of groundworks took place on 26 October 2004 on a 13m by 11m site on the west side of Park Street, Monaghan, towards the western edge of the early 17th-century town (Mullaghmonaghan townland). Natural subsoil, a light-brown sandy clay, was exposed close to street level over most of the site. Within 4m of the street frontage, subsoil was overlain by a depth of 0.1m, or less, of brown silty clay with charcoal flecks and occasional small brick fragments. A small pit, approximately rectangular in shape, 0.62m by 0.37m and up to 0.32m deep, was revealed 2.7m from the street front and 0.44m from the wall of the adjacent building on the northern side of the site. A small stone slab, 0.2m by 0.14m by 0.08m, was set vertically against the southern edge. An interesting group of finds was recovered from the dark-purplish-brown silt fill. Pottery finds comprised part of a mottled ware tankard, sherds from a plain white tin-glazed earthenware chamber-pot and two sherds of brown-glazed earthenware in a hard sandy fabric, possibly of local manufacture. Other finds were a glass phial, a white glass domed button with metal shank, an iron key and a small quantity of bird and mammal bone. The pottery suggests a date range of c. 1680-1750 for the feature, which is possibly the base of a cesspit truncated by later developments on the site. The only other feature noted was the stone foundation of the front wall of the late 18th/early 19th-century building that was recently demolished.

Licence No.	05E0219
Author	Dominic Delany, Dominic Delany & Associates, Unit 3, Howley Court, Oranmore, Co. Galway
Townland/Location	Church Square
Description (per www.excavations.ie)	Monitoring of excavations associated with the North East Broadband project in Monaghan town was carried out from January to July 2005. The excavation phase of the project involved the opening of a series of trenches throughout the town centre and its surrounding infrastructure. All of the trenches were located along roads, either in the carriageway proper or the adjoining verge or footpath. The trenches were 0.6m wide and excavated to a standard depth of 0.9m in carriageways and 0.6m in verges/footpaths. Junction boxes (1.25m2) were excavated where two or more trenches intersected, and at regular intervals along long straight sections. The standard method of opening the trenches was to cut the asphalt road surface with a circular saw and remove the soil using small tracked excavators. All trenches excavated within the zone of potential around the historic town and within the area of constraint around three monuments (SMR 9:38, 9:44 and 9:61) were subject to full-time monitoring. All works outside these areas were subject to intermittent monitoring. Pre-development testing was carried out at Church Square in the vicinity of St Patrick's Church and the site of the medieval Franciscan friary. Burials associated with the friary have been uncovered in this area on three separate occasions, the first being prior to 1815, the second during improvement works in the square in 1940, and more recently by Margaret McCarthy, in 2003 (Excavations 2003, No. 1492, 03E1672). No archaeological material was uncovered during testing, but some disarticulated human bone was found at Church Square during subsequent monitoring of excavations. The bone was contained within a redeposit of black silty clay, which directly underlay the road construction layers. The minimum number of individuals for this small assemblage was three. Furthermore, a human skull was uncovered on the interface between the subsoil and the overlying redeposit at a depth of c. 1m. It was located c. 10m west of the double-gated entrance to St Patrick's Church. The skull was facing east and had collapsed inwards, with the facial bones becoming lodged in the cranial cavity. The mandible was not present and no other bones from this skeleton were evident. No grave cut was discernible, but the possibility that the skull represented articulated remains was not

	precluded. Following consultations with the relevant authorities, it was decided that the remains should be preserved in situ and an appropriate mitigation strategy was agreed.

Licence No.	21E0230
Author	Camilla Brannstrom, John Cronin and Associates, Burnside, Saint Oran's Road, Buncrana, Co. Donegal
Townland/Location	Roosky, Tirkeenan
Description (per www.excavations.ie)	A programme of archaeological monitoring of geotechnical investigation (GI) pits and testing (one archaeological test trench) was implemented within the boundaries of the proposed South Dublin Street Monaghan regeneration scheme in June and July 2021. The development area is located within the Monaghan Zone of Archaeological Potential. The excavation of a total of thirteen GI slit trenches were archaeologically monitored and one 20 m long archaeological test trench machine excavated and examined. One possible 18th century cobbled surface was uncovered within ST006 and one sherd of North Devon slipware (Sgraffito ware) was retrieved from a disturbed deposit within TP003.

Appendix

15e

Placenames Review

Appendix 15E: Placenames Review

Translation of townland names within the study area (Source: www.loganim.ie)

Name	Irish	Translation	Indicative Potential
Mullaghmonaghan	Mullach Mhuineacháin	Mullach 'hilltop' Mhuineacháin 'place abounding in thickets'	None
Roosky	Rúscaigh	Rúscaigh 'marsh'	None
Tirkeenan	Tír Chianáin	Tír 'land, territory'	Possible reference to settlement