

BGS Surface Geophysical Survey Tender 2019

<i>Invitation to Tender</i>	Provision of surface geophysical services to support project monitoring and research activities.
<i>Version</i>	V5

SPECIFICATION

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Invitation to Tender and Terms of Reference

For:

Provision of surface geophysical services to support project monitoring and research activities.

SPECIFICATION

1. Background

This document is an invitation to quote for the provision of surface geophysical services to support project monitoring and research activities at selected locations across the border areas of the island of Ireland. This work is part of the Catchment Care project. The CatchmentCARE project is being funded through the European Union's INTERREG VA Programme, which is managed by the Special EU Programme's Body. Match-funding has been provided by the Department of Agriculture, Environment and Rural Affairs Northern Ireland and the Department of Housing, Planning and Local Government in Ireland making a grand total of €13.8 million.

The aim of CatchmentCARE is to establish 3 water quality improvement projects in the Finn, Blackwater and Arney Catchments and install 51 groundwater monitoring points across the region. This will be achieved through 3 policy actions, 6 catchment actions and 3 community actions which were selected based on three critical criteria; measurable impact on water quality; transferable beyond the three catchments; and contribute to a project legacy. The actions selected will address water quality issues related to hydromorphology, point and diffuse sources of pollution, farm nutrient management practices, characterisation and monitoring of groundwater quality, lag times in response to the implementation of measures and an economic analysis of the cost of achieving the objectives of the Water Framework Directive in the three catchments.

The British Geological Survey (BGS) is a partner on the project responsible for the delivery of the groundwater monitoring stations work package. Our aim is to install high quality groundwater monitoring stations within the eligible area that will enable groundwater resources to be properly monitored for future preservation and management. The siting of monitoring stations is therefore vital to the success of this work package, therefore characterising the subsurface prior to installation is important to inform precise locations for monitoring stations.

2. Context for Tender

2.1 Milestones for the Procurement

British Geological Survey (BGS) will endeavour to conduct the competition in accordance with the timelines set out below. BGS reserves the right to alter the timelines set out below at its sole discretion. BGS reserve the right to alter the timelines due to unforeseen circumstances such as adverse weather conditions

3. Detailed Scope of Requirements

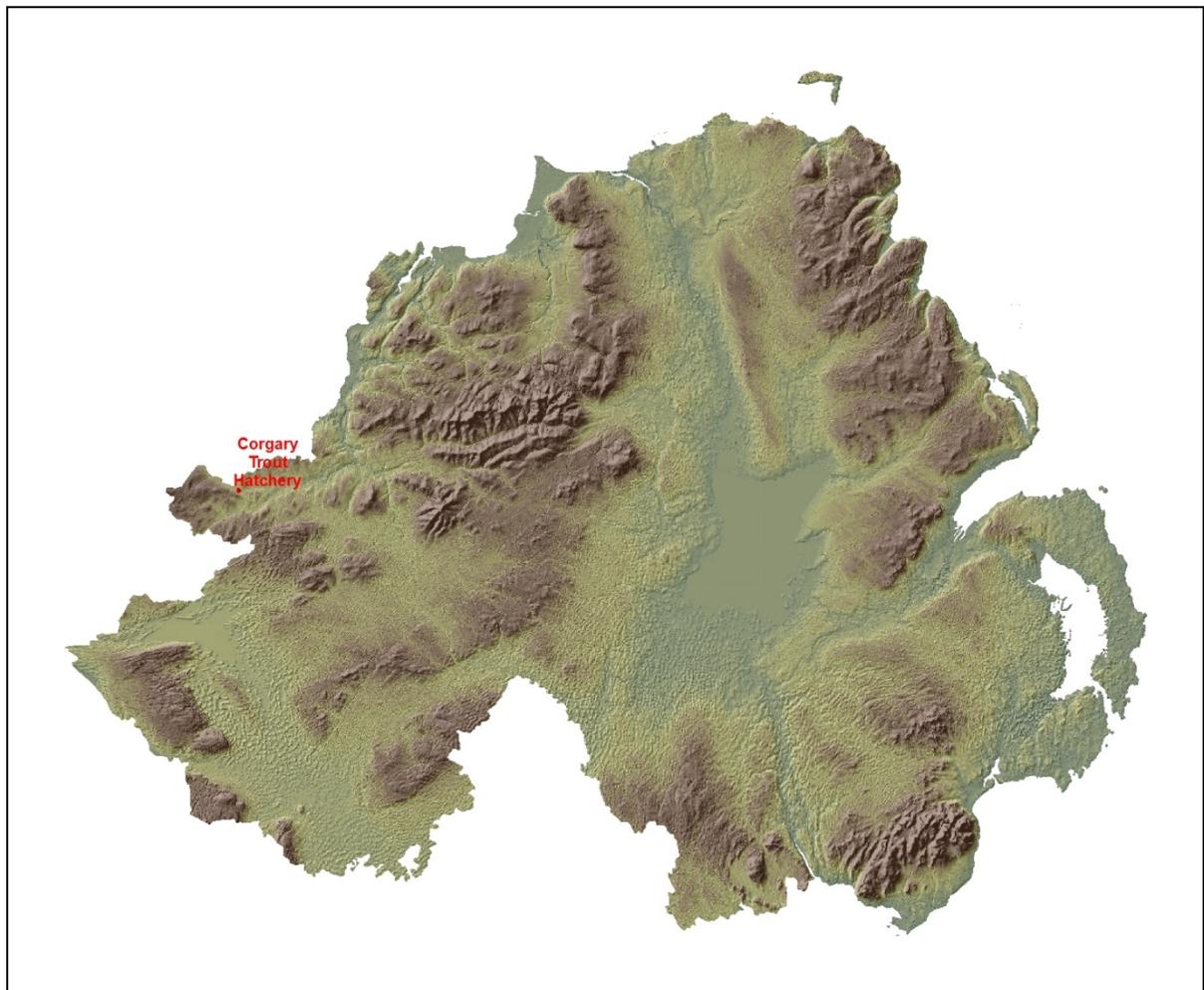
3.1 Specification of Requirements for Initial Contract

The Catchment Care project will install 51 groundwater monitoring points. The installation will take place over the autumn of 2019, and summer of 2020. It is anticipated that around 20 groundwater monitoring points will be completed in 2019 and the remainder in 2020.

To support this the provision of surface geophysical services in 2 catchments to support project monitoring and research activities is required.

3.2 Sites

Location 1: Corgary Trout Hatchery, Corgary Road, Castleberg, County Tyrone, Northern



Ireland. See Figure 1 & 2.

Figure 1 - Northern Ireland with Corgary Trout Hatchery in red

Site Description: The land is owned by Corgary Trout Hatchery. The main function of the site is as a trout hatchery. 13 ponds are fed by a channel that diverts water from the Mournebeg River. This water is then returned to the river almost 500 m downstream. There is a residential property with the boundary of the site. No surveying should take place over the area of this property.

Topography: The site is on the floodplain of the Mournebeg river. This means the land is fairly flat but can be boggy in parts.

Geology: The only published geology maps for this area are the 1:250,000 scale superficial and bedrock geology maps. The area has been field mapped by the Geological Survey of Northern Ireland but a 1:10,000 scale map has not yet been published. The superficial geology (as shown in Figure 3) is likely to be a sequence of alluvium and glacial till of unknown thickness but is expected not to be too thick (<20 to 30m). The bedrock geology is part of the Dalradian supergroup. This includes Psammites, Semi-pelites, quartzites and schists. The 1:250k map shows an igneous dyke beneath the site along with Lough Mourne Grit Formation (Psammite).

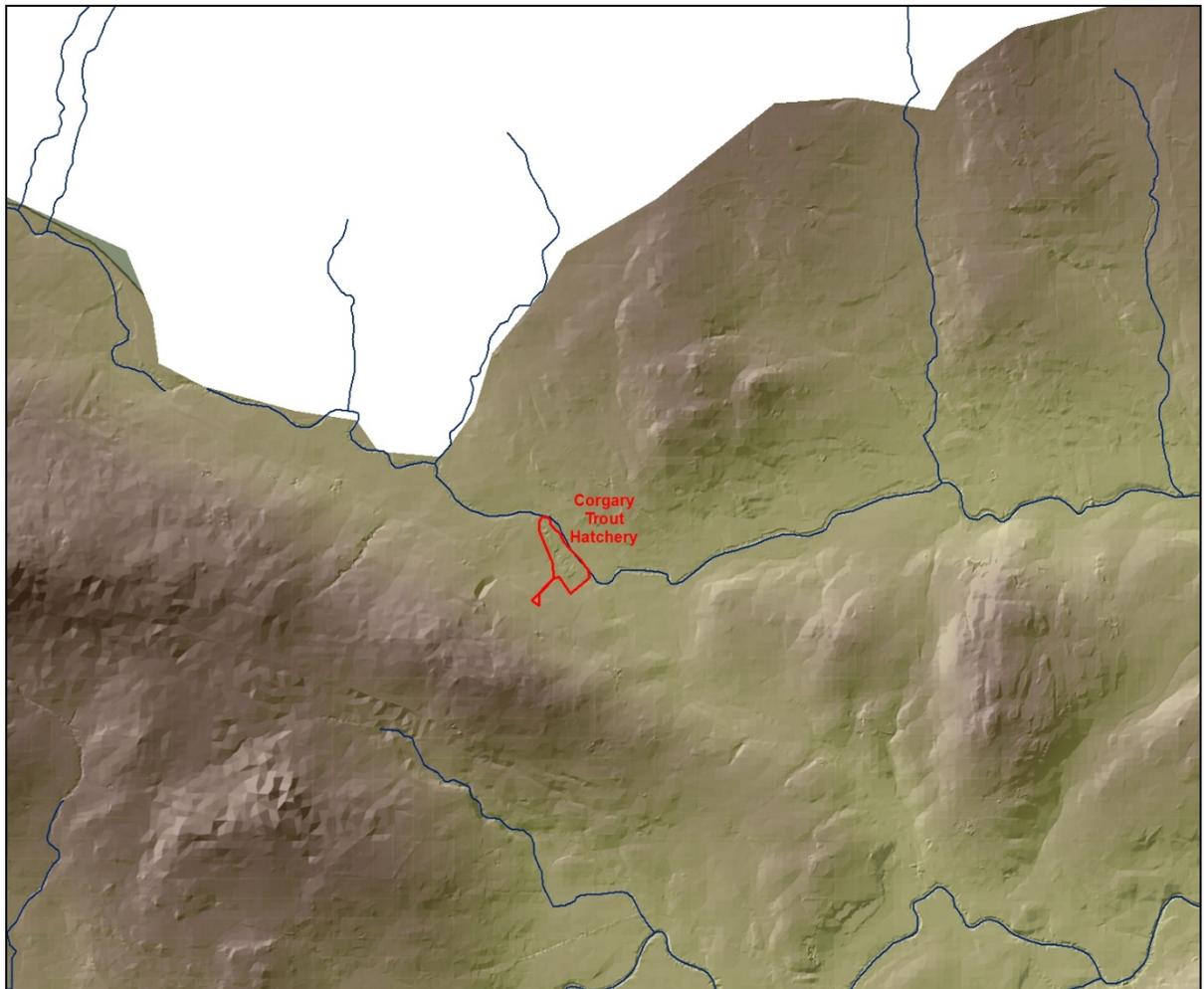


Figure 2 – The topography around the Corgary area

Land use: The land is mostly used for the trout hatchery but some of the surrounding fields are used for cattle and sheep grazing from time to time. There are parts of the site that are covered in dense woodland particularly to the north east close to the abstraction inlet for the hatchery.

Since the hatchery will be operational, all procedures must be followed in line with the requirements of the hatchery owners to avoid bringing harmful material on to the site. Care will be required to work along with the hatchery owners to ensure no disturbance to the operation, for safety of operators and to prevent damage or harm to the hatchery operations.

Aims of the geophysical survey:

- Primary aim - Assist with the siting of a groundwater monitoring station by identifying good targets for drilling a productive groundwater borehole within the bedrock – fracture networks, bedrock geology structure such as faults and dykes
- Secondary aim - Estimate the superficial geology thickness

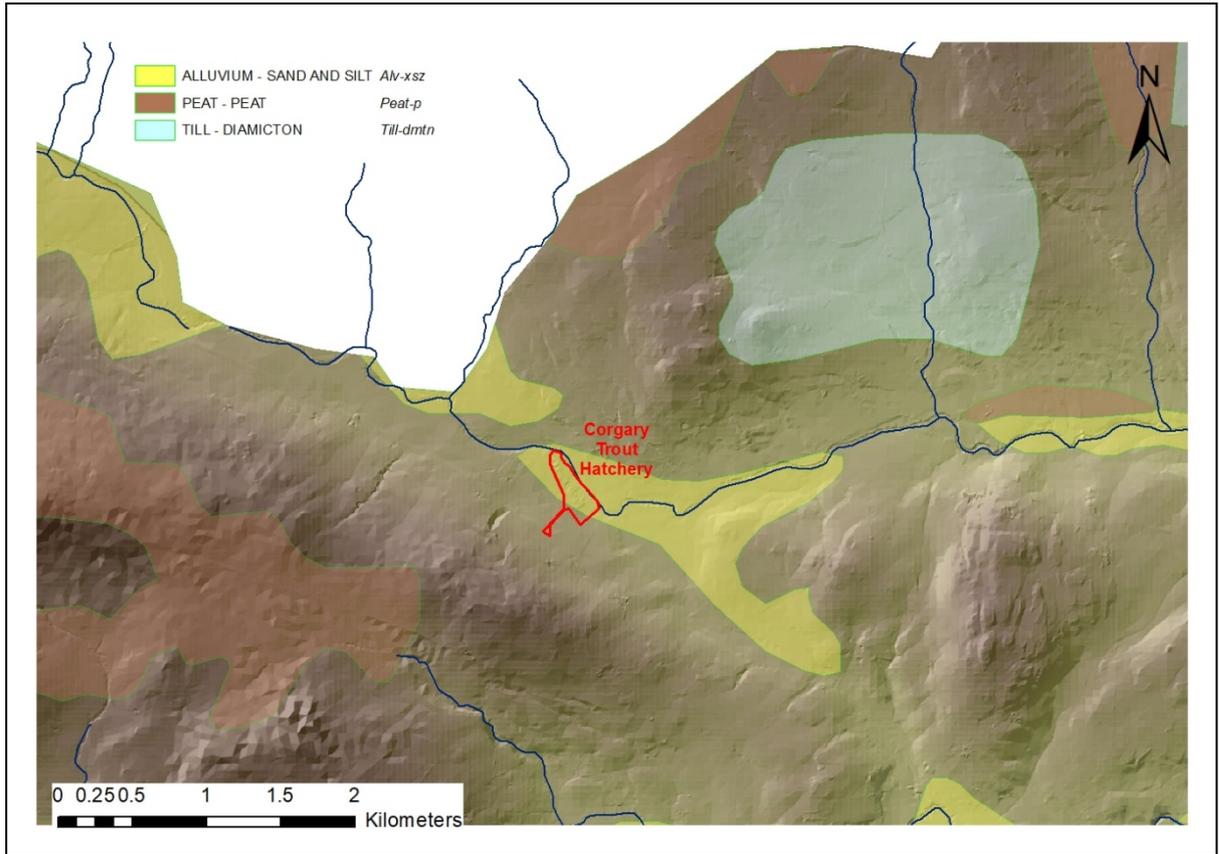


Figure 3 – 1:250,000 superficial geology map

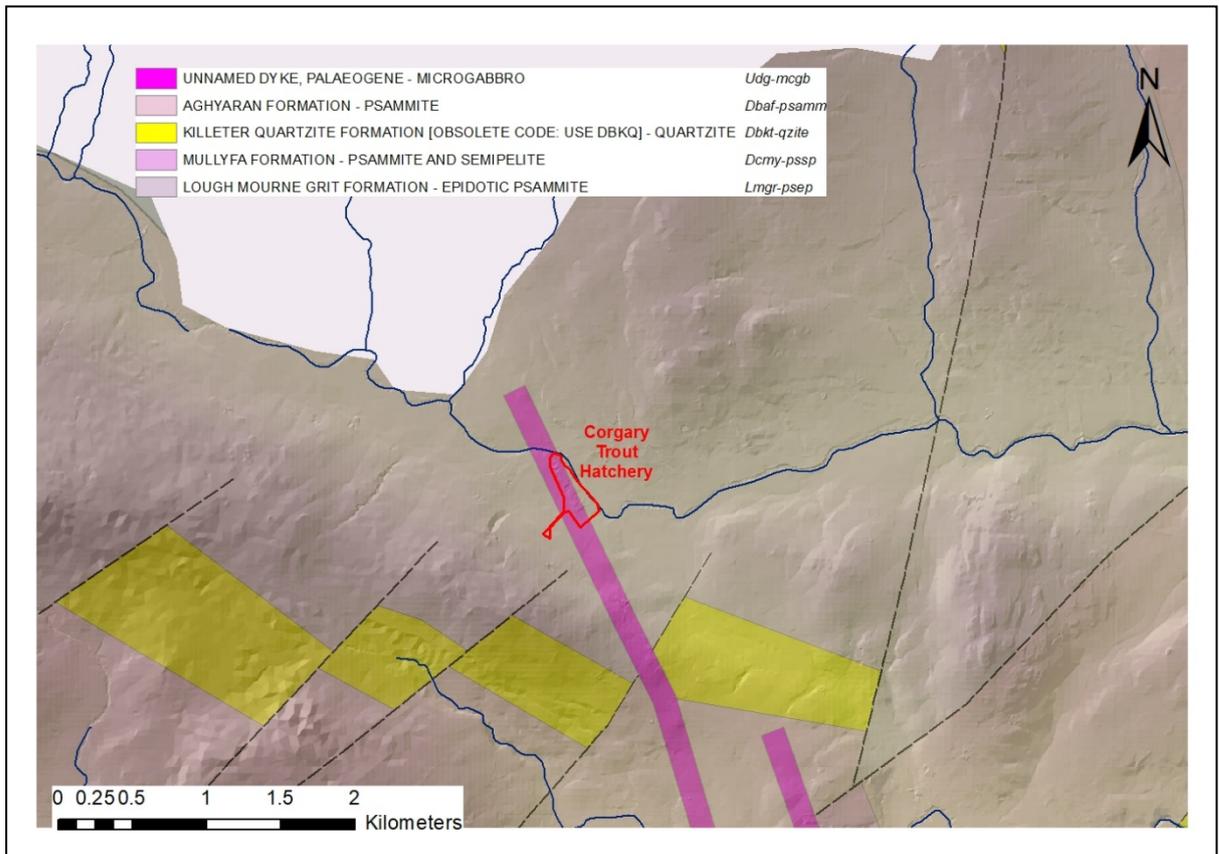


Figure 4 - 1:250,000 bedrock geology map



Figure 5 - Aerial photograph of the available site

Obstructions and restrictions: There are some hedges, sheds associated with the hatchery, fences and woodland. The entire survey is to remain within the extent of the site. The location of services are unknown.

Reporting and Deliverables:

An interpretive electronic report, satisfactory to BGS, will be due two weeks after the survey has been completed at the site, is required of all the geophysical investigations. This should include the following:

- Methodologies used
- Survey results
- Interpretation of the results to address the aims of the survey
- Appropriate figures to graphically represent the results
- Tables of the spatial location of the survey points and lines

As well as this, all of the raw data collected should be supplied in an electronic format.

All coordinates should be in ITM (Irish Transverse Mercator) and elevation (m AOD) must be recorded at each electrode and geophone location.

All final maps and sections must be compatible with ARCGIS / CAD.

The project hydrogeologist will review the deliverables and determine if all of the requirements have been met before signing off the contract.

Requirements for Location 1:

1. Mobilisation - Transport of all equipment, tools, staff and materials from depot to survey sites, complete, and return to depot (including set-up to perform geophysical survey and dismantle at survey site).
2. Land access - Liaising with landowners to agree site access. All contact with landowners is to be done by the successful tenderer. The successful tenderer will be required to identify landowners on site and approach them in person to obtain access permission. Documenting/locating any infrastructure, buried features, sources of cultural noise that may affect the geophysical survey. Organising and scheduling: absence of livestock; powering down of electric fences; safety limits/boundaries for members of public during data acquisition. Surveying across roads and railway lines is not required.
3. EM or VLF Survey - Perform a reconnaissance walkover survey of the available site using either EM or VLF techniques to identify possible target profiles for an ERT survey. 5 profiles of up to 500 m length along a SE-NW direction at 20m spacing. Up to 2,5km. It is for the successful tenderer to ascertain the most suitable survey to use. Only one may be chosen per profile
4. Electrical Resistivity Tomography (ERT) survey - Perform ERT profiles using Wenner or Wenner-Schlumberger array with electrode spacing of 3-5m, 20 measurement levels, start and end-point co-ordinates. To a target depth of at least 50 m. Transect location and length are to be decided following the reconnaissance survey along with the project hydrogeologist. To include approximate interpretation of acquired data on site. To include acquisition, processing, drafting and final interpretation. Res2DInv profiles, interpretive sections, report and raw data files required.
5. Seismic refraction profiles - Perform 5 seismic refraction profiles using 24 channel 3m geophone spacing at approximately 100m intervals along the same transect to be agreed for the ERT survey above. To include start and end-point co-ordinates, acquisition, processing, drafting, approximate interpretation of acquired data on site and final interpretation. Seismic profiles, interpretive sections, report and raw data files required.

Location 2: Derg Inlet Works, Castlederg, County Tyrone, Northern Ireland. See

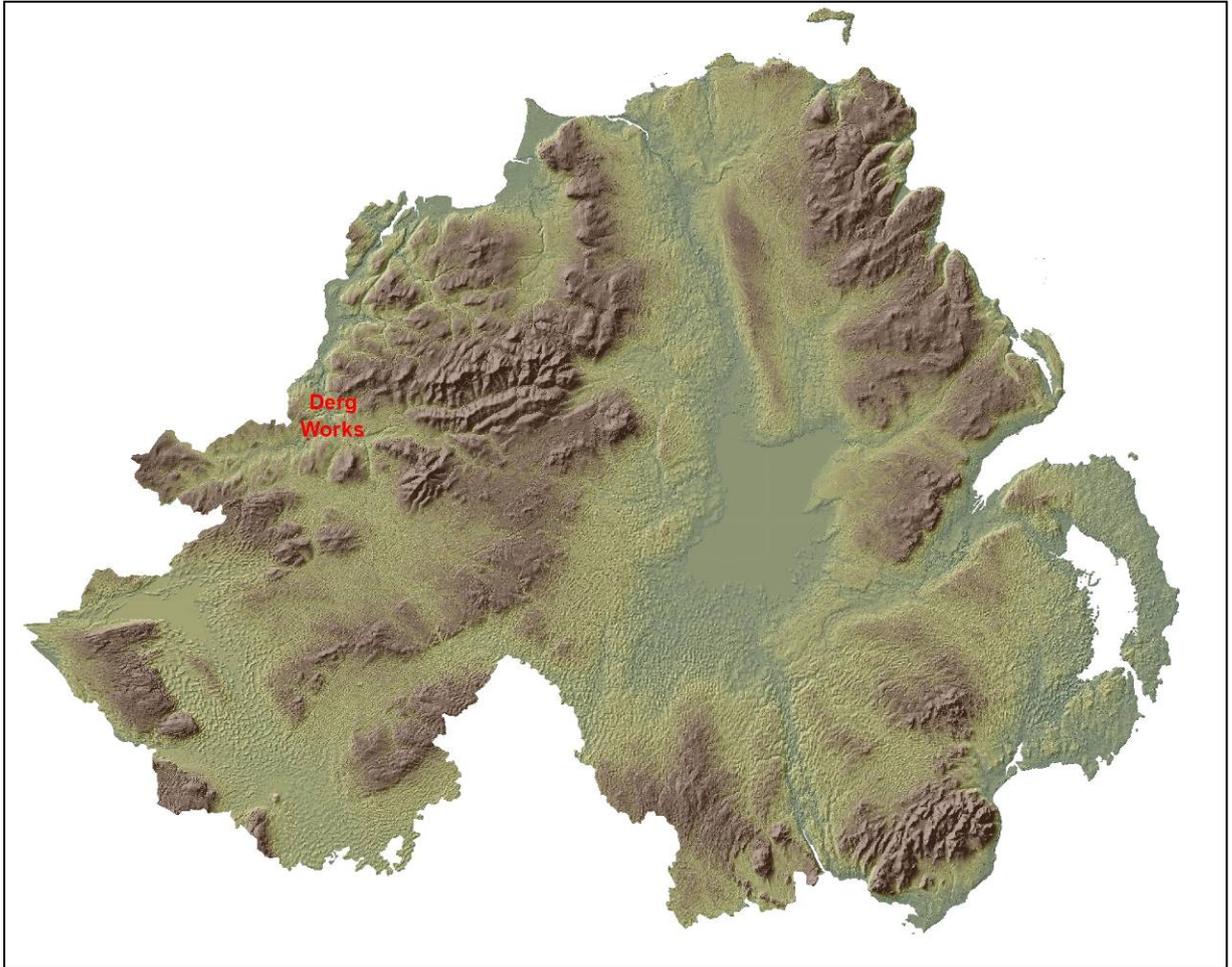


Figure 1 & 2.

Figure 6 - Northern Ireland with the Derg Works in red

Site Description: The land at the inlet works is owned by Northern Ireland Water with other landowners owning the agricultural land nearby. The inlet works are beside the River Derg from which NIW abstract water for public supply.

Topography: The area is hummocky due to the glaciofluvial ice contact deposits. The Derg valley is a wide v shaped valley.

Geology: The area has been mapped to a scale of 1:10,000. The bedrock geology is part of the Dalradian supergroup. This includes Psamites, Semi-pelites, quartzites and schists. The superficial geology is a sequence of river alluvium on top of glaciofluvial ice contact sand and gravel deposits on top of till. Moving away from the river sand and gravels thin to till at the surface.

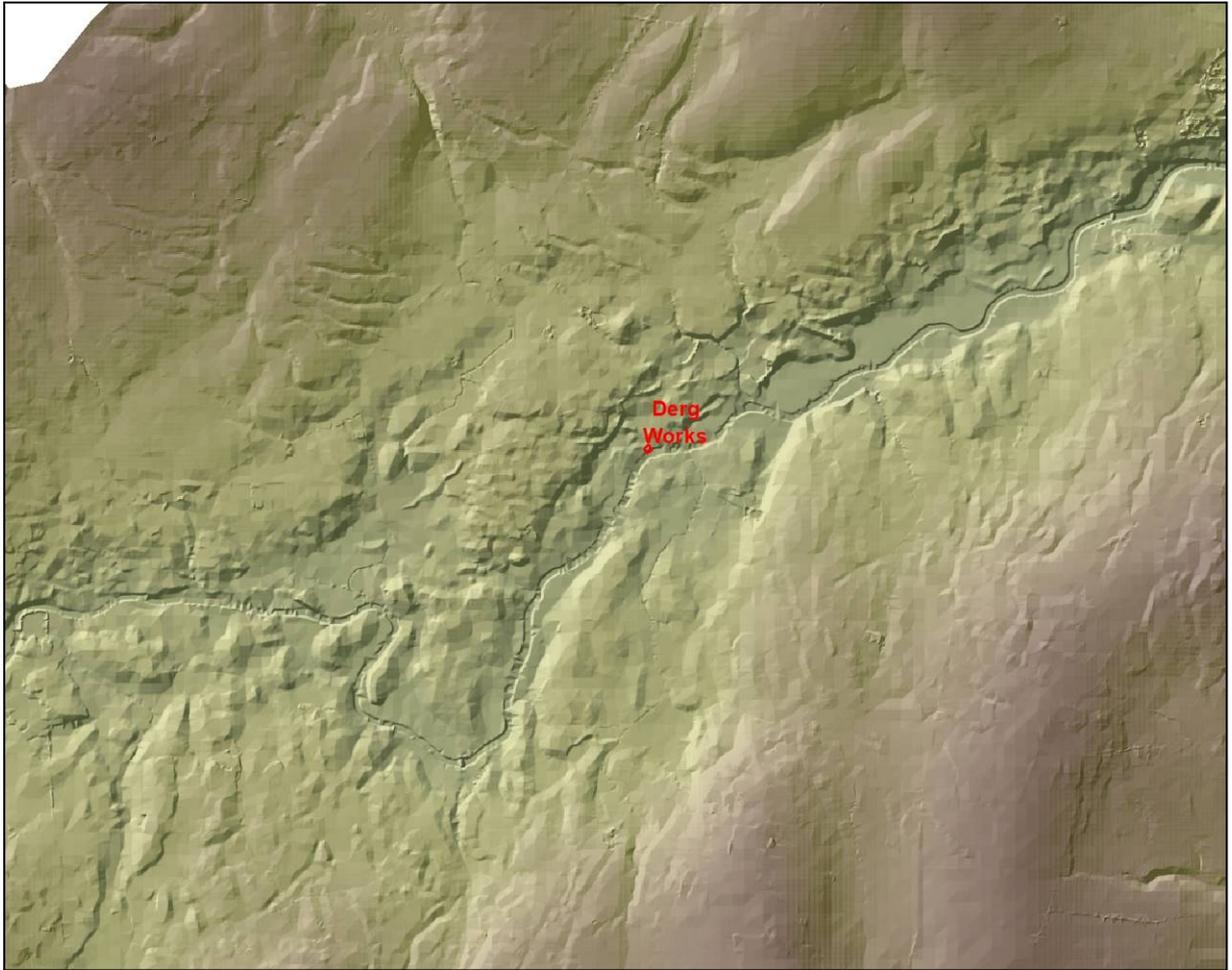


Figure 7 – Topography of the lower Derg Valley

Land use: The primary land use is agricultural, primarily for grazing.

Aims of the geophysical survey:

An observation borehole will be installed at the inlet works to primarily study the shallow sand and gravel aquifer. Very little is known of it including how thick it is and what level the water table is within it, therefore the scale of the aquifer is unknown. Understanding the lateral extent of the sand and gravels will be useful in quantifying the aquifer and therefore modelling groundwater flow and contaminant transport.

- Primary aim – Determine the thickness of the sands and gravels away from the River Derg
- Secondary aim – Estimate the depth to the water table within the sands and gravels
- Tertiary aim – Identify and characterise any significant bedrock structure and lithological changes

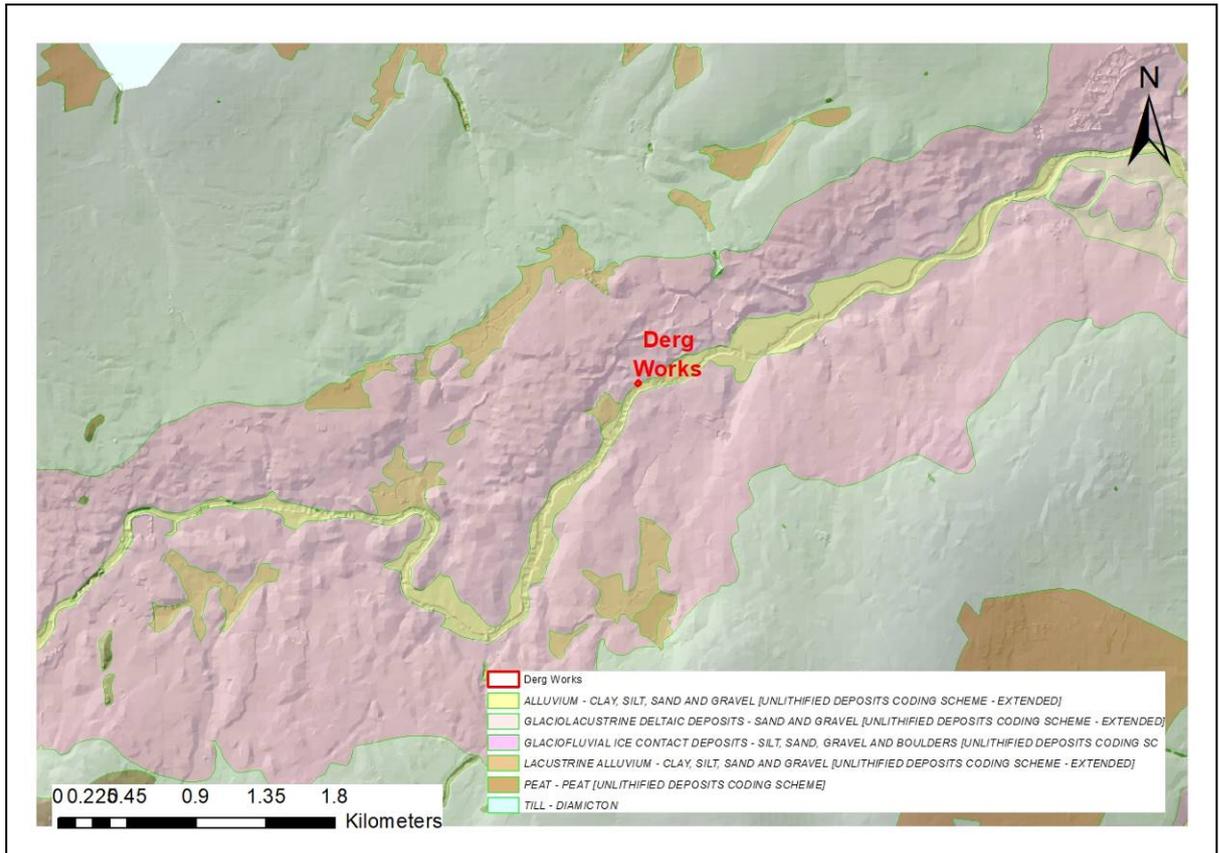


Figure 8 – 1:10,000 superficial geology map (top picture)

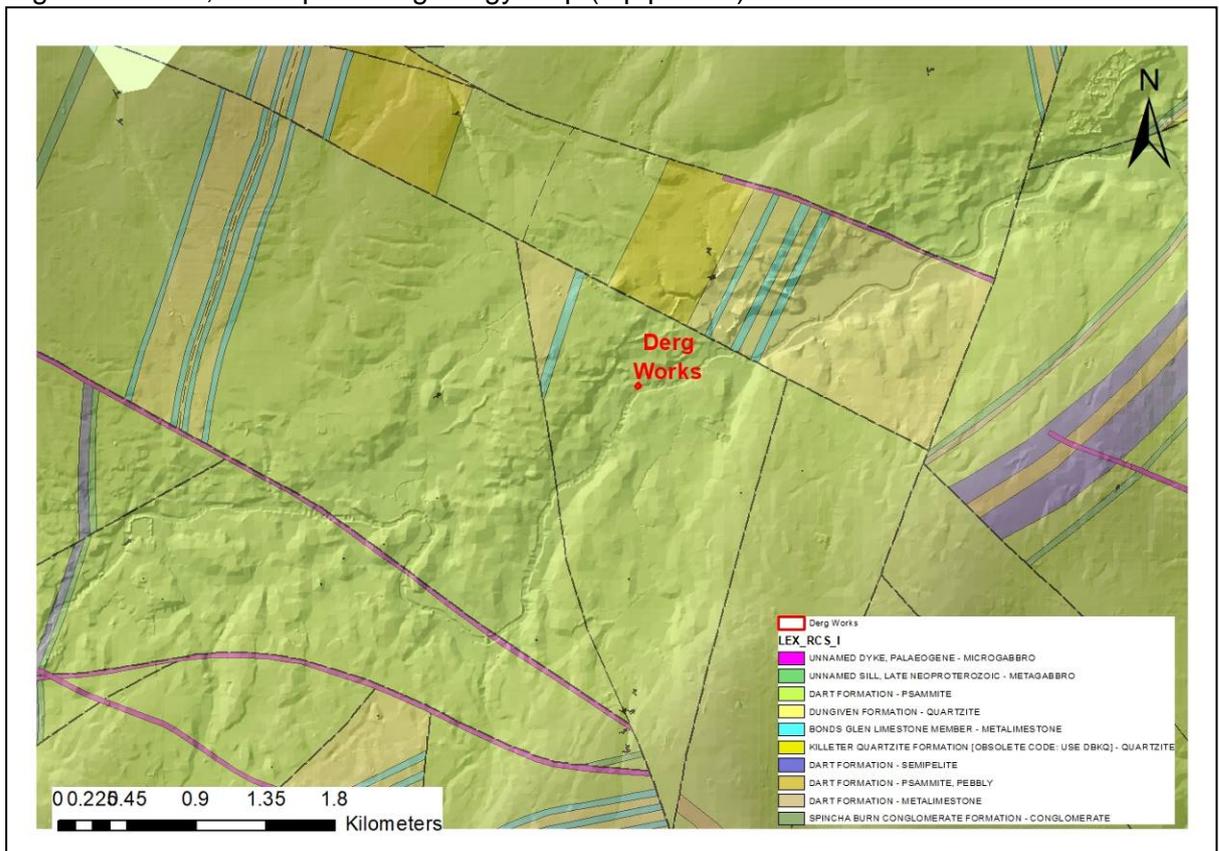


Figure 9 - 1:10,000 bedrock geology map (bottom picture)

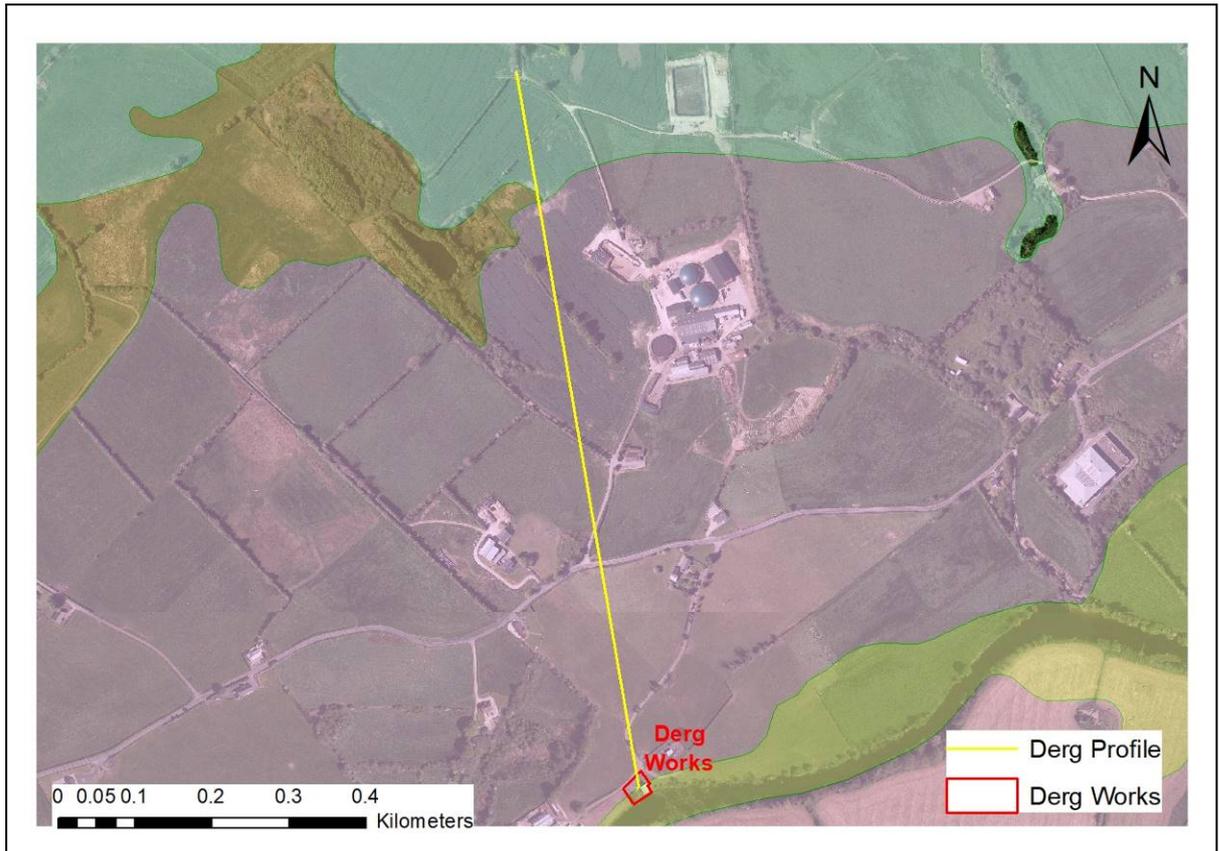


Figure 10 - Survey profile with underlying superficial geology

Obstructions and restrictions: There are some hedges, roads and lanes along the main survey profile proposed, as shown in Figure 10. There may be other services that should be considered.

The co-ordinates of the ends of the profile are IGR 232465, 386170 to 232301, 387107.

Reporting and Deliverables:

An interpretive electronic report, satisfactory to BGS, will be due, two weeks after the survey has been completed at the site, is required of all the geophysical investigations. This should include the following:

- Methodologies used
- Survey results
- Interpretation of the results to address the aims of the survey
- Appropriate figures to graphically represent the results
- Tables of the spatial location of the survey points and lines

As well as this, all of the raw data collected should be supplied in an electronic format.

All coordinates should be in ITM (Irish Transverse Mercator) and elevation (m AOD) must be recorded at each electrode and geophone location.

All final maps and sections must be compatible with ARCGIS / CAD.

The project hydrogeologist will review the deliverables and determine if all of the requirements have been met before signing off the contract.

Requirements for Location 2:

1. Mobilisation - Transport of all equipment, tools, staff and materials from depot to survey sites, complete, and return to depot (including set-up to perform geophysical survey and dismantle at survey site).
2. Land access - Liaising with landowners to agree site access. All contact with landowners is to be done by the successful tenderer. The successful tenderer will be required to identify landowners on site and approach them in person to obtain access permission. Documenting/locating any infrastructure, buried features, sources of cultural noise that may affect the geophysical survey. Organising and scheduling: absence of livestock; powering down of electric fences; safety limits/boundaries for members of public during data acquisition. Surveying across roads and railway lines is not required.
3. EM or VLF Survey - Perform a reconnaissance walkover survey along 5 transects approximately 250m apart, away from the River Derg, up valley, 1 km in length. EM techniques to understand the depth and extent of glaciofluvial sands and gravels. It is for the successful tenderer to ascertain the most suitable survey to use. Only one may be chosen per profile
4. Electrical Resistivity Tomography (ERT) survey - Perform ERT profiles using Wenner or Wenner-Schlumberger array with electrode spacing of 5m, 20 measurement levels, start and end-point co-ordinates. To a target depth of at least 30 m. Transect location and length are to be decided following the reconnaissance survey along with the project hydrogeologist. To include approximate interpretation of acquired data on site. To include acquisition, processing, drafting and final interpretation. Res2DInv profiles, interpretive sections, report and raw data files required.
5. Seismic refraction profiles - Perform 5 seismic refraction profiles using 24 channel 3m geophone spacing at approximately 200m intervals along the same transect to be agreed for the ERT survey above. To include start and end-point co-ordinates, acquisition, processing, drafting, approximate interpretation of acquired data on site and final interpretation. Seismic profiles, interpretive sections, report and raw data files required.

3.3 Monitoring of Contract – Project Management

A contact point will be appointed at the start of the contract to monitor progress, guide the different phases of the work and to comment on the quality of the work and timeliness of the deliverables.

Weekly meetings on site will be organised between the BGS and the successful tenderer to report progress and discuss difficulties, with the first meeting being held prior to field work commencing. The successful tender organisation will be required to liaise with the contact point on a regular basis. Additionally, the BGS should be notified of any difficulties that cannot be resolved by the successful tenderer, e.g. if site access becomes a problem.

The successful tender should keep a record of any difficulties meeting the requirements of the contract, e.g. site access and other difficulties. This data will be collated, along with a general summary of the work and any difficulties encountered should be reported to the BGS in a **single concise report at the completion of each survey**. There is also the requirement that a major issue such as being unable to access the site will be communicated immediately to BGS.

3.4 Account Management

BGS requires tenderers to nominate a dedicated account manager who will act as the main point of contact for the duration of the contract. This person shall have the authority to deal with all matters in relation to the contract and be responsible for the satisfactory delivery of the services required. The duties of the account manager will include the following:

- Overall responsibility for a good working relationship with the BGS;
- Meet weekly and when required to review the relationship and examine performance;
- Deal with disputes, complaints or concerns that cannot be adequately resolved;
- Weekly give and receive both formal and informal feedback on the relationship, workloads, processes, areas.
- Proactively discuss with the BGS ways of improving efficiency regarding service delivery in general

3.5 Personnel

Tenderers should identify personnel that have been selected for the project team, briefly indicating their relevant expertise and their project role and responsibilities. While a certain degree of flexibility in the project team may be acceptable with agreement from BGS, the project team should accurately reflect the personnel that will carry out the work if the tenderer is successful and major deviation from the proposed project team may not be acceptable. Changes to key personnel during the life of the contract be notified to BGS as soon as known and request confirmation how they will be able to continue to provide the service.

3.6 Deliverables

The key project deliverable is the provision of reports incorporating analysis of the data collected that are representative of the sites, supplied within two weeks after the survey has been completed. As well as this, all of the raw data collected should be supplied in an electronic format. All coordinates should be in ITM (Irish Transverse Mercator) and elevation (m AOD) must be recorded at each electrode and geophone location. All final maps and sections must be compatible with ARCGIS / CAD. The project hydrogeologist will review the deliverables and determine if all of the requirements have been met before signing off the contract. As indicated in 3.2 under 'Reporting and Deliverables' regular updates and a general summary report of the work undertaken and any issues arising should be provided to the BGS.

3.7 Health and Safety

All personnel MUST be aware of the requirements of the Safety, Health & Welfare at Work Act 2005 and also local safety issues whilst engaging in this project. It is expected that all necessary precautions will be undertaken to prevent injury to Company personnel and members of the public. Where applicable, safety and welfare considerations MUST be made in relation to livestock. This does not exempt from statutory requirements whether explicit or implied.

3.8 Contract Duration

The contract will be for a maximum period of 6 weeks from mobilisation of Contract.

Mobilisation will occur from 0 – 4 weeks maximum from Award of contract (Please see document PR19064 Groundwater Surface Geophysics ITQ Invitation to Quote Questions - question AW6.5

3.9 Completion of Work

The contract will be for a maximum period of 6 weeks from mobilisation of Contract.

Project payment will be at the completion of the project.